

SYLLABUS

Date/ Revision : 15 July 2016

Faculty : Business and Social Sciences

Approval :Dr. Samuel Prasetva

SUBJECT: Innovation and Product Development

1. Identification of Subject:

: Innovation and Product Development Name of Subject

Code of Subject : PROD-2100

SKS / ECTS : 2/3 Semester : 3

Study Program :B-MGT/B-IBA/B-INR/B-HTM

: Norman Yachya, ST, MM, Timotius A. Rachmat, MM & Astrid Wiriadijaja, MSi Lecturer

2. Competency

Afterhavingthecourse, studentsareexpectedto:

- a) Identify and analyze the strategic elements of new product innovation, e.g., the process, different functions, and individual roles.
- b) Assess and evaluate advantages and disadvantages with an internal versus open innovation approach.
- c) Propose a framework suitable for the management of new product innovation processes.
- d) Describe the nature and techniques of innovation and new product development;
- e) Discuss the role marketing plays in the early stages of product innovation and how the pattern of consumption influences the likely success or failure of a new product;
- Evaluate the process of developing new products and many of the new product management issues faced f) by companies;
- Demonstrate the best level of practice in each problem situation within the context of innovation and g) new product development;
- h) After completing the course, students will be able to describe the core aspects of Innovation and product development.
- Through the successful participation in this course students are able to recognize how to implement innovation and create new product development.

3. Description of Subject:

This course provides students with an in-depth understanding of innovation and new product development using a management framework. It focuses on how to create value and growth through innovation in new and existing markets. Students will explore the concepts, methods and tools on how to organize and manage innovation process with the objective to better control cost and risk, examine the process of developing new products and many of the new product management issues faced by companies. Plenty of case studies will be discussed to help students to better understand the successes and failures in innovation and new product development, ultimately, to improve the chance of success.











4. LearningApproach

Approach : Classroom , One on one , group discussion and interactive activities.

Method :A combination of lectures, case studies, videos, live projects and in-class discussions

will be employed to familiarize students with the theories and key concepts of the

course. Students are required to participate actively n class discussion.

Student Task: Group Assignment Media : LCD and Video

5. Evaluation

a) Absencemaximum : 25% Participationindiscussion : 10points b) : 20points c) **Group Assignment Project Presentation** : 15points Daily Quiz : 10points e) **Final Examination** f) : 45points

> Total : 100points









6. Contents/ Topics of Lecturing:

Week	Topics	Content	Remark
1	Introduction	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 Exercises	Chapter 1
	Development Processes	Thought Question	Chanton 2
	& Organizations	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 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 Choosing an Organizational Structure Distributed Product Development Teams The Tyco Product Development Organization Exercises Thought Questions	Chapter 2
2	Opportunity Identification	What Is an Opportunity? Types of Opportunities Tournament Structure of Opportunity Identification Effective Opportunity Tournaments Opportunity Identification Process Step 1: Establish a Charter Step 2: Generate and Sense Many Opportunities Techniques for Generating Opportunities Step 3: Screen Opportunities Step 4: Develop Promising Opportunities Step 5: Select Exceptional Opportunities Step 6: Reflect on the Results and the Process Exercises	Chapter 3

