

# Product Development with Analysing Customer Requirements and Techniques

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## **Abstract**

Every rewarding company has always used data and information to serve in its delineation procedure. In design a new product, engineers have always scrutinize the manufacturing and achievement history of the current product. The buyer Futures scenarios present plausible future developments, exploring the challenges and opportunities the consumer goods industry may face in 2020. We base all our scenarios on a set of certainties and uncertainties. This allows us to explore the way powerful trends may play out and interact to shape our future. Customer needs and wants are sensitive and complex. Through customer needs and competitive analysis, product development methods help to identify the critical technical components that require change. FAST diagram represents a very powerful tool in analyzing complex systems and boiling down the descriptions of the functions performed into the essence of the task that must be delivered.

**Index Terms** — New product development, product development data, product design, customer requirements, FAST method.

## **Introduction**

Every profitable corporation has always custom data and instruction to serve in its delineation procedure. In delineation a new product, engineers have always explored the manufacturing and performance history of the incidental product. They consider at field criterion data, compare with their product to that of their rival's product. They scrutinize any purchaser gratification complaint that might happen to be available.

Unfortunately, much of this complaint is often incomplete. It is often scrutinize as particular data, without illustration to other data that may verify or oppose it. Customers purchase benefits and producers propose features. This seems alike a relatively simple idea; however, except customers and producers are completely in sound with one another, it may be very troublesome to expect these characteristic, or each implicit benefit from each producer. It is of complete importance to transfer the desire of each and every customer into some substantial values that can be turned into engineering specifications. Some of these characteristic contain but are not restricted to:

1. Parts
2. Costs
3. Functions
4. Quality Character& Reliability

5. Processes

6. Tasks

## **TODAY'S WORLD SCENARIO**

The customer Futures scenarios present plausible future developments, exploring the challenges and opportunities the consumer goods industry may face in 2020 [8]. We base all our scenarios on a set of certainties and uncertainties. This allows us to explore the way powerful trends may play out and interact to shape our future. We can be confident that some trends will be a part of any future [8]. For example, there is consistent research indicating a significant growth in the global population. In many industrial branches the development process of new products is changing from the experimental testing method to the digital prototyping method. This procedure can be observed especially in the automotive industry. There the market always disposes the OEM to reduce the time and cost invested on a new product [7]. In today's industrial scenario of customer comfort and cost reduction of project have proved to be the heart of any automotive process. All over the world, engineers are in the automotive industry working in a plethora of roles, on a variety of components and systems, and in different types of companies. As in many industries, advances in engineering are the key to competitiveness in the automotive industry.

## **PRODUCT DEVELOPMENT**

Many enterprises have been devoting a significant portion of their budget to product development in order to distinguish their products from those of their competitors and to make them better fit the needs and wants of customers. Hence, businesses should promote product scheming that could satisfy the customers' requirements since this will increase the enterprise's competitiveness and it is an essential criterion to earning higher loyalties and profits [1]. A new product development cannot only be pursuant to the business of the design and manufacturing capability one also has to consider the customer's needs and preferences and translate then into the design map [2]. When underdeveloped recent products, one must be completely sensitive of the needs of customers, market rivals-hip and the kind of the market as these are exact success element to unworn any product [2].

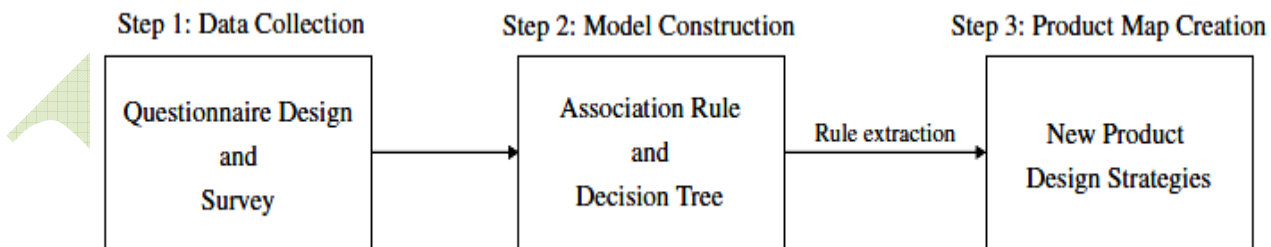


Fig. 1. New Product Development: Research Framework

Now we take an example of developing new product (driver seat mechanism) and we can consider the customer needs, wants and requirements for functional analysis of new product development.

