

**CUSTOMER VALUE DELIVERY PRACTICES IN TYRE PRODUCTION
AND THE PERCEPTION OF CUSTOMERS & EMPLOYEES ON ITS
PRODUCT QUALITYDELIVERY**

- A CASE OF HORIZON ADDIS TYRE SHARE COMPANY

Thesis

**Submitted to the Department of Management in Partial Fulfillment of the
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By: REISOM GEBRETINSAE

ADVISOR: Dr. TAREKEGN DEA

Adama Science and Technology University

School of Business and Economics

Department of Management

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Approved by Board of Examiners

Name	Signature	Date
1. <u>Dr. TarekegnDea</u> (Advisor)	_____	_____
2. _____ (chair man)	_____	_____
3. _____ (Examiner)	_____	_____
4. _____ (Examiner)	_____	_____

Declaration

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university, and that all the sources of materials used for the thesis have been duly acknowledged.

Declared By:-

Name: ReisomGebretinsae

Date: 14/12/2015

Signature: _____

Confirmed by Advisor:-

Name: Dr. TarekegnDea

Date: _____

Signature: _____

Place and date of submission_____

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Acronyms

AHP-----	ANALYTICAL HIERARCHY PROCESS
CVD-----	CUSTOMER VALUE DELIVERY
DIN-----	DEUTSCHE INDUSTRIAL NORMS
HATC-----	HORIZON ADDIS TYRE SHARE COMPANY
HDPE-----	HIGH-DENSITY POLYETHYLENE
HOQ-----	HOUSE OF QUALITY
METEC-----	METALS AND ENGINEERING CORPORATION
PVC-----	POLYVINYL CHLORIDE
PPR-----	POLYPROPYLENE RANDOM COPOLYMER
QVD-----	QUALITY VALUE DELIVERY
SPSS-----	STATISTICAL PACKAGE FOR SOCIAL STUDIES
UPVC-----	UNMODIFIED/UNPLASTICISED POLY VINYL CHLORIDE
VOC-----	VOICE OF CUSTOMERS

Abstract

Flint, Woodruff & Gardial (2009) state that customer value delivery is, broadly speaking, about understanding users today, seeking future opportunities for buyers, and intelligently creating innovations for payers. Traditionally, customer value is conceptually placed between a company's resources and market outcomes that embody the financial purpose of the business; customer value complements technology, and technology is seen as an enabler of customer value.

Researchers claim that customer value delivery is systemic and dependent on more than one attribute, and possibly on more than one firm (Pynnönen, Ritala & Hallikas, 2011). Hence, not limited to organizational change (Goodstein & Butz, 1998), customer value is introduced as part of the comprehensive reasons for thinking about the systemic change of customer value in the ecosystem.

Customer value delivery (CVD) has three dimensions: the physical attribute of the product or services such as price, quality, speed of delivery and completeness of the service; the relationship that a customer experiences by interacting with the company; and the emotional appeal of the company or its products and services to the customer. (Goodstein & Butz, 1998). From the above three dimensions, the study focused on the physical attribute of the product/service specifically on quality value delivery to customers from the beginning of design to ending of delivery process.

The aim of this study was to: a) study perception of CVD among Horizon Addis Tyre Share co. customers and employees and b) to determine the relationship between value delivery, product quality and satisfaction. Primary data were collected using questionnaire from the employees of the company and customers and discussion on a purposive sampling basis. Quantitative data were analyzed using Statistical package for social studies SPSS and qualitative data were analyzed by Analytical Hierarchy process (AHP). Moreover, the research aimed at prioritizing customer needs. The result shows that customers are satisfied with the quality delivery of products and services of the company. Based on the requirements of the customers, their voices have been tried to be translated into technical parameters and prioritized. Horizon Addis Tyre Company/industry needs to give a due attention in training all its employees so as to maintain the competitive advantage that it has now.

Keywords: Customer value delivery, Quality value delivery, Service quality, Product Quality, Voice of the customer, House of Quality, Correlation analysis.

CHAPTER ONE

1. Introduction

1.1 Back ground of the study

Customer value delivery(CVD) is “an overall concept that provides a means of translating customer requirements into the appropriate technical requirements for each stage of product development and production (i.e., marketing strategies, planning, product design and engineering, prototype evaluation, production process development, production, sales)” (Sullivan, 1986).

CVD is a pro-active “customer-driven planning process” so that problems could be found and solved at the very beginning of the product development and fewer people have to deal with the problems at the later stages (Day, 1993).

Customer value deployment focuses on customer expectations or requirements, often referred to as the voice of the customer. It is employed to translate customer expectations, in terms of specific requirements, into directions and actions, in terms of engineering characteristics, that can be deployed through Product planning, Part development, Process planning, Production planning and service (Mizuno &Akao 1978)

In order to achieve best quality production, an organization must understand the customer’s wants and needs, also known as the voice of the customer (VOC). The voice of the customer is defined as the identification, structuring, and prioritization of customer needs (Eshan S. Jaiswal, 2012)..

It is vital for companies to identify the exact needs of the customers and to measure their satisfaction toward a need fulfillment level to survive in the current competitive market. CVD focuses on designing in quality rather than inspecting in quality which reduces development times, lowers startup costs, and promotes the use of teams.

Horizon Addis Tyre Company(HACT)is pioneer in Ethiopian tyre production, mainly produce nylonthread type tyre and modern radial(wire mesh) type tyre. Different size tyres are produced in the company for Automobile, Minibus, Isuzu, Buses and Heavytrucks. Currentlythe

company's headquarter is facilitating contract agreement with the 4th largest tyre production company called CONTINENTAL worldwide tyre manufacturing. Horizon Addis Tyre Company headquarter and its production area are located around Saris (Addis Ababa). HATC produces 540/320 type for Heavy truck and buses, 480/260 type for Medium Isuzu and FSR, 240/120 for small automobile and minibuses. Polyethylene products such as tubeless rubber and tyre, tube type tyre and rubber are additionally produced for Lorries, tow bars, industrial boots and junction boxes.

A case of Tyre production at HATC is dealt in the research and shown the importance of incorporating Customer value deployment and analyzing the requirements of customers in fulfilling the spoken voices /requirements/ of customers in the development of the product..

1.2 Back Ground of the Company

Horizon Addis tire is the only tire production share company in Ethiopia since 1971 G.C. In the company different types of tires are produced. From this tube type tires are produced for automobiles, minibuses, buses and heavy trucks. On the other hand tubeless tires are also produced for tow bars, Lorries and moveable machines. Its production capacity of the company is 700,000 tires annually in full manpower and machinery within three work shift throughout 24hrs. (Horizon Addis tire production department: 2012 annual report) Currently the wire mesh tire also started to produce. In the current years the new radial technology is introduced and contributed to the integration of Ethiopian society through transportation like that of open wireless system is laid out linking the capital city with all the important administrative cities in the country.

Horizon Addis tire as widely known old name called Addis Tire Factory production was started at the regime of Emperor Haile Selassie, then after 30 years life of the company in 2001 the name replaced by MATADOR ADDIS SH.CO. Due to 61% of total share was bought by the Slovakian investors, and 39% remain with government (Company record section). After the Slovak bought few structural adjustments takes place and three machineries are imported but no more than 8 years can survive in the business, after the Slovak release, the world No.4 tire Production Company called Continental tire and Rubber Company which is a German company improves the quality of products by introducing the new radial technology and technical support.

Due to the increment of local market it was then, that the dedicated and committed investor for the development of Ethiopia, SHEIKH MOHAMMED H.AL-AMOUDI, decided to buy the share of Continental through one of his group companies called HORIZON PLANTATION P.L.C in Jan, 2011 currently owns a total share of 61% and government 39%. The company now is joined MIDROC ETHIOPIA investment group. At this time the company is awarded ISO9001 and started exporting to five countries like Chile, Singapore, Malaysia, Egypt and south Sudan. The future perspective is to be competent by improving the existing nylon products to the customers need and to sustain in the market (Company record section).

The qualities of the company's products and process have been certified by International Electrochemical Committee (IEC), International Organization for Standard (ISO9001), German Technical Standard (DIN) and Ethiopian Standard organization.

1.2.1 Company Vision:

“To be a leader in product quality & customer service delivery within the Tyre production Sector”

1.2.2 Company Mission:

To satisfy the needs & wants of its customers requirement for Tyre related materials using up to date production technologies & qualified manpower through which the company secures its future survival & growth.

1.2.3 Business Objectives:

The business objectives of the company are to produce & deliver Tyre related

- Modern Radial type tyres for all vehicles.
- Tubeless tyres for new moveable machineries and different size Lorries.
- Different rubber type house hold & utensils up to the maximum satisfaction of its customers in economically viable & financially profitable manner.

1.2.4 VALUES

- Customer Loyalty
- Innovation and continuous improvement
- Transparency and accountability
- Competitiveness
- Human capital is a great asset
- Contributing for friendly environment
- Always deliver quality product and service

1.2.5 Company Motto

“We strive to maximize our customers’ satisfaction”

1.3 Statement of the problem

Customer value delivery (CVD) is one of the methodologies for customer oriented product delivery. It is a systematic way to translate specific customer requirements in to engineering characteristics for design, development, manufacturing and delivery of a product (Akao, 2008).

One of the critical challenges of CVD implementation is the difficulties in capturing, understanding and organizing customer needs. Traditional methods such as survey, interview and focus group are usually adapted in CVD to collect customer needs, classifying them in to different categories and visualizing their relationship with customer needs, and determining their degree of importance.

CVD has been implemented in rarely few manufacturing industries in our country in general and in the Tyre production process of Horizon Addis Tyre Company (HATC) in particular. However, as far as the researchers knowledge is concerned, even if many research have been done in the area of customer quality delivery management: including “uses and applications of quality engineering a case of Ethiopia plastic share company” by AsratMekonnen (2011); a research on CVD that can relate and interpret the often fuzzy requirements of customers in to technical requirements and show their interrelation and suggested a method in proposing a way out is still deficient. On the other hand, so many researchers have been done in other countries that show the importance of applying customer value in production.

Marvin E. González, Gioconda Quesada, and A. Terry Bahill (2003), in their research “Improving Product Design Using quality value Deployment: The School Furniture Case in Developing Countries” have concluded that QVD theory could be a very inspiring source for improvements in a manufacturing system, helping out not only in the cost reduction but also the design of products, processes, and procedures.

RYAN R. CRAIG (2009), in his research “A quality value deployment methodology for Product delivery” has reached to a conclusion that “the use of conjoint analysis and the house of quality proved to be a powerful, useful tool for product delivery. It helps to decrease lead time, better capture the voice of the customer, and decrease costs. Firms wishing to implement this methodology can look to increases in customer satisfaction and product delivery efficiency. Consumers can benefit from this methodology when firms are able to produce a better product based on the consumer’s requirements”.

So, in this thesis, the researcher will try to capture the requirements of the customers of the company, analyze the data, create a relationship matrix and propose a guide line for applying CVD in the Tyre production process.

1.4 Objective of the Study

1.4.1 General Objective

The general objective of the study is to show how the Customer Value delivery deployment is perceived, the uses and applications of CVD practice as a tool for improvement of production and process quality and customer satisfaction.

1.4.2 Specific objectives

The specific objectives of the study can be divided in to the following.

- The first is to examine how customers’ fuzzy requirements are being interpreted in to technical requirements and then incorporated in the production process of tyres.
- The second objective is to create understanding of the customer value delivery method: how it works, the principal ideas on which it is built, and how it might best be applied.
- The third objective is to properly prioritize and interpret customer requirements in to technical requirements and develop a relationship that shows importance of giving value to the voice of the customers and its outcomes.

It is also anticipated that other researchers might have interesting ideas as to what might be done differently in the future.

1.5 Research Questions

Based on the above objectives, the study will answer the following questions.

1. Can the fuzzy requirements /voice of customers/ properly prioritized and interpreted in to technical /engineering/ requirements in the company?
2. What is the relationship between the different variables (needs and results) that have an effect in the customers' perception and satisfaction of tyre production?
3. How are the product qualitiesand service delivery of the company perceived?
4. Does each requirement/variable/ has similar effect on the satisfaction of customers, which ones are of highest priority?

1.6 Scope of the Study

Among the many industries in Ethiopia and the production industries which are find in Addis Ababa, this study confined to customers' value delivery practice,surveying customers' and employees' perception of service delivery and product quality and its impact on satisfaction. Moreover, the analysis does not incorporate the third and fourth phases of CVD.

1.7 Significance of the Study

The primary merits of the study goes to the Horizon Addis Tyre sh.co. Suggestion on the proper application of CVD to the product of the company and how to enhance fulfilling the requirement of the customers in order to incorporate the voice of the customer has been dealt. The researcher believes that Horizon Addis Tyre Company (HATC) will be motivated to implement results of the study on its production and process quality delivery improvement.

Other stake holders such as production industries, Ministry of Trade and Industry, Quality and Standard Authority of Ethiopia and other interested sectors could draw important concepts out of the study.

The study can add value on the manufacturers understanding of customer needs towards their satisfaction and loyalty as a result of listening to their voices. To those researchers who would like to pursue their research on customer value delivery practices at HATC and elsewhere, it may serve them as a starting point of reference. In addition, the study can benefit HATC as it may

draw attention where corrective action is necessary to satisfy and delight customers and to make customers loyal.

Customer value delivery is employed to translate customer expectations, in terms of specific requirements, into directions and actions, in terms of engineering characteristics, that can be deployed through Product planning, Part development, Process planning, Production planning and service (Mizuno & Akao 2006). This research asserts that CVD can therefore be used to help translate the requirements of customers and to fulfill quality of service and product so as to give customers satisfaction.

CHAPTER TWO

2. REVIEW OF RELATED LITERATURE

2.1 Definition of customer value delivery and its quality

According to Dale (2003) in today's business world there is no single accepted definition of quality. However, irrespective of the context in which it is used, it is usually meant to distinguish one organization, event, product, service, process, person, result, action, or communication from another. For the word to have the desired effect as intended by the user and to prevent any form of misunderstanding in the communication, the following points need to be considered:

- The person using the word must have a clear and full understanding of its meaning.
- The people/audience to whom the communication is directed should have a similar understanding of quality to the person making the communication.
- Within an organization, to prevent confusion and ensure that everyone in each department and function is focused on the same objectives, there should be an agreed definition of quality. For example:
 - Betz Dearborn Ltd. defines quality as: "That which gives complete customer satisfaction."
 - Rank Xerox (UK) as: "Providing our customers, internal and external, with products and services that fully satisfy their negotiated requirements."
 - North-West Water Ltd. uses the term "business quality value delivery" and defines this as: "Understanding and then satisfying customer requirements in order to improve our business results. Continuously improving our behavior and attitudes as well as our processes, products and services. Ensuring that a customer focus is visible is all that we do."

There are a number of ways or senses in which quality value may be defined, some being broader than others but they all can be boiled down to either meeting requirements and specifications or satisfying and delighting the customer.

2.2 Customer Perception of Quality value delivery

What is Perceived Quality value?

As M.Karthikeyan writes, perceived quality value can be defined as the customer's perception of the overall quality or superiority of a product or service delivery with respect to its intended purpose, relative to alternatives. Perceived quality value is, first, a perception by customers how it is delivered. It thus differs from several related concepts, such as:

- a) Actual or objective quality value: the extent to which the product or service delivers superior service.
- b) Product-based quality value: the nature and quantity of ingredients, features, or services delivery include.
- c) Manufacturing quality: conformance to specification, the "zero defects" goal up to ending process.

Perceived quality value cannot necessarily be objectively determined, in part because it is a perception and also because judgments about what is important to customers are involved. An evaluation of washing machines by a Consumer Report expert may be competent and unbiased, but it must make judgments about the relative importance of features, cleaning action, types of clothes to be washed, and so on that may not match those of all customers. After all, customers differ sharply in their personalities, needs, and preferences.

Perceived quality value is an intangible, overall feeling about a brand. However, it usually will be based on underlying dimensions which include characteristics of the products to which the brand is attached such as reliability and performance. To understand perceived quality value, the identification and measurement of the underlying dimensions will be useful, but the perceived quality value itself is a summary, global construct.

2.3 Customer Satisfaction

Customers will always assess the services delivered they experienced by comparing them with whatever they wish to receive. According to Kotler (2003), satisfaction is a person's feelings of pleasure or disappointment resulting from comparing a product's perceived performance in

relation to his or her expectations. Here we see that there is a close relationship between customer service quality delivery and customer satisfaction because they seem to be measured in terms of the difference between perceived performance and expected performance. Milbourn (2008) suggests that the economic success of companies fluctuates with the quality of service that is offered. They report that dissatisfied customers rarely complain. Instead, most dissatisfied customers simply purchase from another store. Across industries, service organizations who deliver high quality service consistently receive repeat customers.

2.4 Tyre

A Tyre is a type of synthetic or man-made polymer which is extracted from hydrocarbon compounds. It is similar in many ways to natural resins found in trees and other plants. Webster's Dictionary defines polymers as: any of various complex organic compounds produced by polymerization, capable of being molded, extruded, cast into various shapes and films, or drawn into filaments and then used as textile fibers. Many common tyres are made from hydrocarbon monomers. These tyres are made by linking many monomers together into long chains to form a polymer backbone. Polyethylene, polypropylene and polystyrene are the most common examples of these hydrocarbon compounds.

2.5 A BRIEF REVIEW OF CVD HISTORY

Customer value delivery is “an overall concept that provides a means of translating customer requirements into the appropriate technical requirements for each stage of product development and production process (i.e., marketing strategies, planning, product design and engineering, prototype evaluation, production process development, production, sales)” (Sullivan, 2006).

In Chapter 21, Quality value delivery, of the second edition of Gower Handbook of

Quality Management edited by D. Lock, Hill (2004) wrote similarly, “quality value delivery for customers evolved from a number of different initiatives between 1997 and 2002, but the two main drivers which led to its creation in Japan were those: 1. To improve the quality of design. 2. To provide manufacturing and field staff with the planned quality control chart (showing the points to be controlled within the production process) before the initial production run.” Therefore, it is clear that “it was the struggle by product designers under the total quality control movement to improve their work that spawned quality function deployment in Japan” (Neff, 2001).

Historically, Japanese industry began to formalize the CVD concepts when Mr. Oshiumi of the Kurume Mant plant of Bridgestone Tire produced a processing assurance chart containing some of CVD's main characteristics in 1996 and K. Ishihara developed the ideas of "functional deployment of business" similar to those of CVD and applied them to Matsushita in the late 1990s (Cohen, 1998).