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Week	Topics	Content	Remark
		Thought Questions	
	Product Planning	The Product Planning Process	Chapter 4
		Four Types of Product Development Projects The Process	
		Step 1: Identify Opportunities	
		Step 2: Evaluate and Prioritize Projects	
		Competitive Strategy	
		Market Segmentation	
		Technological Trajectories	
		Product Platform Planning	
		Evaluating Fundamentally New Product Opportunities	
		Balancing the Portfolio	
		Step 3: Allocate Resources and Plan Timing	
		Resource Allocation	
		Project Timing	
		The Product Plan	
		Step 4: Complete Pre-Project Planning	
		Mission Statements Assumptions and Constraints	
		Assumptions and Constraints Staffing and Other Pro Project Planning Activities	
		Staffing and Other Pre-Project Planning Activities	
		Step 5: Reflect on the Results and the Process	
		Exercises	
		Thought Questions	o
3	Identifying Customer	Step 1: Gather Raw Data from Customers	Chapter 5
	Needs	Choosing Customers	
		The Art of Eliciting Customer Needs Data	
		Documenting Interactions with Customers	
		Step 2: Interpret Raw Data in Terms of Customer Needs	
		Step 3: Organize the Needs into a Hierarchy	
		Step 4: Establish the Relative Importance of the Needs	
		Step 5: Reflect on the Results and the Process	
		Exercises	
		Thought Questions	
	Product Specifications	What Are Specifications?	Chapter 6
		When Are Specifications Established?	oapto. o
		Establishing Target Specifications	
		Step 1: Prepare the List of Metrics	
		Step 2: Collect Competitive Benchmarking Information	
		Step 3: Set Ideal and Marginally Acceptable Target Values	
		Step 4: Reflect on the Results and the Process	
		Setting the Final Specifications	
		Step I: Develop Technical Models of the Product	
		Step 2: Develop a Cost Model of the Product	
		Step 3: Refine the Specifications, Making Trade-Offs Where	
		Necessary Stop 4: Flow Down the Specifications as Appropriate	
		Step 4: Flow Down the Specifications as Appropriate Step 5: Reflect on the Possults and the Process	
		Step 5: Reflect on the Results and the Process	
		Exercises	
		Thought Questions	
4	Concept Generation	The Activity of Concept Generation	Chapter 7











Week	Topics	Content	Remark
		Structured Approaches Reduce the Likelihood of Costly	
		Problems	
		A Five-Step Method	
		Step 1: Clarify the Problem	
		Decompose a Complex Problem into Simpler Subproblems	
		Focus Initial Efforts on the Critical Subproblems	
		Step 2: Search Externally	
		Interview Lead Users	
		Consult Experts	
		Search Patents	
		Search Published Literature	
		Benchmark Related Products	
		Step 3: Search Internally	
		Both Individual and Group Sessions Can Be Useful Hints for	
		Generating Solution Concepts	
		Step 4: Explore Systematically	
		Concept Classification Tree	
		Concept Combination Table	
		Managing the Exploration Process	
		Step 5: Reflect on the Solutions and the Process	
		Exercises	
		Thought Questions	
5	Concept Selection	Concept Selection Is an Integral Part of the Product	Chapter 8
		Development Process	
		All Teams Use Some Method for Choosing a Concept	
		A Structured Method Offers Several Benefits	
		Overview of Methodology	
		Concept Screening	
		Step 1: Prepare the Selection Matrix	
		Step 2: Rate the Concepts	
		Step 3: Rank the Concepts	
		Step 4: Combine and Improve the Concepts	
		Step 5: Select One or More Concepts Step 6: Reflect on the Regults and the Process	
		Step 6: Reflect on the Results and the Process Concept Scoring	
		Step 1: Prepare the Selection Matrix	
		Step 2: Rate the Concepts	
		Step 3: Rank the Concepts	
		Step 4: Combine and Improve the Concepts	
		Step 5: Select One or More Concepts	
		Step 6: Reflect on the Results and the Process	
		Caveats	
		Francisco	
		Exercises Thought Questions	
6	Concept Testing	Step 1: Define the Purpose of the Concept Test	Chapter 9
	Solice per results	Step 2: Choose a Survey Population	Shapter 5
		Step 3: Choose a Survey Format	
		Step 4: Communicate the Concept	
		Matching the Survey Format with the Means of	
		Communicating the Concept	
		Issues in Communicating the Concept	











