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A STUDY ON ISSUES IN CONVERTING AN INNOVATIVE IDEA IN TO COMMERCIAL PRODUCT IN M/S.VAARAAHI EMBEDDED SYSTEMS

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A PROJECT REPORT

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of

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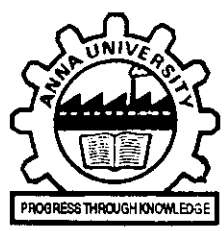

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ABSTRACT

Innovativeness is the key factor for the existence of every organization. Not all the innovative ideas can be transformed in to a commercial product. The process of conversion of an innovative idea in to a commercial product is catalyzed and hindered by numerous factors. New ideas and technologies will provide today's businesses with unlimited opportunities in the future- but these must be planned for.

According to the industrial analysts less than one in five promising ideas will make it through the commercialization process. Additionally, an astonishing fifty to seventy percent of all new product introductions will fail.

This project aims at

1.) **Identifying all the factors** which are correlated in the process of conversion of an innovative idea in to a commercial product at M/S.Vaaraahi Embedded Systems.

2.) To focus on the **effect of the relationship** between **marketing** and **product development** team in the commercialization of the product.

The above factor is very critical and plays a vital role in the success of any new product. New product need to meet market needs. Product development should follow a staged process from concept through launch.

ACKNOWLEDGEMENT

I thank the **Director, Centre for Distance Education, Anna University**-Chennai, for giving me a chance to conduct and present my study as a project work and also, for guiding us in the initial stages in providing overall assistance for carrying out my project work.

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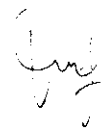
Much is indebted to my guide **Prof. Dr.S.V.DEVANATHAN** for his valuable guidance, suggestions and constant encouragement which has shaped the form and content of this project.

I thank **Mr.Kannan, Technical Director**, M/s.Vaaraahi Embedded Systems, Coimbatore for his monumental help in making my project a great success, from the core of our heart.

We are greatly indebted to **M/S.Vaaraahi Embedded Systems**, Coimbatore for
Permitting us to do the project work and for all the help rendered during the entire period of our work.



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INTRODUCTION

1.1 RESEARCH BACKGROUND:

According to industry analysts, less than one in five promising ideas will make it through the commercialization process. Additionally, an astonishing fifty to seventy percent of all new product introductions will fail.

Companies have just one chance to launch a new product successfully. To increase success rates, companies need an effective product commercialization process to identify commercial opportunities, target the right market segments, erect barriers against the competition, and optimize pricing strategies.

The challenge for the product commercialization process is successful product launches that meet schedule requirements, market demands and financial goals.This project report provides a picture of relationship between marketing department and the product development, and also lists out the factors which play significant role in commercializing an innovative idea.

Corporate Profile of M/S.Vaaraahi Embedded Systems:

Vaaraahi embedded, an embedded software\Hardware design and development Company incorporated in the year 2002 as a part of the Pioneer group of Company –Rosun Group engaged in Steel Manufacturing for the last fifteen years. It was started as Training Institute in the Advanced Technological areas in Electronics and further enhanced its activities towards Design and Product development. The state of the art Research and Development center ensures that the employees have at their disposal all the resources needed to provide the best possible services to the clients. We aim to provide with a competitive advantage through timely delivery of high quality and cost effective Hardware\Software solution to the clients.

Company strives to become a one-stop shop for our clients' entire spectrum of Software/ Hardware Design and Development Information requirements. This ensures that our client can depend on a Single reliable partner for all their aspects of product development requirements. Our Portfolio of services includes,

- Existing Product Development
- Concept to product development
- Custom Build product development
- Product Re-Engineering
- Adapting new technology in Old products
- Support Services and consulting
- PCB Design Development
- Consulting services for Certification and From Regulatory approvals

Company takes all efforts to bring the best Technical Professional with complementary skill set, expertise and experience. Company management comprises Executives having Years of experience in the technical aspects of product development based on the latest Technology and makes the whole product cost effective. Company always employ the services of specialized R & D personnel whose sole purpose is to research in emerging technologies and incorporate them for better solution.

1.2 IDENTIFIED PROBLEM:

The conversion rate of an innovative idea in to a successful commercial product is generally low across the organizations. Huge numbers of factors are involved in this process. Nowadays organizations are keen on the R&D productivity and they have started using the specialists and consultants for the above task. So this project intends to deal with the factors relating to the conversion of the innovative idea in to commercial product.

1.3 NEED FOR STUDY:

As stated above, as there are huge numbers of factors involved in the process of conversion of an innovative idea into a commercial product, it becomes to manage all these factors effectively and efficiently for the successful product launch. To assist the organization in successful conversion of an innovative idea in to commercial product this study becomes essential.

1.4 OBJECTIVES AND SCOPE:

1.) **Identifying all the factors** which are correlated in the process of conversion of an innovative idea in to a commercial product at M/S.Vaaraahi Embedded Systems.

2.) To focus on the **effect of the relationship** between **marketing** and **product development** team in the commercialization of the product.

The above factor is very critical and plays a vital role in the success of any new product. New product need to meet market needs. Product development should follow a staged process from concept through launch.

1.5 DELIVERABLES:

Findings, suggestions and recommendations in conversion of an innovative idea into a commercial product at M/S.Vaaraahi Embedded Systems.

CHAPTER 2

LITERATURE SURVEY

CHAPTER 2

LITERATURE SURVEY

2.1 REVIEW OF LITERATURE:

New Product Commercialization: Needs and Strategies

Journal of Applied management and Entrepreneurship, April 2007 by Udell, Gerald, Hignite and Mike

In this paper the authors examine estimates of the high rate of new product failure and the role of management in such failures. Because of the apparent importance of ego involvement in new product failure, the authors suggest that there is a need for unbiased individuals to audit company product development policies, procedures and processes and to do so in light of the commercialization needs of individual new products. The authors present a case study of the commercialization needs of 1700 new products generated as part of a national new product screening experiment conducted in cooperation with Wal-Mart Stores, Inc.

A Case Study in New Product Assessment

An experiment at Wal-Mart Stores, Inc. provided a unique opportunity to study new product offerings from an objective point of view. (Leader to Leader, 1998) From the Wal-Mart perspective, the Support American Made (SAM) experiment was a program designed to help identify potential new products and suppliers for Wal-Mart. However, the experiment was designed by researchers at Missouri State University (MSU) to focus on broader economic development issues, such as providing smaller manufacturing enterprises with essentially a strength and weakness assessment of both their product and their venture. Thus, feedback to participating enterprises was deemed to be as significant, if not more so than the information provided to Wal-Mart.

Accordingly, participants received a product and venture assessment report and copies of the product evaluation and venture assessment manuals, both of which had been prepared to provide participants with additional information about, and insight into, the assessments of their product and venture. During the course of the experiment,

approximately 1700 firms participated of which 1500 were selected for further study. Of this group, 148 or 8.6% ultimately received vendor status at Wal-Mart. A series of pre-experiment personal and group interviews conducted with Wal-Mart buyers indicate that the experiment achieved approximately a fifteen-fold increase in the ration of smaller enterprises (SME's) reaching the shelves at Wal-Mart, relative to pre-experiment procedures.

The product assessments were completed by a team of experienced professionals who were trained in the S.A.M. evaluation and assessment (E&A) procedures, and worked out of Wal-Mart's Bentonville, Arkansas, headquarters under the supervision of a S.A.M. experiment team member from the Center for Business and Economic Development of the College of Business Administration at MSU. The E&A team had no ties or vested interests in any of the products reviewed, and they used a structured, systematic product and venture assessment process. (Udell, 1995) In effect, the team functioned as auditors and not as advocates or product champions.

The S.A.M. product assessment procedure was based on the Preliminary Innovation Evaluation System (PIES), which was developed under funding from the National Science Foundation (NSF) in 1974, to evaluate new product ideas, inventions and other early-stage potential innovations as part of the NSF Innovation Centers Experiment (Udell, 1975). The PIES format, which had been revised several times since the NSF experiment, was modified and expanded for the S.A.M. experiment.

The data reported here reflects the product assessments of the S.A.M. Evaluation and Assessment (E&A) Team in the areas of product potential for technology transfer and new venture start-up, as well as the experience and know-how required to launch and successfully establish the product under review in the areas of marketing, finance, technology, and production. The questions in the tables to follow are drawn directly from the S.A.M. product assessment questionnaire and a frequency count (expressed in percentages) of the approximately 1700 E&A team responses to each question is recorded.

Other References:

PDSS: Product Development System and solutions

During and after a product launch, the challenge is managing the lifecycle to ensure business case fulfillment. During this time, it is important to capture product performance data from supply chain, manufacturing, sales and field support as input for future product development efforts.

Enable your product line management teams with Six Sigma tools and best practices with PDSS' **Six Sigma for Marketing - Product Line Management** program.

The **Six Sigma for Marketing - Product Line Management** program provides:

- Training and consulting for tools and practices to better manage product life cycles from new product launch to ongoing support, adaptation to changing competitive conditions and ultimately discontinuance.
- The tools to help process data into information to enable better decision making.
- Ongoing stewardship of the Product Line Business Cases through linkage of the Business Case Y = f(X) model to the critical parameters that enable ongoing management of maximum margin and minimum price erosion.
- Assurance that each product and service is supported within a rigorous value management and margin control process through a critical parameter database.
- Tools and best practices that are used to sustain and maximize the value of the launched product portfolio across the market segments.
- Project management methods control the time-line of tasks and tool applications for adaptive control of your operations in post-launch product marketing and support.
- Scorecards that are used to manage risk make key decisions and assure that products are managed with the proper data.

IPTOOLBOX:

Commercializing IP is the process you undertake to get your innovation, whether it is in the form of products or services, to the market place.

