THE VALUE OF CUSTOMER CO-PRODUCTION IN DEVELOPING NEW

PRODUCTS

by

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ABSTRACT

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The concept of customer co-production has been mentioned in the marketing literature on several occasions. The lack of a clear definition and the poor operationalization in previous literature stimulated the interest to investigate it as a growing marketing concept. This dissertation investigated the perceived value of co-production in developing new products and found that it has an influence on customers' symbolic and functional reasons for purchase. In addition, the moderating effects of business communications and customers being classified classification as early adopters of innovation were found to be significant.

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CHAPTER I

INTRODUCTION

Statement of the Problem

The concept of co-production has been discussed in the marketing literature

because of its perceived importance as a new tool for increasing customer satisfaction

and products' success in the market. The problem stems from the wide variety of

definitions that were provided for this growing concept without providing several links

between co-production and other essential marketing concepts. In this research, there

will be an attempt to provide an inclusive explanation of the construct of customer co-

production including its underlying dimensions.

To understand the concept of co-production, we can look at Solomon's (2004)

analogy for explaining customer co-production. He sees the service performance as a

theater that has front stage (service delivery) and back stage (service production) on

which audience (customers) and actors (the firm) share the performance. He thinks that

creating a thrilling experience for customers is one of the main keys of success

nowadays.

Adopting the co-production concept can be considered as a shift in the firms'

perspective of customers. Customers are no longer considered as receivers of the

values, products, and/or services provided by these firms. Rather; customers are active

partners in the production process (Bettencourt 1997; Wind and Rangaswamy 2000; Pralahad and Ramaswamy 2000, Bendapudi and Leone 2003). The values that customers want to receive have to be determined by them and, therefore, understanding and applying the process of customers' co-production is an essential step to cope with the new era of product innovations.

Based on that, a critical step in converting customers into co-producers is to explore customers' talents and skills and whether these skills match the needs of the firm (Bendapudi and Leone 2003). At the same time, it is important to understand the targeted customers and how to give them the values that they are looking for before getting them to co-create the new products.

To be able to increase the values that customers seek, there is a need to investigate the reasons that encourage these customers to purchase the products that they co-produced. In addition, it is important to investigate the types of communications that customers want to have with firms in order to facilitate the success of co-production. Adoption stage is another aspect that could provide a deeper look at the type of customers who are willing to participate in the co-production process. The stage of innovation's adoption is one of these characteristics that could help in understanding customers' attitude toward co-producing products.

<u>Purpose of the Study</u>

This research is going to provide an investigation of the effect of the process of customer co-production on customers' reasons for purchasing products. Understanding these reasons is basically the clue for exploring how customers value co-producing new

products. Also, this dissertation attempts to investigate other factors that could facilitate the process of co-production.

Since the concept of value is another well-researched construct, a detailed explanation of the types of value included in this study is provided in order to explore customers' reasons for purchase. As it is noticed, the concept of value has been examined in the marketing literature at several occasions (Dodds et al. 1991; Zeithaml 1988; Rockefeller 1986; and Kantamneni and Coulson 1996). Many researchers looked at it from different angles. Some researches decided to focus on the factors influencing customer's perception of value (Kantamneni and Coulson 1996). Other researchers relied on quality as an indicator of value considering the price of products and, at some occasions, brand names (Dodds and Monroe 1984; Kantamneni and Coulson 1996; and Dodds et al 1991).

In this dissertation, the reliance will be on the functionality and symbolism of products as indicators of the value they provide to customers (Bhat and Reddy 1998). Basically, this research focuses on the reasons that customers have for purchasing new products. Theses reasons investigated are either symbolic or functional ones.

The functionality of the product follows the rational school of thought and it is concerned with the utilitarian and materialistic benefits that the product provides (Schiffman and Kanuk, 1994; Bhat and Reddy 1998; Allen and Ng 1999; Mowle and Merrilees 2005). Also, the products' functions are expected to affect customers' attitudes towards these products as discussed in the next chapter (Shavitt et al 1992). On the other hand, the symbolic values of products can be classified into two groups:

the self-symbolic value and the social-symbolic value (Fiske 1989 and Elliott 1997).

Basically, products of symbolic values (self and/or social) are expected to satisfy customers' needs for conformity with the culture and society (extrinsic values) as well as satisfying other intrinsic feelings such as uniqueness (Mason 1984; Dittmar 1992; Elliott 1997; Amaldoss and Jain 2005). Understanding the functionality and symbolic meanings of products is important for translating them into the reasons that drive customers to purchase these products as discussed in the following chapters.

After investigating the main effect of customer co-production on the functional and symbolic reasons for purchase, it is essential to explore some of the moderating effects of other variables such as the classification of customers in terms of the stage of adopting innovations, especially that the focus is going to be on co-producing new products. Of course, the concepts of diffusion and innovation adoption were mentioned in different fields of research including anthropology, marketing, sociology and education. The diffusion occurs when the early adopters use the products and pass this acceptance to other people (Zaltman and Stiff 1989; Wu and Wu 2005). Roger's (1962) classification of adopters is going to be used in the first study in this dissertation. He classified adopters as: innovators, early adopters, early majority, late majority, and laggards. Based on this classification, an investigation of its effect on adopting the concept of co-production is to be included in the study.

Developing new products that are competitive and have the potential to grow is one of the challenges facing many companies nowadays (Kristensson et al 2004). Based on that, we noticed that in the previous literature, researchers were proposing

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different ways to get customers involved in developing new products (von Hippel 2001; Thomke and von Hippel, 2001; Kristensson et al 2004). The whole process of getting customers involved is to convince them to participate with their creative ideas in order to design and/or develop new products (Kristensson et al 2004). One could argue that the continuous communications between firms and their customers is going to facilitate the phases of developing new products, especially if these customers are co-producing the products. Therefore, this study focuses on three types of business communications (risk related, product related, and business systems related) as another moderator for the relationship between the co-production process and customers' reasons for purchase.

CHAPTER II

LITERATURE REVIEW

Overview

This chapter reviews the literature from several areas such as 1) the concept of co-production and its stages, 2) customers perceived values of purchase, 3) customers' stage of adopting new innovation, and 4) business communications as the main concepts of the study.

The Concept of Customer Co-production

The traditional approach of exploring different consumers' needs is becoming a costly process and it required managerial change in perspective toward developing new products (von Hippel 2001; von Hippel and Katz 2002). Based on this point of view, this research is trying to investigate the alternative that companies can adopt in order to efficiently develop new products.

Nowadays customers have shifted their role from the receiver of services and products into part time employees (von Hippel 2001; Honebein and Cammarano 2006). Honebein and Cammarano (2006) described five different roles of customers in the market place. First, the transactionals who like to shop online and who are willing to have a self checkout at the grocery store. Second, the traditionals who enjoy the do it yourself process (e.g., gardening and auto repair). Third, conventionals who like to shop for the products that they can use at home. Fourth, the intentionals, who like to

have their products personalized because of the joy of having such products (e.g., build a bear). Fifth, the radicals who like to take the co-production process into another extreme by developing products that are useful to all types of users (e.g., ipod's new programs).

Co-production was sometimes misrepresented in the marketing literature as customers' participation or customers' involvement (Petty, Cacioppo, and Schumann, 1983, Cermak and File 1994, Dabholkar 1990, p. 484, Bendapudi and Leone 2003). It would be more reasonable to argue that customer co-production incorporates both concepts: participation and involvement at its core. One could say that not every customer participation and/or customer involvement considered as a full customer co-production. Of course, any co-production process cannot be completed without the involvement of customers and their participation in the production process.

Participation and Involvement

Cermak and File (1994) found some interesting results in their study such as the strong association between participation and repurchase. In addition, they found that participation has a strong positive effect of the probability customers' recommendation and referrals in some service settings. They argued that it would be more interesting to know whether these relationships would be affected by the type of service settings and the type and length of the relationship between the firm and its customers. They defined participation as "the customer behaviors related to specification and delivery of a service" (Cermak and File 1994, p. 91). Also, they defined involvement as "the personal relevance or importance a product has for a consumer" (Cermak and File 1994,

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p. 91). They further explained the distinction between involvement and participation in terms of attitude and actual behavior (involvement as the attitude or state and participation as the actual involvement as a behavior (Cermak and File 1994, p. 95).

Another definition of customer participation is concerned with the degree of customer's involvement in the production and delivery processes (Dabholkar 1990, p. 484, Bendapudi and Leone 2003). In addition, there are different degrees of customer participation in the production process (Bendapudi and Leone 2003). The product/service can be entirely produced by the firm, entirely by the customer, or as a joint activity between the firm and its customers (Meuter and Bitner 1998, Bendapudi and Leone 2003). All of the above explanations focused on the post-purchase situations neglecting other stages of the customers' involvement.

It was explained in the literature that customer involvement takes place at the pre-purchase, post-purchase and re-purchase stages while customer participation appears at the point of purchase (Petty, Cacioppo & Schumann, 1983, Cermak and File 1994). It should be understood that the involvement and participation concepts usually differ from one situation to another based on the type and length of the relationship between the firm and its customers (Cermak and File 1994).

Customer Co-production Definition

In their study, Bendapudi and Leone (2003) investigated the psychological consequences of customers' participation in the production process of products/services. The authors aimed to investigate the effect of self-serving bias and the customer choice in the co-production process on customers' satisfaction. Bendapudi and Leone (2003)

found that the self-serving bias is usually reduced when the customer has the choice of whether to participate in the production process.

Rodie and Kleine (2000) provided a definition for co-production as the customers' actions and resources that are used in the production and delivery phases. Bettencourt et al. (2002) also defined co-production in terms of the involvement in the production process of services leading to a successful service delivery.

Groth (2005) defined co-production as "those behaviors that customers need to perform in order to complete the service delivery" (p. 8). This process has benefits for both sides: 1) cost reduction and efficiency for the firm and 2) better service experience for customers' side. They differentiated between customer co-production and customer citizenship behaviors. Following this conception, customers can be considered as human resources of the organization.

Adopting the co-production concept can be considered as a shift in the firms' perspective of customers. Customers are no more considered as receivers of the values, products, and/or services provided by these firms, rather, customers are active partners in the production process (Bettencourt 1997, Wind and Rangaswamy 2000, Pralahad and Ramaswamy 2000, Bendapudi and Leone 2003).

Based on the literature presented above and on the understanding of the concept of customer co-production, it can be defined, based on the context of this dissertation, as "the continuous and dynamic exchange between the firm and its customers in order to convert those customers into active participants in every step of the production process through maintaining their affective and cognitive involvement."

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Although one could argue that maintaining a strong social relationship with customers is considers as one of the main building blocks in the success of customer co-production, this type of strong relationship could act as an obstacle especially when the customer gets used to relying on the firm to provide him/her with products and services. Spending years in pampering customers and then asking them to do everything partially or fully by themselves may cause those customers to become unsatisfied with the firm's self-service strategy (Bendapudi and Leone 2003). Therefore, deeper attention should be taken in order to retain loyal and satisfied customers.

<u>The Stages of Customer Co-production</u>

In this research it is believed that the process of customer co-production has three stages: 1) pre-production, 2) product development, and 3) post-production. Bettencourt (1997) introduced a very interesting model that could be an essential building block in the customer co-production concept. In their study, he argued that the customers have three important roles as partial employees of the firm: 1) customers as promoters, 2) customers as human resource, and 3) customers as consultants. Based on that, one could say that the later roles would fit perfectly in the proposed three-stage co-production process.

Co-production at the Pre-production Phase

Customers could act as a very essential source of information for the firm. Developing new ideas for creating new products and service or even enhancing (extending) existing services and products are among the important information that could be provided by customers (Bettencourt 1997). At this stage we can see the fit of

the involvement concept since it reveals customers' attitudes toward the co-production process. We can still look at customers as consultants at this stage especially when providing suggestions toward developing and improving the firm's products and/or services.

Co-production at the Post-production Phase

The customer's role as a partial employee does not stop; rather it continues to take a new direction that is critical to the success and competitiveness of the firm. At this stage, customers can act as promoters of the firm's activities (Bettencourt 1997). In his paper, Bettencourt (1997) linked this role to the concept of customer loyalty.

Recommending the firm and its products to other consumers and spreading positive word of mouth can be indicators of customer loyalty and, at the same time, it serves the purpose of promoting the firm's activities to the public (Boulding et al. 1993, Zeithaml et al. 1996, Bettencourt 1997). This could also mean that the firm is gaining a cost reduction benefits in terms of saving some of promotion activities expenditures. It is also reasonable to think of customers as consultants at this stage. The firm relies partially on customers' feedback, complaints and suggestions in order to improve its current offerings or introduce new products/services to the market (Plymire, 1991, Bettencourt 1997). It is very critical of the firm to make its customers think that their opinions and needs are well-respected by the firm and are taken into serious consideration (Bettencourt 1997).

Actual Participation in the Product Development Phase

At this stage, customers participate in producing/designing new products. Customers also participate in improving the quality of the service provided whether through interactions with the firm's employees or by performing their own roles as co-producers (Bitner et al. 1994, Bettencourt 1997). Bettencourt (1997) description of customers' cooperative role as human resources would fit the purpose of this stage of the co-production process. At this stage, customers have the strongest need for understanding their responsibilities and their level of accountability. Defining the customers' role at this stage would help in increasing the trust between the firm and its customers (Prahalad and Ramaswamy 2003, Bendapudi and Leone 2003).

The toolkit of innovation approach is a good representation of the process of co-producing between companies and customers. The toolkit idea was first established during the 1980's in the semiconducting industry. Customers co-produced the integrated circuits because the companies wanted to avoid the costly errors that occurred in the past.

Based on von Hippel (2001), the process of toolkit of innovation has several benefits which include: 1) getting access to the used sticky information, 2) achieving a cheaper form of learning-by-doing with the reduction of the trial-and-error cycle, and 3) building a library of previous designs that are based on simple skills and capabilities of other customers. The sticky user information represents the cost of transferring any unit of information from one pace to another (von Hippel 2001). The increased cost of this type of information stems from the difficulty of acquiring them from customers

especially that, sometimes, customers cannot specify their own needs and wants (von Hippel 2001).

Co-creation of Valuable Experience

Prahalad and Ramaswamy (2003) argue that companies need to create different experiences rather than a variety of products and services. The variety of experiences would accommodate different situations at different times and customers' hetero-geneity. The personalization is for the experience in making unique for individuals (Prahalad and Ramasawamy 2003, Solomon 2003).

In the traditional approach, managers used to focus on the efficiency of the value chain to control the flow of products and services that are supposed to meet customers' demand (Bendapudi and Leone 2003, Prahalad and Ramaswamy 2003). Basically, the value was created by the firm. The new approach, on the other hand, is to create unique value through the interaction with individuals. Firms need a variety of co-created experiences and then break it down into several unique and context-specific experiences with the help of customers' involvement in specifying the desired experience (Prahald and Ramaswamy 2003).

Customers' Perceived Value and Reasons for Purchase

The concept of value has been examined in the marketing literature at several occasions (Dodds et al. 1991; Zeithaml 1988; Rockefeller 1986; Kantamneni and Coulson 1996). Many researchers looked at it from different angles. Some researchers decided to focus on the factors influencing customer's perception of value (Kantamneni and Coulson 1996). Other researchers relied on quality as an indicator of products'

value considering the price of products and, at some occasions, brand names (Dodds and Monroe 1984; Kantamneni and Coulson 1996; Dodds et al 1991).

Tellis and Gaeth 1990 explained the marketers' tendency to use the utility approach when it comes to conceptualizing the concept of value (Kantamneni and Coulson 1996). Based on the utility approach, customers look for the products that yield the higher profits rather than considering the level of satisfaction of using these products (Kantamneni and Coulson 1996). Zeithaml (1988) presented different explanations of the concept of perceived value based on: 1) low price, 2) what is wanted from the product, 3) the quality obtained compared to the paid price, and 4) comparing what has been gained to what has been given (Kantamneni and Coulson 1996).

Products' value can also be based on the core function provided by them (Elliott, 1997; Bhat and Reddy 1998). Some customers decided to purchase a product for the sake of fulfilling a social need or to enhance their image in front of others (Elliott 1997; Bhat and Reddy 1998). Shavitt et al (1992) investigated the effect of product types (social identity products vs. utilitarian or functional products) on low and high self-monitors' product attitude. The authors relied on the functional theories that proposed the importance of attitude as an aspect of the psychological functions of people. They also classified attitude based on the motivations and functions of customers such as utilitarian attitude functions for benefit maximization and social identity attitude functions for public image enhancement. Products can serve one utilitarian function or

one self identity function but at the same time there are products that serve multiple functions and it all relied on the goal of purchasing these products.

Another need that customers may want to satisfy is the symbolic value which is very personal and differs from one person to another (Wallendorf and Arnould, 1988; Elliott, 1995). Customers seek satisfying symbolic values when they want to show that they have a specific privilege such as their high class life style or their wealth (Wallendorf and Arnould 1988; O'Donohoe, 1994). Basically, those customers care about the way people judge them (Wallendorf and Arnould, 1988; O'Donohoe 1994).

Bhat and Reddy (1998) discussed functionality and symbolism as two concepts of brands. They divided the literature into two schools of thought. The first was the rational school of thought which suggests that customers are rational and that their motivation of buying products is to gain the maximum utility from these products (Schiffman and Kanuk, 1994; Bhat and Reddy 1998; Allen and Ng 1999; Mowle and Merrilees 2005).

Following this school of thought means that customers go though a cognitive process of searching, evaluating, comparing, and finally choosing products. The utilitarian approach could be another way of considering the rational school because customers are seeking the maximum benefits or utilities from each product.

The other school of thought focuses on the emotional wants of customers. Researchers following this school of thought consider the emotions that customers seek from the consumption process and they call it the hedonic process (Holbrook 1982; Schiffman and Kanuk, 1994; Bhat and Reddy 1998; Allen 2001). Previous literature

has shown that the symbolic values of brands are better indicators of consumers' choice and brand differentiation (De Chernatony et al 2000; Bhat and Reddy 1998; Mowle and Merrilees 2005). One could argue that the importance of symbolic values with regards to brand choice is obvious because customers relate brands into intangible feelings and emotions (Mowle and Merrilees 2005). But since the brand value is multidimensional, both functional and symbolic values are to be considered (Bhat and Reddy 1998; Mowle and Merrilees 2005).

Based on these two schools of thought, companies design products and services with the aim of appealing to utilitarian and hedonic motivations of customers (Bhat and Reddy 1998; Park et al. 1991).

The functionality of the product can be investigated through the tangible attributes and the benefits gained by using this particular product (Allen 2000; Allen and Ng 1999; Allen 2001). The tangible attributes are objective in nature and are not subject to the objective and emotional judgments of customers (Allen 2001).

When Elliott (1997) discussed the different meanings of the experience of consumption, he stressed on the symbolic vs. material aspects. Since symbolic needs depend on customers' interpretation of the meaning of these needs, the examination of such needs tends to be subjective and it requires deep understanding of the signs that show the symbolic meanings of products (Le Vine 1984; Elliott 1997). Based on Elliott (1995) and Elliott (1997), symbolism can be looked at from two different perspectives: 1) self-symbolism and 2) social-symbolism. Products carrying social-symbolic meanings serve the social and cultural practices and they help customers in sending

certain social messages (Fiske 1989; Elliott 1997). In other words, such products

provide customers with extrinsic values and feeling of conformity (Mason 1984;

Amaldoss and Jain 2005). Products carrying self-symbolic meanings, on the other

hand, are expected to help customers in expressing their self-concept and identity

(Dittmar 1992; Elliott 1997). Basically, these products provide customers with an

intrinsic values and inner satisfaction feeling of being unique (Mason 1984; Amaldoss

and Jain 2005).

For the purpose of this study, symbolic and functional values represent the

reasons (symbolic and functional) upon which customers decide to purchase the co-

produced products.

<u>Customer Classification Based on the Diffusion of Innovation Theory</u>

The concepts of diffusion and innovation adoption were mentioned in the

literature of several fields including anthropology, marketing, sociology and education.

The diffusion occurs when the early adopters use the products and pass this acceptance

to other people (Zaltman and Stiff 1989; Wu and Wu 2005). When Rogers (1962)

proposed the innovation diffusion process, he divided the process into two stages:

1) adoption which includes knowledge acquisition, persuasion and learning, and

decision; and 2) implementation which incorporates preparation of change, task process,

and technology needed for the innovation (Rogers 1983; Wu and Wu 2005). In his

book **Diffusion of Innovation**, Everett Rogers (1962) defined four elements of the

process of diffusion of innovation: 1) innovation which includes any idea or objects

that could be considered as a new unit, 2) communication channels, 3) time (such as

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rate of adopting innovation), and 4) social system which includes a group of interrelated objects that are involved in a problem solving situation in order to reach a certain goal (Rogers 1962; Rogers 1995). Innovations have to be adopted by people (customers in our case) and these adopters can be categorized as: 1) innovators who are considered as risk takers, 2) early adopters who are considered as popular social leaders, 3) early majority, late majority who are the skeptical and 4) traditional people and laggards who fear to adopt innovations (Rogers 1962; Rogers 1983). In this study, customers are to be categorized based on the previous classification of innovation diffusion in order to understand their attitude toward the process of co-production and its benefits. Specifically, this study focuses on the early adopters group of customers. The late adopters group is going to be explored as well but only for the purpose of having better understanding of the distribution of the sample.

Business Communications

Nowadays, consumers may not be seeking a lot of variety and, at the same time, different variety of products and services may not be associated with better consumption experience. The roles of customers now have evolved to become more connected, informed, and active in the production process (Bettencourt 1997, Prahalad and Ramaswamy 2003, Groth 2005). The problem is that customers want to have power in the production process without being accountable for the outcomes (Prahalad and Ramaswamy 2003). It is important to gain an active customer participation which through achieving a desired level of interaction in order to create unique value.

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The importance of developing creative ideas for new products is one of the issues facing many companies, especially that these new ideas are supposed to satisfy a new customer's need or an existing but hidden one (Amabile et al. 1996; Kristensson et al. 2004). When the customer has the opportunity to create new products with the company, he/she will be able to integrate the reality of the environment along with his/her personal factors into the new product idea (Kristensson et al 2004). Based on that, the company will have the chance to know more about customers and their motivations to participate in the co-production process. In addition, the company would have to share some information with the customer regarding its resources and capabilities, the risks that customers may encounter while using the products, and any other information about the products' technologies and business systems (von Hippel, 2001; Prahalad and Ramaswamy 2003; Kristensson et al. 2004).

CHAPTER III

RESEARCH QUESTIONS AND HYPOTHESES

Overview

The main research question that this dissertation attempts to answer is: What is the influence that the process of customer co-production has on the reasons behind purchasing the co-produced products? Other research questions are investigated as well and they are: 1) what is the effect of customers' classification based on the stages of innovations' adoption on the relationship between co-production and reasons for purchase, and 2) what is the effect of continuous business communications between the firm and its customers on the relationship between co-production and reasons for purchase.

The Value of Customer Co-production

Bendapudi and Leone (2003) argue that the concept of customer participation is not new to the marketing literature. Converting customers into co-producers, on the other hand, is a new and interesting concept that should be investigated as a tool of competitive effectiveness. Kelley, Donnelly and Skinner (1990) argue that when customers are committed to the participation process, they will be more involved in the production of products and services. They also indicated that customization of services would lead to more customer's service involvement.

Bendapudi and Leone (2003) summarized two streams of research. The first one is concerned with benefits associated with co-production from the perspective of the firm (e.g., labor cost reduction and improved productivity) (Kelley, Donnelly and Skinner 1990; Bettencourt 1997). The second stream of research focuses on managing customers as partial employees (Bowen and Schneider 1985; Mills and Morris 1986; Bettencourt 1997). One should not neglect the fact that customers as employees must be motivated in order to become co-producers. Such motivation comes with a level of understanding of the responsibilities (whom to blame in case of negative outcomes) and the benefits (the type of credits gained) of such shift in roles (Bendapudi and Leone 2003). In addition, we should investigate the benefits that customers are seeking from being part of the co-production process.

When customers interact with the firm, they learn more about their new role as co-producers and partial employees in that firm. In addition, customers will be more satisfied with the firm if the roles that they have to perform match their expectation (Kelley, Donnelly and Skinner 1990). Customers need to feel that they were treated fairly in order to become committed to their roles as partners and co-producers with the firm (Bettencourt 1997). Other benefits that customers may receive as result of co-producing with the firm include faster delivery and reduced prices (Kelley, Donnelly and Skinner 1990).

<u>Reasons for Purchase Based on Co-production</u>

In the early literature of value, this concept was attached to only its monetary or the economic utilitarian aspects (Dodds et al 1991; Tsai 2005). The conceptualization of

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value has been considered as a difficult process (Kantamneni and Coulson 1996), yet it has been associated with price and quality at several occasions (Hoffinan 1984; Dodds and Monroe; Kantamneni and Coulson 1996).

After that a new post-modern concept of symbolism has emerged in the literature to embrace the other emotional and cultural aspects of the consumption process. The basic idea behind symbolic meanings of products is that customers care about the way their self-identity and how others look at them in the society/peer groups (Tsai 2005).

Two of the well known classes of value were introduced by Lewis (1947) and these classes are the extrinsic value and intrinsic value. The extrinsic value is usually derived from the value of another factor while the intrinsic value is included in the product itself such as its core benefit (Kantamneni and Coulson 1996). To represent these values, this research relies on a similar classification including functional and symbolic values. This type of classification of products based on customers' motivations (functional vs. symbolic) has been used in the literature especially when it comes to brand positioning (Bhat and Reddy 1998; Mowle and Merrilees 2005).

Functional vs. Symbolic

Customers need to obtain symbolic values that are necessary for fulfilling self and social related needs (Park, Jaworski, and MacInnis 1986; Kantamneni and Coulson 1996). Examples of products that satisfy symbolic values could include luxurious watches and specially tailored designer suits. One could argue that the symbolic values differ from one person to another and from one segment of customers to another and

this could be caused because of the differences among customers with regards to defining the meaning of wealth, lifestyle, achievements, social class, and self concept and image.

Based on Elliot (1995; 1997), the symbolic values of products can be classified into two categories: social symbolism (outward) and self-symbolism (inward). In the social world, customers need to express their belonging to their current cultural and social status through the products that they are socially using or co-creating (Fiske 1989; Elliott 1997). When customers give companies creative ideas about the new products and get recognition for that, they will feel that their social status has improved.

Also, recognition is going to enhance their ego and self-satisfaction. While the social symbolism is concerned with the culture and the society, self-symbolism focuses on the self-concept and the way customers desire to differentiate themselves in front of others in terms of their identities and achievements (Dittmar 1992; Elliott 1997). When customers recommend new products to others -- especially the ones that they co-created, they will feel their ego and self-image are enhanced and that they have higher social status. One could argue that theses two classes of symbolism may not have a positive relationship. What is accepted by a person may not be accepted by the society and based on that a conflict between social symbolism and self-symbolism can exist (O'Donohoe 1994; Elliott 1997). Based on the above, the following are hypothesized:

Hypothesis 1a: Attitude toward customer's co-production in the *pre-production phase* will be positively related to customers' symbolic reasons for purchase.

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Hypothesis 1b: Attitude toward customer's co-production in the *post-production phase* will be positively related to customers' symbolic reasons for purchase.

Aside from the symbolic values, functional values stems from the product's ability to solve current or future consumption problems facing customers (Jaworski and MacInnis 1986; Kantamneni and Coulson 1996). Examples of the functional values can be manifested in products such as home appliances and basic items of furniture. Buying products for their functional values follows the rational model that relies on the tangible and utilitarian aspects of the products and neglects the other hedonic and subjective aspects associate with products such as emotions and fantasy (Holbrook 1980; Bhat and Reddy 1998; Mowle and Merrilees 2005).

To be able to get customers to get involved in the production process, companies might use what has been known as the toolkits. Toolkits are a means of information exchange between manufacturers and users and they allow users to design the products and specify their functionality through the tools provided for them ((Thomke and von Hippel 2002; von Hippel 2001; von Hippel and Kdatz 2002; Jeppesen 2005).

This process requires companies to share more information with customers especially with regards to availability of resources and designs and based on the fact that companies need to provide customers with a higher level of support (Jeppesen 2005). The negative implications of the "do it yourself" factor is out of this researcher's scope. Jeppesen (2005) proposed a consumer-to-consumer support system as solution for the problem of the increase need for customer support. This system of support will

allow customers using the toolkits to share information and problem solving issues with other customers and, at the same time, it saves the company the cost of hiring more employees to do the same job. Using the toolkits, customers will have the chance to express their needs for certain functions and benefits by designing what they need instead of relying on words only to describe these needs (von Hippel 1986; Jeppesen 2005). Of course, customers must have certain level of skills and capabilities to be able to use the toolkit (Jeppesen 2005). For the importance of the functional values, the following is hypothesized.

Hypothesis 2: Attitude toward customer's co-production in the *product development phase* will be positively related to functional reasons for purchase.

Classification Based on the Diffusion of Innovation Theory

To be able to reach the desired outcomes of socialization between the firm and its customers, it is important to understand what those customers are willing and able to offer to the firm (Kelley, Donnelly and Skinner 1990). In addition, when the firm succeeds in socializing with its customers and treating them as partners, gaining a better competitive position could be one of the benefits that the firm would gain (Kelley, Donnelly and Skinner 1990; Bettencourt 1997).

A critical step in converting customers into co-producers is to explore customers' willingness to be part of the production process. This research investigates this type of willingness based on the diffusion theory of innovation. The diffusion process occurs when the innovation (idea or product) starts to be accepted and used by

all users and not only innovators or early adopters (Zaltman and Stiff 1989; Wu and Wu 2005).

Rogers (1983) proposed different characteristics for each category of innovation adopters. Innovators tend to function well under uncertain circumstances and they have a desire for taking risk, having more financial control, understanding and applying more complex technologies. Early adopters integrate to local social systems and they tend to have a greater degree of leadership and respect, represent role models for others in the social system, and are usually more successful. Early majority, on the other hand, interact frequently with the other members of the social system and that is why they do not hold leadership positions. Also, they tend to be reluctant before adopting any new idea or product. Late majority tend to act based on the social pressure and economic necessity. They are also known for being more cautious. Finally, laggards are usually isolated from the other members of the social system and they are suspicious when it comes to new innovations. In addition, they require a long time to make decisions especially when it comes to new innovations.

