The Use of Marketing Research During NPD Process

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Preface:

This document is written as our theses for:
Master of science in Industrial marketing at the Division of Industrial Marketing and e-Commerce at Lulea University of Technology. The work during this thesis has provided us to gain better understanding of the role of Marketing Research during New Product Development used in IKCo (Iran Khodro Company), the biggest car manufacturer in middle east, as a case study and increased skills regarding academic and scientific writing.

We would like to show our sincere gratitude and appreciation to the people that have helped us during the process of writing, making this thesis possible. First of all, we would like to thank our supervisor Professor Salehi Sangari for his support and committed guidance. Furthermore, we want to thank Professor Abili who provided us with support and advice during the phase of the writing and guided us in the area of methodology of the thesis. We would also like to thank IKCo R&D and Sales departments that have taken the time to participate in our research. Without them, this thesis would not have been possible to complete.

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Abstract:

This Thesis aims to study the use of marketing research though IKCo’s new product development process. By exploring, describing and somewhat explaining IKCo’s objective of marketing research during new product development (NPD) process as well as how this process should be implementing with comparison of the literature review and also based on view points of interviewee.

Three major finding was made. Firstly, The IKCo’s new product development has not well developed based on the information achieved from marketing research. Secondly, IKCo’s managers accept that marketing research is an essential tool for new product development success. Thirdly, today IKCo mostly use marketing research as a sales and marketing support system during some of NPD phases, which should be revised to cover the whole process of new product development.
Chapter 1: INTRODUCTION

1. Introduction ................................................................. 8
2. Backgrounds and General Problem .................................... 8
3. Research Objective .......................................................... 12
4. Research Question .......................................................... 12
5. Demarcations ................................................................. 13
6. Structure of the Study ........................................................ 13
7. Chapter Summary ............................................................ 13

Chapter 2: LITERATURE REVIEW

1. Introduction ........................................................................ 14
2. New product development .................................................... 14
   2-1- Definitions of New Product Development (NPD) ............... 14
   2-2- New product development process (NPD Process) .......... 16
   2-3- Benefit of Stage-gate process for NPD Projects ............... 17
   2-4- Stages of NPD Process .................................................. 17
   2-5- Decision Points (Gates) in NPD Process ......................... 18
   2-6- Objective and Detail Actions for decision making in NPD process 20
      2-6-1- Ideation (Stage 0) .................................................. 20
      2-6-2- First decision: Idea Screen (Gate 1) ......................... 21
      2-6-3- Preliminary Investigation (Stage 1) ........................... 21
      2-6-4- Second decision: Second Screen (Gate 2) ................. 21
      2-6-5- Detail Investigation (Stage 2) ................................... 22
      2-6-6- Third decision: Go to Development (Gate 3) .............. 22
      2-6-7- Development (Stage 3) ......................................... 22
      2-6-8- Forth decision: Go to testing (Gate 4) ....................... 23
      2-6-9- Testing and Validation (Stage 4) .............................. 23
      2-6-10- Fifth decision: Go to Launch (Gate 5) ...................... 23
      2-6-11- Full Production and Market Launch (Stage 5) .......... 24
      2-6-12- Post Launch Review ............................................ 24
   2-7- Project Works in NPD process stages ............................. 25
Chapter 3: THEORETICAL FRAME OF REFERENCE

1. Introduction................................................................. 45
2. Conceptualization.......................................................... 45
2-1- Stages and decision points in NPD process. ......................... 45
2-2- Classification and different types of marketing research .......... 46
2-3- The use of marketing research in NPD. ............................ 47
3. Emerged Frame of Reference............................................ 51
4- Chapter Summery ............................................................ 51

Chapter 4: Methodology

1. Introduction........................................................................ 52
2. Research Propose........................................................... 53
3. Research approach ......................................................... 53
4. Research Strategy .......................................................... 54
5. Data Collection Method .................................................. 55
6. Sample Selection .......................................................... 57
7. Analysis of Data .......................................................... 58
8 – Quality Standards: Reliability and Validity .......................... 58
9- Chapter Summery ............................................................ 59
Chapter 5: Data Collection

1. Introduction ........................................................................................................ 59
2. IKCo’s Product Development Process (PDP) .................................................... 59
3. PDP Phases ........................................................................................................... 63
4. PDP Gateways ..................................................................................................... 69
5. Automotive Consumer Clinic ............................................................................ 67
6. IKCo’s Sales and After Sales department comments ...................................... 71
7. IKCo’s R&D Center comments .......................................................................... 76
8. Chapter Summary ............................................................................................... 79

Chapter 6: Data Analysis

1. Introduction ........................................................................................................ 79
2. Stages of new car development process in IKCo .............................................. 79
3. Decision-making points of each stage in NPD of IKCo .................................... 83
4. Marketing research in NPD stages for decision-making points ................... 87
5. Type of marketing research for stages or decision-making points ........... 88
6. Chapter Summary ............................................................................................... 94

Chapter 7: Conclusion

1. Introduction ........................................................................................................ 94
2. Conclusion .......................................................................................................... 94
3. Recommendation for management .................................................................. 100
4. Recommendation for further study .................................................................. 100

Appendix:

Appendix A ........................................................................................................... 102
Appendix B ........................................................................................................... 103
Appendix C ........................................................................................................... 104
Appendix D ........................................................................................................... 106
References .......................................................................................................... 107
List of Tables:

Table 2-1: Project Works in NPD process stages ........................................... 25
Table 2-2: Exploratory and conclusive research ................................. 31
Table 2-3: Basic research designs comparison ..................................... 33
Table 2-4: Qualitative Marketing Research ............................................. 34
Table 2-5: Quantitative Marketing Research ............................................. 37
Table 2-6: continuum of market information ......................... 38
Table 2-7: classification of market information in NPD ..................... 39
Table 2-8: The typical four decision-making activities ......................... 40
Table 2-9: the inputs and outputs of the NPD ...................................... 41
Table 2-10: The role of market research in the portfolio management ...... 42
Table 2-11: The use of market research in the identification of opportunities 42
Table 2-12: The use of market research to define and test product concept 43
Table 2-13: The use of market research as support in NPD .................. 43
Table 3-1: Exploratory and confirmatory market research techniques ....... 49
Table 3-2: The marketing research methods -Identification of opportunities 49
Table 3-3: The marketing research methods - Concept definition and test ...50
Table 3-4: The marketing research methods - Product and process development .................................................................................. 50
Table 4-1: Relevant situations for different Research Strategies .......... 55
Table 4.2: the strengths and the weaknesses of evidences ................. 56
Table 5-1: The TRAFFIC LIGHT system ................................................. 63
Table 6-1: Comparison Table ................................................................. 83
Table 6-2: Gateways Comparison Table ................................................... 86
Table 6-3: Marketing Research Comparison ........................................... 89
Table 6-4: Marketing Research Method Comparison Table ..................... 94
List of Figures:

Figure 2-1: Funnel view of NPD ….................................................................16
Figure 2-2: General position of stages in NPD………………………….. 17
Figure 2-3: Simplified approach process for product development ……….. 18
Figure 2-4: Decision points …................................................................. 19
Figure 2-5: A Stage Gate Approach ….................................................. 19
Figure 2-6: A stage-gate process …....................................................... 20
Figure 2-7: A NPD typical phases and marketing research steps…………… 30
Figure 2-8: Marketing research classification…………………………….. 32
Figure 2-9: Qualitative researches …...................................................... 34
Figure 2-10: Quantitative marketing researches……………………………..37
Figure 3-1: Stages & decision points in new product development process. 53
Figure 5-1: The PDP different Level ….................................................. 61
Figure 5-2: The PDP Main Process………………………………………… 64
Figure 5-3: The Gateway Regime …....................................................... 66
Figure 5-4: The PDP Program Time Scaling …...................................... 68
Figure 5-5: The Clinics in NPD ….......................................................... 71
Figure 5-6: Customer Feedback during PDP …...................................... 77
Figure 5-7: Decreasing Lead-time for NPD …...................................... 78
Figure 5-8: PDP deliverables ….............................................................. 78
Figure 6-1: Gateways Comparison ….................................................... 87
Figure 6-2: Marketing Research Comparison …................................... 89
Figure 6-3: Marketing Research types …............................................. 92
Figure 7-1: PDP decision-making points ….......................................... 98
Figure 7-2: PDP marketing research points …...................................... 99
Figure 7-3: PDP marketing research type …....................................... 100
INTRODUCTION

1-Introduction

The entire business environment is experiencing major global changes that have a direct impact on companies and their consumers. Competition is intensifying and generating changes in the way that consumers make purchase decision. Nowadays, the marketing research is the essential activity in large and small companies, which managers avoid to make decision without it. On the other hand, these companies need to develop new products or modify the current products in order to remain in the market and retain their market share. New product success almost always is linked to an understanding of customers’ needs and wants. In fact, evidence suggests that new product failure often can be attributed to a lack of marketing research. [Ref. 2] Information plays a key role in reducing new product development (NPD) failure and thus increasing new product development (NPD) success. [Ref. 3] One of the most important of this information refers to marketing issues. Companies use marketing research to achieve different information about the market.

2-Background and General Problem

Marketing research is a continuous process for gathering data on product characteristics, suppliers’ capabilities and the business practices that surround them plus the analysis of that data to make acquisition decisions. [Ref. 9] Marketing decision in contemporary organizations are some of the most important decisions made by managers. The decisions of what consumer segments to serve with what products or services, at what prices, through which channels, and with what type and amounts of promotion not only determine the marketing posture of a firm, but also affect decisions in other areas as well. The decision to emphasize quality products, for instance, affects decisions on procurement, production personnel, quality control and so on.

Successful new product marketers learn how to delight customers by studying their needs and behaviors. Marketing research can provide you with that information, and it’s an investment well worth making to help you beat the odds and succeed in new product development. [Ref. 7] Developing an understanding of consumer needs, wants, perceptions, … is a prerequisite to effective decision-making. Many companies are discovering that the decisions involved in creating and distributing goods and services for selected consumer segments have such long-run implications for the organization.
Marketing research is the specific marketing function relied upon to provide information for marketing decisions. However, it should be stressed at the outset that merely doing marketing research does not guarantee that better decisions will be made. The quality of each stage of a marketing research project will either contribute to better decision-making or will make it an ever-elusive goal. If research results are correctly analyzed and imaginatively applied, studies have shown that increased profitability is often the outcome.

The marketing research suggests the connection between research and decision-making in business organizations. More succinctly, marketing research produces the information managers need to make marketing decisions. Marketing research specifies the information required to address these issues; designs the method for collecting information; manages and implements the data collection process; analyzes the results; and communicates the findings and their implications. Effective marketing research involves few steps and follows a procedure. According to the type of problem, market researchers use different methods for their research in the steps.

Although conducting the activities of marketing research requires using a variety of research techniques, the focus of the research should not be on the techniques. Marketing research should focus on decisions to be made rather than the collection techniques used to gather information to facilitate decision-making. This focus is central to understanding the marketing research function in terms of what it should be and to the effective and efficient use of research as an aid to decision making. The basic purpose of marketing research is to reduce uncertainty or error in decision-making.

The most important areas and the related forms of marketing research include concept/product testing, tracking study, product/brand service usage, advertising penetration, image evaluation, public opinion surveys, copy testing, test marketing/product placement, taste tests, market segmentation, media measurement, market feasibility, location studies, market share/market studies, competitive analysis, positioning studies, customer satisfaction studies. [Ref.1] These areas of marketing research illustrate that at least one decision-making is required for related issues. One of the most important areas which strongly needs the different decision-making is concept/product testing. On the other word, there are many factors in a new concept/product development, which requires making decision or selecting specific alternative between different existed alternatives.

In this research the required marketing research will be defined as a suitable tool for making decision.

The business environment today is truly global, which requires high-speed product development to maintain and increase the competitiveness of companies. New product development (NPD) is essential for company survival and growth. [Ref. 3] Companies are faced with a dynamic and turbulent environment that requires flexibility to change business needs. New products represent, on average, 35% of firms’ annual sales. [Ref. 4] The development of new products is perhaps the most significant activity within a firm. It is also one of the most risky decisions. Many years and millions of dollars are spent developing products that on average fail far more often than they succeed. Information plays a key role in reducing NPD failure and thus in increasing NPD success. [Ref. 3]

New product development is defined as the transformation of a market opportunity and a set of assumptions about product technology into a product available for sale.
The importance of new product development is due to recognize and understand the processes, which affect to manage and control many factors such as cost, time and information. On the other hand, the importance of the new product development process is related to many decisions, make during the product development. However, the firm’s organization, specialist, human resources, technology knowledge and other facilities dictate which process is suitable or eligible for the company. By the new product development process (NPDP), firms are able to provide required and accurate information in a suitable time and cost. Furthermore they are able to allocate suitable resources such as human resources to different activities and tasks.

Therefore, one of the important propose of this research is to select the popular process of new product development and to identify the main points of the new product development, which one decision has to be made. In addition, these decisions need to be categorized in different aspects. For instance a part of these decisions impact on the marketing and customers’ view and the remained decisions impact on the other issues such technical, economical and so on. After recognizing the different aspect of decisions, it needs to be identified the suitable marketing research method. It is expected that the suitable marketing research can provide some facilities to make accurate and certain decisions. On the other word, the marketing research can be used as a tool in order to provide the accurate and certain information for making a decision.

The product development process encompasses actions inside and between the several sectors of the company, and is highly desirable for the efficient communication, should be facilitated by the market research. [Ref. 10]

The key to develop new products that will be successful in the marketplace is close contact with the target audience throughout the developmental process. Rigorous attention to customers' wants and needs helps to prioritize investment dollars, reduce time to market, and greatly lower the risk of product failure. [Ref. 6]

The new product development process (NPDP) has at least six stages. In each stage, information about the market and consumers is needed to support critical decisions about the product. [Ref. 7] Since the decisions faced at each stage of the product development process are unique, marketing research activities must be structured to meet the unique information needs of each stage. Customer and market information is carried forward, refined, and updated as the surviving product concept moves from stage to stage. Early stage research tends to be more qualitative and unstructured, emphasizing customer interaction and creativity, while later-stage research is more quantitative and structured. [Ref. 8]

In the framework of using marketing research to reduce uncertainty, marketing research activities are custom-designed to fit the new product decision requirements. [Ref. 8] Marketing research projects identify types of data as well as expected results and they can be utilized in each phase of the product development process. Through this reflection, it was evidenced the importance of data gathering, its processing, and the use of the results in decision making for the success of the product under development.

In this research the main steps of product development, which required marketing information for making decision, will be identified and recognized. Then in the other stage the suitable marketing research method will be suggested in terms of qualitative or quantitative types of research, data collection, research design, methodology,
analysis and etc. on the other word, the different type of marketing research, collecting data, analysis, and … will be selected.

Iran Khodro (IKCo) was established in August 1962 with the aim of manufacturing cars and spare parts. The production factories as well as the administration offices, warehouses and personnel residents and units were all established in an area of 3,190,000 sq/m. The covered area of the company equals to 4,100,000 sq/m. More than 19,000 employees work directly for IKCo. [Ref. 11] IKCo has been engaged in a different range of vehicles including passenger cars, light trucks, minibuses, buses and heavy trucks. [For more information see Appendix A] The product development process is an important area of research for the Auto industries. Global Auto Manufacturers are improving constantly their new product development processes in order to introduce improvements on Time-to-Market and Time-to-Customer. The main reasons that Iran Khodro Company, as a biggest car manufacturer in Iran should consider market research in the new product development processes are:

- To reach world-class quality & competitiveness for its products in order to benefit from the expected liberalization of the Iranian market. To be able to compete with products & sales strategies of foreign OEMs in an open global market.
- To design & develop “IKCo Brand“ vehicles with a high level of efficiency, setting the path of industrial leadership, with resultant benefit to the company and its people form customer satisfaction.
- To bring to the market a new line of world-class vehicles, enabling significant export opportunity with neighboring countries and the whole region, reduce time to market, and greatly lower the risk of product failure.

Recognizing IKCo business need for leadership of the Iran and Middle East automotive industry a product portfolio is established for the introduction of new passenger cars, for the next 10 years. In order to successfully design, develop and launch the portfolio of vehicles into both Iran and export markets a new product development process is required which is defining to be implemented throughout the IKCo Corporation. In the other word, the process of new product development responds to IKCo ten-year product portfolio plan. In this research, the product, which is selected to work, is passenger car. According to the above illustration for this research, first of all the IKCo process for new product development should be recognized, after that the important decision points should be identified in this process. Some of these decision points need marketing information in order to be decided about them. Therefore, some specific marketing research should be implemented to provide and support this process. On the end, the suitable method of marketing research will be selected and described for each step, which require marketing information. In some points may use secondary or primary data or implement qualitative or quantitative researches. These are what, which should be identified in this thesis.

In this thesis research, the problem is: What is the use of marketing research in new car development in Iran Khodro passenger car? How Marketing Research can be utilized in a new product development.
3- Research Objective

The activities of new product development most often are implemented as a sequence of technological-scientific efforts. It needs to be managed systematically in order to attain the optimization of project factors such as speed, quality and cost, and to achieve product attributes targets such as price, customers needs, product quality, product performance and so on.

Thus, in order to implement an eligible new product development and to achieve the suitable product attributes targets, apart from scientific technology and process management, the marketing research and information are also required.

In addition, marketing research has different methods. Each method satisfies different goals and they implement for different objectives. Therefore, the correct use of market research techniques can greatly help in the decision-making points of a new product development. It works as a mechanism for understanding customers’ needs, monitoring its habits and attitudes and evaluating concepts, prototypes and products.

On the other hand, regarding the mission of Iran Khodro Co., emphasizes to satisfy the Iranian customer requirements and provide suitable cars for them, it needs to be considered different kind of marketing researches during new product development process.

On the whole, the objectives of this thesis are:

- To familiar the IKCo new product development process,
- To identify stages of new product development process and its decision making points in IKCo,
- To show the stages and the decision making points, which is required to implement a marketing research,
- To find out what type of market research should be used for different stages of new product development process.

The theoretical and operational variables, which will be used in this study are introduced and defined in Appendix B.

4- Research Question

Main question: What is the use of marketing research in process of developing new car in Iran Khodro Company?

1. In which stage of new car development process, marketing research should be implemented?
   1.1. What are the stages of new car development process in Iran Khodro passenger car?
   1.2. What are decision-making points of each stage in new car development in IKCo?
   1.3. In which decision-making points, marketing research should be implemented in IKCo?

2. What are the types and objectives of marketing research during the new car development process?
   2.1. What type of marketing research should be considered during different stages or decision-making points of new car development process in IKCo?
   2.1.1. Is it based on primary data or secondary data?
2.1.2. Is it qualitative or quantitative or both?
2.1.3. Is it explorative, descriptive, … research?

5-Demarcations

Due to limited time and the wide area that our research questions cover, we have decided to concentrate our research study on the general new product development process and also on the general concepts of marketing research. Furthermore, we have focused our research on the car manufacture industry with the case of Iran Khodro Company.

6-Structure of the Study

The subsequent parts of the thesis will be structured as follows:

- Chapter two presents an overview over the literature and the relevant theories concerning our field of study and based on our research questions.
- Chapter three contains a conceptual framework that creates a foundation for the interview guide and the rest of the thesis.
- Chapter four describes the methodology used when obtaining the data needed for this thesis. It begins with the purpose of our research, continues with our research approach, our research strategy, data collection method, our sample selection, the analysis of our data and terminates with the validity and reliability section.
- Chapter five presents the empirical data collected for this study, which will be carried out by interview and documents.
- Chapter six includes the analysis and comparison of the collected data in the previous chapter.
- Chapter seven presents our finding from the analysis in chapter six, and the conclusions we have drawn based on our research questions. In this chapter we also give recommendations for future research within this area.
LITERATURE REVIEW

1-Introduction

New product development (NPD) is essential for company survival and growth (Hart, 1996)

The use of marketing research is going to be increased by many companies. Marketing research is used for different decision-makings and requirements of organizations. Furthermore, One of the most important missions in each firm is to identify a new product and to be able to manage the process of new product development and launch it to the markets in the eligible time and cost in order to sustain in the markets.

On the other hand, it is expected that one of the important tools for supporting the new product development process is the marketing research technique. Therefore, the literature review of this thesis should find out the specific process of new product development. It is expected that this new product development process have some activities and decision points, which need to be identified. Moreover, the marketing research should be identified by literature review and also different techniques and types of marketing research need to be defined.

At the end, if there are sufficient information and resources, the use of marketing research in new product development process should be reviewed in the literatures. By this literature review, it is expected that the thesis is to be able to apply the mentioned information for Iran Khodro cases.

2-New product development

The need for product innovation has never been greater. Product life cycles are shorter and new products make old ones obsolete. [Ref.40] New product development (NPD) has been called one of the riskiest, yet most important, endeavors of the modern corporation and is essential for the health and survival of most companies. However, it is difficult to understand customer needs and preferences and to balance them with organizational strategy and capabilities to produce a product or service that satisfies consumers better than competing alternatives. Furthermore, identify opportunities for a new product, especially radical or really new products, is quite difficult. Really new products can offer new, unique, or superior solutions to users’ needs and can create entirely new markets. [Ref. 28]
Success in developing new products is vital for the health and survival of many organizations, and good decisions are vital for successful NPD programs. [Ref.31] The development of user-relevant product advantages is a recurrent pre-requisite for new product success in the literature. This information plays a key role in reducing NPD failure and thus in increasing NPD success. Depending on the level of newness of the new product, several basic questions have to be answered including what product actually to develop, how to design it, and how to market it? In general, the more innovative the new product, the more information will be required. In order to help obtain information, a large number of tools have been developed. [Ref.60] This requires that customer information be fed into the development process, yet there is little empirical research, which has examined what information is required, when it is required and how it can be used during the various phases of the NPD process. [Ref.22] If we accept that the customer relevant advantage is germane to the success of new products, research must develop insights into how this advantage is identified and translated into new product solutions. The approach taken in this thesis focuses on the relevance of market information to the search for customer relevant advantage and we introduce an inventory of propositions with associated methodological steps which are expected to initiate research towards increasing our understanding on the nature and role of market information in advancing new product success.