There is no such thing as a 'best' strategy to commercialize your product. It very much depends on your 'business profile', the attributes of the IP and your desired outcomes. How you decide to commercialize depends on **your** particular IP, circumstances, existing core business capabilities, understanding of the market, and ability to generate finance The ability to generate a financial return is particularly important. Bringing IP to a market-ready state can incur a substantial investment in:

- Developing the concept further;
- Testing and trialing the product;
- Designing tools;
- Developing a manufacturing facility:
- Developing a business or marketing plan; and
- Marketing, promoting and selling the product.

Few projects undertaken by M/S.Vaaraahi Embedded Systems:

Energy Metering:

Energy or power metering is about collection of data one Energy consumption for billing purposes. This instrument will provide customer with the energy consumption for specific period along with the Bill for energy consumed. This instrument has been designed in two models for specific application. This instrument can be used for Home and Industries to keep track on the Total units consumed and Total Price for the Energy consumed

The prepaid energy meter is equipped with smart card interfaces, which contains the validation data that allows or prohibits the Energy withdraw. If validation is found to be failed, the meter will cut the Power line Connection.

The Remote Energy Meter is a typical meter provided for selected customers. The referred customer based may include suspicious clients or those located very close to other, such as in high rise building. Tens or hundreds of meter ma use RF to send billing data to a common collector unit, which then transmits the data package to the service provider using Telephone modem or through some other link.

RFID Based System Development:

RFID System consists of an Electronic data carrier device of Passive Transponder and the reader that communicates information using Radio Frequency Technology utilizing ISM (Industrial, Scientific and Medical) Band of Frequency. The RF Tag Emits binary bit in radio Frequency and the RF Reader reads this bit and Authenticate for Some specific applications. The security settings of the RF Tag are configured so that all of the data can be read without restriction. The Develop RF Reader and as well as specific control design based on RFID Tags. Few of the application are specified below.

- Departmental store
- Automatic attendance
- Security Systems
- Health care cards
- Access control

SPIN and Dip Coating machines for taking thin Film samples:

These Instruments are the primary requirement for research Scholars doing research based on Thin Films. These instruments are used to take sample of Chemicals like Polymer Materials on a Glass Substrate for the desired thickness in order to study its various Properties. Spin and Dip coating machine are the two instruments we developed and tested and these instrument can be used for laboratory purpose.

In the spin coating Instrument, the user can place the chemical sample on a glass substrate and the used can feed various requirements such as Speed and Time control for the desired thickness of the sample.

In the Dip Coating machine, the sample can be taken by dipping the glass substrate in the chemical. In this instrument, the used can control the Dip time, Dip speed, No of dips etc per sample as per required Sample thickness.

GPS Based Auto tracking System:

It is the most advanced and accurate technology available for position Navigation. It provides precision data regarding Latitude and Longitude and other parameters to find the Present position. This system has been designed and developed based on the Jupiter TV30D315 OEM Module receiver and interfaced to the Microcontroller to fetch and analyze the data received from the OEM for some specific applications. This system can be modified as per the clients' requirement and can be implemented for navigation applications which are specified below

- Auto tracking of vehicle
- Remote Access Control
- Marine
- Navigation and Monitoring from remote side

Smart Card Based System Design:

The smart card based systems are the most widely acclaimed of most of the other solution provided for various application because of their Reliability, Simplicity and having Secured features. This smart card based system has been developed based on ATMEL Crypto Memory smart card which is an easy to implement for secured solution by interfacing with embedded microcontroller. This card has designed to keep contents securely, whether operating in a system or removed from the board and sitting in the hackers lab. One card is enough to manage for multiple applications. This system can be easily modified to suit requirement of clients. Some of the applications based on smart card specified below.

- Attendance
- Health card
- Security system
- Access control
- Customer card for departmental stores
- Banking
- Entertainment

- **SMS Based Home Automation:**

The main purpose of developing this system is to control the remote applications / Devices through SMS Messages. In this system, the user can connect the Home appliances/Devices such as Audio/Video equipments, Lightings, Heaters, Air conditioners etc to a Mobile Phone. Each device will have a unique identification, Password and address of the device connected to the Mobile phone. The user from the remote location can send the proper ID, Password and address in the form of SMS text messages. The Mobile at the remote side will receive the SMS text and decode it and if authenticated, the system will activate the appliances/devices as per the user requirement. This system will also send the status of the device connected to the mobile phone through the same mobile phone to the specific user. The system can modified to suit the below applications

2.2 RESEARCH GAP:

Research Design:

Research design is an arrangement of condition for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure. A research designs the blue print specifying every stage of action in the course of research. The researcher should specify the approach with respect to the proposed study.

Descriptive research design:

The researcher has used descriptive research for the study. Descriptive research focuses on the portrayal of the characteristics of a group or a situation.

Research design:

Data source	:	Primary data
Data type	:	Descriptive research
Research approach	:	Survey
Research instrument	:	Questionnaire
Contact method	:	Personal interview

Research Tools:

In the study the primary data was collected through questionnaire from respondents directly. A questionnaire contains list of questions relating to certain specific aspect, regarding which the researcher collects data.

A questionnaire is a formalized framework consisting of a set of questions and scales designed to generate primary raw data. It is a pre formulated written set of questions to which the respondents record their answers. The answers are mostly chosen by a respondent from within the closely defined alternatives. The questionnaires can be administered personally, mailed to the respondents or electronically distributed.

In this project the questionnaires are administered personally. The preliminary sample questionnaire is presented at the end of the report

CHAPTER 3

METHODOLOGY

CHAPTER 3

METHODOLOGY

3.1 Type of Project: Descriptive –Survey Type

The research concerned with finding out who, what, where, when or how much is a descriptive study. The descriptive studies are more formalized and have a structure with clearly stated hypothesis or investigative questions.

In this project to identify the factors affecting the commercialization of the product and to find the effect of relationship between Marketing department and Product development in the process of commercialization of the product.

Research study can take the form of casual or co relational investigation. A casual study is conducted to establish a definitive cause and effect relationship.
In this case the objective of the research is to delineate one or more factors that are causing the problem.

3.2 Target Respondents:

As previously mentioned, one of the main objective is to find out the effect of relationship between the Marketing Department and Product Development department, the target respondents are Executives and Staffs of the above two departments at M/S.Vaaraahi Embedded systems.

Since the number of respondents is 25, census method has been selected and no sampling is used.

3.3 Assumptions, constraints and Limitations:

- The employees have disclosed all the information honestly and correctly without any bias.
- The staff might not disclose all the details as they may hesitate to pinpoint the flaws in their own organization superiors.

3.4 Sampling methods:

Since the number of respondents is 25, census method has been selected and no sampling is used.

3.5 Tools for Analysis: Percentage analysis

In this project two tools are used for data analysis.

The first one is the Percentage analysis an the second one is the Hypothesis formulation and testing of Hypothesis using Chi- Square Test. The tools are explained briefly in the following section

Percentage analysis:

Using the percentage analysis the responses of the employees to each question are studied in detail and the various factors relating the conversion of an innovative idea in to a commercial product are studied and their significance in the particular organization is studied.

Chi –square method:

A **chi-square test** is any statistical hypothesis test in which the test statistic has a chi-square distribution when the null hypothesis is true, or any in which the probability distribution of the test statistic (assuming the null hypothesis is true) can be made to approximate a chi-square distribution as closely as desired by making the sample size large enough. This is a statistical method, used to test any hypothesis, when the sample is small.

In this method, a null Hypothesis is stated. A calculation is done, in each category on the assumption that the null hypothesis is correct. Thus for each observation, we shall have observed frequency and expected frequency. Then a level of significance is determined. Then the chi-square is calculated by using the following formula.

Chi square = $\sum (Oi-Ei)^2/Ei$

Where

i = 1 to K

Oi = observed frequency in the ith category.

Ei =Expected frequency in the ith category.

K - number of categories.

Then the number of degrees of freedom is calculated. For the specified level of significance, the critical or theoretical value of chi-square is found. The calculated value of chi-square is compared with the theoretical value and the region of rejection is determined. If the calculated value of chi-square is less than the theoretical value, then the null hypothesis is accepted. If on the other hand, the calculated value of chi-square is greater than the theoretical value, the null hypothesis is rejected.

Chapter 4

Data Analysis and Interpretation

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION:

4.1 Proposed Analysis (Statistical Tools) and Interpretation methodologies

In data analysis, different tools used which are explained below.

a) Percentage method:

It's the earliest and best method to analyze a given data. This method has been extensively used in this work.

Percentage was calculated with the help of the following formula,

Percentage = No of response/Sample size * 100

b) Chi-Square test:

The Chi-Square test is one of the simplest and most widely used non-parametric tests in statistical work. The quantity Chi-square describes the magnitude of the discrepancy between theory and observation,

The Chi-square test require following steps,

State the null hypothesis and calculate the number in each category if the null hypothesis is correct,

Determine the level of significance that is how much risk, the type of error the researcher is prepared to take. In this research, the researcher has selected 5% level of significance.

O – Refers to observed frequency

E – Refers to expected frequency

Determine the number of degree of freedom. For the specified level of significance and the degree of freedom find the criteria or theoretical value of

Degree of freedom = (R-1) * (C-1)

Where R=Number of rows

C=Number of columns

Compare the calculated value with the theoretical value and determine.

If the calculated value is less than the tabulated value Ho is accepted and H1 is rejected and vice-versa.

Please refer to Annexure 1 for the questionnaire.