For the purpose of simplicity, this dissertation will rely on two groups only which are the early adopters and the late adopters. The early adopters will be also innovators and they will be willing to take the risk and participate in the new process of co-production. This study is concerned with the effect of the early adopters group of customers. The late majority, on the other hand, will hesitate to adopt the new concept of co-production. The late adopters group will be used only for the sample's distribution purpose. Based on the previous classification, this research proposes the

moderating effect of such concept on the relationship between customer co-production process and perceived values. This research hypothesizes the following:

Hypothesis 3a: For the early adopters group, the adoption tendency is going to moderate the relationship between attitude toward co-production and symbolic reasons for purchase.

Hypothesis 3b: For the early adopters group, the adoption tendency is going to moderate the relationship between attitude toward co-production and functional reasons for purchase.

Business Communication

Groth (2005) found that there is a strong positive relationship between co-production and customer socialization. He considered customer socialization as a dynamic process in which those customers get to learn skills and values associated with the firm's roles in order to improve efficiency. This type of socialization is supposed to help customers to have the required knowledge to co-produce and deliver products and services. With frequent interactions and social exchanges, customers can build a level of trust and develop product expectations that will affect their commitment toward the firm as an entity.

The depth of customers' involvement could be divided into three levels: 1) listening to customers, 2) interaction with users, and 3) the use of toolkits (Jeppesen 2005). At the first level, companies rely on listening to customers through complains and feedback without gaining any specific information about their needs and wants and giving them a feeling of relief. At the second level, companies may rely on interested

customers to give them insights about the products and whether they match their

expectations. At this stage, customers can give creative ideas to the company and, at

the same time, recommend its products to other customers. The third level of

participation involves the use of toolkits which are helpful in getting customers

involved in the production process.

At the first and second levels of involvement, the company collects general

information from customers that could help in solving obvious problems in new

products that are already in the market. The problem stems from the need for more

insights in order to design new products that have the highest possibility of satisfying

customers' needs. Based on that, the co-production process is the only approach that

would allow companies to obtain the hard to reach information about customers and

their needs and motivations.

Following Prahalad and Ramaswamy (2003) on the co-creation of experience,

the four elements of DART (dialogue, access, risk assessment, and transparency) that

they described can be used as guidelines for establishing business communications

between firms and customers. The dialogue element is concerned with the deep level of

interaction between firms and their customers in order to find common ground on which

they can meet for satisfying mutual goals. This interaction requires firms to understand

customers' emotional, cultural, and social background. This study incorporates the

dialogue into the different levels of business communication since each level requires

the existence of such deep interaction. The access element is concerned with the

information that customers need to obtain to be able to decide whether they want to

purchase products or not. This study focuses on information related to the products'

technologies. The risk assessment element focuses on the harm that customers might

encounter while using products. When customers co-produce products, they need to

know the possible risks associated with there products and whether they will be liable

for these risks. Finally, the transparency element is concerned with the extent to which

firms share business information with their customers. Such business information

includes firms' costs, billing systems, and investments.

In this study there will be three levels of business communication that are based

on the DART elements of Pralahad and Ramaswamy (2003). They are: risk-related

communication, product's technology information, and business systems

communications. Based on the above, customers will need to maintain active

communication with the firm to make the co-production process an easier and more

efficient one. Hence the following is hypothesized:

Hypothesis 4a: The three business communication elements will moderate the

relationship between attitude toward participating in the *pre-production phase* and

customers' symbolic reasons for purchase.

Hypothesis 4b: The three business communication elements will moderate the

relationship between attitude toward participating in the *product development phase* and

customers' symbolic reasons for purchase.

Hypothesis 4c: The three business communication elements will moderate the

relationship between attitude toward participating in the *post-production phase* and

customers' symbolic reasons for purchase.

Hypothesis 5a: The three business communication elements will moderate the relationship between attitude toward participating in the *pre-production phase* and customers' functional reasons for purchase.

Hypothesis 5b: The three business communication elements will moderate the relationship between attitude toward participating in the *product development phase* and customers' functional reasons for purchase.

Hypothesis 5c: The three business communication elements will moderate the relationship between attitude toward participating in the *post-production phase* and customers' functional reasons for purchase.

<u>The Effect of Demographic Factors</u>

This research is going to investigate the moderating effect of gender on the proposed relationship between customer co-production and perceived values. The hypotheses do not specify the strength and direction of the moderating effect. Previous literature found gender differences in terms of functional vs. symbolic motivations behind consumption of goods (Tse et al 1998; Eastman et al 1997; O'Cass and McEwen 2004). Those studies showed the males to be more materialistic and looking for utilitarian values. O'Cass and McEwen (2004) found some significant differences among males and females in terms of conspicuous consumption. They found out that males tend to care about conspicuousness more than females in the age between 18 and 25. Based on that, the following are hypothesized.

Hypothesis 6a: Being a male will moderate the relationship between attitude toward the three phases of customer co-production and symbolic reasons for purchase.

Hypothesis 6b: Being a male will moderate the relationship between attitude toward the three phases of customer co-production and functional reasons for purchase.

The overall model proposed in this study is depicted in Figure 1 below.
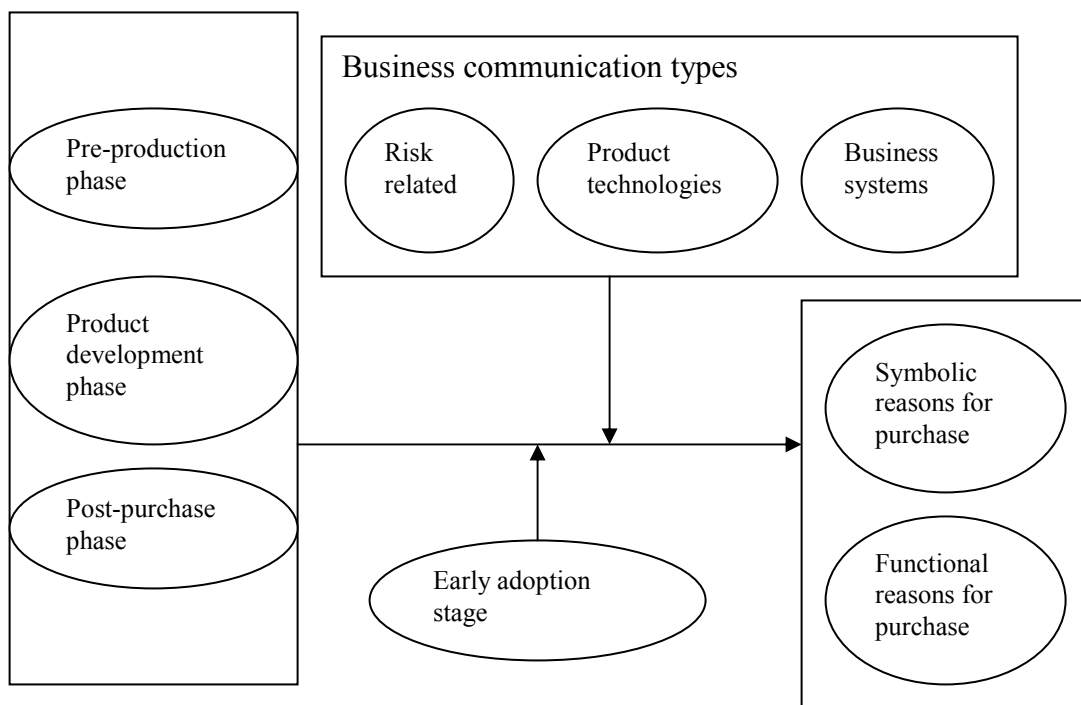
Figure 3.1: The Overall Model of the Study

CHAPTER IV

METHODOLOGY

Overview

This chapter attempts to present the methodology that is used to test the

hypotheses proposed in the previous chapter. Basically, this chapter is going to present

the research strategy, research design, sampling, and reliability and validity issues.

Research Strategy

The choice of the research strategy in this dissertation will be based on the eight

research strategies discussed by McGrath et al. (1982) that include: laboratory

experiments, simulated experiments, field experiments, field studies, computer

simulations, sample surveys, formal theory, and judgment. This study used the simple

survey strategy. A simple survey is a structured way of collecting data from the

respondents. This research strategy has several advantages such as: low cost, real world

data, bases for more elaborate research, easy to quantify, high level of generalizability,

and easy to be widely distributed (McGrath et al. 1982; Ary et al. 1996). The

disadvantages of sample survey include: lack of in-depth analyses, lack of some types

of validity, low response rate, and the possibility of obtaining different conclusions due

to the difference in researchers' interpretations (McGrath 1982; Ary et al. 1996).

In addition, the self-report was used because, for the current case, it was the

most feasible way to measure the constructs of interested. It is understood that method

triangulation will be the ideal for such situation but it was not feasible due to the lack of

sufficient financial resources (McGrath et al 1982).

Research Design

This study used a standardized survey that was administrated by the principle

researcher. The survey was distributed among a sample of students at The University of

Texas at Arlington (College of Business Administration) that represents the main

population of customers. All surveys were standard in order to have a control over the

observation method.

Research Validity Issues

The following is a discussion of the possible threats for external ad internal

validity with an explanation of how they were controlled for:

Threats to Internal Validity

Cook and Campbell (1976) discussed several threats to the internal validity the

following is a discussion of the relative threats that were controlled for in the current

study:

History Threat

Some of the events could occur in the past or the student's experience

with other surveys might affect their response to the current study's survey. The

random selection of classes could partially control for this threat.

Maturation Threat

It might be possible that the students lost interest or felt bored while filling out the survey. This means that their answers might be biased. This should not be an issue in the current study due to the short time period required for completing the survey.

Testing Threat

Again, since this study is not a longitudinal one, this threat should not be an issue. There was no different tests that the subjects have to go through that could affect the way they score in the study.

Instrumentation Threat

This study had a standardized test which means a minimization of the instrumentation threat.

Mortality Threat

Selection-mortality arises when there is differential nonrandom drop out between pre test and pos test. Post test differences might then be due to the different types of dropouts -- the selection-mortality -- and not to the independent variable. Using randomization is going to minimize this threat.

The following are some of the threats that are not controlled for by randomization:

Diffusion or Imitation of Treatment

This occurs when the respondents learn about the survey from other students who completed it previously. Students were asked not to share the information with others. Data collection was completed in one week to minimize the spread of information.

Compensatory Rivalry

The subjects in this did not get any motivation to influence their response and based on that compensatory rivalry will not be a threat to this dissertation.

This is almost the opposite of compensatory rivalry. Here, instead of the subject developing a rivalry, they get discouraged or angry and they give up. This study does not raise any rivalry among subjects and there is nothing to be discouraged about.

Compensatory Equalization of Treatment

Again, no respondent will receive any benefits from participating in the study. This threat should not be an issue in this dissertation.

Threat to External Validity

The importance of external validity stems from its purpose to generalize the results across times, settings, and persons. Since this study is a simple survey, the external validity was not threatened. The following threats to external validity were discussed by Cook and Campbell (1976).

Interaction of Selection and Treatment

The results obtained from a sample of students can be applicable to other groups of people, time, and settings.

Interaction of Setting and Treatment

Peripheral cues are controlled for in this study and that's why this threat is not an issue.

Interaction of History and Treatment

This threat is not considered because there is no inherent special characteristics that will only hold in historical terms in out study.

Threats to Construct Validity

This study controlled for most of the construct validity threats by: 1) Defining constructs thoroughly, 2) using multiple scale items, 3) and visiting different class rooms that include graduate and undergraduate students to ensure that students' characteristics are relatively different. The only threat that might be of concern is: confounding constructs and level of constructs (Campbell and Stanley 1963).

Confounding Constructs and Levels of Constructs

Other variables may have confounding effect on the proposed relationship. Also, sometimes, the independent variable would affect the dependent variable at one level but has no affect on it at other levels. This threat is expected in this research study.

Threats to Statistical Conclusion Validity

Statistical conclusion validity represents the degree to which conclusions about the relationship between the dependent and the independent variables are reasonable. The following are the known threat to statistical conclusion validity.

Low Statistical Power

There is a need to increase the sample size in order to minimize this threat. An adjustment for the significance level is needed too so that the researcher would not make Type II error

Violated Assumptions of Statistical Tests

The violation of the statistical tests must be minimized in order to obtain accurate findings. The statistical tests include linearity, equal variance, normality, and independence of error terms.

Fishing and the Error Rate Problems

When the number of iterations is increased, there is a chance to increase the significance level. This change might be due to chance and rather than the change in variables.

Other Concerns with Validity

Along with the previous types of validity threats, the following are the major threats that should be considered while using the sample survey (McGrath 1982; Ary et al. 1996).

Internal Validity

Measurement error is possible when the sample survey is used. Also, the instruments that are used may not be measuring what they are supposed to measure. To control the measurement error threat, the survey needs to be clear and logical, the scale must be reliable, and the instrument must be valid (Ary et al. 1996).

External Validity

There is a possibility to have a sampling bias when using sample survey. For example, the sample may not be representative of the population. Also, at many occasions, the researcher will face the problem of non-response bias. To control for the sampling bias, the researcher must do his/her best to have a sample that is highly representative of the population of interest. In addition, the probability sampling technique might be used. As for the non-response threat, the researcher can control for it by increasing the sample size, and compare early to late respondents.

<div align="center">Measures</div>

Independent Variable

The independent variable in this research is the three stages of co-production: pre-production phase, product development, and post-production phase. Bettencourt (1997) studied the case of customers acting as partners in delivering services. In his study, Bettencourt (1997) categorized customers' voluntary performance in delivering services inside stores into three types: customer loyalty (with alpha = 0.75), customer co-operation (with alpha = 0.69), and customer participation (with alpha = 0.85). The loyalty represented the customers' intention to visit the same store and recommend it to

others. Based on that, this factor could be used to represent the post-purchase co-production; especially that it was defined in the previous chapter as promoting the new product through recommendations and positive word of mouth. The cooperation factor represented customers' physical help in the store. Since the items representing the cooperation factor are very specific, they cannot be used in the current study. Finally, the participation factor represented customers' willingness to share ideas and complaints with company. This representation fits the pre-purchase c-production dimension in the current study.

In this study, Bettencourt's scale for customers' voluntary performance, which is a 7-point Likert scale, was used to measure the independent variable of customer co-production. Of course, changes will be added to the factors in order to fit the current research. These changes include: the context of the scenario, the label of the factors, and the wording. As for the production process, items will be generated in order to measure customers' attitude toward the idea of toolkits and their intention to use it.

Dependent Variable

The dependent variable is the reasons behind customers' purchases as a result of evaluating their participation in the co-production process. The types of reasons used were functional and symbolic ones. To measure the symbolic reasons for purchase (self and social), O'Cass' et al. (2004) scale was used. The over all reliability of the scale was: alpha = .89 with total variance explained of 59.4%. In their study, O'Cass et al (2004) investigated customers' status and conspicuous consumption. In this dissertation, the items used to capture the conspicuous consumption will represent the

self-symbolic values of products. The status consumption, on the other hand, will represent the social-symbolic values of products. As for the functional reasons, Kantamneni and Coulson (1996) discussed the perceived value of products. They used a 7-point Likert scale to assess customers' perception of the functional value of products. This study used some of the items examined by Kantamneni and Coulson (1996) to represent the core value factor (with alpha = 0.8347). Of course, these items were adjusted them to the context of the current experiment.

Moderators

The first moderator used in this study is customer's adoption stage based on the diffusion theory of innovation. The second moderator is the types of business communications between customers and firms. Gender effect was examined as well.

In order to group respondents into early adopters and late adopters, this study relies on Roger's (1983) characteristics for the different types of adopters. The items were generated based on the characteristics described by Rogers' (2003, p. 282). Among the characteristics of innovators and early adopters are: desire to take risks, ability to understand and apply complex technologies, opinion leadership, success, respect among peers. On the other hand, some of the characteristics of late majority (who are labeled as late adopters in this study) include: skepticism, cautiousness, and suspicion of innovation. A Likert scale of 7-points was used to ask respondents to answer the characteristics questions based on what fits their personality.

As for the business communication construct, this study relies on Prahalad and Ramaswamy (2003) explanation of the DART elements for items' generation. Three

types of communications were proposed in this study and they are: risk related communications, product's technologies related communication, and business' systems related communications. A Likert scale of 7-points was used to measure the three types of business communication. The items were generated for the first time in this study.

<center>Scales Reliability and Validity Issues</center>

In order to have a reliable instrument, multiple items scale will be used in this study and along with the use of standardized treatments. The next step will be a reliability check of the items used in the study. SPSS software can help the investigator assess reliability in a very simple way. Assessing the reliability of the items is important for providing consistency in our items and reducing the random error as much as possible. Based on Crano et al. (1973), an acceptable level of reliability will be a Cronbach coefficient alpha that is equal or higher than 0.75. Also, Nunnally (1978) suggested alpha level of 0.7 as the cutoff point as scale reliability indicator.

<center>Reliability of Instruments</center>

To insure the internal consistency of the instruments used, the following types of reliability discussed by Gall et al. (1996) must be considered:

- *Test-Retest:* In this approach, the respondent will be provided with the same instrument at a later time and the consistency in his/her response will represent the reliability of the instrument. Memory may interfere in the accuracy of this type of reliability test.

<center>41</center>

- *Equivalent or Alternate-Form*: Here, an alternative, but similar, instrument will be provided to the same respondent and then a score of reliability is to be estimated.

- *Split-Halves:* The items will be divided into two halves and then the correlation between them is to be examined.

- *Internal Consistency:* The well known estimate of the internal consistency is the Cronbach's alpha.

- *Inter-rater Reliability:* It is concerned with the reliability of the researchers administrating the survey. The researchers should be trained to be as consistent as possible when they conduct several surveys.

Scale Validity

When it comes to developing scales, it is essential to maintain a certain level of scale validity (Crano et al. 1973). Since this dissertation is developing some of the scales for the first time, the scale validity was investigated for the constructs developed. Also, it was essential to ensure the validity for the entire survey used in this study especially that it has different scales measuring different constructs. Based on Crano et al. 1973 and Bagozzi et al. (1991), the following types of scale validities were investigated:

- *Face Validity:* This refers to the extent to which the scales look like the measuring the constructs they are supposed to measure. Basically, it deals with the readability for the items used.

- *Content Validity:* This refers to the items and how they represent the construct that they are supposed to measure.

- *Predictive Validity:* This type of validity is concerned with the relation between the measure and its theoretical origin.

- *Construct Validity:* This refers to whether the scale measures the right constructs that they are designed to measure.

- *Convergent and Discriminate Validity:* Convergent validity refers to items of the scale and how they are hanging together in measuring the construct. Discriminant validity, on the other hand, is concerned with how the items of one construct are not loading on another construct at the same time. In other words, constructs must be different even though they might be theoretically related. When convergent and discriminant validity exist, they ensure the existence of construct validity.

- *Nomological Validity:* This refers to how the construct relate to other constructs in the model.

Sampling and Subjects' Recruitment Process

Of course there are several ways to choose the number of subjects needed. Neter et al. (1996) suggested six to eight cases for each variable in the mode. This study tried to collect more data in order to obtain a better understanding of the relationships proposed. The sample in this study was acquired from university students (undergraduate and graduate). A small token of appreciation might be used in this study (e.g., free lunch in the university center).

Pilot Study

In order to test the readability and clarity of the questions used, a pilot study was conducted (see appendix A). The principle investigator collected 110 completed surveys. Four returned surveys were not fully completed and therefore not used in the pilot study which was conducted with a total of 106 completed surveys. The responses showed that some of the questions used were not clear or not easily understandable. Based on that, some of the questions were altered and simplified in order to have better face validity. In addition, the reliability of the scales used and the item loadings were investigated and found to be significant (see appendix A). Due to the small sample size, compared to the number of variables used, comprehensive data analyses were not conducted.

Sample and Data Collection

For the purpose of collecting the required primary data, eleven classrooms were visited and 300 surveys were returned. All of the responses came from undergraduate and graduate business students at The University of Texas at Arlington. Out of the 300 responses, 290 were used.

The principle investigator visited the classrooms and distributed the survey. The investigator had to make sure that all of the participants are eighteen years or older. All instructors had to leave the classroom to ensure complete voluntary participation. Also, there were no promises for extra credit and students were assured that participating in this research was completely voluntary and confidential. Candy and small chocolate bars were offered as tokens of appreciation. The investigator asked the students to read

the consent form (see Appendix B) and keep it for future references if they wish to

contact the researcher. The consent form included a short description of the purpose of

the research and the benefits of participating in it. Also, full contact information was

provided for any future complaints or comments. Next, respondents were asked to read

the provided scenario that explains the situation upon which they have to answer the

questions in the survey. All respondents were able to complete the surveys within ten to

fifteen minutes.

<div align="center">The Scenario</div>

In order to measure the constructs of interests, respondents needed to be

presented with an imaginary scenario that helps them in linking the main concepts of

the study and, at a later step, answer the survey questions (see appendix B). This

research used the elements of complete experience suggested by Honebein and

Cammarano (2006). The first element is the vision which is supposed to help customers

in having a vision about the benefits and uses of the new product. The second element

is the access which represents the availability of the firm's information for customers to

learn about the processes and stages of the co-production process. The third element is

the incentive which is supposed to encourage customers to participate in co-production

by explaining all the possible motivations and incentive (e.g., cash rewards and

recognition). The fourth element is the expertise which is concerned with the tools and

the knowledge that are provided to customers to use if they accept to participate in the

co-production process.

Basically, students were supposed to imagine that they are going to co-produce a student-help device that is going to help students in saving their class notes and generating test questions (vision). If they decided to participate, the imaginary firm is going to give the students the opportunity to design the product and help on producing it from the stage of idea creation until after the point of sale (access). Also, they get to choose and have lunch with the celebrity who is going to appear in advertising campaigns. The other incentive mentioned in the scenario was the cash reward (fifty dollars) that the students are going to gain from their participation at the end of the co-production period (incentive). To facilitate the co-production process, the imaginary firm is going to send a small tool kit for students to help them in designing the new product's prototype (expertise). When the product gets to be introduced to the market, students who participated in co-producing it are supposed to help in promoting it to others.

Deception and Ethical Considerations

Ethical issues are very important and should be considered in any research. Since this study is not going to have any risk to the subjects' mental and physical health, an information sheet will be provided to them as an explanatory step. An IRP approval was obtained from the Human Subjects Committee at The University of Texas at Arlington prior to data collection at the pilot study stage as well as the actually study stage.

Information Sheet (Consent)

An information sheet written in clear and concise language was presented to subjects before the survey was administered. Subjects were given sufficient time to read through the form and ask any questions they might have. The sheet included a description of any possible discomfort or risk, a notification of the completely voluntary nature of research participation, including the right for subjects to withdraw at any time. The overall purpose and objectives of the research was not completely revealed in the information sheet in order to avoid bias by subjects guessing the objectives of the research and act accordingly.

CHAPTER V

ANALYSES AND RESULTS

Overview

In this chapter, analyses used and results obtained are discussed in details. The following results will be discussed: 1) demographics, 2) descriptive statistics, 3) common factor analyses and unidimensionality, 4) reliability, 5) logistic regression analyses, 6) multiple regression (OLS) analyses, 9) other variables included, and 8) confirmatory factor analyses using SEM.

Demographics

As mentioned in the previous chapter, there were 290 surveys included in this study. The three demographic questions are: gender, age, and ethnicity. Please, refer to appendix C for extra information on the frequency analyses of the demographic information. The majority of the participant was Caucasians (44.1%) compared to 16.2% of African American, 12.1% Hispanics, 20% Asians, and 7.6% who belonged to another ethnic group.

Furthermore, there was a total of 150 participating males in the study (51.7%) and a total of 140 female participants (48.3%). Also, the majority of respondents (62.1%) were between 21 and 25 years old. This was anticipated since this study relied on a student sample.

Other Variables Included in the Survey

In order to have a better understanding of customers' attitude toward co-production, there were six extra questions asked in the survey. Five of these questions (questions 44 to 48 in the survey, appendix B) were asked to make sure that the respondents did not view the concept of co-production as a burden or as a boring process. The results show that almost 30% of the respondents always found that participating in the co-production process is a burden and too much work. Please refer to appendix F for frequency analyses.

The sixth extra question was a rating one by which respondents identified the co-production phase that they are mostly interested in (question 65, appendix B). The results show that the majority of the respondents wanted to participate in the entire process of co-production (31.7%). The second largest group included the respondents who wanted to participate in the preproduction and product development phases together (31.4%). Please refer to appendix F for frequency analyses.

Descriptive Statistics

The following table shows the descriptive statistics of the variables used in this study. Apparently, some of these variables are skewed. The skewed variables were not transformed.

Table 5.1 Descriptive Statistics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Statistic	Skewness Statistic	Std. Error	Kurtosis Statistic	Std. Error
Pre-production items averaged	290	1.00	7.00	5.9081	.86835	-2.200	.143	9.118	.285
Production items averaged	290	1.00	7.00	5.8861	.98774	-1.534	.143	4.512	.285
Post-production items averaged	290	1.00	7.00	5.5190	1.02503	-1.023	.143	2.850	.285
Symbolic values items averaged	290	1.00	7.00	2.8929	1.53065	.423	.143	-.845	.285
Functional values items averaged	290	2.00	7.00	5.9021	.85891	-.856	.143	.940	.285
Risk items averaged	290	3.00	7.00	5.7379	.95320	-.399	.143	-.565	.285
Product technologies items averaged	290	2.00	7.00	5.2397	1.18613	-.371	.143	-.315	.285
Business systems items averaged	290	1.00	7.00	4.5672	1.57943	-.321	.143	-.484	.285
early adopters items averaged	290	1.80	7.00	5.6117	.87756	-.804	.143	1.804	.285
Valid N (listwise)	290								

Common Factor Analyses

In this study, there were a total of 68 questions asked in the survey distributed to UTA students. Out of the 68 questions there were seventeen items measuring the co-production process (including its three underlying dimensions), twelve items measuring the symbolic reasons for purchase, seven items measuring the functional reasons for purchase, seven items measuring the business communication construct, eleven items measuring the early adoption stage, and five items measuring the late adoption stage (see appendix B). Also, there were three questions regarding the respondents' demographics (gender, age, and ethnicity). There were extra six questions that were asked in order to have a better understanding of the distribution of the sample used. Five of the added questions were asked for the purpose of discovering whether

customers have negative disposition towards the process of co-production. One additional question was asked in order to know which of the three phases of co-production is mostly preferred by customers.

Although most of the constructs used in this study were identified in the literature, it was important to investigate their unidimensionality when used in the context (Gerbing and Anderson 1988). A common factor analyses method (using maximum likelihood) was used for the purpose of ensuring the convergent validity of the constructs investigated in the study. Item purification was an essential step in order to maintain a good level of unidimensionality and construct validity. Some of the initial items generated had to be dropped from the model due to their low levels of variance extracted and to the fact they were loading on different constructs at the same time. Moreover, all of the reverse coded items showed weakness when added to the model and therefore had to be dropped. Please refer to appendix B for the final items remaining in the model. Factors with an accumulative extracted variance of 50% or above were found to match the proposed constructs (Gerbing and Anderson 1988). Constructs consisting of more than one dimension(s) were rotated in order to obtain better representation of the items' loadings. The oblique rotation method was used in order to have better understanding of the underlying structure of the data (Gerbing and Anderson 1988; McGee and Peterson 2000). Please refer to appendix D for detailed outputs.

Common Factor Analyses' Results for Co-production Construct

For the construct of customer co-production, running common factor analyses helped in specifying its three underlying dimensions (pre-production, product development, and post-production.) The cumulative variance extracted for the three dimensions came to be approximately 64%.

In order to make sure that at least 50% of the variance was extracted for each dimension, individual common factor analyses were used for each phase of co-production. The total variance extracted for each dimension of co-production was 56.86%, 62.117%, and 68.004% for each dimension respectively.

Common Factor Analyses' Results for Symbolic and Functional Values Construct

Running common factor analyses for the construct of symbolic values showed that it has good unidimensionality with total variance explained of 73.45%. As for the functional reasons for purchase, the total variance explained was 63.141%.

Common Factor Analyses' Results for the Early Adoption Construct

Most of the items used for defining the early adopter groups of customers showed good unidimensionality and were used in the analyses. Some of the items were dropped during the items' purification stage due to the very low communalities that they represented. Also, the same items were barely loading on the construct. The total variance explained by the remained items was 51.538%. As for the late adoption construct, the responses were not consistent and based on that most of the items were

deleted. One of the main reasons for this situation is that respondents did not want to admit that they have any negative aspects in their personality.

Common Factor Analyses' Results for the Business Communication Construct

Since this construct is newly developed, common factor analyses were a fundamental step in investigating its underlying dimensions. The analyses revealed three dimensions that measures business communications. This finding followed what was theoretically proposed in the previous chapters. The total variance explained by the construct of business communications is 65.871%.

Scales' Reliability

All of the items remained in the model were then checked for scale reliability. The table below shows the Cronbach Alpha values for each construct used in the study. Also, the same table summarizes the total variance explained by the constructs included in this study.

Table 5.2: Total Variance Explained and Scales Reliability

Construct	Total Variance Explained	Alpha
Pre-production	56.863%	.8858
Product development	62.117%	.8299
Post-production	68.044%	.8913
Symbolic values	73.447%	.9701
Functional values	63.141%	.9239
Business communications	65.871%	.8144
Early stage of adopting innovations	51.538%	.8569

While checking for the regression assumptions, a violation of the normality condition was detected with regards to customers' symbolic reasons for purchase construct. Specifically, the distribution for the symbolic reasons for purchase was seen to be bi-model. Based on that, the construct was dichotomized using a median split. Therefore, logistic regression was used for all the analyses concerned with the symbolic reasons foe purchase construct. For simplifying the explanation of the results, all of the logistic regression results will be discussed first.