However, it was Akao who first realized the value of this approach in 1989 and wanted to utilize its power during the product design stage so that the product design characteristics could be converted into precise quality control points in the manufacturing quality control chart (Hill, 1994). After several industrial trials, Akao wrote a paper on this new approach in 1992 and called it hinshitsutenkai (quality value deployment). This paper and Nishimura (1992) were the first two papers fostering the then new concept of quality value deployment known to the West. In the meantime, the Kobe Dockyard of Mitsubishi Heavy Industries began to apply the ideas of QVD in 1991 following Akao's suggestion (Pardee, 2006), and Nishimura at Kobe produced a quality table that showed the correlation between the customer-required quality functions and the counterpart engineering characteristics between 1992 and 1994 (Hill, 2004; Nishimura, 1992). Akao formulated all these into a procedure channeling the customer requirements from the design stages down to the production operations, which was called hinshitsukinotenkai (quality value deployment) (Cohen, 1998).

CVD was introduced to Toyota's Hino Motor in 1975 and Toyota Auto body in 1977 with impressive results, and was later introduced into the whole Toyota group integrated with quality value deployment.

A Japanese book on QVD edited by Mizuno and Akao, Deployment of the Quality value, was published in 1988, shows the fast development and wide applications of QVD in Japan. Two years later, Kayaba won the Deming Prize with special recognition for applying QVD to bottleneck engineering (Cohen, 1998).

Through the above-described explorations and practices, QVD has been successfully used in many Japanese industries, such as agriculture systems, construction equipment, consumer electronics, home appliances, integrated circuits, software systems, steel, synthetic rubber, and textile (Akao, 1990).

The first recorded case study in QVD in the US was probably in 1986 when Kelsey Hayes used QVD to develop a coolant sensor, which fulfilled critical customer needs such as “easy-to-add coolant”, “easy-to-identify unit”, and “provide cap removal instructions” (King, 1997a). Early adopters of QFD in the US included 3M Company, AT&T, Baxter Healthcare, Budd, Chrysler, DEC, Ford Motor, General Motors, Goodyear, Hewlett-Packard, IBM, ITT, Kodak Eastman, Motorola, NASA, NCR, Polaroid, Procter and Gamble, and Xerox (Adiano and Roth, 2004; Bosserman, 2002; Cohen, 1998).

The annual US QVD Symposium transactions (<http://www.qvdi.org/transact.htm>) show that there are more than 100 major companies using QVD in the US.

Since 1998, the annual International Symposium on QVD has been held in US or other countries (<http://www.icqvd.org/transact.htm>). At the end of the 3rd International Symposium on QVD in 1998, the International Council for QVD (ICQVD: <http://www.icqvd.org>) was established as a non-profit organization chaired by Professor Akao and incorporated in Michigan, US. The Council includes representatives from the Union of Japanese Scientists and Engineers (<http://www.juse.or.jp>), US QVD Institute, Linkoping University (Sweden: <http://box.ikp.liu.se/publications/gemensamma/qvdprogm.html>), MacQuarie University (Australia), NTQI, FCO, UFMG (Brazil), and QVD Institute Deutschland (Germany: <http://www.qvd-id.de>), which are all active QVD organizations around the world and show the globalization of the QVD technique.

CVD was originally proposed, through collecting and analyzing the voice of the customer from its quality perspective, to develop products with higher quality to meet or surpass customer's needs. Thus, the primary functions of CVD are product development, quality management, and customer needs analysis. Later, CVD's functions had been expanded to wider fields such as design, planning, decision-making, engineering, management, teamwork, delivery time, and costing. Essentially, there is no definite boundary for CVD's potential fields of applications. In the Foreword for J. Terninko's book Step by Step CVD (Terninko, 1997), B. King wrote, “In the 1960s, Quality Control and Quality Improvement had a distinctively manufacturing flavor in Japan. . . . In the late 1960s and early 1970s, Yoji Akao and others went to work on improving the design process so that when the new product was introduced to manufacturing, it was high quality from the beginning. The process for improving design and delivery process was called

Customer Value delivery (CVD). From 1975 to 1995, this tool/process was integrated with other improvement tools to generate a mosaic of opportunities for product developers and service providers.”

2.6 Functional fields of CVD

CVD was originally proposed, through collecting and analyzing the voice of the customer, to develop products with higher quality to meet or surpass customer’s needs. Thus, the primary functions of CVD are product development, quality management, and customer needs analysis. Later, CVD’s functions had been expanded to wider fields such as design, planning, decision-making, engineering, management, teamwork, delivery time, and costing. Essentially, there is no definite boundary for CVD’s potential fields of applications.

2.6.1 Product development

One of CVD’s two popular application fields is product development (Ansari and Modarress, 1994; Anthony and Dirik, 1995; Griffin, 1992; Maduri, 1992; Matzler and Hinterhuber, 1998; Rahman, 1995; Zhang et al., 1999). There are also many similar and particular applications of CVD in this field, including the development of courses/curriculums (Bier and Cornesky, 2001), model-change products (Hoque et al., 2000), new products (Dawson and Askin, 1999; Griffin, 1989), products and processes (Verma et al., 1998), product concept (Schmidt, 1997), reliability test methods (Kwon and Han, 1999), software (Barnett and Raja, 1995; Haag et al., 1996), strategic performance metrics (Hauser, 2001), and systems (Stubbs and Diaz, 1994; Stylianou et al., 1997).

2.6.2 Quality value management

Another popular field of CVD’s applications is quality value management that is an important part of the CVD process and essential for successful product development, and many publications can be found in this field, such as Adiano (1998), Aly et al. (1990), Anjard (1995), Barnett (1991), Basili and Musa (1991), Beerten (1996), Bhote (1997b), Braunsperger (1996), Coate (1990), Cozart et al. (1990), Dale et al., Price (1995), Radharamanan and Godoy (1996), and Zairi and Youssef (1995). In particular, CVD has been applied to expert systems for quality management (Bird, 1992), delivery process improvement (Hybert, 1996), quality control (Acord, 1996; Eriksson and McFadden, 1993), quality information systems (Chang, 1989), quality systems (Burn, 1994; Kanji, 1998), customer service improvement (Barnes and Vidgen,

2001;Chin et al., 2001;), service quality management systems (Chang and Lin, 1991), and software process improvement (Herzwurm et al., 2000).

2.6.3 Customer needs analysis

Quality value management and product development are achieved in CVD through customer needs analysis that, in fact, the very first step of a CVD process and is thus an important functional field of CVD. Publications in this field are quite rich, focusing mainly on the two key aspects of customer needs analysis: collecting/translating customer needs (Bech et al., 1997; Bergquist and Abeysekera, 1996; Griffin and Hauser, 1993; Gustafsson, 1993; Hales, 1993; Hauser, 1993 Sullivan, 1986; Whiting, 1993) and satisfying customer needs (Askin and Dawson, 2000).

2.6.4 Product design

CVD can be referred to as designed-in quality value rather than traditional inspected-in quality in the sense that it helps a company shift from inspecting the product's quality to designing quality into the product through customer needs analysis (Guinta and Praizler, 1993). Therefore, product design is also a functional field of CVD as illustrated in Acord (1997), Bodell and Russell (1989).

There are many studies in this field focusing on the design of different products as well as on the different issues in product design, including design for manufacturability (Fabricius, 1994; Youssef, 1994), product/process innovation (Presley et al., 2000; Hauser, 1993), product/service introduction (Nolle, 1993).

2.6.5 Planning

CVD is a pro-active “customer-driven planning process” so that problems could be found and solved at the very beginning of the product development and fewer people have to deal with the problems at the later stages (Day, 1993). This idea of CVD is not only applicable to the usual product planning (Cohen, 1995) and process planning (Price, 1998), but also applicable to general planning (Casey et al., 1993), strategic planning (Crowe and Cheng, 1996), and other specific types of planning. Examples include business planning (Ferrell and Ferrell, 1994), business process planning (Rajala and Savolainen, 1996).

2.6.6 Engineering

Apart from the above five popular functions; CVD through its quality delivery is also related to and can thus be applied to other fields. One such field is concurrent engineering (Anderson, 1993; Zakarian and Kusiak, 1999). Specially, there have also been CVD linkages with knowledge intensive engineering (Reich, 1995), quality engineering & delivery process (Charteris, 1993).

2.6.7 Decision-making

CVD determines product design specifications (how's) based on customer needs (what's) and competitive analysis (why's), which represents a customer-driven and market-oriented process for decision-making. It is quite natural to use CVD in this field for such purposes as determining customer needs (Stratton, 1989) and development priorities (Han et al., 1998). CVD has been widely applied to the major aspects of decision-making: measurement, selection/determination, and evaluation from the different customers' current requirement. Reported examples include measuring customer satisfaction (Motwani et al., 1996), performance (Ellis, 1998; Jagdev et al., 1997) and quality of services (Van Looy et al., 1998); selecting/ determining composition of peacekeeping forces (Partovi and Epperly, 1999), optimal design requirements (Park and Kim, 1998), development priorities (Han et al., 1998), marketing strategies (Nagendra and Osborne, 2000), products (Weiss and Butler, 1992), R&D projects (Curtis and Ellis, 1998), MBA programs (Pitman et al., 1996).

2.6.8 Quality value Management

All of the above reviewed functions of CVD are related to management, more or less. It is thus not surprising that CVD can be directly used as a management tool to handle clients/customers (Beerten, 1996; Cozart et al., 1998; Howell, 2000; McLaurin and Bell, 2001). In particular, CVD has been applied in this field to the management of advanced manufacturing enterprises (Ren et al., 1997), business (Flaig, 1992), business processes (Rajala et al., 1997), capital budget (Partovi, 1999), culture (Angeli et al., 1998), customer complaints (Lapidus and Schibrowsky, 1994), customer-supplier relationships (Kochhar and Saeed, 1999), manufacturing (Conley, 1998), organization's competitive advantages (O'Neal, 2001), policies (Sullivan, 1988), projects (Richardson, 2001), radar-based position reporting systems (Johnston and Burrows, 1995), research portfolios (Kauffmann et al., 2000), risk (Monplaisir et al., 1997), road traffic accidents

(Sohn, 1999), services (Partovi, 2001), supply chain (Samuel and Hines, 1999) , strategies(Ko and Lee, 2000), and technologies (Hequet, 1999).

2.6.9 Teamwork

CVD functions above-mentioned multi-functions demonstrate its usefulness, and its successful applications have produced noticeable benefits such as the promotion of teamwork, the provision of documentation, shorter design cycles, and lower start-up cost (Abdul-Rahman et al., 1999; American Supplier Institute, 1994; Sullivan, 1996). Specifically, CVD is beneficial to cross-functional cooperation (Song et al., 1997), improving product development cycles& customers' satisfaction level (Sansone and Singer, 1993), and improving the visualization of the design attributes (Hallberg, 1999).

2.7 Benefits of CVD

James L. has beautifully depicted the benefits of CVD in his book in the following way:-

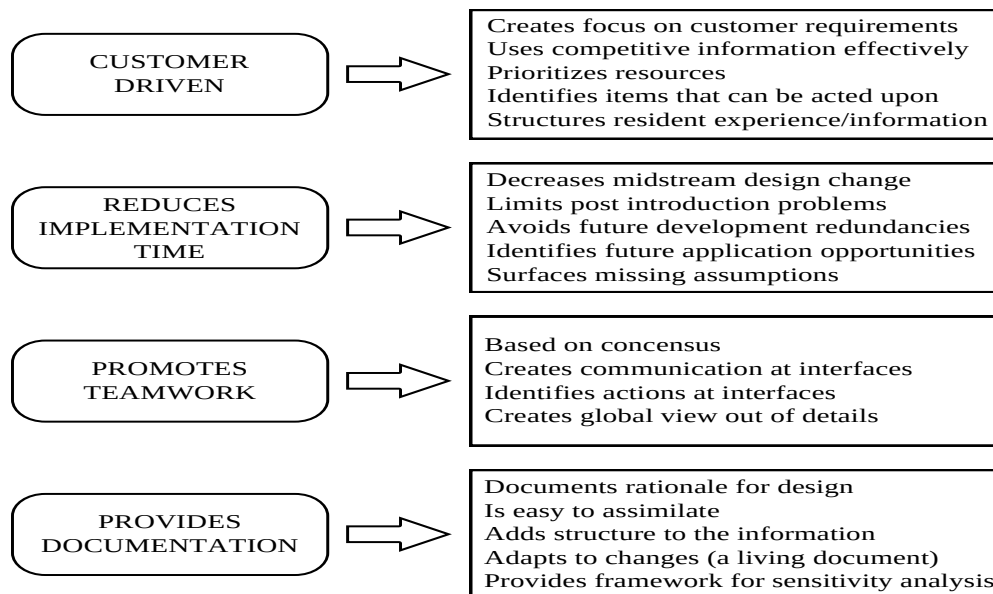


Figure i. Benefits of CVD

2.8 Applied industries of CVD

The first two reported applications of CVD were in the shipbuilding (Nishimura, 1972) and electronics (Akao, 1972) industries. CVD's from the quality base early applications focused on

such industries as automobiles, electronics, and software. The fast development of CVD has resulted in its applications to many manufacturing industries. Eventually, CVD has also been introduced to the service sector such as government, banking and accounting, health care, education and research. Now it is hardly to find an industry to which CVD has not yet been applied.

Manufacturing is also an earlier area of CVD applications, which can be found, e.g., in the papers of Sullivan (1996) and Swackhamer (1995). Along with its fast development, there have been more and more CVD applications in manufacturing (Atkinson, 1990).

CVD has also been applied to diversified manufacturing areas, such as assembly lines/plants/stations, finishing and before and after delivery service. (Adiano and Roth, 1994; Mrad, 1997, 1999), bearing (Anonymous, 1993a), braking systems (Nickerson, 1993), capital goods (Lucas and Pilkington, 1995; Pfohl and Ester, 1999), composite material (Karbhari et al., 1991), computer-integrated manufacturing (Boubekri et al., 1991), engine filters (Zhang et al., 1999), equipment (Maduri, 1992; Matzler and Hinterhuber, 1998), furniture (Acord, 1996, 1997), helmet-mounted displays (Cadogan et al., 1994), hybrid bicycles (Govindaraju and Mital, 2000), metals (Crowe and Cheng, 1996), plastic components (Yeung and Lau, 1997), power protection equipment (Gershenson and Stauffer, 1999), printing (Cozart et al., 1990; Finley, 1992).

2.9 Voice of the customer (VOC)

Voice of the Customer (VOC) is the name used to describe a process of communication where there is give and take to ensure that requirements and expectations are clearly defined, documented, and understood by all parties involved. (Eshan S. Jaiswal, 2012).

A critical aspect of a CVD analysis is gathering the voice of the customer to assess how a product or service measures against what the customer wants or expects. The voice of the customer is defined as the identification, structuring, and prioritization of customer needs (Griffin and Hauser, 1991). Customer needs are measured in terms of consequences, which are determined by asking customers directly what they are looking for in a product or service. Then, the customer consequences are assessed and technical requirements are developed by knowledgeable professionals associated with the specific field of the product or service being

assessed. The technical requirements are design dimensions that are specifically made to meet the customer consequences developed from the VOC. For example, if a customer consequence was better fuel economy (associated with a vehicle), perhaps a technical requirement would be the fuel type or weight of the vehicle that would directly be associated with the customer consequence.

The VOC is obtained primarily by two methods, namely through interviews or focus groups, which are then used to develop a survey questionnaire to distribute to potential and/or existing customers. Griffin and Hauser (1991) suggest that interviews with 20-30 customers should identify 90% or more of the customer needs in a relatively homogeneous customer segment.

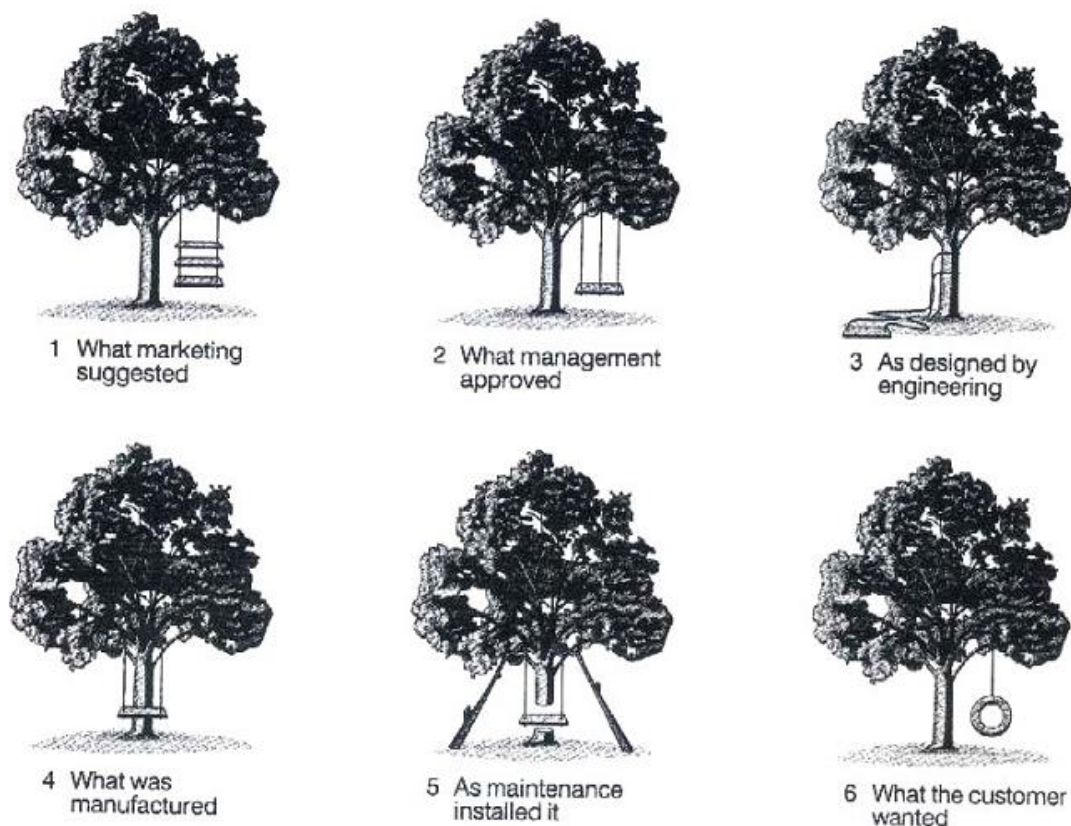


Figure ii. What really customer need (Source: Oakland 2000)

2.10 The four phases of quality management

Phase 1, Product Planning:

Phase 1 or product planning, is also called The House of Quality value. Many organizations only get through this phase of a QM process. Phase 1 documents customer requirements, warranty data, competitive opportunities, product measurements, competing product measures, and the technical ability of the organization on to meet each customer requirement. Getting good data from the customer in Phase 1 is critical to the success of the entire QM process (Eshan S. Jaiswal, 2012).