4.2 Inferences and Diagrammatic Representations:

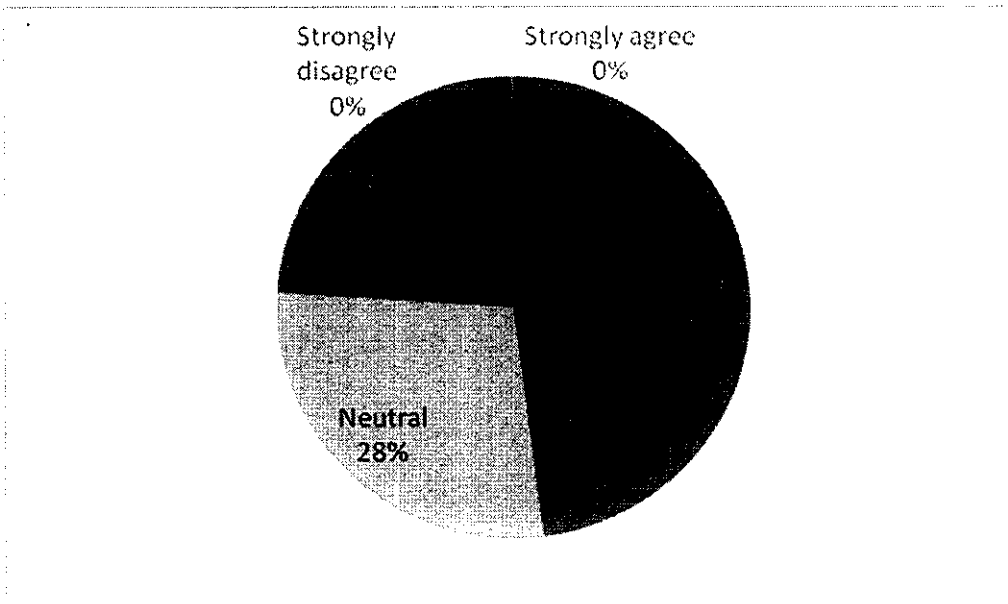
4.2.1 Percentage Analysis:

Marketing surveys strictly follows proven scientific techniques

Table 4.1:

	Number of responses	Percentage
Strongly agree	-	-
Agree	12	48
Neutral	7	28
Disagree	6	24
Strongly disagree	-	-

Figure 4.1:



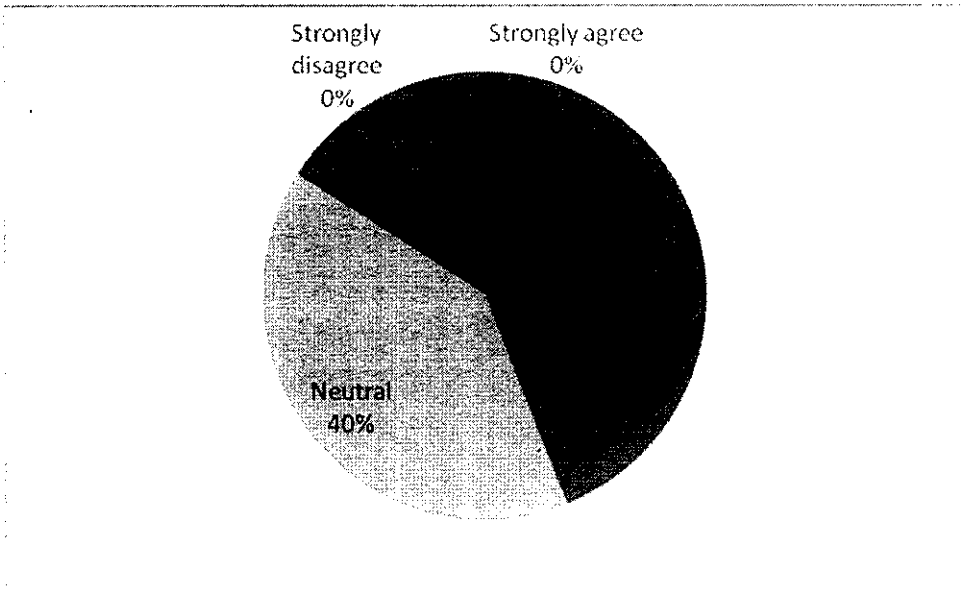
On analyzing this case, we could see that almost, an average of more than 50% of the people is on the other side. Neutral always indicates haziness in decision. This means that people in the company are not educated about the scientific Data collection methods. Upon training, people should greatly appreciate and knows the value of survey.

Marketing Department is very clear on the Product Road Map in terms of it's Launch and success

Table 4.2:

	Number of responses	Percentage
Strongly agree	-	-
Agree	11	44
Neutral	10	40
Disagree	4	16
Strongly disagree	-	-

Figure 4.2:



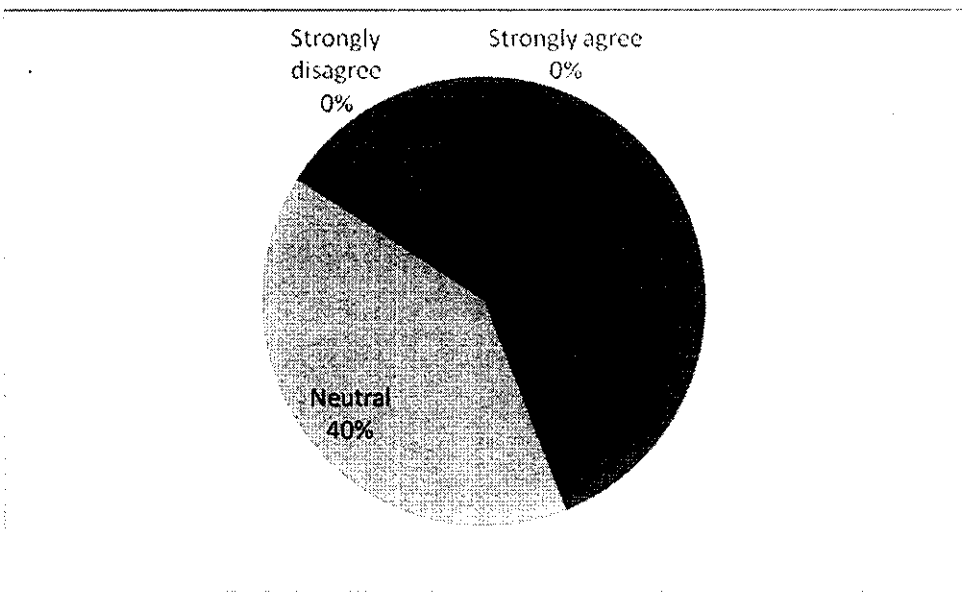
On analysis, we could see that 40% of the respondents are neutral, and 16% of the respondents don't agree with this statement. Again, on giving the benefit of doubt, people aren't very confident about the Marketing Department's Road Map. This is a very serious situation where Marketing team should be conscious about the perception that prevails across organization. Every attempt should be made to ensure that people are very clear about their moves and make them much more transparent.

Marketing Department was very clear about the Launch Dates of the product and it was communicated to PD right at the start

Table 4.3:

	Number of responses	Percentage
Strongly agree	2	8
Agree	18	72
Neutral	5	20
Disagree	-	-
Strongly disagree	-	-

Figure 4.3:



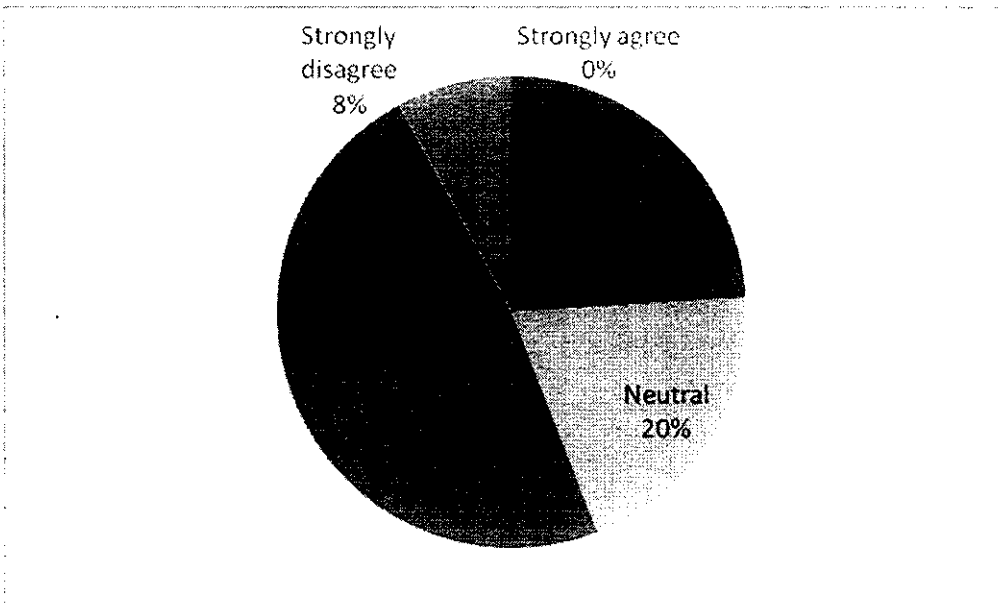
This very clearly indicates that Marketing Team was very focused and had plans for the product launch. This as well shows that the dates were communicated to the operations team, which actually helps in backward scheduling as a result of which your planning tends to be more accurate.

The requirement for a product in the market is well explained (in terms of its intended functionality, aesthetics etc) by the marketing team TO THE OPERTATIONS TEAM before the start of design.