<u>Logistic Regression Results</u>

The following are the results of logistic regression analyses linked to the hypotheses concerned with customers' symbolic reasons for purchase as the first dependent variable:

Hypothesis 1a: Attitude toward customer's co-production in the *pre-production phase* will be positively related to customers' symbolic reasons for purchase.
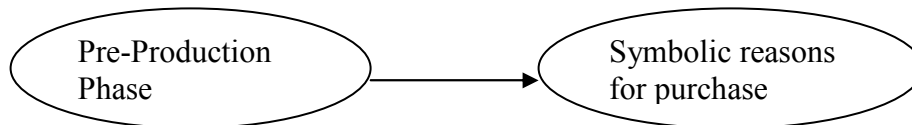
Figure 5.1: Hypothesis 1a

Logistic regression analyses were used and did not detect any significant direct relationship between the attitude toward participating in the pre-production phase as the independent variable and the symbolic reasons for purchase as dichotomous dependent variable. Therefore, this hypothesis was not supported

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An explanation of this situation could be that before actually getting involved in the entire process of co-production, customers may not be attached to the product and therefore will not be sensitive to its symbolic meanings.

Hypothesis 1b: Attitude toward customer's co-production in the *post-production phase* will be positively related to customers' symbolic reasons for purchase.
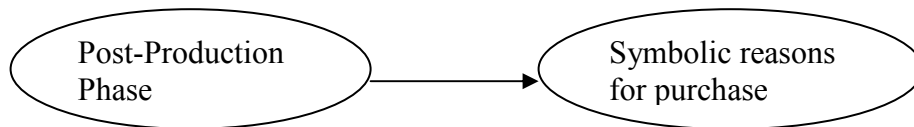
Figure 5.2: Hypothesis 1b

Logistic regression analyses found the support for this hypothesis and the following table summarizes the resulted significant relationship.

Table 5.3: Hypothesis 1b Results' summary

Hypothesis	-2LL	Cox & Snell R2	Wald	Sig	Exp (B): odds ratios
H1b: supported	387.136	.050	12.235	.000	1.811

As shown in the table above, the Wald test is significant and odds ration is large enough to indicate the increase of the probability that the symbolic reasons for purchase will increase with each unit increase in the attitude toward the post-production phase. One could argue that it is logical to expect that customers will be more attached to the

products that they co-produced and, as a result, will tend to purchase them for their symbolic meanings.

Hypothesis 3a: For the early adopters group, the adoption tendency is going to moderate the relationship between attitude toward co-production and symbolic reasons for purchase.
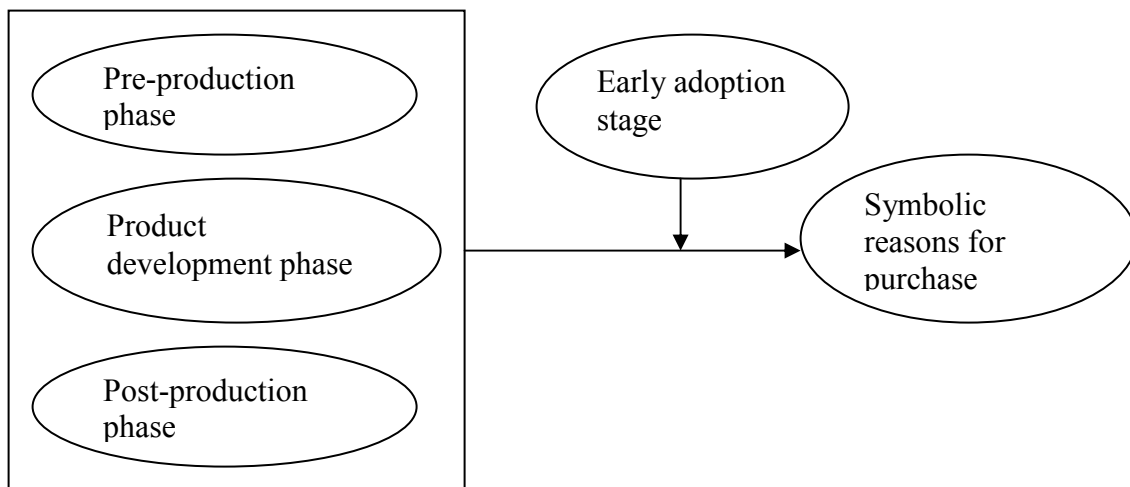
Figure 5.3: Hypothesis 3a

Logistic regression analyses were used with the inclusion of the interaction terms that represent the moderating effect of the early adoption stage. The analyses did not yield any statistically significant results with regards to the interaction term and therefore, the hypothesis was not supported. This could be due to the character of early adopters who are innovative in nature and want to see more practical results rather than focusing on the symbolic meaning of products.

Hypothesis 4a: The three business communication elements will moderate the relationship between attitude toward participating in the *pre-production phase* and customers' symbolic reasons for purchase.

Figure 5.4: Hypothesis 4a

Including the interaction terms of the business communication elements as moderators in the logistic regression model yielded significant results supporting the proposed hypothesis. The following table summarizes the results.

Table 5.4: Hypothesis 4a Results' Summary

Hypothesis	-2LL	Cox & Snell R2	Wald *			Exp (B): odds ratio		
			Risk	Product tech	Business systems	Risk	Product tech	Business systems
H4a: supported	378.616	.078	8.03	5.52	8.41	.93	1.05	1.04

* The significance level of the interaction terms are .005, .019, .004 respectively

The Wald test values are significant for the three interaction terms between the elements of communications and the pre-production phase as the independent variable. Also, the odds ratios show that the increase in business communications at the pre-

production level is going to increase the probability that customers purchase the co-produced products for their symbolic meanings.

Hypothesis 4b: The three business communication elements will moderate the relationship between attitude toward participating in the *product development phase* and customers' symbolic reasons for purchase.
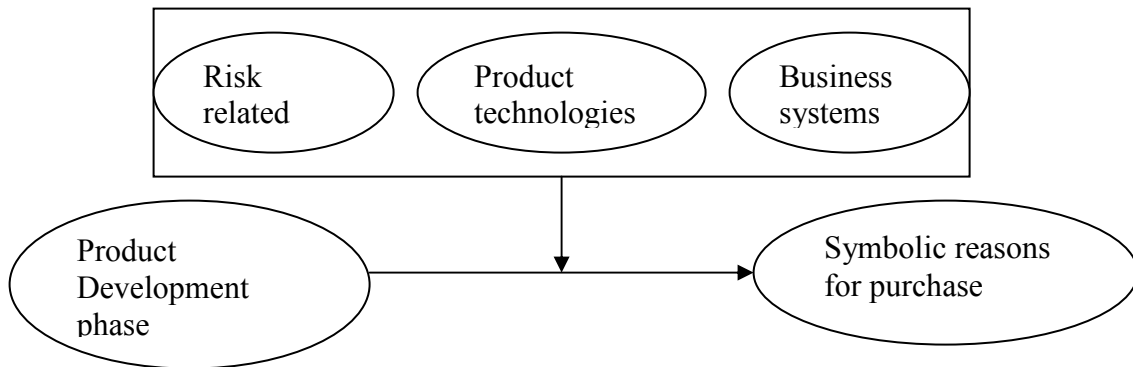
Figure 5.5: Hypothesis 4b

The logistic regression results shown in the table below represent the support for the proposed hypothesis.

Table 5.5: Hypothesis 4b Results' Summary

Hypothesis	-2LL	Cox & Snell R2	Wald *			Exp (B): odds ratio		
			Risk	Product tech	Business systems	Risk	Product tech	Business systems
H4b: supported	280.809	.071	8.03	5.52	8.41	.939	1.05	1.04

* The significance level for the interaction terms are .013 .023 and .004 respectively

Again, the Wald tests are significant with regards to the interaction terms between the business communications elements and the product development phase as

the independent variable. The odds ratios show that the increase business communications at the product development level is going to increase the probability that customers purchase the co-produced products for their symbolic meanings.

Hypothesis 4c: The three business communication elements will moderate the relationship between attitude toward participating in the *post-production phase* and customers' symbolic reasons for purchase.
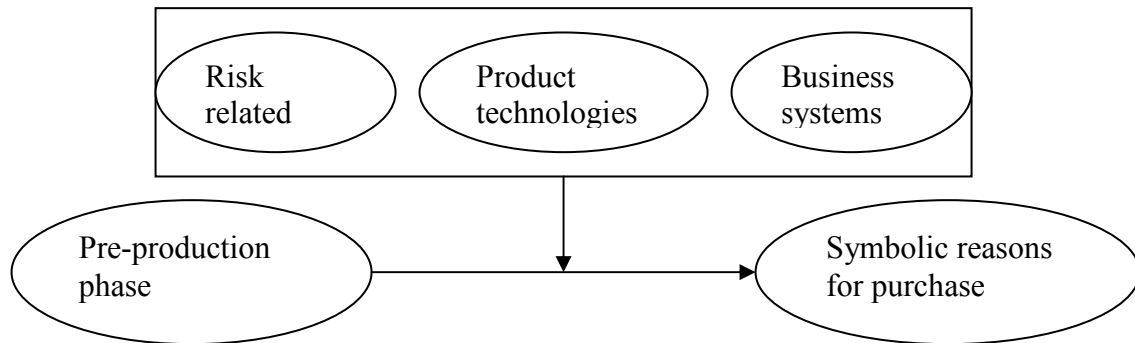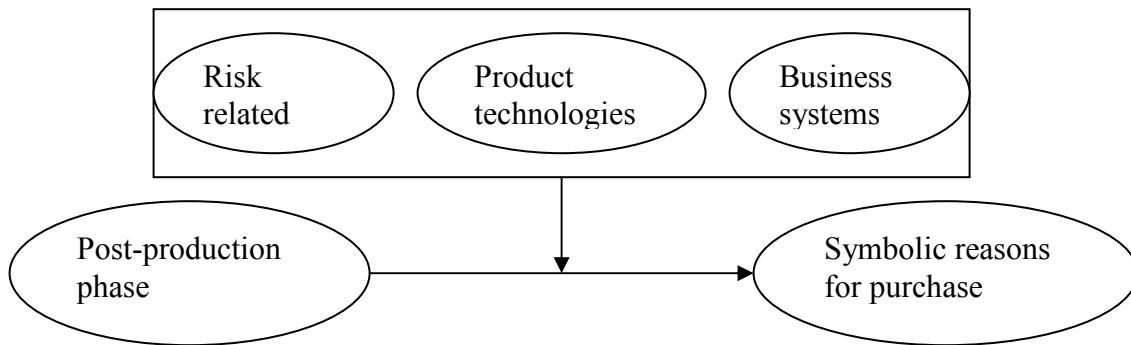

Figure 5.6: Hypothesis 4c

This hypothesis was only partially supported because the moderating effect of the product technologies' related communication was not statistically significant. The following table summarizes the logistic regression results for this hypothesis.

Table 5.6: Hypothesis 4c Results' Summary

Hypothesis	-2LL	Cox & Snell R2	Wald *			Exp (B): odds ratio		
			Risk	Product tech	Business systems	Risk	Product tech	Business systems
H4c: partially supported	369.33	.107	10.12	2.8	9.25	.91	1.04	1.05

* The significance level for the interaction terms is .001 with regards to risk and .002 with regards to business systems but for the product technologies it was low at .095 sig level.

Only the moderating effects of the risk related information and the business systems' communications were significant. As shown in the table, the Wald test for the interaction terms of risk related communication and the business' systems communications were significant and much higher than the one for the interaction term of product's technologies communication. However, the odds ratios still represent that an increase of the business communications at the post-production level is going to increase the probability that customers will purchase the products for their symbolic values.

Hypothesis 6a: Being a male will moderate the relationship between attitude toward the three phases of customer co-production and symbolic reasons for purchase.
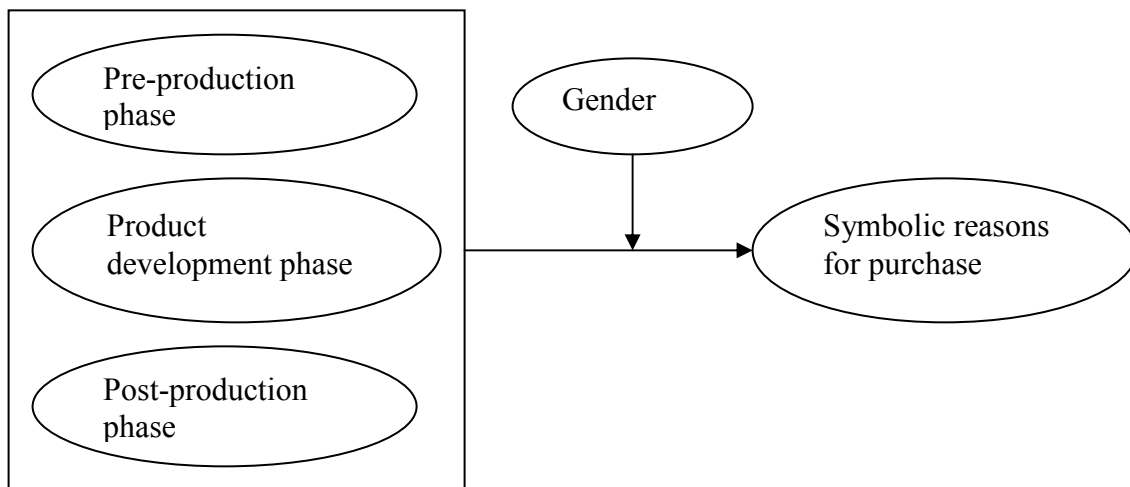
Figure 5.7: Hypothesis 6a

Investigating the moderating effect of gender on the main relationship by including gender's interaction terms with each phase of co-production into the logistic regression analyses did not yield any statistical significance. Therefore, the proposed

hypothesis about the gender effect was not supported. Basically, males and females tend to have similar attitude toward co-production and its influence on their symbolic reasons for purchase.

OLS Regression Results

The following are the regression analyses (OLS) results with regards to customers' functional reasons for purchase as the second dependent variable. Please refer to appendix E for regression assumptions and ANOVA tables.

Hypothesis 2: Attitude toward customer's co-production in the *product development phase* will be positively related to functional reasons for purchase.
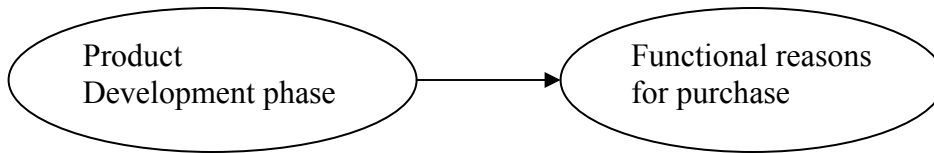
Figure 5.8: Hypothesis 2

This hypothesis was supported using multiple regression analyses. The positive relationship between the product development phase and customers' functional reasons for purchase was significant. One could argue that when customers decide to devote their time and effort into developing and designing new products with the firm, they will expect to meet functional goals when purchasing these products.

Table 5.7: Hypothesis 2 Results' Summary

Hypothesis	R^2	Adjusted R^2	R^2 change	F*	0.05 sig level
H2: supported	.064	.06	.06	19.560	.000

* Sig. F change is .000

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Hypothesis 3b: For the early adopters group, the adoption tendency is going to moderate the relationship between attitude toward co-production and functional reasons for purchase.
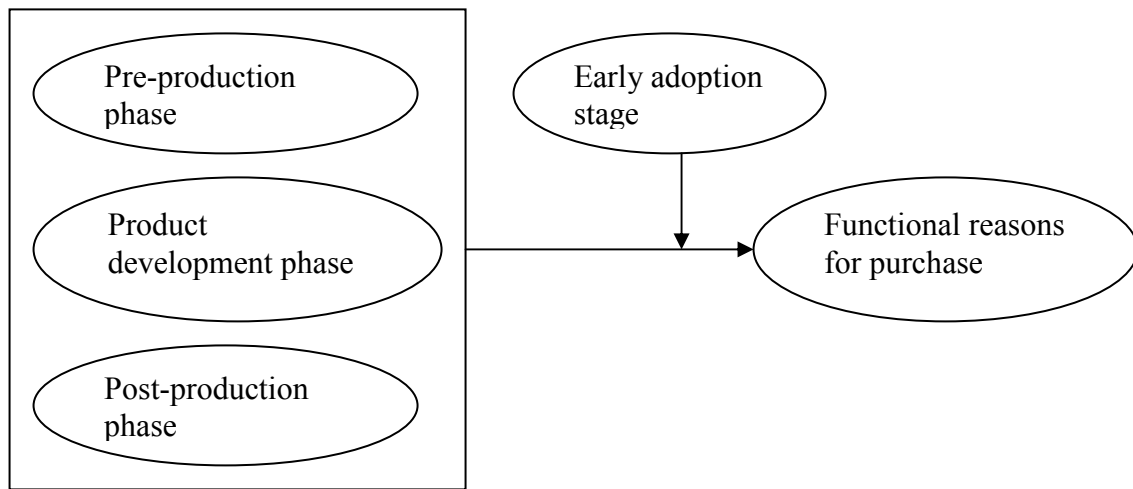
Figure 5.9: Hypothesis 3b

Due to the high colinearity between the interaction effects, three separate regression analyses were run in order to check for the moderating effect of the early adoption of innovation stag. The multiple regression analyses showed a good support for this hypothesis as shown in the tables below.

Table 5.8: Hypothesis 3b Results' Summary (Pre-production)

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H6: supported for the pre-production phase.	.142	.136	23.818	.004

Table 5.9: Hypothesis 3b Results' Summary (Product Development)

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H6: supported for the product development phase	.100	.094	16.015	.001

Table 5.10: Hypothesis 3b Results' Summary (Post-production phase)

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H6: supported for the post-production phase	. 096	.090	15.280	.003

* Sig. F change is .000

This hypothesis was supported with regards to the moderating effects of the early adoption of innovation when interacting with the three phases of co-production. This finding supports what Hirschman (1982) proposed regarding the type of the product produced and innovation. Basically, because the product mentioned in the survey is considered as functional innovation (high technology), it should trigger functional reasons for purchase especially for early adopters of innovations.

Hypothesis 5a: The three business communication elements will moderate the relationship between attitude toward participating in the *pre-production phase* and customers' functional reasons for purchase.
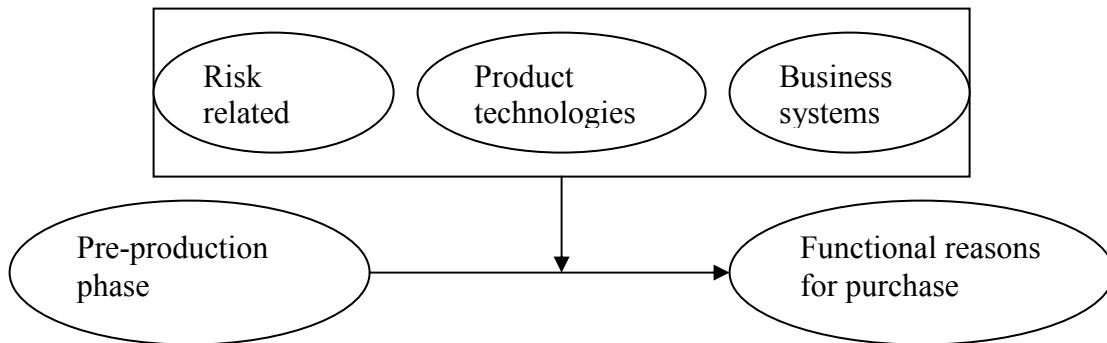
Figure 5.10: Hypothesis 5a

Regression analyses revealed that the risk related communications is the only significant element of business communications during the phase of pre-production. Therefore, this hypothesis is partially supported. The table below summarizes the results.

Table 5.11: Hypothesis 5a Results' Summary

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H5a: Partially supported for the risk related communication only	.141	.129	11.697	.015

* Sig. F change is .000

The pre-production phase is basically the foundation of the other phases of co-production, and based on that customers might be more cautious about the cost of participating in the entire process. To be able to answer these concerns, communicating the risks and costs associated with this product's development should be a necessity at the phase of pre-production. Furthermore, other business communications might not be as important as the risk related ones at this stage.

Hypothesis 5b: The three business communication elements will moderate the relationship between attitude toward participating in the *product development phase* and customers' functional reasons for purchase.
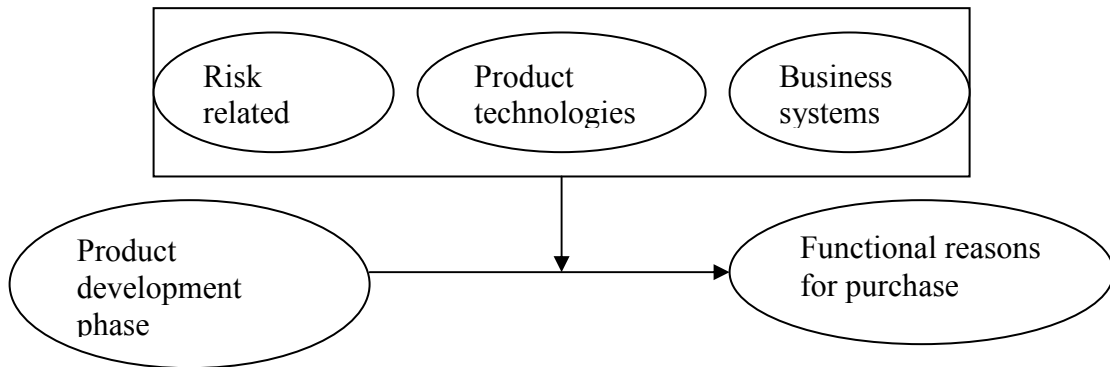
Figure 5.11: Hypothesis 5b

This hypothesis was only partially supported. The interaction effect, shown below, between the product development phase and the risk related communication with the firm was the only significant one.

Table 5.12: Hypothesis 5b Results' Summary

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H5b: Partially supported for the risk related communication only	.100	.088	7.957	.006

* Sig. F change is .000

Again, the risk related information was found to be the most influential type of business communication on the relationship between the product development phase and the functional reasons for purchase. The explanation of this finding could be that

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when customers get involved in designing products, they want to make sure that these

products are harmless to other users.

Hypothesis 5c: The three business communication elements will moderate the

relationship between attitude toward participating in the *post-production phase* and

customers' functional reasons for purchase.
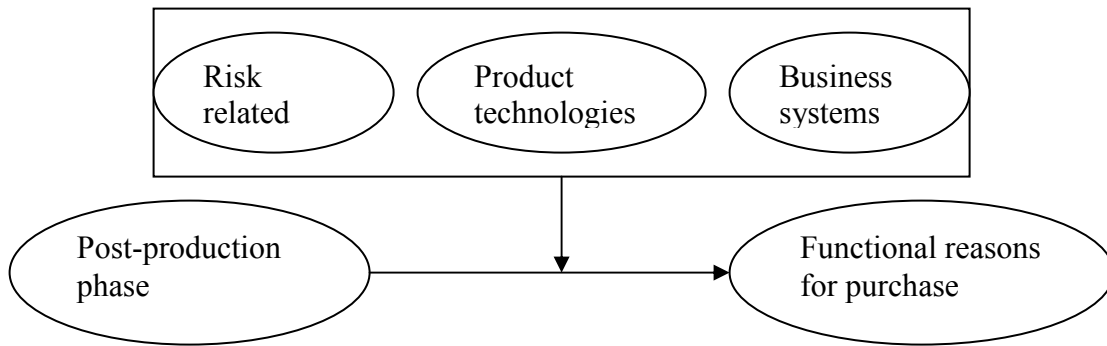
Figure 5.12: Hypothesis 5c

This hypothesis was partially supported. The interaction effect between the post-

development phase and the risk related communication with the firm was significant.

The table below summarizes the significant results.

Table 5.13: Hypothesis 5c Results' Summary

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H5c: Partially supported for the risk related communication only	.098	.085	7.738	.006

* Sig. F change is .000

The risk related communications appear to be the most influential moderator on

the relationship between co-production (including the three phases) and the functional

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reasons for purchase. Apparently, the type of the product discussed in the survey had an effect on how respondents perceived the importance of business communications. Since it is a sophisticated electronic device, respondents wanted to make sure that it doesn't cause any harm to them while co-producing it and to other customers while using it.

Hypothesis 6b: Being a male will moderate the relationship between attitude toward the three phases of customer co-production and functional reasons for purchase.
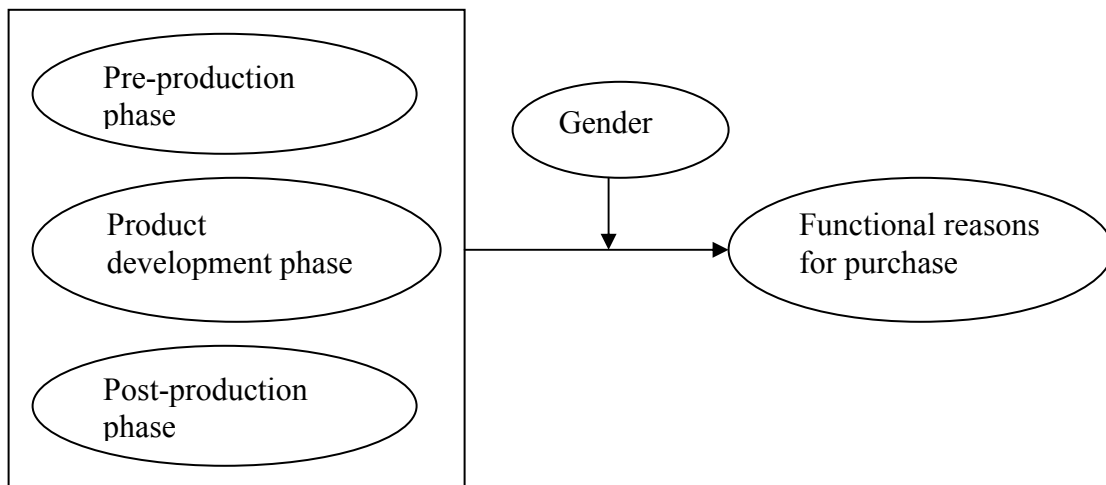
Figure 5.13: Hypothesis 6b

Running regression analyses with the inclusion of gender interaction effects did not yield any statistically significant moderating effects. Therefore, this hypothesis was not supported. This means that males and females have similar attitudes toward co-production and they purchase the co-produced products for the almost the same reasons.

Structural Equation Modeling

One could argue that since this study is investigating some of constructs for the first time, using a rigorous method for testing the proposed relationships is an essential step that could strengthen the findings of the study (Peterson et. al. 2005). Structural Equation Modeling was chosen in order to reach this goal. In order to use SEM in this study, LISREL 8.5 software was the statistical tool utilized. SEM is the best way for testing multiple relationships at the same, examining latent variables, and allowing for enhanced model fits (Hair et. al. 1991). Also, it is a recognized confirmatory analyses method (measurement model). This study followed Anderson and Gerbing (1988) as a two-step approach which used two models for investigating the latent variables. The first step is the measurement model which is basically the confirmatory factor analyses method. In the measurement model the latent variables are allowed to correlate and the model can be adjusted for better fit (item purification). The second step is the structural equation model. In this step the main relationships are investigated and the nomological validity is assessed. The following is a detailed discussion of the two-step method used in this study.

Measurement Model

At this level of the analyses including any dichotomized variable into the model would complicate the analyses, especially that this study is using LISREL software. Therefore, all of the constructs were entered into the model except the symbolic reasons for purchase. The first measurement model revealed that some of the items need to be removed from the model. In order to take the decision of deleting an item, some

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statistical tests and indicator have to be considered such as the goodness of fit, t-tests,

modification indices, standardized residuals, items' loadings on the constructs, and root

mean square residuals. Several measurement models were run in order to reach an

acceptable model fit. Please refer to the appendix G that includes the path diagram of

the final measurement model that includes the constructs, the standardized solutions,

and the items remaining in the model. The remaining items' loadings on the factors

(constructs) show that the scales have good convergent validity (more than 0.5). The

following table (5.14) shows the remaining items and their loadings on the underlying

constructs.

In order to assess the discriminant validity, that ensures that each construct is

different than the other constructs in the model, the average variance extracted

procedure (AVE) that was introduced by Dillon and Goldstein (1984) was used. The

following table (5.15) presents the average variance extracted by each construct,

correlations between constructs (phi), and the correlation between constructs squared

(phi^2). As shown in the table, all of the AVE values are higher than 0.5, indicating good

level of unidimensionality. Also, all of the (phi^2) values show that the constructs are

different from each other and therefore discriminant validity is assessed. Since the

discriminant validity and the convergent validity were assessed, the construct validity of

the scales is assessed as well. Furthermore, the correlation between the exogenous

variables was high among the dimensions that are measuring the same construct. The

correlations between the co-production phases were .48 and .6, while they had lower

correlations with the other variables in the model. Also, the correlations between the

business communications' dimensions were .4 and .6, while they don't correlate much

with the other variables.