## ***PRODUCT DETAILS***

Name of the product: Car Seat height adjusting mechanism

Seat means a structure, which may or may not be definite integral with the vehicle, construction completed with trim, designed to seat one adult person. The expression protects both an individual seat and part of a bench seat designed to seat one person.

Vehicle seats have very dissimilar functionalities to fulfil. While parked, the vehicle seat has a stable function, similar the seat in a living room. However, when driving, it has to assist an occupant that is subject to accelerations. In the incident of a crash, even more and sometimes contradictory functions are needed. One component of lively safety is seating comfort. Seats must be designed such that vehicle occupants with dissimilar body proportion do not experience from driving fatigue. An excellent seat must succeed in the following parameters:

1. Support of individual body areas (distribution of pressure),
2. Lateral support when cornering,
3. Freedom of movement so that an occupant may change his sitting position without readjusting the seat,
4. Vibration and damping characteristics (matching the natural frequency with the excitation frequency band),
5. Adjust ability of seat cushion, backrest and head restraint. The above parameters are affected by the following:
6. Dimensions and shapes of the upholstery in the seat cushion and backrest,
7. Distribution of the spring rates of individual cushioned zones,
8. Overall spring rate and damping capacity, in particular of the seat cushions,
9. Thermal conductivity and moisture absorption capacity of the covers and upholstery,
10. Operation and range of the seat adjustment mechanisms.

## ***ADVANCEMENTS IN DRIVER SEAT MECHANISMS***

Height adjuster Mechanism may make adjustment easier or make a greater degree of adjustment possible than on standard car seats including: - height adjustments which may provide an alternative to placing a cushion on a standard seat and can be used to assist a person when getting out of the car; - forwards and backwards movement of the seat to increase leg clearance or provide space for a wheelchair to be transferred into the car; - lateral advancement to facilitate move into and out of the car. Height Adjustment mechanisms may be manually or electrically operated by push-knob or touch sensitive controls.

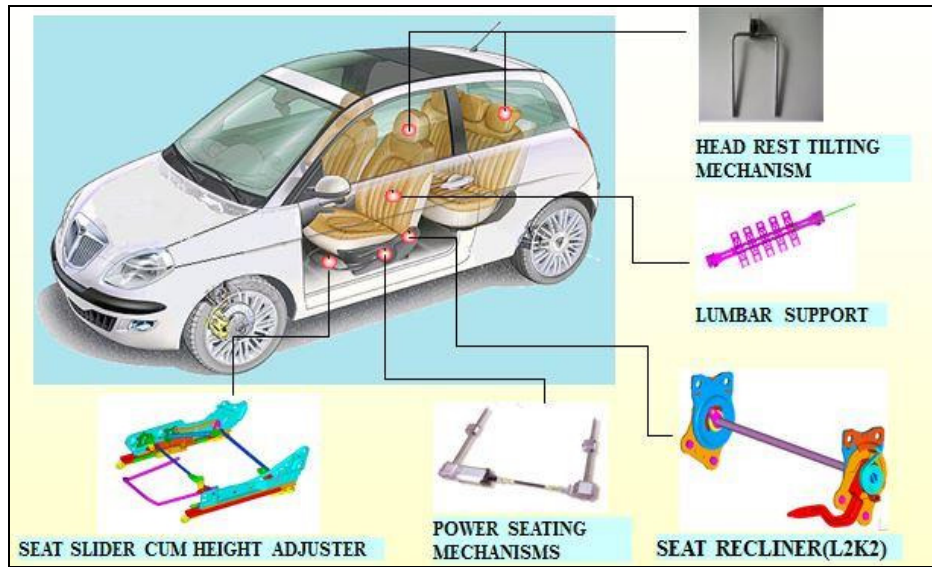


Fig 2. New Generation car seats

New generation motorcar adjustment system has the device by which the seat or its parts can be adjusted to a position suited to the morphemic of the seated occupier. This device may, in specific, permit:

1. Longitudinal direction
2. Vertical direction.

### **MANUAL SEAT HEIGHT ADJUSTER**

A manual seat height adjuster mechanism for a seat of a vehicle includes a base frame, total links (two sets of two links each) for the vertical movement of the seat, frame rods, a manually operated lever for height adjustment and rails for the horizontal movement of the seat. The base frame is placed on the rails. The seat cushion is mounted on the base frame with the help of spring loaded links and rods. When the manual lever is operated the spring loaded links change their angle in fixed intervals and the cushion base is uplifted or lowered to suit the required height. This mechanism is selectively engage and disengages with the mechanical spring loaded levers to allow the height of the seat to be adjusted and to prevent the height of the seat from moving once the height has been adjusted.