Week	Topics	Content	Remark
		Step 5: Measure Customer Response	
		Step 6: Interpret the Results	
		Step 7: Reflect on the Results and the Process	
		Exercises	
		Thought Questions	
7	Exam	Estimating Market Sizes	
8	Break		
9	Product Architecture&	What Is Product Architecture?	Chapter 10
	Industrial Design	Types of Modularity	·
		When Is the Product Architecture Defined?	
		Implications of the Architecture	
		Product Change	
		Product Variety	
		Component Standardization	
		Product Performance	
		Manufacturability	
		Product Development Management	
		Establishing the Architecture	
		Step 1: Create a Schematic of the Product	
		Step 2: Cluster the Elements of the Schematic	
		Step 3: Create a Rough Geometric Layout	
		Step 4: Identify the Fundamental and Incidental Interactions	
		Delayed Differentiation Platform Planning	
		Differentiation Plan	
		Commonality Plan	
		Managing the Trade-Off between Differentiation and	
		Commonality	
		Related System-Level Design Issues	
		Defining Secondary Systems	
	Industrial Design	Establishing the Architecture of the Chunks	Chapter 11
	, and the second	Creating Detached Interface Specifications	
		Exercises	
		Thought Questions	
		What Is Industrial Design?	
		Assessing the Need for Industrial Design	
		Expenditures for Industrial Design	
		How Important Is Industrial Design to a Product?	
		Ergonomic Needs	
		Aesthetic Needs	
		The Impact of Industrial Design	
		Is Industrial Design Worth the Investment?	
		How Does Industrial Design Establish a Corporate Identity?	
		The Industrial Design Process	
		1. Investigation of Customer Needs	
		2. Conceptualization	
		3. Preliminary Refinement	
		4. Further Refinement and Final Concept Selection	
		5. Control Drawings or Models	













Week	Topics	Content	Remark
		6. Coordination with Engineering, Manufacturing, and	
		External Vendors	
		The Impact of Computer-Based Tools on the ID	
		Process	
		Management of the Industrial Design Process	
		Timing of Industrial Design Involvement	
		Assessing the Quality of Industrial Design	
		1. Quality of the User Interface	
		2. Emotional Appeal	
		3. Ability to Maintain and Repair the Product	
		4. Appropriate Use of Resources	
		5. Product Differentiation	
		3. Froduct Differentiation	
		Evereione	
		Exercises The control of the control	
- 10	5	Thought Questions	0
10	Design for Environment	What Is Design for Environment?	Chapter 12
		Two Life Cycles	
		Environmental Impacts	
		History of Design for Environment	
		Herman Miller's Journey toward Design for Environment	
		The Design for Environment Process	
		Step 1: Set the DFE Agenda: Drivers, Goals, and Team	
		Identify the Internal and External Drivers of DFE	
		Set the DFE Goals	
		Set Up the DFE Team	
		Step 2: Identify Potential Environmental Impacts	
		Step 3: Select DFE Guidelines	
		Step 4: Apply the DFE Guidelines to the Initial Product	
		Design	
		Step 5: Assess the Environmental Impacts	
		Compare the Environmental Impacts to DFE Goals	
		Step 6: Refine the Product Design to Reduce or Eliminate	
		the Environmental Impacts	
		Step 7: Reflect on the DFE Process and Results	
		Step 7. Nellect on the DLE Process and Results	
		Exercises	
		Thought Questions	
		Thought Questions	
		Design for Environment Guidelines	
11	Design for manufacturing	Design for Manufacturing Defined	Chapter 13
11	Design for manufacturing	DFM Requires a Cross-Functional Team	Cilabrel 13
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		DFMIs Performed throughout the Development Process	
		Overview of the DFM Process	
		Step 1: Estimate the Manufacturing Costs	
		Transportation Costs	
		Fixed Costs versus Variable Costs	
		The Bill of Materials	
		Estimating the Costs of Standard Components	
		Estimating the Costs of Custom Components	
		Estimating the Cost of Assembly	
		Estimating the Overhead Costs	
		Step 2: Reduce the Costs of Components	
		Understand the Process Constraints and Cost Drivers	
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Week	Topics	Content	Remark
WCCK	Topics	Redesign Components to Eliminate Processing Steps	Kemark
		Choose the Appropriate Economic Scale for the Part Process	
		Standardize Components and Processes	
		Adhere to "Black Box " Component Procurement	
		Step 3: Reduce the Costs of Assembly	
		Keeping Score	
		Integrate Parts	
		Maximize Ease of Assembly	
		Consider Customer Assembly	
		Step 4: Reduce the Costs of Supporting	
		Production	
		Minimize Systemic Complexity	
		Error Proofing	
		Step 5: Consider the Impact of DFM Decisions on Other	
		Factors	
		The Impact of DFM on Development Time The Impact of DFM on Development Cost	
		The Impact of DFM on Product Quality	
		The Impact of DFM on External Factors	
		Fugueiras	
		Exercises The works Overstions	
12	Durat at union and Date at	Thought Questions	Clarata a 1.4
12	Prototyping and Robust	Understanding Prototypes	Chapter 14
	Design	Types of Prototypes	
		What Are Prototypes Used For	
		Principles of Prototyping	
		Analytical Prototypes Are Generally More Flexible Than	
		Physical Prototypes	
		Physical Prototypes Are Required to Detect Unanticipated	
		Phenomena A. D. J. J. G. J. J. G. J.	
		A Prototype May Reduce the Risk of Costly Iterations	
		A Prototype May Expedite Other Development Steps	
		A Prototype May Restructure Task Dependencies	
		Prototyping Technologies	
		3D CAD Modeling and Analysis	
		Free-Form Fabrication	
		Planning for Prototypes	
		Step 1: Define the Purpose of the Prototype	
		Step 2: Establish the Level of Approximation of the Prototype	
		Step 3: Outline an Experimental Plan	
		Step 4: Create a Schedule for Procurement, Construction,	
		and Testing	
		Planning Milestone Prototypes	
		Exercises	
	Dalamat D	Thought Questions	Chart 15
	Robust Design	What Is Robust Design?	Chapter 15
		Design of Experiments	
		The Robust Design Process	
		Step 1: Identify Control Factors, Noise Factors, and	
		Performance Metrics	
		Step 2: Formulate an Objective Function	