Table 5.14: Final Scale Items and Standardized Factor Loadings

Items	Loading
Pre-production	
I will let the company know of the ways that they can better serve me.	.82
I will give the company constructive suggestions about the new product.	.91
Product Development	
I will follow the rules the company sets regarding the company's product secrets.	.78
I will follow the schedules for my responses that the company sets.	.81
I will direct my best thinking to the development of the company's products.	.78
Post-production	
I will recommend this product to other people I know.	.91
I will encourage other people to use this product.	.95
Functional Reasons for Purchase	
It is a reliable product.	.89
It functions better then other products.	.93
It has high quality.	.90
Risk Related Communications	
I want to be aware of all the potential risks associated with the product usage.	.65
I want to be engaged in an active dialogue with firms about risks of product usage.	.82
Product Technologies Communications	
I want to be informed about the firm's current product technologies.	.92
I want to be informed about potential product technologies the firm might adopt.	.85
Business Systems Communications	
I want to be informed about the firms' current business systems (such as billing).	.93
I want to be informed about business systems (such as customized billing) the firm might adopt.	.96
Early Adoption Stage	
I am respected among my peers.	.73
I am a successful person.	.92
I am a role model for other people.	.79

Table 5.15: Discriminant Validity

Average Variance Extracted		Φ	Φ²
Pre-Production .750	Product Development .623	.60	.36
Pre-Production .750	Post-Production .869	.48	.23
Pre-Production .750	Functional Reasons .825	.32	.102
Pre-Production .750	Risk Related .552	.28	.08
Pre-Production .750	Product Technologies .785	.28	.08
Pre-Production .750	Business Systems .893	.15	.023
Pre-Production .750	Early adoption .667	.10	.01
Product Development .623	Post-Production .869	.42	.18
Product Development .623	Functional Reasons .825	.28	.084
Product Development .623	Risk Related .552	.23	.053
Product Development .623	Product Technologies .785	.21	.0441
Product Development .623	Business Systems .893	.14	.012
Product Development .623	Early Adoption .667	.18	.032
Post-Production .869	Functional Reasons .825	.27	.073
Post-Production .869	Risk Related .552	.25	.063
Post-Production .869	Product Technologies .785	.35	.123
Post-Production .869	Business Systems .893	.17	.03
Post-Production .869	Early Adoption .667	.19	.036
Functional Reasons .825	Risk Related .552	.24	.058
Functional Reasons .825	Product Technologies .785	.16	.026
Functional Reasons .825	Business Systems .893	.03	.001
Functional Reasons .825	Early Adoption .667	.27	.073
Risk Related .552	Product Technologies .785	.60	.36
Risk Related .552	Business Systems .893	.40	.16
Risk Related .552	Early Adoption .667	.19	.04
Product Technologies .785	Business Systems .893	.45	.203
Product Technologies .785	Early Adoption .667	.16	.023
Business Systems .893	Early Adoption .667	.03	.001

Furthermore, in assessing the model fit, the following table summarizes the SEM's fit indices that resulted in the refined measurement model. As shown in the table, the comparative fit index and the goodness of fit index are high indicating that the model fits well. The low p-value of the badness of ft (chi-square) could be due to the fact that many of the items were dropped from the model or due to sample size issues.

Table 5.16: Measurement Model Fit

Chi-square	P-value	RMSEA	CFI	GFI	AGFI	RMSR
193.62	.000	.044	.98	.93	.90	.051

Structural Model and Nomological Validity

The second step of the analyses was to fit tow different constructs in one model and test the relationship between these tow different constructs. Since the main hypothesis regarding the functional reasons for purchase was about the product development phase, these two constructs were tested in the same structural model. The correlation between the two constructs (Gamma γ) was .3 which is lowest acceptable level of correlation. Finding an acceptable level of correlation between the two constructs assesses the nomological validity for these two constructs. The following table summarizes the model's indices of fit. As shown in the table, the model's fit seems to be high based on the high CFI and GFI indices. Please refer to appendix G for the path diagram that shows the standardized solutions.

Table 5.17: Structural Model Fit

Chi-square	P-value	RMSEA	CFI	GFI	AGFI	RMSR
8.98	.344	.021	1.00	.99	.97	.023

Moreover, checking the reliability of the scales for the second time was an essential step in order to insure the interior consistency of the constructs after deleting some of the items included in the measurement model. Table 5.18 summarizes the new scales' Reliability.

Table 5.18: New Scales Reliability

Construct	Alpha
Pre-production	.8573
Product Development	.8299
Post-production	.9285
Functional reasons for purchase	.9324
Early Adoption	.8478
Risk related communications	.6787
Product technologies' communications	.8769
Business systems' communication	.9417

Regression Analyses Based on the New Model

The items' purification process that took place in the measurement model suggested the importance of re-testing the hypotheses of this study in order to check for the consistency of the results. Since the symbolic reasons of purchase were not included in the SEM model, they were still treated as a dichotomized variable. The rest of the constructs were taken from the SEM suggested model and entered to the regression models (OLS and Logistic).

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It was also important to check for the descriptive statistics of the remaining constructs and their indicators. The following table summarizes the main descriptive statistics:

Table 5.19: Descriptive Statistics for the New Model

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Statistic	Skewness Statistic	Std. Error	Kurtosis Statistic	Std. Error
pre-production items averaged	290	1.00	7.00	5.9414	1.00173	-1.946	.143	5.827	.285
product development items averaged	290	1.00	7.00	5.8862	.98766	-1.534	.143	4.511	.285
post-production items averaged	290	1.00	7.00	5.5897	1.12177	-.994	.143	1.801	.285
functional reasons for purchase averaged	290	1.00	7.00	5.7563	1.02731	-1.167	.143	2.449	.285
risk related communication items averaged	290	3.00	7.00	5.7379	.95320	-.399	.143	-.565	.285
product technologies communication items averaged	290	2.00	7.00	5.2397	1.18613	-.371	.143	-.315	.285
business systems communication items averaged	290	1.00	7.00	4.5672	1.57943	-.321	.143	-.484	.285
early adoption items averaged	290	1.00	7.00	5.6506	.94308	-1.034	.143	2.508	.285
Valid N (listwise)	290								

Logistic Regression Results for the New Model

The new analyses were divided into two parts based on the method used for analyzing the data. The first part of the analyses was concerned with the symbolic reasons for purchase and based on that used logistic regression in order to investigate the proposed hypotheses. The following is a list of hypotheses and the logistic regression's results associated with them.

Hypothesis 1a: Attitude toward customer's co-production in the *pre-production phase* will be positively related to customers' symbolic reasons for purchase.

Logistic regression analyses were used again to investigate the proposed relationship. The finding of this test confirmed the previous results which did not detect a statistically significant relationship between the pre-production phase and the symbolic reasons for purchase. This hypothesis was not supported

Hypothesis 1b: Attitude toward customer's co-production in the *post-production phase* will be positively related to customers' symbolic reasons for purchase.

Table 5.20: Hypothesis 1b Tested Based on the New Model

Hypothesis	-2LL	Cox & Snell R2	Wald	Sig	Exp (B): odds ratios
H1b: supported	387.637	.048	13.054	.000	1.522

Based on the table above, a significant relationship between the post-production phase and the symbolic reasons for purchase was found. This hypothesis was confirmed again as it was found in the previous section. Furthermore, the finding indicates that the more customers get involved in the post-production phase the higher the probability that they are going to purchase the product for symbolic reasons.

Hypothesis 3a: For the early adopters group, the adoption tendency is going to moderate the relationship between attitude toward co-production and symbolic reasons for purchase.

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Logistic regression analyses were used for testing this hypothesis. The analyses did not yield any statistically significant results and therefore, the hypothesis was not supported. This follows what was found in the previous section.

Hypothesis 4a: The three business communication elements will moderate the relationship between attitude toward participating in the *pre-production phase* and customers' symbolic reasons for purchase.

Including the interaction terms of the business communication elements as moderators in the logistic regression model yielded significant results supporting the proposed hypothesis and confirming the previous findings. This hypothesis was supported and that indicates that customers who need communication with the firm at the pre-production phase will purchase the product for symbolic reasons. The following table summarizes the results:

Table 5.21: Hypothesis 4a Tested Based on the New Model

Hypothesis	-2LL	Cox & Snell R2	Wald *			Exp (B): odds ratio		
			Risk	Product tech	Business systems	Risk	Product tech	Business systems
H4a: supported	379.797	.074	7.154	6.197	7.393	.933	1.053	1.04

* The significance level of the interaction terms are .007, .013, .007 respectively

Hypothesis 4b: The three business communication elements will moderate the relationship between attitude toward participating in the *product development phase* and customers' symbolic reasons for purchase.

Table 5.22: Hypothesis 4b Tested Based on the New Model

Hypothesis	-2LL	Cox & Snell R2	Wald *			Exp (B): odds ratio		
			Risk	Product tech	Business systems	Risk	Product tech	Business systems
H4b: supported	280.799	.071	6.130	5.171	8.343	.939	1.05	1.044

* The significance level for the interaction terms are .013 .023 and .004 respectively

The table above represents summary for the results of using logistic regression for testing the fourth hypothesis (b). As shown, the three interaction terms were statistically significant which indicates that the hypothesis was supported. This means that customers at the product development phase will need to have more communication with company.

Hypothesis 4c: The three business communication elements will moderate the relationship between attitude toward participating in the *post-production phase* and customers' symbolic reasons for purchase.

This hypothesis was only partially supported (confirming previous finding) because the interaction term of between the post-production phase and the product technologies' communication was not statistically significant. The three interaction terms of the three elements of business communication with the post-purchase phase were tested using logistic regression. Only the moderating effects of the risk related information and the business systems' communications were significant.

Table 5.23: Hypothesis 4c Tested Based on the New Model

Hypothesis	-2LL	Cox & Snell R2	Wald *			Exp (B): odds ratio		
			Risk	Product tech	Business systems	Risk	Product tech	Business systems
H4c: partially supported	368.159	.110	9.252	2.886	9.572	.915	1.039	1.049

* The significance level for the interaction terms is .002 with regards to risk and .002 with regards to business systems but for the product technologies it was low at .089 sig level.

Hypothesis 4: Being a male will moderate the relationship between attitude toward the three phases of customer co-production and symbolic reasons for purchase.

Investigating the moderating effect of gender on the main relationship by including gender's interaction terms with each phase of co-production into the logistic regression analyses did not yield any statistical significance for the second time. Therefore, the proposed hypothesis about the gender effect was not supported.

OLS Regression Results for the New Model

The following are the regression analyses (OLS) results with regards to customers' functional reasons for purchase as the second dependent variable:

Hypothesis 2: Attitude toward customer's co-production in the *product development phase* will be positively related to functional reasons for purchase.

Using regression analyses, the positive relationship between the product development phase and customers' functional reasons for purchase was significant. Therefore, this hypothesis was supported.

Table 5.24: Hypothesis 2 Tested Based on the New Model

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H2:	.064	.06	19.692	.000

* Sig. F change is .000

The table shown above supported the previous findings that indicated the positive relationship between the product development phase and the functional reasons for purchase.

Hypothesis 3b: For the early adopters group, the adoption tendency is going to moderate the relationship between attitude toward co-production and functional reasons for purchase.

The problem of high colinearity between interaction terms appeared again at this step and therefore, it was essential to run separate regression models for each interaction term between the early adoption stage and the three phases of co-production. The following tables represent summaries of the results.

Table 5.25: Hypothesis 3b Tested Based on the New Model

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H3b: Pre-production	.111	.105	17.985	.002

* Sig. F change is .000

Table 5.26: Hypothesis 3b Tested Based on the New Model

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H3b: Production development	.097	.091	15.407	.001

* Sig. F change is .000

Table 5.27: Hypothesis 3b Tested Based on the New Model

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H3b: Post-production	.101	.094	16.048	.001

* Sig. F change is .000

Based on the tables above, it is clear that the hypothesis was supported. The adoption stage was found, for the second time, to be significantly affecting the relationship between co-production and the functional reasons for purchase.

Hypothesis 5a: The three business communication elements will moderate the relationship between attitude toward participating in the *pre-production phase* and customers' functional reasons for purchase.

Table 5.28: Hypothesis 5a Tested Based on the New Model

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H5a: Partially supported for the risk related communication only	.100	.087	7.915	.042

* Sig. F change is .000

Running regression analyses showed that the only significant interaction effect was the one between the risks' related communications and the preproduction phase. As found in the previous section, respondents wanted to know more about the risks associated with the product before they begin the process of co-production. Based on that, this hypothesis was partially supported.

Hypothesis 5b: The three business communication elements will moderate the relationship between attitude toward participating in the *product development phase* and customers' functional reasons for purchase.

Table 5.29: Hypothesis 5b Tested Based on the New Model

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H5b: Partially supported for the risk related communication only	.089	.076	6.952	.031

* Sig. F change is .000

This hypothesis was only partially supported. The interaction effect between the product development phase and the risk related communication with the firm was the only statistically significant interaction term. Again, this finding supports what was found in the previous section. Respondents were interested in knowing ore about the risks associated with the products at this phase of co-production.

Hypothesis 5c: The three business communication elements will moderate the relationship between attitude toward participating in the *post-production phase* and customers' functional reasons for purchase.

Table 5.30: Hypothesis 5c Testes Based on the New Model

Hypothesis	R^2	Adjusted R^2	F*	0.05 sig level
H5c: Partially supported for the risk related communication only	.084	.071	6.543	.029

* Sig. F change is .000

This hypothesis was partially supported and confirmed the previous findings. The interaction effect between the post-development phase and the risk related communication with the firm was the only significant one.

Hypothesis 6b: Being a male will moderate the relationship between attitude toward the three phases of customer co-production and functional reasons for purchase.

For the second time, running regression analyses with the inclusion of gender interaction effects did not yield any statistically significant moderating effects. Therefore, this hypothesis was not supported even after applying the model's adjustments.

CHAPTER VI

DISCUSSIONS AND CONCLUSIONS

Overview

This chapter includes a discussion of the results presented in the previous

chapter. Such discussion will lead into theoretical and managerial implications that

should be considered. Also, this chapter includes the limitations of the research and the

suggested research steps that should be considered in the future.

Discussion of Results

The main objective of this research was to investigate the importance of the co-

production concept. This study provided a concise definition of customer co-production

as a continuous and dynamic concept in the marketing literature. Furthermore, this

study looked at customer co-production as a process that includes three phases which

are pre-production, product development, and post-purchase. The pre-production phase

is when customers agree to be involved in new products' ideas generation. The product

development phase is the core of the co-production process because customers agree to

participate in actually producing the new products, build a small prototype, and commit

to the firm's schedules and regulations. Of course, customers will be rewarded by cash

and social recognition if they decide to participate and devote their efforts and time for

the co-production of new products. The post-production phase requires customers to

promote the newly developed product among their peers and circle of acquaintances.

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The simple survey method was used in order to capture the main relationships proposed by this study. The following are summarized discussions of the main relationships that were investigated.

Reasons for Purchase

In order to understand the importance of customer co-production, it was essential to link it to other related variables and explore how it could affect customers' decisions. First, this study investigated customers' attitude toward the process of co-production and then link it to the symbolic and functional reasons for purchase. It was argued that the value of the process will be manifested in the reasons it triggers to encourage customers to buy such co-produced products. As hypothesized, customers who had a positive attitude toward the product development phase valued the functional reasons for purchase and customers who had a positive attitude toward the post-production phase valued the symbolic reasons for purchase. However, customers who had a positive attitude toward the pre-production phase did not value the symbolic reasons for purchase. These findings reveal that customers are willing to participate in developing products that are going to meet their functional goals. Basically, they want the products that were worth the effort of spending the time co-producing them. Also, customers get attached to the products that they helped in producing because they could be source of customers' pride, sense of achievement, and belonging. Although it was difficult to get a deeper look at the symbolic reasons for purchase due to the fact that respondents did not consider them as important as the functional reasons, one could argue that respondents usually don't like to be seen as vulnerable or emotionally

attached to anything. This study still argues that the symbolic reasons for purchase are still strongly influenced by the co-production process but this influence need to be manifested by using other methods of data collection or other by using other instruments.

<div align="center">Early Adoption Stage</div>

As this study proposed, when customers are classified as early adopters of innovation their attitude toward co-production and its influence on functional reasons for purchase was stronger. Basically, customers who consider themselves as successful, opinion leaders, socially active, and confident, believed that they can co-produce new products and purchase such products for the functional benefits that they provide. The symbolic reasons for purchase, on the other hand, were not connected to the adoption stage which is contrary to what was proposed in this study.

Investigating the late adopters group is important because they may not be the first to accept the idea of co-production but they might still go for it for the functional and/or symbolic reasons for their purchases. Although it was not hypothesized, the late adopters group did not manifest any interest in purchasing the co-produced products. The items used for measuring the late adoption stage were not strong enough to compose one construct and therefore only one item was used to represent this group of respondents (suspicion of new innovations). Based on that, other insights about the late adopters group should be pursued in order to have better comparison between the two groups in terms of their attitude toward customer co-production.

Another interesting aspect that should be discussed as well is the age of the respondents. Most of the students who participated in this study were under 25 years old and they were willing to participate in the co-production process. Younger crowds usually are more opened toward new innovations and are into the mass customization and customer-centric projects (Adcock et al. 1977; Dickerson and Gentry 1983). Based on that, the late adopters group was very difficult to capture in this study.

Business Communication

The three types of business communications that were used in this study are: risk related communications, product's technologies related communications, and business' systems related communications. The results showed that only the risk related communications have a positive influence on customers' attitude toward the three phases of co-production when linked to functional reasons for purchase. Basically, in order for customers to purchase the co-produced product for the functional benefits that it provides, they need to be aware of all of the current a potential risks associated with developing and using this product from the beginning until the end of their participation.

As for the symbolic reasons for purchase when linked to the pre-production and product development phases, it was found that these links are influenced by the three types of business communication. However, the link between the post-production phase and the symbolic reasons for purchase was only affected by the risk related communications and the business systems related communications. Specifically, respondents tend to value the risk related communications more than the other two

types of business communications. This could happen because customers feel that they are responsible for the product that they co-produced and therefore they are liable for any harm it could cause to other users. With the use of a stronger scale, this study can reveal more types of communications needed for the completion of the co-production process.

One could say that, in general, customers need to be connected with the firm through the three types of communication in order to purchase the products that they co-produced and became attached to.

Gender Effect

This study did not detect any differences between males and females when it comes to their attitude toward the process of co-production and its link to symbolic and functional reasons for purchase. Although the number of males slightly exceeded the number of females (controlling for the ethnicity and age), there was no evidence of males' preference for participating in the co-production process. Most of the students participating in this study were under 25 years of age and this could explain the reasons for the lack of gender effects.

Theoretical and Managerial Implications

The main theoretical implication of this dissertation is linking the previous literature that discussed the process of co-production and based on that providing a precise definition that could be considered in future research. This research revealed that co-production could be a fundamental addition to the consumer behavior field and the customer-centric marketing orientation field as well. This supports what Prahalad

and Ramaswamy (2003) proposed regarding the future of competition and how it will rely on the co-creation of consumption experience between firms and customers. Also, this dissertation supports von Hippel's (2002) proposition of the importance of looking at customers as innovators and giving them the chance to communicate their innovations through toolkits.

The managerial implications of this research revolve around the fact that customers have a positive attitude toward participating in the co-production process. Managers can rely on defining the lead users (von Hippel 2002) on communicating their innovations with the firm in the process of developing new products. Also, the findings show that customers are willing to purchase the co-produce products for several reasons that managers can use as motivations to encourage more customers to get involved in the co-production process.

Finally, the findings of this dissertation show that customers who are willing to participate in the co-production process will need to maintain certain level of communications with the firm. Understanding all the types of risks associated with the products is the most important factor that managers should consider while establishing business communications with customers. Other types of communications regarding the products' potential uses and developments are to be considered, too. All in all, customer co-production could be the next fundamental factor of competition between firms (Prahalad and Ramaswamy 2003).

Limitations and Suggested Future Research

Limitations

As any other research, this dissertation has its own limitations and shortcomings. Among these limitations are the sample size and the difficulty of having more control on the subjects participating in the survey. As any other self-report surveys, some expected mono-method weakness in the findings will occur due to the fact that all of the variables are being investigated based on the same respondents. Another limitation is the lack of detail investigation of the value of each stage of the process of co-production separately. Investigating the motivations and the attitude towards each stage would strengthen the main argument of this research. Such shortcoming can be demonstrated in the expected disadvantages of adopting the toolkit method (Hippel 2002).

One could argue that the toolkit approach will carry some difficulties that include: 1) the need for certain design module or simulations that allow the innovation without going through the entire manufacturing process, 2) the importance of being user friendly with minimal need for learning new skills or languages, 3) the need for additional information regarding the capabilities and limitations of the production process, and 4)the difficulty of satisfying every need and designing every innovation (Thomake and von Hippel 2002).

Furthermore, the scales that were developed for the first time in this study were not as strong as expected. The three types of business communications had only two items measuring each type. This problem stem from the fact that the main focus was on the DART elements proposed by Prahalad and Ramaswamy (2003). Such a major

variable required a stronger theoretical back ground to support the items' generation process. In addition, the early adoption and late adoption stages represented another challenge, especially that customers were reluctant in reporting any characteristic that could classify them as late adopters.

Finally, the low level of R-square is considered as another limitation of this study. Many reasons could cause such low levels of associations. Small sample size and data distribution could be among the main causes of this problem. Also, the variation in customers' responses could be another reason that could be control for with larger sample size.

Future Research

The logical next steps for this research are 1) to develop better scales and try to capture the same relationship with these new scales and 2) to further explore the group that did admit their symbolic attachment to the co-produced products and try to understand their attitudes and purchase intentions at deeper level. Qualitative research method could be used in order to examine the symbolic reasons for purchasing co-produced products.

One of the future research projects will focus entirely on the managers' side. It will be interesting to explore their views and attitudes toward co-producing with customers. The business communications construct can be to investigate again but from the perspective of managers. Issues such as type of products, types of customers to be involved, and the firm position in the market will be among the topics to be investigated in the managerial piece.

Furthermore, future research projects can go to a more challenging level by investigating cultural differences among consumers in different parts of the world, their perceptions of the concept of customer co-production and whether they have the trust in local and foreign firms.

Finally, focusing on business customers is worth investigating as well as end consumers. Including the B2B concept is going to enrich our understanding of the role of customer co-production in businesses' growth and success.

<div align="center">Final Conclusion</div>

This dissertation succeeded in providing a precise definition for co-production as a three-phase process. Also, based on the findings, customers value the participation of coproduction and want to be involved in it, given that they are provided with the right incentives. Furthermore, when it comes to new innovations, early adopter groups of customers will be more willing to purchase the products that they co-produced with the firm. Finally, with the right type of communications with the firm, customers are going to purchase the products that they helped in producing. In conclusion, customer co-production is a valuable marketing concept that both customers and managers should be aware of in order to communicate in the new era of customer-centric marketing orientation.

APPENDIX A

PILOT STUDY

Information Sheet

This research involves Customers' attitude toward new products.
You will be provided with information regarding a new generation of cell phones that is going to be introduced to the market in the near future. Then you will be asked to respond to questions regarding your opinion toward these new cell phones based on the scenario provided. This task will take you, on average, 10 to 15 minutes to complete. You have the opportunity to contact the researcher with any questions that you may have. The researcher is Miss Samar M. Baqer.

Please, be informed that there will be *NO* discomfort anticipated with this research.

The major benefits you will receive from participation in this research are increased knowledge of Consumer Decision Making and attitude toward new products. Also, you will gain an increased familiarity with marketing research methods.

Please, understand that your answers will be held strictly confidential. Responses will only be presented in aggregate form.

This research is under the supervision of Dr. Mark Peterson. Dr. Peterson's office is room 605 in the Business Building at the University of Texas at Arlington. His phone number is (817)-272-2283. Please feel free to contact Dr. Peterson or myself, the researcher, at 817-907-4715 if you have any questions. If you have any concerns or questions regarding this survey and the process of conducting it, please contact Pat Myrick, Director of Research Compliance, in the Office of Research Compliance, at 817-272-0834.

Thank you for participating in our research project. In the next few pages you will be asked to answer some questions regarding the following scenario. Your response will be held in the strictest confidence and will not be associated with your information.

Imagine the following situation: Your favorite electronics manufacturer is going to take the initiative to introduce the new generation of gadgets which is a student-help small device that is supposed to help students in saving all their class notes, in organizing them, generating test questions based on them, and playing them in an audio form. This product is going be introduced to the market in the next two years.

Because you are a valuable customer for this firm, they decided to contact you and ask you to help them in the processes of producing this product. They want you to get involved in the process from the beginning until the product is offered for sale in the market. You will have the chance to 1) name this product, 2) add features to it such as connectivity type, 3) choose its interface such as color and size, and 4) design its final look. The company is going to be flexible with your time schedule and send you all the information that you need to know. You can expect to devote 1 hour per week for 5 weeks in this effort. You will receive $50 at the end of the 5 weeks.

In case you approve to cooperate with the company, you will receive a package in the mail that will contain all the possible new innovations that could be added to the new generation of student-help device based on the firm's capabilities. Also, you will be asked to send the company a proposal with all the possible new innovations that you think would serve customers, like you, in a better way. A toolkit is going to be sent to you at later stage to give you the chance to enjoy the process of designing the product by yourself, The company will use your work in developing this new student-help small device. When the product is introduced to the market, the company will ask you to promote it to all the people you know.

(I) *Given the above, please answer the following questions on a scale from 1 to 7*

Strongly Disagree	*Disagree*	*Somewhat Disagree*	*Neural*	*Somewhat Agree*	*Agree*	*Strongly Agree*
1	2	3	4	5	6	7

1) _____ I will let the company know of the ways that they can better serve me.
2) _____ I will give the company constructive suggestions about the new product.
3) _____ I will likely NOT have ideas on how to improve the current products.
4) _____ I will inform the company about any problem that I face with the new product.
5) _____ I will let the company know if am satisfied with the product.

6) _____ I will cooperate with the company to develop this new product.
7) _____ I will help the company in designing this product.
8) _____ If I participate in developing this product, I will follow the rules the company

sets regarding the company's product secrets.

9) ____ If I participate in developing this product, I will follow the schedules for my responses that the company sets.

10) ___ If I participate in developing this product, I will direct my best thinking to the development of the company's products.

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

11) ___ I will help the company increase the benefits sought by those who will use this product.

12) ___ I will recommend this product to other people I know.

13) ___ I will NOT encourage other people to use this product.

14) ___ I will cooperate with the company again in developing new products.

15) ___ I will talk about this product with my peers.

16) ___ I will help the company in improving this product after it has been introduced into the market for sale.

17) ____ If I cannot afford this product now, then I will NOT recommend it to other \ customers.

(II) Tell us about your goals of purchasing the product indicated in the above scenario. Please. Pick up the number that best suits your opinion:

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

I will **buy** this product **because**:

18) ___ it will make me noticed by others.

19) ___ it will help me gain others' respect.

20) ___ it will make me popular among my peers.

21) ___ it will show people who I am.

22) ___ it will increase my self-confidence.

23) ___ it is a symbol of success.

24) ___ it is a symbol of being cool

25) ___ it is a symbol of prestige.

26) ___ it indicates wealth.

27) ___ it indicates my achievements.

28) ___ it enhances my image in the eyes of other people.

29) ___ it shows that I have higher social status.

30) ___ it is a reliable product.

31) ___ it functions better then other products.
32) ___ it has high quality.
33) ___ it is priced reasonably.
34) ___ it has the benefits that I seek.
35) ___ it serves my needs.
36) ___ it is a practical product.

(III) Tell us what you think about your communication with the firm. Please Pick up the number that best suits your opinion:

Strongly Disagree	*Disagree*	*Somewhat Disagree*	*Neural*	*Somewhat Agree*	*Agree*	*Strongly Agree*
1	2	3	4	5	6	7

37) _____ I prefer ownership of products compared to merely receiving benefits of
product use.
38)_____ I want to be aware of all the potential risks associated with the product usage.
39)_____ I want to be engaged in an active dialogue with firms about risks of product
usage.
40)_____ I want to be informed about the firm's current product technologies.
41)_____ I want to be informed about potential product technologies the firm might
adopt.
42)_____ I want to be informed about the firms' current business systems (such as
billing).
43)_____ I want to be informed about business systems (such as customized billing) the
\

firm might adopt.

44)_____ Sharing my thoughts about new product concepts with any firm would be
inconvenient.
45)_____ Helping firms in designing a new product would be a burden.
46)_____ Following up with a firm after the point of purchase would be much work.
47)_____ Recommending products to my friends that I have helped develop with a firm
would be an unwanted task.
48)_____ Participating in any product development activity with a firm would require
too

much from me.

(IV) We want to know more about your personality and life style. Please choose the number that indicates your agreement of the fit of these characteristics with your personality:

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

49) ___ I am a person who likes to take risks in life.
50) ___ I **don't** consider myself an adventurous person.
51) ___ I **can't** easily understand complex technical knowledge.
52) ___ I am a socially active person.
53) ___ Among my peers, I consider myself as an opinion leader.

54) ___ I am respected among my peers.
55) ___ I am a successful person.
56) ___ I am a role model for other people.

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

57) ___ I am a cautious person
58) ___ I am a skeptical person.
59) ___ I am usually suspicious of innovations.

60) ____ I consider myself to be a creative person
61) ____ I **don't** consider myself to be an optimistic person
62) ____ I consider myself to be a confident person
63) ____ I consider myself as a fast learner
64) ____ I help others only if I they offer me incentives.

(V) Please, tell us about yourself

65) Which of the following activities **interests** you the **most**?
   ____ **Only** giving ideas to the company about new products.
   ____ **Only** participating in designing new products.
   ____ **Both**, giving ideas and helping in the design of new products
   ____ **Only** recommending the company's product to other people you know.
   ____ Giving ideas of new products, helping in designing these products, and
       recommending them to others after they have been introduced to the market.

66) Gender:
   ____ Female
   ____ Male

67) Age:
_____ 18-20
_____ 21-26
_____ 26- 30
_____ 31-40
_____ 41 and above

68) Ethnicity
_____ Caucasian
_____ African American
_____ Hispanic
_____ Asian
_____ Other

That completes our research. Thank you for your time and cooperation.