Table 4.4:

	Number of responses	Percentage
Strongly agree	-	-
Agree	6	24
Neutral	5	20
Disagree	12	48
Strongly disagree	2	-

Figure 4.4:



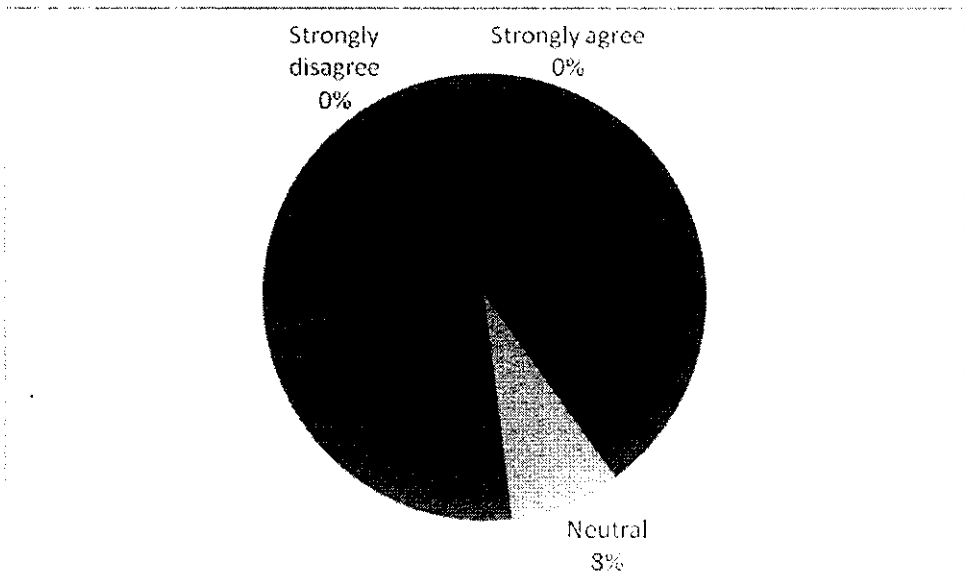
This is one of the questions which indicate , that there is a serious Process lapse. It clearly shows that people are not aware of the product that they make. Such a lapse would have its own serious effect during its final outcome. There should a process which should ensure that all people invloved in the project are aware of the results, what they make, how they make.Marketing team should ensure that the product is well explained as to what would be its role in the market. By doing this, a sense of ownership is being inculcated in the minds of people who work on it as a result of which we can expect more efficiency and ownership.

All the project proposal documents were clear and approved by Head of Departments and Head of the company

Table 4.5:

	Number of responses	Percentage
Strongly agree	-	-
Agree	10	40
Neutral	2	8
Disagree	13	52
Strongly disagree	-	-

Figure 4.5:



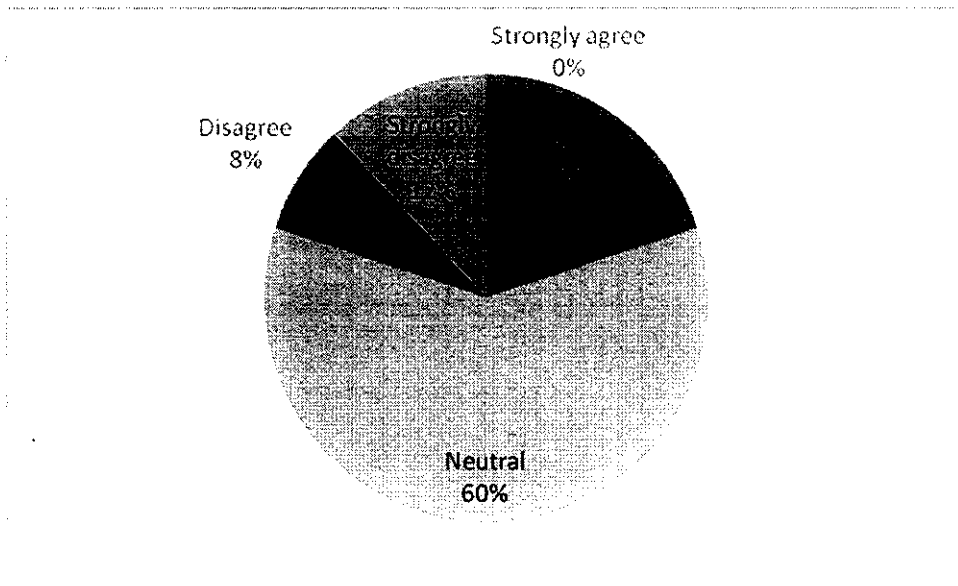
One another indicator, showing a process lapse. When a company is certified by quality bodies such as ISO, BVQI, they strongly suggest some documentation which actually is beneficial in tracking the whole product cycle and the ownership being spread across, which also ensures an effective communication. 52% of the respondents have clearly indicated that the document approval doesn't happen. If the management tries to revoke the product after investing a lot of time, we don't even have any document to show the Management acceptance. Hence a formal WORKFLOW DOCUMENTATION should be made available either through automated systems like PLM (Product Life Cycle Management) (or) at least manually.

All the Workmen involved are very clear of the final product design

Table 4.6:

	Number of responses	Percentage
Strongly agree	-	-
Agree	5	20
Neutral	15	60
Disagree	2	8
Strongly disagree	3	12

Figure 4.6:



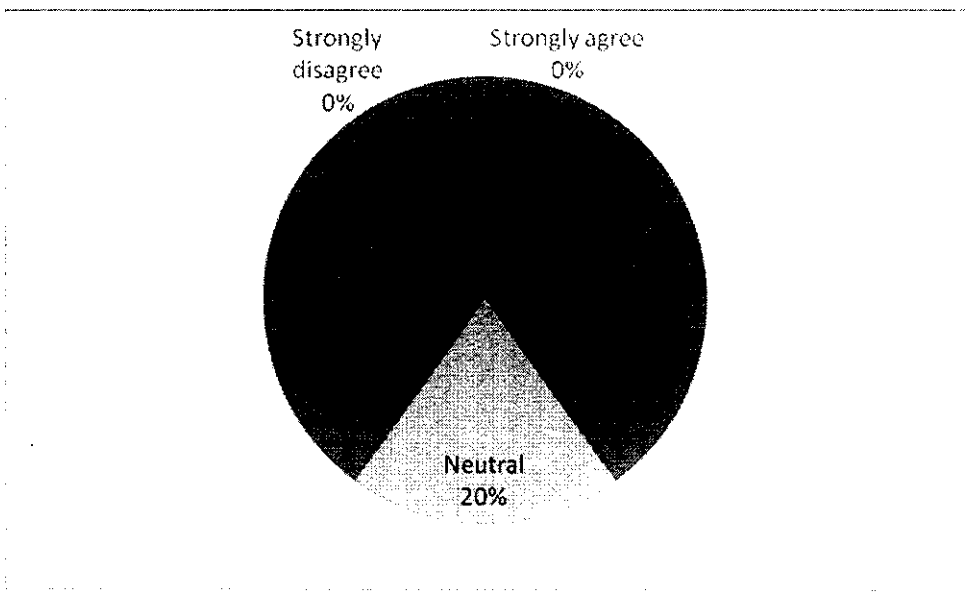
On analysis, this question again indicates, the lack of confidence among the respondents. Almost 60% of the people have a neutral view which explains that people aren't very confident about what is being wanted. Again, marketing needs to displaying portraits/pictures of the model what they perceive. A very typical example is NANO, where Tata ensured that the CAR model is displayed across the entire plant where it is made. Visualization becomes very easy in this case, as to how the product is going to shape out and ownership is emphasized. This is one of the indirect motivation techniques, where people take a lot of pride on the success of the product.

Frequent meetings are conducted between marketing and product development teams to update the status of the development.

Table 4.7:

	Number of responses	Percentage
Strongly agree	-	-
Agree	10	40
Neutral	5	20
Disagree	10	40
Strongly disagree	-	-

Figure 4.7:



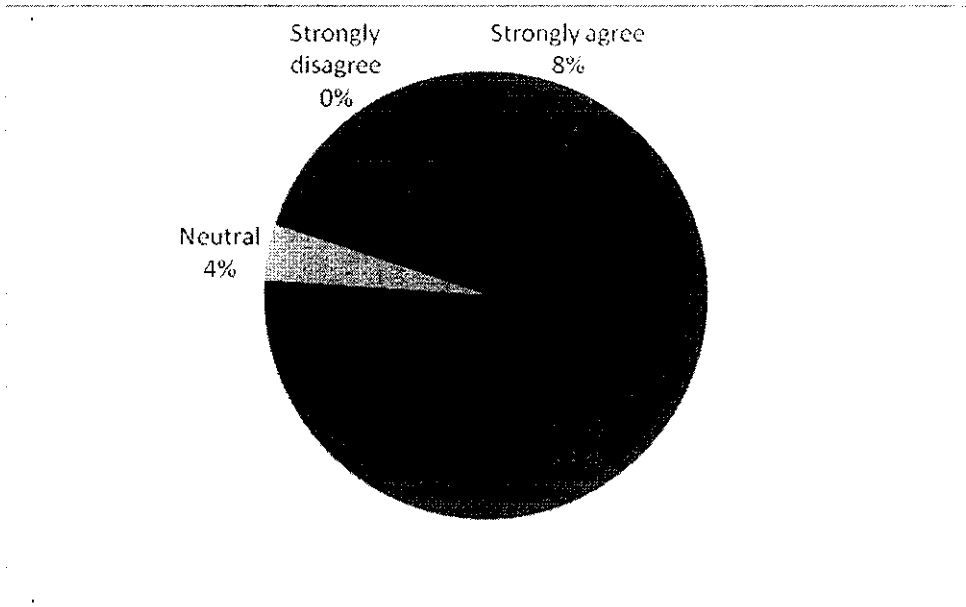
There is a balance in the number of people agreeing and disagreeing this. One another area where the company has to concentrate on a methodical way of communicating the outcomes of the meeting to all people involved. This is one of the positive steps, where by people get to know as to what are the major decisions being taken and effective communication keeps every body is on the same page.

The Initial Prototype is shown to Marketing and approvals are given by all HODs

Table 4.8:

	Number of responses	Percentage
Strongly agree	2	8
Agree	17	68
Neutral	1	4
Disagree	5	20
Strongly disagree	-	-

Figure 4.8:



One of the positive indicators, where by 68% of the people have agreed that all head of the departments know what is happening. This avoids a lot of conflicts.

