Enterprise Business Models

4. The Essentials of Product Innovation

- Scale of Product Innovation
- Product vs. Process Innovation
- Examples of Disruptive innovations
- New Product Development Framework

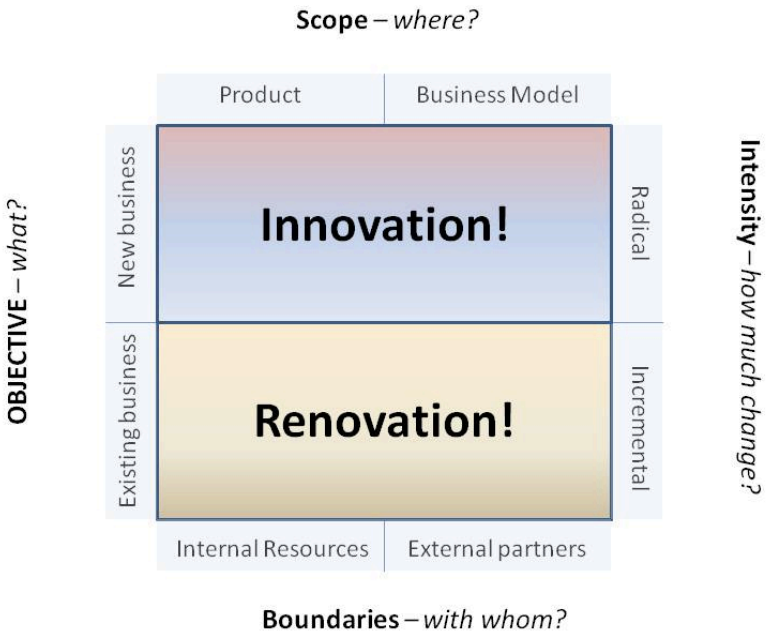
Chap. 4. The Essentials of Product Innovation

4.1. Scale of Product Innovation

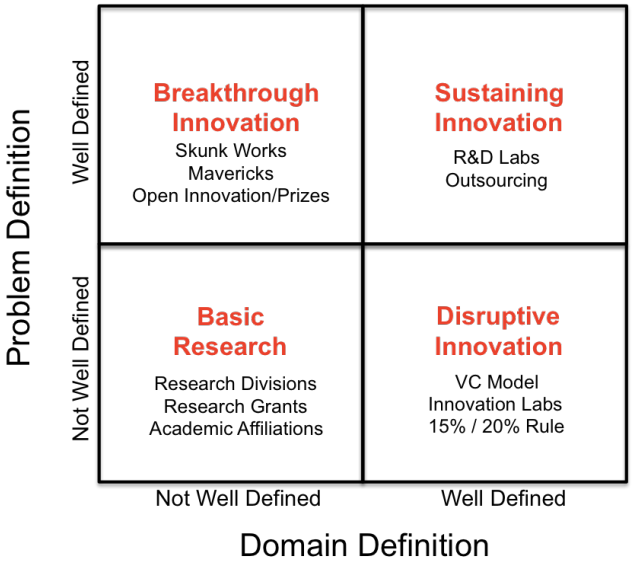
Business model innovations form another important element of business model management and are relevant in the context of changes in business models. With the help of the concept of business model management, innovative business models can be identified and successfully implemented.

An example for a successfully implemented business model innovation through business model management can be found in Apple's iPod and iTunes store. With the combination of a portable media player with an appealing design and the digital music business, Apple has not only achieved a trans- formation of the whole company, but also created a completely new market. The innovation of the Apple Company was mainly achieved in the area of the established business model. ″Apple did something far smarter than take a good technology and wrap it in a snazzy design. It took a good technology and wrapped it in a great business model.″ Today, Apple receives nearly 50% of its revenue from the iPod/iTunes combination and has increased its market capitalization from one billion US dollars to more than 150 billion US dollars.

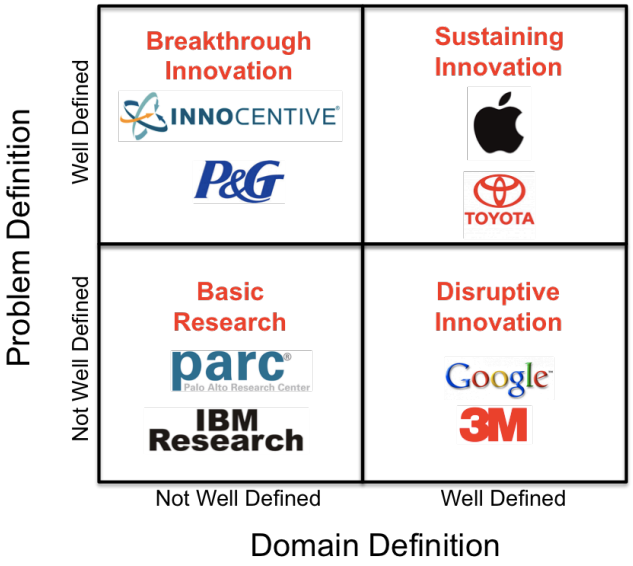
All in all, it can be said that the concept of the business model has gained significance and today is considered to be relevant for success in both academic circles and in management practice. With the help of business model management, a company can differentiate itself from the competition in order to build and ensure competitive advantages in the long run.