2-1- Definitions of New Product Development (NPD)

In order to examine the nature and role of marketing research during the new Product development (NPD), it is first necessary to define what is meant by these terms.

According to the literature review there are lots of definitions for new product development (NPD) such as:

- New Product Development is a process which starts from a motivating goal, moves through an idea conception phase, is reduced to practice in its implementation phase, and is completed in a transitional phase, during which time the product becomes established. [Ref.61]
- The overall process of strategy, organization, concept generation, product and marketing plan creation and evaluation, and commercialization of a new product. Also frequently referred to just as "product development." [Ref: 41]
- The process a product goes through before introduction, involving seven phases: idea generation, screening ideas, concept testing, business analysis, product development, test marketing and commercialization. [Ref: 42]
- (1) The overall process of strategy, organization, concept generation, product and marketing plan creation and evaluation, and launch of a new product. (2) Sometimes restricted in meaning to that part of the process done by technical (R&D and manufacturing) departments. (3) Sometimes used to denote the person or persons engaged in the new product creation task. New product development concerns activity within an organization, in contrast to the acquisition of finished new products from outside. [Ref: 43]
- The creation of new products needed for growth or to replace those in the decline stage of their life-cycle; the stages in the new product development process are commonly listed as idea generation; screening; concept
development and testing; the formulation of marketing strategies; business analysis; production; market testing; and commercialization. [Ref: 44]

Besides to these definitions it is interesting to note that new product development (NPD) is not the only term used to describe the process by which new products are developed. The particular term employed depends on the discipline of the researcher. Hence, “NPD” tends to be the label used by those in marketing, those working in technological fields refer to “innovation”, while those in the sphere of engineering often refer to “design”. In this thesis, the term NPD is used to describe a multidisciplinary process that involves many separate tasks which begins with an idea and ends with the launch of a new product.

2-2-New product development process (NPD Process)

The new product development process is a tool that can help companies and organizations to successfully develop new products or upgrade existing ones through a series of logical steps, starting new from the process of idea generation and ending at the launch of the product into a market. [Ref.39] From a normative point of view, the new product development process is comprised of multiple, overlapping and iterative stages, whose final output (the new product) is dependent on both technical and marketing input. [Ref. 22] A helpful way of thinking about product development is to view the process as a funnel. [Ref. 27] The figure 2-1 illustrates the mentioned funnel.

![Funnel view of NPD](image)

Ref.: Product development: A customer-driven approach; Harvard business school; 1996

The widest opening, indicating the point of maximum flexibility, exists at the beginning of the project. [Ref. 27] The ultimate goal of conducting marketing research with consumers during the early stages of the NPD process is to develop successful new products. [Ref.28] There are a few types of new product development processes, which are used by many companies. Most types of new product development processes have some type of project review points. [Ref. 28] one of the most famous NPD processes is Stage-gate process (SGP). The stage-gate process is an operational roadmap for driving new product projects from idea to launch. [Ref.29] It was recently conducted a study of new product development process across industries and found that nearly 60% of firms use a stage-gate process to guide their development activities. [Ref.33] The
The stage-gate process works by establishing and using separate stages of timely activities followed by decision points (gates) on deliverables. [Ref. 30]

**2-3-Benefit of Stage-gate process for NPD Projects**

The benefits of the stage-gate process include:
- Puts discipline into a somewhat ad-hoc, chaotic process
- Provides improved focus via gates (decision points), where poor projects are killed and efforts can be redirected to more promising projects and products
- Ensures a complete process – no critical errors of omission and no missing steps
- Builds the voice of the customer into new product new product projects
- The process is visible, relatively simple, and easy to understand and communicated
- The requirements are clear: expectations of a project team and leader at each stage and gate are spelled out
- Stage-gate manages business risk by breaking resource commitment into increments or stages and more money spent up-front greatly improves the odds of success. [Ref.40]

The Stage-gate also provides faster times to market due to:
- More up-front homework results in better and sharper product definition – speeding up the development phase and ensuring less recycling and wasted time
- Clearly defined gates with pre-specified deliverables mean faster decision-making
- Cross-functional, Parallel processing: new product rugby not a relay race. [Ref.40]

**2-4-Stages of NPD Process**

Stages are where the action occurs. The players on the project team undertake key tasks to gather information needed to advance the project to the next gate or decision point. Stages are Cross-Functional and each activity is undertaken in parallel to enhance speed to market. (Figure 2-2)

![Figure 2-2: General position of stages in NPD](http://www.prod-dev.com/stage-gate.shtml)

New product development begins with an idea and ends with the successful launch of a new product. The figure 2-2 shows the general position of stages in new product development. The steps between these points can be viewed as a dynamic process. Stage-gate divides this process into a series of activities (stages) and decision points (gates). [Ref. 29]
There are a few approaches of NPD process stages. One approach introduces the new product development process with a few stages: idea generation, screening, concept development and testing, marketing strategy, business analysis, product development, market testing and commercialization. [Ref. 21] The stages are defined by tasks or activities. [Ref. 22] Each stage contains a set of defined concurrent activities, incorporating industry best practices. [Ref. 29] Another approach of new product development process has been defined by the following items [Ref. 22]: 1-Explicit statement of new product strategy, budget allocation, 2- Idea generation (or gathering), 3- Screening ideas: finding those with most potential, 4- Concept development: turning an idea into a recognizable product concept, with attributed and market position identified, 5- Business analysis: full analysis of the proposals in terms of its business potential, 6- Product development: crystallizing the product into semi-finalized shape, 7- Test marketing: small-scale tests with customers, 8- Commercialization. [Ref. 22] The following approach simplified process for product development, which can be expanded into five unique stages based on the time it takes to bring a new product (vehicle or feature) to market. Visually it can be seen as an ever-narrowing funnel that begins with a broad set of needs leading to possible product solutions (i.e., new product concepts). Before being approved for development and eventual product introduction, each product solution must pass through successive filtering phases, or stage gates. (Figure 2-3)

![Figure 2-3: Simplified approach process for product development](image-url)

Ref: The effectiveness of market information in enhancing new product success rates; By: Susan Hart, Nikolaos Tzokas, and Michael Saren

There are some decision points between two stages, which are called gates.

### 2-5 Decision Points (Gates) in NPD Process

Following each stage is a gate, also called a review or decision point, where managers determine whether to proceed with developing the project or to terminate it prior to commercialization based on the projected marketing, technical, and financial performance. (See figure 2-4) [Ref. 31] On the other word, preceding each stage is a...
decision point or gate, which serves as a Go/Kill and prioritization decision point. [Ref.40]

**Figure 2-4:** Decision points

Gates provide the funnels where mediocre projects are culled out and resources are allocated to the best projects. [Ref.40] Gates are decision points where senior leaders decide whether to continue funding a project. [Ref. 29]

The next approach of new product development process is introduced as the model of figure 2-5. [Ref. 30]

**Figure 2-5:** A Stage Gate Approach

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An effective new product process means effective gates. In best practice businesses, this translates into a menu of specified deliverables for each gate, visible Go/Kill and prioritization.
prioritization criteria at gates. [Ref. 32] A stage-gate process is a conceptual and operational road map for moving a new product project from idea to launch. [Ref. 40]

**Figure 2-6: A stage-gate process**

![Stage-gate process diagram]


Stage-gate is a widely employed product development process that divides the effort into distinct time sequenced stages separated by management decision gates. [Ref. 40] According to the figure 2-6, ideas are generated and screened and the surviving ideas are developed into product concepts. A product concept is an elaborated version of the idea expressed in meaningful customer terms. During this stage, the product ideas that form the new product implementation list must be defined more precisely. [Ref. 21]

The ideas must emerge into well-formulated sets of attributes designed to appeal to specific sets of customers. These attributes (at least tangible ones) must be transformed into detailed design blueprints. For this to occur, four major tasks must take place. First, product designs and/or models must be made available to manufacturing and to the team for preliminary market testing. Second, market acceptance studies on current product ideas must be finalized. Third, customer segments must be identified and target markets selected. Fourth, production studies must be initiated [Ref. 21].

Moreover, the new product development process is often viewed as one of uncertainty reduction, wherein information is generated and used to reduce the uncertainties germane of the process. While all these uncertainties must be reduced by the NPD process, it is suggested that the dominant uncertainties are those relating to the market, which is a stance supported by the dominance of “understanding user needs” in studies of new product success and failure [Ref. 22].

**2-6-Objective and Detail Actions for decision making in NPD process**

The decision-making points in NPD process are related to the stages and gates of new product development process.

The stages and gates of new product development process follow specific objective. In order to achieve these objective there are some activities in each phase. More investigation is mentioned in the following section of decision points:

**2-6-1-Ideation (Stage 0)**

Ideation is to identify and capture ideas, which have potential to make significant contribution to gross margin. [Ref. 35] Ideas are everywhere inside and outside of the company. [Ref. 36] New ideas can be sourced from company, personnel, consumers, and competitors and through trade research/gap analysis. [Ref. 37] The firms can generate ideas through:
- Hear the voice of consumers. [Ref.35] Your customer probably has your next new product idea. Building in VOC work into your new discovery stage helps to identify customer’s problems, unmet needs and even unarticulated needs. [Ref.36],
- Brainstorm with sales staff. [Ref.35] It is a good technique to obtain broad and odd ideas for new products that can be developed fast. [Ref.39]
- Solicit contributions from technical, marketing, and sales staff, [Ref.35]
- Cull consumer complaint files for systematic unresolved problems. [Ref.35]
and evaluate ideas for linkage with:
  - Know consumer needs
  - Technical competencies
  - Business strategy [Ref.35]
A product idea (concept) addresses the question of how the product will meet customer needs by describing, usually through a drawing or rough three-dimensional model and some general text, what technology and form the product will employ. [Ref. 27]
In this stage the data gathering should produce unedited statement from the respondents, general impressions from the interviews, and quantitative results from surveys, without interpretation or bias. [Ref. 27]

2-6-2-First decision: Idea Screen (Gate 1)

Screen new ideas, which were identified in Ideation stage. [Ref. 35] In this gate, the initial GO/Kill decision is made with largely qualitative approaches. [Ref.30] Screen idea should be done in order to make sure:
  - Value to customer
  - Value to gross margin
  - Resources required to commercialize
  - Sustainability under actual market conditions [Ref.35]
It is necessary to determine merit of idea with qualitative assessment of:
  - Idea consistent with strategic aims
  - Fit with:
    - Technical competencies
    - Technology, operations
    - Marketing competence and infrastructure
    - Technical and marketing resources
  - Link to customer needs
  - Customer recognition of need and high value
  - High margins and sustainable competitive distinction in marketplace
  - Firms’ intents [Ref.35]

2-6-3-Preliminary Investigation (Stage 1)

A quick and inexpensive assessment of the technical merits of the project and its market prospects. [Ref.40] Translating customers’ needs into product attributes is the main goal of this stage. [Ref.27] This stage prepares the product concept, technical feasibility and commercial prospects. [Ref. 30] In addition to define solution and idea, the following items are identified:
- Value to customer
- Value to company
- Resources required to develop and sell idea
- Plan, which is used to accomplish the necessary [Ref.35]

The feasibility study in terms of technical, marketing and financial should be implemented in this stage. In this stage the project gathers and assess the information. [Ref.35] It is important to note that up to this point, the development team has not performed in-depth marketing research to assess value. This changes as product ideas move on to the next phase. [Ref.33]

2-6-4-Second decision: Second Screen (Gate 2)

Concepts (ideas) that pass the initial idea screen should then be put through a concept screen in which an order-of-magnitude cost and value estimation is performed and used to calculate a value/cost ratio. This ratio is then used to prioritize the products creating the highest value for the least cost, and determines which products are pushed to the next phase of development. [Ref.33] On the other word, it is a reevaluation in light of Stage 1 information. [Ref. 30] This gate determines the illegible concept to move into the next stage. [Ref. 35] In this point, it is decided if the project is still worth pursuing based on the information available. [Ref. 37] One method that is frequently used to screen and evaluate product concepts during new product development is conjoint analysis. This technique requires more quantitative analysis by the project team. [Ref.27]

2-6-5-Detailed Investigation (Stage 2)

This is the critical homework stage, the one that makes or breaks the project. [Ref.40] It needs to identify, gather, and assess the detail information. [Ref.35] At this stage the project build a business plan. [Ref.30] This stage identifies the detail information:

- Detail value to customer [Ref.35] (or product definition [Ref.40])
- Detail value to company [Ref.35] (or project definition [Ref.40])
- Resources required to develop and sell idea [Ref.35] (or project justification [Ref.40])
- Action plan, which is used to accomplish the necessary [Ref.35] (or project plan [Ref.40])

This stage helps to develop a sound basis for taking the project into the development stage. [Ref. 30] This stage is critical, as it requires a detailed assessment of market, sales, production, technical, human resources and financial issues. It is essential that market research be conducted throughout to ensure the final product is fine tuned and modified in line with market demands. At this stage, it is recommended that market research, most likely focus groups be conducted to evaluate reaction to the product concept in relation to the flavor, packaging, brand name, proposed price point, etc. [Ref.37]

At this point, the development team conducts a series of depth interviews with customers to build an accurate value estimation. This cannot be done with surveys and
other quantitative research methods because these methods presume that customers already understand the value of the product. In contrast, depth interviews enable the team to explore how the new product impacts the customer’s business model and gain a rich understanding of the value it creates. [Ref. 33]

**2-6-6-Third decision: Go to Development (Gate 3)**

It is the beginning of a serious project. It opens the door to expensive development and other work. [Ref. 30] This gate determines the possible solutions, which is eligible for moving to the development stage by evaluating idea and commit resources to develop it. [Ref. 35] This is a critical step in the new product development decision points and represents the last opportunity to end a project before it enters the product development phase, a phase which can be time-consuming and expensive. [Ref. 37]

**2-6-7-Development (Stage 3)**

Business case plans are translated into concrete deliverables. The manufacturing or operations plan is mapped out, the marketing launch and operation plans are developed, and the test plans for the next stage are defined. [Ref. 40] On the other word, it needs to deliver fully developed and tested new solution. [Ref. 35] In this stage, the project executes development plan, undertakes marketing development work, define manufacturing/operations process and updates detailed financial analysis. [Ref. 30]

The scope of development work in this stage includes:
- Technical development
- Market development
- Production development [Ref. 35]

During this stage, the company should engage in full-scale development, including plant trails. It is important to update financial and business case analysis as the product goes through technical development. All likely costs should be taken into consideration including promotional spend, packaging and ingredients costs, trial and full-scale production costs etc. [Ref. 37]

**2-6-8-Forth decision: Go to testing (Gate 4)**

At this gate, it is determined if solution has sufficient merit. [Ref. 35] This gate marks the beginning of the commercialization phases of the product and project. It needs to sanity and consistency check, meets customer expectations and product requirements, remains a sound business proportion, plans are realistic and appropriate. [Ref. 30]

**2-6-9-Testing and Validation (Stage 4)**

The purpose of this stage is to provide final and total validation of the entire project including the product itself, the production process, customer acceptance, and the economics of the project. [Ref. 40] This stage can involve test marketing the product to find out consumer reaction before full production commences. It is likely at this stage that the customer will want samples for further evaluation, particularly if launching an own label product. [Ref. 37]
Prototypes are representations of all or a portion of a product; they are created during the development process to accommodate any one of a handful of purposes. The completeness of the prototype varies according to how far along in the process it is created and what purpose it intends to serve. Typically, prototypes are used to meet one or more of the following goals:
- Test the feasibility of concept – this can be done either through physical or analytical (computer, mathematical) modeling.
- Collect customer feedback on part or all of the concept
- Communicate an idea (to other members of the company, suppliers, distributors, and so forth). [Ref.27]

Therefore, in this stage, the purpose is to validate both product and project prior to commercialization, to finalize the plans of launch phase, and to acquire and test the product equipment. [Ref.30]

2-6-10- Fifth decision: Go to Launch (Gate 5)

At this gate, it is evaluated the following items:
- Ramp-up of revenue vs. projection
- Margin vs. projection
- Market penetration vs. projection
- Opportunities for spin-off customer solutions or cross-fertilization of other business units
- Production capacity tracking demand [Ref.35]

It opens the door to full-scale production and market launch. [Ref.30] This ensures the project is still an attractive one for the company and the product is what was agreed previously. [Ref. 37] This is the last point where project can be stopped before a major commitment of resources and reputation. It is a final check that serves to verify that everything is satisfactory prior to launch. [Ref.30] If prototyping has been effective, therefore, by the time the final design has been accepted the factory should be nearly ready to execute full-scale production. [Ref.27]

2-6-11- Full Production and Market Launch (Stage 5)

It is related to full commercialization of the product. It is the beginning of full production and commercial launch. [Ref.40] At this stage, the project team measures actual results versus projection at Gate 3 and 5. Moreover it needs to generate the reasons for gaps and variances and lesson learned. [Ref.30]

This final stage move toward commercial production entails three steps: pilot production, ramp up, and market launch. Market launch is the phase in which the marketing plans regarding the target segment, positioning, product and service combinations, pricing, marketing communications, and distribution are executed in an integrated way to ensure the right product gets to the right customers at the right time for the right price. [Ref.27]

The launch phase introduces the new product to the market. First production runs are initiated and market entry occurs. The timing is crucial and all of the elements of the marketing mix must be in place. These are:
- Product: must satisfy a customer need, be of top quality and have a real point of difference (unique selling point).
- Price: must be competitive; cover costs and offer consumers value for money.
- Promotion: develop a promotional plan, which can be a mix of above the line (e.g., advertising) and below the line (e.g., in-store sampling; recipe leaflets) spend depending on company budget.
- Place: the distribution channel used to get the goods to the consumer (e.g., multiple retailers, forecourt stores etc.) must be in place before launch. [Ref.37]

2-6-12-Post Launch Review

An informal or formal review immediately following the first production runs to ensure that the launch proceeded according to plan is carried out. [Ref.37] It marks the end of the project, 6-12 months after launch. It is necessary to compare actual results versus expectations, gap analysis, assess success of project. [Ref.30]

2-7-Project Works in NPD process stages

The following table (table 2-1) shows the project general work in the each stage of new product development Process. [Ref.38]

<table>
<thead>
<tr>
<th>Project Work</th>
<th>Stage 1 Preliminary Assessment</th>
<th>Stage 2 Build the Business Plan</th>
<th>Stage 3 Development</th>
<th>Stage 4 Validation</th>
<th>Stage 1 Product Launch</th>
<th>Post-Launch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market Database Analysis</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary Market Research</td>
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<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Secondary Market Research</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image Studies</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive Analysis</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Value Chain Analysis</td>
<td></td>
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<td>✓</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Business Modeling</td>
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<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Risk and Decision Analysis</td>
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<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Future Business Planning</td>
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<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Customer Value Mapping</td>
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<tr>
<td>Licensing Arrangement</td>
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<td>✓</td>
<td></td>
</tr>
<tr>
<td>Acquisitions and Mergers</td>
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<td></td>
<td></td>
<td></td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

3-Marketing Research

Marketing research is the systematic design, collection, analysis, and reporting of data and findings relevant to a specific marketing situation facing an organization. [Ref.65] It has been found that new product failure is frequently associated with lack of marketing information and, conversely, that new product success is positively related to the exist of marketing information [Ref. 24].