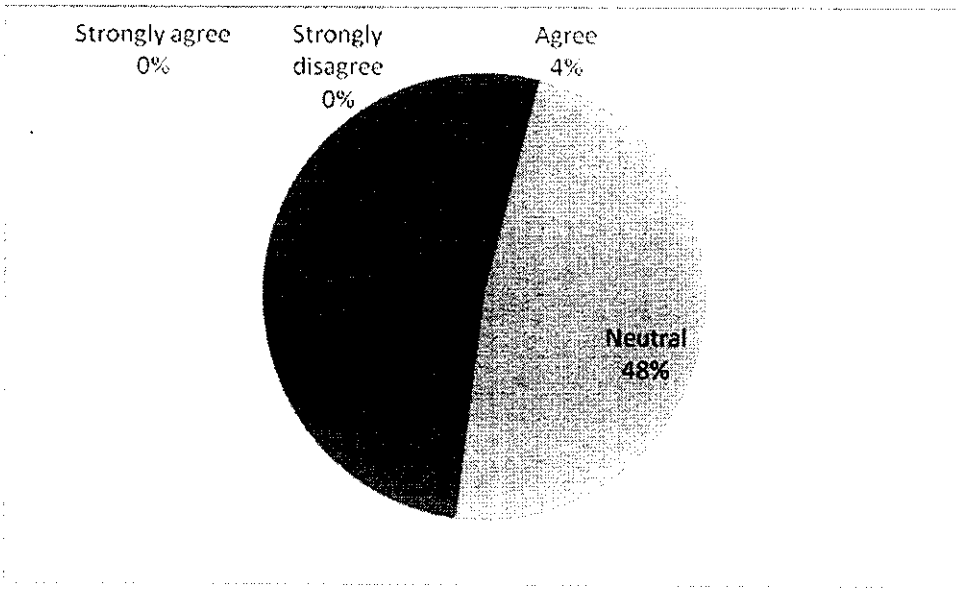
On the other hand, we could see that 20% of the respondents are disagreeing on the same fact. This process needs a little investigation, as to what exactly the respondents mean. This could have been due to the Transparency in communication. Those barriers needs to be found and eliminated

FMEA, QFD and DFSS is conducted at appropriate stages and Marketing Representative are involved in all these discussions

Table 4.9:

	Number of responses	Percentage
Strongly agree	-	-
Agree	1	4
Neutral	12	48
Disagree	12	48
Strongly disagree	-	-

Figure 4.9:



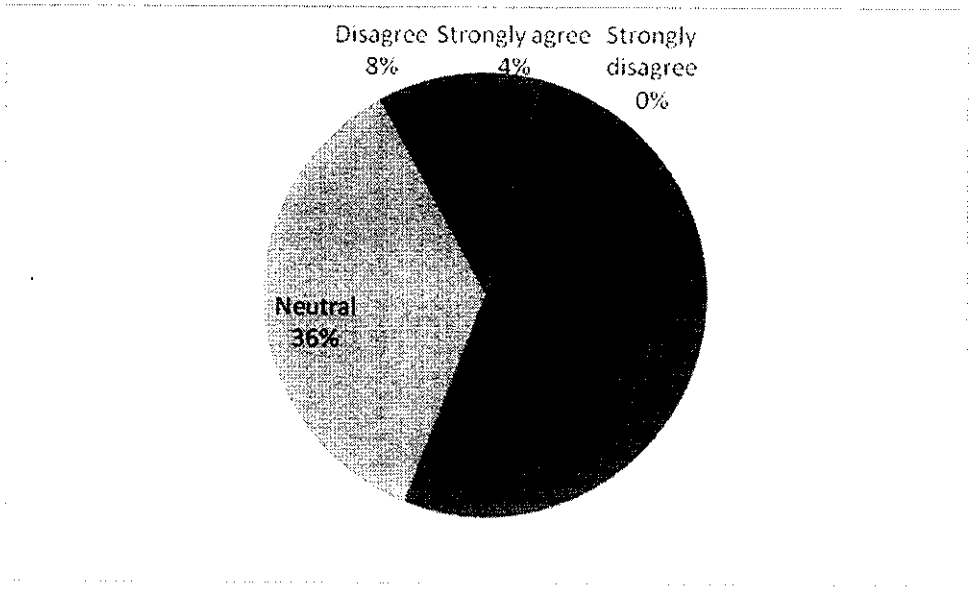
On analyzing the chart we can see that most of the people have disagreed. When you look at it, though the question may sound technical, a Marketing representative is definitely required in this stage. This is a particular phase of development, where in they identify a lot of "POT HOLES" in the project, evaluate them technically and find a feasible solution. There could be chances that the entire design, whatever was done till date, might get changed, where in this requires the consent of the marketing team. Hence, there should be a process wherein the Marketing Personnel is available during this process.

The "Factor of Safety" of the product is determined and is conveyed to Marketing for their approval

Table 4.10:

	Number of responses	Percentage
Strongly agree	1	4
Agree	13	52
Neutral	9	36
Disagree	2	8
Strongly disagree	-	-

Figure 4.10:



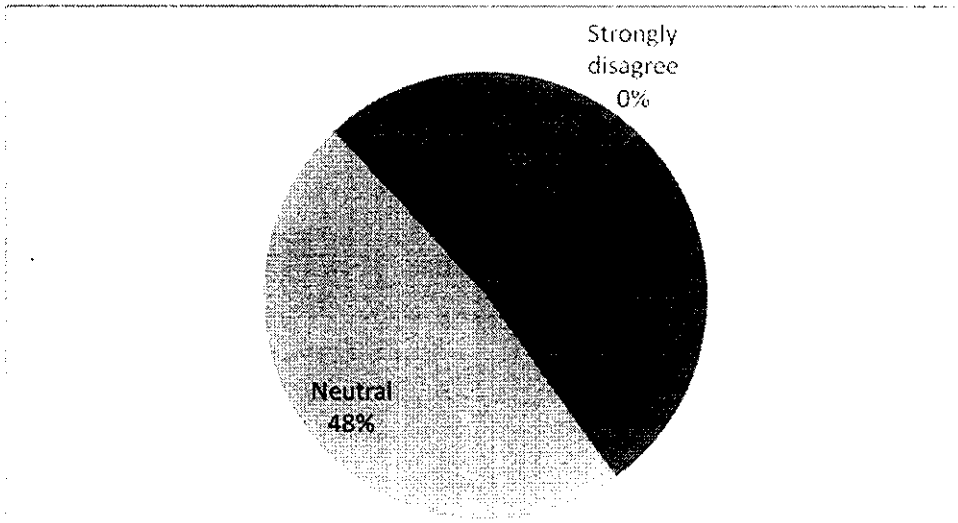
Factor of safety (**FoS**) can mean either the fraction of structural capability over that required, or a multiplier applied to the maximum expected load (force, torque, bending moment or a combination) to which a component or assembly will be subjected. The two senses of the term are completely different in that the first is a measure of the reliability of a particular design, while the second is a requirement imposed by law, standard, specification, contract or custom. Careful engineers refer to the first sense as a factor of safety, or, to be explicit, a realized factor of safety and the second sense as a **design factor**, but usage is inconsistent and confusing, so engineers need to be aware of both. The Factor of Safety is given to the engineer as a requirement. The Design Factor is calculated by the engineer. This would greatly help in designing a product which would have higher reliability

At each of the stage of PD, Marketing is involved and their Suggestions/Criticisms are taken into consideration during the next Iteration

Table 4.11:

	Number of responses	Percentage
Strongly agree	3	12
Agree	7	28
Neutral	12	48
Disagree	3	12
Strongly disagree	-	-

Figure 4.11:



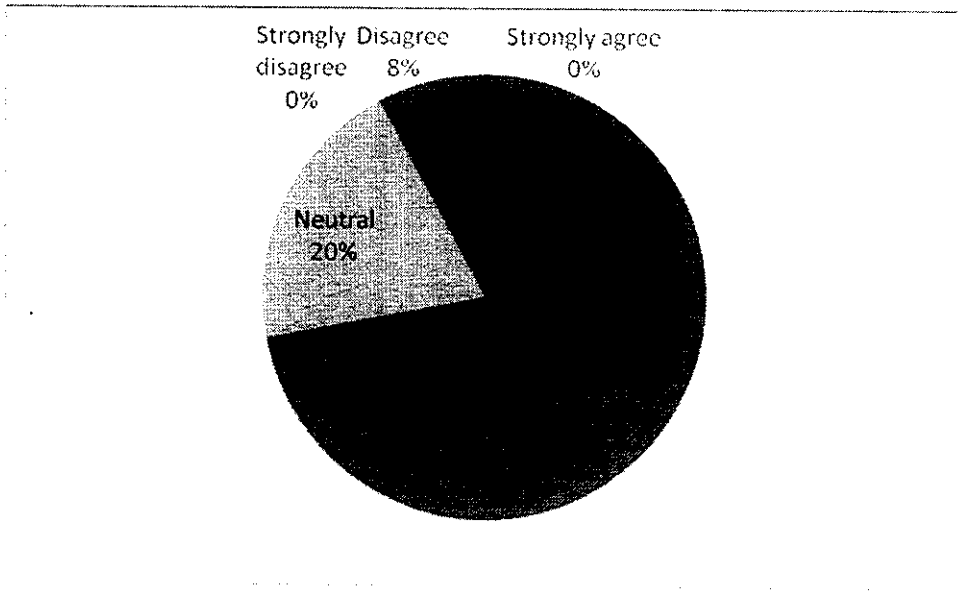
One of the very important things during Product evolution is including Marketing during every stage of product iteration. From the pie chart, we could see that this process has happened regularly which is an appreciable feature.