Phase 2, Product Design:

Product design requires creativity and innovative team ideas to solve the design problem in the requirement of the customer. Product concepts are created during this phase and part specifications are documented. Parts that are determined to be most important to meeting customer needs are then deployed into process planning, or Phase 3.

Phase 3, Process Planning:

Process planning comes next and is led by manufacturing engineering to evaluate the standard with the requirement of customers. During process planning, manufacturing processes are flowcharted and process parameters (or target values) are documented.

Phase 4, Process Control:

And finally, in production planning, performance indicators are created to monitor the production process, maintenance schedules, and skills training for operators. Also, in this phase decisions are made as to which process poses the most risk and controls are put in place to prevent failures. The quality assurance department in concert with manufacturing leads to the final interest or requirement of the customers(Phase 4).

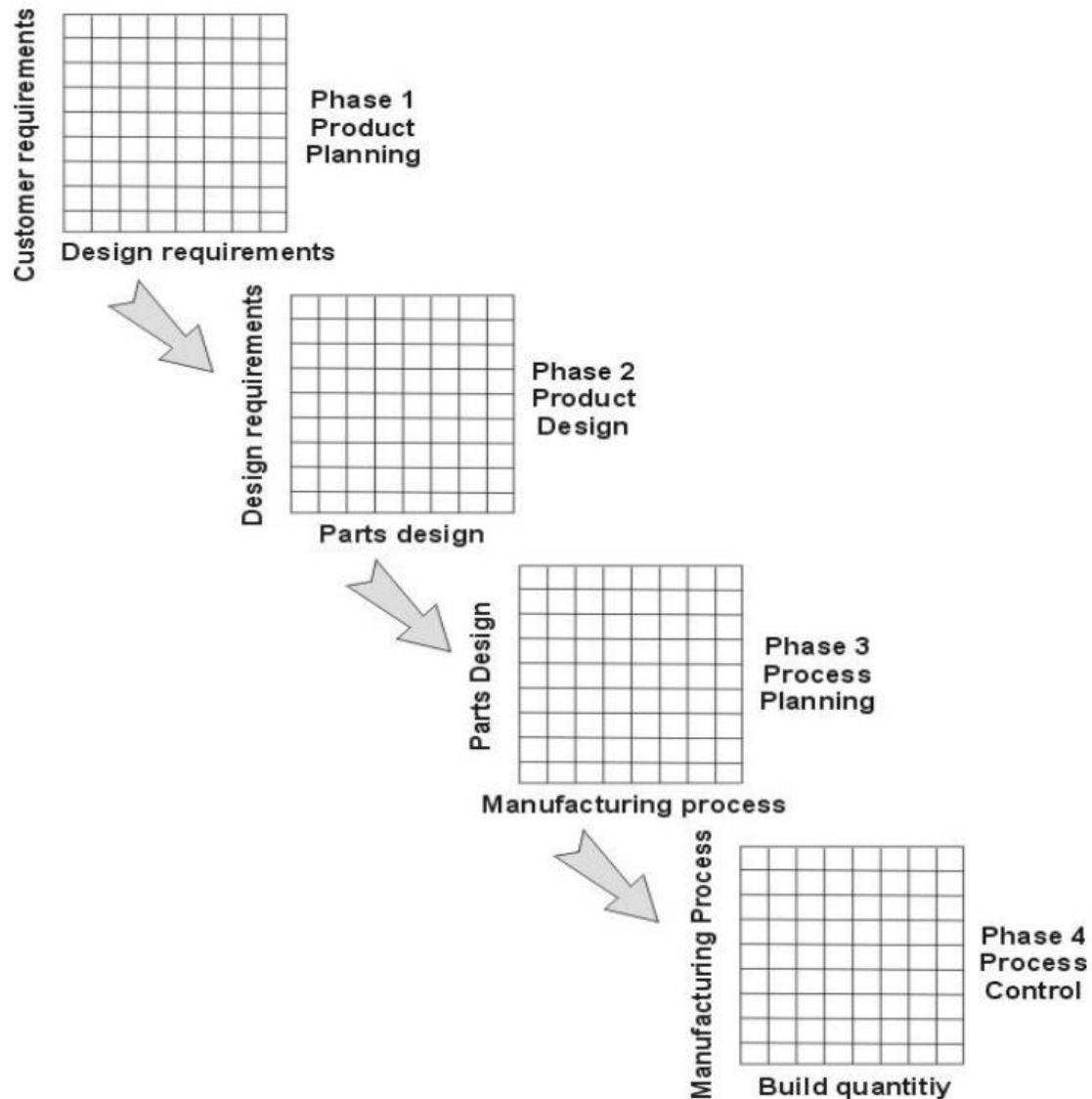


Figure iii. The Four Phases of QM (Source:-IOSR Journal of Mechanical and Civil Engineering (IOSR-JMCE))

2.11 House of Quality (HOQ)

Lewis and Hartley (2001) report that the HOQ is a design tool that supports information processing and decision making in the engineering design process. They note that for companies just implementing quality value delivery and the HOQ, there is undoubtedly an improvement in information structure, flow, and direction. Hauser and Clausing (1998) state that the principal benefit of the HOQ is increasing the quality focus of the organization. That is, the HOQ gets people within an organization thinking in the right direction and thinking together.

Customer value delivery from customer based requirement uses a set of interrelated matrix diagrams. The first matrix is the HOQ, which converts the customer consequences into technical requirements that must be fulfilled throughout the supply chain. The starting point on the left of the house is the identification of basic customer consequences. The next step is the definition of the priority levels that customers assign to these needs. These priorities are translated into numeric values that indicate relative importance, as discussed earlier. Customer ratings, shown on the right side of the house, enable benchmarking with competitors' services. The section just below the roof states the technical requirements used to meet the customer consequences. The relationship between the customer consequences and technical requirements constitutes the main body of the HOQ, called the relationship matrix. This matrix helps identify certain technical requirements that should be given priority if one addresses multiple customer consequences. The correlation matrix defines the relationships among technical requirements, which is represented by the roof of the HOQ. The bottom of the house evaluates the competition in terms of technical requirements.

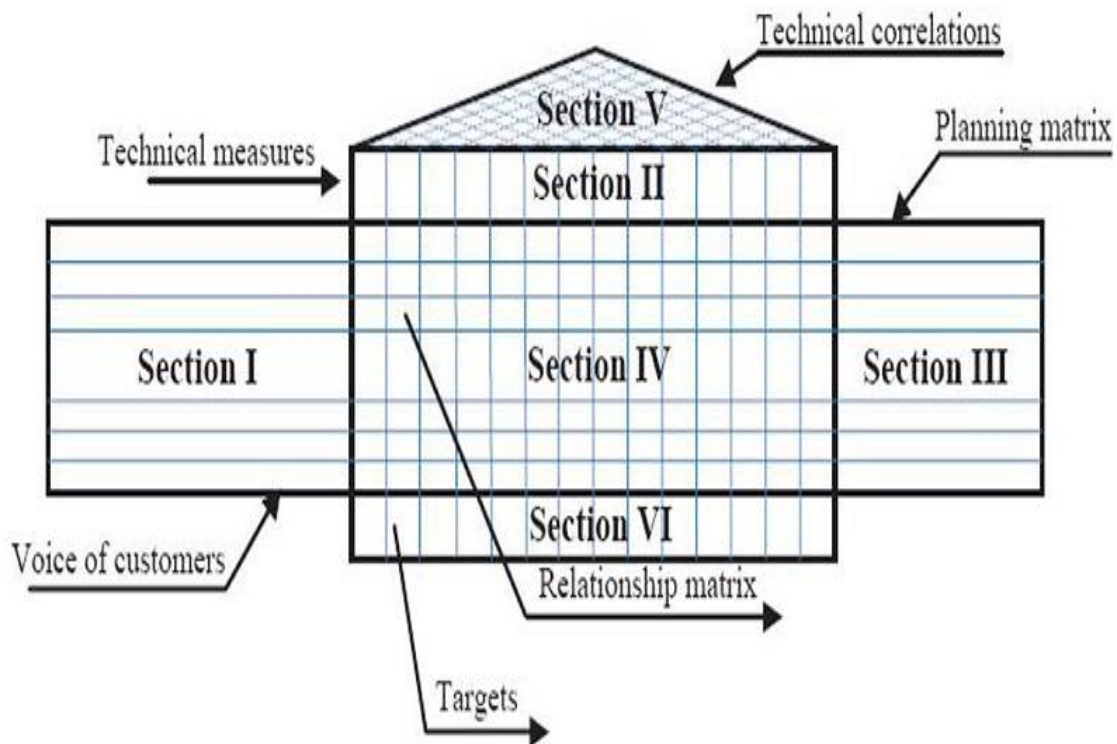


Figure iv. Basic House of Quality matrix (Source: Dikmen,et al. 2004)

2.12 Kano Model and CVD application review

Noriaki Kano was the first person to develop a method to identify user requirement and expectation through a preference classification technique (Kano et al., 1984). Kano Model is able to determine user requirement and exceed their expectation. There are three categories of requirements which influence user satisfaction in different ways (Sauerwein et al., 1996).

Must-be requirements: If these requirements are not fulfilled, the customer will be extremely dissatisfied. On the other hand, as the customer takes these requirements for granted, their fulfillment will not increase his satisfaction. The must-be requirements are basic criteria of a product. Fulfilling the must-be requirements will only lead to a state of "not dissatisfied". The customer regards the must-be requirements as prerequisites, he takes them for granted and therefore does not explicitly demand them. Must-be requirements are in any case a decisive competitive factor, and if they are not fulfilled, the customer will not be interested in the product at all

One-dimensional requirements: With regard to these requirements, customer satisfaction is proportional to the level of fulfillment - the higher the level of fulfillment, the higher the customer's satisfaction and vice versa. One-dimensional requirements are usually explicitly demanded by the customer.

Attractive requirements: These requirements are the product criteria which have the greatest influence on how satisfied a customer will be with a given product. Attractive requirements are neither explicitly expressed nor expected by the customer. Fulfilling these requirements leads to more than proportional satisfaction. If they are not met, however, there is no feeling of dissatisfaction.

The advantages of classifying customer requirements by means of the Kano method are very clear:

- Priorities for product development upon customer requirements. It is, for example, not very useful to invest in improving must-be requirements which are already at a satisfactory level but better to improve one-dimensional or attractive requirements as they have a greater influence on perceived product quality and consequently on the customer's level of satisfaction.

- Product requirements are better understood: The product criteria which have the greatest influence on the customer's satisfaction can be identified. Classifying product requirements into must-be, one-dimensional and attractive dimensions can be used to focus on
- Kano's model of customer satisfaction can be optimally combined with quality function deployment. A prerequisite is identifying customer needs, their hierarchy and priorities (Griffin/Hauser, 1993). Kano's model is used to establish the importance of individual product features for the customer's satisfaction and thus it creates the optimal prerequisite for process-oriented product development activities.
- Kano's method provides valuable help in trade-off situations in the product development stage. If two product requirements cannot be met simultaneously due to technical or financial reasons, the criterion can be identified which has the greatest influence on customer satisfaction.
- Must-be, one-dimensional and attractive requirements differ, as a rule, in the utility expectations of different customer segments. From this starting point, customer-tailored solutions for special problems can be elaborated which guarantee an optimal level of satisfaction in the different customer segments.
- Discovering and fulfilling attractive requirements creates a wide range of possibilities for differentiation. A product which merely satisfies the must-be and one-dimensional requirements is perceived as average and therefore interchangeable (Hinterhuber/Aichner/Lobenwein 1994).

2.13 Conceptual framework

This section explains the key factors, variables and relationships among theories or models. The conceptualization helps to answer the study's research questions.

Based on the past literature review; this research concentrates on Kano's model /conceptual framework/ of customers satisfaction combining with requirement fulfillment. According to one of Kano's categories of requirements, customer satisfaction was mostly seen as a one-dimensional construction - the higher the perceived product quality, the higher the customer's satisfaction and vice versa.

This framework emphasizes variables like technical quality; functional quality; internal and external influence, corporate image, service quality, perceived price. These independent variables are positively related to the customer's requirement or customer's satisfaction for an organization. The diagram framework is given below:

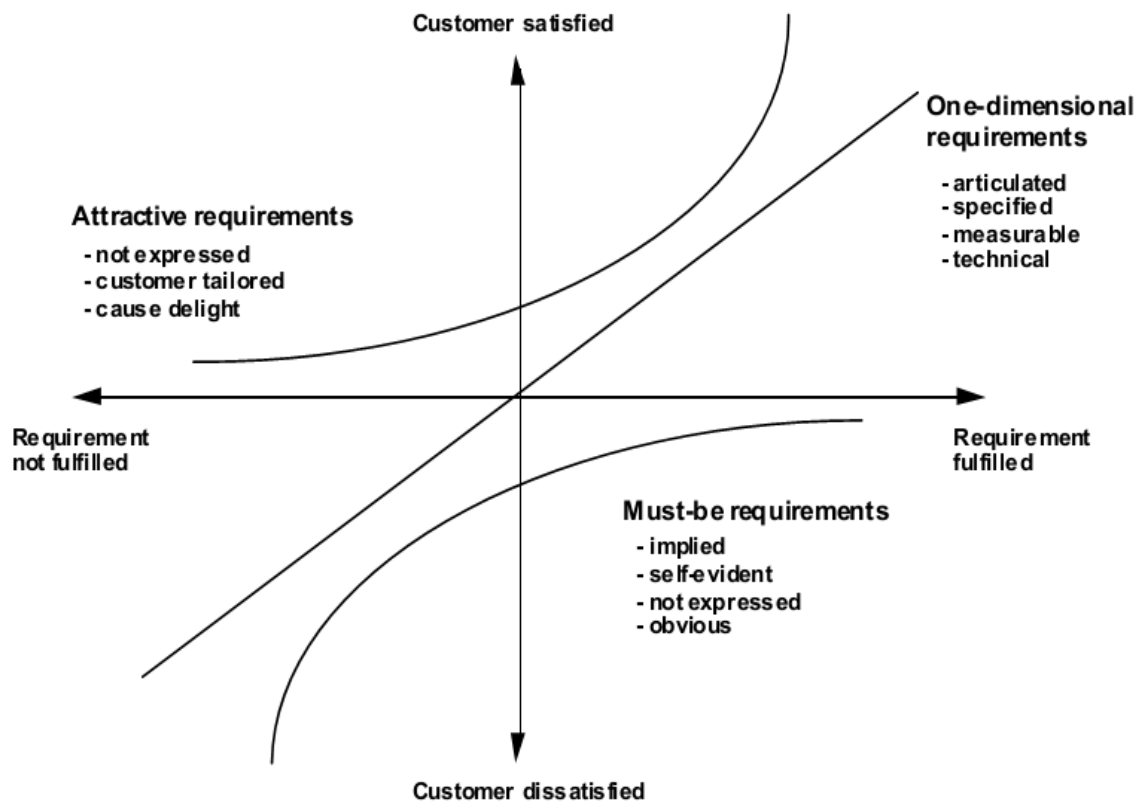


Figure v. Kano's Model /Conceptual Framework/

CHAPTER THREE

3 METHODOLOGY OF THE STUDY

3.1 Research Design

There are three basic types of research design: Exploratory, descriptive and casual. The research approach that is applied in this study is the descriptive type.

As Gay and Airasian (2006) state, Descriptive research studies involve collecting data in order to test hypotheses or answer questions regarding the subjects of the study. In contrast with the qualitative approach the data are numerical. The data are typically collected through a questionnaire, an interview, or through observation. In descriptive research, the researcher reports the numerical results for one or more variables on the subjects of the study. Examples include public opinion surveys, fact-finding surveys, job descriptions, surveys of the literature, documentary analyses, anecdotal records, critical incident reports, test score analyses, normative data, and description of the type and age of computers in rural schools. Policy makers often rely on this type of research to inform and justify their decisions.

3.2 Sources of Data

The data that was employed includes detailed information on customer requirements of HATC using both primary and secondary sources. The primary source of data was collected from the respondents that are users of the tyre products produced at HATC and the employees of the industry who are considered as the target population. The secondary source of data like the list of sub-contractors, were collected from the company.

Data was collected from customers and industry employees through questionnaire, interview and physically attending to the industry's production area.

3.3 Tools of Data collection

Data were collected from customers and industry employees' through questionnaire, interview and discussion by physically attending in the company production area and with customers.

3.4 Sampling Techniques

Before going to the sampling technique employed in this research, let's see the target population. Among the total of 598 employees, those selected as the target population due to their relatively direct interaction with customers are 120:-

Table i.Types of employees targeted for the research

S.No	Name /Type/	N
1	Top management	6
2	Middle management	8
3	Supervisor	4
4	Team leader	6
5	Technician	59
6	Engineer	14
7	Support staff worker (marketing & sales)	23
Total		120

And the most frequent customers of the industries products are:-

Table ii. Types of customers targeted for the research

S.No	Type	N
1	Sole proprietor ship	-
2	Small enterprise	-
3	Medium enterprise	7
4	Large enterprise	1
5	Whole seller	3
6	Retailer	9
7	Sales agent	17

8	Consumers buying product per 22 days per one sales agent	33
Total		70

A heterogeneous type of purposive sampling technique was employed for customers and expert sampling type of purposive sampling was used for the employees. The number of respondents selected to fill the questionnaire that fit the Morgan's sample size selection criteria for a sample size of 127 that corresponds to a population size of 190 /49 customers and 78 employees/ is used.

Table iii. Sample size selection (Source:-Robert v., 1970)

Table for Determining Sample Size from a Given Population

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	100000	384

Note.—*N* is population size,
S is sample size.

3.5 Analysis

The analysis of data collected from respondents using interview and questionnaire was done using Analytical Hierarchy process (AHP) for the qualitative and Statistical Programming for Social Sciences/ Statistical Product and Service Solutions (SPSS, version 20) for the quantitative data then it was depicted in a House of Quality matrix.

The AHP model reduces subjectivity and ensures fairness in the selection process; it will also provide a systematic framework for decision making, and it saves time. (Bernard W. Taylor, 2006).

SPSS (Statistical Package for the Social Sciences) uses both a graphical and a syntactical interface and provides dozens of functions for managing, analyzing, and presenting data. (The American University in Cairo, 2011).