Descriptive Statistics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Statistic	Skewness Statistic	Std. Error	Kurtosis Statistic	Std. Error
co1_avg	106	2.40	7.00	5.7849	.93837	-1.172	.235	1.750	.465
co2_avg	106	2.00	7.00	5.6384	1.05847	-1.176	.235	1.859	.465
co3_avg	106	2.50	7.00	5.2799	.97415	-.072	.235	-.418	.465
soc_avg	106	1.00	7.00	3.0778	1.52029	.487	.235	-.535	.465
fun_avg	106	2.00	7.00	5.8288	1.03888	-1.182	.235	2.109	.465
dart_avg	106	2.29	7.00	5.2655	.98392	-.442	.235	.002	.465
early	106	2.67	6.33	5.1226	.66665	-.742	.235	1.175	.465
Valid N (listwise)	106								

Total Variance Explained and Scales' Reliability

Construct	Total Variance Explained	Alpha
Pre-production	61.785%	.7869
Product development	56.714%	.8563
Post-production	63.574%	.8056
Symbolic values	67.079%	.9545
Functional values	68.492%	.9225
Business communications	50.795%	.7944
Early stage of adopting innovations	49.572%	.7785

Regression Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	.432(a)	.187	.179	.94122	.187	23.919	1	104	.000

a Predictors: (Constant), co_avgall

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.190	1	21.190	23.919	.000(a)
	Residual	92.134	104	.886		
	Total	113.323	105			

a Predictors: (Constant), co_avgall
b Dependent Variable: fun_avg

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	2.937	.598		4.910	.000	1.751	4.124
	co_avgall	.521	.106	.432	4.891	.000	.309	.732

a Dependent Variable: fun_avg

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.102(a)	.010	.001	1.51961	.010	1.094	1	104	.298

a Predictors: (Constant), co_avgall

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2.527	1	2.527	1.094	.298(a)
	Residual	240.157	104	2.309		
	Total	242.684	105			

a Predictors: (Constant), co_avgall
b Dependent Variable: soc_avg

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	4.076	.966		4.220	.000	2.161	5.992
	co_avgall	-.180	.172	-.102	-1.046	.298	-.521	.161

a Dependent Variable: soc_avg

APPENDIX B

MAIN STUDY SURVEY

Information Sheet

This research involves Customers' attitude toward new products.
You will be provided with information regarding a new generation of gadgets (student-help) that is going to be introduced to the market in the near future. Then you will be asked to respond to questions regarding your opinion toward these new gadget based on the scenario provided. This task will take you, on average, 10 to 15 minutes to complete. You have the opportunity to contact the researcher with any questions that you may have. The researcher is Miss Samar M. Baqer.

Please, be informed that there will be *NO* discomfort anticipated with this research.

The major benefits you will receive from participation in this research are increased knowledge of Consumer Decision Making and attitude toward new products. Also, you will gain an increased familiarity with marketing research methods.

Please, understand that your answers will be held strictly confidential. Responses will only be presented in aggregate form.

This research is under the supervision of Dr. Mark Peterson. Dr. Peterson's office is room 605 in the Business Building at the University of Texas at Arlington. His phone number is (817)-272-2283. Please feel free to contact Dr. Peterson or myself, the researcher, at 817-907-4715 if you have any questions. If you have any concerns or questions regarding this survey and the process of conducting it, please contact Pat Myrick, Director of Research Compliance, in the Office of Research Compliance, at 817-272-0834.

Thank you for participating in our research project. In the next few pages you will be asked to answer some questions regarding the following scenario. Your response will be held in the strictest confidence and will not be associated with your information.

Imagine the following situation: Your favorite electronics manufacturer is going to take the initiative to introduce the new generation of gadgets which is a student-help small device that is supposed to help students in saving all their class notes, in organizing them, generating test questions based on them, and playing them in an audio form. This product is going be introduced to the market in the next two years.

Because you are a valuable customer for this firm, they decided to contact you and ask you to help them in the processes of producing this product. They want you to get involved in the process from the beginning until the product is offered for sale in the market. You will have the chance to 1) name this product, 2) add features to it such as connectivity type, 3) choose its interface such as color and size, 4) design its final look based on trends you perceive in fashion, 5) choose the themes for the advertising campaign, and 6) recommend possible celebrity endorsers for the brand. The company is going to be flexible with your time schedule and send you all the information that you need to know. You can expect to devote 1 hour per week for 5 weeks in this effort. You will receive $50 at the end of the 5 weeks. You will also be invited to a special pre-launch event with the celebrity endorser chosen for the brand.

In case you approve to cooperate with the company, you will receive a package in the mail that will contain all the possible new innovations that could be added to the new generation of student-help device based on the firm's capabilities. Also, you will be asked to send the company a proposal with all the possible new innovations that you think would serve customers, like you, in a better way. A toolkit is going to be sent to you at later stage to give you the chance to enjoy the process of designing the product by yourself, The company will use your work in developing this new student-help small device. When the product is introduced to the market, the company will ask you to promote it to all the people you know.

(I) *Given the above, please answer the following questions on a scale from 1 to 7*

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

1) _____ I will let the company know of the ways that they can better serve me.
2) _____ I will give the company constructive suggestions about the new product.
3) _____ I will likely NOT have ideas on how to improve the current products.
4) _____ I will inform the company about any problem that I face with the new product.
5) _____ I will let the company know if am satisfied with the product.
6) _____ I will cooperate with the company to develop this new product.
7) _____ I will help the company in designing this product.
8) _____ If I participate in developing this product, I will follow the rules the company

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sets regarding the company's product secrets.

9) ____ If I participate in developing this product, I will follow the schedules for my responses that the company sets.

10) ___ If I participate in developing this product, I will direct my best thinking to the development of the company's products.

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

11) ___ I will help the company increase the benefits sought by those who will use this product.

12) ___ I will recommend this product to other people I know.

13) ___ I will encourage other people to use this product.

14) ___ I will cooperate with the company again in developing new products.

15) ___ I will talk about this product with my peers.

16) ___ I will help the company in improving this product after it has been introduced into the market for sale.

17) ___ If the product is expensive for me, then I will NOT recommend it to others.

(II) Tell us about your goals of purchasing the product indicated in the above scenario. Please. Pick up the number that best suits your opinion:

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

I will **buy** this product **because**:

18) ___ it will make me noticed by others.

19) ___ it will help me gain others' respect.

20) ___ it will make me popular among my peers.

21) ___ it will show people who I am.

22) ___ it will increase my self-confidence.

23) ___ it is a symbol of success.

24) ___ it is a symbol of being cool

25) ___ it is a symbol of prestige.

26) ___ it indicates wealth.

27) ___ it indicates my achievements.

28) ___ it enhances my image in the eyes of other people.

29) ___ it shows that I have higher social status.

30) ___ it is a reliable product.

31) ___ it functions better then other products.

32) ___ it has high quality.

33) ___ it is priced reasonably.

34) ___ it has the benefits that I seek.

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35) ___ it serves my needs.
36) ___ it is a practical product.

(III) Tell us what you think about your communication with the firm. Please Pick up the number that best suits your opinion:

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

37) ____ I prefer ownership of products compared to merely receiving benefits of product use.
38)____ I want to be aware of all the potential risks associated with the product usage.
39)____ I want to be engaged in an active dialogue with firms about risks of product usage.
40)____ I want to be informed about the firm's current product technologies.
41)____ I want to be informed about potential product technologies the firm might adopt.
42)____ I want to be informed about the firms' current business systems (such as billing).
43)____ I want to be informed about business systems (such as customized billing) the firm might adopt.

44)____ Sharing my thoughts about new product concepts with any firm would be inconvenient.
45)____ Helping firms in designing a new product would be a burden.
46)____ Following up with a firm after the point of purchase would be much work.
47)____ Recommending products to my friends that I have helped develop with a firm would be an unwanted task.
48)____ Participating in any product development activity with a firm would require too
    much from me.

(IV) We want to know more about your personality and life style. Please choose the number that indicates your agreement of the fit of these characteristics with your personality:

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

49) ___ I am a person who likes to take risks in life.
50) ___ I consider myself an adventurous person.
51) ___ I easily understand complex technical knowledge.
52) ___ I am a socially active person.
53) ___ Among my peers, I consider myself as an opinion leader.
54) ___ I am respected among my peers.

55) ___ I am a successful person.
56) ___ I am a role model for other people.

Strongly Disagree	Disagree	Somewhat Disagree	Neural	Somewhat Agree	Agree	Strongly Agree
1	2	3	4	5	6	7

57) ____ I consider myself to be a creative person.
58) ____ I consider myself to be a confident person.
59) ____ I consider myself as a fast learner.
60) ____ I am a cautious person.
61) ____ I am a skeptical person.
62) ____ I am usually suspicious of innovations.
63) ____ I consider myself to be a pessimistic person.
64) ____ I help others only if they offer me incentives.

(V) Please, tell us about yourself

65) Which of the following activities **interests** you the **most**?
(Please choose ONE option from the list below)
   ____ **Only** giving ideas to the company about new products.
   ____ **Only** participating in designing new products.
   ____ **Both**, giving ideas and helping in the design of new products.
   ____ **Only** recommending the company's product to other people you know.
   ____ Giving ideas of new products, helping in designing these products, and
          recommending them to others after they have been introduced to the market.

66) Gender:
   ____ Female
   ____ Male

67) Age:
   ____ 18-20
   ____ 21-25
   ____ 26- 30
   ____ 31-40
   ____ 41 and above

68) Ethnicity
   ____ Caucasian
   ____ African American/Black
   ____ Hispanic
   ____ Asian
   ____ Other

That completes our research. Thank you for your time and cooperation.

Final Items Used in the Model

Pre-production
- I will let the company know of the ways that they can better serve me.
- I will give the company constructive suggestions about the new product.
- I will inform the company about any problem that I face with the new product.
- I will let the company know if am satisfied with the product.
- I will cooperate with the company to develop this new product.
- I will help the company in designing this product.

Product Development
- If I participate in developing this product, I will follow the rules the company sets regarding the company's product secrets.
- If I participate in developing this product, I will follow the schedules for my responses that the company sets.
- If I participate in developing this product, I will direct my best thinking to the development of the company's products.

Post-production
- I will recommend this product to other people I know.
- I will encourage other people to use this product.
- I will cooperate with the company again in developing new products.
- I will talk about this product with my peers.

Symbolic Reasons for Purchase
- It will make me noticed by others.
- It will help me gain others' respect.
- It will make me popular among my peers.
- It will show people who I am.
- It will increase my self-confidence.
- It is a symbol of success.
- It is a symbol of being cool
- It is a symbol of prestige.
- It indicates wealth.
- It indicates my achievements.
- It enhances my image in the eyes of other people.
- It shows that I have higher social status.

Functional Reasons for Purchase
- It is a reliable product.
- It functions better then other products.
- It has high quality.
- It is priced reasonably.
- It has the benefits that I seek.
- It serves my needs.
- It is a practical product.

Risk Related Communications
- I want to be aware of all the potential risks associated with the product usage.
- I want to be engaged in an active dialogue with firms about risks of product usage.

Product Technologies Communications
- I want to be informed about the firm's current product technologies.
- I want to be informed about potential product technologies the firm might adopt.

Business Systems Communications
- I want to be informed about the firms' current business systems (such as billing).
- I want to be informed about business systems (such as customized billing) the firm might adopt.

Early Adoption Stage
- I am a socially active person.
- Among my peers, I consider myself as an opinion leader.
- I am respected among my peers.
- I am a successful person.
- I am a role model for other people.
- I consider myself to be a confident person.

APPENDIX C

DEMOGRAPHICS

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	MALE (0)	150	51.7	51.7	51.7
	FEMALE (1)	140	48.3	48.3	100.0
	Total	290	100.0	100.0	

gender

gender
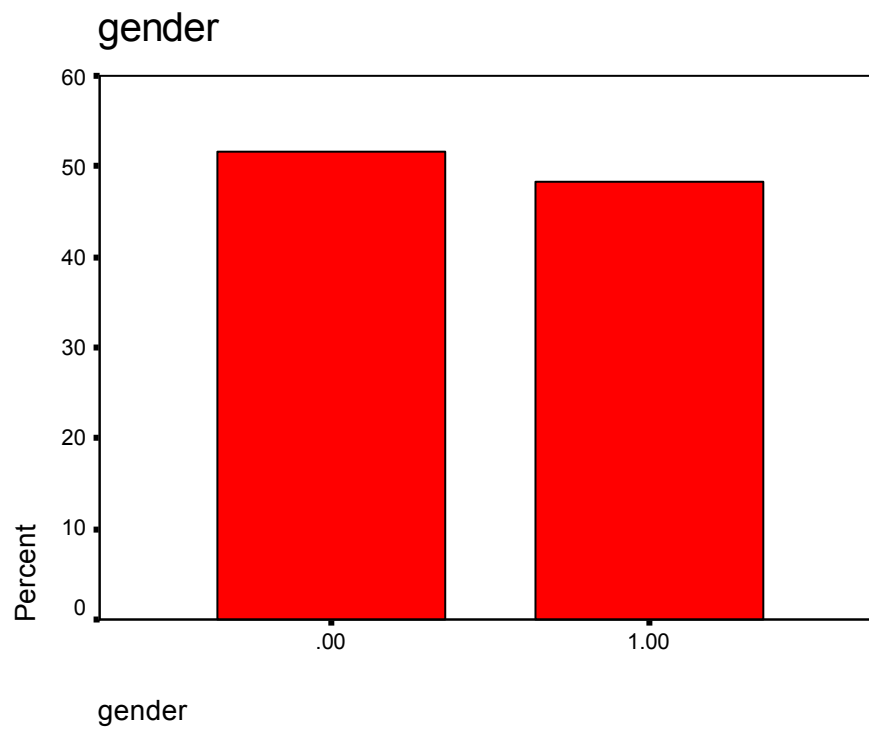
AGE

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18 – 20 years old	18	6.2	6.2	6.2
	21 – 25 years old	180	62.1	62.1	68.3
	26 – 30 years old	52	17.9	17.9	86.2
	31 – 40 years old	28	9.7	9.7	95.9
	41 and above	12	4.1	4.1	100.0
	Total	290	100.0	100.0	

AGE

AGE
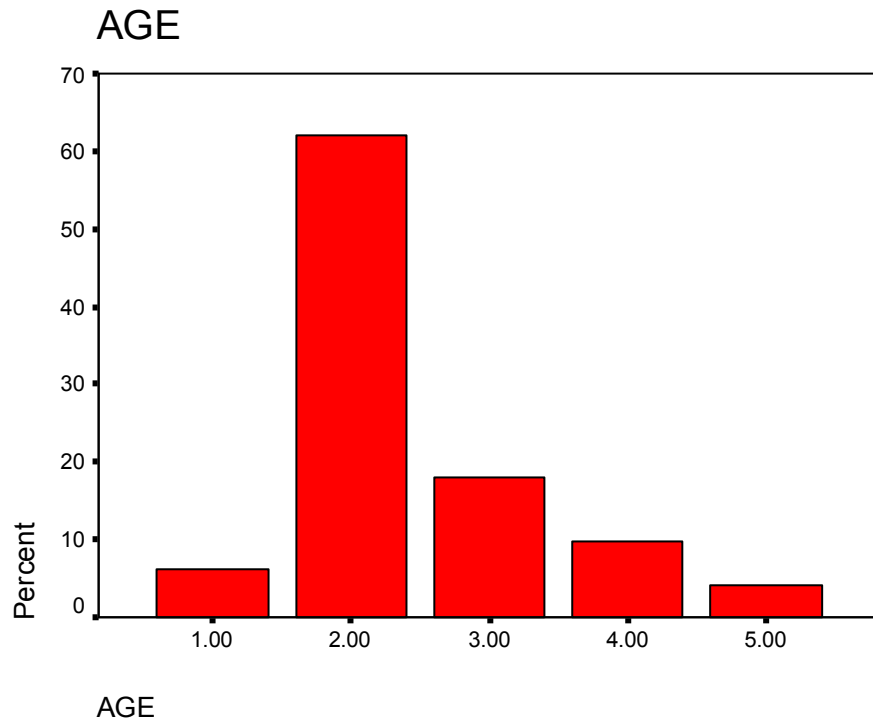
ETHNICITY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Caucasian	128	44.1	44.1	44.1
	African American/black	47	16.2	16.2	60.3
	Hispanic	35	12.1	12.1	72.4
	Asian	58	20.0	20.0	92.4
	Other	22	7.6	7.6	100.0
	Total	290	100.0	100.0	

ETHNICIT

ETHNICIT
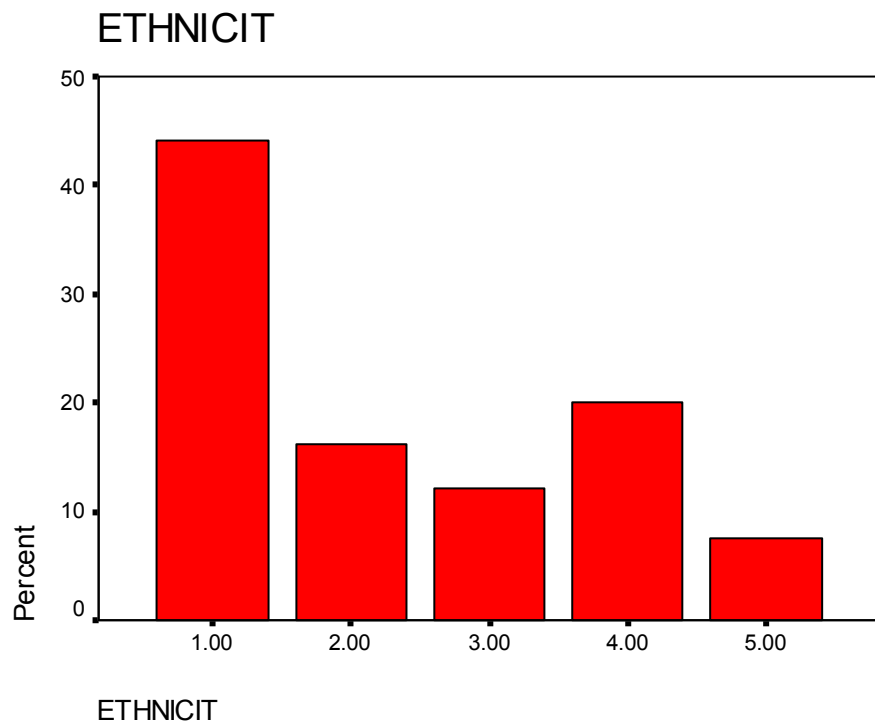
APPENDIX D

COMMON FACTOR ANALYSES

Total Variance explained by the three stages of Co-production (three phases in one model)

Total Variance Explained

| Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings(a)
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.789	52.226	52.226	6.179	47.534	47.534	5.511
2	1.436	11.046	63.273	1.375	10.577	58.111	4.620
3	1.095	8.424	71.696	.770	5.923	64.034	4.307
4	.668	5.142	76.839				
5	.557	4.284	81.123				
6	.433	3.335	84.457				
7	.408	3.136	87.593				
8	.380	2.921	90.514				
9	.336	2.583	93.097				
10	.281	2.165	95.262				
11	.268	2.059	97.321				
12	.220	1.692	99.013				
13	.128	.987	100.000				

Extraction Method: Maximum Likelihood. When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Scree Plot
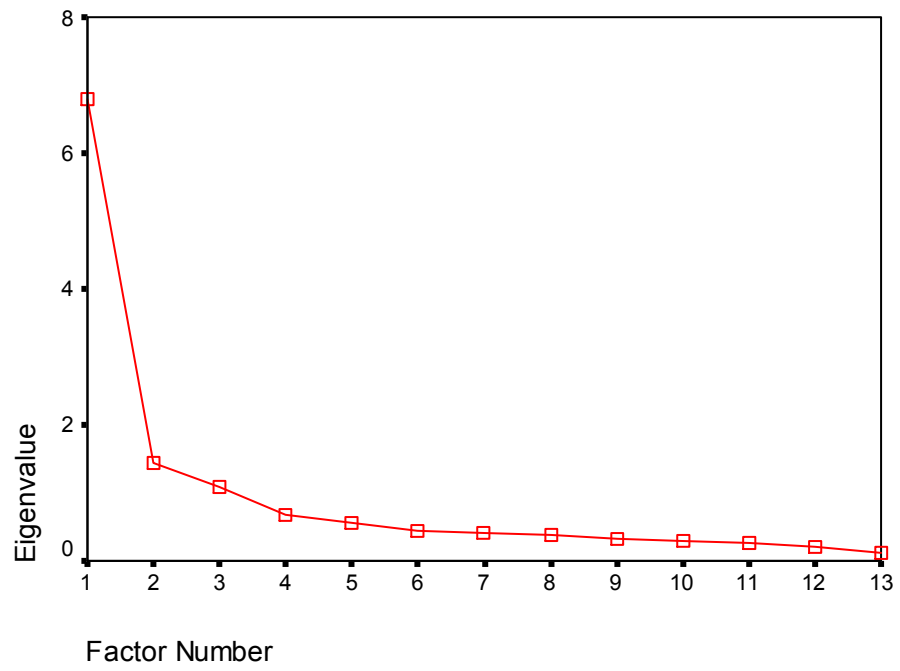
Pattern Matrix(a)

	Factor		
	1	2	3
give the company constructive suggestions	.907		
let the company knows how to serve me better	.891		
will inform the company about any problems	.656		
will let the company knows that am satisfied	.564		
will cooperate to develop the new product	.556		
will help increasing the product's benefits	.447		
will encourage others to use it		-.963	
will recommend this product to others		-.957	
will talk about the product with my peers		-.549	
will cooperate with the company again		-.458	
will follow the company's schedules			.854
will direct my thinking to developing company's products			.769
will follow the company's rules			.731

Extraction Method: Maximum Likelihood. Rotation Method: Oblimin with Kaiser Normalization.
a Rotation converged in 7 iterations.

Total variance explained by the pre-production dimension

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.843	64.044	64.044	3.412	56.863	56.863
2	.628	10.469	74.513			
3	.535	8.909	83.422			
4	.392	6.526	89.948			
5	.361	6.016	95.964			
6	.242	4.036	100.000			

Extraction Method: Maximum Likelihood.

Total variance explained by the product development dimension:

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.239	74.649	74.649	1.864	62.117	62.117
2	.416	13.875	88.524			
3	.344	11.476	100.000			

Extraction Method: Maximum Likelihood.

Total variance explained by the post-production dimension

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.038	75.956	75.956	2.722	68.044	68.044
2	.490	12.260	88.216			
3	.339	8.483	96.699			
4	.132	3.301	100.000			

Extraction Method: Maximum Likelihood.

Symbolic vs. Functional reasons for purchase:

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.075	75.627	75.627	8.814	73.447	73.447
2	.707	5.888	81.514			
3	.507	4.226	85.740			
4	.305	2.542	88.282			
5	.277	2.306	90.587			
6	.257	2.141	92.729			
7	.220	1.837	94.565			
8	.184	1.537	96.102			
9	.152	1.264	97.366			
10	.126	1.052	98.418			
11	.104	.870	99.288			
12	.085	.712	100.000			

Extraction Method: Maximum Likelihood.

The following is a table that shows the item loadings on the symbolic values factor:

Factor Matrix(a)

	Factor 1
it is a symbol of prestige	.907
it will help me gain other's respect	.880
it is a symbol of being cool	.877
it indicates wealth	.870
it will make me popular among peers	.870
it is a symbol of my success	.869
it will show people who I am	.867
it will make me noticed by others	.854
it enhances my image	.853
it will increase my self-confidence	.823
it indicates my achievements	.811
it shows that I have higher social status	.798

Extraction Method: Maximum Likelihood.
a 1 factors extracted. 5 iterations required.

The following tables represent the results for the functional values construct

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.832	69.035	69.035	4.420	63.141	63.141
2	.872	12.457	81.492			
3	.440	6.290	87.782			
4	.363	5.186	92.968			
5	.203	2.904	95.872			
6	.163	2.330	98.202			
7	.126	1.798	100.000			

Extraction Method: Maximum Likelihood.

Factor Matrix(a)

	Factor 1
it has high quality	.909
it is a reliable product	.876
it functions better than other products	.869
it has the benefits that I seek	.743
it is priced reasonably	.741
it serves my needs	.736
it is a practical product	.656

Extraction Method: Maximum Likelihood.
a 1 factors extracted. 6 iterations required.

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.567	59.452	59.452	3.092	51.538	51.538
2	.788	13.130	72.582			
3	.550	9.162	81.743			
4	.482	8.036	89.780			
5	.369	6.153	95.933			
6	.244	4.067	100.000			

Extraction Method: Maximum Likelihood.

Factor Matrix(a)

	Factor 1
I am a successful person	.830
I am a role model for others	.796
I am respected among peers	.790
I am a confident person	.649
I am an opinion leader	.615
I am socially active	.588

Extraction Method: Maximum Likelihood.
a 1 factors extracted. 4 iterations required.

Business Communication

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings(a)
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	3.165	45.208	45.208	2.282	32.595	32.595	2.315
2	1.208	17.256	62.464	1.555	22.207	54.803	2.300
3	1.070	15.290	77.753	.775	11.068	65.871	1.497
4	.800	11.431	89.184				
5	.437	6.238	95.422				
6	.218	3.112	98.534				
7	.103	1.466	100.000				

Extraction Method: Maximum Likelihood.
a When factors are correlated, sums of squared loadings cannot be added to obtain a total variance.

Pattern Matrix(a)

	Factor		
	1	2	3
I want to know about current business systems	1.015		
I want to know about potential business systems	.875		
I want to know about current product technologies		1.001	
I want to know about potential product technologies		.753	
I want to be aware of all potential usage risks			.776
I want to engage in active dialogue with the company			.549

Extraction Method: Maximum Likelihood. Rotation Method: Oblimin with Kaiser Normalization.
a Rotation converged in 4 iterations.

APPENDIX E

MULTIPLE REGRESSION RESULTS

The relationship between product development and functional reasons for purchase

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	.252(a)	.064	.060	.83259	.064	19.560	1	288	.000	2.167

a Predictors: (Constant), Production items averaged
b Dependent Variable: Functional values items averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.559	1	13.559	19.560	.000(a)
	Residual	199.645	288	.693		
	Total	213.205	289			

a Predictors: (Constant), Production items averaged
b Dependent Variable: Functional values items averaged

Coefficients(a)

| Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Collinearity Statistics	
		B	Std. Error	Beta			Lower Bound	Upper Bound	Tolerance	VIF
1	(Constant)	4.611	.296		15.583	.000	4.029	5.194		
	Production items averaged	.219	.050	.252	4.423	.000	.122	.317	1.000	1.000

a Dependent Variable: Functional values items averaged

Histogram

Dependent Variable: Functional values items a⁞

Std. Dev = 1.00
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Functional values items averaged

Observed Cum Prob

126
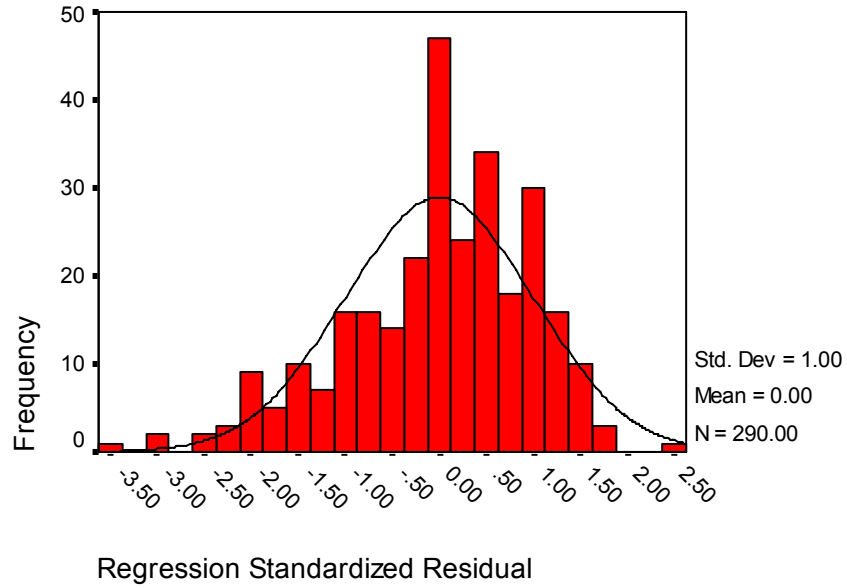
Scatterplot

Dependent Variable: Functional values items averaged

Regression Standardized Predicted Value
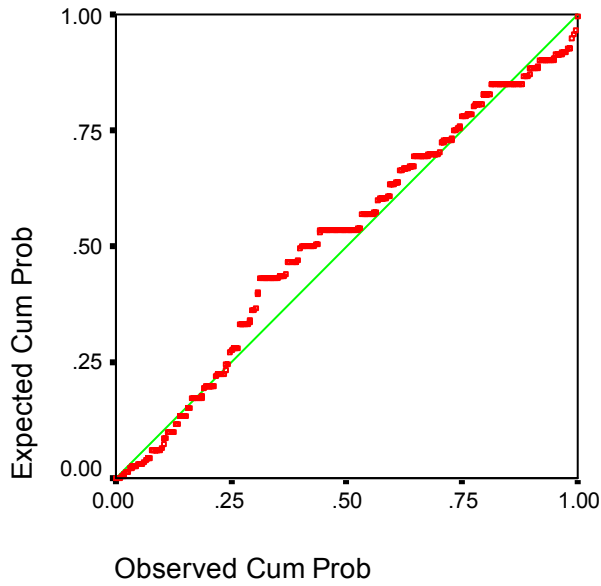
The effect of early adoption