3-1- Definitions of Marketing Research

In order to examine the nature and role of market research, it is first necessary to define what is meant by the term. Most marketing and marketing research texts make a distinction between market and marketing information. [Ref.22] Marketing research comprises a form of applied sociological study, which concentrates on understanding the behaviors, whims and preferences, mainly current and future, of consumers in a market-based economy. [Ref.64] On the other hand, market research has a broad scope and includes all aspects of the business environment. It asks questions about competitors, market structure, government regulations, economic trends, technological advances, and numerous other factors that make up the business environment. [Ref.64] Market research is an important tool for understanding the characteristics of target markets. [Ref. 23]

Market research deals specifically with the gathering of information about a market’s size and trends. But, marketing research covers a wider range of activities. While it may involve market research, marketing research is a more general systematic process that can be applied to a variety of marketing problems. [Ref.20]

Philip Kotler defined Marketing research as “The systematic design, collection, analysis and reporting of data and findings relevant to a specific marketing situation facing the company.” and the American Marketing Association’s definition is “the systematic gathering, recording and analyzing of all data about problems relating to the marketing of goods and services.” we can also list the main definitions on this topic as the below:

- The systematic gathering, recording, analyzing, and use of data relating to the transfer and sale of goods and services from producer to consumer. [Ref: 45]
- The process of systematically gathering, analyzing and interpreting data pertaining to the company's market, customers and competitors, with the goal of improving marketing decisions. [Ref: 46]
- The process of gathering, recording, and analyzing information pertaining to the marketing of goods and services. Topic areas: Fundraising and Financial Sustainability. [Ref: 47]
- The process of systematically gathering, analyzing and interpreting data pertaining to the company's market, customers and competitors, with the goal of improving marketing decisions. [Ref: 48]
- The process of gathering, interpreting and reporting information to help marketers solve specific marketing problems or take advantage of marketing opportunities. The specification, gathering, analyzing, and interpretation of information that links the organization with its market environment. [Ref: 49]
• Quantitative and/or qualitative data that address a specific marketing problem or situation facing the company. [Ref: 50]
• The systematic gathering, recording, and analyzing of market information for management decision-making purposes. [Ref: 51]
• The systematic gathering, recording, and analyzing of data about problems relating to the marketing of goods and services. [Ref: 52]
• The analysis of markets to determine opportunities and challenges, and to find the information needed to make good decisions. [Ref: 53]
• The systematic design, collection, analysis, and reporting of data relevant to a specific marketing situation facing an organization. [Ref: 54]
• The systematic design, collection, analysis and reporting of data regarding a specific marketing situation. [Ref: 55]
• Linking the customer, consumer and public with the marketer through information, which is used to identify and define marketing opportunities and problems. Market research generates, refines and evaluates marketing actions, monitors marketing performance and improves the understanding of marketing. Market research specifies the information required to address issues, designs the methods for collecting information and manages and implements data collection, analyzes results and communicates the findings and their implications. [Ref: 56]
• The analysis of markets to determine opportunities and challenges, and to find the information needed to make good decisions. [Ref: 57]
• Survey research into the motivational factors influencing purchase and product use. These activities include advertising, customer satisfaction, positioning, and pricing research. [Ref: 58]
• Research that gathers and analyzes information about the moving of good or services from producer to consumer. [Ref: 59]

Recent developments in the literature on the market orientation of firms suggest that too much attention to customer and immediate market information only may be characterized as narrow and myopic. Moreover, the organizational learning literature has contributed to this subject and posits that market information processing is a function of what the organization has learned previously, in terms of both facts about its relevant markets and its particular way of acquiring, distributing, interpreting and storing information, whether that be formal or informal. [Ref.22]

3-2- Marketing Research Process

Business practitioners often identify problems that can only be solved satisfactorily through rigorous and systematic analysis. In such situations, marketing research is warranted. [Ref. 19] A simple view of marketing research is to find out what customers want, and to give them what they want [Ref. 13].

Marketing research is a major source of information bearing on marketing decision-making [Ref. 24]. The goal of marketing research is to provide the facts and direction that managers need to make their more important marketing decisions. [Ref.20] Marketing research performs multiple roles, such as the identification of viable market opportunities, reduction of uncertainty, and better coordination of marketing activities [Ref. 24].
There are different kinds of marketing research definition. One of the more popular definitions has mentioned in the following statements:

- Market research is the systematic and objective identification, collection, analysis and dissemination of information. The task of marketing research is to assess the information needs and provide management with relevant, accurate, reliable, valid and current information. Marketing research provides some information for improving decision making related to the identification and solution of problems and opportunities in marketing. [Ref. 14] On the other word, marketing research is a function, which links the consumer, customer or public to the company through information. [Ref. 15]

Marketing research links the organization with its market environment. It involves the specification, gathering, analysis, and interpretation of information to help management understand the environment, identify problems and opportunities, and develop and evaluate courses of marketing action. [Ref. 16] On the whole it can mention that marketing research is the systematic and objective identification, collection, analysis, and dissemination of information for the purpose of improving decision making related to the identification and solution of problems and opportunities in marketing. [Ref. 17]

After defining the marketing research, it is needed to know that in which situation; companies prefer to do marketing research or not to do marketing research. Companies usually do a marketing research in order to

- Make better marketing decisions,
- Understand consumers and the marketplace,
- Find out what went wrong [Ref.15] or what are going to be wrong.

It is important to know that marketing research is rarely the whole story. Research is often mistaken for an oracle. [Ref. 13] marketing research must be combined with managerial judgment and experience. [Ref. 15] On the following items, companies usually avoid to do marketing research:

- A lack of resources
- Poor timing in the marketplace
- Decision has already been made
- Managers cannot agree on the information needed
- The information needed already exists
- Cost of conducting research outweighs the benefits
- Lose the element of surprise [Ref. 15]

Further marketing research should be conducted only when the expected value of the information to be obtained exceeds the total cost of conducting the research [Ref. 19]. On the other hand, regarding the current situation of businesses and markets, many companies intend to use marketing research in order to help for making decision.

**3-3- Benefits and needs for Marketing Research**

When a decision problem relates to firm performance, the need for marketing research is essential. A decision problem is a situation in which a manager has to decide on
which course of action to take that will help to accomplish a specific objective. In a more general context, a decision problem refers to an independent variable (e.g. marketing mix element, environmental condition or situational factor) that needs managerial attention. In many instances, a decision problem is a weakness or threat, or a strength or opportunity. A weakness may be an ineffective marketing mix (e.g. a mismatch of product, price, promotion and distribution). A threat might be environmental changes (e.g. new product safety laws, increases in direct competition), changes in situational factors (e.g. increased consumer demand for quality and satisfaction) or a combination of these factors. Strength may be a firm’s capability to attract clientele with a willingness to pay top prices for product quality. An opportunity may be a situation in which a company’s principal competitor has decided to exit the market. [Ref. 19]

According to the above explanation, a marketing research has several benefits; the following items summarize the main benefits of marketing research:

- Helps firms stay in touch with customers’ changing attitudes and purchase patterns
- Assists in better understanding market opportunities
- Determine the feasibility of a particular marketing strategy
- Aids in the development of marketing mixes to match the needs of customers
- Improves marketer’s ability to make decisions [Ref. 18]

Today marketing research defines as a need for companies and many companies allocate high budget and resources to its marketing department or divisions and employ many professional and expensive experts and specialists for this purpose.

### 3-4- Marketing Research phases

The marketing research process is generally described as a set of standardized phases. [Ref. 19] there are different concepts for dividing the marketing research process to a few phases.

Marketing research process evolves from answers to five key questions:

- Why should we do research?
- What research should be done?
- Is it worth doing the research?
- How should the research be designed to achieve the research objective?
- What will we do with the research? [Ref. 17]

Dividing the research process into some distinct, yet interrelated, processes enhances the logical nature of the hierarchical ordering of phases. [Ref. 19] General steps of the marketing research process are mentioned in the following: [Ref. 18]

1) Locating or defining issues or problems
2) Designing the research project
3) Collecting data
4) Interpreting research findings
5) Reporting research findings [Ref. 18]
A typical phases and marketing research steps has been displayed in the diagram of figure 2-7: [Ref. 19]

**Figure 2-7 : A NPD typical phases and marketing research steps**

Ref: The marketing research process; http://highered.mcgraw-hill.com/sites/dl/free/0074711385/101503/sample_ch02.pdf

### 3-5-Classification of marketing research

Marketing research consist of two types of research. The first one is “Exploratory” research and the second is “Conclusive” research [Ref. 25 and Ref. 26] or “Confirmatory” research [Ref. 22]. The conclusive research comprises Descriptive research and casual research [Ref. 25]. The following table (table 2-2) states the differences between exploratory and conclusive research [Ref. 26]
### Table 2-2: Exploratory and conclusive research

<table>
<thead>
<tr>
<th>Exploratory</th>
<th>Conclusive</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
<td>To provide insights, understandings.</td>
</tr>
<tr>
<td><strong>Characteristics</strong></td>
<td>Information needed defined loosely. Research process flexible/unstructured. Sample is small and non-representative. Analysis of primary data is qualitative.</td>
</tr>
<tr>
<td><strong>Findings</strong></td>
<td>Tentative.</td>
</tr>
<tr>
<td><strong>Outcome</strong></td>
<td>Followed by conclusive research.</td>
</tr>
</tbody>
</table>

Ref: A classification of marketing research design; [http://www.sfxbrown.com/lecture%202%20(Nature%20of%20marketing%20research)%20ppt.ppt](http://www.sfxbrown.com/lecture%202%20(Nature%20of%20marketing%20research)%20ppt.ppt)

The following chart (figure 2-8) illustrates a classification of marketing research designs [Ref. 26]:

**Figure 2-8: Marketing research classification**


Therefore, there is different type of research. Marketing research can be classified in one of the following categories:

- Exploratory Research
- Conclusive Research
  - Descriptive Research
Exploratory research has the goal of formulating problems more precisely, clarifying concepts, gathering explanations, gaining insight, eliminating impractical ideas, and forming hypotheses [Ref. 20]. Exploratory research conducted to gather more information about a problem or to make a tentative hypothesis more specific [Ref. 18]. Exploratory research can be performed using a literature search, surveying certain people, exploratory research studies would not try to acquire a representative sample, but rather, seek to interview those who are knowledgeable and who might be able to provide insight concerning the relationship among variables. Case studies can include contrasting situation or benchmarking against an organization known for its excellent. Exploratory research may develop hypotheses, but it does not seek to test them. Exploratory research is characterized by its flexibility [Ref. 20]. Descriptive research is more rigid than exploratory research and seeks to describe users of a product, determine the proportion of the population that uses a product, or predict future demand for a product [Ref. 20]. Descriptive research conducted to clarify the characteristics of certain phenomena to solve a particular problem [Ref. 18]. As opposed to exploratory research, descriptive research should define questions, people surveyed, and the method of analysis prior to beginning data collection. In other words, the who, what, where, when, why, and how aspects of the research should be defined. Such preparation allows one the opportunity to make is required changes before the costly process of data collection has begun [Ref. 20].

Causal research seeks to find cause and affect relationship between variables. It accomplishes this goal through laboratory and field experiments [Ref. 20]. Causal research in which it is assumed that a particular variable X influences a variable Y [Ref. 18]

A comparison of basic research designs state in the following table (See table 2-3) [Ref. 26]:

<table>
<thead>
<tr>
<th>Table 2-3: Basic research designs comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective</strong></td>
</tr>
<tr>
<td><strong>Characteristics</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td><strong>Findings</strong></td>
</tr>
</tbody>
</table>

Ref: A classification of marketing research design;
http://www.sfxbrown.com/lecture%202%20(Nature%20of%20marketing%20research)%20ppt.ppt
3-6-Types of marketing research

Marketing research is often designed for companies to assess buyer attitudes and behaviors for building or revising a marketing strategy, and creating a marketing plan. [Ref.66] In terms of data capture and analysis there are two main types of marketing research: 1- Qualitative research, 2- Quantitative research [Ref. 67]

3-6-1- Qualitative marketing research

Qualitative marketing research means “quality”. Conversely, and importantly, it does not mean “quantity”. Qualitative research methods are designed to talk to a relatively few people in the target audience of interest. The purpose of qualitative research is to plumb the depths and range of buyer attitudes and beliefs, not to measure incidence, project, or forecast quantity. [Ref.68] Qualitative research is a set of research techniques, used in marketing and the social science, in which data are obtained from a relatively small group of respondents and not analyzed with statistical techniques. This differentiates it from quantitative research in which a large group of respondents provides data that is statistically analyzed. [Ref.70]

Qualitative marketing research generally used for exploratory purposes, small number of respondents, not generalizable to the whole population, statistical significance and confidence not calculated. [Ref.64] Qualitative research is about investigating the features of a market through in-depth research that explores the background and context for decision-making. [Ref. 67]

Figure 2-9 : Qualitative researches

Qualitative research is a marketing research method that plays an important market research role in conducting customer value analysis, customer satisfaction research, market segmentation research, branding and naming research, brand equity research, and new product development research. [Ref.68] Qualitative research methods are used primarily as a prelude to quantitative research. They are used to define a problem, generate hypotheses, identify determinants, and develop quantitative research designs. They are inexpensive and fast. Because of the low number of respondents involved, these exploratory research methods cannot be used to generalize to the whole population. They are however, very valuable for exploring an issue and are used by almost all researchers. They can be better than quantitative research at probing below the surface for affective drives and subconscious motivations. [Ref.70]
According to the figure 2-9 and table 2-4, popular qualitative marketing research methods include focus group studies, depth interviews triads (one interviewer, two respondents, and dyads (one interviewer, one respondent,) and observational techniques such as ethnography and, popular in marketing research, photo-ethnography. [Ref.66]

Table 2-4 : Qualitative Marketing Research

<table>
<thead>
<tr>
<th>Focus Groups</th>
<th>Depth Interviews (with or without projective techniques)</th>
<th>Photo-ethnography</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups of 6 to 12 people</td>
<td>Group interaction can stimulate unplanned reactions. New ideas spawned Group-think can occur. Individuals have little time to speak individually; participants may hide or be passive. Often an artificial &quot;performance mentality&quot; as clients view behind one-way mirror.</td>
<td>Watching user behavior can reveal good insights about their attitudes. Participants get highly involved in study. Unforeseen relationships may be discovered Somewhat forced environment as people may modify behavior</td>
</tr>
<tr>
<td>Traditionally, in live group setting with moderator</td>
<td>Long, in-depth interviews using open-ended questioning. Usually one-on-one, however dyads and triads may be used. A non-directive approach often useful to explore how respondent thinks about category.</td>
<td>Observational method; “watching” rather than &quot;asking&quot; Participants interact with product or solutions to need Participant take video of relevant situations under study, e.g. their pet, their car, etc. Diary kept, &amp; report behavior and attitudes to interviewer</td>
</tr>
<tr>
<td>Online groups conducted via internet</td>
<td>Traditionally, in live group setting with moderator</td>
<td></td>
</tr>
<tr>
<td>Phone conference w/ web or video</td>
<td>Online groups conducted via internet</td>
<td></td>
</tr>
<tr>
<td>Moderator must know how to engage in non-directive questioning. (If moderator is merely to pepper people with structured questions, do quant market surveys instead.)</td>
<td>Phone conference w/ web or video</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


There are two main qualitative methods, depth interviews and focus groups. However qualitative research can also include techniques such as usability testing, brainstorming sessions and vox pop surveys. [Ref.67] The main types of qualitative research are: [Ref. 70]

- **Depth Interviews** [Ref.70]
  - interview is conducted one-on-one, and lasts between 30 and 60 minutes
  - best method for in-depth probing of personal opinions, beliefs, and values
  - very rich depth of information
  - very flexible
  - probing is very useful at uncovering hidden issues
Depth interviews are the main form of qualitative research in most business markets. Here an interviewer spends time in a one-on-one interview finding out about the customer’s particular circumstances and their individual options. The majority of business depth interviews take place in person, which has the added benefit that the researcher visits the respondent’s place of work and gains a sense of the culture of the business. However, for multi-national studies, telephone depth interviews, or even online depth interviews may be more appropriate. [Ref.67]

- **Focus Groups** [Ref.70]
  - an interactive group discussion lead by a moderator
  - unstructured (or loosely structured) discussion where the moderator encourages the free flow of ideas
  - usually 8 to 12 members in the group
  - usually last for 1 to 2 hours
  - usually recorded on video
  - the room usually has a large window with one-way glass - participants cannot see out, but the researchers can see in
  - inexpensive and fast
  - can use computer and internet technology for on-line focus groups
  - respondents feel a group pressure to conform
  - group dynamics is useful in developing new streams of thought and covering an issue thoroughly

Focus groups are the mainstay of consumer research. Here several customers are brought together to take part in a discussion led by a researcher (or moderator). These groups are a good way of exploring a topic in some depth or to encourage creative ideas from participants. Group discussions are rare in business markets, unless the customers are small businesses. In technology markets where the end user may be a consumer, or part of a team evaluating technology, particularly at more creative stages of research. [Ref.67]
- **Projective Techniques** [Ref.70]
  - these are unstructured prompts or stimulus that encourage the respondent to project their underlying motivations, beliefs, attitudes, or feelings onto an ambiguous situation
  - they are all indirect techniques that attempt to disguise the purpose of the research

3-6-2- **Quantitative marketing research**

Quantitative marketing research is a social research method that utilizes statistical techniques. It typically involves the construction of questionnaires and scales. Large numbers of people are contacted, usually in a survey. Marketers use the information so obtained to craft strategies and marketing plans. [Ref.71] Qualitative market research studies are designed to assess, predict, and estimate buyer attitudes and behaviors, used for market sizing, market segmentation, and uncovering drivers for brand and product preference. [Ref.69]

Qualitative marketing research generally used to draw conclusions, tests a specific hypothesis, uses random sampling techniques so as to infer from the sample to the population, and involves a large number of respondents. [Ref. 64]

**Figure 2-10: Quantitative marketing researches**

![Quantitative Research Methods](http://www.powerdecisions.com/quantitative-market-research.cfm)

Qualitative marketing research designs gauge, describe, and forecast quantity. Using a range of sampling strategies, quantitative market research studies often project results of quantitative market surveys to the entire marketplace. [Ref.66] If quantitative marketing research is carried out correctly, both descriptive and inferential statistical techniques can be used to analyze data and draw conclusions. It involves a large number of respondents. Tests of a specific hypothesis, and the use of random sampling techniques to enable inference from the sample to the population. [Ref.71]

Popular quantitative market survey methods include online survey, personal quantitative interviews, mail surveys, and telephone surveys. [Ref.66]

According to the figure 2-10 and table 2-5, the key strengths of qualitative research data collection methods are: [Ref.69]

- Online: Fast implementation for complex measurement constructions.
- Phone: Top-of-mind brand awareness and first reaction attitudes.
- In-person: Hybrid quantitative/qualitative; depth probing of attitudes and beliefs by skilled interviewers.
- Mail: Allows time for respondent to think about complicated issues without pressure or interview influence.
- Intercept (central location testing): For both quantitative questions and for choice exercises in mock stores, and for physical product examination and concept testing.

### Table 2-5: Quantitative Marketing Research

<table>
<thead>
<tr>
<th>Method</th>
<th>Sampling Type</th>
<th>Optimum Use</th>
<th>Cost</th>
<th>Implementation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone Surveys</td>
<td>Random probability samples</td>
<td>Optimum use is for top-of-mind awareness, branding and brand comparisons, and perception studies.</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
</tr>
<tr>
<td></td>
<td>Best for mostly close-end questioning, when dimensions and ranges of issues are known.</td>
<td>Response rate is critical, especially with growing privacy issues and phone screening among consumers and business executives alike.</td>
<td></td>
<td>Skilled interviewer can extract more information than a self-administered method (mail, online)</td>
</tr>
<tr>
<td></td>
<td>Success depends highly on filtering sample to those consumer or business users who find topic or category relevant.</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10-12 average interview lengths is maximum target unless highly specialized population or incentives paid.</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
<td></td>
</tr>
<tr>
<td>Personal Interviews and Central Location Interviews</td>
<td>Random probability sample - OR- convenience sample, depending upon design. (Central location usually use a convenience sample, i.e. mall traffic)</td>
<td>High cost.</td>
<td>Can provide good hybrid method combining features of qualitative and quantitative research by asking quant-type questions first, followed by in-depth probing questions and projective techniques.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Used where a face-to-face environment is desired.</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>In B2B research, personal interviews may be done by appointment where interviewer goes to respondent's office.</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some special consumer studies may be done in-home by appointment.</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Often respondents are recruited to come to a central location, or recruited from mall traffic to a nearby office to conduct interview.</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Used for complicated or sensitive issues, B2B environments, or where extensive physical or visual display requirements exist along with need for specialized interviewing skills (depth probing, time for evaluation and reaction.)</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
<td></td>
</tr>
<tr>
<td>Online Surveys (Web Surveys)</td>
<td>Can employ true random probability sampling</td>
<td>Low relative cost</td>
<td>Generally, fast implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complicated survey questionnaire formats can be used. For example, piping, rating, rankings, constant sum questions, etc.</td>
<td>Sampling control is critical.</td>
<td>Large pre-recruited panels allow quick access to willing respondents, although sampling validity must be carefully assessed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Easy to display visual information previously available only in a face-to-face interview format. (Advertising copy, concept statements, projective stimuli, etc.)</td>
<td>Sampling control is critical.</td>
<td>Large pre-recruited panels allow quick access to willing respondents, although sampling validity must be carefully assessed.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Allows deployment of complicated respondent tasks. (card sorts, conjoint ratings, etc.)</td>
<td>Sampling control is critical.</td>
<td>Large pre-recruited panels allow quick access to willing respondents, although sampling validity must be carefully assessed.</td>
<td></td>
</tr>
<tr>
<td>Hybrid Surveys -- Methods</td>
<td>Hybrid methods combine two or more techniques to optimize response or measurement validity. Examples:</td>
<td>Higher cost</td>
<td>More time required for implementation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mail or phone invitation to online surveys.</td>
<td>Enhances quality through higher response rates, and better response quality or validity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Online surveys with phone follow-up to permit depth probing of key market research questions by expert interviewer.</td>
<td>Enhances quality through higher response rates, and better response quality or validity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Quantitative surveys from which participants are selected based on their answers for a follow-up qualitative phase (focus group, depth)</td>
<td>Enhances quality through higher response rates, and better response quality or validity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Panel recruited from a one-time quantitative survey.</td>
<td>Enhances quality through higher response rates, and better response quality or validity.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3-7-Marketing Information

The former relates to information describing the market only, while the latter refers to information concerning the marketing activities of the firm, their impact on and interaction with the market and their effectiveness in achieving marketing objectives. It is proposed a useful continuum of market information in following table (table 2-6): [Ref. 22]

Table 2-6 : continuum of market information

<table>
<thead>
<tr>
<th>Macro data</th>
<th>Industry information</th>
<th>Customer segment information</th>
<th>Customer purchase information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of buyers in market</td>
<td>Competitive forces</td>
<td>Buyer behaviour</td>
<td>Product usage</td>
</tr>
<tr>
<td>Demographic changes</td>
<td>Rivals' strength</td>
<td>Usage rates</td>
<td>Rates</td>
</tr>
<tr>
<td>Dominant economic characteristics</td>
<td>Innovativeness</td>
<td>Demographic data</td>
<td>Customer satisfaction levels</td>
</tr>
<tr>
<td>Interest rates</td>
<td>Nature of competition</td>
<td>Psychographic and lifestyle data</td>
<td>Benefits sought from purchase</td>
</tr>
<tr>
<td>Technology trajectory</td>
<td>Prospects for profitability</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Marty (1994)

Ref: The effectiveness of market information in enhancing new product success rates; By: Susan Hart, Nikolaos Tzokas, and Michael Saren

4-Types of information and marketing research in new product development

In order to relate the type of information to the types of decisions, for which it might be appropriate, it is necessary to examine in greater detail, the process of new product development.

