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# Product design and development ulrich 6th edition pdf

Chapter 1: Introduction The economic success of manufacturing firms depends on their ability to identify the needs of customers and to quickly create products that meet these needs and can be produced at low cost. Achieving these goals is not solely a marketing problem, nor is it solely a design problem or a manufacturing problem; it is a product development problem involving all of these functions. This book provides a collection of methods intended to enhance the abilities of crossfunctional teams to work together to develop products. A product is something sold by an enterprise to its customers. Product development is the set of activities beginning with the perception of a market opportunity and ending in the production, sale, and delivery of a product. Although much of the material in this book is useful in the development of any product, we explicitly focus on products that are engineered, discrete, and physical. Exhibit 1-1 displays several examples of products from this category. Because we focus on engineered products, the book applies better to the development of power tools and computer peripherals than to magazines or sweaters. Our focus on discrete goods makes the book less applicable to the development of products such as gasoline, nylon, and paper. Because of the focus on physical products, we do not emphasize the specific issues involved in developing services or software. Even with these restrictions, the methods presented apply well to a broad range of products, including, for example, consumer electronics, sports equipment, scientific instruments, machine tools, and medical devices. The goal of this book is to present in a clear and detailed way a set of product development methods aimed at bringing together the marketing, design, and manufacturing functions of the enterprise. In this introductory chapter we describe some aspects of the industrial practice of product development and provide a road map of the book.Characteristics of Successful Product Development From the perspective of the investors in a for-profit enterprise, successful product development results in products that can be produced and sold profitably, yet profitability is often difficult to assess quickly and directly. Five more specific dimensions, all of which ultimately relate to profit, are commonly used to assess the performance of a product development effort: Product quality: How good is the product resulting from the development effort? Does it satisfy customer needs? Is it robust and reliable? Product quality is ultimately reflected in market share and the price that customers are willing to pay. Product cost: What is the manufacturing cost of the product? This cost includes spending on capital equipment and tooling as well as the incremental cost of producing each unit of the product. Product cost determines how much profit accrues to the firm for a particular sales volume and a particular sales price. Development time: How quickly did the team complete the product development effort? Development time determines how responsive the firm can be to competitive forces and to technological developments, as well as how quickly the firm receives the economic returns from the team's efforts. Development cost: How much did the firm have to spend to develop the product? Development cost is usually a significant fraction of the investment required to achieve the profits. Development capability: Are the team and the firm better able to develop future products as a result of their experience with a product development project? Development capability is an asset the firm can use to develop products more effectively and economically in the future. High performance along these five dimensions should ultimately lead to economic success; however, other performance criteria are also important. These criteria arise from interests of other stakeholders in the enterprise, including the members of the development team, other employees, and the community in which the product is manufactured. Members of the development team may be interested in creating an inherently exciting product. Members of the community in which the product is manufactured may be concerned about the degree to which the product creates jobs. Both production workers and users of the product hold the development team accountable to high safety standards, whether or not these standards can be justified on the strict basis of profitability. Other individuals, who may have no direct connection to the firm or the product, may demand that the product make ecologically sound use of resources and create minimal dangerous waste products.Who Designs and Develops Products? Product development is an interdisciplinary activity requiring contributions from nearly all the functions of a firm; however, three functions are almost always central to a product development project. Marketing: The marketing function mediates the interactions between the firm and its customers. Marketing often facilitates the identification of product opportunities, the definition of market segments, and the identification of customer needs. Marketing also typically arranges for communication between the firm and its customers, sets target prices, and oversees the launch and promotion of the product. Design: The design function plays the lead role in defining the physical form of the product to best meet customer needs. In this context, the design function includes engineering design (mechanical, electrical, software, etc.) and industrial design (aesthetics, ergonomics, user interfaces). Manufacturing: The manufacturing function is primarily responsible for designing and operating the production system in order to produce the product. Broadly defined, the manufacturing function also often includes purchasing, distribution, and installation. This collection of activities is sometimes called the supply chain. Different individuals within these functions often have specific disciplinary training in areas such as market research, mechanical engineering, electrical engineering, materials science, or manufacturing operations. Several other functions, including finance and sales, are frequently involved on a part-time basis in the development of a new product. Beyond these broad functional categories, the specific composition of a development team depends on the particular characteristics of the product. Few products are developed by a single individual. The collection of individuals developing a product forms the project team. This team usually