Pre-production

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.377(a)	.142	.136	.79820

a Predictors: (Constant), Pre-production and early adoption interaction, Pre-production items averaged
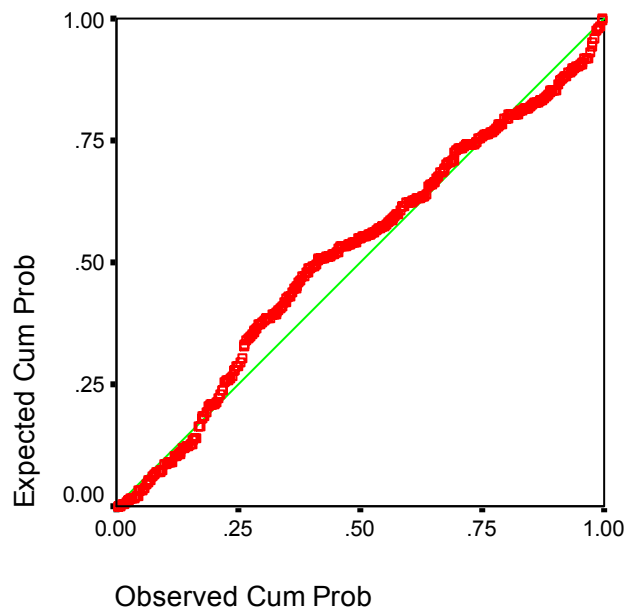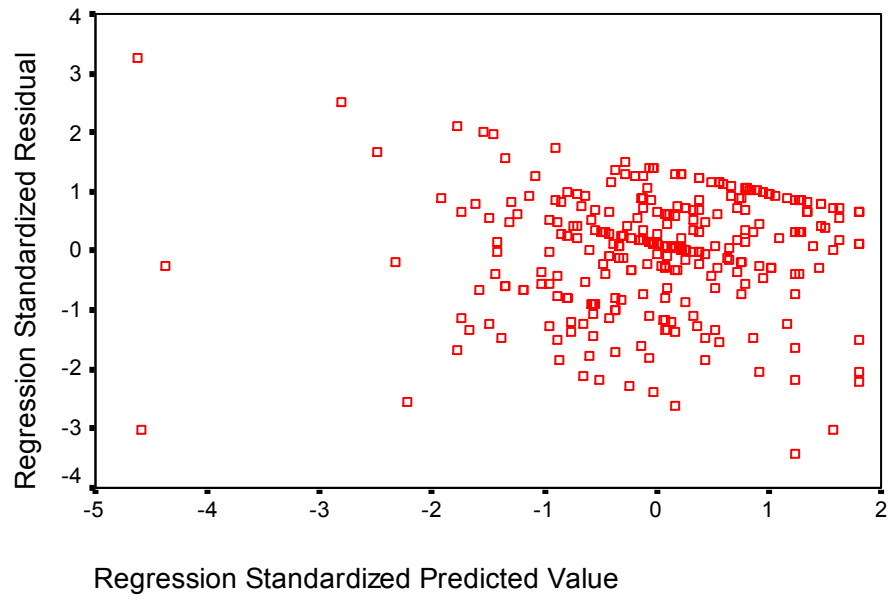b Dependent Variable: Functional values items averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.351	2	15.175	23.818	.000(a)
	Residual	182.854	287	.637		
	Total	213.205	289			

a Predictors: (Constant), Pre-production and early adoption interaction, Pre-production items averaged
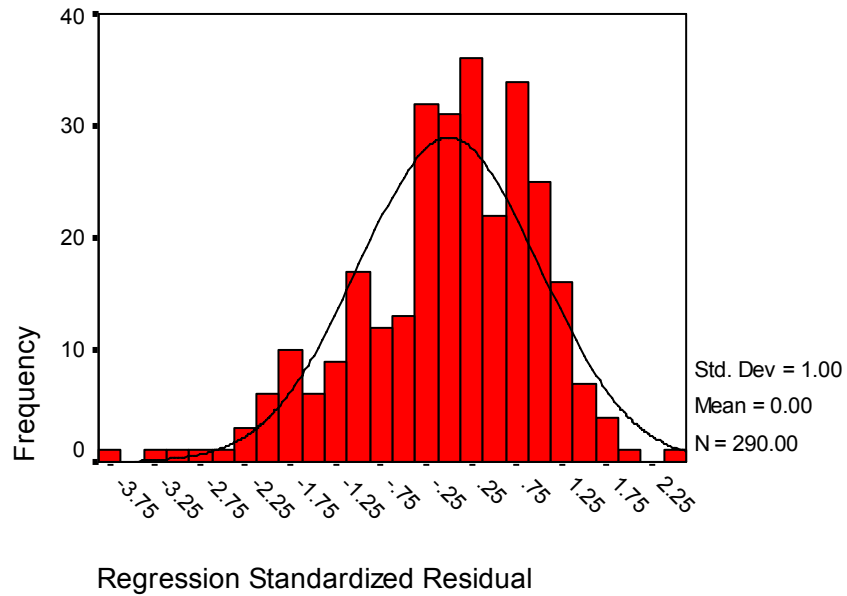b Dependent Variable: Functional values items averaged

Histogram

Dependent Variable: Functional values items averaged

Std. Dev = 1.00
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Functional values items averaged

Observed Cum Prob
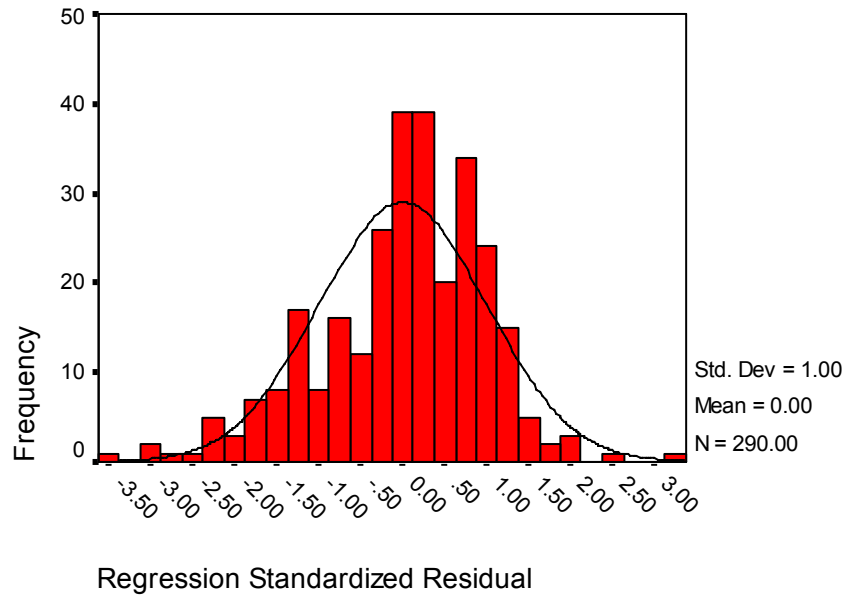
Scatterplot

Dependent Variable: Functional values items averaged

Product development

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.317(a)	.100	.094	.81749

a Predictors: (Constant), Production and early adoption interaction, Production items averaged
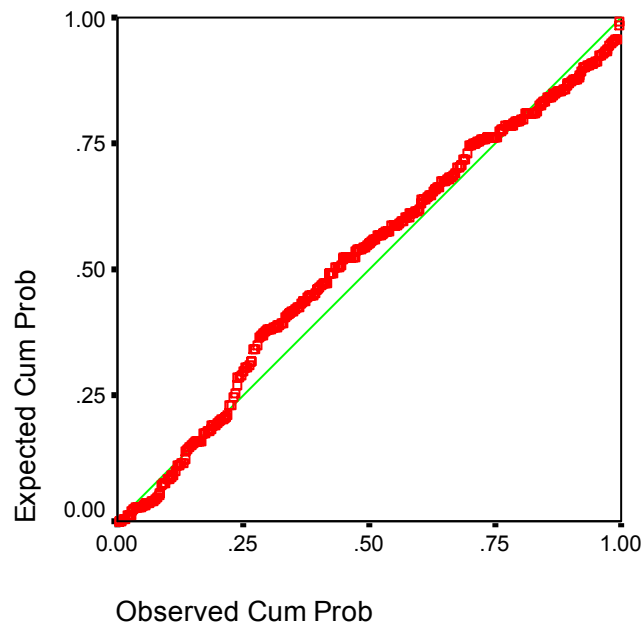b Dependent Variable: Functional values items averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.405	2	10.703	16.015	.000(a)
	Residual	191.800	287	.668		
	Total	213.205	289			

a Predictors: (Constant), Production and early adoption interaction, Production items averaged
b Dependent Variable: Functional values items averaged

131

Histogram
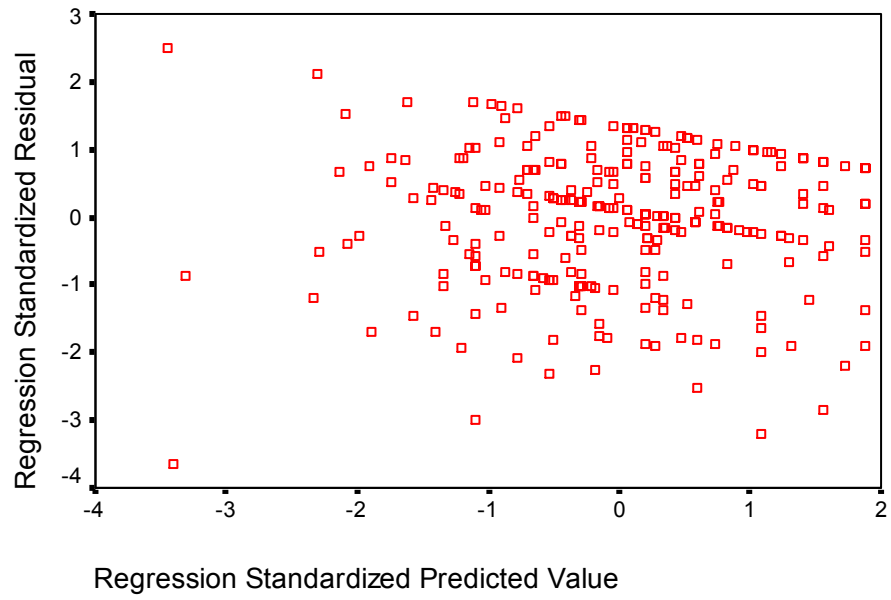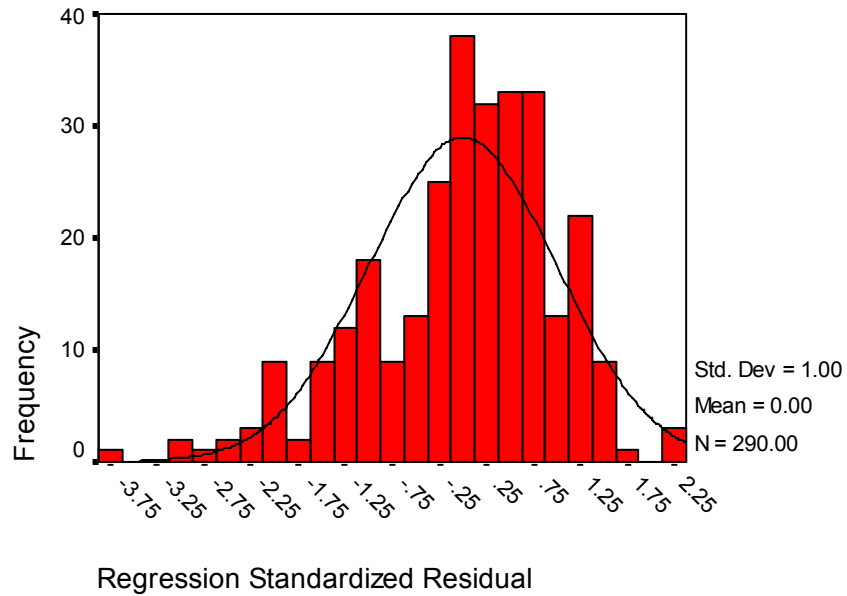
Dependent Variable: Functional values items averaged

Regression Standardized Residual

Std. Dev = 1.00
Mean = 0.00
N = 290.00

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Functional values items averaged

Observed Cum Prob

Scatterplot

Dependent Variable: Functional values items averaged

Regression Standardized Residual (y-axis)

Regression Standardized Predicted Value (x-axis)

Post-production

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.310(a)	.096	.090	.81938

a Predictors: (Constant), Post-production and early adoption interaction, Post-production items averaged
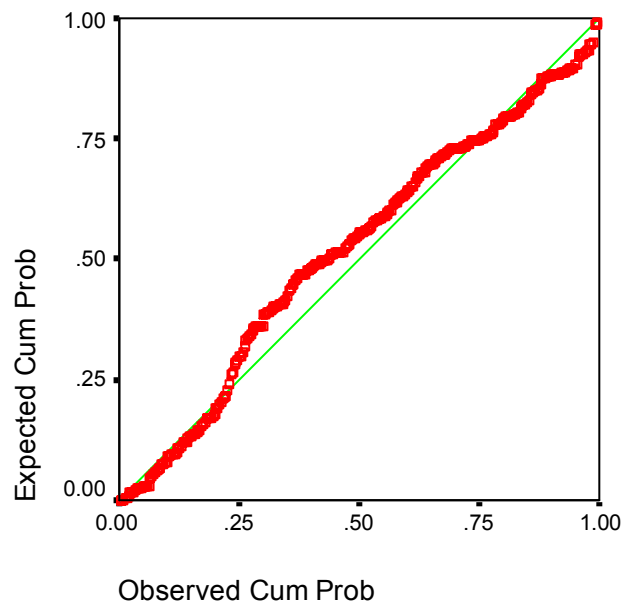b Dependent Variable: Functional values items averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.518	2	10.259	15.280	.000(a)
	Residual	192.687	287	.671		
	Total	213.205	289			

a Predictors: (Constant), Post-production and early adoption interaction, Post-production items averaged
b Dependent Variable: Functional values items averaged

Histogram

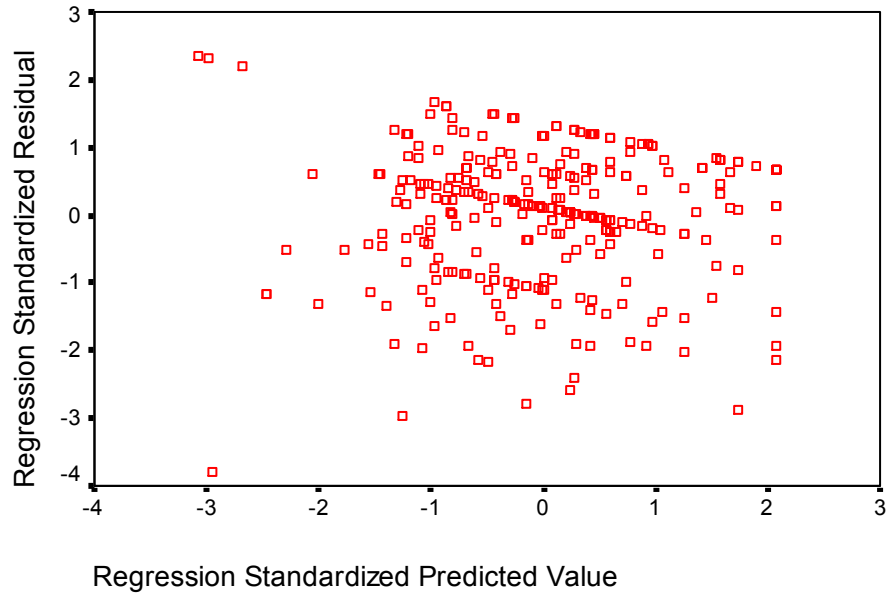## Dependent Variable: Functional values items averaged

Std. Dev = 1.00
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Functional values items averaged

Scatterplot

Dependent Variable: Functional values items averaged

Regression Standardized Predicted Value

Business Communication Effect

Pre-production

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.376(a)	.141	.129	.80162

a Predictors: (Constant), Pre-production and Business systems interaction, Pre-production items averaged, Pre-production and Product tech interaction, Pre-production and Risk info interaction
b Dependent Variable: Functional values items averaged
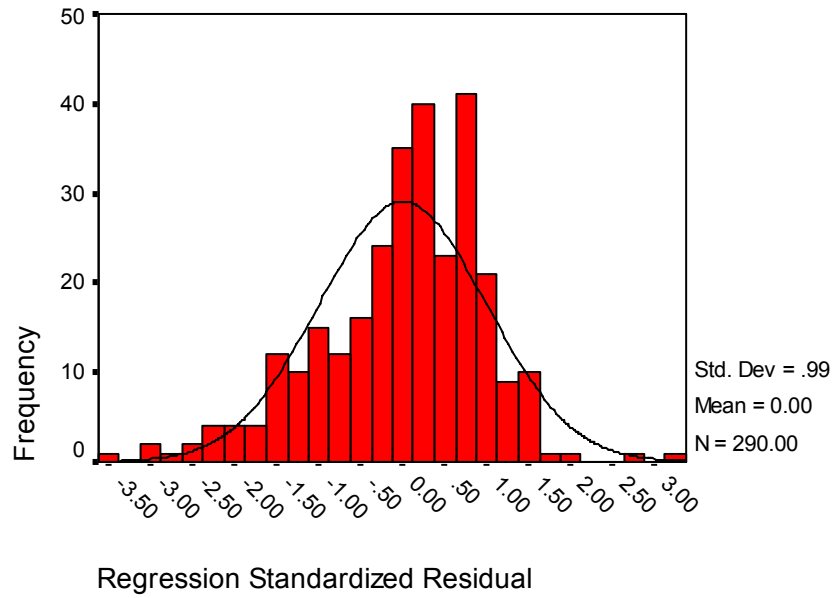
ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.066	4	7.517	11.697	.000(a)
	Residual	183.138	285	.643		
	Total	213.205	289			

a Predictors: (Constant), Pre-production and Business systems interaction, Pre-production items averaged, Pre-production and Product tech interaction, Pre-production and Risk info interaction
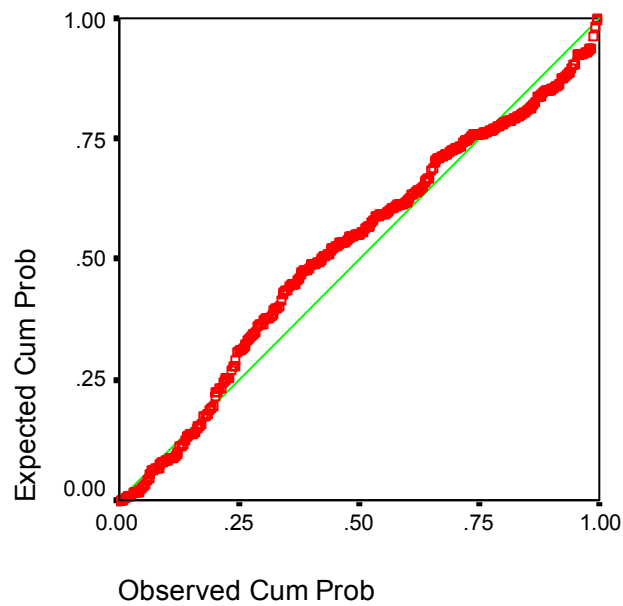b Dependent Variable: Functional values items averaged

Histogram

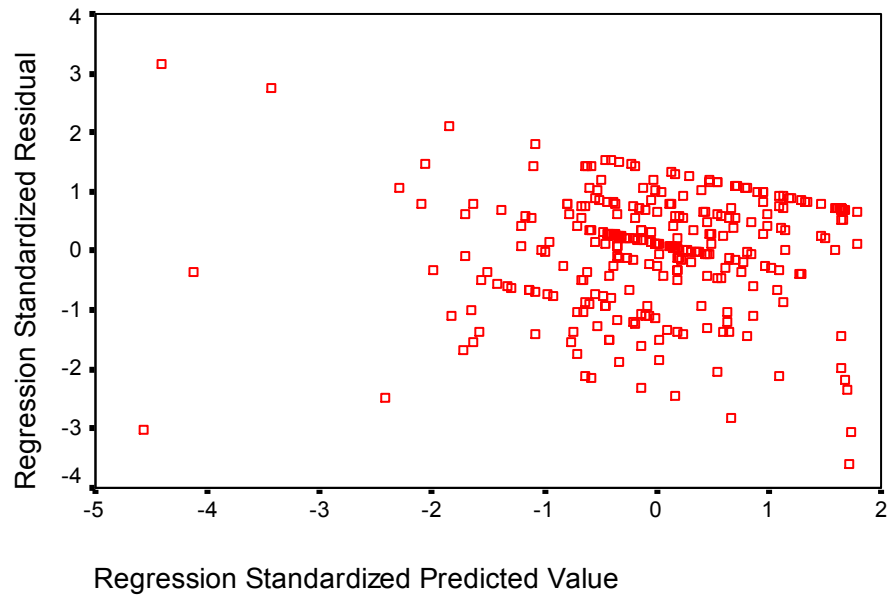## Dependent Variable: Functional values items averaged

Std. Dev = .99
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Functional values items averaged

138

Scatterplot

Dependent Variable: Functional values items averaged

Product development

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.317(a)	.100	.088	.82033

a Predictors: (Constant), Production and Business systems interaction, Production items averaged, Production and Product tech interaction, Production and Risk info interaction
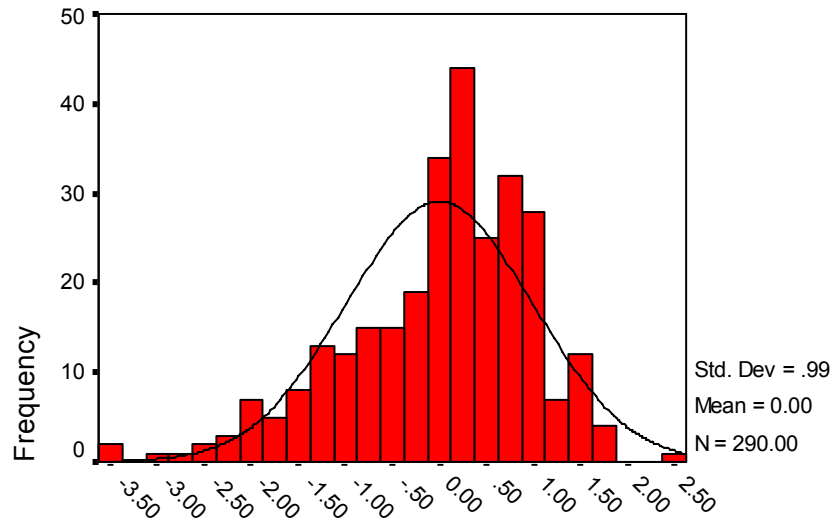b Dependent Variable: Functional values items averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.418	4	5.355	7.957	.000(a)
	Residual	191.786	285	.673		
	Total	213.205	289			

a Predictors: (Constant), Production and Business systems interaction, Production items averaged, Production and Product tech interaction, Production and Risk info interaction
b Dependent Variable: Functional values items averaged
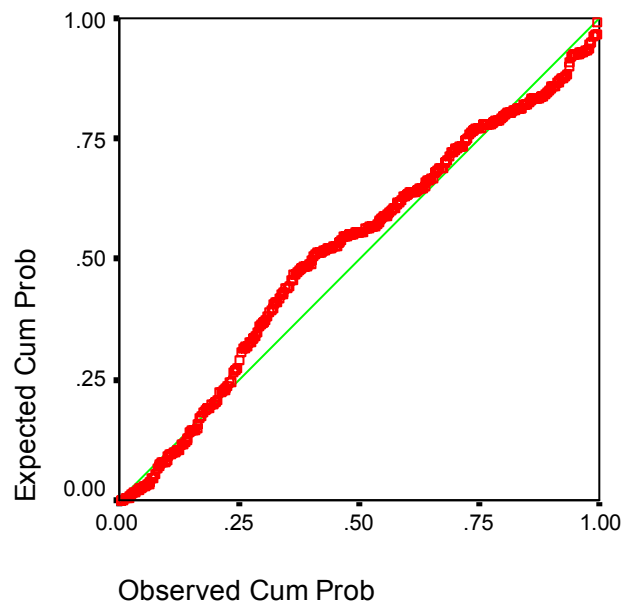
Histogram

Dependent Variable: Functional values items averaged

Std. Dev = .99
Mean = 0.00
N = 290.00

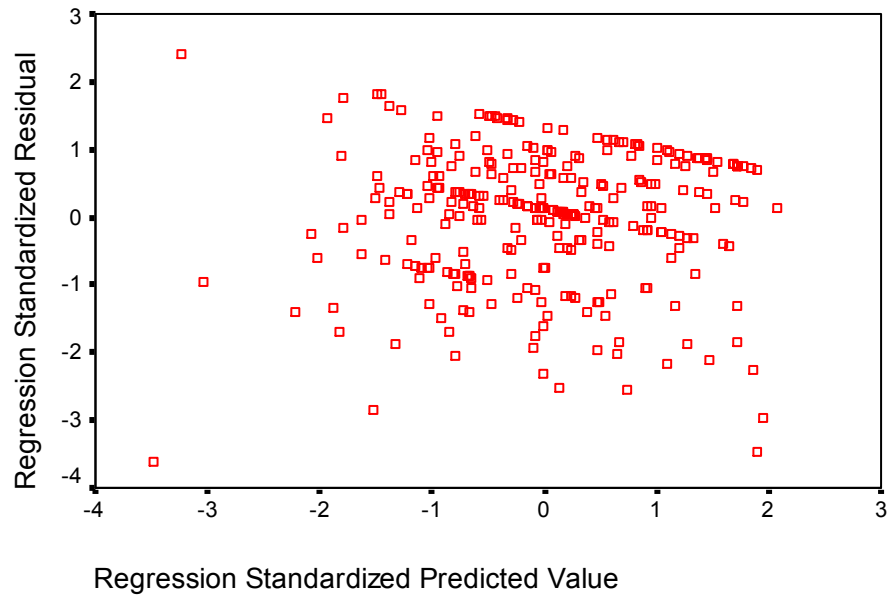Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Functional values items averaged

Scatterplot

Dependent Variable: Functional values items averaged

Regression Standardized Predicted Value

Post-production

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.313(a)	.098	.085	.82146

a Predictors: (Constant), Post-production and Business systems interaction, Post-production items averaged, Post-production and Product tech interaction, Post-production and Risk info interaction
b Dependent Variable: Functional values items averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20.887	4	5.222	7.738	.000(a)
	Residual	192.317	285	.675		
	Total	213.205	289			

a Predictors: (Constant), Post-production and Business systems interaction, Post-production items averaged, Post-production and Product tech interaction, Post-production and Risk info interaction
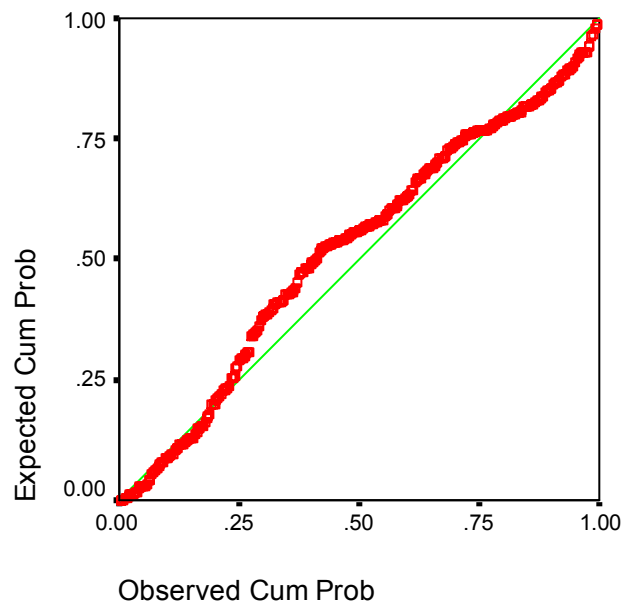b Dependent Variable: Functional values items averaged

Histogram

Dependent Variable: Functional values items averaged

Std. Dev = .99

Mean = 0.00
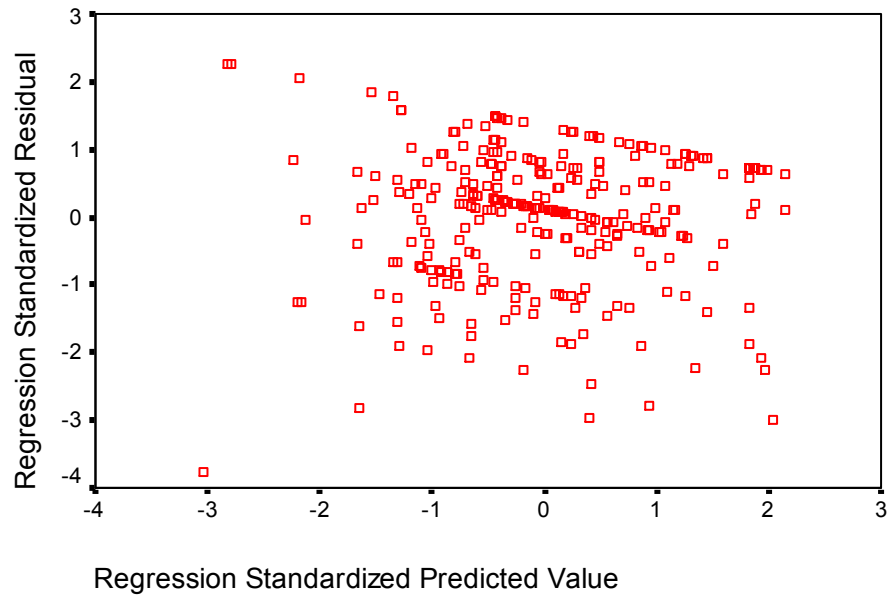
N = 290.00

Regression Standardized Residual
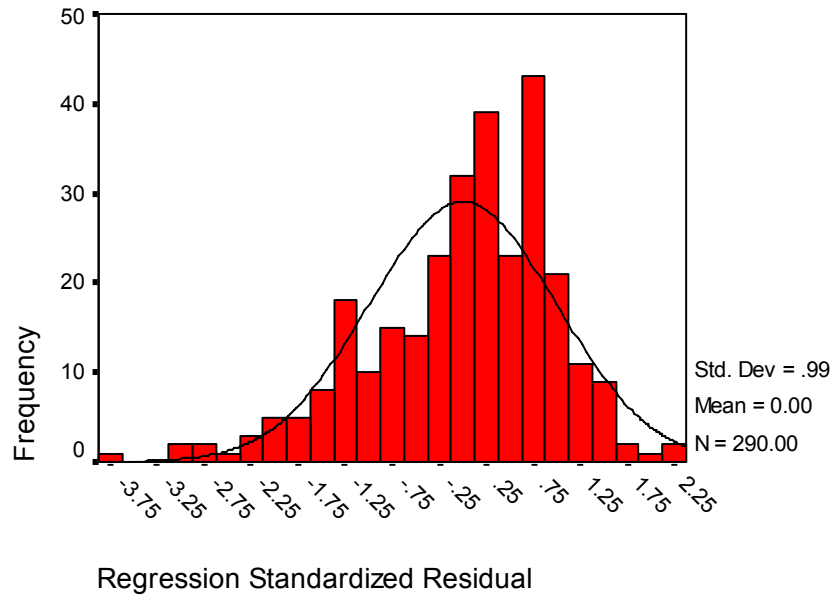
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: Functional values items averaged