The Product Safety was taken into consideration and all statutory Approvals were strictly followed

Table 4.12:

	Number of responses	Percentage
Strongly agree	-	-
Agree	18	72
Neutral	5	20
Disagree	2	8
Strongly disagree	-	-

Figure 4.12:



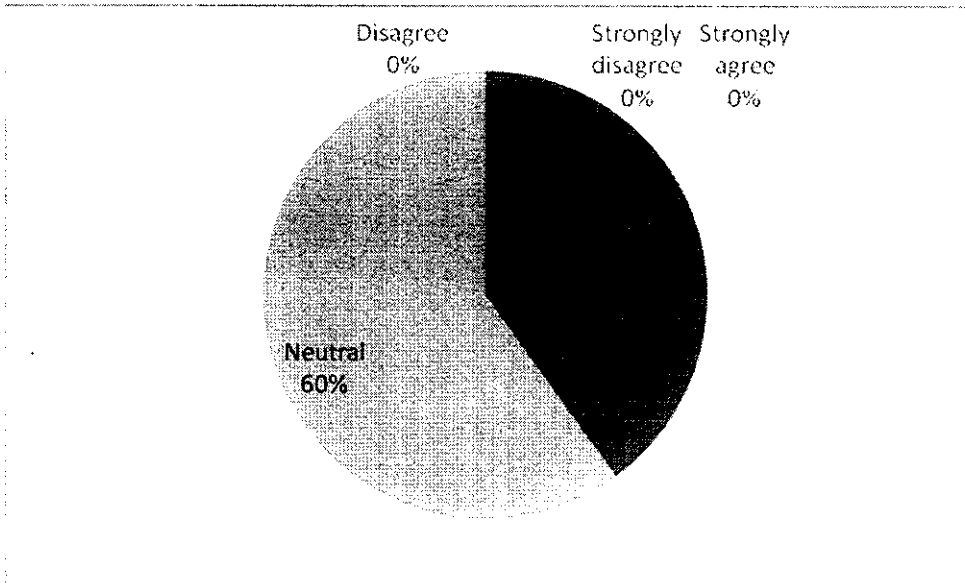
A product is better sold in the market only when it has a SAFETY MARK. Consumers are becoming increasingly conscious about the statutory approvals. Looking on the Pie-chart we can see that 72% of the respondents are conscious about statutory approvals, which is a healthy sign. Any product coming out of this team would definitely be safe.

The dates for Pilot Production are informed to marketing well ahead of time

Table 4.13:

	Number of responses	Percentage
Strongly agree	-	-
Agree	10	40
Neutral	15	60
Disagree	-	-
Strongly disagree	-	-

Figure 4.13:



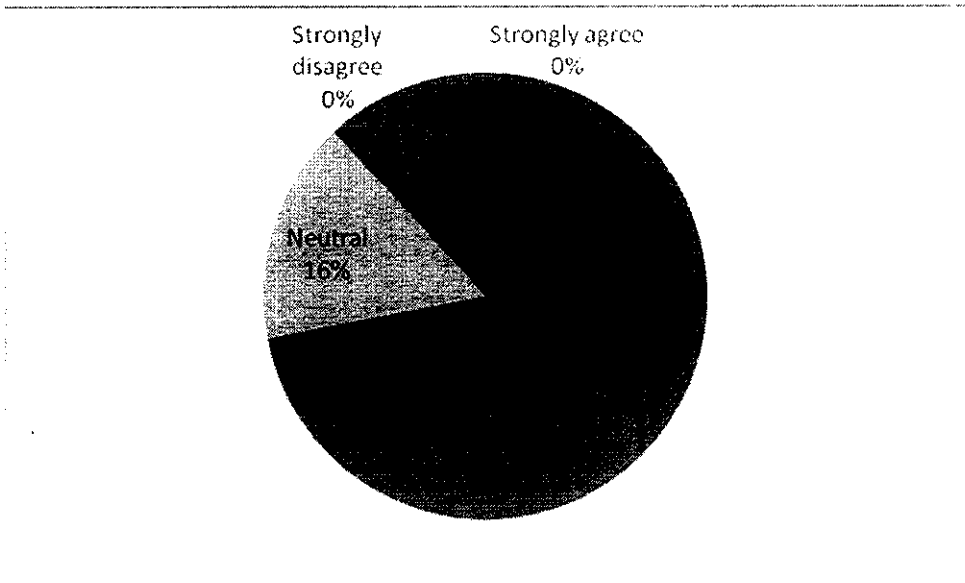
40% of people have agreed to the fact that Pilot Production dates are communicated. Since Pilot Batch is the very first batch of products after the sample-phase, where marketing would visually see the product and evaluate it against their expectation, it becomes mandatory for the Marketing team to be available during Pilot Production. On the other hand, 60% of the people are neutral about this fact and hence due weightage to be given to that factor as well.

Market feedback of the Pilot Product is made available to development

Table 4.14:

	Number of responses	Percentage
Strongly agree	-	-
Agree	18	72
Neutral	4	16
Disagree	3	12
Strongly disagree	-	-

Figure 4.14:



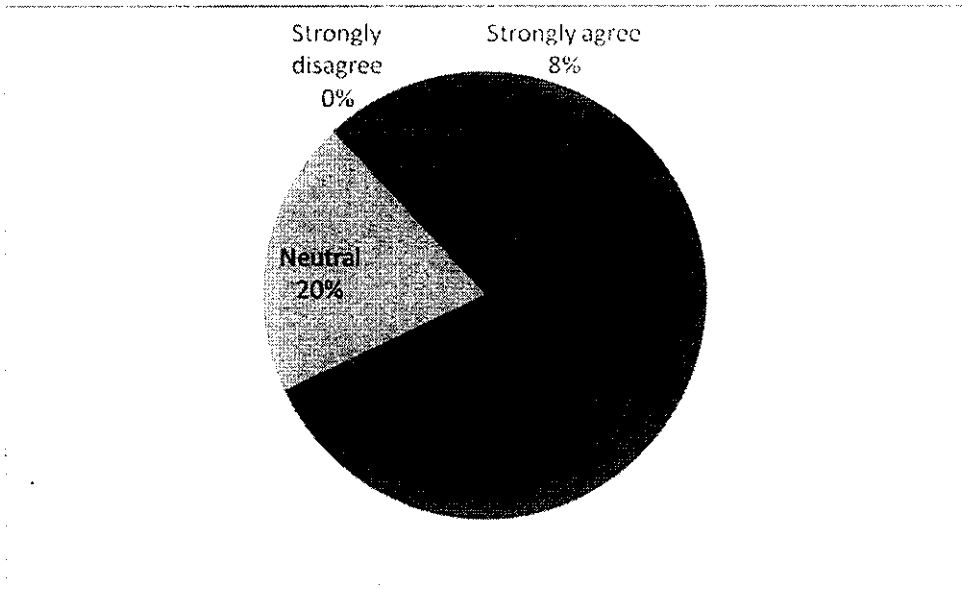
This factor is to be considered very important as this serves as a feedback mechanism and a sense of motivation. The feedback as such completes the loop, with the operations team, which is a positive sign and a kind of motivation. At the same time, the operations team can get it better during the next better, if there were criticisms.

The design for the Supplements (like Cartons, Pamphlets) are taken into consideration and Prior Marketing approvals are obtained

Table 4.15:

	Number of responses	Percentage
Strongly agree	2	8
Agree	15	60
Neutral	5	20
Disagree	3	12
Strongly disagree	-	-

Figure 4.15:



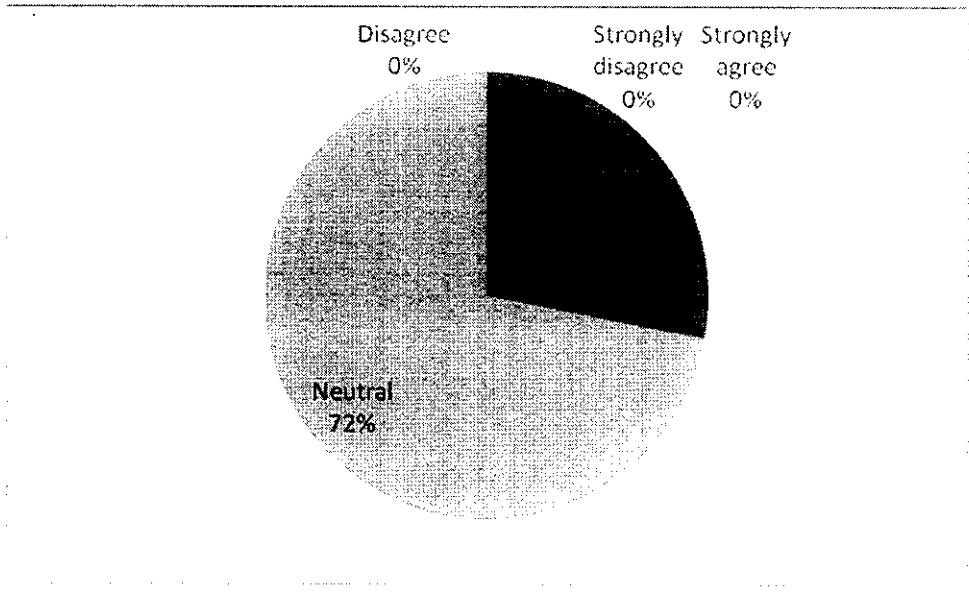
Aesthetics play an important role in the sale of the product. It's natural that people get attracted towards a product that has exquisite external appearance. Hence depending on the size of the product, we need to design the packaging stuffs, which play an important role in taking the product to the market. 60% of people have agreed that design approval is being got. Hence this is a positive sign. Anyways, we need to evaluate the rest of the 12%, as to what they find as a deficiency.