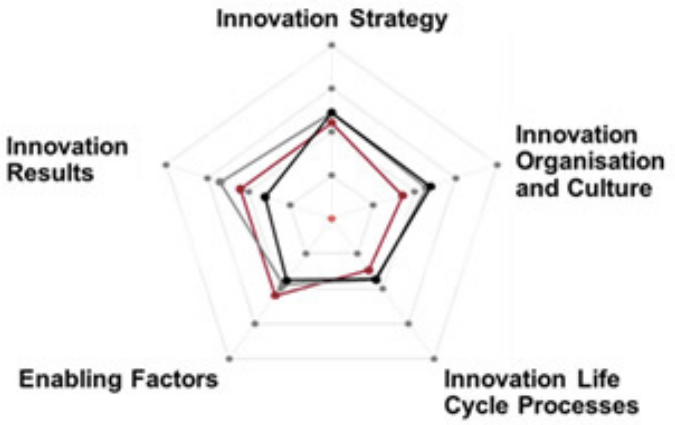


Innovation Matrix



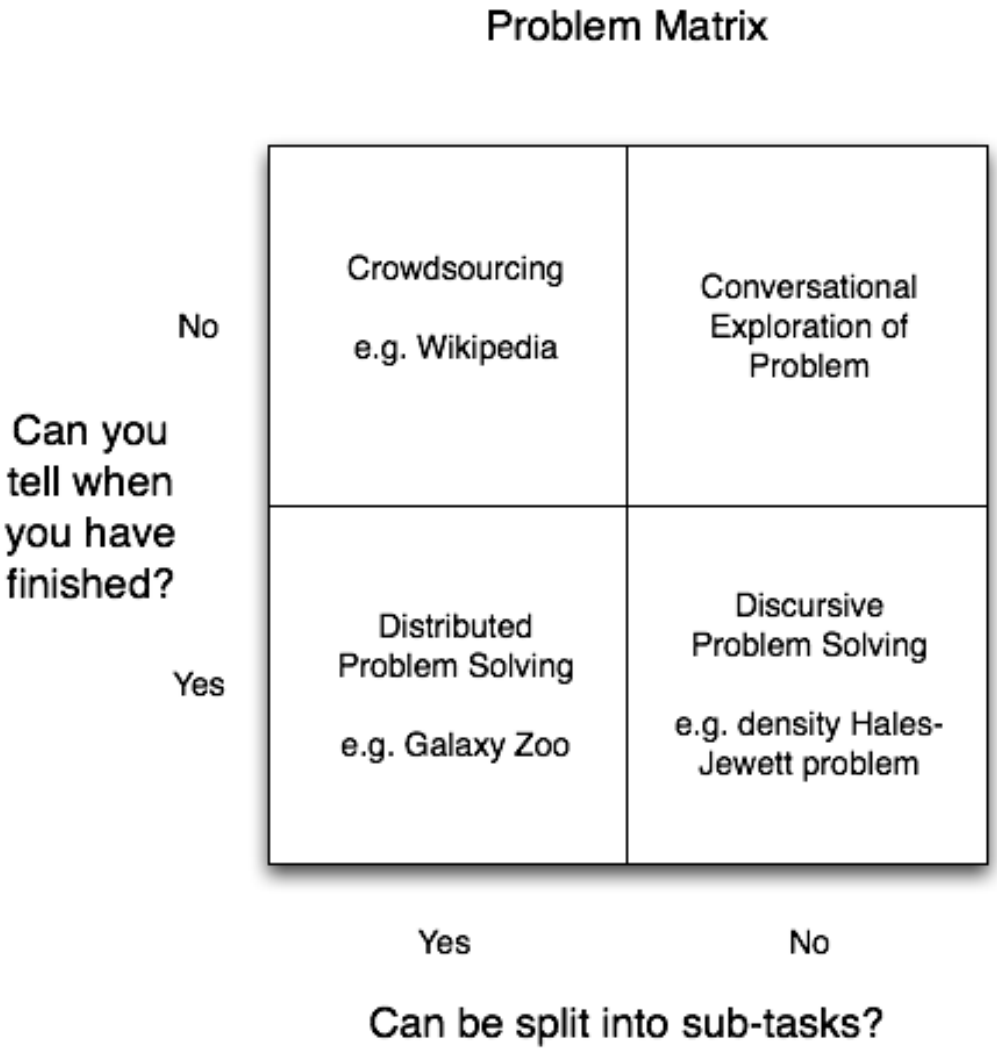
Innovation Matrix





Own company Growth Champions Average

Source: IMP³rove Global Coordination Team, 2013; www.improve-innovation.eu; IMP³rove is a registered trademark



4.2. Product vs. Process Innovation

Product innovation
Types of Innovation Process

A Product / Good is any tangible offering that might satisfy the needs or aspirations of the consumer.

Anatomy of a product can be studied along three dimensions:

- Core benefits – these are the basic functions and attributes meant to be provided by the good / product.
- Tangible specifications – these define shape, size, appearance etc of the product.
- Augmented features – these are the additional benefits or utilities associated with the product like after sale service, perceived benefits of a brand etc.

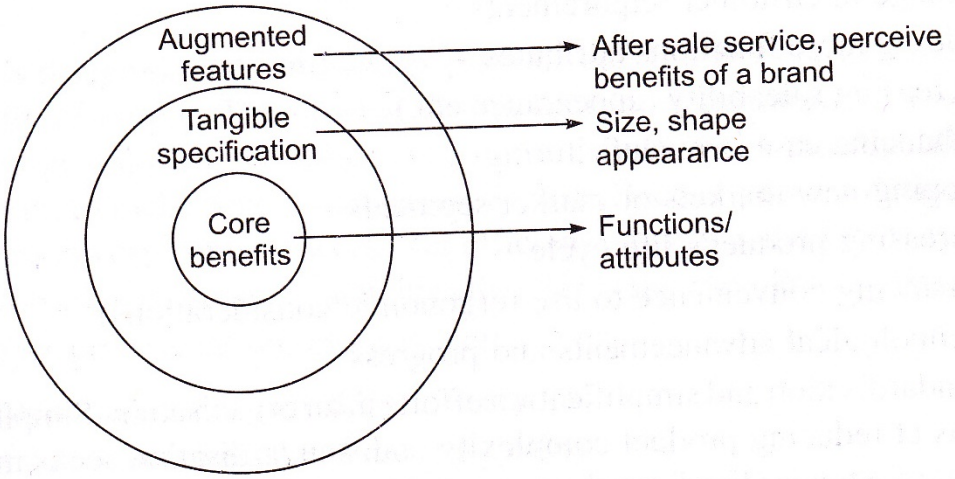


Fig. 13.1 Anatomy of a Product

Product design refers to complete specification of a product to be manufactured and contains following details :

- functions / attributes
- wieght, size, appearance
- engineering / technical specifications
- constituents / components / parts of final product

Product design may be for a new product or for modification of existing product.