Week	Topics	Content	Remark
		Step 3: Develop the Experimental Plan	
		Experimental Designs	
		Testing Noise Factors	
		Step 4: Run the Experiment	
		Step 5: Conduct the Analysis	
		Computing the Objective Function	
		Computing Factor Effects by Analysis of Means	
		Step 6: Select and Confirm Factor	
		Setpoints	
		Step 7: Reflect and Repeat	
		Exercises	
		Thought Questions	
13	Patents and intellectual	What Is Intellectual Property?	Chapter 16
	property	Overview of Patents	
		Utility Patents	
		Preparing a Disclosure	
		Step 1: Formulate a Strategy and Plan	
		Timing of Patent Applications	
		Type of Application	
		Scope of Application	
		Step 2: Study Prior Inventions	
		Step 3: Outline Claims	
		Step 4: Write the Description of the Invention	
		Figures	
		Writing the Detailed Description	
		Defensive Disclosure	
		Step 5: Refine Claims	
		Writing the Claims	
		Guidelines for Crafting Claims	
		Step 6: Pursue Application	
		Step 7: Reflect on the Results and the Process	
		Exercises	
		Thought Questions	
14	Product development	Elements of Economic Analysis	Chapter 17
	Economics, Managing	Quantitative Analysis	
	Project	Qualitative Analysis	
		When Should Economic Analysis Be Performed?	
		Economic Analysis Process	
		Step 1: Build a Base-Case Financial Model	
		Estimate the Timing and Magnitude of Future Cash Inflows	
		and Outflows	
		Compute the Net Present Value of the Cash Flows	
		The Base-Case Financial Model Can Support	
		Go/No-Go Decisions and Major Investment Decisions	
		Step 2: Perform Sensitivity Analysis	
		Development Cost Example	
		Development Time Example	
		Step 3: Use Sensitivity Analysis to Understand Project Trade-	
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Week	Topics	Content	Remark
Week	Managing Projects	Offs Six Potential Interactions Trade-Off Rules Limitations of Quantitative Analysis 366 Step 4: Consider the Influence of the Qualitative Factors on Project Success Projects Interact with the Firm, the Market, and the Macro Environment Carrying Out Qualitative Analysis Exercises Thought Questions Understanding and Representing Tasks Sequential, Parallel, and Coupled Tasks The Design Structure Matrix Gantt Charts PERT Charts The Critical Path Baseline Project Planning The Contract Book Project Task List Team Staffing and Organization Project Schedule Project Risk Plan Modifying the Baseline Plan Accelerating Projects Project Execution Coordination Mechanisms Assessing Project Status Corrective Actions Postmortem Project Evaluation	Chapter 18
		Thought Questions	
15	Final Examination		
16	Break		

7. BookReference:

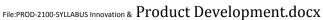
a) TextBook: Product Design and Development, Karl Ulrich and Steven D Eppinger



















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