3.6 Reliability Analysis

Reliability with regards to the consistency of the results is obtained from the instrument used in the research. The present study is reliable because it used valid strategies and techniques appropriate to the research objectives. It has been tried also to present a detailed evidence of the research plan (i.e. details of the research site, method of sample selection, instruments used) and its implementation in the methodology section to assure the study's reliability.

3.7 Validity Analysis

The content validity of the instrument for the present study was ensured as the product and service quality dimensions and items are identified from the literature and were reviewed by professionals. Pilot tests were then conducted with customers who were seen as similar to the population for the study.

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3.7 Limitations of the study

3.7.1 Limitations

The results in the study pertain only to the respondents and generalization to a wider population should be done with consideration. There was also a deficiency of getting the total number of consumers of the product since the whole sellers and sales agents do not have this registered data.

4 DATA PRESENTATION ANALYSIS AND INTERPRETATION

4.1 Introduction

This section analyzes the data gathered from respondents. Both quantitative and qualitative analysis is done. The quantitative analysis is done using SPSS and the qualitative analysis is made by AHP. SPSS version 20 statistical software is used to compute the results collected from respondents statistically. Demographic information of respondents is presented in the form of pie chart to give an overview of respondents' profile.

Descriptive statistics is used to find out the frequency of response from respondent. Correlation analysis of the dependent and independent variables is also made.

4.2 Quantitative Analysis

The collected data through questionnaire both from the employees and customers of the company are analyzed and interpreted quantitatively.

The questionnaire was prepared in such a way that it can be filled by employees and customers. The questionnaire prepared for employees consisted of 35 questions categorized in four sections. The first section was the general background of respondents, the second was staff's perception of CVD and its practices in the company, the third section was the importance that employees give to customer wants and the fourth section was the practices of quality training in general and CVD in particular in the company.

The questionnaire for the customers consisted of 25 questions categorized in three sections. The first section deals with the general background of the respondents, the second section consisted of questions related to customers' satisfaction towards HATC products and services; the third section was intended to gather suggestions and recommendations of customers.

A total of 130 questionnaires were distributed and 127 questionnaires were returned i.e. 97% of the total distributed questionnaires were used for the analysis.

Based on the responses gathered from 78 employee respondents and 49 customers, the following analysis and interpretation was made.

4.2.1 Respondents Profile

Table iv. Employee Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Gender	78	1.00	2.00	110.00	1.4103	.49506
Age category	78	1.00	3.00	117.00	1.5000	.63960
Experience in the industry	78	1.00	4.00	142.00	1.8205	.80168
Educational Qualification	78	1.00	4.00	199.00	2.5513	.74985
position/level at industry	78	1.00	7.00	394.00	5.0513	1.91303
Valid N (list wise)	78					

Table vi. Customers Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
gender/sex	49	1.00	2.00	72.00	1.4694	.50423
Age	49	1.00	4.00	107.00	2.1837	.95030
experience as use of industry's products	49	1.00	3.00	65.00	1.3265	.55482
Educational Qualification	49	1.00	4.00	113.00	2.3061	.82169
type of business	49	3.00	8.00	346.00	7.0612	1.47773
Valid N (list wise)	49					

The demographic backgrounds of the sample respondents in five parameters are presented to understand the respondents' profiles i.e., gender, age, experience, education, and position for the employees and gender, age, experience, education, and type of business for customers. Tables above depict the sample profile of the respondents. Accordingly about 43.3% of the respondents are females and the rest are males (56.7%). This shows that majority of the respondents are male.

The tables also depict age distribution of the respondents. It is evident from the table that the age group 18-30 years is majority of responders which is 44.9% of total respondents. Respondents with age group of more than 40 years account for 11.8% of total respondents.

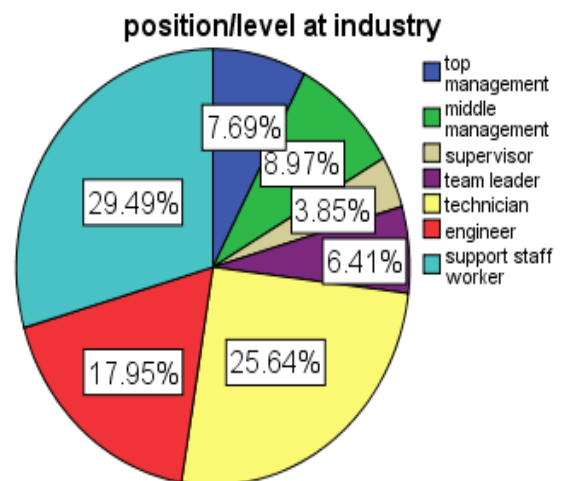
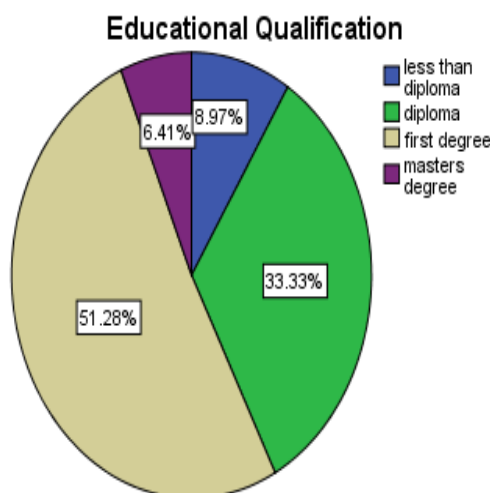
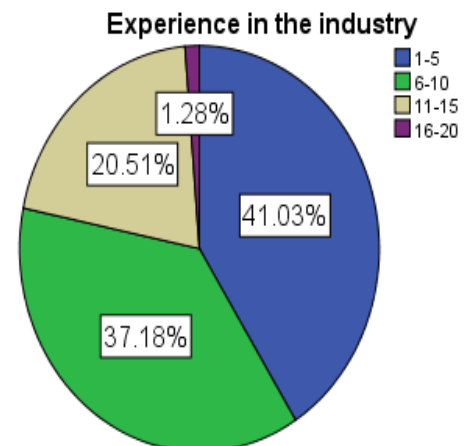
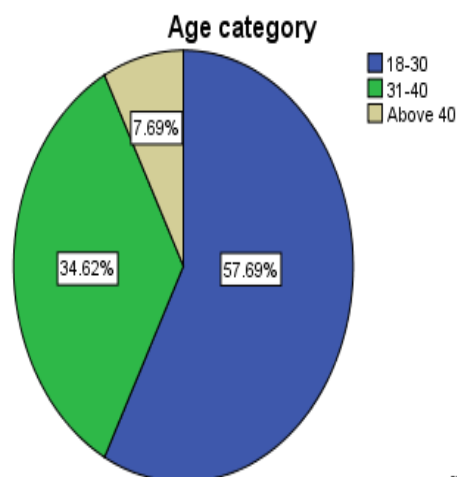
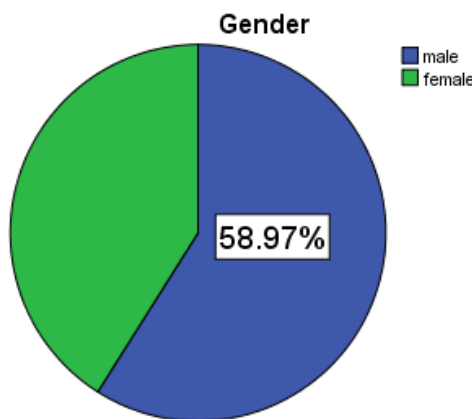
The educational background of respondents also shows that 12% are less than diploma, 37% are diploma graduates, 44.9% have first degree and 6.3% of respondents have masters' degree. This indicates that most of the company customers and employees are educated and have a good understanding of quality delivery.

It is also observed that, among the 78 employee respondents of the company 7.7% are members of top management, 9% are middle management, 3.8% are supervisors, 6.4% are team leaders, 25.6% are technicians, 17.9% are engineers, and 29.5% and the majority are support staff workers.

Among the 49 customer respondents, the majority, i.e., 24.4% are sales agents. These are the people who have frequent and at most contact with the company.

The following pie charts show the gender, age experience, education and experience of the employees

Profile of Employee Respondents

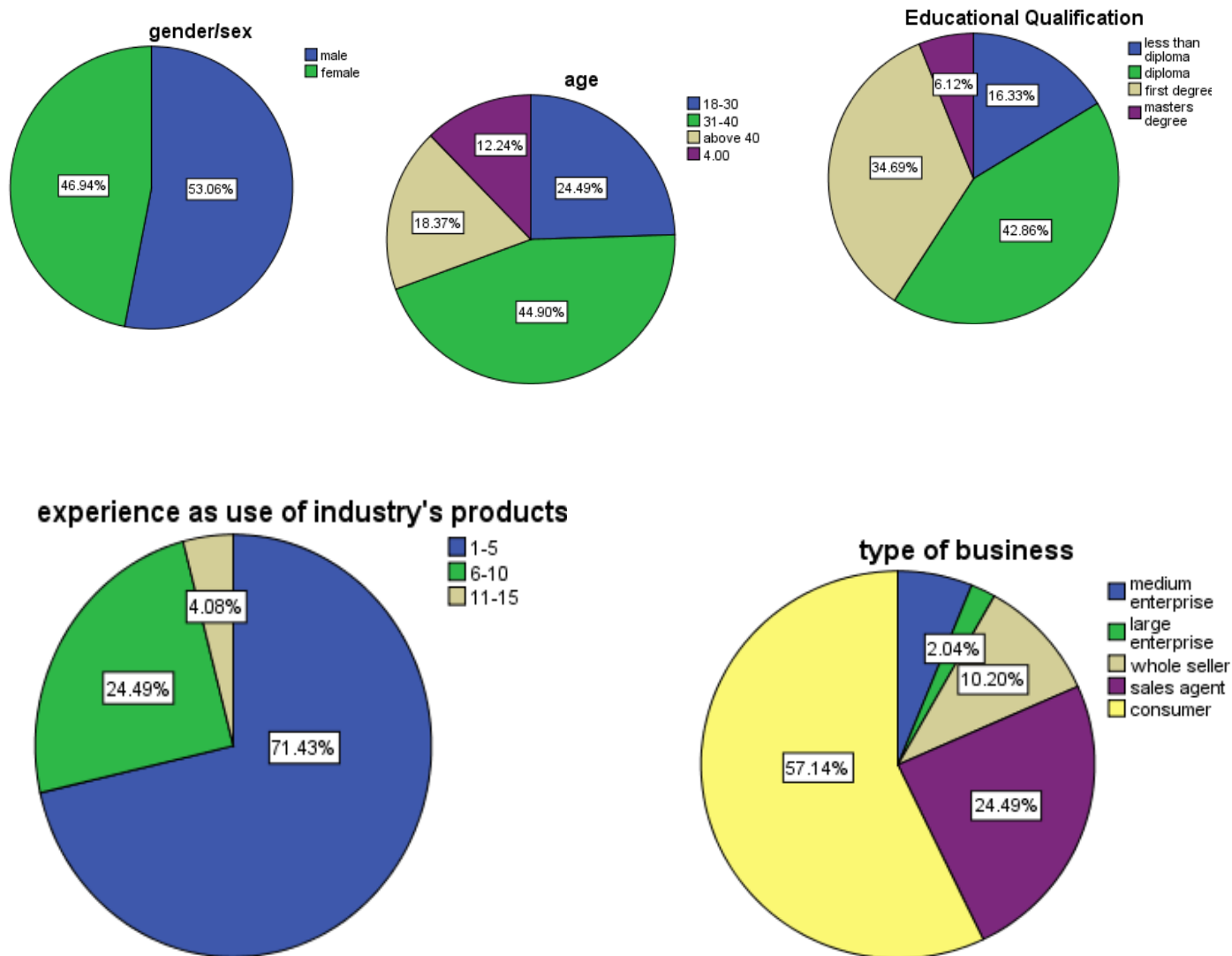


Among the employee respondents of the company (industry) 58.97% are male and

the remaining 41.03% are female. This indicates the majority of the employee respondents are male. The age category that ranges from 18-30 is the highest percentage of the employee respondents and this indicates the youth is

getting most part. The educational background of the employee respondents shows us that first degree holders i.e., 51.78% take the highest percentage. When we see the position /level at the industry (company)/ of the respondents, the top management takes 7.69%, middle management 8.7%, supervisors 3.85%, team leaders 6.41%, technicians 25.64%, engineers 17.95% and 29.49% of support staff workers.

Profile of customer Respondents

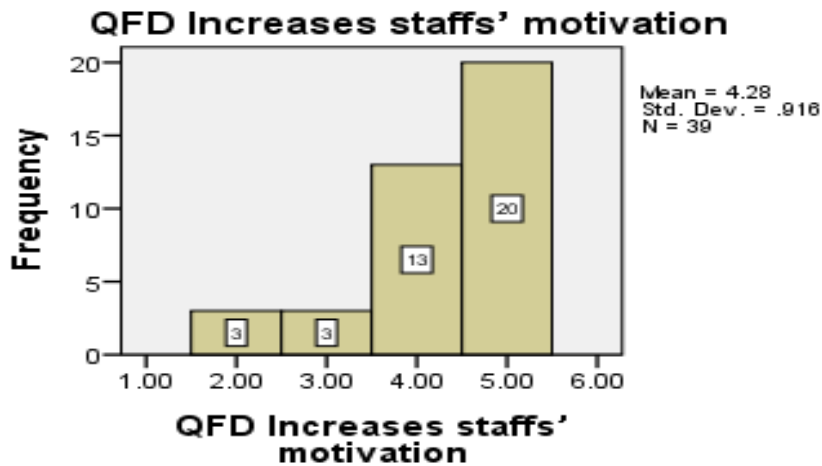


Among the customers of the tyre industry who responded the questionnaire, 53.06% are male and the remaining 46.94% are female. This indicates the majority of the customer respondents are male. The age category that ranges from 31-40 is the highest percentage of the employee respondents and this indicates the middle aged take the highest percentage. The educational background of the customer respondents shows us that diploma graduates i.e., 42.86% take the highest percentage. When we see the experience as users of the tyre industry's products, 71.43% of the respondents have been customers for 1-5 years and they take the highest percentage. When we see the type of

business on which the customer respondents are engaged in, the sales agents that account for 24.49% take the highest percentage.

4.2.2 Employee Data analysis and interpretation of quality function deployment (QFD) under customer requirement

Table v. Employee response presentation



The above chart shows 20 employees (47.4%) strongly agree, 13 employees (35.9%) agree, and 3 employees 7.7% disagree that QFD in the process of customer value delivery (CVD) increases staff's motivation to address customer's requirement. This shows the majority of the employee respondents believe that implementation of QFD under customer requirement in the industry (company) has increased their motivation. Even if the lesser percentage i.e., 7.7% disagreed on this issue, it should not be understated as it might arise due to the improper performance evaluation and incentive mechanism of the company.

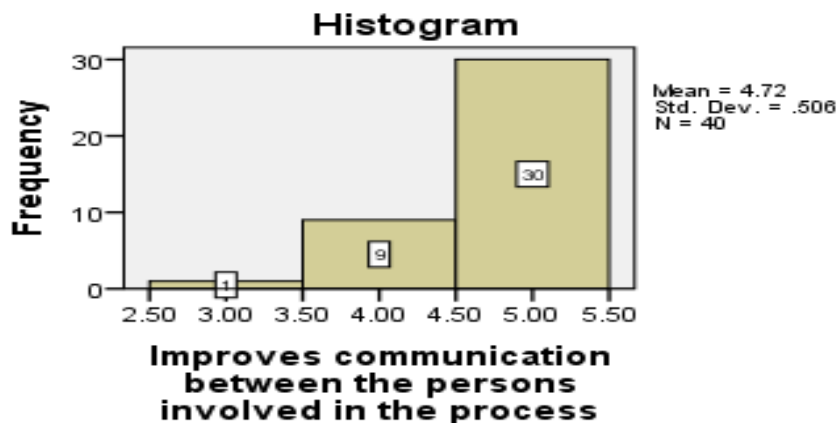
	Frequency	Percent	Valid Percent	Cumulative Percent
Neutral	2	2.6	2.6	2.6
Agree	21	26.9	26.9	29.5
strongly agree	55	70.5	70.5	100.0
Total	78	100.0	100.0	

The above table shows that 70.5% of employees strongly agree that QFD facilitates two-way relationship of customers and producers and nobody disagreed this. This table and the above depicted charts agree with what James L. suggests as benefits of QFD especially when designing products that is indicated in the literature review (2.7).

Quality value helps employees to improve their awareness of fulfilling customer requirements

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	26	33.3	33.3	33.3
Valid strongly agree	52	66.7	66.7	100.0
Total	78	100.0	100.0	

The table above shows that 52% of employees strongly agree and 26% agree that quality value delivery helps employees to improve their awareness of fulfilling customers' requirements. This agrees with "CVDCreates focus on customer requirements" that has been mentioned in the literature review.



From the above graph we can see 30 employees (57%) strongly agree and 9 employees (19%) agree that quality value delivery improves communication between the persons involved in the process. This goes in line with what has been mentioned in the benefits of quality value section in the literature review as "customer value delivery creates communication at interfaces".

Implementing CVD Make employees become more committed towards their job and quality

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	6	7.7	7.7	7.7
Valid Neutral	3	3.8	3.8	11.5

Agree	20	25.6	25.6	37.2
strongly agree	49	62.8	62.8	100.0
Total	78	100.0	100.0	

49% of employees strongly agree, 20% agree, 6% disagree and 3% are neutral that implementing CVD makes employees become more committed towards their job and quality. This agrees with what has been presented in the first graph that is “CVD increases staff’s motivation as motivation leads commitment to work”.

Implementing CVD Makes the industry/company/ more competent

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	2	2.6	2.6	2.6
Agree	19	24.4	24.4	26.9
Valid strongly agree	57	73.1	73.1	100.0
Total	78	100.0	100.0	

The above table shows 57% of employees strongly agree, 19% agree and 2% disagree that implementing CVD makes the industry more competent. This agrees with “quality at the beginning of product development decreases rework” (Day 1993).