Pilot Production of the product is always a great success and the expectations of the Marketing team are fully met

Table 4.16:

	Number of responses	Percentage
Strongly agree	-	-
Agree	7	28
Neutral	18	72
Disagree	-	-
Strongly disagree	-	-

Figure 4.16:



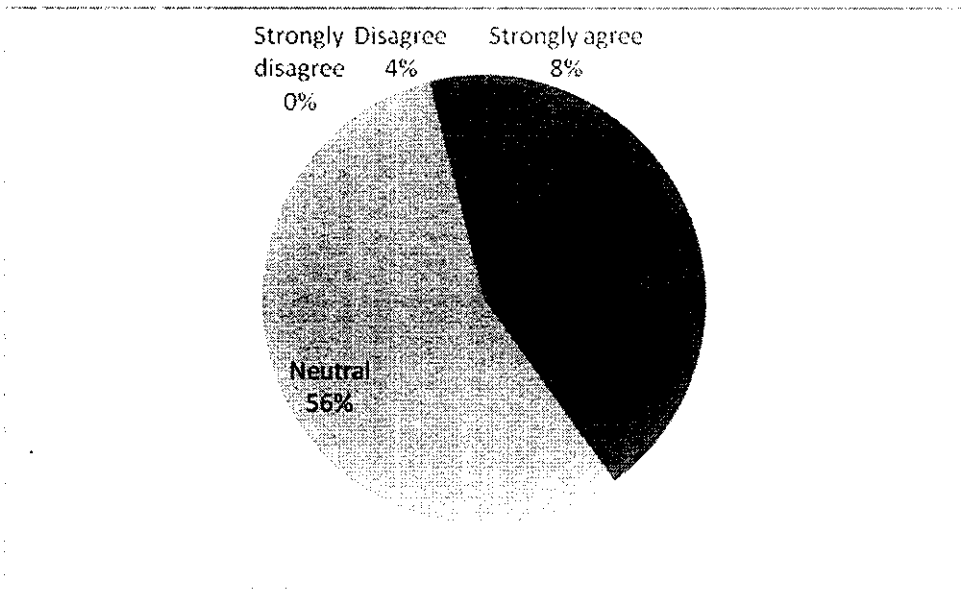
The response we would have in this case is either an agree (or) Strongly agree because all the hardwork put in by design and Manufacturing team gets reflected only with the Pilot Production's success. 72% of the respondents being Neutral indicates that it's a mixed bag. We should study and analyze as to which goes wrong , and definitely take appropriate steps in attacking this. Few of the respondents have felt major changes are being communicated only during the Pilot Production, which is a detrimental sign. As such this is just a stage ahead of production and when something goes wrong here, eventually delays the launch of the product. The failure of launch on the date committed always leaves a bad impression with the consumers awaiting the product.

Marketing is satisfied with the Product output

Fig 4.17:

	Number of responses	Percentage
Strongly agree	2	8
Agree	8	32
Neutral	14	56
Disagree	1	4
Strongly disagree	-	-

Figure 4.17:



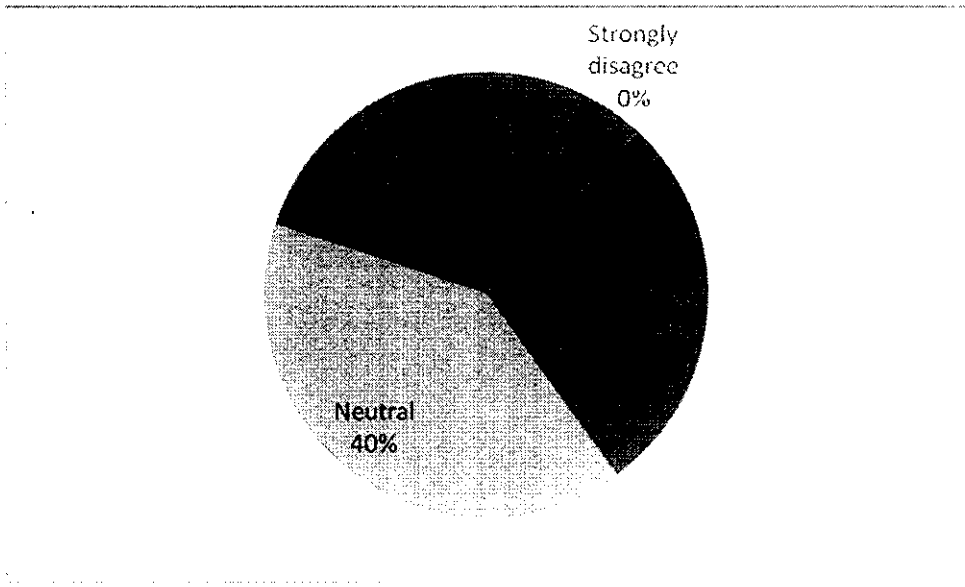
People are very neutral with 56% of the respondents not sure of the fact that whether the marketing is satisfied or not which isn't a healthy sign. We would have to strongly evaluate the process followed during development and ensure that this percentage moves towards the "Agree" band.

Cost Analysis of the product is done once after the Pilot Production and marketing are involved during the exercise

Table 4.18:

	Number of responses	Percentage
Strongly agree	3	12
Agree	7	28
Neutral	10	40
Disagree	5	20
Strongly disagree	-	-

Figure 4.18:



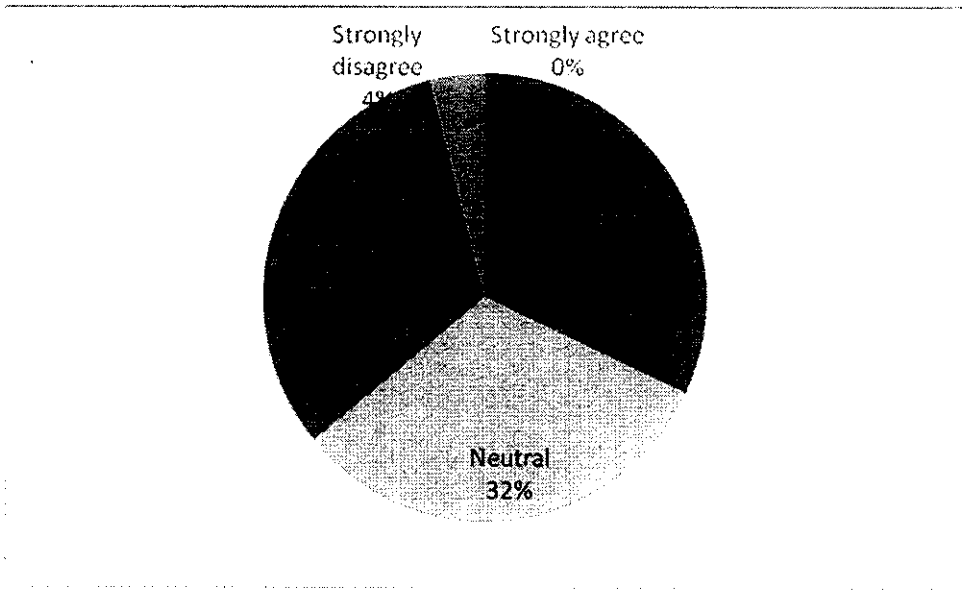
The most important of all is "Money". The Money that flows into the product from the RM to the packaging is rolled up to form the COST. The cost determines the price, which in turn speaks about the success of the product in the market. In general a cost analysis is done during the very initial phase in order to look into the feasibility of continued success. The initial costing is evaluated against the product in hand and ensures that the cost computed during the design stage still holds good. 40% of Neutral response indicates that people aren't confident about the same. This is a serious concern and needs to be addressed, where every one involved should know the costing details.

The Pilot Lot is put under statutory testing and the samples are sent for Statutory Approvals (like ISI, CE Marking etc)

Table 4.19:

	Number of responses	Percentage
Strongly agree	-	-
Agree	8	32
Neutral	8	32
Disagree	8	32
Strongly disagree	1	4

Figure 4.19:



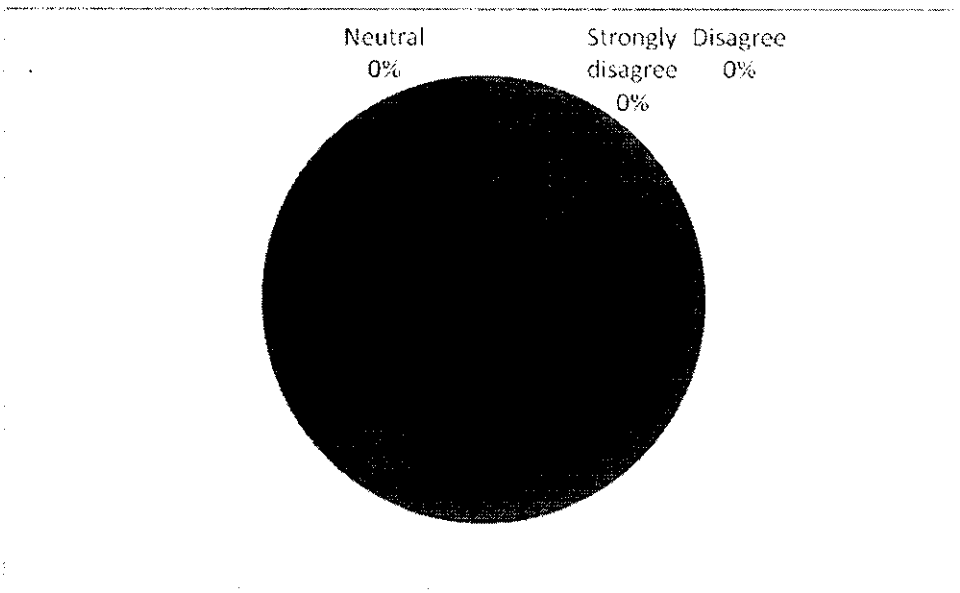
Though this is a mandatory process, we could see 32% of respondents have disagreed to the fact. One another factor which indicates a flaw/lack in process. The QA in charge should take appropriate steps in ensuring that this is getting done and all concerned development people need to aware of this.

Operations or product development assisted marketing during the Product launch

Table 4.20:

	Number of responses	Percentage
Strongly agree	4	16
Agree	21	84
Neutral	-	-
Disagree	-	-
Strongly disagree	-	-

Figure 4.20:



A leading success factor, which says that there was sync between Marketing and Operations, which is very much essential.

4.2.2 Chi- square test - Hypothesis testing

Consider the following table 4.21

Table 4.21: Synergy between product development and Marketing department

The requirement for a product in the market is well explained (in terms of its intended functionality, aesthetics etc) by the marketing team TO THE OPERTATIONS TEAM before the start of design.