During the pre-development activities, which tend to occur at the preliminary stages of the NPD process, where, as yet, there is no specific concept, which could be evaluated by customers, strategic market information is required (market/customer trends, need assessments, perceptual maps and so on). The types of market research study delivering information for these needs are known as “exploratory”. Exploratory research can be classified as either innovative or co-coordinative. For example, exploratory research such as purchase or consumption trends might be intended for reducing uncertainty about the potential target market for a developing product, in which case it would be classified as innovative. On the other hand, exploratory research describing usage problems with a particular product category will give an indication of the magnitude of the development task required to solve those problems, in which case the information is coordinative. These distinctions are important because they give insights into what can (and cannot) be achieved by using market information in pursuit of success. [Ref. 22]

The goal of “exploratory” marketing research is discovery. The underlying questions are, what is new? And what are we missing? The “exploratory” marketing research is conducted to open eyes and broaden the vision. [Ref. 23]

As the development process proceeds, the effectiveness of market information is related to the extent to which it provides specific methods for reducing more specific
points of uncertainty. This kind of research is generally described as “confirmatory”. [Ref. 22]

The goal of “confirmatory” techniques is resolution, the underlying questions are, is this the right choice? What results can we expect? The “confirmatory” marketing research is conducted to narrow the options and concentrate the efforts along the optimal path. [Ref. 23]

These observations of the different types of information required by the various stages of the NPD process have led to the development of a four-way classification of market information in new product development (See the table 2-7). [Ref. 22]

<table>
<thead>
<tr>
<th>Table 2-7: classification of market information in NPD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Focus of the search for market information</td>
</tr>
<tr>
<td>Types of market information</td>
</tr>
<tr>
<td>Innovative</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Co-ordinative</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Ref: The effectiveness of market information in enhancing new product success rates; By: Susan Hart, Nikolaos Tzokas, and Michael Saren

Regarding the above-mentioned, it can be concluded four principal in terms of market information and marketing research in NPD.

- **Principal I**: During the pre-development activities of the NPD process, the perceived utility of market information is higher when the focus of research is more exploratory than confirmatory. [Ref. 22]
- **Principal II**: During the pre-development activities of the NPD process, the perceived utility of market information is higher where it contains both innovative and coordinative information. [Ref. 22]
- **Principal III**: During the development activities of the NPD process, the perceived utility of market information is higher when the focus of research is more confirmatory than exploratory. [Ref. 22]
- **Principal IV**: During the development activities of the NPD process, the perceived utility of market information is higher where it contains both innovative and coordinative information. [Ref. 22]

Therefore, for both pre-development and development the innovative and coordinative information are required. The type of marketing research is crucial for distinctive of pre-development and development in NPD. “Exploratory” is more useful for pre-development stages and “confirmatory” is usually more practical for development stages.
Exploratory and confirmatory market research techniques are used at different stages in a research project's decision making (Following table). [Ref. 23]
Each activity requires different market research techniques as the researcher's informational needs change from initial exploratory information (Scan the Environment) to final confirmatory information (Evaluate Success). [Ref. 23]
The typical four decision-making activities in the table 2-8 are further described in relation to each activity's objectives and suggested marketing research techniques. [Ref. 23]

### Table 2-8: The typical four decision-making activities

<table>
<thead>
<tr>
<th>Activity/Questions</th>
<th>Objectives</th>
<th>Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scan the Environment</strong>&lt;br&gt;How are we doing?&lt;br&gt;What's going on?</td>
<td>Identify, describe, monitor</td>
<td><em>Main</em>: Secondary research, user visits&lt;br&gt;<em>Supporting</em>: Focus groups, surveys</td>
</tr>
<tr>
<td><strong>Generate Options</strong>&lt;br&gt;What are the possibilities?</td>
<td>Generate, define, explore</td>
<td><em>Main</em>: User visits, focus groups&lt;br&gt;<em>Supporting</em>: Secondary research</td>
</tr>
<tr>
<td><strong>Select an Option</strong>&lt;br&gt;What is the explanation?&lt;br&gt;Which option is best?</td>
<td>Evaluate, test, select, prioritize</td>
<td><em>Main</em>: Experiments, surveys, choice models, usability tests&lt;br&gt;<em>Supporting</em>: Secondary research</td>
</tr>
<tr>
<td><strong>Evaluate Success</strong>&lt;br&gt;What will we achieve?&lt;br&gt;How are we doing?</td>
<td>Measure, track, assess</td>
<td><em>Main</em>: Surveys, secondary research&lt;br&gt;<em>Supporting</em>: user visits</td>
</tr>
</tbody>
</table>

Ref: Using market research strategies with disability research results; www.ncddr.org/du/researchexchange/v05n01/strategyresults.html

The marketing research has some techniques, which fall under the categories of exploratory and confirmatory market research and include such as secondary market research, focus groups, survey and so on.

**4-1-Marketing information in NPD**

The fundamental role of market information in new product development is to reduce market uncertainty, which comprises consumer and competitive uncertainties, throughout the NPD process. [Ref. 22]
According to the new product development process and information, which are necessary to feed the NPD, there is a normative example of the inputs and outputs of the NPD process in the table 2-9: [Ref. 22]
Information collected in support of the activities of one stage enters the stage as information input, but by means of information processing, it is converted into a solution to the problem and can be seen as “information output”. Thus the information output generated by some activities can feed into other activities as input. [Ref. 22]

### 4-2- Marketing research in the different stages of NPD process

According to the new product development process section, there are a few definitions of different stages of NPD process. We can divide the new product development to two general phases. The first phase is pre-development, which can be called “portfolio management” and the second phase is development, which typically consist of:

- **a) Identification of opportunities**
b) Concept definition and test

c) Product and process development [Ref. 6]

In the pre-development phase, a firm should concentrate on product portfolio management. The role of market research in the product portfolio management is mentioned in the table 2-10: [Ref. 6]

**Table 2-10: The role of market research in the product portfolio management**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Necessary Data</th>
<th>Technical Analyses</th>
<th>Result Obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obtain market information</td>
<td>Product demand history</td>
<td>Regression</td>
<td>Future demand estimates</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Time series</td>
<td>Market growth rate</td>
</tr>
<tr>
<td>Obtain information on competitors</td>
<td>Number of competitors Products turnover</td>
<td>Descriptive analyses: measures-summary tables and graphs</td>
<td>Synthesis and information visualization</td>
</tr>
<tr>
<td></td>
<td>Consumption of each existing brand</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Ref: The Role Of Market Research during product development; By Luiz A.Castanheria Polignanao and Fatima Brant Drumond, Product and Market Development, 2003

The first stage of development phase is identification of opportunities. The use of market research in the identification of opportunities is summarized in table 2-11. [Ref. 6]

**Table 2-11: The use of market research in the identification of opportunities**

<table>
<thead>
<tr>
<th>Necessary</th>
<th>Analysis techniques</th>
<th>Results obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative research of consumers (individual and focus group interview), brainstorming, client service data</td>
<td>Descriptive analysis</td>
<td>Consumer needs, habits, attitudes, values and perception</td>
</tr>
<tr>
<td>Quantitative research of consumers to evaluate product attributes, preference or similarity of products</td>
<td>Factor Analysis, Multidimensional Scaling (MDS), Correspondence analysis</td>
<td>Perceptual map, Preference vector, Market segmentation, Market gaps</td>
</tr>
<tr>
<td>Competitors’ data (price, market, promotion, and product)</td>
<td>Descriptive analysis</td>
<td>Visualization of competitors’ strategies</td>
</tr>
</tbody>
</table>

Ref: The Role Of Market Research during product development; By Luiz A.Castanheria Polignanao and Fatima Brant Drumond, Product and Market Development, 2003
The second stage of development phase is concept definition and test. The use of market research to define and test product concept is summarized in table 2-12. [Ref. 6]

Table 2-12: The use of market research to define and test product concept

<table>
<thead>
<tr>
<th>Steps</th>
<th>Necessary Data</th>
<th>Analysis techniques</th>
<th>Results obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept Definition</td>
<td>Research of preference or purchase intention in relation to several concepts</td>
<td>Conjoint analysis</td>
<td>Identification of attributes which most affect preference. Prevision market share Selection of the best concept</td>
</tr>
<tr>
<td>Concept testing</td>
<td>Evaluation of concept perception</td>
<td>Descriptive analysis Factor analysis</td>
<td>Perceptual map Strong and weak points of the concept</td>
</tr>
</tbody>
</table>

Ref: The Role Of Market Research during product development; By Luiz A.Castanheria Polignano and Fatima Brant Drumond, Product and Market Development, 2003

The third stage of development phase is product and process development. The use of market research as support in product and process development is summarized in table 2-13. [Ref. 6]

Table 2-13: The use of market research as support in NPD

<table>
<thead>
<tr>
<th>Necessary Data</th>
<th>Analysis techniques</th>
<th>Results obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of the perception or acceptance of the prototypes and final product (market test)</td>
<td>Descriptive analysis Factor analysis Preference Map</td>
<td>Strong and weak points of the product from the point of view of the clients Prioritization of corrective measures</td>
</tr>
</tbody>
</table>

Ref: The Role Of Market Research during product development; By Luiz A.Castanheria Polignano and Fatima Brant Drumond, Product and Market Development, 2003

In the NPD process section (based on the [Ref. 22]), there was market test task, which can be concluded in the third stage of development phase. The above table also illustrates the use of market research in this task.
5- Chapter Summary:

In this chapter, we have reviewed the all-available literatures, related to the new product development process and marketing research. Moreover, we have found the effectiveness of marketing research in the new product development.

There are a number of stages and decision points in the new product development. A new product development begins from an ideation and turn out to the launch of product. On the other hand, a marketing research provides some specific information for the company. Furthermore, there are different kind of marketing research such as exploratory research and descriptive research. Also, we can categorize marketing research in terms of qualitative and quantitative researches.

On the whole, we have found in the literature which type of marketing researches should be used in new product development and in which stages and gateways the marketing research should be implemented.
Theoretical Frame of Reference

1 – Introduction

In the previous chapter, we presented a brief review of the literature related to our research questions. This chapter will provide the conceptualization, which constitutes the frame of reference for this study. Based on the literature review, we will in this chapter select relevant literature review that we will use in our research. Hence, the frame of reference will guide us when collecting the data and help us fulfill the purpose of gaining a better understanding of how marketing research is used in new product development process.

2 – Conceptualization

We would like to start by presenting the theories that will be used connected to our first research question, of in which stage of new product development process, marketing research should be implemented? Furthermore, this will be followed by theories connected to our second questions, of what are the types and objectives of marketing research during the new product development process? Since, we will find out the use of marketing research within new product development. Therefore, after identifying the stages and decision points in the new product development, we will focus on the different type of marketing research, which can be use in the new product development process.

2-1- Stages and decision points in new product development process

The new product development process is a tool that can help companies and organizations to successfully develop new products or upgrade existing ones through a series of logical steps, starting new from the process of idea generation and ending at the launch of the product into a market. [Ref.39] There are a few types of new
product development processes, which are used by many companies. Most types of new product development processes have some type of project review points. [Ref.28] One of the most famous NPD processes is Stage-gate process (SGP). The stage-gate process is an operational roadmap for driving new product projects from idea to launch. [Ref.29]

A stage-gate process is a conceptual and operational road map for moving a new product project from idea to launch. [Ref.40] Stage-gate is a widely employed product development process that divides the effort into distinct time sequenced stages separated by management decision gates. [Ref.40] The decision-making points in NPD process are related to the stages and gates of new product development process. The stages and gates of new product development process follow specific objective.

When a decision problem relates to firm performance, the need for marketing research is essential. A decision problem is a situation in which a manager has to decide on which course of action to take that will help to accomplish a specific objective. [Ref.19] The marketing research supports the decision-making points in a new product development process. The fundamental role of market information in new product development is to reduce market uncertainty, which comprises consumer and competitive uncertainties, related to the each stages and gate of NPD process. In the framework of using marketing research to reduce uncertainty, marketing research activities are custom-designed to fit the new product decision requirements. Marketing research projects identify types of data as well as expected results and they can be utilized in each phase of the product development process. Through this reflection, it was evidenced the importance of data gathering, its processing, and the use of the results in decision making for the success of the product under development.

2-2- Classification and different types of marketing research

Marketing research is the systematic design, collection, analysis, and reporting of data and findings relevant to a specific marketing situation facing an organization. [Ref.65] A simple view of marketing research is to find out what customers want, and to give them what they want. [Ref.13] Marketing research is a major source of information bearing on marketing decision-making. [Ref.24] The goal of marketing research is to provide the facts and direction that managers need to make their more important marketing decisions. [Ref.20] The marketing research process is generally described as a set of standardized phases. [Ref.19] There are different concepts for dividing the marketing research process to a few phases.

Marketing research process evolves from answers to five key questions: [Ref.17]

- Why should we do research?
- What research should be done?
- Is it worth doing the research?
- How should the research be designed to achieve the research objective?
- What will we do with the research? [Ref. 17]

Marketing research can be classified in two categories. The first one is “Exploratory” research and the second is “Conclusive” research [Ref.25][Ref.26] or “Confirmatory”
research. [Ref.22] The conclusive research comprises Descriptive research and casual research. [Ref.25]

- Exploratory research has the goal of formulating problems more precisely, clarifying concepts, gathering explanations, gaining insight, eliminating impractical ideas, and forming hypotheses. [Ref.20]
- Descriptive research is more rigid than exploratory research and seeks to describe users of a product, determine the proportion of the population that uses a product, or predict future demand for a product. [Ref.20]

In terms of data capture and analysis, there are two main types of marketing research: [Ref.67]

1- Qualitative research: The purpose of qualitative research is to plumb the depths and range of buyer attitudes and beliefs, not to measure incidence, project, or forecast quantity. [Ref.68] Qualitative research is a set of research techniques, used in marketing and the social science, in which data are obtained from a relatively small group of respondents and not analyzed with statistical techniques. [Ref.70] Qualitative marketing research generally used for exploratory purposes. [Ref.64] Popular qualitative marketing research methods include focus group studies, depth interviews triads (one interviewer, two respondents, and dyads (one interviewer, one respondent,) and observational techniques such as ethnography and, popular in marketing research, photo-ethnography. [Ref.66]

2- Quantitative research: Quantitative marketing research is a social research method that utilizes statistical techniques. It typically involves the construction of questionnaires and scales. Large numbers of people are contacted, usually in a survey. [Ref.71] Popular quantitative market survey methods include online survey, personal quantitative interviews, mail surveys, and telephone surveys. [Ref.66]

### 2-3- The use of marketing research in new product development

In order to relate the type of marketing information to the types of decisions in new product development, it can be concluded four principal in terms of market information and marketing research in NPD.

- **Principal I:** During the pre-development activities of the NPD process, the perceived utility of market information is higher when the focus of research is more exploratory than confirmatory. [Ref.22]
- **Principal II:** During the pre-development activities of the NPD process, the perceived utility of market information is higher where it contains both innovative and coordinative information. [Ref.22]
- **Principal III:** During the development activities of the NPD process, the perceived utility of market information is higher when the focus of research is more confirmatory than exploratory. [Ref.22]
- **Principal II:** During the development activities of the NPD process, the perceived utility of market information is higher where it contains both innovative and coordinative information. [Ref.22]

Therefore, for both pre-development and development the innovative and coordinative information are required. The type of marketing research is crucial for
distinctive of pre-development and development in NPD. “Exploratory” is more useful for pre-development stages and “confirmatory” is usually more practical for development stages.

Exploratory and confirmatory market research techniques are used at different stages in a research project's decision making (See table 3-1). [Ref.23]

Table 3-1: Exploratory and confirmatory market research techniques

<table>
<thead>
<tr>
<th>Activity/Questions</th>
<th>Objectives</th>
<th>Techniques</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scan the Environment</td>
<td>Identify, describe, monitor</td>
<td>Main: Secondary research, user visits</td>
</tr>
<tr>
<td></td>
<td>Generate Options</td>
<td>Generate, define, explore</td>
</tr>
<tr>
<td></td>
<td>Select an Option</td>
<td>Evaluate, test, select, prioritize</td>
</tr>
<tr>
<td></td>
<td>Evaluate Success</td>
<td>Measure, track, assess</td>
</tr>
</tbody>
</table>

Table 3-2: The marketing research methods -Identification of opportunities

<table>
<thead>
<tr>
<th>Necessary</th>
<th>Analysis techniques</th>
<th>Results obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualitative research of consumers (individual and focus group interview), brainstorming, client service data</td>
<td>Descriptive analysis</td>
<td>Consumer needs, habits, attitudes, values and perception</td>
</tr>
<tr>
<td>Quantitative research of consumers to evaluate product attributes, preference or similarity of products</td>
<td>Factor Analysis</td>
<td>Preference vector</td>
</tr>
<tr>
<td></td>
<td>Multidimensional Scaling (MDS)</td>
<td>Market segmentation</td>
</tr>
<tr>
<td>Competitors’ data (price, market, promotion, and product)</td>
<td>Correspondence analysis</td>
<td>Market gaps</td>
</tr>
<tr>
<td></td>
<td>Descriptive analysis</td>
<td>Visualization of competitors’ strategies</td>
</tr>
</tbody>
</table>

Ref: The Role Of Market Research during product development; By Luiz A. Castanheria Polignano and Fatima Brant Drumond, Product and Market Development, 2003

The marketing research has some techniques, which fall under the categories of exploratory and confirmatory market research and include such as secondary market research, focus groups, survey and so on. The marketing research methods within new product development process are mentioned in the following stages (See tables 3-2, 3-3, 3-4): [Ref.6]

1) Identification of opportunities [Ref.6]
II) Concept definition and test [Ref.6]

<table>
<thead>
<tr>
<th>Steps</th>
<th>Necessary Data</th>
<th>Analysis techniques</th>
<th>Results obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concept Definition</td>
<td>Research of preference or purchase intention in relation to several concepts</td>
<td>Conjoint analysis</td>
<td>Identification of attributes which most affect preference.</td>
</tr>
<tr>
<td>Concept testing</td>
<td>Evaluation of concept perception</td>
<td>Descriptive analysis Factor analysis</td>
<td>Selection of the best concept Perceptual map</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Strong and weak points of the concept</td>
</tr>
</tbody>
</table>

*Table 3-3: The marketing research methods - Concept definition and test*

The Role Of Market Research during product development; By Luiz A.Castanheria Polignano and Fatima Brant Drumond, Product and Market Development, 2003

III) Product and process development [Ref.6]

<table>
<thead>
<tr>
<th>Necessary Data</th>
<th>Analysis techniques</th>
<th>Results obtained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluation of the perception or acceptance of the prototypes and final product (market test)</td>
<td>Descriptive analysis Factor analysis Preference Map</td>
<td>Strong and weak points of the product from the point of view of the clients Prioritization of corrective measures</td>
</tr>
</tbody>
</table>

*Table 3-4: The marketing research methods - Product and process development*

The Role Of Market Research during product development; By Luiz A.Castanheria Polignano and Fatima Brant Drumond, Product and Market Development, 2003

In the NPD process section, there was market test task, which can be concluded in the third stage of development phase. The above table also illustrates the use of market research in this task.

In this research the main steps of product development, which required marketing information for decision-making, will be identified and recognized. Then in the other stage the suitable marketing research method will be suggested in terms of qualitative or quantitative types of research, data collection, research design, methodology, analysis and etc. on the other word, the different type of marketing research, collecting data, analysis, and will be selected.
3 – Emerged Frame of Reference

In this section we will present our emerged frame of reference. Figure 3-1 visualizes our frame of reference, showing the stages and decision points in the new product development process. Moreover, it shows the different classification and types of marketing research and which type of marketing research should be used in different stages of new product development process in order to make a decision.

4 – Chapter Summary

In this chapter, we have tried to categorize and use the literature information with the frame of research questions. First of all, we have introduced the stages and decision points in new product development process. Then, the classification and different types of marketing research have been presented. The use of marketing research in new product development was the most important section, informed in this chapter.
Figure 3-1: Stages and decision points in new product development process

**Classification and different types of marketing research**

Research

- Exploratory Research Design
- Conclusive Research Design
  - Descriptive
  - Causal Research
    - Cross-Sectional
    - Longitudinal Design

Qualitative
  - Focus Groups
  - Depth Interviews
  - Ethnography

Quantitative
  - Online
  - Phone
  - In-person
  - Mail
  - Intercept

**The use of marketing research in new product development**

Ref: Authors’ own construction
Methodology

1 – Introduction

Regarding the objective, Research questions, and literature review we intend to survey the use of marketing research during new product development in a case study of IKCo. The previous chapter showed how the literature has been conceptualized in this study and provided a visual explanation of the emerged frame of reference. Therefore, this chapter will cover the methodology used in this research. The selection of methodology is based on the research problem and state research questions. The general concept of the methodology chapter is presented in figure 4-1.