Scatterplot
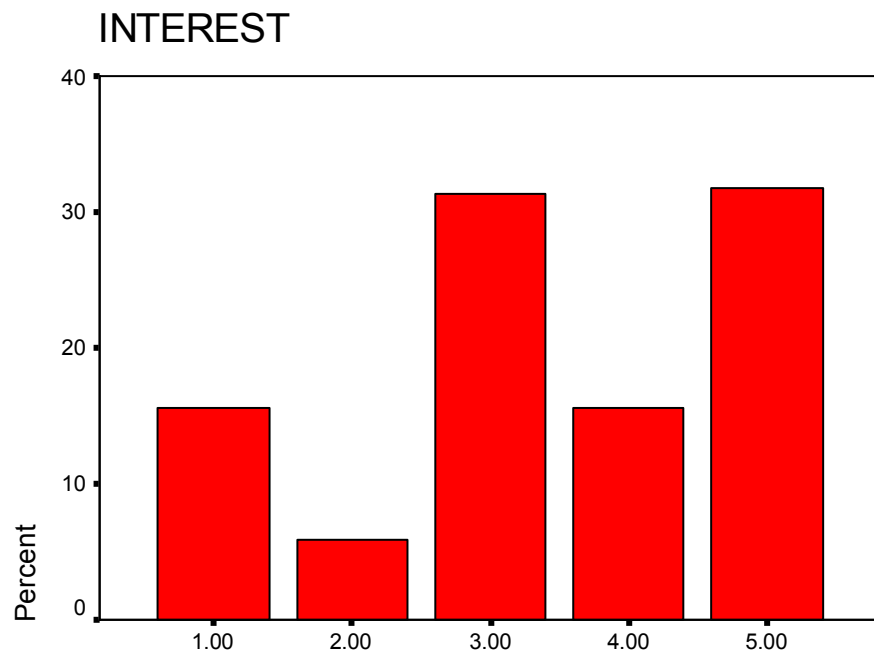
Dependent Variable: Functional values items averaged

APPENDIX F

OTHER VARIABLES INVESTIGATED

The co-production phase that customers are mostly interested in

INTEREST

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Ideas only	45	15.5	15.5	15.5
	Design only	17	5.9	5.9	21.4
	Both ideas and design	91	31.4	31.4	52.8
	Recommending only	45	15.5	15.5	68.3
	Complete co-production	92	31.7	31.7	100.0
	Total	290	100.0	100.0	

INTEREST

INTEREST

Customers who have a negative disposition towards the co-production process

sharing thoughts with companies is inconvenient

sharing thoughts with companies is inconvenient
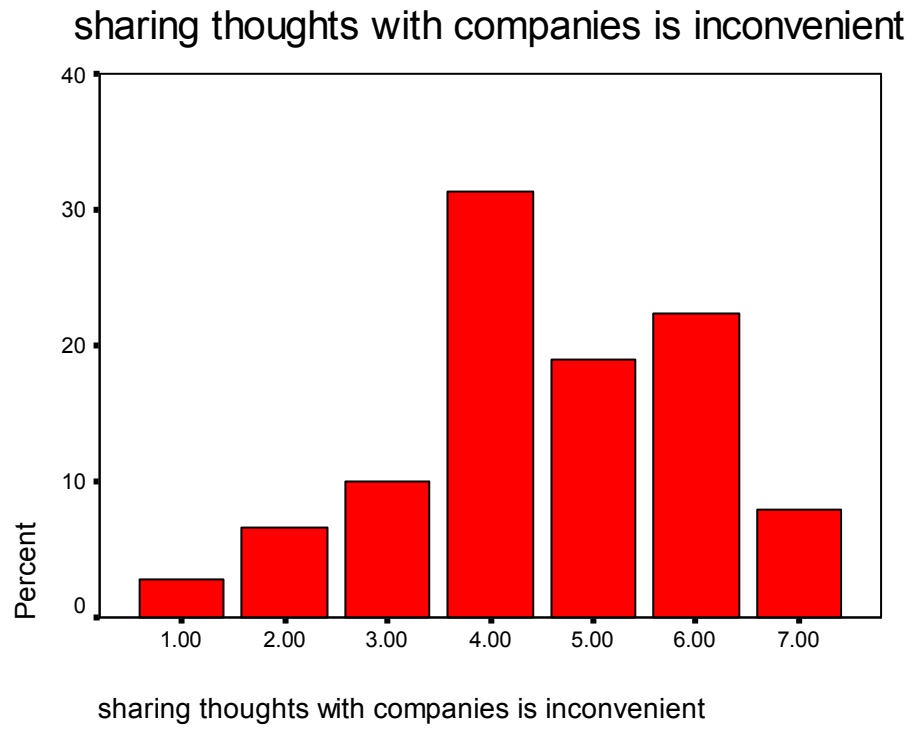
helping in new products' designs is a burden
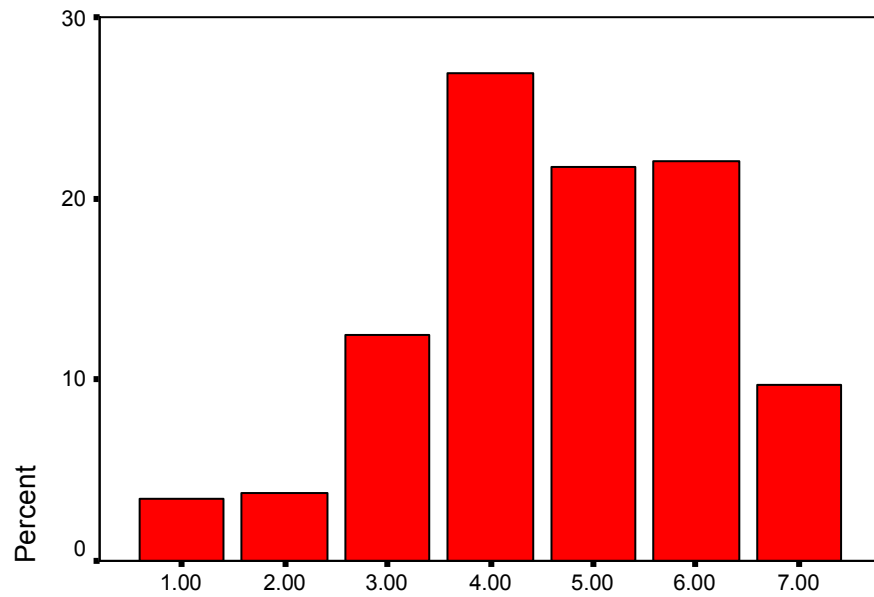
helping in new products' designs is a burden

participating in product development is too much work
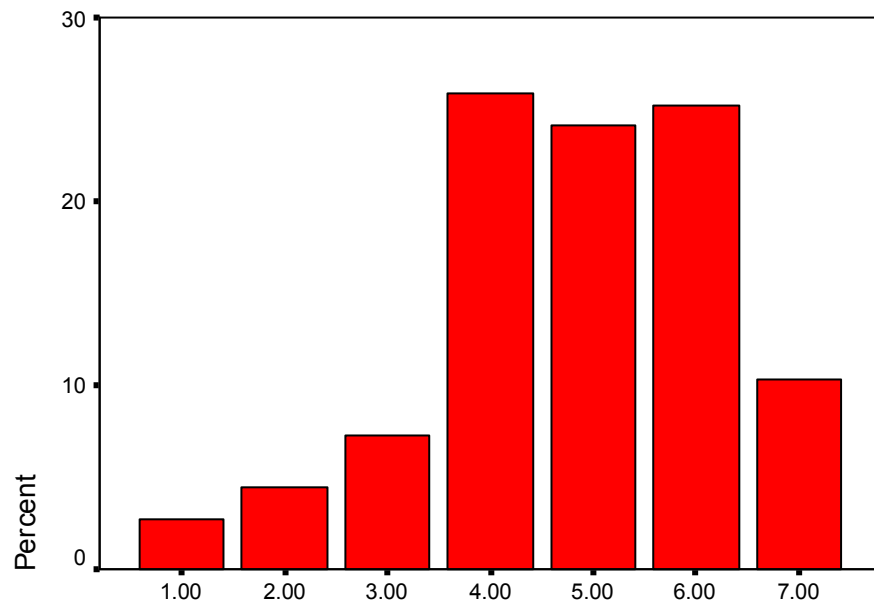
participating in product development is too much work

recommending products is unwanted task
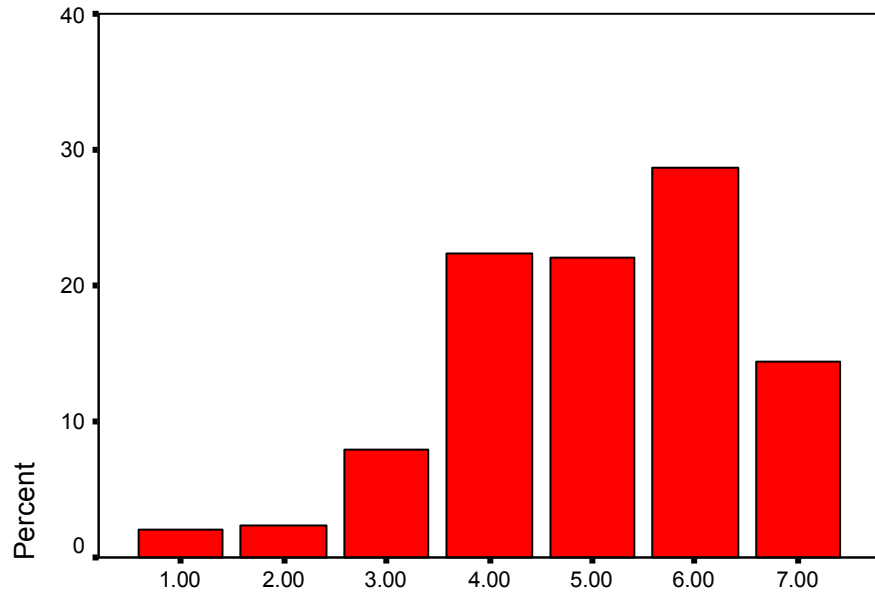
recommending products is unwanted task

following up will be much work
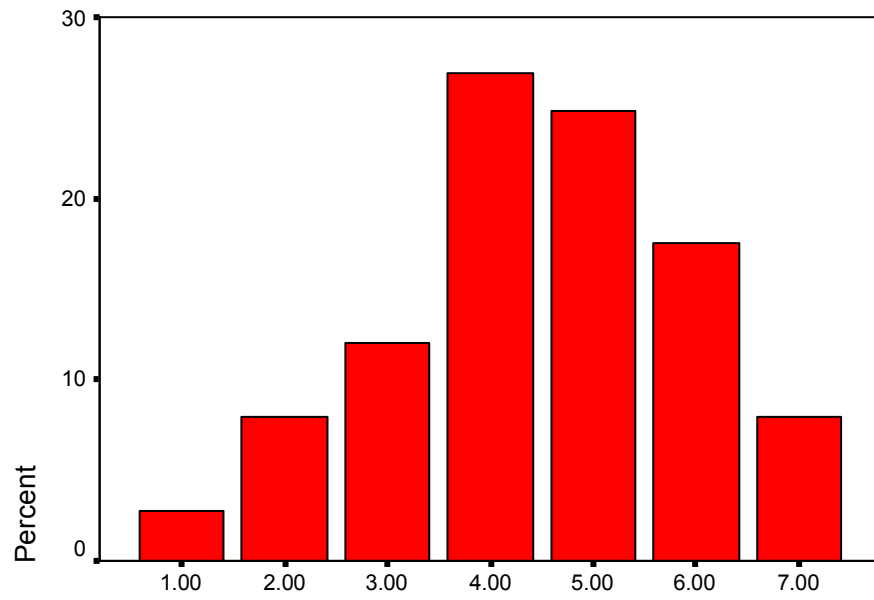
following up will be much work

APPENDIX G

SEM PATH DIAGRAMS

Measurement Model
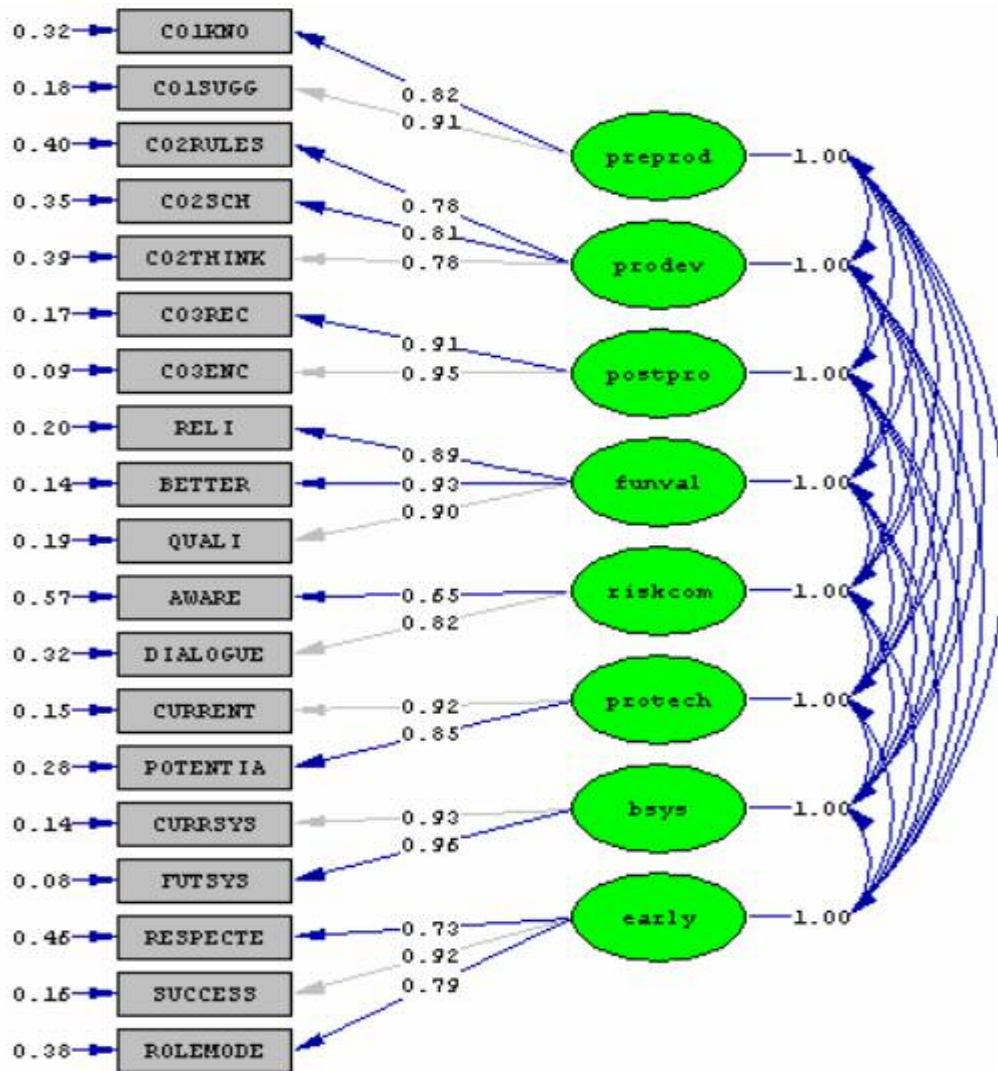
Structural Model
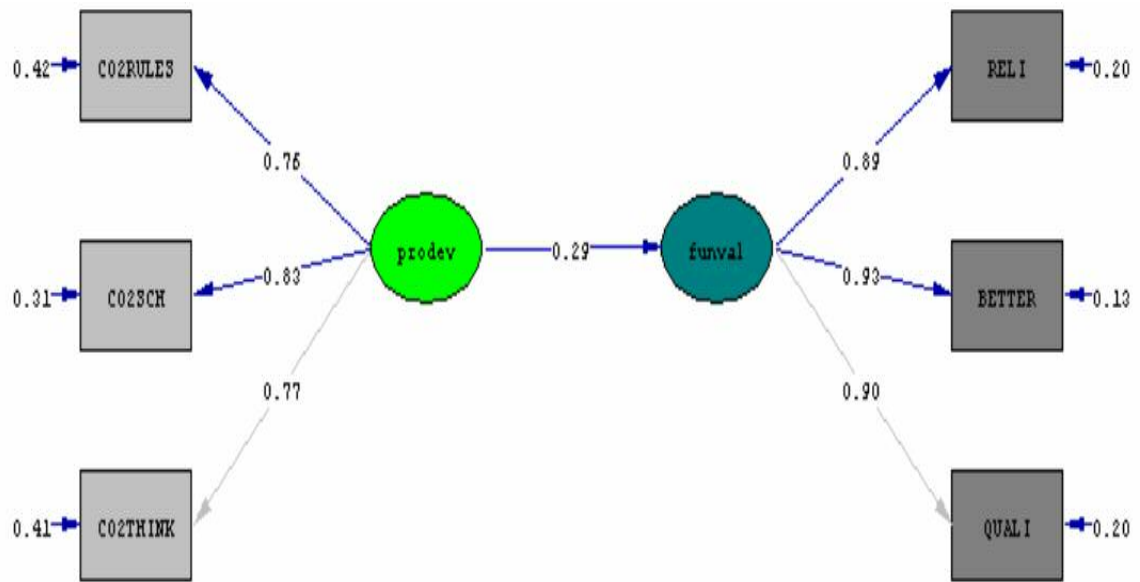
Chi-Square=8.98, df=8, P-value=0.34374, RMSEA=0.021

APPENDIX H

RESULTS BASED ON SEM'S SUGGESTED CONSTRUCTS

OLS Regression Results

Hypothesis 2

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
					Change Statistics				
1	.253(a)	.064	.061	.99562	.064	19.692	1	288	.000

a Predictors: (Constant), product development items averaged
b Dependent Variable: functional reasons for purchase averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.520	1	19.520	19.692	.000(a)
	Residual	285.483	288	.991		
	Total	305.002	289			

a Predictors: (Constant), product development items averaged
b Dependent Variable: functional reasons for purchase averaged

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.207	.354		11.889	.000
	product development items averaged	.263	.059	.253	4.438	.000

a Dependent Variable: functional reasons for purchase averaged

Histogram

Dependent Variable: functional reasons for purcahse averaged

Std. Dev = 1.00
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: functional reasons for purcahse averaged

Observed Cum Prob
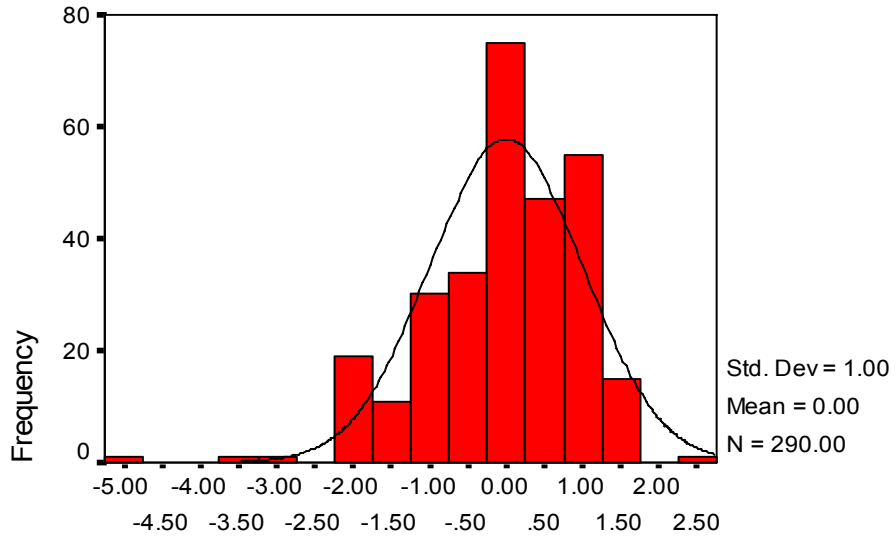
Scatterplot

Dependent Variable: functional reasons for purcahse averaged
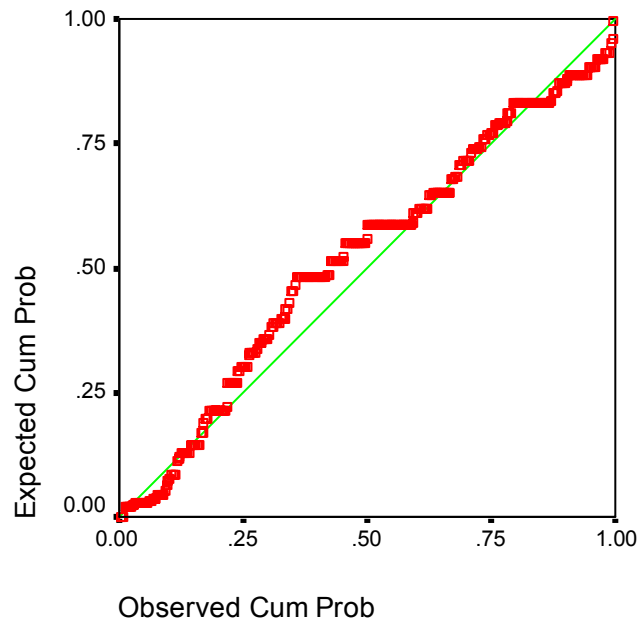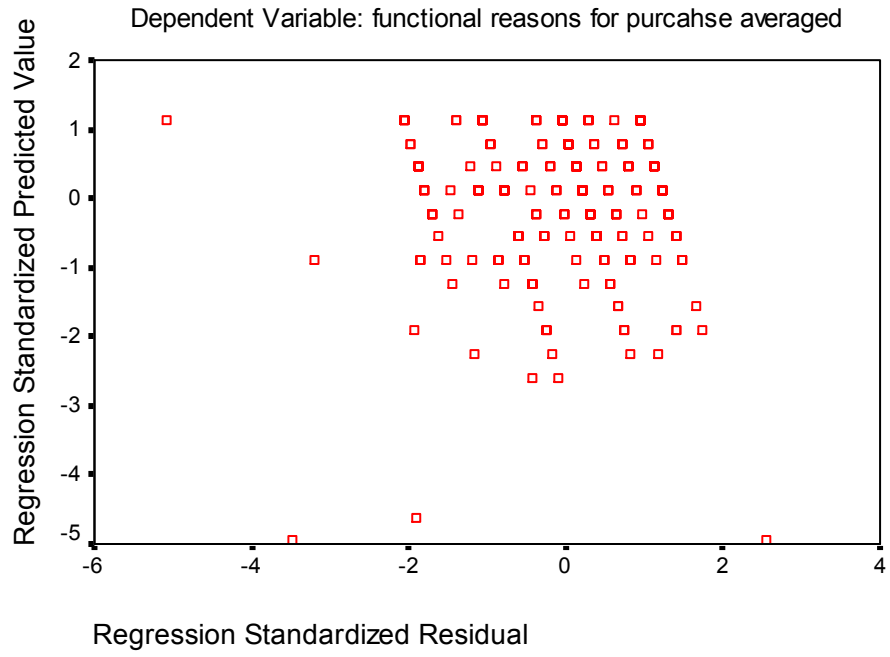
Hypothesis 3b

The Pre-production phase's interaction with early adoption stage

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.334(a)	.111	.105	.97179	.111	17.985	2	287	.000

a Predictors: (Constant), Pre-production and early adoption interaction, pre-production items averaged
b Dependent Variable: functional reasons for purchase averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33.969	2	16.984	17.985	.000(a)
	Residual	271.034	287	.944		
	Total	305.002	289			

a Predictors: (Constant), Pre-production and early adoption interaction, pre-production items averaged
b Dependent Variable: functional reasons for purchase averaged

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.139	.346		11.945	.000
	pre-production items averaged	.100	.085	.098	1.174	.241
	Pre-production and early adoption interaction	.030	.010	.255	3.060	.002

a Dependent Variable: functional reasons for purchase averaged

159

Histogram

Dependent Variable: functional reasons for purcahse averaged

Std. Dev = 1.00
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: functional reasons for purcahse averaged

Observed Cum Prob

160

Scatterplot

Dependent Variable: functional reasons for purcahse averaged

Regression Standardized Residual
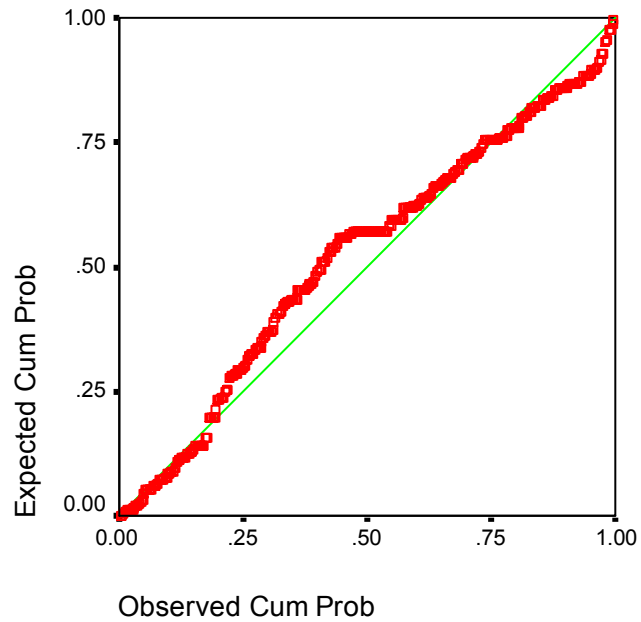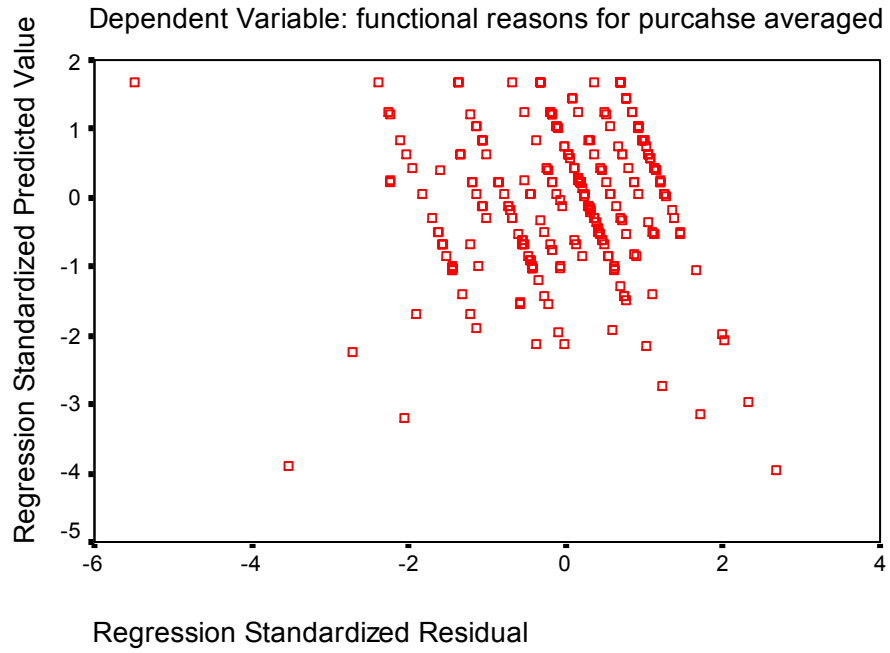
The Product Development phase's interaction with early adoption stage

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.311(a)	.097	.091	.97964	.097	15.407	2	287	.000

a Predictors: (Constant), Product development and early adoption interaction, product development items averaged
b Dependent Variable: functional reasons for purchase averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29.573	2	14.786	15.407	.000(a)
	Residual	275.430	287	.960		
	Total	305.002	289			

a Predictors: (Constant), Product development and early adoption interaction, product development items averaged
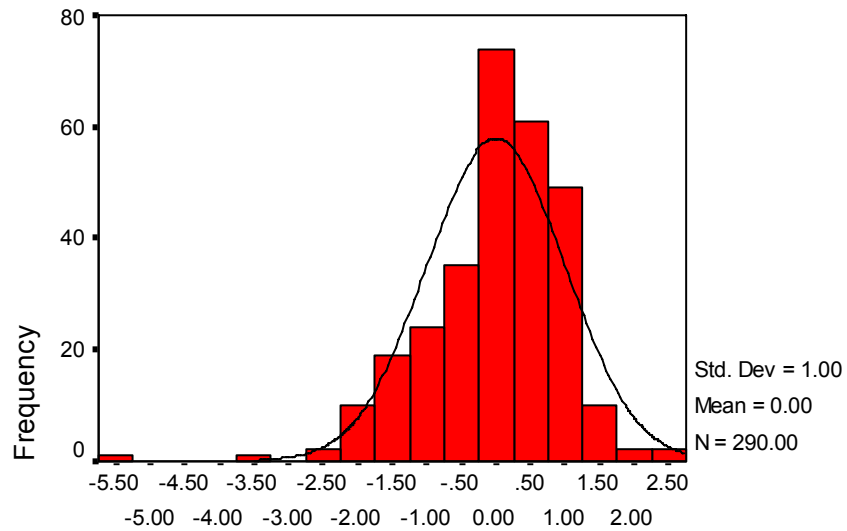b Dependent Variable: functional reasons for purchase averaged

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.382	.352		12.435	.000
	product development items averaged	.047	.089	.045	.524	.601
	Product development and early adoption interaction	.033	.010	.276	3.237	.001

a Dependent Variable: functional reasons for purchase averaged

Histogram

Dependent Variable: functional reasons for purcahse averaged


Std. Dev = 1.00
Mean = 0.00
N = 290.00

Frequency

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: functional reasons for purcahse averaged