- Product design is normally the first step immediately after accepting the concept of the product.
- Product design has direct impact over selection of processing equiments & methods, plant layout and in-process material flows.
- A proper product design ensures that
  - the intended functions are dicharged by the product
  - it can be manufactured with ease in the factory
  - it can be sold to the customer

Product innovation – Drivers of change

Reasons for Change in Product Design / Product Redesign

- Change in customer requirements
- Adding more functions / attributes
- Increasing saleability (appearance etc.)
- Enhancing ease in manufacturing
- Tapping new markets or market segments
- Increasing product's life cycle
- Enhancing convenience to use (ergonomic considerations)
- Technological advancements and progress

- Standardization and simplification efforts in an organiztion. --- Simplification aims at reducing product complexity and Standardization seeks manufacture of standardized products and dropping what is unnecesary or superfluous.
- Improving quality
- Improving produt reliabilty
- Maintaining technological leadership
- Reducing processing and manufacturing costs
- Gaining competitive edge
- Sustaining comeptitiveness

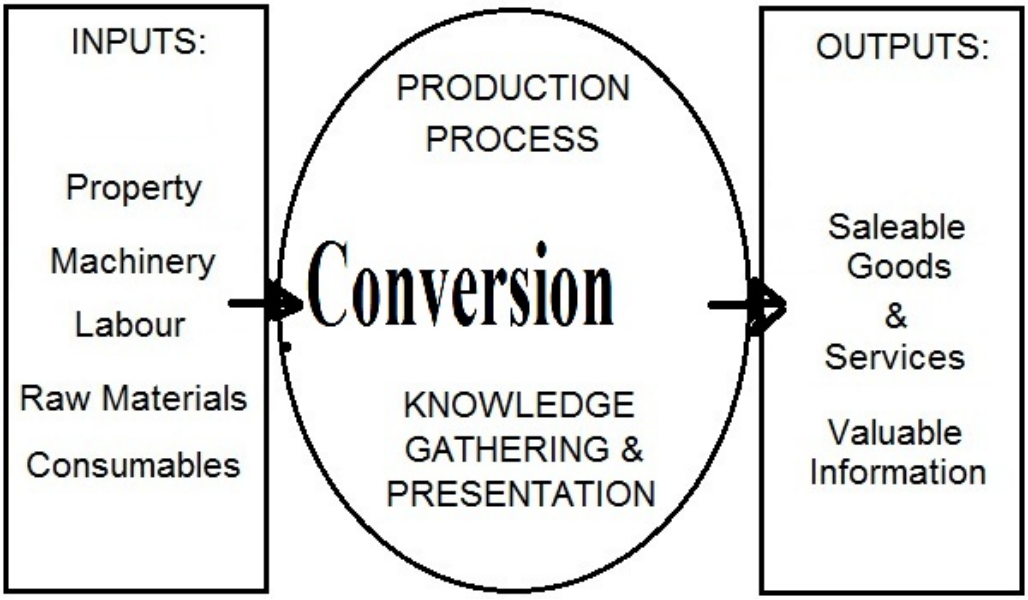
Process innovation

A Process is combination of facilities, skills and technologies that are used to produce products or provide services.

A process usually consists of :

- a set of tasks
- a flow of material and information that connect thees tasks and
- storage of material and information.

These tasks transform inputs into output. Thus process results into change. Process changes i.e. converts inputs into outputs. Inputs are - land, labour, capital etc. Output is- goods and / or services.



Process Design –

- It means the complete delineation and description of specific steps in the production process and the linkages among these steps that will enable the production system to produce products / provide services as per the goals / policies of the organization.
- Like product design, process design is very crucial to the success of an organization.
- Process design directly influences plant layout.

- It affects processing wastage and quality of output.
- The process design decision influences processing time, in-process-inventories and processing costs.
- It influences capability of an organiztion to make timely deliveries.
- A cost effetive process design helps in procuring jobwork / contract work
- A proper process design ensures that
    - Production is completed by delivery date.
    - Goods or services are of desired quality
    - Processing costs are optimal thus leading to cost competitiveness

Process innovation – Drivers of change

Factors Necessitating Change in Process Design / Process Redesign

- For controlling and reducing process wastage
- For improving quality of output
- For controlling and reducing work in process inventories
- For reducing processing time
- For reducing processing costs
- For improving process efficiency
- For improving productivity
- For improving ease in manufacturing
- For ensuring timely deliveries
- For reducing health hazards and improving safety of workforce
- May be thrust upon / forced by
    - Changes in product design
    - Overall technological advancement / progress
- Gaining competitive edge
- Sustaining comeptitiveness

Steps in Process Innovation

Successful process innovation requires the following:

- Proper Planning as to focus area of innovations; deciding about use of technological tools for mechanisation, computerisation & automation; setting targets, goals; deciding timeframe of commercialization etc.
- Creating a multifunctional team of Technical, Production and Maintenance Department

- Selecting a small group of operators and workers, seeking their participation in process innovation though communication, counselling, training and rewards etc.
- Pilot run of the new process
- Observations and improvements in the new process based on feedback from pilot testing
- Large scale training of entire work force
- Commercial use of new Process

Tools for Process Innovation

- Developing Assembly Charts for studying conceptual framwork of material flow
- Developing Process Charts for studying conceptual framwork of process flow
- Computer Aided Designing (CAD), Computer Simulation
- Time Study for comparing time taken for various operations and tasks
- Value Engineering and Analysis
- Business Process Reengineering
- Benchmarking
- Using Change Management Strategies
- Financial Appraisal

Concurrent Engineering

- During initial stages of innovation process, many organizations mainly focus on new product development and its commercialization as major goal is to satisfy the needs of the customers and reap the benfits of product innovation.
- During initial period, little / less efforts are made for process development.
- During later stages, as the product designs get stabilized, focus shifts to attaining process efficiences, hence to process innovations.
- This approach is suitable when the rate of technological change is slow or when the applications are being developed for emerging technologies, thus making large time available for innovation process.