**Figure 3-1: Stages and decision points in new product development process**

<table>
<thead>
<tr>
<th>Research Purpose:</th>
<th>Exploratory</th>
<th>Descriptive</th>
<th>Explanatory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Approach:</td>
<td>Qualitative</td>
<td>Quantitative</td>
<td></td>
</tr>
<tr>
<td>Research Strategy:</td>
<td>Case Study</td>
<td>Archival Analysis</td>
<td>Surveys</td>
</tr>
<tr>
<td>Data Collection Methods:</td>
<td>Archival Records</td>
<td>Direct Observations</td>
<td>Participants Observations</td>
</tr>
<tr>
<td>Interviews</td>
<td>Focused personal Interviews</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sample Selection:</td>
<td>Judgment</td>
<td>Random</td>
<td></td>
</tr>
</tbody>
</table>
2 - Research purpose

Research strategies can be used for the three purposes: explore, describe, or explain [Ref: 72]. Exploratory studies aim for basic knowledge within the problem area. These studies are suitable when a problem is difficult to demarcate and when relevant theory is unclear. They are for the appropriate when important characteristics and relations are hard to determine. Descriptive research is appropriate when a problem is clearly structured but the intention is not conduct research about connections between causes and symptoms. The researcher knows what he or she wants to investigate but not the answers. Explanatory research is used for studying relations between causes and symptoms. The researcher tries to identify the factors, which together cause a certain phenomena. [Ref: 72]

Which category study belongs to depends on ambitions and knowledge within the research area. The research purpose of this thesis is mainly descriptive. This due to the fact that the research purpose is clearly structured and that this thesis wanted to gain a better understanding of what is the use of marketing research in process of developing new car in Iran Khodro Company? Moreover, the fact that we are not focusing on the connection between causes and symptoms also demonstrate that this thesis will follow a descriptive approach. However, this thesis is also somewhat exploratory. This due to that marketing research in NPD is a rather new area of interest for companies and also by the fact that we have not been able to find studies that focus on the exact same topic as we have chosen to do in this thesis. Towards the end of this thesis the authors’ own conclusions are presented by answering the research questions. In that sense, this is beginning to explain the issues that have been described. This makes our study mainly descriptive but with exploratory and explanatory influences.

3 - Research approach

There are two general approaches of a research, qualitative and quantitative. [Ref: 72] When conducting a quantitative research, statistical methods are used to analyze the data and a large number of respondents are selected, either randomly or judgmentally. A quantitative approach is formalized, structured and characterized by a high degree of control from the research. During a qualitative research one or few objects are studied in depth and the main purpose is to gain a deeper understanding of the problem studied and to acquire a profound knowledge of the studied objects. The qualitative approach is characterized by closeness between the sources and researcher, and a low degree of formalization.

The choice of research approach naturally depends on the defined research problem and the data needed for solving this problem. In this thesis, a qualitative approach is used. This is due to the aim of gaining a better understanding of what kind of marketing research should be used in NPD. Furthermore, in order to understand and characterized the use of marketing research in Iran Khodro’s NPD, A qualitative approach is the most appropriate. The stated research questions will require answers that probably cannot t be fully obtained by quantitative means.
4 - Research Strategy

There are five research strategies that a researcher can choose between in social science. [Ref: 72] These are experiments, surveys, archival analyses, histories, and case studies. The selection of these strategies depends on (1) the type of research questions. (2) The extent of control a researcher has over behavioral events, and (3) the degree of the focus on contemporary versus historical events. Table 4-1 shows the different research strategies in relation to these three conditions.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Form of research question</th>
<th>Requires control over behavioral events</th>
<th>Focuses on contemporary events</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>How, why</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Archival analysis</td>
<td>Who, what, where, how many, how much?</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>History</td>
<td>How, why</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Case study</td>
<td>How, why, Deep What</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Ref: Yin, RK 1994. Case Study Research: Design and Methods, 2nd ed

In this research, the type of research question posed is primarily of a “How” character. There is no control over the behavioral events, and the focus is on contemporary event. This will influence the choice of research strategy. An experiment is done when an investigator can manipulate behavior directly and precisely. This can occur in a laboratory. Focusing on isolated variables. Hence, in an experiment, control over the behavioral environment is required, and is therefore not possible in our research. Survey research is concerned with systematic gathering of information from respondents, generally in the form of a questionnaire. The use of questionnaires would not provide us with the better understanding of what is the use of marketing research in process of developing new car in Iran Khodro Company? And can therefore be ruled out as well. The historical methods deals with the past, and is used when no relevant persons are alive to report [Ref: 72]

As the above discussion indicates, two strategies seem to appropriate in our research, an archival and a case study. When conducting an analysis of archival information, the goal is to describe the incidence or prevalence of a phenomenon. The use of archival information is difficult when topic is a coming research area. Yin describes a case study as:

“An empirical inquiry that investigates a contemporary phenomenon within its real life context, especially when boundaries between phenomenon and context are not clearly evident.” [Ref: 72]

However, the preferred strategy when the questions are “how”, there is no control over behavioral events, and contemporary events are studied, is the case study. Therefore, the case study is selected as research strategy in this study.
5 - Data Collection Method

When conducting case studies, the data collection can rely on six different sources. [Ref: 72 ] These sources in cluded documents, archival records, interviews, direct observations, participant observation and physical artifacts. Table 4.2 shows the strengths and the weaknesses of each of the six sources of evidence.

Table 4.2: the strengths and the weaknesses of evidences

<table>
<thead>
<tr>
<th>Source of Evidence</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation</td>
<td>▪ Stable – can be reviewed repeatedly.</td>
<td>▪ Reliability – can be low.</td>
</tr>
<tr>
<td></td>
<td>▪ Unobtrusive – not created as a result of the case study.</td>
<td>▪ Biased selectivity, if collection is incomplete.</td>
</tr>
<tr>
<td></td>
<td>▪ Exact – contains exact names, references, and details of an event.</td>
<td>▪ Reporting bias – reflects (unknown) bias of author.</td>
</tr>
<tr>
<td></td>
<td>▪ Broad coverage – long span of time, many events, and many settings.</td>
<td>▪ Access – may be deliberately blocked.</td>
</tr>
<tr>
<td>Archival Records</td>
<td>▪ Same as above for documentation.</td>
<td>▪ Same as above for documentation.</td>
</tr>
<tr>
<td></td>
<td>▪ Precise and quantitative.</td>
<td>▪ Accessibility due to privacy reasons.</td>
</tr>
<tr>
<td>Interviews</td>
<td>▪ Targeted – focused directly on case study topic.</td>
<td>▪ Bias due to poorly constructed questions.</td>
</tr>
<tr>
<td></td>
<td>▪ Insightful – provides perceived causal inferences.</td>
<td>▪ Respond bias.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Inaccuracies due to poor recall.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Reflexivity – respondent gives what interviewer wants to hear.</td>
</tr>
<tr>
<td>Direct Observations</td>
<td>▪ Reality – covers events in real time.</td>
<td>▪ Time-consuming.</td>
</tr>
<tr>
<td></td>
<td>▪ Contextual – covers context of event.</td>
<td>▪ Selectivity – unless broad coverage.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Reflexivity – event may proceed differently because it is being observed.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>▪ Cost – hours needed by human observers.</td>
</tr>
<tr>
<td>Participant Observation</td>
<td>▪ Same as above for direct observations.</td>
<td>▪ Same as above for direct observations.</td>
</tr>
<tr>
<td></td>
<td>▪ Insightful into interpersonal behavior and motives.</td>
<td>▪ Bias due to investigator’s manipulation of events.</td>
</tr>
<tr>
<td>Physical Artifacts</td>
<td>▪ Insightful into cultural features.</td>
<td>▪ Selectivity.</td>
</tr>
<tr>
<td></td>
<td>▪ Insightful into technical operations.</td>
<td>▪ Availability.</td>
</tr>
</tbody>
</table>

Ref : Yin, RK 1994. Case Study Research: Design and Methods, 2nd ed
Archival records have the same strengths as documentation, but are also more quantitative and precise. Since this is a qualitative research, these later characteristics are not needed in this study. Direct observations will not be used either, mainly due to that it is extremely time consuming and very costly. This is also the case with participant observation. Physical artifacts are not relevant in this study either, since there is no real need for data on cultural features or technical operations. In this research the sources of documentation and interviews will be used. Documentation that will be used is mainly in the form of company information material. Documentation material will provide us with more information about the company, allowing us to obtain a clearer picture of how they handle Marketing research through New Product development phases. Interviews would be used due to its ability of providing a deep insight.

Interviews can be open-ended, focused or structured. In open-ended interviews, the interview does not follow any structured questions [Ref: 72]. One asks a respondent for both the facts of a matter as well as the respondent’s opinion about events, and the respondent might act more like information than a respondent. In a focused interview, the respondent is interviewed for a short period of time, like an hour. Here, the researcher is more likely to follow a certain set of questions, although the interviews might still assume a conversational manner. Finally, a structured interview is the most structured form of interview. The questions are clearly structured along with the lines of a formal survey.

In this study, a focused interview will be conducted since a certain set of questions needed to be answered during a limited period of time, in order to obtain data on the research questions. The interviews also have to be relatively open-ended, since we wanted to preserve the interview flexibility. We also wanted to be able use probing techniques, which is possible in focused interviews.

There are two types of interviews: personal and telephone interviews [Ref: 72]. In this research, the interview method used is a personal interview. A personal interview is used mainly for reasons of acceptable cost and time consumptions, and also due to the belief that the questions in this research could not be answered properly by way of telephone interviews. Before the interviews were conducted, an email would be sent to the respondents, explaining the area of research and overall purposes, forming a base for the following interviews. We also will have telephone conversations with several individuals including the respondent in the Iran Khodro Company. This gives us a good pre-understanding of the topic in general and especially how it works in each company. We believe that this gives us the possibility of obtaining the most exhaustive data related to our research questions.

During the interviews, a pre-conducted interview guide will be used (see appendix D). The same interview guide will be used during all interviews. However, the returned questions from the respondents give us hints on what to ask in each interview more specifically. This included that some questions could be ruled out and some questions deemed as necessary could be added in each interview. The interviews will be lasted around 60 to 80 minutes, and will all be conducted in Iran Khodro, which is the mother tongue both of the researchers and the interviewees. During the interviews, we both take and use a tape recorder in order to register the empirical data precisely.
6 - Sample Selection

In order to suite our research purpose, the sample collection would be followed some judgmental criteria. As discussed in chapter one, there is a need of investigating what is the use of marketing research in process of developing new car in Iran Khodro Company? According to Iran khodro intention to receive the result of this project this will facilitate the contacting phase and ease the establishment of a good relation with the respondents in this research.

The selection of respondent is crucial. [Ref: 72]. According to the nature of this study the sample selection was carry over form related department. [Appendix D ]. If the wrong departments are being selected, the research may turn out to be in invalid or worthless. During the first contact call with each department, the intention with the research as explained and the right person to speak with was identified. In order to fulfill the purpose of this thesis it is of great importance to get in contact with the persons with most knowledge and experience of working with Marketing Research and NPD. Since the chosen respondents at each department will be perceived to be the most appropriate persons both by their departments and themselves, we believe that this would be achieved.

According to the above explanation the conditions for selection persons and the right persons are introduced in appendix C.

7 - Analysis of Data

This research followed a qualitative approach. We started by studying already established theories within the area of different types of New Product Development [N.P.D] and continued with theories regarding the use of Marketing Research during New product development.

As we mentioned before during a qualitative research one or few objects are studied in depth and the main purpose is to gain a deeper understanding of the problem studied and to acquire a profound knowledge of the studied objects. The qualitative approach is characterized by closeness between the sources and researcher, and a low degree of formalization.

We found it appropriate to start with the theories to get a foundation for research to be able construct the questions in the interview guide and then later on logically to try to draw conclusions based on knowledge and empirical findings. The statistic analysis for the quantitative approach would not have been suitable to use in since in this study, a focused interview will be conducted.

8 – Quality Standards: Reliability and Validity

There are two important criteria that can be used to determine the quality of a research: the reliability and the validity. [Ref: 72]. In order to obtain validity the researcher should ask himself the question Do I in my research with this choice of method measure what I intend to measure? Reliability is defined, as measuring tool ability to give stable and reliable data. When measuring the reliability the researcher should ask himself: Would I get the same or similar result if I were to use the same techniques repeatedly?
The goal of reliability is to minimize the errors and biases in a study. The objective is that if a later researcher follows the same procedures as described by a previous researcher and conducts the same case study all over again; the later researcher should arrive at the same finding and conclusions as the previous. One prerequisite for the researcher to be able to repeat a previous case study is that the procedure followed in the earlier case are documented. Hence, a good guideline is to conduct the research so that an auditor could repeat the procedure and arrive at the same result.

In this study, we have tried to map out the procedures involved in detailed throughout the study. Firstly, we have tried to develop clear research question that guides these research. [Appendix C]. Secondly, the steps that have been taken in order to collect data on this research question have been thoroughly described in this chapter. Furthermore, the respondents have been sent a base of information regarding the area of research and overall purpose for this thesis before the interview. An interview guide was developed, showing how we have conceptualized the research questions. [See Appendix C] However, despite these attempts of maintaining a high reliability in this study, personal biases are always present to some extent when conducting interviews. Hence, we cannot be sure of the influence of attitudes and values of the respondents and us in the study. Regarding the validity of this study, the establishment of a chain of evidence, this study builds upon existing theories related to our research questions, and follows this base throughout the research. Hence, the data collected on the research questions are derived overlooked, which might have an impact on the validity.

Analytical generalization is concerned with generalizing a particular set of result to some broader theory. In this study, a multiple-case study has been conducted, which might be considered to give a better base of generalization than a single case study.

9 – Chapter Summery:

This chapter illustrated the methodology of this thesis. The research purpose of this thesis is descriptive and its research approach is qualitative. Moreover, the research strategy was defined as a case study.

The data are collected through interviews and reviewing the current documentation. Sample selection is done by judgment. Hence, the validity and reliability have been explained in the last section of this chapter.
DATA COLLECTION

1 – Introduction

In the pervious chapter, the methodology of the research was discussed. In this chapter, the empirical data collected from each of the specialist investigated will be presented. According to the role of different departments in IKCo new product development 2 main departments in Ikco organization were selected (see chapter 4-sample selection) which directly involve in the NPD process a) Research and development Center and b) Sales and after sales department then we have selected the relevant section of the mentioned departments to be interviewed. The interviews investigated are from Vehicle Engineering, Product Planning, Benchmarking sections of Research and development Center and Marketing Research and Sales sections of Sales and After-Sales departments.

In the Data Collection presentation, the interview will be referred to as the department name. The empirical data is presented in a manner that addresses the two main research question of this study. The data is collected based on the information collected from these interviews and the archival records, which referenced in chapter four. First the archival records are presented and then the interviews information will be presented.

2– IKCo PRODUCT DEVELOPMENT PROCESS (PDP)

2-1- IKCo Business Vision:

According to the R&D documents the role of a PDP should develop IKCo’s three Business Vision outlines, which are:

- To reach world-class quality & competitiveness for its products in order to benefit from the expected liberalization of the Iranian market. To be able to compete with products & sales strategies of foreign OEMs in an open global market
- To design & develop “Ikco Brand” vehicles with a high level of local content, setting the path of industrial leadership, with resultant benefit to the country and its people
- To bring to market a new line of world-class vehicles, enabling significant export opportunity with neighboring countries and the whole region, thus promoting business growth
2-2- **IKCo Definition: Product Development Process (PDP)**

It is a system by which IKCo plan, design, develop, and launch new vehicles. The function operates as a process for sustaining and growing profitable IKCo manufacturing operations by continuously bringing to market self-engineered “IKCo Brand” products that meet both customer and the corporate needs.

2-3- **Scope of the PDP:**

IKCo PDP comprises a MAIN PROCESS, key sub-processes with supporting methodology and procedures and scope of the MAIN PROCESS is: [Ref: 73]

1. The guiding philosophies of Concurrent Engineering & Supply Chain Management.
2. The top level activities for design, production set up and launch of a new / freshened vehicle.
3. IKCo Management Method, comprising 9 key elements
4. The Gateway Process, with generic deliverables & Quality of Event discipline
5. A Prototyping Process, utilizing 3 steps for implementation

According to decision-making Level the PDP will be cascaded to three levels as shown in the figure 5-1 and in each level the Quality of Event will be control with different tools.
- Level 1: Program Master Plan
- Level 2: Major Activity Timing Plan
- Level 3: Sub-Activity Work plan

**Figure 5-1: The PDP different Level**

Ref: Ikco “PDP83 Main Process” Document
2-4- Scope of the Main Process

IKCo Main processes should cover top-level activities for design, production set-up and launch that comprise:
- Program & Product Planning
- Product Definition, Styling & Surfacing
- Vehicle System design, development, validation & Sign Off
- Vehicle Assy Process design, development & validation
- Production Tooling, Equipment & Parts supply / logistics
- Manufacturing systems design, development and validation
- Manufacturing Facilities installation & commissioning
- Pre – Production Prove Out for Mass Production

2-5-The Gateway Process

As it was mentioned in the literature review in chapter two there are a few types of new product development processes, which are used by many companies and most types of new product development processes have some type of project review points, one of the most famous NPD processes is Stage-gate process (SGP). The stage-gate process is an operational roadmap for driving new product projects from idea to launch. In IKCo the PDP will be mange by the Gateway Process, which consider as a stage-gate process in the literatures.

2-5-1- Definition:

A Gateway is a management review of Program progress, checked against a preset plan. It focuses on deliverables committed to by the team and progress on the definition/control of Program& Product Targets / Objectives. Each review is called a program “EVENT” and is shown on the Figure 5-2. (The PDP Main Process) [Ref: 73]

2-5-2- Principle:

In a “Gateway Process” Program Teams conduct Gateway Reviews in order that the Program Steering Team on the health of the program can brief Ikco executive management and authorize continuation of pre-planned activities, onto the next Gateway. This “health” review enables all program activities to be measured against detailed plans and recovery action taken if necessary to ensure achievement of the Program objectives.

2-5-3- Method:

A Quality of Event (QOE) is planned for each Gateway Review. This refers to the status of required deliverables and program / product targets. A “TRAFFIC LIGHT” system is used as the management graphic for describing the status on each deliverable / target which describe in the table 5-1.
Table 5-1: The TRAFFIC LIGHT system

<table>
<thead>
<tr>
<th>Review Graphics</th>
<th>Status Code</th>
<th>Consequence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RED</td>
<td>The deliverable has not been achieved / target cannot be achieved. There is no recovery work plan to complete the deliverable / target achievement forecast before the next gateway. Input status to cumulative Program Status</td>
</tr>
<tr>
<td></td>
<td>AMBER</td>
<td>The deliverable has not been achieved / target cannot be achieved. There is a recovery work plan to complete the deliverable / target achievement forecast before the next gateway. Input status to cumulative Program Status</td>
</tr>
<tr>
<td></td>
<td>GREEN</td>
<td>The deliverable has been achieved / target is forecast to be achieved. Input status to cumulative Program Status.</td>
</tr>
</tbody>
</table>

Ref: Ikco “PDP83 Main Process” Document

2-5-4- Gateway Review Statuses:

Deliverables / Target status is collated onto a matrix and the overall or “cumulative” Program Status determined.

I. **Red Status Code**: If the Program status is RED then executive management will STOP the Program until recovery plans are available. In order to quantify a STOP directive a minimum of the Program Manager, Director of R&D Center and Vice President- Iran Khodro, will conduct a critical review of the deliverables / targets matrix with associated risk analysis (provided by the Program Manager).

II. **Amber Status Code**: If the Gateway Review is cumulative AMBER then executive management will authorize continuation of the Program to the next gateway, with the Program Manager providing a continuous review of approved recovery plans up to the next gateway.

III. **Green Status Code**: If the Gateway Review is cumulative GREEN then executive management authorize continuation to the next gateway.
2-6- PDP Phases :

The PDP Main Process is divided first into five phases. These phases group all activities into a logical progression from start to finish, for a new or freshened vehicle program. [Ref: 73] The Gateway events are linked to these phases, as shown in the figure 5-2.

1- Advanced Planning (Pre-production Stage)
2- Planning
3- Planning which include two main phases
   - Product design and development
   - Process design and development
4- Product and process validation
5- Production

Figure 5 -2: The PDP Main Process

There are five main stages in PDP, which in following the current statues of different marketing research through different stage of PDP will be presented:

Stage 1: Advanced Planning

The Advanced Planning phase has been constructed to guide the project team through the various stages of the product planning process. Through the advanced Planning phase the project team could explain facets of constructing a comprehensive concept proposal to a new product and justifying the proposal with a robust commercial business case. The Advanced Planning results are essential in establishing and controlling new product development during different phase of development. A well
researched and executed planning process can save considerable time and cost in the
development of new product as well as ensuring a greater degree of success for the
product in the market place.

**Stage 2: Planning**

The main deliverables that need to be achieved at the end of this stage are: The macro
studies in case of product, market and feasibility study (mechanical & economical) for
the whole of project and also primitive project design such as primarily programming,
organizing and staffing done at this stage. Moreover, this stage the reports of
analyzing the customers’ needs, new market needs and the reports of needs
explanation are presented. other most important other deliverables of this stage are:
Benchmarking report, choose the best vehicle report, legislation & legal in target
market, customer wants and needs, customer behavior & purchasing power reports,
interior and exterior themes. Idea generation could be done in inner sources or outer
sources.

**Stage 3: Product and Process design & development**

The main deliverables that are delivered at the end of this stage are Plans for auto
design, detail design, trim, BIW (body in white), CAE (computer aided engineering),
feature list, add & delete list, kitting list, BOM (bill of material) based on attribute
table and the samples of product such as: clay model, simulator, EP (evaluation
prototype) and VP (verification prototype).In this stage some style alternatives would
be developed by paint model or physical model.