Implementing CVD Enables the industry/company/ to compete in changing our world

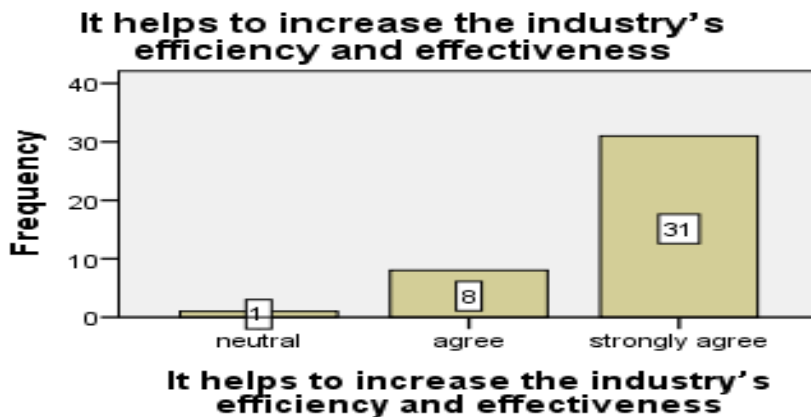
	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	15	19.2	19.2	19.2
Valid strongly agree	63	80.8	80.8	100.0
Total	78	100.0	100.0	

63% of employees strongly agree and 15% agree implementing CVD enables the company to compete in the changing world. This implication goes in line with what has been seen in the above table and the corresponding Literature. i.e., quality product and minimum or no rework is a competitive advantage.

CVD is Suitable as a method for structuring teamwork

	Frequency	Percent	Valid Percent	Cumulative Percent
Neutral	2	2.6	2.6	2.6
Agree	23	29.5	29.5	32.1
strongly agree	53	67.9	67.9	100.0
Total	78	100.0	100.0	

As we can see from the above table, 53% of employees strongly agree and 23% agree that CVD is suitable as a method for structuring team work. This greatly supports “CVD promotes team work” that is mentioned by many writers indicated in the literature review.



31 employee respondents (59%) strongly agree, 8 employees (17% agree), and 1 employee (2%) are neutral that CVD helps to increase the industry's efficiency and effectiveness

It helps in developing a sense of belongingness of the staffs and increases their participation rate in the industry/company

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	10	12.8	12.8	12.8
Neutral	9	11.5	11.5	24.4
Agree	26	33.3	33.3	57.7
strongly agree	33	42.3	42.3	100.0
Total	78	100.0	100.0	

33% of employees strongly agree, 26% agree, 10% disagree, and 9% are neutral that CVD helps in developing sense of belongingness of the staffs and increases their participation rate in the company.

Ensures to solve problems at all levels of the industry/company

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	7	9.0	9.0	9.0
Neutral	10	12.8	12.8	21.8
Valid Agree	29	37.2	37.2	59.0
strongly agree	32	41.0	41.0	100.0
Total	78	100.0	100.0	

32% of employees strongly agree, 29% agree, 10% are neutral and 7% disagree that CVD ensures to solve problems at all levels of the company/industry/. This suggests that employees may think it is not only CVD that solves problems at all levels of the industry.

Implementing CVD is of most likely no fundamental difference concerning the result in comparison with a conventional approach.

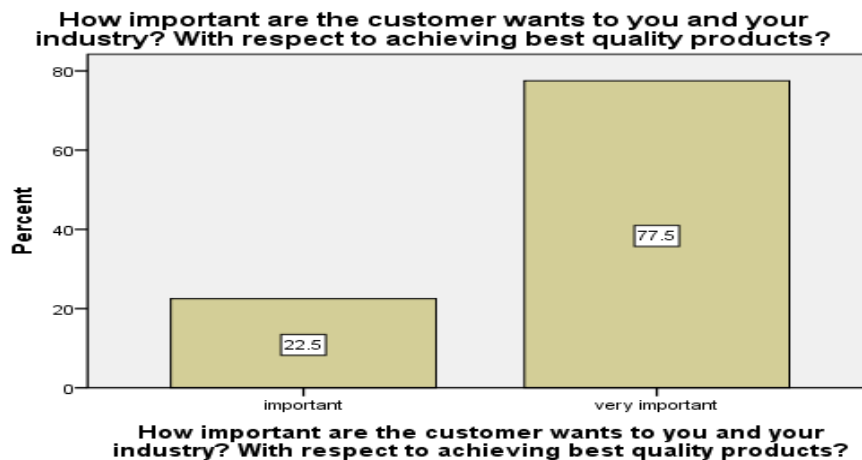
	Frequency	Percent	Valid Percent	Cumulative Percent
strongly disagree	31	39.7	39.7	39.7
Disagree	39	50.0	50.0	89.7
Neutral	4	5.1	5.1	94.9
Agree	2	2.6	2.6	97.4
strongly agree	2	2.6	2.6	100.0
Total	78	100.0	100.0	

31% of employees strongly disagree, 37% disagree, 4% are neutral, 2% agree and 2% strongly agree that implementing CVD is of most likely no fundamental difference concerning the result in comparison with a conventional approach. This assures what (Guinta and Praizler, 1993) wrote. "CVD can be referred to as designed-in quality rather than traditional inspected-in quality in the sense that it helps a company shift from inspecting the product's quality to designing quality into the product through customer needs analysis"

Implementing CVD Helps to improve the quality and features of all the industry's products & services

	Frequency	Percent	Valid Percent	Cumulative Percent
Disagree	4	5.1	5.1	5.1
Agree	24	30.8	30.8	35.9
strongly agree	50	64.1	64.1	100.0
Total	78	100.0	100.0	

The above table indicates 50% of employees strongly agree, 24% agree and 4% disagree that implementing CVD helps to improve the quality of all the industry's products and services. This might result from the value that the employees give to fulfill the demands of the customers.



Regarding the importance of customers' wants, as the above graph indicates, 77.5% of employees responded that customers' wants are very important and 22.5% responded that it is important. This is the core thing that CVD lie its bases. Even if the rate of response is between very important and important, there is no respondent who claimed that customers' wants are of no importance. This agrees with the frequently mentioned "CVD Creates focus on customer requirements" in the literature review.

Have you attended any training and development related to quality and value delivery in general and CVD in particular?

	Frequency	Percent	Valid Percent	Cumulative Percent
yes	65	83.3	83.3	83.3
Valid no	13	16.7	16.7	100.0
Total	78	100.0	100.0	

Concerning the training and development that the industry/customer/ gives to its customers, 83.3% of the respondents had gained and 16.7% didn't gain training and development related to quality and value delivery in general and CVD in particular.

4.2.3 Customers' Data

I liked more and interested to the products and services offered by the Horizon Addis tyre industry

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	11	22.4	22.4	22.4
Valid strongly agree	38	77.6	77.6	100.0
Total	49	100.0	100.0	

The above table shows 38% of customer respondents strongly agree and 11% agree that they like more and interested to the products and services offered by the industry and equally responded that they have strong feeling about the quality delivery of the products and services. Since the products and services in general are the “Must-be requirements” suggested by Kano and if these requirements were not fulfilled, the customer would have been extremely dissatisfied.

I have strong feeling and positive attitude towards the quality of the products and service delivery offered by the industry/company/

	Frequency	Percent	Valid Percent	Cumulative Percent
Agree	14	28.6	28.6	28.6
Valid strongly agree	35	71.4	71.4	100.0
Total	49	100.0	100.0	

35% strongly agree and 14% agree that they have strong feeling and positive attitude towards the quality of the products and services offered by the industry.

The company's marketing staffs or any concerned person from the company assesses our requirements regularly

	Frequency	Percent	Valid Percent	Cumulative Percent
strongly disagree	4	8.2	8.2	8.2
Valid Disagree	9	18.4	18.4	26.5
Neutral	6	12.2	12.2	38.8

Agree	16	32.7	32.7	71.4
strongly agree	14	28.6	28.6	100.0
Total	49	100.0	100.0	

The demands that I/we raise are always fulfilled by the industry/company/

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
strongly disagree	2	4.1	4.2	4.2
Disagree	4	8.2	8.3	12.5
Neutral	11	22.4	22.9	35.4
Agree	23	46.9	47.9	83.3
strongly agree	8	16.3	16.7	100.0
Total	48	98.0	100.0	
Missing				
System	1	2.0		
Total	49	100.0		

8% strongly agree, 23% agree, 4% disagree and 2% strongly disagree that their demands are always fulfilled by the industry.

The products of the industry are of fair and competent price what is called convenient cost

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
Neutral	4	8.2	8.2	8.2
Agree	20	40.8	40.8	49.0
strongly agree	25	51.0	51.0	100.0
Total	49	100.0	100.0	

25% strongly agree, 20% agree, 4% are neutral that the products of the industry are of fair and competent price.

The products of the company/industry/ comprise additional features that distinguish them from othertyre manufacturers

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Neutral	3	6.1	6.1	6.1
Agree	17	34.7	34.7	40.8
strongly agree	29	59.2	59.2	100.0
Total	49	100.0	100.0	

The products of the industry are more durable than other manufacturers

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Disagree	2	4.1	4.1	4.1
Neutral	2	4.1	4.1	8.2
Agree	8	16.3	16.3	24.5
strongly agree	37	75.5	75.5	100.0
Total	49	100.0	100.0	

correlations of Variables

			Implementing CVD Make employees become more committed towards their job and quality delivery	It helps to increase the company's/industry's/ efficiency and effectiveness
Spearman's rho	Implementing CVD Make employees become more committed towards their job and quality delivery	Correlation Coefficient	1.000	.492**
		Sig. (2-tailed)	.	.000
		N	78	78
	It helps to increase the company's/industry's/ efficiency and effectiveness	Correlation Coefficient	.492**	1.000
		Sig. (2-tailed)	.000	.
		N	78	78

**. Correlation is significant at the 0.01 level (2-tailed).

			CVD Increases staffs’ motivation	CVD helps employees to improve their awareness of fulfilling customer requirements
Spearman's rho		Correlation Coefficient	1.000	.355**
	CVD Increases staffs’ motivation	Sig. (2-tailed)	.	.002
		N		78
		Correlation Coefficient	.355**	1.000
	CVD helps employees to improve their awareness of fulfilling customer requirements	Sig. (2-tailed)	.002	.
		N	78	78

**. Correlation is significant at the 0.01 level (2-tailed).

As we can see from the above responses of the customer respondents, their satisfaction greatly depends on whether their requirements are fulfilled or not. This goes in line with Kano's conceptual frame work mentioned in the literature review. (2.12)

It has been tried to see the relationship between two related variables using correlation analysis. The analysis is carried out separately for two pair of variables and the result is depicted below.

This shows the two variables- whether CVD makes employees more committed towards their job and CVD helps the industry's efficiency and effectiveness have a strong relation that is significant at 0.492.

The above correlation shows that the two variables- CVD increases staff's motivation and CVD helps employees to improve their awareness of fulfilling customer requirement have a relation that is significant at 0.355.

Correlations

		CVD Increases staffs' motivation	Implementing CVD Makes industry more competent
Spearman's rho	Correlation Coefficient	1.000	.357**
	CVD Increases staffs' motivation		
	Sig. (2-tailed)	.	.001
	N	78	78
	Implementing CVD Makes the industry more competent		
	Correlation Coefficient	.357**	1.000
	Sig. (2-tailed)	.001	.
	N	78	78

**. Correlation is significant at the 0.01 level (2-tailed).

The above correlation shows that the two variables- CVD increases staff's motivation and Implementing CVD makes the industry more competent have a relation that is significant at 0.357.

Correlations

		Failure to implementing CVD/incorporating the requirement of customers/ leads to total failure of the industry	It helps to increase the industry's efficiency and effectiveness
Spearman's rho	Failure to implementing CVD/incorporating the requirement of customers/ leads to total failure of the industry	Correlation Coefficient	1.000
		Sig. (2-tailed)	.406**
		N	.000
			76
	It helps to increase the industry's efficiency and effectiveness	Correlation Coefficient	.406**
		Sig. (2-tailed)	1.000
		N	.000
			76
			78

**. Correlation is significant at the 0.01 level (2-tailed).

The above correlation shows that the two variables- Failure to implementing CVD leads to total failure of the industry and CVD helps to increase the company's/industry's/ efficiency and effectiveness have a strong relation that is significant at 0.406.

4.2.4 Correlation of the variables satisfaction and Requirement fulfillment of Customers

It has been tried to organize the questionnaire in such a way to be categorized as dependent and independent variables. The dependent variable is satisfaction arising from the products and services delivered in the company and the independent variable is the requirement/demand fulfillment of the customers to be delivered. After the variables are categorized as dependent and independent, correlation and regression analyses were made.

Correlations

		Perception and satisfaction	Requirement fulfillment
Spearman's rho	Correlation Coefficient	1.000	.765**
	Sig. (2-tailed)	.	.000
	N	48	48
	Correlation Coefficient	.765**	1.000
	Sig. (2-tailed)	.000	.
	N	48	48

** . Correlation is significant at the 0.01 level (2-tailed).

The correlations appear in the cross positions. The table is symmetrical, so the same information that is the top-right is also in the bottom left.

The Spearman's rho indicates the direction and the strength of the relationship.

- Satisfaction and requirement fulfillment had a statistically significant positive relationship i.e., the strength is .765.

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
Perception and satisfaction	3.8906	.45005	48
Requirement fulfillment	4.2153	.62735	48

Regression

The relationship between the two independent and dependent variables are analyzed. The researcher conducted a linear regression analysis. The main variables of interest are the R-squared measure and the estimated coefficients for the independent variables. The R-squared reports the overall goodness of fit and describes the proportion of the variability in the dependent variable that can be explained by the regression model. The estimated coefficients for each of the independent provide information about the explanatory power of the respective coefficients. The F-test provides information about the statistical significance of the overall model, whereas the t-tests provide information about the significance of the individual coefficients.

Variables Entered/Removed^a

Model	Variables Entered	Variables Removed	Method
1	trecur_fulfm ^b	.	Enter

a. Dependent Variable: percep_and_satisfn

b. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate

1	.767 ^a	.588	.579	.29214
---	-------------------	------	------	--------

a. Predictors: (Constant), requir_fulfmt

ANOVA^a

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	5.594	1	5.594	65.538	.000 ^b
	Residual	3.926	46	.085		
	Total	9.520	47			

a. Dependent Variable: percep_and_satisfn

b. Predictors: (Constant), requir_fulfmt

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.573	.289		5.434	.000
	requir_fulfmt	.550	.068	.767	8.096	.000

a. Dependent Variable: percep_and_satisfn

The R value is 0.767, The R^2 value or the coefficient of determination is 0.588. Therefore, about 58.8% of the variation in the satisfaction has been significantly explained by the independent variables requirement fulfillment. So therefore, there is a linear relationship.

Table ix. Reliability

Case Processing Summary

		N	%
Cases	Valid	48	98.0
	Excluded ^a	1	2.0
	Total	49	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.853	21

Descriptive

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Perception and satisfaction	48	3.00	4.50	3.8906	.45005	.203
Requirement fulfillment	48	2.17	5.00	4.2153	.62735	.394
Valid N (list wise)	48					

Table x. Frequencies

Statistics

	percep_and_satisfn	requir_fulfmt
N		
Valid	48	48
Missing	1	1

Frequency Table

Perception and satisfaction

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid				
3.00	2	4.1	4.2	4.2
3.13	4	8.2	8.3	12.5
3.38	3	6.1	6.3	18.8
3.50	2	4.1	4.2	22.9
3.63	3	6.1	6.3	29.2
3.75	7	14.3	14.6	43.8
3.88	5	10.2	10.4	54.2
4.13	7	14.3	14.6	68.8
4.25	3	6.1	6.3	75.0
4.38	8	16.3	16.7	91.7
4.50	4	8.2	8.3	100.0
Total	48	98.0	100.0	
Missing				
System	1	2.0		
Total	49	100.0		

Requirement fulfillment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2.17	2	4.1	4.2	4.2
	3.50	3	6.1	6.3	10.4
	3.83	9	18.4	18.8	29.2
	4.00	7	14.3	14.6	43.8
	4.17	3	6.1	6.3	50.0
	4.33	6	12.2	12.5	62.5
	4.50	1	2.0	2.1	64.6
	4.67	9	18.4	18.8	83.3
	5.00	8	16.3	16.7	100.0
	Total	48	98.0	100.0	
Missing	System	1	2.0		
Total		49	100.0		

Pie Chart

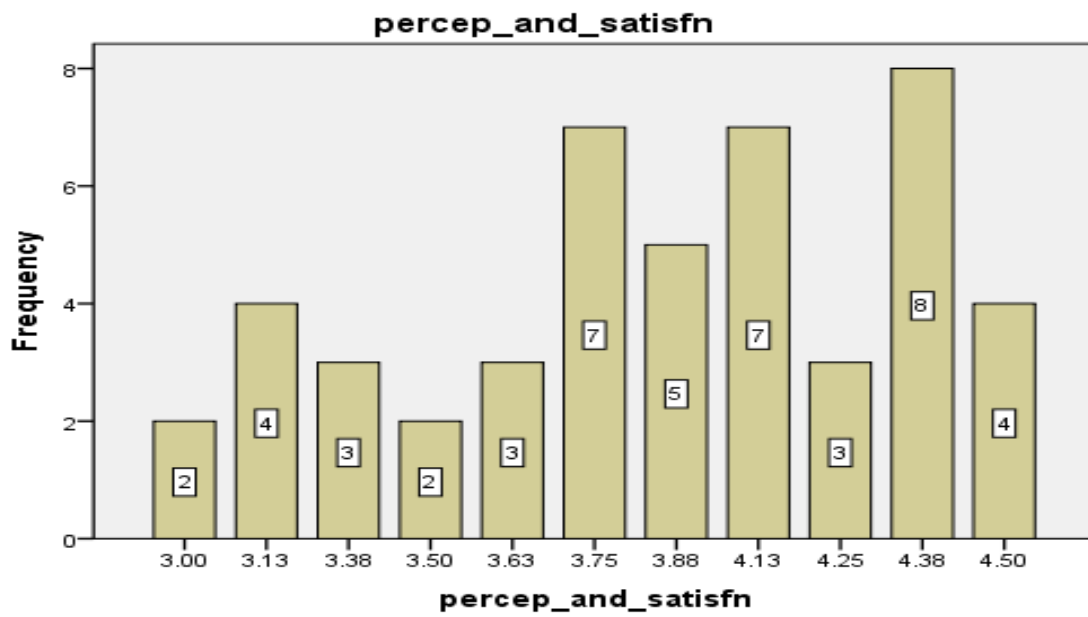


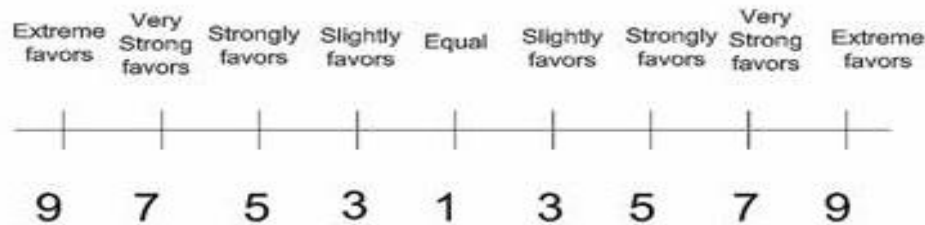
Figure VI. Perception and Satisfaction



Figure vii. Requirement Fulfillment

4.3 Qualitative Data Analysis

For AHP analysis, a pair wise comparison was made based on the following 1-9 scale.