Concurrent Engineering

- Traditional innovation process time frame

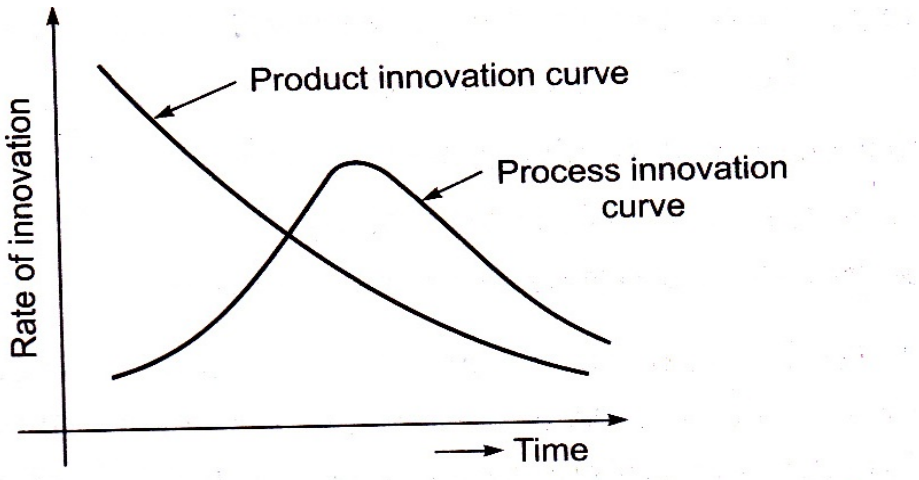


Fig. 13.2 Time Frame of Product and Process Innovations

- Above approach is not suitable in situations where rate of technological change is fast or when due to high competitive pressures firm wants to launch new products in lesser time or when the firm has adopted Enterpreneurial Fast

Track Experimentation Innovation mode. In such situations, less time is available / allowed for development and commercialization of new product or processes.

- Modern era is a period of fast changes including fast technological changes.
- Time available for development and commercialization of products or processes is limited / less.
- In the simultaneous engineering or concurrent engineering approach, the product design proceeds at the same time as process design with continuous interaction between two developments i.e. both product and process are developed and improved at the same time.
- The continuous interaction between product design and process design is shown in the exhibit given below:

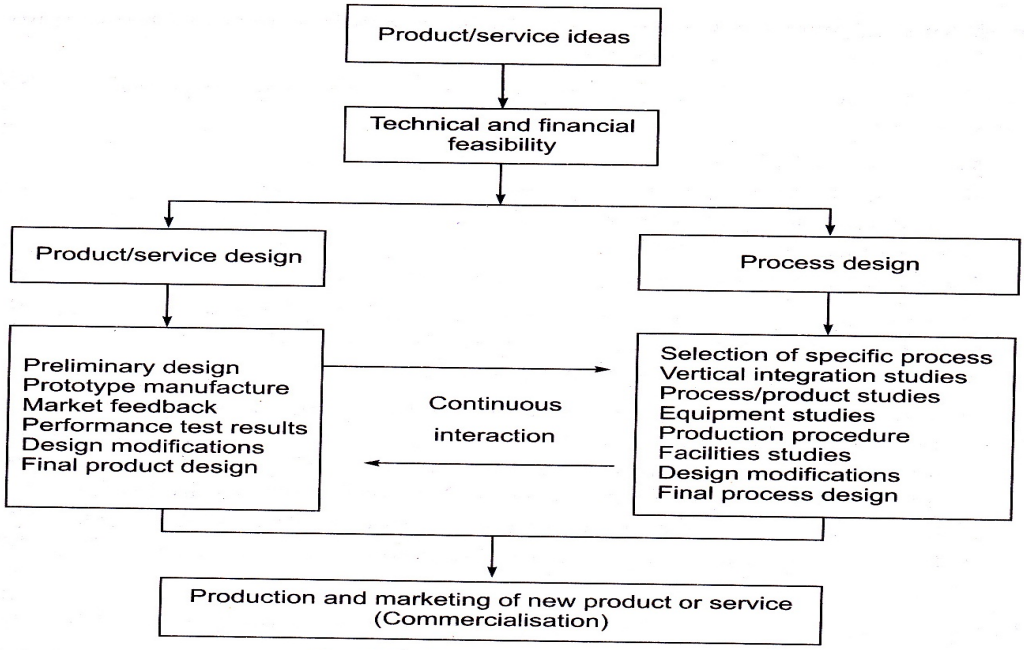


Fig. 6.5 Concurrent Engineering

Advantages

- Concurrent Engineering provides benefits such as reduced product development time, reduced design rework, reduced product development cost and improved communications.
- Examples from companies using Concurrent Engineering techniques show significant increases in overall quality, 30-40% reduction in project times and costs, and 60-80% reductions in design changes after release.