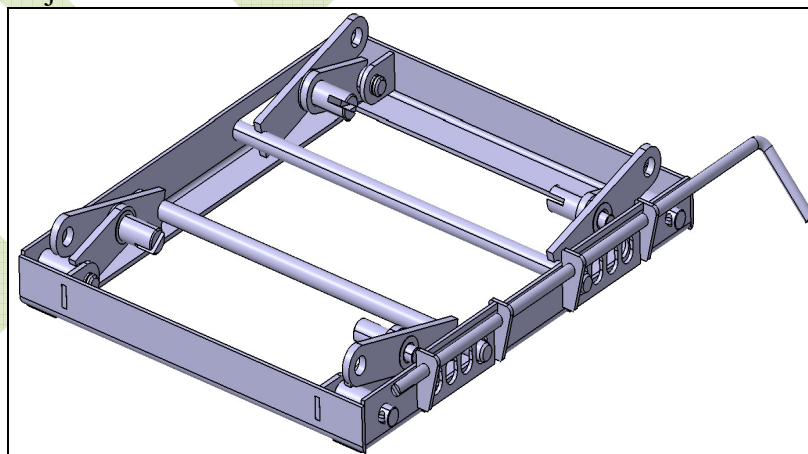


Fig. 3. Height Adjuster Mechanism CAD Model

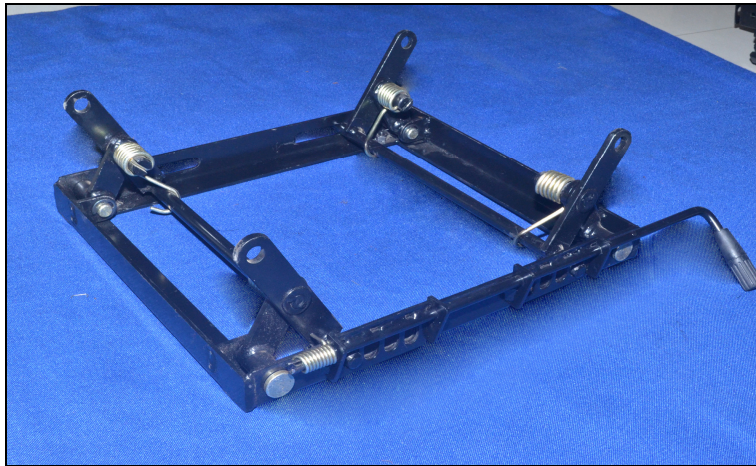


Fig. 4 Height Adjuster Mechanism Actual Photograph

### **HEIGHT ADJUSTER MECHANISM**

Height adjuster mechanism consists of two main parts, riser and slider seat adjuster. Riser is the base component of seat mounting assembly. It forms the link between seat and car chassis. It is used to transfer the load of seat occupant and seat assembly to the chassis of vehicle. Slider seat adjusters are used to move the seat position in front and back in horizontal direction. Back & forward movement is such that the 5th and 95th percentile men can accommodate in the seat. Horizontal adjustment accommodates differences in leg length that are associated with seat height and preferred knee angle.

Function: Height adjuster is used to adjust the height of seat of driver of the car. It gives him comfort of sitting and height adjusting mechanism is added to the deliver sliding mechanism of seat so as to increase the viewing angle and comfort level of driver. Vertical adjustment adjusts the dissimilarity in height while occupier is in sited position. Adjuster mechanism which fulfills the following requirements as lay down by the company:

1. Design Height adjuster mechanism with stroke length of 60 mm [15 pitches]
2. Design should be ergonomic and operator friendly.
3. Design should satisfy the safety norms.
4. Design should be cost effective.



Fig. 5.Height Adjuster Mechanism

**CUSTOMER'S REQUIREMENTS:**

All over the world, engineers are in the automotive industry working in a excess of roles, on a difference of components and systems, and in different types of companies. As in many industries, advances in engineering are the essential to fight in the automotive industry. Customer needs and wants are sensible and difficult [8]. If a firm can understand them while developing a new product and make use of all knowledge management concepts make efforts to fulfill purchaser demands and supply favorable service, then customers will be more supportive. Customers are much more demanding, aggressively inquiring, and unpredictable in what they inquire for. Most absorb a lot, and many will move heaven and world to get the product or service that is correct for them. Many consumers are also demanding more and better information about products, which drives up environmental and social standards. People are especially interested in the personal impact that products will have on them. In this fast-paced world, time is regarded as a precious resource. Customers are asking both for time management advice, and for more leisure and relaxation opportunities. Customers are confident about trusted brands, and spend a lot with them, but they are also demanding, expecting the 'very best' on every score – most innovative, cheapest, and most individual, most in line with their values. They also expect highly personalized products, services and entertainment from the retail experience [8]. To provide these, companies are trusted with large amounts of customer information. Many consumers are happy to own 'access all areas' cards that hold all their account and transaction details. There are folks who omit out from this 'consumption-orientated technocratic difficult'. As a result there is a small but flourish grey market both for those who are reluctant to enroll into the contract with profession and for those with deeper ethical objections.

