

Product family design article review

[Design](#)



**ASSIGN
BUSTER**

Implemented In this field. The marketing firms believe In the art of Introducing variability In their product line which gives us evidence of sales initially but later the sales diminishes due to the concept of law of diminishing returns'. Decision framework:- The product family design and development encompasses consecutively five domains I. E. , customer, functional, physical, process and logistics domains. The customer needs are translated to functional requirements and these form the front end part of the product family design. Then the functional requirements are mapped to physical parameters by the company.

The back end consists of process variables (IV) and logistics of the product being produced by the company. To achieve this process the method of assemble-to-order and outsourcing are used. Fundamental Issues:- Product family - A product family refers to a set of similar products that are derived from a common platform and yet possess specific features/functionality to meet particular customer requirements. Each variable or instance in the product family Is known as 'product variant' or 'Instance'. From marketing point of view they call It a product line, engineers view It as a collection of different technologies.

Product platform:-they can be general, abstract or product specific. They have been delved Into two platforms - physical and 'as a set of subsystems'.

Product Architecture:- It tells us how the functional requirements Interact In physical form of life. Architecture can either be Integral or modular In nature.

Five categories of modularity, I. E. , component swapping, component sharing, fabricate-to-fit, bus and sectional modularity. Product family architecture involves systematic planning of modularity and commonality in

terms of building blocks and their configuration structures across the functional, technical and structural views.

The variety is of two natures -functional and technical. Functional variety is associated with customer satisfaction but technical variety deals with manipulability and costs. Modularity vs.. Commonality:- Modularity is done to separate the system into different parts or modules in order to differentiate them easily. Correspondingly, there are three types of modularity associated with product families: (1) functional modularity, (2) technical modularity, and (3) physical modularity.

These three types of modularity are characterized by specific measures of module interaction from a particular point of view. It is nominally that entails the difference of the architecture of product families from that of a single product. While modularity resembles decomposition of product structures and is applicable to describing module (product) types, commonality characterizes the grouping of similar module (product) variants of a specific module (product) type that is characterized by modularity. Therefore, clustering is the main concern of commonality.

The correlation of modularity and commonality is embodied in class-member relationships. A product structure is defined in terms of its modularity, through which module types are specified. Product portfolio and product family positioning The original mindset of developing product families is to make wide variety of products available and letting customers " vote" on the shelf. This practice, however, not only seems to be wasteful and expensive,

but also tends to constrain customers' ultimate satisfaction, leading to mass confusion.

Product family positioning (I. E. , product portfolio planning) has been traditionally dealt with in the management and marketing fields with emphasis on portfolio optimization based on customer preferences where the objective is to maximize profit, share of choices, or sales. Product positioning Product positioning involves decisions about abstract perceptual attributes and customer heterogeneity . The basic principle lies in the multidimensional scaling of customer perceptions via factor analysis, discriminated analysis or similarity scaling.

A number of multidimensional scaling- based algorithms have been developed, dependent upon the number of ideal points (individuals or segments) in the Joint space. Product line design Most literature on product line design tackles the optimal selection of products by maximizing the surplus? the margin between the customer-perceived utility and the price of the product. Platform based product family design Corresponding to the scalable and modular product platforms, there are two types of approaches to platform-based product family design.

One common approach is called scalable (namely parametric) product family design, whereby scaling variables satisfy a variety of customer needs. Product family modeling develops a discipline-independent data model to provide constructs for modeling products with optional contents. The initiative of Product Family Classification Tree emphasizes the classification of end-products and/or modules from a functional viewpoint. To facilitate

representations from multiple respective, Generic Product Modeling is advocated to represent product families from both commercial and assembly views.

Managing Process Variety:- When a firm's product structures or product mixes change, its process structure should also be changed to balance flexibility and efficiency. The traditional approach to deal with a large number of variants associated with product families is to treat each product as an individual bill-of-materials (MOM), which however leads to a data explosion problem. **Supply chain issues of product families:-** Customer requirements for flexibility, agility, cost efficiency and product variety force impasse to reconfigure their supply chains and to focus more on collaboration with external partners.

The design of a supply chain has an essential influence on how a manufacturer of complex products organizes and coordinates the stream of innovative products through platform and architectural design strategies visit--visit the sourcing, manufacturing and distribution strategies. Resource allocation In a networked manufacturing supply chain, allocating proper production volumes to various manufacturing sites is a complex task involving diverse markets, product families, manufacturing capabilities, as well as final-production and sub-assembly applies.

Economic Justification Product family design and development is associated with new cost and profit structures that can be coined as " economies of scale and scope". Current research on the economic and performance evaluation of product families is dominated by empirical studies, ad hoc

samples, or broad approaches based on cost accounting. Traditional cost accounting by allocating fixed costs and variable costs across multiple products may produce distorted Cost-carrying figures due to possible sunk costs associated with investment into product and process platforms.