**Stage 4: Product and Process validation**

The main deliverables that need to be achieved at the end of this stage are the final
stage of NPD, these cases are delivered: Final BOM, jigs & fixtures, dies and tools,
production line, part catalogue, auto repair direction, auto user direction and market
plan.At this stage prototype models are made on the basis of the best style from
previous stage. At the end of this stage we have a complete which may change less.

**Stage 5: Lunch**

In this stage the product is in the ramp up period and the minor change will be done to
meet the production plan.

**2-7- PDP Gateway Regime:**

Each Gateway / Milestone is identified by a summary statement of the deliverables
completed on, or prior, to the Gateway Event date[Ref: 73]. (Figure 5-3)
In addition to the Program Gateways a set of Program team Milestones are used to monitor the remaining major Program “ check points “. According to IkCo PDP documents The Gateway headline deliverables are as follows:

1. The deliverables in KO (Kick Off) Gateway:
   - Start program specific work in line with PVO (Product Vehicle Outline)

2. The deliverables in PSP1(Pre-Strategic Plan 1) Gateway:
   - Basic program viability established

3. The deliverables in PSP2 (Pre-Strategic Plan 2) Gateway:
   - Define alternatives to be studied

4. The deliverables in SP (Strategic Plan) Gateway:
   - Compatible product / business proposition & new technologies identified

5. The deliverables in SR (Strategy Ready) Gateway:
   - Powertrain line up selected & vehicle system / sub system level 1 targets committed

6. The deliverables in PS (Package Sign Off) Gateway:
   - Proportions & selected hard points frozen
   - Level 2 sub system targets committed

7. The deliverables in PA (Program Approval) Gateways:
   - Theme approval for ext / interior ( Styling Sign Off )
   - All targets become objectives
   - Facilities & tooling investment approved

Ref: Ikco “PDP83 Main Process” Document
8. The deliverables in ST (Surface Transfer) Gateways:
   - Approved theme refined
   - Transfer of ext / int surfaces begins

9. The deliverables in PT (Powertrain Design Complete) Gateways:
   - Powetrain analytical design verification & calibration complete

10. The deliverables in DC (Design Complete) Gateways:
    - Evaluation Prototype Critical Tests Complete

11. The deliverables in VR (Validation Ready) Gateways:
    - “Make like production” prototype parts & assy tools
    - First VP offline for tuning & durability test

12. The deliverables in CC (Change Cut Off) Gateways:
    - Preliminary Engineering Sign Off (Stage 1)
    - No further design changes except NO BUILDS
    - All PSW parts available for TTO / Methods build

13. The deliverables in PO (Production Prove out Ready) Gateway:
    - Final Engineering Sign Off
    - All production assy tools have been functioned at tool source in home line
    - All PSW parts available for 1PP build

14. The deliverables in LS (Launch Sign Off) Gateway:
    - Production feasibility assessed
    - TTO & 1PP complete
    - All PSW parts available for 2PP build (Locally Sourced)

15. The deliverables in J1 (Production Ready / Job # 1) Gateway:
    - 2PP & Operator training complete
    - First Saleable Vehicle Built
    - Volume Ramp up begins

16. The deliverables in FS (Final Status) Gateway:
    - Customer feedback – first 3 months
    - Lessons learned
    - Market Acceptance
    - Financial Report

2-7-1 Program Time Scaling:

The timing of each new product program (figure 5-4) is controlled by a timing matrix, in which the combination of platform, vehicle and powertrain content determine which IKCo time “scale” will be apply. The timing of each Gateway & Milestone in any specific Program is described in a synthetic timing template, based on the matrix format. [Ref: 73]
A reality in the automotive industry is the incredible lead-time required between concept initiations and bringing an actual vehicle to market. For example, the Chevrolet Venture minivan, which is just now coming to market, had its initial consumer research conducted in May 1991. Delays in a product development program, even minor ones, can run into millions of dollars in costs. As a result, there is constant pressure to reduce the time requirements across all aspects of vehicle development.

Automotive product research has not been immune to these pressures. Research suppliers to the automotive industry have been consistently pressed over the past several years to do it "better, faster and cheaper" than ever before. Subsequently, computerized data collection came into use in the early 1990s as a way of addressing these competitive pressures. Technological innovation in both hardware and software allowed a few other market research companies to begin using computer-assisted self-administered interviews (CASI) in automotive consumer clinics at that time.

2-8-1 Consumer Clinics Concept

Automotive consumer clinics have been around for more than three decades, since the early 1960s. They were a natural outgrowth of the automobile manufacturers’ interest in conducting consumer research on current and future vehicles. In order to conduct
the research, manufacturers felt they had to show actual vehicles to respondents as test stimuli to provide a realistic environment for evaluation. Cost, timing and logistical considerations dictated that these events occur at centralized locations, with qualified respondents being invited to attend. Although computers have dramatically affected data collection and processing, clinics are not otherwise very different from their early incarnations.

The target population for an automotive clinic is typically defined as the new car buying public. There is no readily available sample frame to identify new car intenders, so most often new car owners are used as a proxy for intenders. Owners are identified through registration and sales data via companies such as R.L. Polk, TRW and Survey Sampling.

A clinic is generally conducted in a single city due to cost, timing and logistical constraints. A city may be selected because its vehicle sales profile closely corresponds to national sales data, based on perceptions that it is leading-edge from a design perspective, or simply due to the fact that it has an adequate number of registrations for a particular set of vehicles to facilitate sample acquisition. Although external validity is a real concern, the limitations previously noted are bolstered by extensive historical data that suggest, for example, that a Ford Taurus buyer in Los Angeles is similar in expected ways to a Taurus buyer in Nashville. Geographical considerations may come into play with respect to characteristics such as front wheel versus rear wheel drive or sales penetration of leather interiors. In situations such as these, studies may be conducted in multiple locations if the issue is key to the research objectives.

Clinics are very eclectic in nature; objectives differ dramatically. Subsequently, research designs vary across a wide range of alternatives. For example, sample sizes can range from as few as 50 people to as many as several thousand. Stimuli may be limited to a handful of vehicle photographs or include more than 90 vehicles on display. However, for purposes of clarification, a typical automotive clinic might have the following characteristics:

1. It would usually be fielded in a limited number of locations, most often a single city with adequate retail sales volume in the product segment of interest (e.g., midsize cars) to facilitate drawing an appropriate sample.

2. Logistically, a central location such as a convention center hall is normally utilized. Facilities must allow for vehicle access since actual cars are used in the evaluations.

3. Most studies include production vehicles; the number may range from two to 60 or more. A study with two vehicles may be a benchmark comparison. A study with 60 vehicles may be attempting to cover vehicle alternatives across several major market segments.

4. Quite often, prototype vehicles are included in the research. A prototype is usually a fiberglass replica of a production automobile. At first glance it is almost indistinguishable from a real car, though it has no powertrain, and most buttons and switches on the interior are non-operational.
5. Our typical sample might consist of 500 owners within the market segment of interest, stratified by vehicle nameplate and drawn proportionally to their relative sales volumes. Names obtained are a random subset of vehicle registration or sales data within a 40 mile radius of the zip code of the facility we are using.

6. Respondents are recruited to participate via phone or mail and an appointment date and time is set. An invitation is sent to the respondent along with a map and directions to the facility. Respondents are typically staggered at 15 or 30 minute intervals to reduce flow congestion. Approximately 5-6 respondents are scheduled at each interval.

7. Respondents arrive at their scheduled time and participate in a self-paced, self-administered survey. An orientation is given as an overview of the study and to provide guidelines to help a respondent pace the interview.

8. The respondent then begins the survey, which typically includes detailed evaluations of some subset of the display vehicles. It may also include other topics such as new feature evaluations. Nearly all information collected is numeric, either ratings scales or descriptive categories. Open-ended data are usually collected by an interviewer at a pre-specified point in the survey.

9. The entire process takes about 2 ½ hours, on average, to complete. Respondents are paid a participation incentive.

According to the fact that IKCo benchmarked its production system form PSA¹. The PSA experience on clinic will be presented in following and then compared with IKCo situation.

2-8-3 PSA experience on clinic

At each stage of the design and development of a new vehicle development [see figure 5-5], more than 300 drivers from all over Europe are questioned by PSA, and their replies analyzed. The timings shown on this diagram can be shortened depending on the models (as was the case with the Xsara Picasso). The aim is to offer a product of impeccable quality that corresponds to the requirements of a multifaceted international clientele. [Ref: 73]

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¹ PSA Peugeot Citroen car manufacturer Group (www.psa-peugeot-citroen.com)
2-8-3-1. Concept tests:

[Timing: Between 250 and 230 weeks before series production start-up]

These surveys are carried out well upstream of the project, in the preliminary phase. It is a question of making a choice between several proposals, each of which illustrates a different concept. On average 5 or 6 life-size models showing the exterior spirit of the vehicle (coupe or saloon) are tested. This is applied to all vehicle ranges, including the niche vehicles.

- IKCo Case: This marketing research was not carried over as normal case in all the new product projects. In a few projects (such as: PIKA) this Marketing Research were carried out in a Qualitative type.

2-8-3-2. Style clinics:

[Timing: Between 160 and 140 weeks before series production start-up]
Again carried out on a representative sample of targeted clients, these tests, known as «clinics», help us assess the attraction of the exterior style of the future car, compared with what the competition is offering. Of course, depending on the results, possible style modifications will then be made to the vehicle. A life-size model is presented in physical form, surrounded by five or six of the main leading vehicles in the segment concerned. In order to avoid any bias in the survey, all the vehicles shown are the same color, with badges removed (i.e. no indication of model), and arranged in a semicircle in the room. These tests proceed in two stages:

1/ A) Quantitative phase, during which the interviewees are asked to mark the vehicles according to a number of criteria: exterior style, image, perceived qualities ... Analysis of the questionnaires then provides figures on the strong points and weak points of the model being tested.

2/ A) Qualitative phase, in the form of individual discussions and group meetings. This phase provides in-depth analysis and understanding of the group results obtained during the quantitative assessment.

- IKCo Case: According to IKCo experience in NPD Projects (such as NP project) this Marketing Research were carried out only in Quantitative type. And like the Concept tests this marketing research was not carried over as normal case in all the new product projects.

2-8-3-3. Color and trim tests:

[Timing: About 77 weeks before series production start-up]

These tests are of a very different nature. They involve making harmonious choices between various style proposals. The customers have to give their opinion on the vehicle’s exterior shades, as well as on different interior trim creations, whether for the seats, the door panels or the dashboards.

- IKCo Case: According to IKCo experience in NPD Projects this Marketing Research were not carried out as a normal case in those project.

2-8-3-4. Marketing surveys (commercial clinic):

[Timing: About 38 weeks before series production start-up]

While the enquiry procedure is fairly similar to that of a style clinic test, the objective is however very different; at this stage of the project, there is no longer any question of changing anything whatsoever on the car. On the other hand, the sales launch must be prepared, especially in terms of the promotion. The marketing test therefore works along these lines, to help the various players refine the vehicle’s positioning. Positioning the model entails: asserting its identity, promoting its strong points, highlighting what makes it stand out from the mass of other vehicles by conveying its differences.

- IKCo Case: According to IKCo experience in NPD Projects this marketing research were carried out only in Quantitative type. Due to Management
decision this marketing research was carried over as normal case in all the new product projects.

2-9- IKCo’s Sales and after sales department Comments:

The first department investigated was IKCo Sales and after sales organization and here the data obtained from interview will be presented through the frame of reference of this theses.

The two departments were selected to be interviewed are:

1. Sales Deputy
2. Marketing Department

2-9-1 The Roll of Marketing Research: Recommendations

Currently IKCo new product development needs to be more Customer Oriented and the lack of suitable marking research during different stage of PDP is considerable:

“We (IKCo) don’t pay enough attention to market trend and customer needs and also economic aspect of product. We must pay more attention on market and economic aspect of product development rather than engineering. Usually we don’t have sufficient market oriented test at stage 1. Ideas are succeeded just on the basis of our person and manage opinion. Its necessary that we have a good market test with predictive nature at each stage of NPD and according that set preliminary economic plan to develop the new product.”

In order to find out, which marketing research should be carry out during different stage of Ikco new product develop we categorized the interview answer based on PDP different stage as follows:

Stage 1: Advanced Planning
Customers’ wants and needs are important issues for this stage. Moreover, it is expected to choose a style trend for both interior and exterior views of the car. The general product definition and the mission of the product should be tested in this stage. Thus we have to identify the customers’ characteristics and potential customers, who foresee to purchase the car. These issues must be done based on the result of marketing research.

“We (IKCo) don’t pay enough attention to marketing research. Many car manufacturers in the worlds class insist on the marketing research in the very beginning phase of NPD. IKCo has implemented a incorrect marketing research for PK project and there was no marketing research for Samand.”

It is rarely care about this marketing research in IKCo. According to the nature of this information, both qualitative and quantities research are required, but in IKCo just quantitative is considered.

Stage 2: Planning
In this stage, we need to find out a suitable concept of the car. In order to realize and select an eligible concept, a market research should be planned and carried out. The
type of research was recommended by qualitative research due to comparison of the concept with the picture or models of competitors.

“We (IKCo) need to test the concepts, which are developed by R&D center to recognize the eligible one and achieve to the weaknesses of the designed concept. Usually, we have got 2/5 models of the concept. This process was done for new products such as PK, NP and 206 notchback in IKCo, but not for old products such as Samand.”

Sometimes, we need to implement two marketing research in order to achieve a complementary data from the customer. Ordinary the second one will support the first one. We can get some additional information by carrying out the second marketing information. However, it is not always essential to implement the second one. Actually, it depends on the company requirements, nature of concept and other factors.

**Stage 3: Product and Process design & development**

At the secondary stage, setting feature list, attribute table must be done according to marketing research. Style is delivered in this stage and it will also freeze at the end of this stage. There are different kind for testing and selecting suitable style. One of the most vital tool is marketing research through showing the models to the potential customers in the different target markets.

“According to the NPD process for Sam and in IKCo, there was not any action for Samand Style marketing research. For the PK and NP projects, we carried out style clinic, but they were just quantitative. In this stage, the needed information had been gathered just by questionnaire or personal interviews. In order to get better imagination, it is recommended to have qualitative research as well.”

It is usual to show the designed style by picture or models and compare with the potential competitors vehicles. It preferred to present the style by 1/1 models beside the other competitors. The color of all product should be the same and it is suggested to be silver color. Selection of the suitable style is one of the important aims of the clinic, but one of the other important purposes is to find out the weaknesses and strengths of detail styles in comparison with competitors style products in terms of beauty, image and so on.

**Stage 4: Product and Process validation**

The trim of the vehicle will be freezing in this stage. As usual, there are different kind of method to confirm the eligible trim. Marketing research through showing the 1/1 models is the most common method to find out the solution. On the other hand, at this stage company needs gradually to identify and candidate the commercial colors for the new vehicles. Usually these two aims will be follow through one marketing research in this stage.

“The aim of this research is descriptive and with the help of questionnaire and interviews techniques, the quantitative preliminary needed information will be gathered from the customers. Also at this stage, in addition to quantitative research, the qualitative one must be used. Never IKCo had the color and trim test. Due to
competitiveness of Iran Auto market, so far it did not sense as a critical issue to the Iranian customer.”
Selection of suitable color and trim is the aim of this marketing research. Company wants to know that which colors of the new vehicle have the most intention for the customer and why.

**Stage 5: Launch & Production**

The market plan needs to be identified in this stage in order to make the 4P (product, price, promotion and place) for new vehicle. In order to provide some information for market plan, company has to plan and design a marketing research. The commercialization of vehicle will be established after this commercial marketing research.

“In IKCo, the marketing research will be usually done through quantitative research therefore, maybe some information will be lost. It would be better that at this stage we use combinable of quantitative and qualitative. The real car will show to the potential customers and it will be compare with other potential competitors.”

The different variants of the vehicle will be recognized and decided on this commercial marketing research. Moreover, the price of different variant should be identified. The policy of advertising and promotion should be dictated based on the customers’ viewpoints, which have achieved in a deep interview.

The marketing research can also be categorized based on deliverables list for each gateways of PDP, therefore there are eight marketing requirements should be achieved through these five stages:

1. **Ideation:**
   - Sources are customers, suppliers, personal and …
2. **Primarily test:**
   - It should be done by a committee consist of marketing and technical experts. Methodology at this stage is Delphi and focus group on nominal group.
3. **Preliminary plan:**
   - It should have two parts, marketing Research to forecast the economic situation and product description in detail.
4. **Concept test:**
   - It could be done with two groups, customers and experts. Qualification methods like as focus group and depth interview and also for decision-making at this stage we need some secondary data such as our previous consumer behavior research.
5. **Concept to style:**
   - Concepts Developed based on different styles alternatives and models under steering committee management.
6. **Style test:**
   - It should be method oriented and done in a safe environment, also respondent consist of end users and some experts. At this stage, we can use combination of qualification like as word association and projection techniques, and quantitative survey. In quantitative, we can
find out new ideas and describe customers needs and orientation and in quantitative we lead to prediction of market demand.

7. **Style to product:**
   - Development styles to final product and it takes the most part of the time of the process. At development stage wherever it’s necessary we can do market survey.

8. **Product test:**
   - Most of the time it will be quantitative marketing Research. The aim of this stage is to predict market success of product. Maybe some simulation tests are necessary.

Unfortunately there are lots of new product development projects, which initiatives fail in IKCo. Some don’t get off the drawing board or are dropped in the early stages of prototyping.

“Yet, despite this sorry history New Product Development project still don’t make use of all the tools available for improving the new product development (NPD) process. Levels of management awareness and a lack of faith in the usefulness of research tools as important factors in the under use of such tools to improve product development.”

Given the problems IKCo specialist identify, it is worth discussing:

- The poor standards of marketing research knowledge and awareness among marketers.
- The problems with existing NPD research tools.
- Don’t use the market research tools in the appropriate time and process (Most of the marketing research will be done in the first and last stages of PDP and for the development stage in the middle phase the lack of this research due to the other project is completely clear.
- Using and involving marketing research companies.

The Second department investigated was IKCo R&D Center and here the data obtained from interviews will be presented through the frame of reference of this thesis. The three departments were selected to be interviewed are:

1. Vehicle Engineering
2. Benchmarking
3. Consultancy in Marketing area

**2-10- IKCo’s R&D Center Comments:**

IKCo new product development is going to change in order to introduce improvements to innovation performance. The project objectives consisted largely of the Iranian customers needs and want and converting this information to product Key attributes therefore IKCo can benefit from its core competencies.

“*The IKCo’s New Product Development team must design a logical and flexible workflow process that matches the nature of the IKCo’s structure, technologies, and markets. ”*
At a strategic level, the team should determine how customers and suppliers will be integrated into the process, how the process will integrate technology, manufacturing, marketing, and operations strategies, and how creative ideas will be generated and pursued. At a tactical level, the search for the "details" of the new process design often involves a search for best practices-those activities that have been successfully used by other organizations. For example,

"According to Ikco different projects on NPD Cross-functional development teams have been identified as a best practice appropriate to IKCo NPD situations."

In benchmarking with the different project, the IKCo should purposefully considering another organization's NPD process, and attempt to distill the important design characteristics and principles that it could also implement. Competitive environment in Iran auto market is going to be very serious and like the other world Auto industries Time-to-Market and Time-to-Customer are very important in Iranian one, and also the product development process is an important area of research for the IKCo as the biggest auto manufacturer. [Ref: 73]

**Figure 5-6; Customer Feedback during PDP**

You can also see in the figure 5-7 speed of decreasing lead-time for introducing new product development during the last 10 years in Iranian car manufacturers. [Ref: 73]
Furthermore, innovation techniques to implementing the customer needs and wants during different stages of PDP should be used to shorten project lead-time and raise the efficiency of the product development (PD) projects (see figure 5-7) and improvement then in the PDP should lead to improvement in IKCo’s competitive position.

In order to relate the use of marketing information to the types of decisions in new product development, at first we should consider the deliverables expected (see figure 5-8) for each gateway. [Ref: 73]
According to the information required in each gateway of PDP we could categorize the different marketing research during new product development in to four group.

- **Marketing Research I**: During the initial Step of NPD as refer to Advanced Planning Phase which following information should be achieved:
  1. Definition of the basic program
  2. Extracted from 5 Years Cycle plan
  3. Outline of Strategies and Goals to support Business plan

- **Marketing Research II**: Before the Strategic Planning (SP) gateway which following information should be achieved:
  1. Definition of the Program initial Strategies
  2. Definition of the Goals & Target for IKCo Business
  3. Product Concept and Key Vehicle Attributes.

- **Marketing Research III**: During the development activities of the NPD process, Before the Strategic Ready (SR) gateway which following information should be achieved:
  1. Compatible Vehicle & Business propositions
  2. Initial request to IKCo organization for capability assessment to execute program and meet target

- **Marketing Research IV, V**: During the final development activities of the NPD process, Before the Design Complete (DC) and Launch Sign Off (LS) gateways which following information should be achieved:
  1. Directive to complete supply
  2. Production Set Up
  3. Launch Vehicle in to the market

For all mentioned phases the innovative and coordinative information are required. The type of marketing research is crucial for distinctive of each phase I,II,III and IV of NPD. “Exploratory” is more useful for advance planning and preliminary program definition stages and “descriptively” is usually more practical for development stages.