**FAST METHOD**

The Function Analysis System Technique (FAST) is not an end effect or result, but rather a beginning. It lays exposed the subject material under study, forming the basis for a extended variety of subsequent study approaches and analysis techniques [5]. Function analysis is a usual language, crossing all technologies. It permits several-disciplined team members to contribute evenly and to convey with each other while addressing the problem objectively, without bias or preconceived conclusions [5].

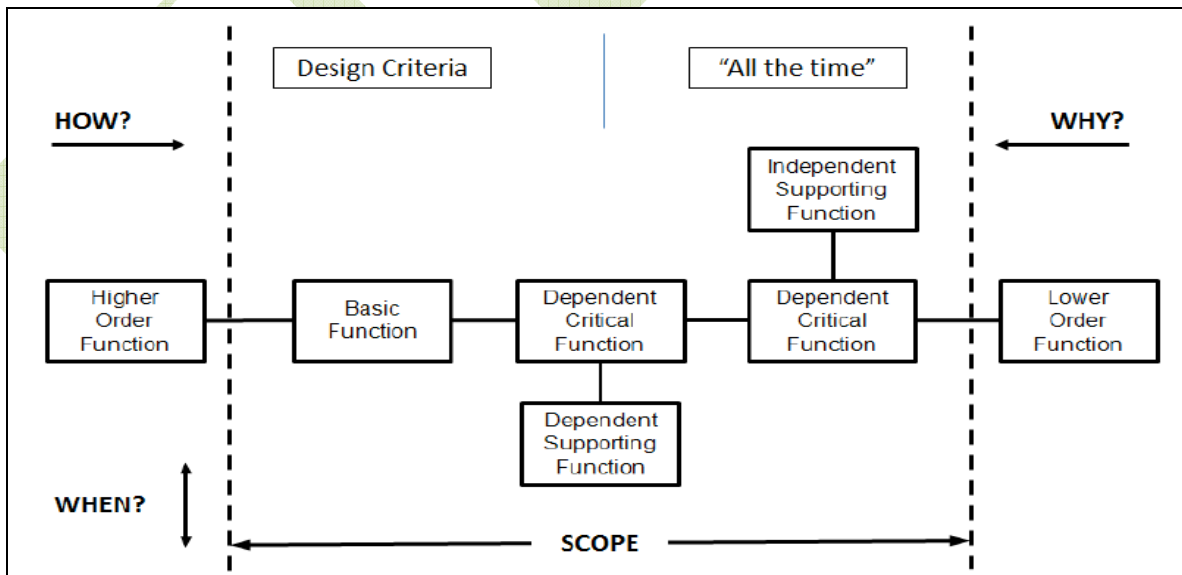


Fig 6. FAST Method

A horizontal chart depicting functions within a project, with the following rules [6]:

- a) The arrangement of functions on the critical path proceeding from left to right answers the question “How is the function to its immediate left performed?”
- b) The arrangement of functions on the critical path proceeding from right to left answers the question “Why is the next function performed?”
- c) Functions happen at the same period or caused by functions on the critical path appear vertically below the critical path
- d) The fundamental function of the study is always endmost to the left of the diagram of all functions within the scope of the study.

Two other functions are classified:

- 1) Highest Order - The reason or purpose that the basic function exists. It answers the “why” question of the basic function and is depicted immediately outside the study scope to the left.
- 2) Lowest Order - The function to begin the plan and is depicted endmost to the right, exterior the study scope.