The first step, as we can see from the above table, is preparing the AHP plan matrix. Here all the requirements are depicted both row wise and column wise. Then, all are compared based on their relative importance. Let's see for example:-

Customers have a very strong favor for fair and competent price over timely delivery of orders. So, fair & competent price will have a value of 7 and timely delivery of orders will have a 1/7 value to price. In General, if the judgment value is on the **left** side of 1, we put the **actual judgment** value and if the judgment value is on the **right** side of 1, we put the **reciprocal** value.

The first matrix looks like the following:-

	Timely delivery of orders	Product Durability	Good Appearance	Additional Features	Basic /Key/ features	Fair and competent price
Timely delivery of orders	1.00	0.14=1/7	5.00	9.00	3.00	0.14=1/7
Product Durability	7.00	1.00	7.00	9.00	0.14=1/7	0.20=1/5
Good Appearance	0.33=1/3	0.14=1/7	1.00	9.00	0.14=1/7	0.20=1/5
Additional Features	0.11=1/9	0.11=1/9	0.11=1/9	1.00	0.20=1/5	0.11=1/9
Basic /Key/ features	0.33=1/3	0.20=1/5	7.00	5.00	1.00	0.14=1/7
Fair and competent price	7.00	7.00	5.00	9.00	7.00	1.00
Total	15.78	8.60	25.11	42.00	11.49	1.80

Table xi. AHP plan Matrix

$$\text{Primary Matrix} = \begin{bmatrix} 1 & \frac{1}{7} & 5 & 9 & 3 & \frac{1}{7} \\ 7 & 1 & 7 & 9 & \frac{1}{7} & \frac{1}{5} \\ \frac{11}{37} & \frac{11}{37} & 1 & 9 & \frac{11}{75} & \frac{11}{75} \\ \frac{11}{99} & \frac{11}{99} & 1 & \frac{11}{59} & \frac{11}{59} & \frac{11}{59} \\ \frac{11}{35} & 7 & 5 & 1 & \frac{1}{7} & \frac{1}{7} \\ 7 & 7 & 5 & 9 & 7 & 1 \end{bmatrix}$$

Then we divide each element of the matrix with the sum of its columns and we let the normalized table as follows:-

Normalizing

Table xii. Normalized Table

							Row Average
Timely delivery of orders	0.06	0.02	0.20	0.21	0.26	0.08	0.14
Product Durability	0.44	0.12	0.28	0.21	0.01	0.11	0.20
Good Appearance	0.02	0.02	0.04	0.21	0.01	0.11	0.07
Additional Features	0.01	0.01	0.00	0.02	0.02	0.06	0.02
Basic /Key/ features	0.02	0.02	0.28	0.12	0.09	0.08	0.10
Fair and competent price	0.44	0.81	0.20	0.21	0.61	0.56	0.47
Total	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Conclusion

Table xiii. Score

Priority	Score	Description
Priority No.1	0.47	Fair and competent price
Priority No.2	0.2	Product Durability
Priority No.3	0.14	Timely delivery of orders
Priority No.4	0.1	Basic /Key/ features
Priority No.5	0.07	Good Appearance
Priority No.6	0.02	Additional Features

House of Quality delivery

According to the row averages, we determine a new scale which includes ranks between 1-5 for the importance of the weights of the customer requirements.

Table xiv. Weight description

Weight	Row average	Description	Weight Value
Strongest	0.47	Fair and competent price	6
Stronger	0.2	Product Durability	5
Strong	0.14	Timely delivery of orders	4
Medium	0.1	Basic /Key/ features	3
Weak	0.07	Good Appearance	2
Weakest	0.02	Additional Features	1

Technical Attribute

Table xv. Designation and weight

Type of Relation ship	Designation	Weight
strongest Relation ship		6
Stronger relationship		5
Strong Relation ship		4
Medium Relation ship		3
Weak Relation ship		2
No relation ship		1

	Importance Weight	Production lead time	shape and size	Distinctive attribute	Basic attribute	cost of production	color composition	Wear and Tear Resistance
Timely delivery of orders	4.00	◆	□	▲	□	●	□	▲
Product Durability	5.00	○	▲	○	●	▲	○	◆
Good Appearance	2.00	□	●	◇	●	▲	●	▲
Additional Features	1.00	○	●	●	▲	◆	○	▲
Basic /Key/ features	3.00	▲	●	▲	●	○	○	●
Fair and competent price	6.00	○	▲	●	●	●	○	●

Tablexvi. Customer requirements vs. Technical Requirement.

The technical translations to the customers' requirements were made in collaboration with the engineers of the company and the corresponding naming is depicted in the table.

Then, the earlier requirements were compared to the newly generated technical requirements and the degree of their relationship was depicted.

Correlations:

Strong Positive $\oplus$

Positive +

Strong Negative $\ominus$

Negative -

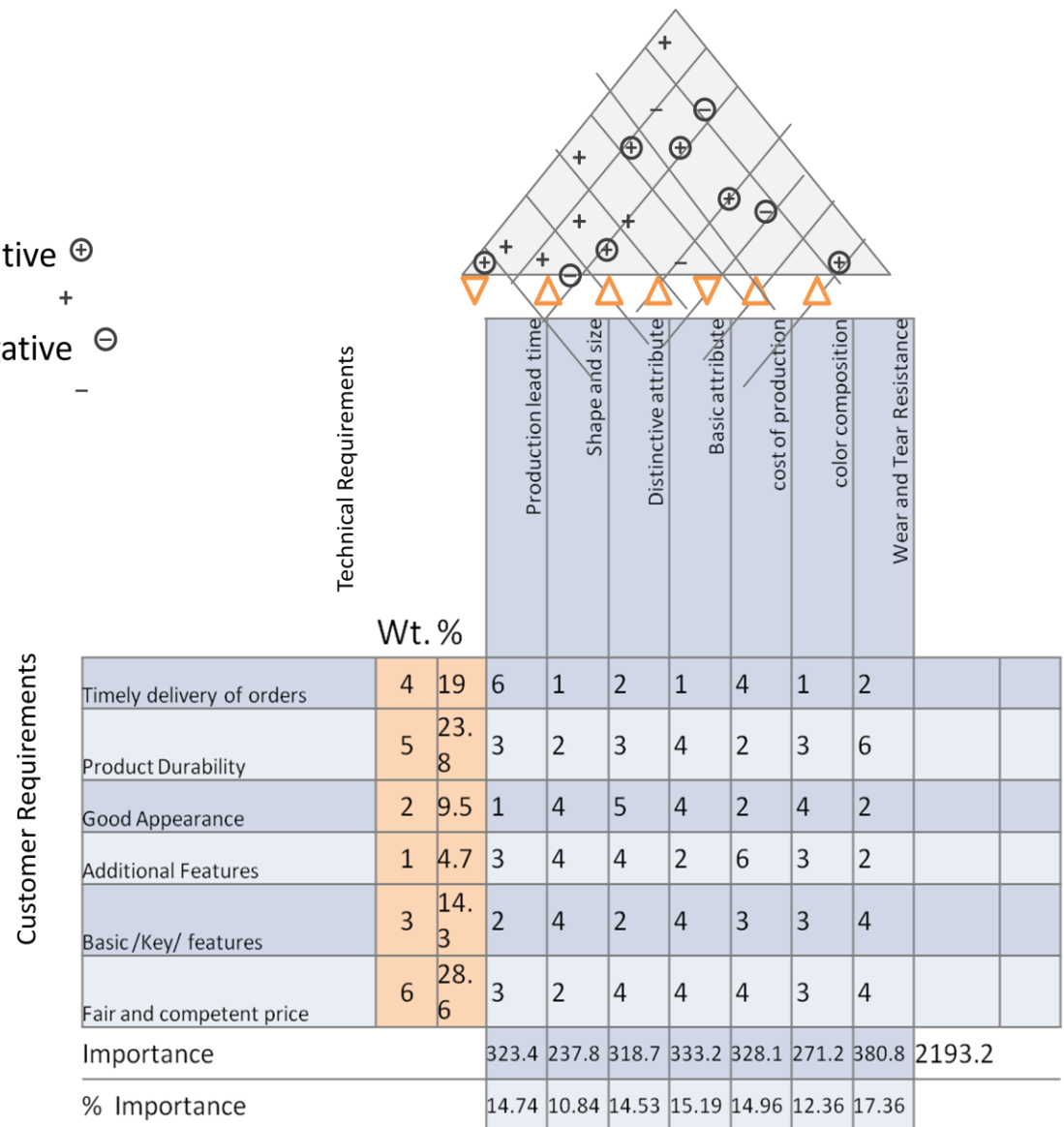


Figure xvii. House of Quality delivery

The importance was calculated as follows:-

1. $[(6 \times 19) + (3 \times 23.8) + (1 \times 9.5) + (3 \times 4.7) + (2 \times 14.3) + (3 \times 28.6)] = 323.4$
 $114 + 71.4 + 9.5 + 14.1 + 28.6 + 85.8$
2. $[(1 \times 19) + (2 \times 23.8) + (4 \times 9.5) + (4 \times 4.7) + (4 \times 14.3) + (2 \times 28.6)] = 237.8$
 $= 19 + 47.6 + 38 + 18.8 + 57.2 + 57.2$
3. $[(2 \times 19) + (3 \times 23.8) + (5 \times 9.5) + (4 \times 4.7) + (2 \times 14.3) + (4 \times 28.6)] = 318.7$
 $= 38 + 71.4 + 47.5 + 18.8 + 28.6 + 114.4$
4. $[(1 \times 19) + (4 \times 23.8) + (4 \times 9.5) + (2 \times 4.7) + (4 \times 14.3) + (4 \times 28.6)] = 333.2$

$$\begin{aligned}
&= 19 + 95.2 + 38 + 9.4 + 57.2 + 114.4 \\
5. &= [(4 \times 19) + (2 \times 23.8) + (2 \times 9.5) + (6 \times 4.7) + (3 \times 14.3) + (4 \times 28.6)] = 328.1 \\
&= 76 + 47.6 + 19 + 28.2 + 42.9 + 114.4 \\
6. &= [(1 \times 19) + (3 \times 23.8) + (4 \times 9.5) + (3 \times 4.7) + (3 \times 14.3) + (3 \times 28.6)] = 271.2 \\
&= 19 + 71.4 + 38 + 14.1 + 42.9 + 85.8 \\
7. &= [(2 \times 19) + (6 \times 23.8) + (2 \times 9.5) + (2 \times 4.7) + (4 \times 14.3) + (4 \times 28.6)] = 380.8 \\
&= 38 + 142.8 + 19 + 9.4 + 57.2 + 114.4 \\
&\quad \text{Sum} = \underline{\underline{2193.2}}
\end{aligned}$$

And the percent importance is calculated by dividing the individual importance by the total.

So, the result shows the company/industry/ should give priority to the requirements as follows while producing its products:-

1st- to wear and tear resistance

2nd- to basic attributes

3rd- to cost of production

4th- production lead time

5th- distinctive attributes

6th- to color composition

7th- to shape and size

CHAPTER FIVE

5. SUMMARY, CONCLUSION, RECOMMENDATION AND FUTURE RESEARCH DIRECTION

5.1 Summary

- ❖ The study has shown that there is a strong correlation between the degree of requirement fulfillment by the company/industry/ and satisfaction of customers.
- ❖ The requirements of the customers /voice of the customers/ can be prioritized and interpreted in to technical or engineering requirements in the company.
- ❖ It has been seen that after the requirements /voices of the customers/ are correctly interpreted and translated in to technical requirements, their need can be properly prioritized.
- ❖ We can deduce that Horizon Addis Tyre Industry's product and service delivery is as per the requirements of the customers and customers have a positive perception to the goods and services provided by the industry.
- ❖ As has been seen in the study, it is 16.7% of the respondents who didn't take training and development that is related to quality delivery. For a successful and consistent accomplishment of customer value delivery methods, all the employees of the company/industry/ should gain training related to total quality delivery in general and CVDquality in particular.

5.2 Conclusion

Delivering customer satisfaction is at the heart of every product and service provider. The most important aspect of the relationship between product/service providers and customers is what customers want and what product/service provider's offer. This is particularly true in case of producers like Horizon Addis Tyre company/industry/. The present study has been undertaken to measure the perception of product/service quality delivery from the customers' and employees perspective and also determine the relationship between product/service quality delivery and satisfaction. Based on analysis of the data and findings the following conclusions are drawn:

1. The Customer value delivery (CVD) assisted by analytical hierarchy process (AHP) proved to be a simple, efficient way for translating voice of the customer in to technical requirements for use in the House of Quality delivery.
2. The study demonstrates that the company/industry/ is able to meet customers' expectation or the customers are satisfied with the product/services offered.
3. Most Customers are satisfied with the product/service quality delivery dimensions indicated and this implies the requirement fulfillment ability of the company/industry.
4. The results found from the analysis support the findings that perceived product/ service quality delivery is related to requirement fulfillment.
5. It has been seen that the study is in favor of Kano's conceptual model. i.e., as requirements are fulfilled- customers are satisfied.

Overall, the use of SPSS, AHP and House of Quality delivery proved to be useful and powerful tools for analyzing the customer requirements /voice of customers/.

5.3 Recommendation

Given the recent situation that customers are becoming more aware of their expectations, and demand higher than standards of products/services, companies should be able to consider measuring their product/service quality delivery and understand what factors contribute to customer satisfaction and make their products/services to be positively perceived.

Generally all companies which provide service or product and particularly Horizon Addis Tyre company/industry should give due attention in implementing this CVD method so as to incorporate the requirements of the customers from the very beginning of the product development phase.

Even if it is 83% of the employee respondents who had gained training and development related to quality delivery in general and customer value delivery quality in particular in the company/industry, it is recommended that all the employees get this capacity building so as to

sustain the perception that has been built in the customers and to give quality products and services as per the requirements of customers.

5.4Future Research Implications

This research concentrated on the study of employees' and customers' satisfaction and perception that arise from the implementation of CVD in HATC and the first two phases of CVD. It is worth suggesting some areas for potentially useful future research. The researcher recommends other researches be engaged in the area that includes all the phases of CVD methods (Including the Analysis of the competitors of the company). More studies on CVD should be undertaken to firmly establish a consistent relationship between requirement fulfillment (service and product quality delivery) and satisfaction.

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APPENDIX

APPENDIX 1: QUESTIONNAIRE

Adama Science and Technology University
School of Business and Economics
Department of Management

1. Questionnaire to be filled by the employees of the Company.

Dear Respondent!

First of all, I would like to thank you for your cooperation on giving your valuable information and time on issues related to your perception of customer value delivery (CVD) practice and its implementation in your company. The purpose of this questionnaire is to collect relevant data that will help to assess the understanding of CVD as a case and how the requirements of the customers are being fulfilled. I would like to assure you that this study is purely for academic purpose where I could present the findings of this research to ADAMA SCIENCE & TECHNOLOG UNIVERSITY as requirement for MBA thesis and hence would not affect anyone in any ways as all information will be kept confidential. Since your genuine and frank responses are of prime importance for the success of this study, you are selected to fill this questionnaire. Thus, you are kindly requested to respond to all questions carefully. Thank you in advance.

General Directions

- You are not required to write your name
- Respond to all closed-ended questions by putting “√” marks on the blank space and to all open-ended ones by writing your responses on the spaces provided.

Section I: Background Information

1. Sex: A) Male ☐ B) Female ☐
2. Age categories (Years): A) 18- 30 ☐ B) 31-40 ☐ C) Above 40 ☐
3. Your experience at the company (in years):
A) 1-5 ☐ B) 6-10 ☐ C) 11-15 ☐ D) 16-20 ☐ E) More than 20 ☐
4. Educational Qualification/Level of Education:
A) Less than diploma ☐ B) Diploma ☐ C) First Degree ☐
D) Masters Degree ☐ E) PhD ☐
5. Your position (level) at the company:

A) Top Management ☐ b) Middle management ☐ Supervisor ☐
D) Team Leader ☐ E) technician ☐ F) Engineer ☐ G) support staff worker ☐

Section II: Questions related to Staffs' Perception about customer value delivery and its quality.

The following statements reflect about your CVD methods perception, awareness and practices. Please indicate your level of agreement for each item using the scales: 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree.

Nº	Items	5	4	3	2	1
1	Good customer handling increases staffs' motivation					
2	CVD methods facilitates two-way relationship of customers & producers					
3	CVD implementation in the company helps employees to improve their awareness of fulfilling customer requirements					
4	It improves communication between the persons involved in the process of customer employee relationship.					
5	Implementing CVD Make employees become more committed towards their job and quality products of the company.					
6	Implementing CVD Makes the company more competent.					
7	Implementing qualified customer value delivery method Enables the company to compete in changing the world.					
8	CVD implementation is Suitable as a method for structuring teamwork.					
9	It helps to increase the company efficiency and effectiveness					
10	It helps in developing a sense of belongingness of the staffs and increases their participation rate in the company.					
11	Ensures to solve problems at all levels of the company.					
12	Implementing customer value delivery method Helps to					

	improve the quality delivery of all the company's products & services.					
13	Failure to handle customers in a standard way costs a lot					
14	Failure to implementing CVD/incorporating the requirement of customers/ leads to total failure of the company.					
15	Implementing CVD& its quality Facilitates an assessment of the product for everybody involved.					
16	Implementing CVD Will decrease the need for a reworking of the product.					
17	Customer value delivery method & its quality is a long and costly approach.					
18	Implementing CVD is of most likely no fundamental difference concerning the result in comparison with a conventional approach.					
19	Customer value delivery methods simplify product planning.					
20	Applicability of CVD method & its quality to the field of Tire production is uncertain.					
21	Implementing CVD / incorporating the requirement of the customer from the start of production/ greatly reduce rework, reject and cost of production.					

Section III: Questions related to perception of CVD methods & its quality at Horizon Addis Tyre Company.