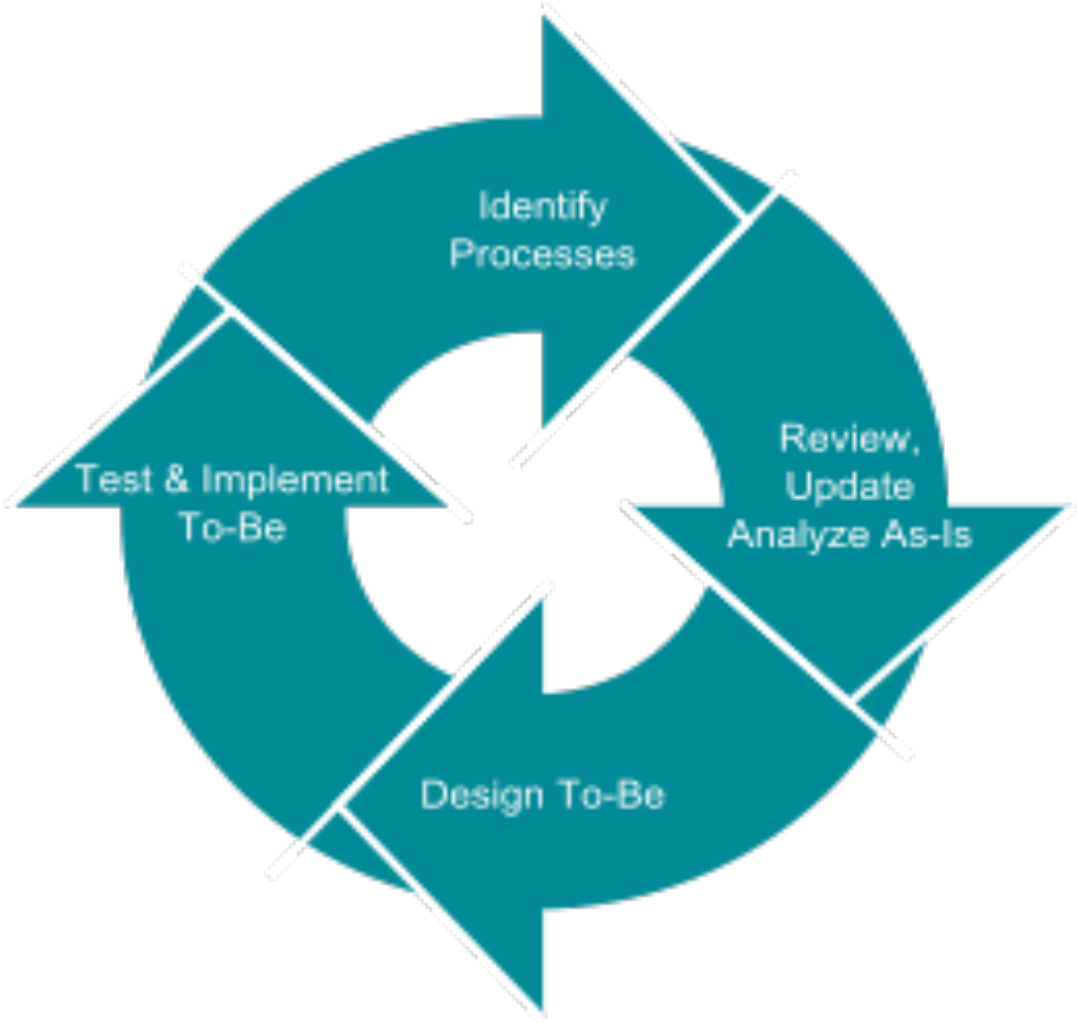
Pitfalls

- Multi dimensional focus – coordination & integration problems
- High degree of creative chaos – poor order in organization
- Unwillingness on the part of top management to institutionalize Concurrent Engineering
- Maintenance of traditional functional reward systems
- Maintenance of traditional reporting lines
- Large teams – members may not have training in teamwork

- Unrealistic schedules – pressure to speed up development
- A focus on computerization rather than process improvement

What is BPR ???

- Business process re-engineering is also known as business process redesign, business process change management.
- Business process re-engineering (BPR) is a technique by which organizations fundamentally rethink how they do their work in order to dramatically improve customer service, cut operational costs, and become world-class competitors.
- It is more than just business improvising.
- A key stimulus for re-engineering has been the continuing development and deployment of sophisticated information systems and networks.
- Reengineering assumes the current process is largely irrelevant - it shall not work on future, it's broke, forget it. Start afresh. Such a clean slate perspective enables the designers of business processes to disassociate themselves from today's process, and focus on a new process.
- Reengineering starts with a high-level assessment of the organization's mission, strategic goals, and customer needs
- Re-engineering identifies, analyzes, and re-designs an organization's core business processes with the aim of achieving dramatic improvements in critical performance measures, such as cost, quality, service, and speed



Business Process Reengineering Cycle

- Total: Make up of the whole. ……. Quality: Degree of excellence a product or service provides. …… Management: Act, art, or manner of handling, controlling, directing, etc.
- Therefore, TQM is the art of managing the whole to achieve excellence. TQM is defined as both a philosophy and a set of guiding principles that represent the foundation of a continuously improving organization.
- It is the application of quantitative methods and human resources to improve all the processes within an organization and exceed customer needs now and in the future.
- TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach.

Diff between BPR vs TQM Approaches

- Davenport (ibid.) points out that the Major difference between BPR and other approaches to organization development (OD), especially the continuous improvement (Kaizen) or TQM movement, is: "Today firms seek not fractional, but multiplicative levels of improvement – (10times) rather than 10%.“

- Johansson provides a description of BPR relative to other process-oriented views, such as TQM and JIT as under:
- "Business Process Reengineering, although a close relative, seeks radical rather than merely continuous improvement. It escalates the efforts of JIT and TQM to make process orientation a strategic tool and a core competence of the organization. BPR concentrates on core business processes, and uses the specific techniques within the JIT and TQM ”toolboxes” as enablers, while broadening the process vision."

Reverse Engineering

Reverse engineering is the process of discovering the technological principles of a device, object, or system through analysis of its structure, function, and operation.

- It often involves taking something (e.g., a mechanical device, electronic component, software program, or biological, chemical, or organic matter) and analyzing its workings / structure in detail to be used in maintenance, or to try to make a new device or program that does the same thing without using or simply duplicating (without understanding) the original.

Reasons for reverse engineering:

- Product analysis. - To examine how a product works, what components it consists of, estimate costs, and identify areas of potential patent infringement.
- Digital update/correction. - To update the digital version (e.g. CAD model) of an object to match an "as-built" condition.
- Security auditing.
- Acquiring sensitive data by disassembling and analysing the design of a system component.
- Military or commercial espionage … Learning about an enemy's or competitor's latest research by stealing or capturing a prototype and dismantling it.
- Removal of copy protection, circumvention of access restrictions.
- Creation of unlicensed/unapproved duplicates.
- Competitive technical intelligence (understand what your competitor is actually doing, versus what they say they are doing).