has a single team leader, who could be drawn from any of the functions of the firm. The team can be thought of as consisting of a core team and an extended team. In order to work together effectively, the core team usually remains small enough to meet in a conference room, while the extended team may consist of dozens, hundreds, or even thousands of other members. (Even though the term team is inappropriate for a group of thousands, the word is often used in this context to emphasize that the group must work toward a common goal.) In most cases, a team within the firm will be supported by individuals or teams at partner companies, suppliers, and consulting firms. Sometimes, as is the case for the development of a new airplane, the number of external team members may be even greater than that of the team within the company whose name will appear on the final product. The composition of a team for the development of an electromechanical product of modest complexity is shown in Exhibit 1-2. Throughout this book we assume that the team is situated within a firm. In fact, a for-profit manufacturing company is the most common institutional setting for product development, but other settings are possible. Product development teams sometimes work within consulting firms, universities, government agencies, and nonprofit organizations.Duration and Cost of Product Development Most people without experience in product development are astounded by how much time and money is required to develop a new product. The reality is that very few products can be developed in less than a year, many require 3 to 5 years, and some take as long as 10 years. Exhibit 1-1 shows five engineered, discrete products. Exhibit 1-3 is a table showing the approximate scale of the associated product development efforts along with some distinguishing characteristics of the products. Product Design and Development. Ulrich:Chapter 1: Introduction Chapter 2: Development Processes and Organizations Chapter 3: Opportunity Identification Chapter 4: Product Planning Chapter 5: Identifying Customer Needs Chapter 6: Product Specifications Chapter 7: Concept Generation Chapter 8: Concept Selection Chapter 9: Concept Testing Chapter 10: Product Architecture Chapter 11: Industrial Design Chapter 12: Design for Environment Chapter 13: Design for Manufacturing Chapter 14: Prototyping Chapter 15: Robust Design Chapter 16: Patents and Intellectual Property Chapter 17: Design of Services Chapter 18: Product Development Economics Chapter 19: Managing ProjectsSample questions asked in the 6th edition of Product Design and Development:Some companies have reportedly abandoned the practice of doing a customer test with the early prototypes of their products, preferring instead to go directly and quickly to market in order to observe the actual customer response. For what types of products and markets might this practice make sense?How would you explicitly include renewable and nonrenewable energy in the life cycle diagram in Exhibit 12-3? Draw such a diagram and explain it. EXHIBIT 12-3 The natural life cycle and the product life cycle.The argument for the motorcycle architecture shown in Exhibit 10-5 is that it allows for a lighter motorcycle than the more modular alternative. What are the other advantages and disadvantages? Which approach is likely to cost less to manufacture? EXHIBIT 10-5 The BMW S1000RR motorcycle. This product exhibits function sharing and an integral architecture with the design of its transmission chunk.Revise the tornado chart in Exhibit 18-15 to show the effect of an increase in development time. Assume that the minimum change in development time is zero, and the maximum change in development time is an increase of one quarter. EXHIBIT 18-15 Tornado chart illustrating the effects on NPV of the uncertainty ranges for the model parameters listed in Exhibit 18-14. Dark bars represent capsule values. APA (6th ed.) Ulrich, K. T., & Eppinger, S. D. (2008). Product design and development. Chicago (Author-Date, 15th ed.) Ulrich, Karl T., and Steven D Eppinger. 2008. Product design and development. Harvard (18th ed.) ULRICH, K. T., & EPPINGER, S. D. (2008). Product design and development. MLA (7th ed.) Ulrich, Karl T., and Steven D. Eppinger. Product Design and Development, 2008. Print. Turabian (6th ed.) Ulrich, Karl T., and Steven D. Eppinger. Product Design and Development, 2008. Learn more about these citation styles: APA (6th ed.) | Chicago (Author-Date, 15th ed.) | Harvard (18th ed.) | MLA (7th ed.) | Turabian (6th ed.) Note: Citations are based on reference standards. However, formatting rules can vary widely between applications and fields of interest or study. 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Genre/Form: Case studies Document Type: Book All Authors / Contributors: Karl T Ulrich; Steven D Eppinger Find more information about: Karl T Ulrich Steven D Eppinger ISBN: 9780078029066 0078029066 OCLC Number: 904505863 Description: xvi, 432 pages : illustrations ; 24 cm Contents: Machine generated contents note: Characteristics of Successful Product Development -- Who Designs and Develops Products? -- Duration and Cost of Product Development -- The Challenges of Product Development -- Approach of This Book -- Structured Methods -- Industrial Examples -- Organizational Realities -- Roadmap of the Book -- References and Bibliography -- Exercises -- Thought Question -- The Product Development Process -- Concept Development: The Front-End Process -- Adapting the Generic Product Development Process -- Technology-Push Products -- Platform Products -- Process-Intensive Products -- Customized Products -- High-Risk Products -- Quick-Build Products -- Product-Service Systems -- Complex Systems -- Product Development Process Flows -- The Tyco Product Development Process -- Product Development Organizations -- Organizations Are Formed by Establishing Links among Individuals -- Organizational Links May Be Aligned with Functions, Projects, or Both. 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Note continued: References and Bibliography -- Exercises -- Thought Questions -- Appendix Design Structure Matrix Example. Responsibility: Karl T. Ulrich, University of Pennsylvania, Steven D. Eppinger, Massachusetts Institute of Technology. Provides step-by-step design and development methods. This book employs detailed industrial examples to illustrate the key ideas. It also treats contemporary design and development issues such as identifying customer needs, design for manufacturing, prototyping, and industrial design. Read more...

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