The following questions reflect about your CVD perception. Please indicate your response for each item using the scales: 5= Very Important, 4=Important, 3=Neutral, 2=Not much important, 1=No purpose

Nº	Items	5	4	3	2	1
1	How important are the customer wants to you and your company? With respect to achieving best quality products?					
2	How important are the design attributes with respect to Customer wants?					
3	How important are the appeals of your products to your Customer wants?					
4	How important are the ease of use of your products to your Customer wants?					
5	How do you evaluate the importance of the key features of your products to your Customers?					
6	How do you evaluate the importance of the incorporating additional features to your products?					
7	How would you decide if the use of CVD methods & its quality in the pilot scheme has been worthwhile or not?					

Section IV: Questions related to the Practices of Total Quality delivery Training in general and CVD quality in particular.

1. Have you attended any training and development related to quality in general and CVD quality in particular?

A) Yes_____ B) No_____

If your answer for the above question is “Yes”, indicate topics or types, years, and the place where you attained the training and development.

Topics or types of training and development	Years	Place	Remarks

2. How do you rate the practice of training opportunities offered for employees to enable them to improve their level of awareness? Please,

rate its extent of practices among the following categories of company employees.

A) Very High_____ B) High_____ C) Moderate_____ D) Low_____ E)Very Low_____

Would you please, briefly justify your response for the above question?

Thank you so much for your time!

**Adama Science and Technology University
School of Business and Economics
Department of Management**

2. Questionnaire to be filled by the customers of the Company

Dear Respondent!

First of all, I would like to thank you for your cooperation on giving your valuable information on issues related to your perception of Customers value delivery (CVD) and the perception of customers & employees on its product delivery quality at your company. The purpose of this questionnaire is to collect relevant data that will help to assess the understanding of CVD at the industry level and how the requirements of the customers are being fulfilled. I would like to assure you that this study is purely for academic purpose where I could present the findings of this research to ADAMA SCIENCE & TECHNOLOG UNIVERSITY as requirement for MBA thesis and hence would not affect anyone in any ways as all information will be kept confidential. Since your genuine and frank responses are of prime importance for the success of this study, you are selected to fill this questionnaire. Thus, you are kindly requested to respond to all questions carefully. Thank you in advance.

General Directions

- You are not required to write your name
- Respond to all closed-ended questions by putting “√” marks on the blank space and to all open-ended ones by writing your responses on the spaces provided.

Section I: Background Information

1. Sex: A) Male ☐ B) Female ☐
2. Age categories (Years): A) 18- 30 ☐ B) 31-40 ☐ C) Above 40 ☐
3. Your experience as the user of the industry's product (in years):
A) 1-5 ☐ B) 6-10 ☐ C) 11-15 ☐ D) 16-20 ☐ E) More than 20 ☐
4. Educational Qualification/Level of Education:
A) Less than diploma ☐ B) Diploma ☐ C) First Degree ☐
D) Masters Degree ☐ E) PhD ☐
5. Your business:
A) Sole proprietorship ☐ small enterprise ☐ medium enterprise ☐
D) Large enterprise ☐ E) whole ☐

F) Retailer ☐ G) sales agent ☐ H) Consumer ☐

Section II: Questions related to Customer Satisfaction towards Horizon Addis Tyre Company's products and services

1. In the following table, certain issues related to customer satisfaction reflected as a result of implementing Customer Value Delivery (CVD) & its quality were listed. Please, indicate your level of agreement with the statements using the scales: 5=Strongly Agree, 4=Agree, 3=Neutral, 2=Disagree, 1=Strongly Disagree.

Nº	Statements	5	4	3	2	1
1	I liked more and interested to the products and services offered by the Horizon Addis Tyre company.					
2	Most customers and consumers of the company's products have strong feeling about the quality of the products.					
3	I have strong feeling and positive attitude towards the quality delivery of the products and services offered by the company					
4	The company's marketing staffs or any concerned person from the company assesses our requirements regularly.					
5	The demands that I/we raise (my/our requirements) are always fulfilled by the company.					
6	The delivery of my orders are timely and hospitably					
7	The products of the company are of fair and competent price					
8	The products of the company comprise key features that fulfills my demand					
9	The products of the company comprise additional features that distinguish them from other manufacturers					
10	The products of the company are more durable than other manufacturers					
11	I am satisfied with the company-customer relation ship					
12	I have an access to see the products that I ordered are being manufactured in the premises of the company.					
13	I can witness that there is a team work and problem solving in the company.					
14	I have come across with the company's product that needs					

	rework.								
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2. From the products and services of the company:

A. What satisfies you more? Please write three product features that you think more.

B. What dissatisfies you more? Please write three of them that you think major.

C. Do you think the products of the company sold at fair price?

Section III: Questions related to Suggestions and Recommendations

1. What do you think are potential problems that the company should solve?
Please write them briefly:

2. In your opinion, what are the possible causes of the problems you mentioned above? If any?

3. What do you suggest to improve the quality, delivery time and cost of the company's products? Please briefly state your possible recommendations.

4. What do you suggest to improve the company-customer relationship practices?

Thank you so much for your time!

APPENDIX 2

Statistics																						
		QFD Increases staffs' motivation	QFD Facilitates two-way relationships of customers & producers	QFD helps employee s to improve their awareness of fulfilling customer requireme nts	Improves communic ation between the persons involved in the process	Implement ing QFD Make employee s become more committed towards their job and quality	Implement ing QFD Makes the industry more competent	Implement ing QFD Enables the industry to compete in changing world	QFD is Suitable as a method for structuring teamwork	It helps to increase the industry's efficiency and effectivene ss	It helps in developin g a sense of belonging ness of the staffs and increases their participati on rate in the industry	Ensures to solve problems at all levels of the industry	Implement ing QFD Helps to improve the quality of all the industry's products & services	Failure to implement ing QFD/Incor porating the requireme nt of customers /leads to total failure of the industry	Failure to implement ing QFD/Incor porating the requireme nt of customers /leads to total failure of the industry	Implement ing QFD Facilitates an assessm ent of the product for everybody involved	Implement ing QFD Will decrease the need for a reworking of the product	QFD is a long and costly approach	Implement ing QFD is of most likely no fundament al difference concernin g the result in compariso n with a convention al approach	QFD simplifies product planning	Applicabilit y of QFD to the field of plastics is uncertain	Implement ing QFD / incorporati ng the requireme nt of the customer from the start of production / greatly reduce rework, reject and cost of production
N	Valid	39	40	40	40	40	40	40	40	40	40	40	40	39	40	40	40	40	40	40	38	39
	Missing	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	1
Mean		4.2821	4.7000	4.6750	4.7250	4.4500	4.7000	4.8250	4.6750	4.7500	4.0750	4.1000	4.5750	4.7692	3.9250	4.5500	4.5750	1.7750	1.7750	4.6750	1.6053	4.6923
Median		5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	5.0000	4.0000	4.0000	5.0000	5.0000	4.0000	5.0000	5.0000	2.0000	2.0000	5.0000	1.0000	5.0000
Mode		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	4.00	5.00	5.00	1.00	2.00	5.00	1.00	5.00
Std. Deviation		.91619	.51640	.47434	.50574	.90441	.60764	.38481	.52563	.49355	1.04728	.98189	.74722	.58316	1.07148	.55238	.95776	.99968	.86194	.61550	.85549	.52082
Variance		.839	.267	.225	.256	.818	.369	.148	.276	.244	1.097	.964	.558	.340	1.148	.305	.917	.999	.743	.379	.732	.271
Range		3.00	2.00	1.00	2.00	3.00	3.00	1.00	2.00	2.00	3.00	3.00	3.00	3.00	3.00	2.00	4.00	4.00	4.00	3.00	4.00	2.00
Minimum		2.00	3.00	4.00	3.00	2.00	2.00	4.00	3.00	3.00	2.00	2.00	2.00	2.00	2.00	3.00	1.00	1.00	1.00	2.00	1.00	3.00
Maximum		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Sum		167.00	188.00	187.00	189.00	178.00	188.00	193.00	187.00	190.00	163.00	164.00	183.00	186.00	157.00	182.00	183.00	71.00	71.00	187.00	61.00	183.00

Correlation of the variables -Employee satisfaction and Requirement fulfillment

Nonparametric Correlations

Table viii Correlations

			Educational Qualification	Education level at industry/company	CVD increases staffs' motivation	CVD facilitates two way relationship			committed	competent		efficiency and effectiveness	industry	company/industry		industry		product for everybody involved	reworking of the product	CVD is a long and costly approach	conventional approach		applicability of CVD to the new tyres is uncertain	reduce rework, reject and cost of production	
Spearman's rho	Educational Qualification	Correlation Coefficient	1.000	.013	-.046	.020	.011	-.068	-.027	.085	.026	-.027	.023	.038	.049	.088	.140	.020	.016	.112	-.035	-.010	.043	-.020	.121
		Sig. (2-tailed)		.913	.692	.864	.922	.553	.811	.460	.820	.817	.844	.739	.669	.442	.229	.859	.330	.764	.928	.711	.868	.297	
		N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	76	
	position/level at industry	Correlation Coefficient	.013	1.000	-.015	-.028	-.055	-.080	-.169	-.253*	-.266*	-.147	-.202	-.180	-.141	-.007	-.163	-.318*	-.157	-.032	-.120	-.085	-.124	-.012	-.119
		Sig. (2-tailed)	.913		.178	.055	.024	.115	.138	.025	.019	.199	.075	.115	.220	.954	.160	.005	.169	.783	.296	.460	.281	.922	.306
		N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	76	78	78	78	78	78	78	76	
	CVD Increases staffs' motivation	Correlation Coefficient	-.046	-.015	1.000	.563**	.355*	.416*	.607**	.357**	.238*	.512*	.410**	.677**	.248*	.052	.270*	.302*	.284*	-.016	-.180	-.217	.199	.031	.091

		Sig. (2-tailed)	.69 2	.1 78		.0 00	.0 0 2	.0 0 0	.00 0	.00 1	.0 3 7	.0 0 0	.00 0	.00 0	.03 0	.6 5 1	.01 9	.0 0 8	.01 2	.89 1	.11 7	.05 8	.0 8 2	.7 9 3	.437
		N	77	77	77	77	7 7	7 7	77	77	7 7	7 7	77	77	77	7 7	75	7 7	77	77	77	7 7	7 3	75	
	CVD Facilities two-way relationship of customers & producers	Correlation Coefficient	.02 0	- .2 18	.56 3**	1.00 0	.4 7 0*	.2 6 7*	.62 5**	.30 0**	.1 7 0	.4 1 0*	.19 1	.23 7*	.39 7**	.2 8 8*	.32 3**	.2 5 5*	.23 2*	- .02 1	- .07 1	- .09 3	.2 6 7*	.0 1 2	.089
		Sig. (2-tailed)	.86 4	.0 55	.00 0	.0 0 0	.0 1 8	.0 0 8	.00 0	.00 8	.1 3 6	.0 0 0	.09 4	.03 7	.00 0	.0 1 0	.00 4	.0 2 4	.04 1	.85 4	.53 8	.41 6	.0 1 8	.9 2 0	.443
		N	78	78	77	78	7 8	7 8	78	78	7 8	7 8	78	78	78	7 8	76	7 8	78	78	78	7 8	7 4	76	
	CVD helps employees to improve their awareness of fulfilling customer requirements	Correlation Coefficient	.01 1	- .2 55*	.35 5**	.4 70**	1.0 0 0	.2 8 6*	.34 0**	.43 8**	.3 4 5*	.6 8 4*	.21 5	.33 3**	.32 5**	.2 0 8	.42 1**	.2 4 9*	.46 3**	.36 5**	- .06 3	- .26 7*	.2 6 0*	- .0 4 4	.132
		Sig. (2-tailed)	.92 2	.0 24	.00 2	.0 00	.0 1 1	.0 0 1	.00 2	.00 0	.0 0 2	.0 0 0	.05 8	.00 3	.00 4	.0 6 7	.00 0	.0 2 8	.00 0	.00 1	.58 2	.01 8	.0 2 2	.7 0 9	.257
		N	78	78	77	78	7 8	7 8	78	78	7 8	7 8	78	78	78	7 8	76	7 8	78	78	78	7 8	7 4	76	
	Improves communication between the persons involved in the process	Correlation Coefficient	-.06 8	- .1 80	.41 6**	.2 67*	.2 8 6*	1.0 0 0	.50 8**	.46 6**	.5 2 7*	.4 9 3*	.80 3**	.42 5**	.41 6**	.2 8 2*	.40 1**	.2 6 0*	.33 2**	.16 5	- .07 7	.01 7	.0 9 8	- .2 5 2*	.213
		Sig. (2-tailed)	.55 3	.1 15	.00 0	.0 18	.0 1 1	.0 0 1	.00 0	.00 0	.0 0 0	.0 0 0	.00 0	.00 0	.00 0	.0 1 2	.00 0	.0 2 1	.00 3	.14 9	.50 1	.88 3	.3 9 3	.0 3 0	.065
		N	78	78	77	78	7 8	7 8	78	78	7 8	7 8	78	78	78	7 8	76	7 8	78	78	78	7 8	7 4	76	
	Implementing CVD Make employees become more	Correlation Coefficient	-.02 7	- .1 69	.60 7**	.6 25**	.3 4 0*	.5 0 8*	1.0 00	.26 1*	.1 7 6	.4 3 2*	.49 2**	.58 4**	.49 1**	.1 4 8	.21 3	.4 0 0*	.30 6**	- .04 9	- .02 1	.03 0	- .0 8 6	.0 4 8	.049
		Sig. (2-tailed)	.81 1	.1 38	.00 0	.0 00	.0 0 0	.0 0 0	.02 1	.1 2	.0 0	.0 0 0	.00 0	.00 0	.00 0	.1 9	.06 5	.0 0	.00 7	.67 1	.85 4	.79 7	.4 5	.6 8	.677

committed towards their job and quality	d)					2	0			3	0				5		0				2	4			
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	74	76		
	Implementing CVD Makes the industry more competent	Correlation Coefficient	.085	-.253*	.357**	.300**	.438*	.466*	.261*	1.000	.812*	.493*	.641**	.281*	.009	.101	.406**	.059	.552**	.346**	-.231*	-.304**	.221	-.347*	.505**
		Sig. (2-tailed)	.460	.025	.001	.008	.000	.000	.021		.000	.000	.000	.013	.937	.379	.000	.605	.000	.002	.042	.007	.052	.000	
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	76	78	78	78	78	78	74	76	
	Implementing CVD Enables the industry to compete in changing world	Correlation Coefficient	.026	-.266*	.238*	.170	.345*	.527*	.176	.812**	1.000	.401*	.570**	.205	.055	.148	.265*	.045	.531**	.464**	-.331**	-.437**	.203	-.544*	.667**
		Sig. (2-tailed)	.820	.019	.037	.136	.002	.000	.123	.000		.000	.000	.072	.634	.197	.021	.697	.000	.000	.003	.000	.074	.000	
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	76	78	78	78	78	78	74	76	
	CVD is Suitable as a method for structuring team work	Correlation Coefficient	-.027	-.147	.512**	.410**	.684*	.493*	.432**	.493**	.410*	1.000	.517**	.480**	.441**	.153	.287*	.332*	.391**	.101	.096	-.179	.111	.046	.134
		Sig. (2-tailed)	.817	.199	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000	.180	.012	.003	.000	.377	.403	.117	.332	.694	.248
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	76	78	78	78	78	78	74	76	
	It helps to increase the industry's efficiency and effectiveness	Correlation Coefficient	.023	-.202	.410**	.191	.215	.803*	.492**	.641**	.577*	1.000	.481**	.296**	.149	.406**	.160	.404**	.045	-.137	-.032	.102	-.193	.254*	
	Sig. (2-tailed)	.844	.075	.000	.094	.058	.000	.000	.000	.000	.000		.000	.009	.194	.000	.162	.000	.695	.233	.782	.373	.100	.027	

	ss	N	.78	.78	.77	.78	.7 8	.7 8	.78	.78	.7 8	.7 8	.78	.78	.78	.7 8	.76	.7 8	.78	.78	.78	.78	.7 8	.7 4	.76
It helps in developing a sense of belongingness of the staffs and increases their participation rate in the industry	Corr elation Coef ficient		.038	- .180	.677**	.237*	.333*	.425*	.584**	.281*	.205	.4880*	.481**	1.000	.483**	.241*	.204	.507*	.373**	- .011	- .119	- .231*	- .025	- .166	.242*
		Sig. (2-tailed)	.739	.115	.000	.037	.003	.000	.000	.013	.072	.000	.000	.000	.000	.000	.033	.077	.000	.924	.301	.042	.827	.158	.035
	N	.78	.78	.77	.78	.7 8	.7 8	.78	.78	.7 8	.7 8	.78	.78	.78	.7 8	.76	.7 8	.78	.78	.78	.78	.78	.7 8	.7 4	.76
	Ensures to solve problems at all levels of the industry		.049	- .141	.248*	.397**	.325*	.416*	.491**	.009	.055	.441*	.296**	.483**	1.000	.395*	.222	.747*	.064	- .056	- .061	- .093	.061	- .164	.089
		Sig. (2-tailed)	.669	.220	.030	.000	.004	.000	.000	.937	.634	.000	.009	.000	.000	.000	.054	.000	.576	.627	.596	.419	.597	.163	.445
	N	.78	.78	.77	.78	.7 8	.7 8	.78	.78	.7 8	.7 8	.78	.78	.78	.7 8	.76	.7 8	.78	.78	.78	.78	.78	.7 8	.7 4	.76
	Implementing CVD Helps to improve the quality of all the industry's products & services		.088	- .007	.052	.288*	.208	.282*	.148	.101	.148	.153	.149	.241*	.395**	1.000	.420**	.319*	.377**	.048	.050	- .296**	.033	- .304*	.053
		Sig. (2-tailed)	.442	.954	.651	.010	.067	.012	.195	.379	.197	.180	.194	.033	.000	.000	.000	.004	.001	.677	.661	.009	.774	.008	.652
	N	.78	.78	.77	.78	.7 8	.7 8	.78	.78	.7 8	.7 8	.78	.78	.78	.7 8	.76	.7 8	.78	.78	.78	.78	.78	.7 8	.7 4	.76
Failure to implementing CVD/ incor	Corr elation Coef ficient		.140	- .163	.270*	.323**	.421*	.401*	.213	.406**	.265*	.287*	.406**	.204	.222	.420*	1.000	.185	.376**	.331**	- .187	- .117	.574*	- .151	.015