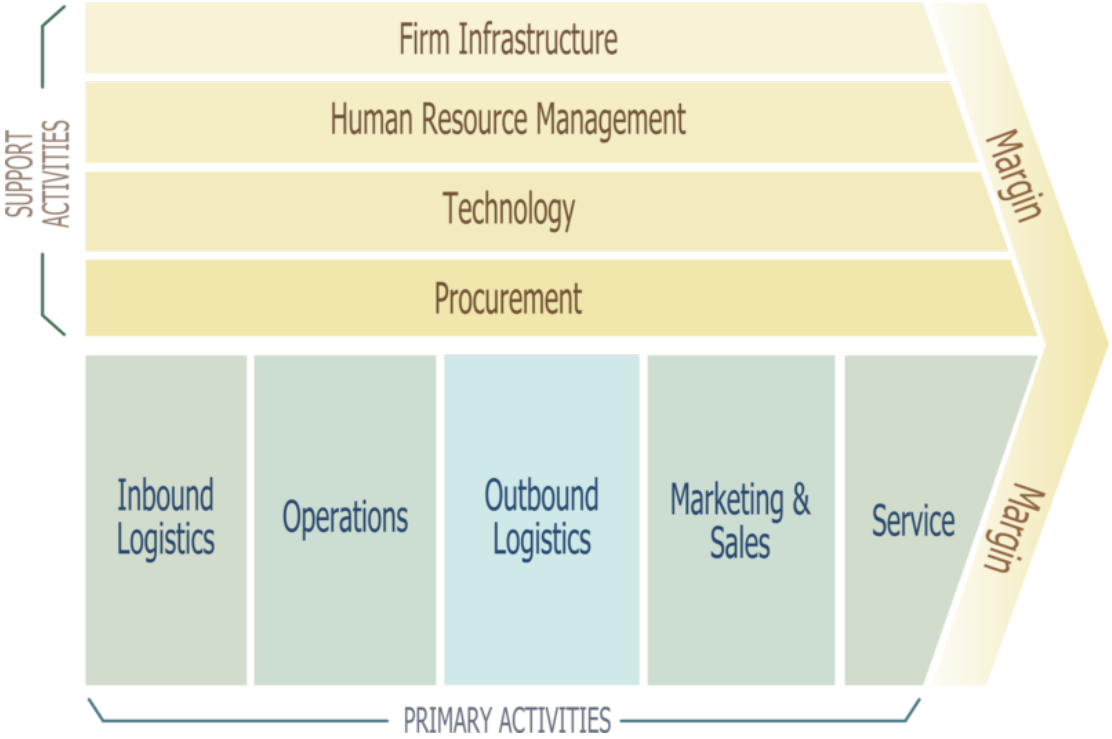
Academic/learning purposes.

- Learning: - learn from others' mistakes. Do not make the same mistakes that others have already made and subsequently corrected.
- Lost documentation: - Reverse engineering often is done because the documentation of a particular device has been lost (or was never written), and the person who built it is no longer available.

Value Chain Model for Process Innovation

- A value chain is a chain of activities for a firm operating in a specific industry.

- The business unit is the appropriate level for construction of a value chain, not the corporate level.
- Products pass through all activities of the chain in order, and at each activity the product gains some value.
- The chain of activities gives the products more added value than the sum of the independent activities' values.
- The value chain categorizes the value-adding activities of an organization in two broad categories.
- The "primary activities" include: inbound logistics, operations (production), outbound logistics, marketing and sales (demand), and services (maintenance).
- The "support activities" include: administrative infrastructure management, human resource management, technology (R&D), and procurement.
- The costs and value drivers are identified for each value activity.
- Value can therefore be increased by either improving the output of a function or reducing the cost associated with a function.



- Value Engineering (VE) is a systematic method to improve the "value" of goods or products and services by using an examination of underlying functions.
- Value engineering is the term applied to analysis done at the design and prototype stage of a product.
- Value can therefore be increased by either improving the function or reducing the cost associated with a function.
- It is a primary tenet of value engineering that basic functions be preserved and not be reduced as a consequence of pursuing value improvements.
- Value Analysis is an effective tool for cost reduction done after commercialization of a product.

Process Innovation & Value Chain

Process innovations enable firms to changes in value chain in three major ways:

- New technologies change the way in which firms actualize the primary value chain activities. Process innovations can be employed to restructure major functions such as manufacturing, marketing, or R&D.
- Process innovations especially in IT can be used to change the conduct of secondary value chain activities.
- Finally process innovations also enable firms to redefine their scope viz outsourcing of insourcing of value adding activities.

Differences Between Mass Production & Mass customization

TABLE 6.1 Comparing Mass Production and Mass Customization

	Mass Production	*Mass Customization*
Focus	Efficiency through stability and control	Variety and customization through flexibility and quick responsiveness
Goal	Developing, producing, marketing, and delivering goods and services at prices low enough that nearly everyone can afford them	Delivering, producing, marketing, and delivering affordable goods and services with enough variety and customization that nearly everyone finds exactly what they want
Key Features	Stable demand	Fragmented demand
	Large, homogeneous markets	Heterogeneous niches
	Low-cost consistent quality, standardized goods and services	Low-cost, high-quality, customized goods and services
	Long product development cycles	Short product development cycles
	Long product life cycles	Short product life cycles

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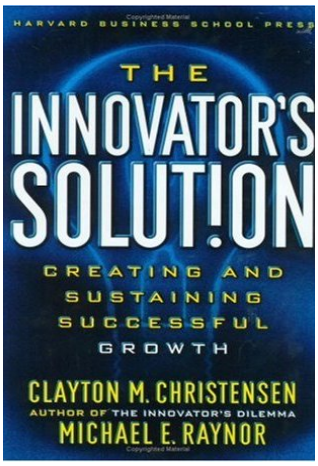
4.3. Disruptive Innovation Models



SHAPING IDEAS TO BECOME DISRUPTIVE (HOW TO BEAT OUR MOST POWERFUL COMPETITORS)

Explore whether the idea can become a new market disruption.

- Is there a large population of people who historically have not had the money, equipment, or skill to do this thing for themselves, and
- as a result have gone without it altogether or have needed to pay someone with more expertise to do it for them?