**2-11- Chapter Summary:**

The data for this thesis have been collected through reviewing the current documents in IKCo and interviews. The main new product development process in IKCo has been gathered from the documents, existed in different departments in IKCo. Furthermore, the complementary information about new product development and specially for marketing research have been collected by interviewing from two special IKCo departments. Ther were R&D center and sales department. We have try to get the current situation of IKCo in terms of marketing research and new product development process and to achieve the suitable NPD process and marketing research for IKCo.
DATA ANALYSIS

6- Introduction

In the previous chapter, the data have been collected through archive and interviews. In this chapter, the data will be analyzed. In order to analyze the mentioned data, we classified the collected data based on research questions and then we compared these data with the information, which were mentioned in the literature chapter (chapter 2). Furthermore, by above-mentioned strategy we could compare the viewpoints of R&D department and Sales department and try to compromise these difference viewpoints with each other to turn out a unique procedure. The analysis is presented in a manner that addresses the four main research questions of this study.

6-1- Stages of new car development process in IKCo

According to the literature review in the chapter two, we have found that an academic new product development process includes 5 stages. They were introduced in the following items:

- Preliminary Investigation
- Detail Investigation
- Development
- Testing & Validation
- Full production & Market Lunch

The main deliverables and activates, which are expected to be concluded in above-mentioned stages, are presented in the below:

Preliminary Investigation Stage: A quick and inexpensive assessment of the technical merits of the project and its market prospects. Translating customers’ needs into product attributes is the main goal of this stage. This stage prepares the product concept, technical feasibility and commercial prospects. In addition to define solution and idea, the following items are identified:

- Value to customer
- Value to company
- Resources required to develop and sell idea
- Plan, which is used to accomplish the necessary

The feasibility study in terms of technical, marketing and financial should be implemented in this stage. In this stage the project gathers and assess the information. It is important to note that up to this point, the development team has not performed in-depth marketing research to assess value. This changes as product ideas move on to the next phase.

Detailed Investigation Stage: This is the critical homework stage, the one that makes or breaks the project. It needs to identify, gather, and assess the detail information. At this stage the project build a business plan. This stage identifies the detail information:
- Detail value to customer (or product definition)
- Detail value to company (or project definition)
- Resources required to develop and sell idea (or project justification)
- Action plan, which is used to accomplish the necessary (or project plan)

This stage helps to develop a sound basis for taking the project into the development stage. This stage is critical, as it requires a detailed assessment of market, sales, production, technical, human resources and financial issues. It is essential that market research be conducted throughout to ensure the final product is fine tuned and modified in line with market demands. At this stage, it is recommended that market research, most likely focus groups be conducted to evaluate reaction to the product concept in relation to the flavor, packaging, brand name, proposed price point, etc.

At this point, the development team conducts a series of depth interviews with customers to build an accurate value estimation. This cannot be done with surveys and other quantitative research methods because these methods presume that customers already understand the value of the product. In contrast, depth interviews enable the team to explore how the new product impacts the customer’s business model and gain a rich understanding of the value it creates.

Development Stage: Business case plans are translated into concrete deliverables. The manufacturing or operations plan is mapped out, the marketing launch and operation plans are developed, and the test plans for the next stage are defined. On the other word, it needs to deliver fully developed and tested new solution. In this stage, the project executes development plan, undertakes marketing development work, define manufacturing/operations process and updates detailed financial analysis.

The scope of development work in this stage includes:
- Technical development
- Market development
- Production development

During this stage, the company should engage in full-scale development, including plant trails. It is important to up-date financial and business case analysis as the product goes through technical development. All likely costs should be taken into consideration including promotional spend, packaging and ingredients costs, trial and full-scale production costs etc.
Testing and Validation Stage: The purpose of this stage is to provide final and total validation of the entire project including the product itself, the production process, customer acceptance, and the economics of the project. This stage can involve test marketing the product to find out consumer reaction before full production commences. It is likely at this stage that the customer will want samples for further evaluation, particularly if launching an own label product.

Prototypes are representations of all or a portion of a product; they are created during the development process to accommodate any one of a handful of purposes. The completeness of the prototype varies according to how far along in the process it is created and what purpose it intends to serve. Typically, prototypes are used to meet one or more of the following goals:

- Test the feasibility of concept – this can be done either through physical or analytical (computer, mathematical) modeling.
- Collect customer feedback on part or all of the concept
- Communicate an idea (to other members of the company, suppliers, distributors, and so forth).

Therefore, in this stage, the purpose is to validate both product and project prior to commercialization, to finalize the plans of launch phase, and to acquire and test the product equipment.

Full Production and Market Launch Stage: It is related to full commercialization of the product. It is the beginning of full production and commercial launch. [Ref.40] At this stage, the project team measures actual results versus projection at Gate 3 and 5. Moreover it needs to generate the reasons for gaps and variances and lesson learned. This final stage move toward commercial production entails three steps: pilot production, ramp up, and market launch. Market launch is the phase in which the marketing plans regarding the target segment, positioning, product and service combinations, pricing, marketing communications, and distribution are executed in an integrated way to ensure the right product gets to the right customers at the right time for the right price. The launch phase introduces the new product to the market. First production runs are initiated and market entry occurs. The timing is crucial and all of the elements of the marketing mix must be in place. These are:

- Product: must satisfy a customer need, be of top quality and have a real point of difference (unique selling point).
- Price: must be competitive; cover costs and offer consumers value for money.
- Promotion: develop a promotional plan, which can be a mix of above the line (e.g., advertising) and below the line (e.g., in-store sampling; recipe leaflets) spend depending on company budget.
- Place: the distribution channel used to get the goods to the consumer (e.g., multiple retailers, forecourt stores etc.) must be in place before launch.

Regarding the data collection by archive and interviews from R&D and Sales departments, the following data can be concluded for stages of new product development in IKCo.

There are a few stages in IKCo PDP. In the following items, the current different stage of IKCo PDP are presented:
Advance Planning or Pre-planning stage, which is started from “KO” gateway and finished at the “SP” gateway

Planning stage, which is started from “KO” gateway and ended after “PA” gateway. Some part of it has overlap with pre-planning in terms of timing issue.

Product design & development stage, which is started from “SR” gateway and ended after “DC” gateway.

Process design & development stage, which is started from “SR” gateway (same as product design & development) and completed in the “PO” gateway.

Product and Process validation stages, which is started after “PA” gateway and ended at the “LS” gateway. It has overlap with design and development in terms of time.

Launch & Production stage, which is started from “PO” gateway and completed at “J1” gateway

Pursuant to the theoretical stages for NPD and the actual stages in the IKCo PDP, we can match and compare the stages of these two resources with each other. The following table (table 6-1) illustrates the comparison of NPD process stages between classical categories and IKCo PDP.

<table>
<thead>
<tr>
<th>Literature document</th>
<th>IKCo different Stage of PDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary Investigation</td>
<td>Stage 0: Advanced Planning</td>
</tr>
<tr>
<td>Detail Investigation</td>
<td>Stage One: Planning</td>
</tr>
<tr>
<td>Development</td>
<td>Stage Two: Product and Process design &amp; development</td>
</tr>
<tr>
<td>Testing &amp; Validation</td>
<td>Stage Three: Product and Process validation</td>
</tr>
<tr>
<td>Full production &amp; Market Lunch</td>
<td>Stage Four: Launch &amp; Production</td>
</tr>
</tbody>
</table>

*Ref: Authors’ own construction*

**Stage 1: Advanced Planning**
The Advanced Planning phase has been constructed to guide the project team through the various stages of the product planning process. Through the advanced Planning phase the project team could explain facets of constructing a comprehensive concept proposal to a new product and justifying the proposal with a robust commercial business case. The Advanced Planning results are essential in establishing and controlling new product development during different phase of development. A well researched and executed planning process can save considerable time and cost in the development of new product as well as ensuring a greater degree of success for the product in the market place.

**Stage 2: Planning**
The macro studies in case of product, market and feasibility study (mechanical & economical) for the whole of project and also primitive project design such as primarily programming, organizing and staffing done at this stage. At this stage also the reports of analyzing the customers’ needs, new market needs and the reports of
needs explanation presented. Also the most important other deliverables at this stage are: Benchmarking report, choose the best vehicle report, legislation & legal in target market, customer wants and needs, customer behavior & purchasing power reports, interior and exterior themes.

Stage 3: Product and Process design & development.
At this stage the most important deliverables are: Plans for auto design, detail design, trim, BIW (body in white), CAE (computer aided engineering), feature list, add & delete list, kitting list, BOM (bill of material) based on attribute table and the samples of product such as: clay model, simulator, EP (evaluation prototype) and VP (verification prototype)

Stage 4: Product and Process validation
At this stage some prototype models are made on the basis of the best style from previous stage. At the end of this stage we have a complete which may change less.

Stage 5: Launch & Production
At the end of this stage, the final stage of NPD, these cases are delivered: Final BOM, jigs & fixtures, dies and tools, production line, part catalogue, auto repair direction, auto user direction and market plan.

6-2- Decision-making points of each stage in NPD of IKCo

According to the literature review in the chapter two, we found that an academic new product development process includes 5 decision-making points or gateways. They were introduced in the following items:

- Idea Screen
- Second Screen
- Go to Development
- Go to testing
- Go to Launch

The main deliverables and decision items, which are expected to be identified in above-mentioned gateways, are presented in the below. Moreover the general concept and description of each gateway are presented.

First decision; Idea Screen: Screen new ideas, which were identified in Ideation stage. [Ref. 35] In this gate, the initial GO/Kill decision is made with largely qualitative approaches. [Ref.30] Screen idea should be done in order to make sure:

- Value to customer
- Value to gross margin
- Resources required to commercialize
- Sustainability under actual market conditions

It is necessary to determine merit of idea with qualitative assessment of:

- Idea consistent with strategic aims
- Fit with:
  - Technical competencies
  - Technology, operations
o Marketing competence and infrastructure
  o Technical and marketing resources
    - Link to customer needs
    - Customer recognition of need and high value
    - High margins and sustainable competitive distinction in marketplace
    - Firms’ intents

Second decision; Second Screen: Concepts (ideas) that pass the initial idea screen should then be put through a concept screen in which an order-of-magnitude cost and value estimation is performed and used to calculate a value/cost ratio. This ratio is then used to prioritize the products creating the highest value for the least cost, and determines which products are pushed to the next phase of development. [Ref.33] On the other word, it is a reevaluation in light of Stage 1 information. [Ref. 30] This gate determines the illegible concept to move into the next stage. [Ref. 35] In this point, it is decided if the project is still worth pursuing based on the information available.

One method that is frequently used to screen and evaluate product concepts during new product development is conjoint analysis. This technique requires more quantitative analysis by the project team.

Third decision; Go to Development: It is the beginning of serious project. It opens door to expensive development and other work. [Ref.30] This gate determines the possible solutions, which is eligible for moving to the development stage by evaluating idea and commit resources to develop it. [Ref. 35] This is a critical step in the new product development decision points and represents the last opportunity to end a project before it enters the product development phase, a phase which can be time-consuming and expensive.

Forth decision; Go to testing: At this gate, it is determined if solution has sufficient merit. [Ref.35] This gate marks the beginning of the commercialization phases of the product and project. It needs to sanity and consistency check, meets customer expectations and product requirements, remains a sound business proportion, plans are realistic and appropriate.

Fifth decision; Go to Launch: At this gate, it is evaluated the following items:
  - Ramp-up of revenue vs. projection
  - Margin vs. projection
  - Market penetration vs. projection
  - Opportunities for spin-off customer solutions or cross-fertilization of other business units
  - Production capacity tracking demand

It opens the door to full-scale production and market launch. [Ref.30] This ensures the project is still an attractive one for the company and the product is what was agreed previously. [Ref. 37] This is the last point where project can be stopped before a major commitment of resources and reputation. It is a final check that serves to verify that everything is satisfactory prior to launch. [Ref.30] If prototyping has been effective, therefore, by the time the final design has been accepted the factory should be nearly ready to execute full-scale production.
Regarding the data collection by archive and interviews from R&D and Sales departments, the following data can be concluded for decision-making points or gateways of new product development in IKCo.

There are a few gateways in IKCo PDP for different stages.

- **KO gateway** is the start point of the new product development process.
- **SP gateway** is the end point of the pre-planning stage and it is located in the middle of planning stage.
- **SR gateway** is the start point of product and process design and development and it is located at the middle of planning stage.
- **PS gateway** is located in the beginning of product and process design and development and it is the point that the packaging of vehicle should be signed off.
- **PA gateway** is located in the middle of product and process design and development and at this gateway all targets of vehicle should be set and the style of vehicle should be approved.
- **DC gateway** is located at the end of product design and development and at the middle of product and process validation. At this gateway the design will be completed.
- **CC gateway** is located at the end of process design and development and also at the end of product and process validation. It is the point that every change will be cut off.
- **PO gateway** is the start point of production and end of product and process design and development stage.
- **LS gateway** is the end point of product and process validation and it is also located on the middle of production and launch stage.
- **J1 gateway** is the start point to ramp up the production of new product. On the other word, it is the end point of new product development process.

IKCo’s new product development gateways could be compared with the main decision-making points or gates in the literature documents. In order to match the introduced IKCo PDP gateways with classic method, we need to extract the major decision points on IKCo PDP. On the other words, we can combine some sub-gateway with each other to turn out the main gateway in IKCo PDP. The following table (table 6-2) illustrates the process of the above explanations:

**Table 6-2: Gateways Comparison Table**

<table>
<thead>
<tr>
<th>Literature document</th>
<th>IKCo PDP gateway</th>
<th>IKCo PDP main gateways</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idea screen</td>
<td>KO</td>
<td>Kick Off (KO)</td>
</tr>
<tr>
<td>Second screen</td>
<td>SP</td>
<td>Strategic Planning (SP)</td>
</tr>
<tr>
<td>Go to development</td>
<td>SR</td>
<td>Strategy Ready (SR)</td>
</tr>
<tr>
<td>Go to testing</td>
<td>PS-PA-DC</td>
<td>Design Complete (DC)</td>
</tr>
<tr>
<td>Go to Launch</td>
<td>CC-PO-LS</td>
<td>Launch Sign Off (LS)</td>
</tr>
</tbody>
</table>

Ref. Authors’ own construction

The figure 6-1 shows the method of combination and comparison of stages and gateways of IKCo new product development method with literatures document.
The following items explain more about the main gateway of IKCo new product development process.

- **Kick Off (KO):** During the initial Step of NPD as refer to Advanced Planning Phase, which the deliveries of this gateway are:
  1. Definition of the basic program
  2. Extracted from 5 Years Cycle plan
  3. Outline of Strategies and Goals to support Business plan

- **Strategic Planning (SP):** According to IKCo PDP procedure the deliveries of this gateway are:
  1. Definition of the Program initial Strategies
  2. Definition of the Goals & Target for IKCo Business
  3. Product Concept and Key Vehicle Attributes.

- **Strategy Ready (SR):** During the development activities of the NPD process, as refer to Product Investigation Letter (PIL) and the deliveries of this gateway are:
  1. Compatible Vehicle & Business propositions
  2. Initial request to IKCo organization for capability assessment to execute program and meet target
Design Complete (DC): According to IKCo PDP procedure the deliveries of this gate way are:
1. Validation prototypes
2. Finalizing production Plan
3. Finalizing prototype attribute

Launch Sign Off (LS): During the final development activities of the NPD process, the deliveries of this gate way are:
1. Directive to complete supply
2. Production Set Up
3. Launch Vehicle in to the market

6-3- Marketing research in NPD stages for decision-making points

Through referring to the literature review in the chapter two, we can realize that marketing research should be implemented in all five NPD stages in order to use the related data collection in all five decision-making points.

In order to know the current situation and specialists’ recommendation for implementation of marketing research in IKCo’s NPD, we have found out the following information from R&D and sales Departments.

First of all we categorized the information mentioned in interviewee data and also the archival records and then we assigned a marketing research in order to cover the requested information.

In “Pre-Planning” stage marketing research will be cover following information:
- Ideation
- Primarily test
- Preliminary plan

Therefore, we need a Marketing Research I: During the initial Step of NPD as refer to Advanced Planning Phase.

In “Planning” stage marketing research will be cover following information:
- Concept test

Therefore, we need a Marketing Research II: Before the Strategic Planning (SP) gateway.

In “Product and Process design & development” stage marketing research will be cover following information:
- Concept to style
- Style test

Therefore, we need a Marketing Research III: During the development activities of the NPD process, before the Strategic Ready (SR) gateway.

In “Test and validation” stage marketing research will be cover following information:
- Style to product
- Product test

Therefore, we need a Marketing Research IV,V: During the final development activities of the NPD process, Before the Design Complete (DC) and Launch Sign Off (LS) gateways.

According to the above-explanations, for the first four stages we need to implement the marketing, which their information will use for SP, SR, DC and LS gateways.
IKCo’s Marketing Research in new product development gateways could be compared with the main decision-making points or gates in the literature documents as shown in the table [6-3]:

**Table 6-3: Marketing Research Comparison**

<table>
<thead>
<tr>
<th>Marketing Research Literature document</th>
<th>Marketing Research IKCo Situation</th>
<th>No M.R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Related Stages:</td>
<td>Related Stages:</td>
<td>Related Gateways:</td>
</tr>
<tr>
<td>During the “Idea screen” Stage</td>
<td>Pre- Planning</td>
<td>Strategic Planning (SP)</td>
</tr>
<tr>
<td>During the “Second screen” Stage</td>
<td>Planning</td>
<td>Strategy Ready (SR)</td>
</tr>
<tr>
<td>During the “Go to development” Stage</td>
<td>Product and Process design &amp; development</td>
<td>Design Complete (DC)</td>
</tr>
<tr>
<td>During the “Go to testing” Stage</td>
<td>Test and validation</td>
<td>Launch Sign Off (LS)</td>
</tr>
</tbody>
</table>

*Ref: Authors’ own construction*

Moreover, the figure 6-2 shows the marketing researches, which are required for IKCo PDP.

**Figure 6-2: Marketing Research Comparison**

*Ref: Authors’ own construction*
On the whole, five marketing researches are needed during the new product development process in IKCo.

6-4- **Type of Marketing research for stages or decision-making points**

According to the literature review in the chapter two, we can classify the purpose of each marketing research to two category.

1- **Exploratory research**, which is intended to discover ideas and to provide insights and understanding. For this research, we have got some characteristics. For instance, the research process is flexible and unstructured. Sample is small and non-representative. Analysis of primary data is qualitative, but the secondary data should be used in this research as well.

2- **Descriptive research**, which is intended to describes market characteristics and test hypothesis or select alternatives and examine the relation between customers’ needs and wants and Company’s products. The main characteristics of this research are to define the problem for marketing research and prior formulation of hypothesis. It is planned, formal and has structured design. Data analysis is qualitative. In order to implement a descriptive research a survey should be carry out.

During the pre-development activities, which tend to occur at the preliminary stages of the NPD process, where, as yet, there is no specific concept, which could be evaluated by customers, strategic market information is required (market/customer trends, need assessments, perceptual maps and so on). The types of market research study delivering information for these needs are known as “exploratory”. The goal of “exploratory” marketing research is discovery. The underlying questions are, what is new? And what are we missing? As the development process proceeds, the effectiveness of market information is related to the extent to which it provides specific methods for reducing more specific points of uncertainty. This kind of research is generally described as “descriptive”.

The goal of “descriptive” techniques is resolution, the underlying questions are, is this the right choice? What results can we expect? The “descriptive” marketing research is conducted to narrow the options and concentrate the efforts along the optimal path.

In order to relate the type of marketing research purpose to the stages and decision-making points in new product development, it can be concluded the following principals:

- **Principal I**: During the pre-development activities of the NPD process, the perceived utility of market information is higher when the focus of research is more exploratory than descriptive.

- **Principal II**: During the development activities of the NPD process, the perceived utility of market information is higher when the focus of research is more descriptive than exploratory.

Therefore, for both pre-development and development the purpose and type of marketing research is crucial for distinctive of pre-development and development in NPD. “Exploratory” is more useful for pre-development stages and “descriptive” is usually more practical for development stages.
Furthermore, marketing research could be categorized to the two types in terms of data capture and analysis:

1- Qualitative marketing research: Qualitative research methods are designed to talk to a relatively few people in the target audience of interest. The purpose of qualitative research is to plumb the depths and range of buyer attitudes and beliefs, not to measure incidence, project, or forecast quantity. [Ref.68] Qualitative marketing research generally used for exploratory purposes, small number of respondents, not generalizable to the whole population, statistical significance and confidence not calculated. [Ref.64] Qualitative research is about investigating the features of a market through in-depth research that explores the background and context for decision-making. [Ref. 67] Qualitative research is a marketing research method that plays an important market research role in conducting customer value analysis, customer satisfaction research, market segmentation research, branding and naming research, brand equity research, and new product development research. [Ref.68] Qualitative research methods are used primarily as a prelude to quantitative research.

2- Quantitative marketing research: Quantitative market research studies are designed to assess, predict, and estimate buyer attitudes and behaviors, used for market sizing, market segmentation, and uncovering drivers for brand and product preference. [Ref.69] Quantitative marketing research generally used to draw conclusions, tests a specific hypothesis, uses random sampling techniques so as to infer from the sample to the population, and involves a large number of respondents. [Ref. 64] Quantitative marketing research designs gauge, describe, and forecast quantity. Using a range of sampling strategies, quantitative market research studies often project results of quantitative market surveys to the entire marketplace. [Ref.66]

On the whole, we can get result that if the purpose of marketing research has exploratory nature, it is recommended to consider and focus on the types of qualitative marketing research more than the types of quantitative marketing research and on the other hand, if the purpose of marketing research has descriptive nature, it is recommended to consider and focus on the types of quantitative marketing research more than the types of qualitative marketing research.

The above-mentioned information can be turned out that:

in preliminary investigation stage the marketing research has exploratory purpose and it should be both quantitative and qualitative survey type.
in detail investigation stage the marketing research has also exploratory purpose and it should be qualitative survey type.
in development stage the marketing research has descriptive purpose and it should be both quantitative and qualitative survey type.
in testing & validation stage, there are two marketing research. They have exploratory purpose and they should be both quantitative and qualitative survey types.