porating the requirement of customers/ leads to total failure of the industry	Sig. (2-tailed)	.229	.160	.019	.004	.000	.000	.065	.000	.021	.012	.000	.077	.054	.000		.110	.001	.003	.105	.312	.000	.200	.899
	N	76	76	75	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	74	
Failure to implementing CVD/ incorporating the requirement of customers/ leads to total failure of the industry	Correlation Coefficient	.020	-.318**	.302**	.255*	.249*	.260*	.400**	.059	.045	.332*	.160	.507**	.747**	.319*	.185	1.000	.201	-.090	-.030	-.187	-.002	-.133	.049
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	76	78	78	78	78	78	78	76	
Implementing CVD Facilities an assessment of the product for everybody involved	Correlation Coefficient	.016	-.157	.284*	.232*	.463*	.332*	.306**	.552**	.531*	.391*	.404**	.373**	.064	.377*	.376**	.201	1.000	.313**	-.263	-.454**	.200	-.364*	.413**
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	76	78	78	78	78	78	78	76	
Implementing CVD Will decrease the need for a reworking	Correlation Coefficient	.112	-.032	-.016	-.021	.365*	.165	-.049	.346**	.464*	.101	.045	-.011	-.056	.048	.331**	-.090	.313**	1.000	-.372**	-.360**	.293*	-.341*	.422**
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	76	78	78	78	78	78	78	76	
	Sig. (2-tailed)	.330	.783	.891	.854	.001	.149	.671	.002	.000	.377	.695	.924	.627	.677	.003	.431	.005	.001	.001	.009	.003	.000	
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	76	78	78	78	78	78	78	76	

of the product	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	
	CVD is a long and costly approach	Correlation Coefficient	-.035	-.120	-.180	-.1071	-.1063	-.1077	-.1021	-.1231*	-.1331*	-.096	-.137	-.119	-.1061	-.1050	-.187	-.1030	-.263*	-.372**	1.000	.653**	-.372*	.725*	-.380**
		Sig. (2-tailed)	.764	.296	.117	.538	.582	.501	.854	.042	.103	.403	.233	.301	.596	.661	.105	.792	.020	.001		.000	.001	.000	.001
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	
	Implementing CVD is of most likely no fundamental difference concerning the result in comparison with a conventional approach	Correlation Coefficient	-.010	-.085	-.217	-.1093	-.1267*	-.1077	-.030	-.304**	-.1437*	-.179	-.1032	-.231*	-.093	-.296*	-.117	-.187	-.454**	-.360**	.653**	1.000	-.268*	.623*	-.442**
		Sig. (2-tailed)	.928	.460	.058	.416	.118	.883	.797	.007	.100	.117	.782	.042	.419	.109	.312	.101	.000	.001	.000		.018	.000	.000
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	
	CVD simplifies product planning	Correlation Coefficient	.043	-.124	.199	.267*	.260*	.1098	-.1086	.221	.203	.111	.1025	-.102	.061	.1033	.574**	-.102	.200	.293**	-.372**	-.268*	1.000	-.244*	.257*
		Sig. (2-tailed)	.711	.281	.082	.1018	.1022	.393	.452	.074	.332	.373	.827	.597	.774	.000	.984	.080	.009	.001	.018		.036	.025	
	N	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	
	Applicability of CVD to the field	Correlation Coefficient	-.020	.12	.031	.12	-.1044	-.1052*	.048	-.347**	-.1544*	.1046	-.193	-.166	-.164	-.304*	-.151	-.133	-.364**	-.341**	.725**	.623**	-.244*	1.000	-.599**

of types is uncert ain	nt	Sig. (2- taile d)	.86 8	.9 22	.79 3	.9 20	.7 0 9	.0 3 0	.68 4	.00 2	.0 0 0	.6 9 4	.10 0	.15 8	.16 3	.0 0 8	.20 6	.2 5 8	.00 1	.00 3	.00 0	.00 0	.0 3 6		.000
		N	74	74	73	74	7 4	7 4	74	74	7 4	7 4	74	74	74	7 4	72	7 4	74	74	74	74	7 4	7 4	74
Imple menti ng CVD / incor porati ng the requir ement of the custo mer from the start of produ ction/ greatl y reduc e rewor k, reject and cost of produ ction	Corr elati on Coef ficie nt		.12 1	- .1 19	.09 1	.0 89	.1 3 2	.2 1 3	.04 9	.50 5**	.6 6 7*	.1 3 4	.25 4*	.24 2*	.08 9	.0 5 3	.01 5	.0 4 9	.41 3**	.42 2**	- .38 0**	- .44 2**	.2 5 7*	- .5 9 9*	1.00 0
		Sig. (2- taile d)	.29 7	.3 06	.43 7	.4 43	.2 5 7	.0 6 5	.67 7	.00 0	.0 0 0	.2 4 8	.02 7	.03 5	.44 5	.6 5 2	.89 9	.6 7 2	.00 0	.00 0	.00 1	.00 0	.0 2 5	.0 0 0	
		N	76	76	75	76	7 6	7 6	76	76	7 6	7 6	76	76	76	7 6	74	7 6	76	76	76	76	7 6	7 4	76

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Nonparametric Correlations

Correlations

			Company/industry	the quality delivery of the product.	services offered by the industry	our requirements regularly	turned by the company/industry.	reputably	fair and competent price	comprise key features that turns my demand	other manufacturers	than other manufacturers	relation ship	premises of the industry	problem solving in the company/industry	that needs rework	gender/sex	age	experience as use of industry's products	level of education	type of business
Spearman's rho	I liked more and interested to the products and services offered by the Horizon addis-tyre company	Correlation Coefficient	1.000	.766**	.309*	.120	.063	.187	.493**	.220	.427**	.363*	.077	.333*	.110	-.050	.114	.196	-.002	-.161	.147
		Sig. (2-tailed)		.000	.031	.412	.670	.199	.000	.129	.002	.010	.597	.019	.451	.738	.435	.176	.988	.270	.313
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49
	Most customers and consumers of the industry's products have strong feeling about the quality delivery of the product	Correlation Coefficient	.766**	1.000	.309*	.120	-.044	.255	.540**	.128	.427**	.363*	.077	.257	.208	0.000	.114	.050	-.002	-.091	.258
		Sig. (2-tailed)	.000		.031	.412	.769	.077	.000	.383	.002	.010	.597	.075	.152	1.000	.435	.735	.988	.536	.074
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49
	I have strong and positive attitude towards the quality of the products and	Correlation Coefficient	.309*	.309*	1.000	-.241	-.042	.002	.166	.158	.199	.355*	-.122	-.035	.185	.183	.233	.086	-.012	-.003	-.097
		Sig. (2-tailed)																			
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49

services offered by the industry	Sig. (2-tailed)	.031	.031		.095	.774	.991	.254	.279	.170	.012	.402	.813	.202	.212	.108	.555	.934	.981	.509
	N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49
The industry's marketing staffs or any concerned person from the industry assesses our requirements regularly	Correlation Coefficient	.120	.120	-.241	1.000	.579**	.559**	.269	.367**	.352*	.173	.709**	.763**	.473**	-.567**	.048	-.097	.135	.089	.218
	Sig. (2-tailed)	.412	.412	.095		.000	.000	.061	.009	.013	.233	.000	.000	.001	.000	.744	.509	.354	.544	.131
The demands that I/we raise are always fulfilled by the company/industry	N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49
	Correlation Coefficient	.063	-.044	-.042	.579**	1.000	.644**	.490**	.530**	.641**	.326*	.672**	.652**	.515**	-.692**	.058	-.081	.239	-.018	.191
The delivery of my orders are timely and hospitably	Sig. (2-tailed)	.670	.769	.774	.000		.000	.000	.000	.000	.024	.000	.000	.000	.000	.695	.583	.102	.903	.192
	N	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
The products of the company/industry are of fair and competent price	Correlation Coefficient	.187	.255	.002	.559**	.644**	1.000	.555**	.362*	.614**	.407**	.760**	.697**	.819**	-.512**	-.100	-.213	.185	-.031	.219
	Sig. (2-tailed)	.199	.077	.991	.000	.000		.000	.011	.000	.004	.000	.000	.000	.000	.493	.141	.204	.833	.131
	N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49
	Correlation Coefficient	.493**	.540**	.166	.269	.490**	.555**	1.000	.298*	.598**	.387**	.406**	.421**	.527**	-.326*	.126	-.133	.109	-.095	.252
	Sig. (2-tailed)	.000	.000	.254	.061	.000	.000		.037	.000	.006	.004	.003	.000	.024	.388	.362	.457	.518	.081
	N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49

	The products of the industry comprise key features that fulfils my demand	d)	N	49	49	49	49	48	49	49	49	49	49	49	49	48	49	49	49	49	49	49
		Correlation Coefficient		.220	.128	.158	.367**	.530**	.362*	.298*	1.000	.570**	.630**	.314*	.467**	.165	-.314*	.135	-.208	.052	.080	.033
		Sig. (2-tailed)		.129	.383	.279	.009	.000	.011	.037		.000	.000	.028	.001	.257	.030	.357	.152	.721	.586	.822
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	49	48	49	49	49	49	49
		Correlation Coefficient		.427**	.427**	.199	.352*	.641**	.614**	.598**	.570**	1.000	.645**	.452**	.632**	.425**	-.560**	.077	-.153	.014	-.008	.171
		Sig. (2-tailed)		.002	.002	.170	.013	.000	.000	.000	.000		.000	.001	.000	.002	.000	.600	.293	.922	.958	.240
	The products of the industry are more durable than other manufacturers	N	49	49	49	49	48	49	49	49	49	49	49	49	49	49	48	49	49	49	49	49
		Correlation Coefficient		.363*	.363*	.355*	.173	.326*	.407**	.387**	.630**	.645**	1.000	.263	.439**	.402**	-.222	.165	-.133	-.086	.022	.137
		Sig. (2-tailed)		.010	.010	.012	.233	.024	.004	.006	.000	.000		.067	.002	.004	.129	.256	.361	.559	.880	.349
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	49	48	49	49	49	49	49
		Correlation Coefficient		.077	.077	-.122	.709**	.672**	.760**	.406**	.314*	.452**	.263	1.000	.803**	.811**	-.663**	-.037	-.084	.235	.004	.230
		Sig. (2-tailed)		.597	.597	.402	.000	.000	.000	.004	.028	.001	.067		.000	.000	.000	.801	.564	.104	.977	.112
	I am satisfied with the industry-customer relationship	N	49	49	49	49	48	49	49	49	49	49	49	49	49	49	48	49	49	49	49	49
		Correlation Coefficient																				
		Sig. (2-tailed)																				
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	49	48	49	49	49	49	49
		Correlation Coefficient																				
		Sig. (2-tailed)																				

	I have an access to see the products that I ordered are being manufactured in the premises of the industry	Correlation Coefficient	.333*	.257	-.035	.763**	.652**	.697**	.421**	.467**	.632**	.439**	.803**	1.000	.663**	-.696**	.038	-.046	.147	.004	.247
		Sig. (2-tailed)	.019	.075	.813	.000	.000	.000	.003	.001	.000	.002	.000	.000	.000	.000	.798	.751	.314	.977	.087
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49
	I can witness that there is a teamwork and problem solving in the industry	Correlation Coefficient	.110	.208	.185	.473**	.515**	.819**	.527**	.165	.425**	.402**	.811**	.663**	1.000	-.421**	.018	-.140	.181	-.027	.203
		Sig. (2-tailed)	.451	.152	.202	.001	.000	.000	.000	.257	.002	.004	.000	.000	.000	.003	.902	.336	.212	.854	.161
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49
	I have come across with the company/industry's product that needs rework	Correlation Coefficient	-.050	0.000	.183	-.567**	-.692**	-.512**	-.326*	-.314*	-.560**	-.222	.663**	.696**	-.421**	1.000	0.000	.061	-.114	.075	-.261
		Sig. (2-tailed)	.738	1.000	.212	.000	.000	.000	.024	.030	.000	.129	.000	.000	.003		1.000	.681	.441	.611	.073
		N	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
	gender/sex	Correlation Coefficient	.114	.114	.233	.048	.058	-.100	.126	.135	.077	.165	-.037	.038	.018	0.000	1.000	.347*	-.160	-.416**	.186
		Sig. (2-tailed)	.435	.435	.108	.744	.695	.493	.388	.357	.600	.256	.801	.798	.902	1.000		.015	.273	.003	.200
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49
	age	Correlation Coefficient	.196	.050	.086	-.097	-.081	-.213	-.133	-.208	.153	.133	-.084	-.046	-.140	.061	.347*	1.000	.180	-.565**	.002
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49

	experience as use of industry's product	fficient																				
		Sig. (2-tailed)	.176	.735	.555	.509	.583	.141	.362	.152	.293	.361	.564	.751	.336	.681	.015		.217	.000	.988	
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49	
		Correlation Coefficient	-.002	-.002	-.012	.135	.239	.185	.109	.052	.014	-.086	.235	.147	.181	-.114	-.160	.180	1.000	.053	-.016	
		Sig. (2-tailed)	.988	.988	.934	.354	.102	.204	.457	.721	.922	.559	.104	.314	.212	.441	.273	.217		.715	.914	
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49	
	level of education	Correlation Coefficient	-.161	-.091	-.003	.089	-.018	-.031	-.095	.080	-.008	.022	.004	.004	-.027	.075	-.416**	-.565**	.053	1.000	-.260	
		Sig. (2-tailed)	.270	.536	.981	.544	.903	.833	.518	.586	.958	.880	.977	.977	.854	.611	.003	.000	.715		.071	
		N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49	
		type of business	Correlation Coefficient	.147	.258	-.097	.218	.191	.219	.252	.033	.171	.137	.230	.247	.203	-.261	.186	.002	-.016	-.260	1.000
			Sig. (2-tailed)	.313	.074	.509	.131	.192	.131	.081	.822	.240	.349	.112	.087	.161	.073	.200	.988	.914	.071	
			N	49	49	49	49	48	49	49	49	49	49	49	49	49	48	49	49	49	49	49

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Correlations

		How important are the customer wants to you and your company/industry? With respect to achieving best	How important are the design attributes with respect to	How important are the appeals of your products to your	How important are the ease of use of your products to your	How do you evaluate the importance of the key features of your products to your	How do you evaluate the importance of the incorporating additional features to your	How would you decide if the use of CVD in the pilot scheme has been worthwhile or not?
Spearman's rho	How important are the customer wants to you and your company/industry? With respect to achieving best quality products delivered?	1.000	.570**	.540**	.612**	.697**	.290	.478**
Spearman's rho	How important are the design attributes with respect to Customer wants?	.570**	1.000	.540**	.444**	.540**	.383*	.377*
Spearman's rho	How important are the appeals of your products to your Customer wants?	.540**	.540**	1.000	.544**	.654**	.189	.364*

How important are the ease of use of your products to your Customer wants?	Correlation Coefficient	.612**	.444**	.544**	1.000	.728**	.378*	.451**
	Sig. (2-tailed)	.000	.004	.000	.	.000	.016	.003
	N	40	40	40	40	40	40	40
How do you evaluate the importance of the key features of your products to your Customers?	Correlation Coefficient	.697**	.540**	.654**	.728**	1.000	.346*	.535**
	Sig. (2-tailed)	.000	.000	.000	.000	.	.029	.000
	N	40	40	40	40	40	40	40
How do you evaluate the importance of the incorporating additional features to your products?	Correlation Coefficient	.290	.383*	.189	.378*	.346*	1.000	.548**
	Sig. (2-tailed)	.070	.015	.244	.016	.029	.	.000
	N	40	40	40	40	40	40	40
How would you decide if the use of CVD in the pilot scheme has been worthwhile or not?	Correlation Coefficient	.478**	.377*	.364*	.451**	.535**	.548**	1.000
	Sig. (2-tailed)	.002	.016	.021	.003	.000	.000	.
	N	40	40	40	40	40	40	40

** . Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Statistics																				
		I liked more and interested to the products and services offered by the Ethiopian plastic industry	Most customers and consumers of the industry's products have strong feeling about the quality of the products	I have strong feeling and positive attitude towards the quality of the products and services offered by the industry	The industry's marketing staffs or any concerned person from the industry assesses our requirements regularly	The demands that I/we raise are always fulfilled by the industry	The delivery of my orders are timely and hospitably	The products of the industry are of fair and competent price	The products of the industry comprise key features that fulfills my demand	The products of the industry comprise additional features that distinguish them from other manufacturers	The products of the industry are more durable than other manufacturers	I am satisfied with the industry-customer relationship	I have an access to see the products that I ordered are being manufactured in the premises of the industry	I can witness that there is a team work and problem solving in the industry	I have come across with the industry's product that needs rework	percep_an	requir_ful	gender/se	age	experienc
																d_satisfn	mt	x		e as use
																				of
																				industry's
																				products
																				level of
																				education
																				type of
																				business
N	Valid	49	49	49	49	48	49	49	49	49	49	49	49	49	48	48	48	49	49	49
	Missing	0	0	0	0	1	0	0	0	0	0	0	0	0	1	1	1	0	0	0
Mean		4.7755	4.7755	4.7143	3.5510	3.6458	3.6939	4.4286	4.4694	4.5306	4.6327	3.8367	4.0816	3.7347	1.5000	3.8906	4.2153	1.4694	2.1837	1.3265
Median		5.0000	5.0000	5.0000	4.0000	4.0000	4.0000	5.0000	5.0000	5.0000	5.0000	4.0000	4.0000	4.0000	1.5000	3.8750	4.2500	1.0000	2.0000	1.0000
Mode		5.00	5.00	5.00	4.00	4.00	4.00	5.00	5.00	5.00	5.00	4.00	4.00	5.00	1.00 ^a	4.38	3.83 ^a	1.00	2.00	1.00
Std. Deviation		.42157	.42157	.45644	1.30801	.99978	.84666	.64550	.58102	.61583	.75537	.82530	1.07697	1.15064	.50529	.45005	.62735	.50423	.95030	.55482
Range		1.00	1.00	1.00	4.00	4.00	3.00	2.00	2.00	2.00	3.00	3.00	4.00	4.00	1.00	1.50	2.83	1.00	3.00	2.00
Minimum		4.00	4.00	4.00	1.00	1.00	2.00	3.00	3.00	3.00	2.00	2.00	1.00	1.00	1.00	3.00	2.17	1.00	1.00	1.00
Maximum		5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	2.00	4.50	5.00	2.00	4.00	3.00
Sum		234.00	234.00	231.00	174.00	175.00	181.00	217.00	219.00	222.00	227.00	188.00	200.00	183.00	72.00	186.75	202.33	72.00	107.00	65.00

a. Multiple modes exist. The smallest value is shown