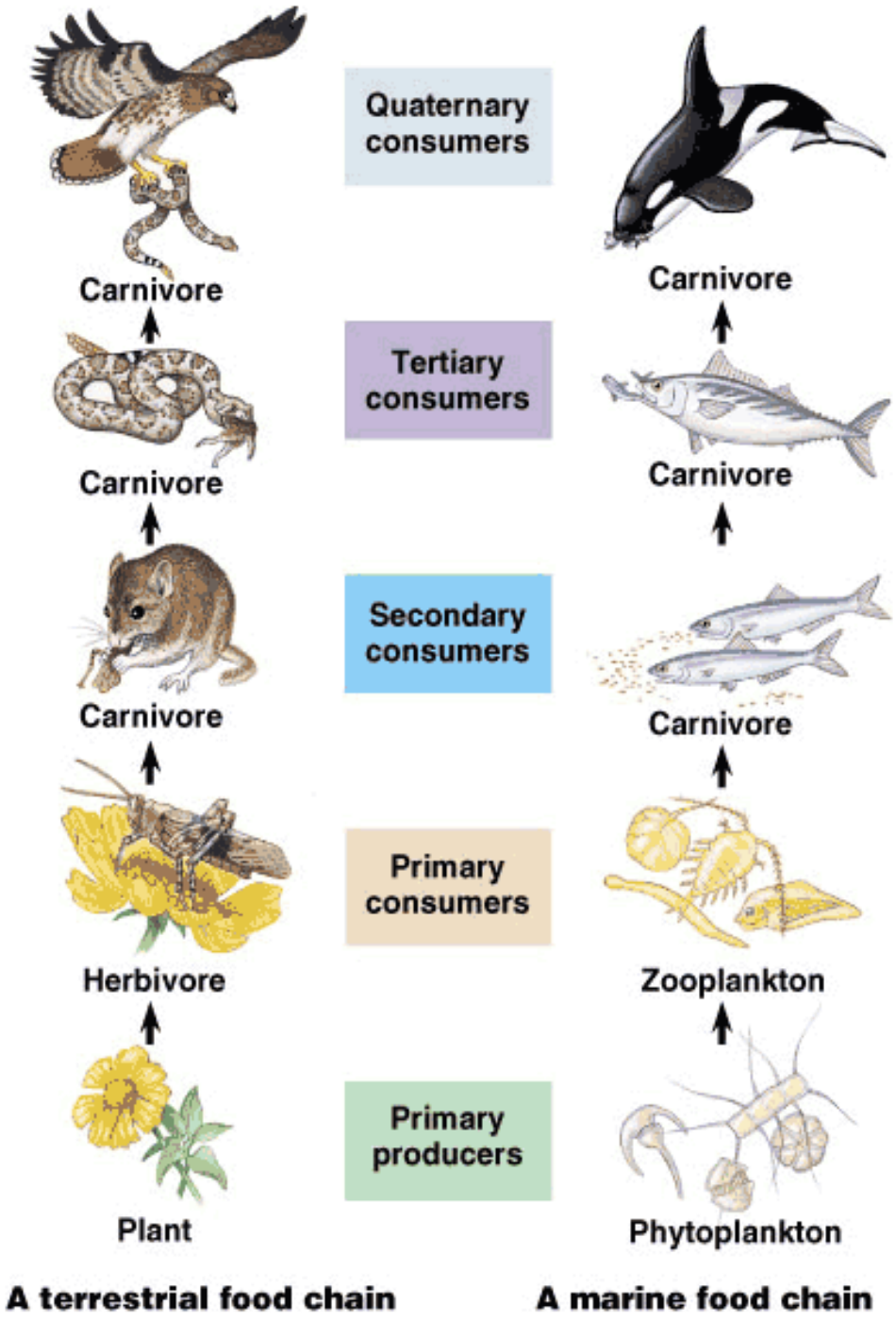
Explores the potential for a low-end disruption

- Are there customers at the low end of the market who would be happy to purchase a product with less (but good enough) performance if they could get it at a lower price?
- Can we create a business model that enables us to earn attractive profits at the discount prices required to win the business of these over-served customers at the low end?

Is the innovation disruptive to all of the significant incumbent firms in the industry?

- If it (the innovation) appears to be sustaining to one or more significant players in the industry, then the odds will be stacked in that firm's favor, and the entrant is unlikely to win.

Competing Against Non-consumers



Competing Against Non-consumption

- The logic of competing against non-consumption as the means for creating new-growth markets seems obvious.
- Despite this, established companies repeatedly do just the opposite.

What Makes Competing Against Non-consumption So Hard?

- Not see disruption coming in. Even if,
- Threat rigidity - Threat elicits more intense and energetic response than opportunity, and then focus on countering the threat to survive.

How to Avoid Hard Non-Consumption Competition

- First, get top-level commitment by framing a threat as an innovation during the resource allocation process. ex. Newspapers embraced online editions to give existing customers additional choice

How to Avoid Hard Non-Consumption Competition

- Later, shift responsibility for the project to an autonomous organization that can frame it as an opportunity. ex. Place the responsibility to commercialize the disruption in an independent unit for which the innovation represents pure opportunity – newspaper's online group

Immelt's approach

- Shift power to where the growth is.
- Build new offerings from the ground up.
- Customize objectives, targets, and metrics.
- Build the DI unit from the ground up, like new companies.
- Have the DI unit report to someone high in the organization.

- The world is in constant disruption – new technologies create new platforms
  - John Hagel III, John Seely Brown, and Lang Davison, "Shaping Strategy in a World of Constant Disruption," Harvard Business Review, October 2008.
- The big emerging markets provide good chance for disruptive technologies
  - Jeffrey R. Immelt, Vijay Govindarajan, and Chris Trimble, "How GE Is Disrupting Itself?" *Harvard Busness Review*, October 2009.

Exercise:
Discuss disruptive innovations with regards to companies such as Apple, Dell and Samsung.