Expected Cum Prob

Observed Cum Prob

Scatterplot

Dependent Variable: functional reasons for purcahse averaged
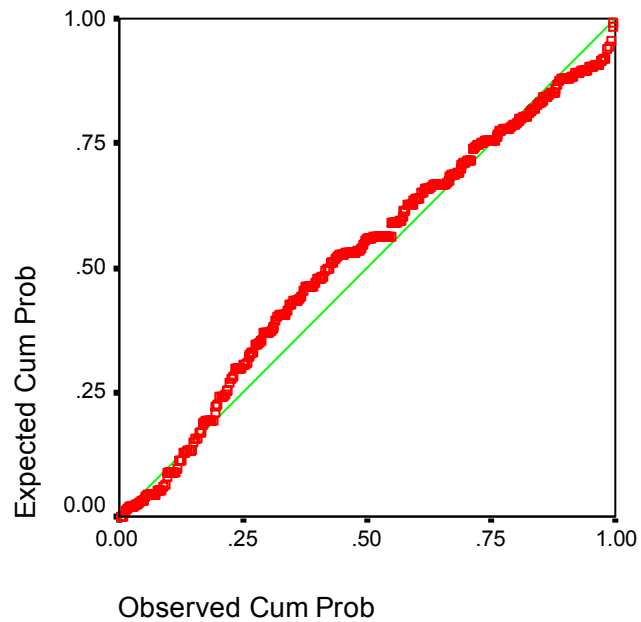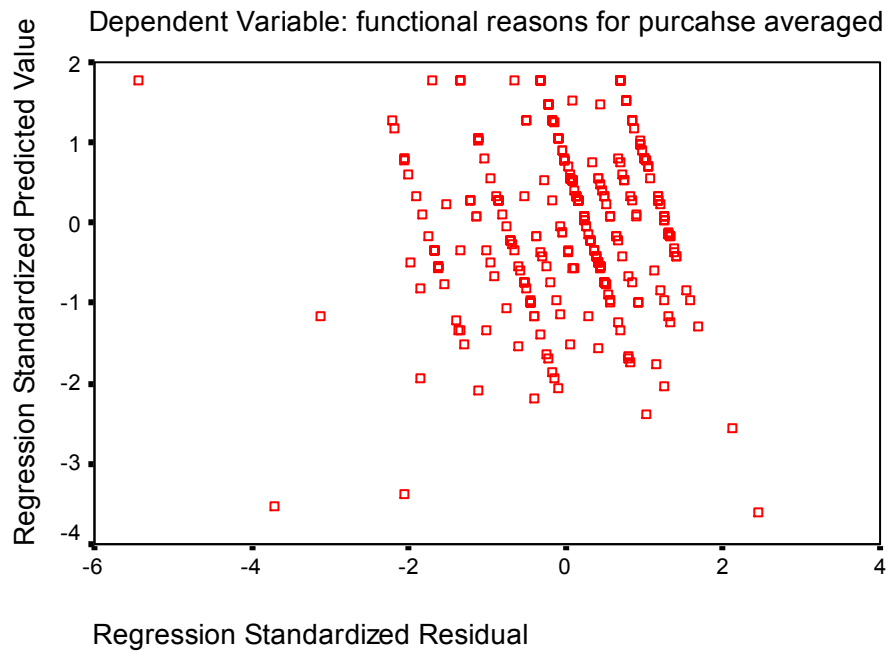
The Post-production phase's interaction with the early adoption stage

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.317(a)	.101	.094	.97767	.101	16.048	2	287	.000

a Predictors: (Constant), Post-production and early adoption interaction, post-production items averaged
b Dependent Variable: functional reasons for purchase averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.678	2	15.339	16.048	.000(a)
	Residual	274.324	287	.956		
	Total	305.002	289			

a Predictors: (Constant), Post-production and early adoption interaction, post-production items averaged
b Dependent Variable: functional reasons for purchase averaged

Coefficients(a)
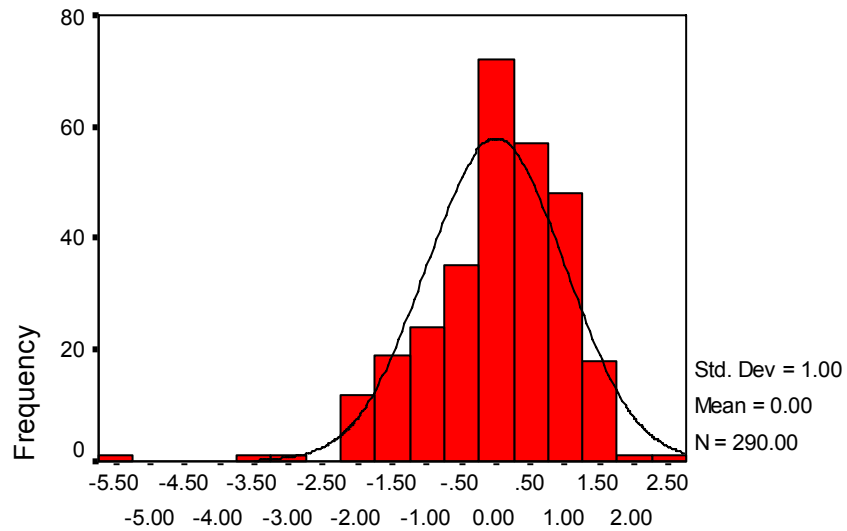
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.668	.298		15.675	.000
	post-production items averaged	-.024	.090	-.027	-.271	.786
	Post-production and early adoption interaction	.039	.011	.339	3.458	.001

a Dependent Variable: functional reasons for purchase averaged

165

Histogram

Dependent Variable: functional reasons for purcahse averaged


Std. Dev = 1.00
Mean = 0.00
N = 290.00

Regression Standardized Residual
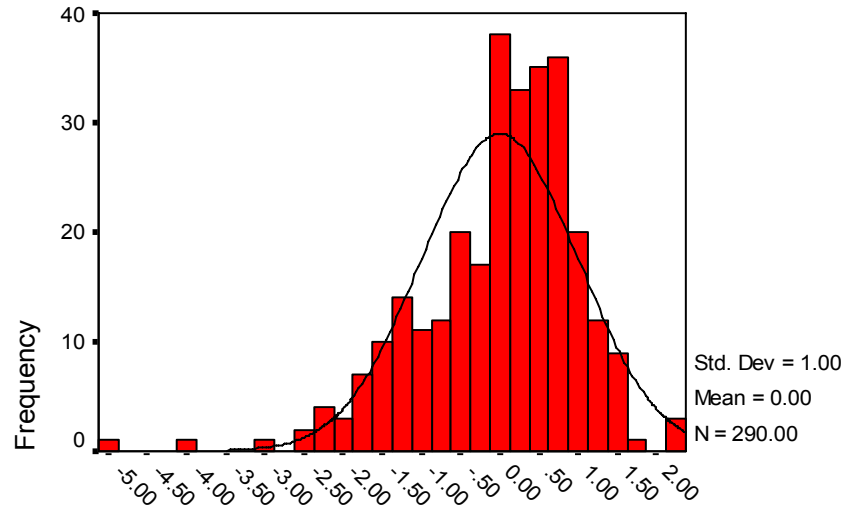
Normal P-P Plot of Regression Standardized Residual

Dependent Variable: functional reasons for purcahse averaged

Scatterplot

Dependent Variable: functional reasons for purcahse averaged
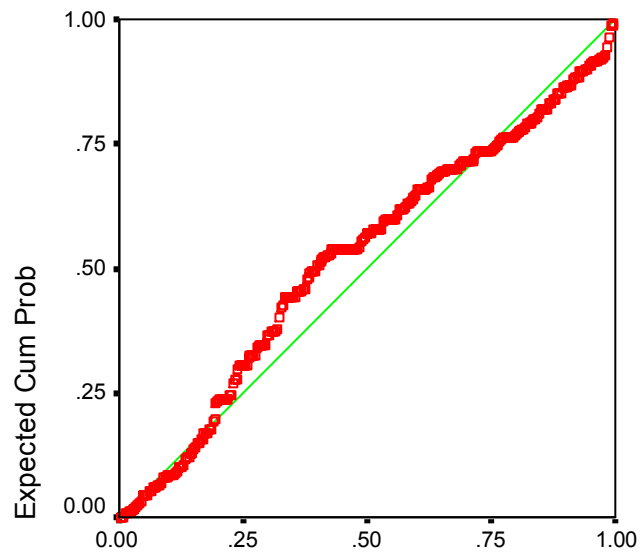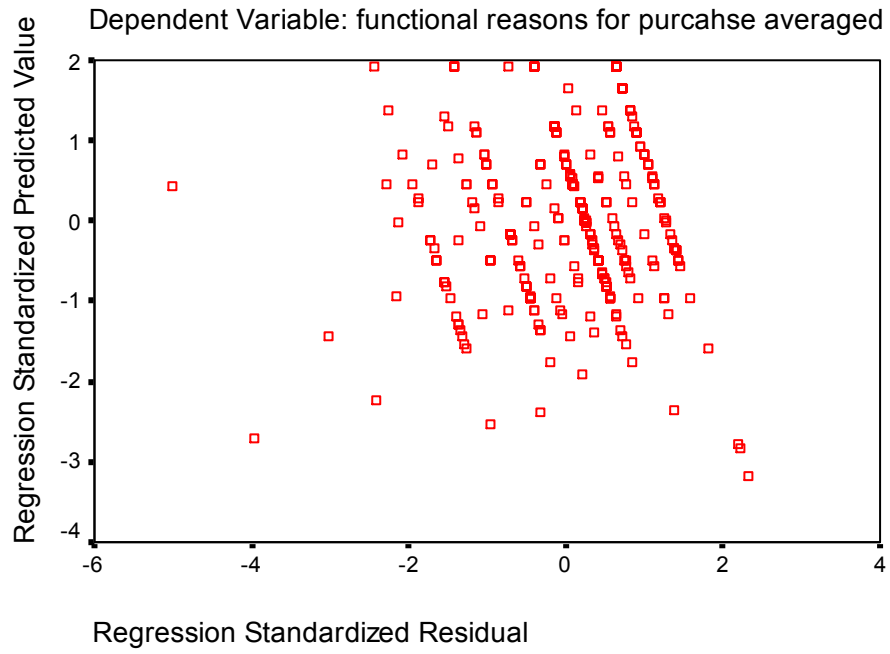
Hypothesis 5a

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.316(a)	.100	.087	.98142	.100	7.915	4	285	.000

a Predictors: (Constant), Pre-production and business systems interaction, pre-production items averaged, Pre-production and product tech interaction, Pre-production and Risk info interaction
b Dependent Variable: functional reasons for purchase averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30.495	4	7.624	7.915	.000(a)
	Residual	274.508	285	.963		
	Total	305.002	289			

a Predictors: (Constant), Pre-production and business systems interaction, pre-production items averaged, Pre-production and product tech interaction, Pre-production and Risk info interaction
b Dependent Variable: functional reasons for purchase averaged

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.181	.358		11.693	.000
	pre-production items averaged	.127	.096	.123	1.314	.190
	Pre-production and Risk info interaction	.024	.012	.205	2.044	.042
	Pre-production and product tech interaction	.004	.009	.037	.405	.686
	Pre-production and business systems interaction	-.004	.007	-.042	-.585	.559

a Dependent Variable: functional reasons for purchase averaged

Histogram

Dependent Variable: functional reasons for purcahse averaged

Std. Dev = .99
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: functional reasons for purcahse averaged

Observed Cum Prob

169

Scatterplot

Dependent Variable: functional reasons for purcahse averaged
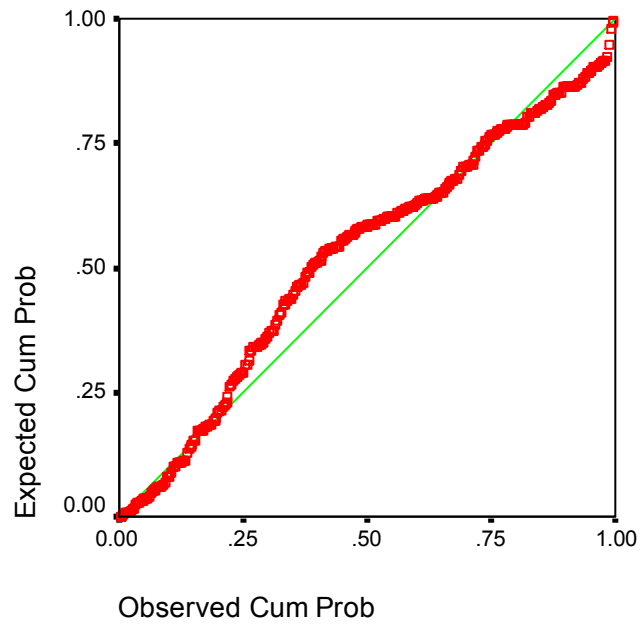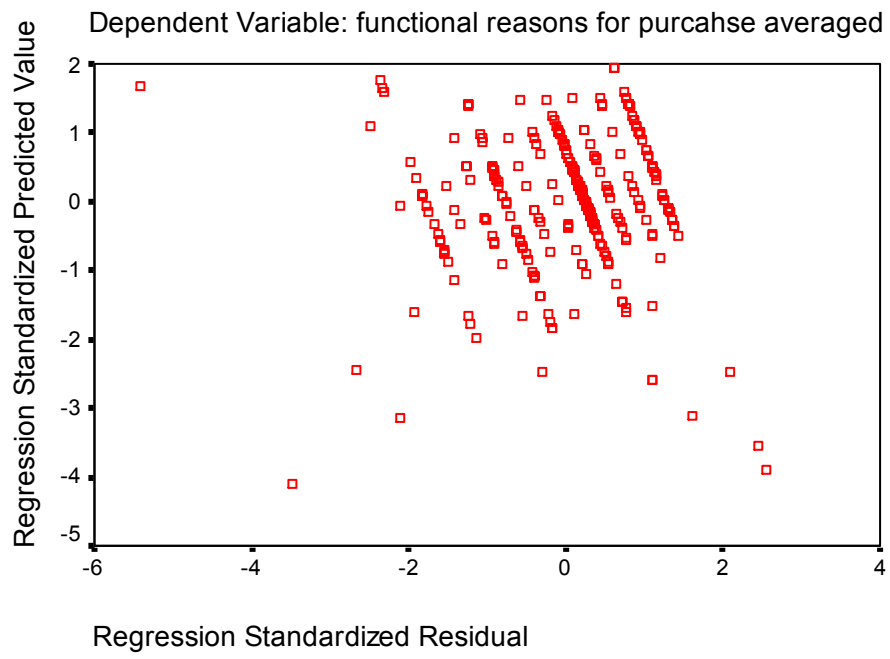
Hypothesis 5b

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.298(a)	.089	.076	.98745	.089	6.952	4	285	.000

a Predictors: (Constant), Product development and business systems interaction, product development items averaged, Product development and Product tech interaction, Product development and risk interaction
b Dependent Variable: functional reasons for purchase averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	27.113	4	6.778	6.952	.000(a)
	Residual	277.889	285	.975		
	Total	305.002	289			

a Predictors: (Constant), Product development and business systems interaction, product development items averaged, Product development and Product tech interaction, Product development and risk interaction
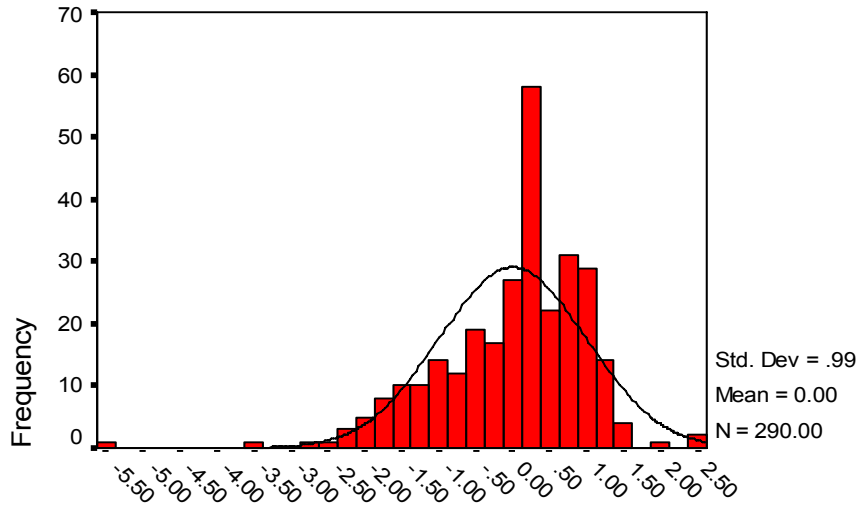b Dependent Variable: functional reasons for purchase averaged

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.382	.358		12.255	.000
	product development items averaged	.074	.094	.071	.788	.431
	Product development and risk interaction	.025	.012	.216	2.168	.031
	Product development and Product tech interaction	.008	.010	.075	.830	.407
	Product development and business systems interaction	-.006	.007	-.067	-.920	.358

a Dependent Variable: functional reasons for purchase averaged

171

Histogram

Dependent Variable: functional reasons for purcahse averaged


Std. Dev = .99
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: functional reasons for purcahse averaged

Observed Cum Prob

172

Scatterplot

Dependent Variable: functional reasons for purcahse averaged
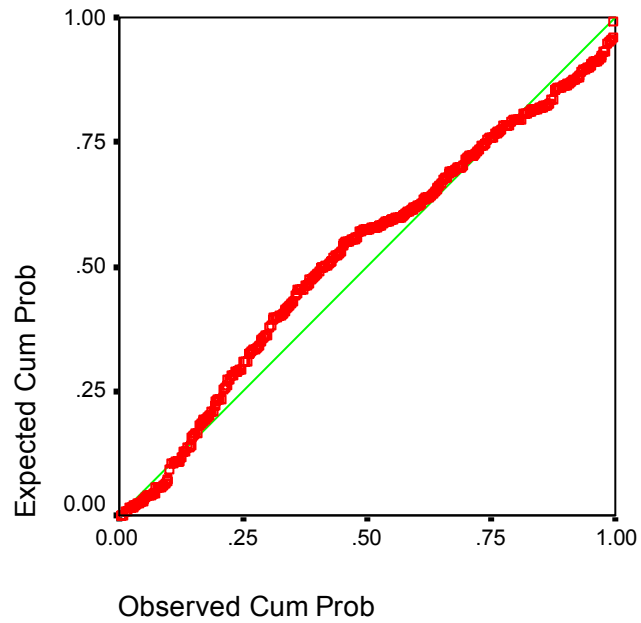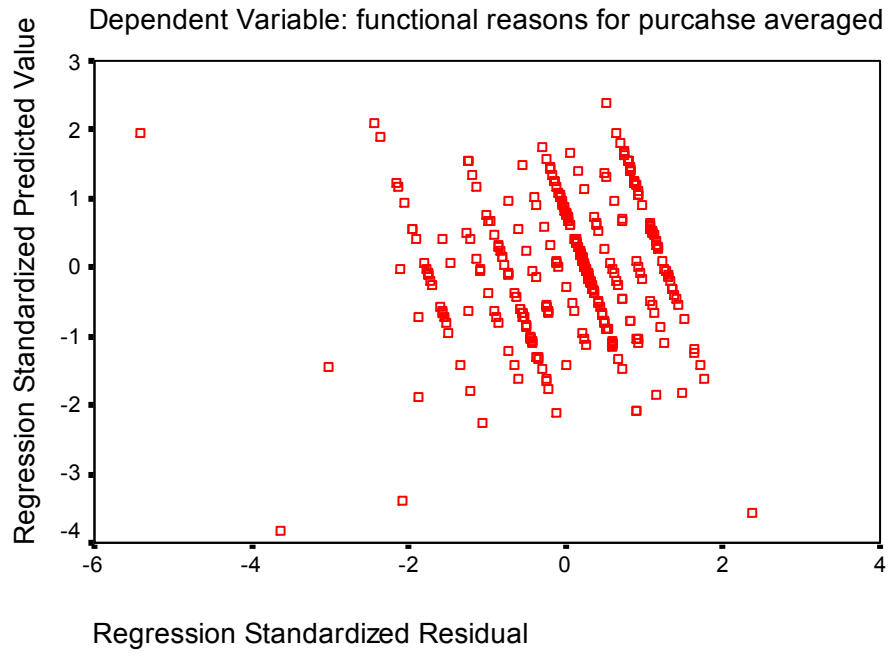
Hypothesis 5c

Model Summary(b)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.290(a)	.084	.071	.99004	.084	6.543	4	285	.000

a Predictors: (Constant), Post-production and business systems interaction, post-production items averaged, Post-production and product tech interaction, Post-product and risk interaction
b Dependent Variable: functional reasons for purchase averaged

ANOVA(b)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	25.654	4	6.413	6.543	.000(a)
	Residual	279.348	285	.980		
	Total	305.002	289			

a Predictors: (Constant), Post-production and business systems interaction, post-production items averaged, Post-production and product tech interaction, Post-product and risk interaction
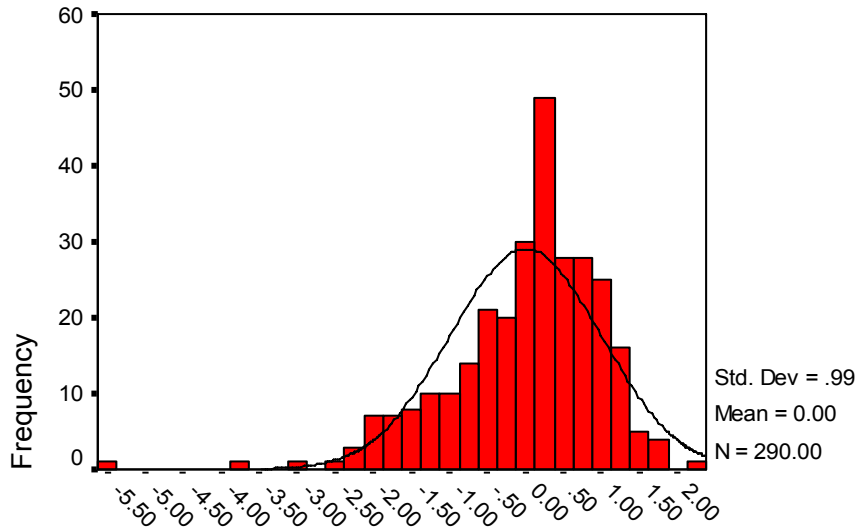b Dependent Variable: functional reasons for purchase averaged

Coefficients(a)

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.654	.309		15.057	.000
	post-production items averaged	.038	.098	.042	.391	.696
	Post-product and risk interaction	.028	.013	.251	2.188	.029
	Post-production and product tech interaction	.005	.010	.045	.437	.663
	Post-production and business systems interaction	-.005	.007	-.057	-.741	.459

a Dependent Variable: functional reasons for purchase averaged

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Histogram

Dependent Variable: functional reasons for purcahse averaged


Std. Dev = .99
Mean = 0.00
N = 290.00

Regression Standardized Residual

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: functional reasons for purcahse averaged

Observed Cum Prob
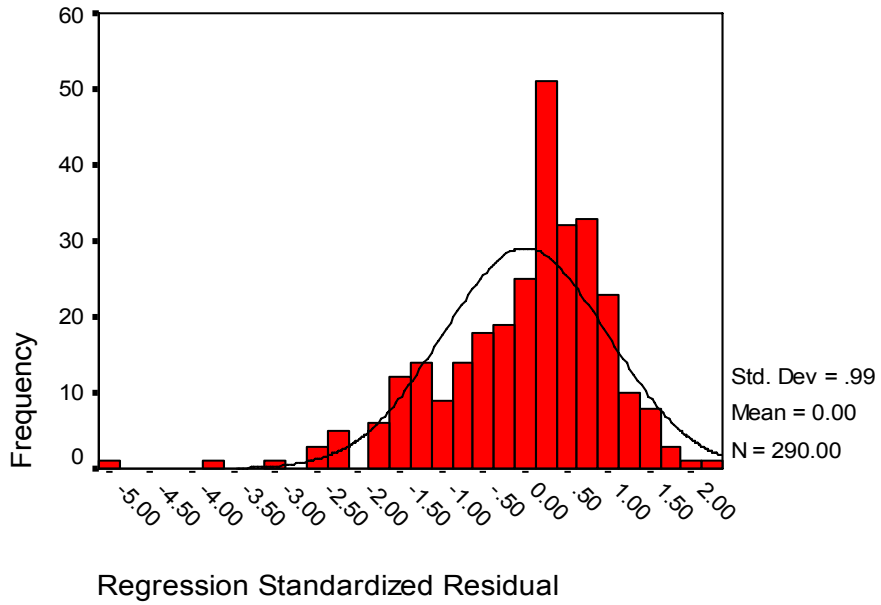
Scatterplot

Dependent Variable: functional reasons for purcahse averaged
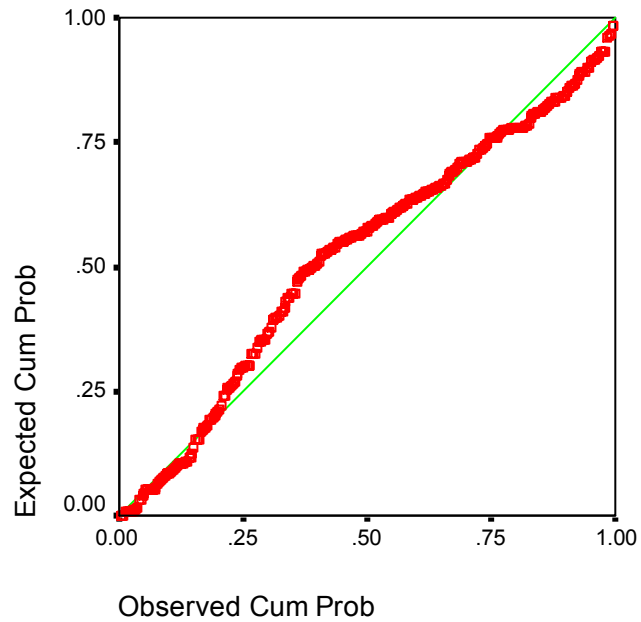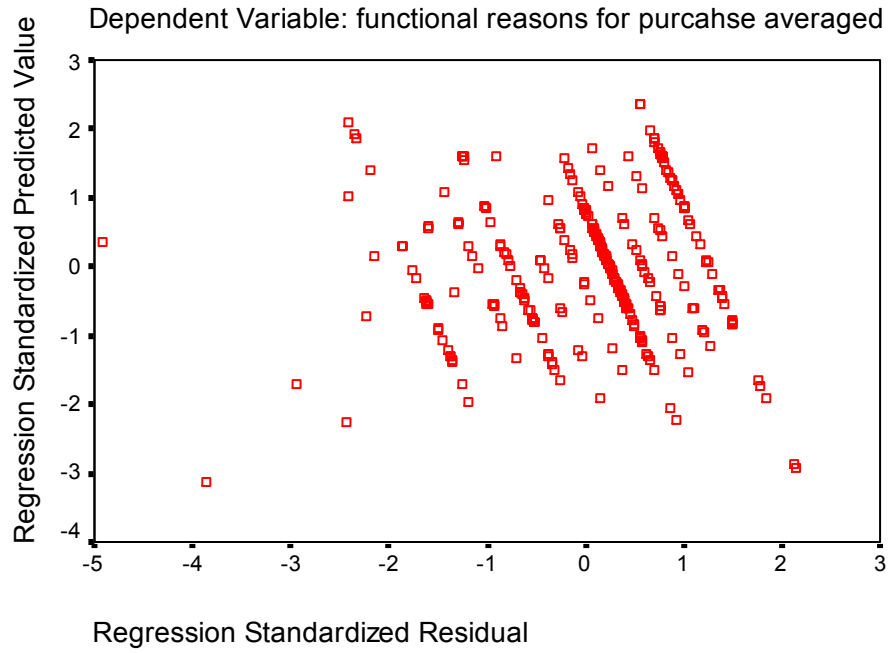
Logistic Regression Results

Hypothesis 1a

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	400.773	.004	.006

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.775	4	.437

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	AVGCO1	.133	.120	1.230	1	.267	1.142
	Constant	-.789	.722	1.195	1	.274	.454

a Variable(s) entered on step 1: AVGCO1.

Hypothesis 1b

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	387.637	.048	.065

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	5.999	5	.306

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	AVGCO3	.420	.116	13.054	1	.000	1.522
	Constant	-2.356	.666	12.509	1	.000	.095

a Variable(s) entered on step 1: AVGCO3.

Hypothesis 3a

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	376.285	.085	.113

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	12.932	8	.114

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	AVGCO1	.607	.841	.521	1	.470	1.835
	AVGCO2	.662	.949	.487	1	.485	1.939
	AVGCO3	-.786	.782	1.008	1	.315	.456
	CO1EARLY	-.111	.146	.585	1	.445	.895
	CO2EARLY	-.155	.164	.903	1	.342	.856
	CO3EARLY	.239	.138	2.988	1	.084	1.269
	Constant	-1.771	.972	3.316	1	.069	.170

a Variable(s) entered on step 1: AVGCO1, AVGCO2, AVGCO3, CO1EARLY, CO2EARLY, CO3EARLY.

Hypothesis 4a

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	379.797	.074	.098

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	4.397	8	.820

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	AVGCO1	.046	.207	.050	1	.823	1.047
	CO1D1	-.069	.026	7.154	1	.007	.933
	CO1D2	.052	.021	6.197	1	.013	1.053
	CO1D3	.039	.015	7.393	1	.007	1.040
	Constant	-.606	.756	.643	1	.423	.545

a Variable(s) entered on step 1: AVGCO1, CO1D1, CO1D2, CO1D3.

Hypothesis 4b

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	380.799	.071	.094

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	6.915	8	.546

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	AVGCO2	-.141	.199	.505	1	.477	.868
	CO2D1	-.063	.025	6.130	1	.013	.939
	CO2D2	.049	.021	5.171	1	.023	1.050
	CO2D3	.043	.015	8.343	1	.004	1.044
	Constant	.291	.744	.153	1	.695	1.338

a Variable(s) entered on step 1: AVGCO2, CO2D1, CO2D2, CO2D3.

Hypothesis 4c

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	368.159	.110	.147

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	18.834	8	.016

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1(a)	AVGCO3	.531	.224	5.641	1	.018	1.701
	CO3D1	-.088	.029	9.252	1	.002	.915
	CO3D2	.038	.022	2.886	1	.089	1.039
	CO3D3	.048	.016	9.572	1	.002	1.049
	Constant	-2.484	.733	11.488	1	.001	.083

a Variable(s) entered on step 1: AVGCO3, CO3D1, CO3D2, CO3D3.

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BIOGRAPHICAL INFORMATION

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