The figure 6-3 shows the types and position of marketing research in new product development process for comparison with IKCo PDP situation.
Pursuant to the current IKCo’s situation and specialists’ recommendation for implementation of marketing research and the objective, purpose and types of marketing research in IKCo’s NPD, we have found out the following information from R&D and sales Departments.

- **Advanced Planning Stage and Marketing Research I**

Customers’ wants and needs are important issues for this stage. Moreover, it is expected to choose a style trend for both interior and exterior views of the car. The general product definition and the mission of the product should be tested in this stage. Thus we have to identify the customers’ characteristics and potential customers, who foresee to purchase the car. These issues must be done based on the result of marketing research.

It is rarely care about this marketing research in IKCo. According to the nature of this information, both qualitative and quantities research are required, but in IKCo just quantitative is considered.

- **Planning Stage and Marketing Research II**

In this stage, we need to find out a suitable concept of the car. In order to realize and select an eligible concept, a market research should be planned and carried out. The
type of research was recommended by qualitative research due to comparison of the concept with the picture or models of competitors.
Sometimes, we need to implement two marketing research in order to achieve a complementary data from the customer. Ordinary the second one will support the first one. We can get some additional information by carrying out the second marketing information. However, it is not always essential to implement the second one. Actually, it depends on the company requirements, nature of concept and other factors.

- **Product and Process design & development Stage and Marketing Research III**

At the secondary stage, setting feature list, attribute table must be done according to marketing research. Style is delivered in this stage and it will also freeze at the end of this stage. There are different kind for testing and selecting suitable style. One of the most vital tool is marketing research through showing the models to the potential customers in the different target markets.
It is usual to show the designed style by picture or models and compare with the potential competitors vehicles. It preferred to present the style by 1/1 models beside the other competitors. The color of all product should be the same and it is suggested to be silver color. Selection of the suitable style is one of the important aims of the clinic, but one of the other important purposes is to find out the weaknesses and strengths of detail styles in comparison with competitors style products in terms of beauty, image and so on.

- **Product and Process validation Stages and Marketing Research III & V**

The trim of the vehicle will be freezing in this stage. As usual, there are different kind of method to confirm the eligible trim. Marketing research through showing the 1/1 model is the most common method to find out the solution. On the other hand, at this stage company needs gradually to identify and candidate the commercial colors for the new vehicles. Usually these two aims will be following through one marketing research in this stage.
Selection of suitable color and trim is the aim of this marketing research. Company wants to know that which colors of the new vehicle have the most intention for the customer and why.
The market plan needs to be identified in this stage in order to make the 4P (product, price, promotion and place) for new vehicle. In order to provide some information for market plan, company has to plan and design a marketing research. The commercialization of vehicle will be established after this commercial marketing research.
The different variants of the vehicle will be recognized and decided on this commercial marketing research. Moreover, the price of different variant should be identified. The policy of advertising and promotion should be dictated based on the customers’ viewpoints, which have achieved in a deep interview.

The procedure of IKCo’s Marketing Research in new product development could be compared with the method suggested in the literature documents as shown in the table [6-4]:
According to the above-mentioned analysis and information we can achieve some conclusion and result, which will be presented in the next chapter.

**6-5- Chapter Summary:**

The data, which have been collected, have been analyzed with regards to requirements of our thesis and research questions. We have found the main new product development process for IKCo. It is based on stage- gateway process. We have identified the main stages and decision points of this process. Moreover, we have realized the points and stages, which marketing researches need to be implement. As the result, we have illustrated the type and required marketing researches in the above-mentioned new product development process.

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**Table 6-4: Marketing Research Method Comparison Table**

<table>
<thead>
<tr>
<th>Marketing Research</th>
<th>Literature document</th>
<th>Marketing Research</th>
<th>IKCo Situation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Purpose</td>
<td>Research type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Discovery of ideas</td>
<td>Exploratory</td>
<td>Qualitative &amp; Quantitative</td>
<td>Normally is not done in IKCo</td>
</tr>
<tr>
<td>Concept Clinic</td>
<td>Exploratory</td>
<td>Qualitative</td>
<td>Only Qualitative</td>
</tr>
<tr>
<td>Style Clinic</td>
<td>Descriptive</td>
<td>Qualitative &amp; Quantitative</td>
<td>Only Quantitative</td>
</tr>
<tr>
<td>Color and Trim Clinic</td>
<td>Descriptive</td>
<td>Qualitative &amp; Quantitative</td>
<td>Usually it is not done in IKCo</td>
</tr>
<tr>
<td>Commercial Clinic</td>
<td>Descriptive</td>
<td>Qualitative &amp; Quantitative</td>
<td>Only Quantitative</td>
</tr>
</tbody>
</table>

*Ref: Authors’ own construction*
CONCLUSION AND RECOMMENDATION

7- Introduction

The previous chapter provided an analysis of the data collected in this study. In this chapter, conclusions will be drawn from the findings in the analysis and in this way we will try to answer the four research questions posed in chapter one. In the final part of this chapter we will give our recommendations for further research within the area studied.

7-1- Conclusion

The result of this research will show the IKCo’s main new product development process, which includes stages and decision points. Furthermore, the main marketing research for the IKCo’s new product development is identified. At the end the types and objective of these marketing research for NPD will be turned out. Therefore, in order to classify the result of this research we would like to focus and answer the research questions one by one.

The first research question (1-1): First of all, we are going to answer our first research question that reads: “What are the stages of new car development process in Iran Khodro passenger car?”

The second research question (1-2): Secondly, we will try to answer our second research question that reads: “What are decision-making points of each stage in new car development in IKCo?”

The third research question (1-3): Thirdly, we will try to answer our third research question that reads: “In which decision-making points, marketing research should be implemented in IKCo?”

The forth research question (2-1): Fourthly, we will try to answer our fourth research question that reads: “What type of marketing research should be considered during different stages or decision-making points of new car development process in IKCo?”
The first research question (1-1): First of all, we are going to answer our first research question that reads: “What are the stages of new car development process in Iran Khodro passenger car?”

The main stages of IKCo’s new product planning are presented in the following items:

- Pre-planning: an idea and strategies should be developed to a sensible product. In this stage the initial feasibility should be implemented.
- Planning: in this stage the business plan, product definition and the master plan of the project should be finalized.
- Product and Process design & development: according to the previous stage, the development of product and process should be implement in this stage. Due to the nature of product, which is very complicated, this stage could be a long time stage for IKCo.
- Product and Process validation: the product and the process, which were designed and developed in the previous stage, should be tested and validated in this stage.
- Launch & Production: After the testing and validation, the new vehicle will be launched and the ramp up of production will be implemented.

According to the literature review, which was done in chapter 2, there are five stages in the classic and theoretical new product development. We can compare and match the IKCo’s NPD stages with theoretical framework. The IKCo’s NPD stages are also five, which are approximately similar to the theoretical framework.

The second research question (1-2): Secondly, we will try to answer our second research question that reads: “What are decision-making points of each stage in new car development in IKCo?”

Regarding the IKCo’s new product development, there are five main decision-making points or gates. The following items illustrate these gates:

- Kick Off (KO): this gate is the start point of the IKCo’s NPD. We can match this gateway with the “Idea screen” in the theory.
- Strategic Planning (SP): the important strategic issue for the new product will be identified in this gateway. It could be matched with “Second screen” in the theory.
- Strategy Ready (SR): the product definition and business plan of the product, which identifies the concept of vehicle, will be decided in this gateway. It can be matched with “Go to development” in the theory.
- Design Complete (DC): in this gateway, it is expected all the product and process design and development have been completed and signed off. This gateway can be matched with “Go to testing” in the theory.
Launch Sign Off (LS): it is the points that the production is started. It can be matched with “Go to Launch” in the theory.

**Figure 7-1; PDP decision-making points**

Due to the nature of product in car industry, the time duration between SR to DC and between DC and LS are too long based on IKCo’s NPD. Therefore, there are further four-sub gateways between these decision-making points. [Figure 7-1] “Package Sign Off” and “Program Approval” are two sub gateways, which locate between SR to DC. “Change Cut Off” and “Production Prove Out Ready” are two sub gateways, which locate between DC to LS.

**The third research question (1-3):** Thirdly, we will try to answer our third research question that reads: “In which decision-making points, marketing research should be implemented in IKCo?”

According to the data collection in chapter 4 and the information analysis in the chapter 5 and also with regards to the literature review in the chapter 2, the following marketing research should be considered in the IKCo’s new product development:

- Marketing Research 1: the first marketing research in the IKCo’s NPD process should be done during the “Pre-planning” stage or stage #1 in order to get the results of this marketing research in “SP” gateway for decision-making.
- Marketing Research 2: the second marketing research in the IKCo’s NPD process should be done during the “Planning” stage or stage #2 in order to get the results of this marketing research in “SR” gateway for decision-making.
- Marketing Research 3: the third marketing research in the IKCo’s NPD process should be immediately done after passing “SR” gateway. Therefore it is implemented during the “Product and Process design & development” stage or stage #3 in order to get the results of this marketing research many times before “DC” gateway, but we should also use these results in “DC” gateway for decision-making.
- Marketing Research 4: the fourth marketing research in the IKCo’s NPD process should be done some times after passing “DC” gateway. Therefore it is implemented during the “Testing & Validation” stage or stage #3 in order to get the results of this marketing research before “LS” gateway, but we should also use these results in “LS” gateway for decision-making.
- Marketing Research 5: the fifth marketing research in the IKCo’s NPD process should be done during the “Testing & Validation” stage or stage #3 but after the fourth marketing research. The results of this research will be presented in “LS” gateway for decision-making.

Figure 7-2; PDP marketing research points

Ref: Authors’ own construction
The above diagram [Figure 7-2] illustrates the number and the points in IKCo’s NPD process, which a marketing research is required.

**The forth research question (2-1):** Fourthly, we will try to answer our fourth research question that reads: “What type of marketing research should be considered during different stages or decision-making points of new car development process in IKCo?”

Pursuant to the following diagram, which has been concluded from the literature review in chapter 2 and the information analysis in chapter 5, we can fine the type and objective of each marketing research for IKCo’s NPD.

**Figure 7-3; PDP marketing research type**

On the whole, the type and objective of each marketing research are defined in the following items: [Figure 7-3]

- Marketing Research 1: (Normally is not done in IKCo)
  - Name of marketing research: Survey for discovery of ideas
  - Research objective: To test the initial product definition and strategy and to identify the customer needs and wants of the product, potential customers’ characteristics of product, market requirements for product
  - Research purpose: Exploratory (Discovery of ideas)
Marketing research type: one qualitative survey and one quantitative survey (The qualitative surveys are rarely done in IKCo)

Type of data: secondary and preliminary data (IKCo always uses the current and secondary data)

Marketing Research 2:
- Name of marketing research: Concept Clinic
- Research objective: To test initial concept of car, which is presented by photo or 2/5 models and to select the best concept of car in comparison with the competitors and based on the customers’ viewpoints.
- Research purpose: Exploratory (Concept selection)
- Marketing research type: one or two qualitative survey
- Type of data: preliminary data

Marketing Research 3:
- Name of marketing research: Style Clinic
- Research objective: To test the shape and style of the car, which is presented by photo by a 1/1 model beside its competitors in the market and to recognize and describe the positive or negative points of the style based on the customers’ viewpoints.
- Research purpose: Descriptive (Style description)
- Marketing research type: one qualitative survey and one quantitative survey
- Type of data: preliminary data

Marketing Research 4: (Usually it is not done in IKCo)
- Name of marketing research: Color and Trim Clinic
- Research objective: To test the Trim (or inside) of the car, which is presented by a 1/1 model or prototype and to select the best required colors of the car based on the customers’ viewpoints.
- Research purpose: Descriptive (Trim description and colors selection)
- Marketing research type: one qualitative survey and one quantitative survey (IKCo just implements quantitative survey)
- Type of data: preliminary data

Marketing Research 5:
- Name of marketing research: Commercial Clinic
- Research objective: To identify the 4P (Product, Price, Promotion, Place) strategy of vehicle in order to develop the market plan. This clinic is hold by presenting a car beside its competitors for getting the customers’ viewpoints.
- Research purpose: Descriptive (Strategy for Launching the vehicle)
- Marketing research type: one qualitative survey and one quantitative survey (IKCo just implements quantitative survey)
- Type of data: preliminary data

Overall conclusion: We have in this thesis made two main findings. First of all, there is a good concept of new product development process, which is comparable with theoretical concepts in literature. Secondly, the marketing research studies are not
implemented in the right aspects. On the other word the number and type of surveys for each marketing research are not designed with a correct methods.

7-2- Recommendation for management

According to the current situation of IKCo and the literature review section and also regarding the constraint of this thesis, the following recommendations are felt to consider for the company and for the future researches:

- IKCo should revise some of its design and methods of marketing research during new product development.

- IKCo managers have to understand the importance of marketing research in the new product development process as a vital activity and tool to become successful. The essential issue is to believe that new product development process and marketing research is something that involves the whole company’s organization and departments, and not just the R&D and Sales departments.

- IKCo needs to learn from previous new product development (Lesson Learnt), its weaknesses and strengths in order to improve and implement marketing research for new product development process.

- Due to limitation of time and sources, we have collected data and interviewed from two departments (R&D Center and Sales Departments), but it is recommended that for next similar studies, the other related IKCo’s departments should be interviewed as well.

- Time and duration for marketing research implementation is important in new product development. In the future researches, this issue should be identified to dictate to the companies.

The details methods, tools and requirements of marketing research in NPD process have not been discussed in this thesis, therefore, it could be a great issue for future researches.

7-3- Recommendation for further study

Some interesting subjects for further research have turned up while conducting this research. Firstly, it would be possible to concentrate on the procedure of different marketing research and investigating it in dept during the new product development in a variety of development procedure. By investigating a single variable in depth might be able to obtain a more detailed picture of marketing research affect the product development process.

To make an investigation based on quantitative data could be another topic for further research. Quantitative research could help to find out in which stage of new product development marketing research will be more critical and used more often in different manufactures.
Finally it would be interesting to study the outcome of doing marketing research during different new product projects by comparing the successes of different new cars introduced in the market with the procedure of marketing research has done in its development phases. Hence, we will now present a list of suggestions for further research that we think could be mentioned as a topic for a future thesis.

- To perform a study concentrate on how the organization structure and transforming to consider more role of marketing research during its new product development.

- To perform the same study in different line of industries.

- In the future researches, the effect of marketing research for achievement of a successful new product development can be studied.

- The future researches can be performed the same or similar study on small or mid sized companies with different industries and products.
Appendix A: Iran Khodro Company (IKCo.)

Iran is one of the potential markets for auto industries due to population and growth of economy. Its population is over 67 millions which create a high potential demand. According to the economy issues, the average growth of economy for last 10 years is about 4.5% and it is forecasted to increase to 6.1% for next 5 years, which shows the suitable growth of the economy in present and future time. [Ref. 62]

Total passenger cars, which have been produced in 2003, were about 680,000 units. The forecasted demand for passenger cars was over 1,000,000 units. This market is going to be saturated and there will be more competitive in the future. For instance, the number of different passenger car models has been increased from 10 models in 1998 to 21 models in 2003. Iran Khodro and SAIPA are two main car manufactures in Iran auto market with 98% market share in 2003. Iran Khodro with 61% market share is the leader in passenger car market and after that SAIPA as a follower has 37% of passenger car market share. [Ref. 63]

Iran Khodro (IKCo) was established in August 1962 with the aim of manufacturing cars and spare parts. The production factories as well as the administration offices, warehouses and personnel residents and units were all established in an area of 3,190,000 sq/m. The covered area of the company equals to 4,100,000 sq/m. More than 19,000 employees work directly for IKCo. IKCo has been engaged in a different range of vehicles including passenger cars, light trucks, minibuses, buses and heavy trucks. [Ref. 11]

In 2003, IKCo was ranked the best company among the top 100 Iranian companies. IKCo has a long lasting dominance in the internal market, which has remained unchallenged during the last 38 years. IKCO is working towards Globalization. The company changed its role from a mere assembler into car manufacture in 1995 when the first 7 year plan was drawn up with the objective to develop new capabilities in mass production, diversity of products and enhancement of engineering and designing capabilities.

Regarding to the status of Iran market and the IKCo strategies, which refer to sustain its situation and increase its market share, developing the new passenger cars is going to be more important projects. Moreover, these new products should satisfy the customers’ requirements. Therefore, IKCo intends to manage and control these projects in terms of cost, time, quality, marketing requirements and customer satisfactions. To follow this issue the importance of marketing research with new product development process is obvious with high priority.
Appendix B: Operational/Theoretical definition

There are some key terms in this research, which was mentioned in the problem statement. The operational/theoretical definition of these terms explain in the following items:

- **Marketing Research**: Marketing research is the function which links the consumer, customer, and public to the marketer through information—information used to identify and define marketing opportunities and problems; generate, refine, and evaluate marketing actions; monitor marketing performance; and improve understanding of marketing as a process. [Ref. 1]

- **Product Development Process (PDP)**: The product development process (PDP) is the series of stages that are commonly executed each time a new product is developed or an executed each time a new product is developed or an existing product is modified. It is not necessary that all stages be performed for every product development project. There is no commitment here to a purely sequential execution of these stages; depending on context, at least some of these stages can overlap or even be carried out concurrently. [Ref. 10]

- **New product development (NPD)**: New Product Development (NPD) is defined as “The process of Forming an idea to a concept, bringing that concept into a product (passenger car) and further on to the market”. Due to several parts and systems, which use in a car, it is a complex product and therefore, the NPD for passenger car is complicated as well.

- **Phases of new product development process (NPDP)**: The new product development process is divided to few stages. Such as idea generation, planning, concept development, product development, market testing, mass production. There are a few approaches to divide NPDP to stages; it depends on the type of companies, organizations, markets and so on.

- **Decision-making**: Decision-making is defined as a choice among alternative courses of action. For purposes of analysis, a decision can be broken down into four distinct steps. Firstly, identify a problem or opportunity. Secondly, define the problem or opportunity. Thirdly, identify alternative courses of action. Fourthly, and select a specific course of action. [Ref. 1]

- **Decision making points**: Some points locate in the new product development process, which need to be made a decision. They may relate to the marketing information issue or information in other issues.

- **Product Portfolio**: Product portfolio is a tool for managing at the equalization of projects carried out by enterprises in terms of project value maximization, strategic alignment, and the kinds of projects carried out. The set of products, which analysis in terms of market, financial, and technological dimensions along with internal resources is essential. [Ref. 12]
Appendix C: Interview Guide

**Department name:**
**Name of the respondent:**
**The respondent’s position:**

**Interview Questions**

1- What do you think about the new product development in IKCo? [Warm up Question]

2- What kind of new product development process, is being used in IKCo? [Warm up Question]

3- What are the phases and stages in IKCo’s new car development process? [With Reference to Research Question 1.1]

4- What are the main deliverables in each stage? [With Reference to Research Question 1.1]

5- What are the decision-making points in IKCo’s new product development process? [With Reference to Research Question 1.2]

6- Which of the main deliverables influence to make decision in each decision-making points? [With Reference to Research Question 1.2]

7- Which of the main deliverables are generated by marketing research? [With Reference to Research Question 1.3]

8- Which of the main deliverables should be generated by marketing research? [With Reference to Research Question 1.3]

9- What is the nature of the main deliverables, which are generated by marketing research? [With Reference to Research Question 2.1]

10- What type of research is used for these marketing research? [With Reference to Research Question 2.1]

11- What type of research should be used for these marketing research? [With Reference to Research Question 2.1]

12- What type of marketing research is used for providing the main deliverables data? [With Reference to Research Question 2.1]
13- What type of research should be used for providing the main deliverables data? [With Reference to Research Question 2.1]

14- What techniques are used for these marketing researches? [With Reference to Research Question 2.1]

15- What techniques should be used for these marketing researches? [With Reference to Research Question 2.1]
Appendix D: Sample Selection

A) Department Selection

According to the role of different departments in IKCo new product development we select 2 main departments in Ikco organization which directly involve in the NPD process a) Research and development Center and b) Sales and after sales organization. After that through this two departments we select 5 unites to be interviewed. These five interviews investigated are Vehicle Engineering, Product Planning, Benchmarking units of Research and development Center and Marketing Research and Sales units in Sales and After-Sales organization.

B) Sample Selection Criteria

In order to fulfill the purpose of this thesis it is of great importance to get in contact with the persons with most knowledge and experience of working with Marketing Research and NPD so our sample would be selected with the below conditions:

- **Academic Degree**: At least B.A. (Batcher of Science)
- **IKCo Departments**: IKCo’s R&D Center, Sales and After Sales Department, Strategic Planning Center, Engineering Center, Systems Development Department
- **Positioning in the IKCo**: Deputy, Manager, Chief, Consultant, Expert, Engineer
- **Work experience in IKCo**: At least 5 years experience in Ikco. [To be familiar with IKCo strength and weakness for handling new project]
- **Experience in the Field**: At least 3 years experience in marketing and be familiar with New Product Development field or vise versa.
- **Experience in a relevant Project**: To be involved in one of the IKCo New product Development project.

C) Interviewees List:

A) Sales and after sales organization Representatives:

3. Keyvan Azimi : IKCo Sales Deputy
4. Mohammad Gamei : IKCo Marketing General Manager

B) IKCo R&D Representatives:

4. Mohhamed Reza Modir Ghomi : Vehicle Engineering General Manager
5. Abolfazl Ghodratzade : Head engineer of Benchmarking
6. Alexander Mekler : R&D P10 project consultancy in Marketing area
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