	Marketing Department	**Product development**
Strongly agree	0	0
Agree	4	2
Neutral	2	3
Disagree	5	7
Strongly disagree	2	0

The above table shows the response given by Marketing and Product development Employees for the statement shown. By using Chi Square test, the communication and interaction level between marketing and product development team can be derived.
The null hypothesis for the statement is
The synergy and interaction link between Marketing and Product development team is low.

For this let us have a significance level of 5%. This indicates that in a long run, the risk of making a wrong decision is 5 %that is one is likely to be wrong in accepting a false hypothesis or in rejecting a true hypothesis on 5 out of 100 occasions. Since the sample is small, let us choose a chi-square test for evaluation of calculations in testing the hypothesis. For proceeding with the chi-square test, we have to find the row total and the column total of the above table. This leads to the following table.

Table 4.22: Chi square Table

	Marketing Department	**Product development**	**Total**
Strongly agree	0	0	0
Agree	4	2	6
Neutral	2	3	5
Disagree	5	7	12
Strongly disagree	2	0	2
Total	13	12	25

Chi square = $\sum (Oi-Ei)^2/Ei$

Where

i = 1 to K

Oi = observed frequency in the ith category.

Ei =Expected frequency in the ith category.

K number of categories.

Let us find Ei

E11= 0*13/25 = 0

E12= 0*12/25 = 0

Similarly,

E21= 6*(13/25) = 3.12

E22= 6*(12/25) = 2.88

E31= 5*(13/25) = 2.60

E32= 5*(12/25) = 2.40

E41= 12*(13/25) = 6.24

E42= 12*(12/25) = 5.76

E51 = 2*(13/25) = 1.04

E52 = 2*(12/25) = 0.96

Table 4.23: Chi square calculation Table:

Oi	Ei	Oi – Ei	(Oi – Ei)^2	{ (Oi – Ei)^2 } / Ei
0	0	0	0	0
0	0	0	0	0
4	3.12	0.88	0.774	0.249
2	2.18	-0.18	0.324	0.149
2	2.60	-0.60	0.36	0.138
3	2.40	0.60	0.36	0.150
5	6.24	-1.24	1.538	0.246
7	5.76	1.24	1.538	0.267
2	1.04	0.96	0.922	0.880
0	0.96	-0.96	0.922	0.960
		Chi square =		3.039

Thus it is seen that the calculated value of Chi-square is 3.039

The degrees of Freedom in this study are = (r-1) * (c-1)

Where

r =number of Rows

c = number of columns.

Hence the Degrees of freedom = (5-1) (2-1)

= 4* 1 = 4.

Hence Degrees of freedom = 4.

We have taken $\alpha = 0.05$ (5% level of significance).

Tabulated value = 9.488

Since the calculated value is less than tabulated value, the null hypothesis is accepted.

Inference:

The synergy and interaction link between Marketing and Product development team is low.

Table 4.24: Process flow within the organization

FMEA, QFD and DFSS is conducted at appropriate stages and Marketing Representative are involved in all these discussions

	Marketing Department	**Product development**
Strongly agree	0	0
Agree	1	0
Neutral	7	5
Disagree	5	7
Strongly disagree	0	0

The above table shows the response given by Marketing and Product development Employees for the statement shown. By using Chi Square test, the process flow and the level of the scientific approach towards the processes within the organization can be evaluated.

The null hypothesis for the statement is

The organization does not use scientific and systematic approach for processes and process flow is not well connected.

For this let us have a significance level of 5%. This indicates that in a long run, the risk of making a wrong decision is 5 %that is one is likely to be wrong in accepting a false hypothesis or in rejecting a true hypothesis on 5 out of 100 occasions. Since the sample is small, let us choose a chi-square test for evaluation of calculations in testing the hypothesis. For proceeding with the chi-square test, we have to find the row total and the column total of the above table. This leads to the following table.

Table 4.25: Chi square table:

	Marketing Department	Product development	Total
Strongly agree	0	0	0
Agree	1	0	1
Neutral	7	5	12
Disagree	5	7	12
Strongly disagree	0	0	0
Total	13	12	25

Chi square = $\sum (Oi-Ei)^2/Ei$

Where

i = 1 to K

Oi = observed frequency in the ith category.

Ei =Expected frequency in the ith category.

K number of categories.

Let us find Ei

E11= 0*13/25 = 0

E12= 0*12/25 = 0

Similarly,

E21= 1*(13/25) = 0.52

E22= 1*(12/25) = 0.48

E31= 12*(13/25) =6.24

E32= 12*(12/25) = 5.76

E41= 12*(13/25) = 6.24

E42= 12*(12/25) = 5.76

E51 = 0*(13/25) = 0

E52 = 0*(12/25) = 0

Table 4.26: Chi square calculation Table:

Oi	Ei	Oi – Ei	(Oi – Ei)^2	{ (Oi – Ei)^2 } / Ei
0	0	0	0	0
0	0	0	0	0
1	0.52	0.48	0.2304	0.45
0	0.48	-0.48	0.2304	0.48
4	6.24	-2.24	5.0176	0.8041
8	5.76	2.24	5.0176	0.8711
4	6.24	-2.24	5.0176	0.8041
8	5.76	2.24	5.0176	0.8711
0	0	0	0	0
0	0	0	0	0
Chi square =				4.284

Thus it is seen that the calculated value of Chi-square is 4.284

The degrees of Freedom in this study is = (r-1)(c-1)

Where

r =number of Rows

c = number of coloumns.

Hence the Degrees of freedom = (5-1) (2-1)

= 4* 1 = 4.

Hence Degrees of freedom = 4.

We have taken $\alpha = 0.05$ (5% level of significance).

Tabulated value = 9.488

Since the calculated value is less than tabulated value, the null hypothesis is accepted.

Inference:

The organization does not use scientific and systematic approach for processes and process flow is not well connected.

Chapter 5

Conclusion

CHAPTER 5

CONCLUSION

5.1 SUMMARY OF FINDINGS:

Though the over all picture looks good, there needs a lot of process improvement.

From the study the following factors are found to be healthy and well managed by the organization.

- Scientific techniques are used by the marketing department for surveys. (Ref:Table 4.21)
- All the project proposal documents are clear and HODs are aware of the same. (Ref:Table 4.5)
- Product development assists the marketing during the product launch. (Ref: Table 4.20)

Also from the study the following phenomenon can also be observed.

The synergy between the Product development and Marketing department is good only at the time of product launch or at post product launch

(Ref: Chi-Square test)

- The marketing department did not explain the requirement of the product to the development team at the initial phase of the design. The marketing department is accountable for this communication gap. (Ref: Table 4.4)
- Also the product development did not involve the marketing development during the development phase and the suggestions and criticisms of marketing department have not been evaluated by Development team. (Ref: Table 4.9, 4.11)

The organization does not use scientific and systematic approach for processes and process flow is not well connected.

(Ref: Chi-Square test)

5.2 SUGGESTIONS AND RECOMMENDATIONS:

The Organization can improve the work flow by **implementing** some automated systems like **PLM**

- **De centralization of Power and ownership**. In lot of questions, we could find that the sense of ownership is missing. Hence we need to have a project sponsor and a Project Manager who can be held responsible for the overall success

- **Transparency in communication**: Irrespective of levels, there should be a transparency in communication when ever an important decision is made. Also, there should be a dash-board for measuring the project advancement.

5.3 CONCLUSION:

The study reveals that there needs to be a lot synergy between the Marketing and the Product development team. Effective communication and process adoption are supposed to be most important and key factors which govern the project and make it an ultimate success.

5.4 DIRECTIONS FOR FUTURE RESEARCH:

The present analysis is done in manufacturing industry. The same study can be done in a service industry and the factors affecting the conversion of an innovative idea in to commercial service can be studied.

Annexure 1

Sample Questionnaire

Annexure 1

Sl.no	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	Marketing Surveys strictly followed proven Scientific Techniques.					
2	Marketing Department was very clear on the Product Road Map in terms of it's Launch and success					
3	Marketing Department was very clear about the Launch Dates of the product and it was communicated to PD right at the start					
4	The requirement for such a product in the market was well explained (in terms of its intended functionality, aesthetics etc) by the marketing team TO THE OPERTATIONS TEAM before the start of design.					
5	All the project proposal documents were clear and approved by Head of Departments and Head of the company.					
6	All the Workmen involved were very clear of the final product design					

Sl.no	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
7	Frequent meetings were conducted between marketing and product development teams to update the status of the development.					
8	The Initial Prototype was shown to the Marketing and approvals were given by all HODs					
9	FMEA , QFD and DFSS was conducted at appropriate stages and Marketing Representative was involved in all these discussions					
10	The "Factor of Safety" of the product was determined and was conveyed to Marketing for their approval					
11	At each of the stage of PD, Marketing was involved and their Suggestions/Criticisms were taken into consideration during the next Iteration					
12	The Product Safety was taken into consideration and all statutory Approvals were strictly followed					
13	The dates for Pilot Production was informed to marketing well ahead of time					

Sl.no	Questions	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
14	Market feedback of the Pilot Product was made available to development					
15	The design for the Supplements (like Cartons, Pamphlets) were taken into consideration and Prior Marketing approvals were obtained					
16	Pilot Production of the product was a great success and the expectations of the Marketing team were fully met					
17	Marketing was satisfied with the Product output					
18	Cost Analysis of the product was done once after the Pilot Production and marketing was involved during the exercise					
19	The Pilot Lot was put under statutory testing and the samples were sent for Statutory Approvals (like ISI,CE Marking etc)					
20	Operations or product development assisted marketing during the Product launch					

REFERENCES

REFERENCES

1. Daniel Goleman, *EMOTIONAL INTELLIGENCE,* Bantam Books
2. Gerald, Hignite, Mike and Udell (April 2007), *Journal of Applied management and Entrepreneurship*
3. IPtoolBox, www.iptoolbox.com
4. Kalypso Services Product Commercialization, www.kalypso.com
5. Product Development System and Solutions, www.pdss.com
6. www.freepatentonline.com
7. www.megaessays.com