### ***FAST METHOD FOR HEIGHT ADJUSTER MECHANISM***

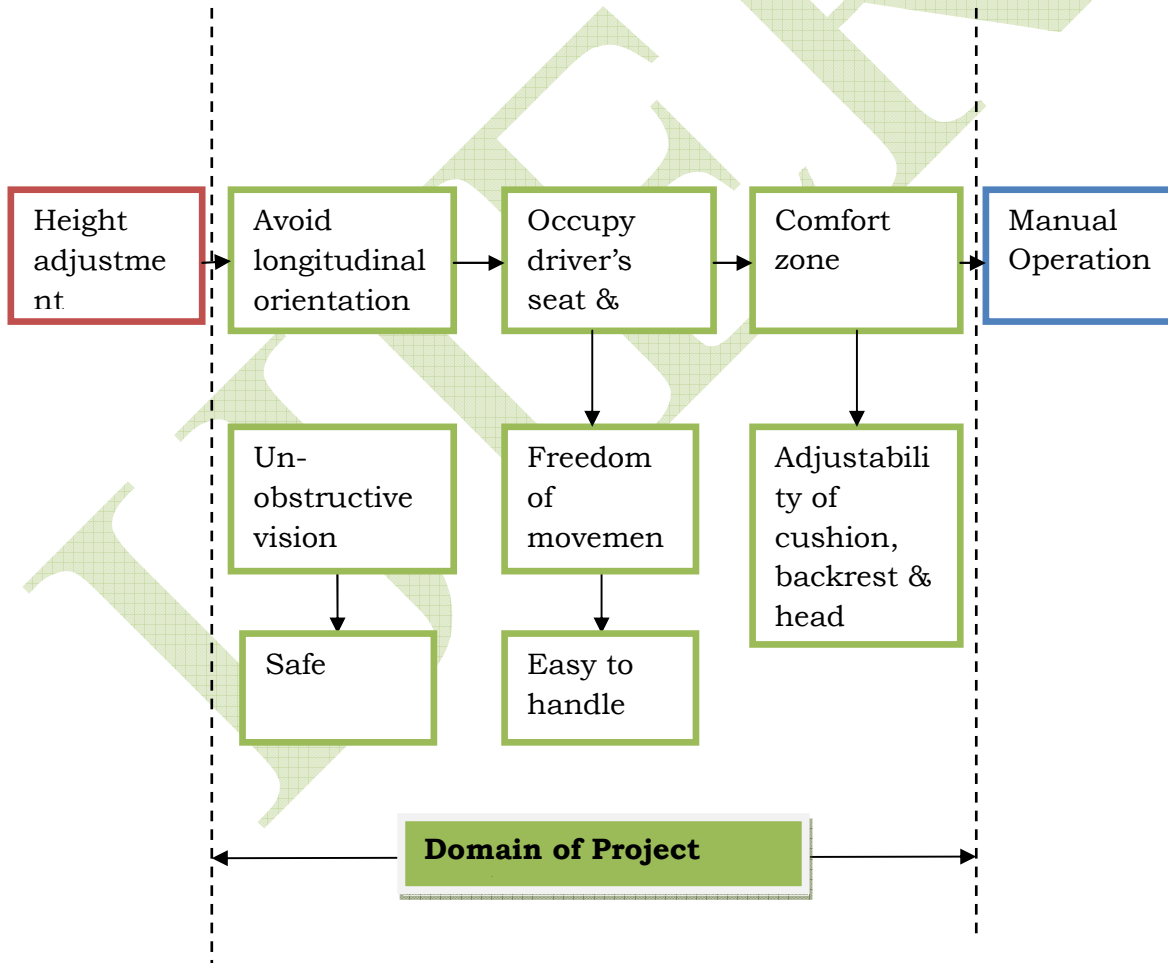


Figure 7 FAST Method for Height Adjuster

## **CONCLUSION**

Customer needs and wants are sensible and complicated. If a firm can catch them while development a new product and make usage of all knowledge management concepts make efforts to fulfill buyer demands and supply friendly service, then customers will be more supportive. During the procedure of development from the product concept to the actual product, the buyer can only passively accept new information, and can only choose from the products that are currently on demand in the market. Issues are addressed that may never have surfaced before. These critical conclusions are then driven through the other matrices to recognize the critical ability, manufacturing operations, and quality control measures needed to manufacture a product that fulfills both customer needs and producer needs within a shorter development cycle period. FAST diagram represents a very powerful tool in analyzing complex systems and boiling down the descriptions of the functions performed into the essence of the task that must be delivered. The requirement that functions to be described in a two word verb noun format is a double edged sword:

- a. It promotes creative thinking in alternate way to deliver a function.
- b. It limits it by constraining the perspective to looking at only positively framed function.

FAST method can make dramatic changes to business practice which gathering of information about the customer to analyze and integrate, provide the engine to realize the knowledge of customer's requirements and developing a new product.

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