4.4 New Product Development Framework

The new product development (NPD) literature emphasizes the importance of introducing new products on the market for continuing business success. Its contribution to the growth of the companies, its influence on profit performance, and its role as a key factor in business planning have been well documented (Booz, Allen & Hamilton, 1982; Crawford, 1987; Urban & Hauser, 1993; Cooper, 2001; Ulrich & Eppinger, 2011). New products are responsible for employment, economic growth, technological progress, and high standards of living. Therefore, the study of NPD and the processes through which they emerge is important.

New product development

The NPD process consists of the activities carried out by firms when developing and launching new products. A new product that is introduced on the market evolves over a sequence of stages, beginning with an initial product concept or idea that is evaluated, developed, tested and launched on the market (Booz, Allen & Hamilton, 1982). This sequence of activities can also be viewed as a series of information gathering and evaluation stages. In effect, as the new product evolves, management

becomes increasingly more knowledgeable (or less uncertain) about the product and can assess and reassess its initial decision to undertake development or launch. Following this process of information gathering and evaluation can lead to improved new product decisions on the part of firms by limiting the level of risk and minimizing the resources committed to products that eventually fail. The NPD process differs from industry to industry and from firm to firm. Indeed it should be adapted to each firm in order to meet specific company resources and needs.

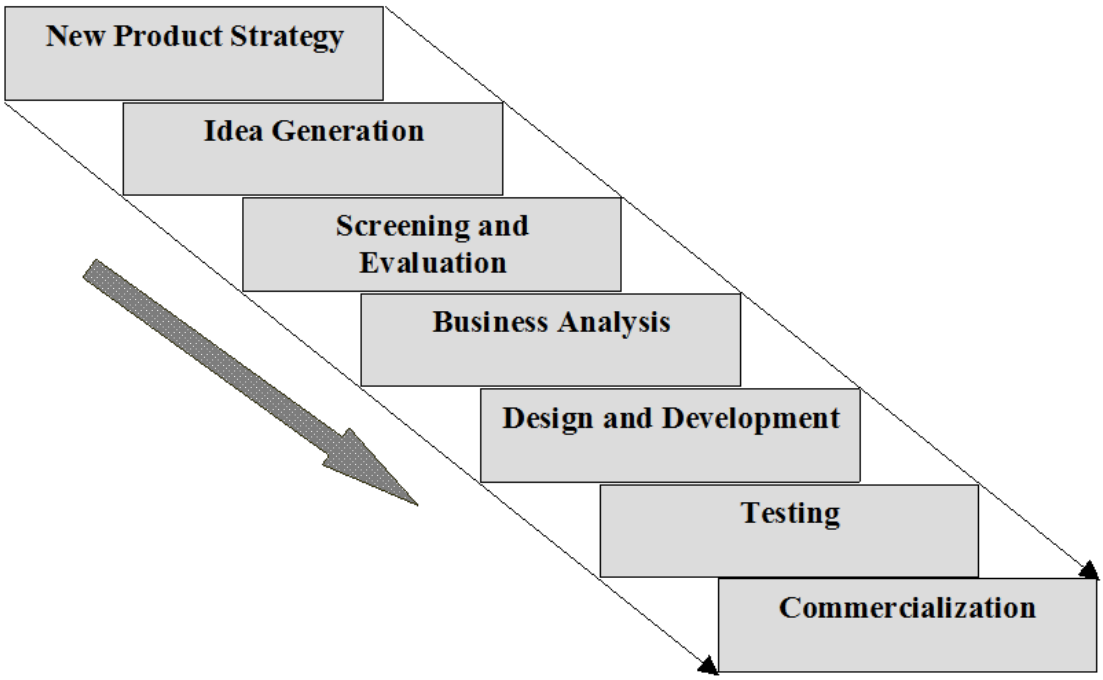


Figure 1. Stages of New Product Development (NPD) (Booz, Allen & Hamilton, 1982)

The stages of the model are as follows:
· _*New Product Strategy*: Links the NPD process to company objectives and provides focus for idea/concept generation and guidelines for establishing screening criteria.

· _*Idea generation*: Searches for product ideas that meet company objectives.

· _*Screening*: Comprises of an initial analysis to determine which ideas are pertinent and merit more detailed study.

· _*Business Analysis:* Further evaluates the ideas on the basis of quantitative factors, such as profits, Return-on-investment (ROI), and sales volume.

· _*Development*: Turns an idea on paper into a product that is demonstrable and producible.

· _*Testing*: Conducts commercial experiments necessary to verify earlier business judgments.

· _*Commercialization*: Launches products.

Booz, Allen and Hamilton (1982) found that companies that have successfully launched new products are more likely to have some kind of formal NPD process and that they generally pass through all of the above stages.

Critical success factors

Over the last two decades, several studies have examined the determinants of NPD success and identified many factors that distinguish successful products from unsuccessful ones. Factors that are necessary and guarantee commercial success are termed as critical success factors (CSF): it is imperative to reflect on how one can benefit from each and how one can translate each into an operational aspect of the NPD process.

Metrics

A metric tracks performance and allows a firm to measure the impact of process improvement over time. Metrics can play an important role in helping companies to enhance their NPD efforts and are important for at least three reasons. First, metrics document the value of NPD and are used to justify investments in this fundamental, long term, and risky venture. Second, good metrics enable Chief Executive Officers and Chief Technical Officers to evaluate people, objectives, programs, and projects in order to allocate resources effectively. Third, metrics affect behavior.

Stage	Critical Success Factor	Metrics	Tools and Technique
New Product Strategy	Clear Strategy	Return on Investment	Financial Analysis
	Well Communicated Strategy	Degree of Communication	Balanced-scorecard as a Communication Tool
Idea Generation	Customer Focused Idea Generation	Number of Customer Focused Ideas Generated	Lead User Methodology
			Ethnographic Approach
Screening and Business Case	Up-Front Homework	Expected Commercial Value (ECV)	Financial Method of evaluation
		Net Present Value (NPV)	
		Internal Rate of Return (IRR)	
		Productivity Index (PI)	
Development	Speed	Development time	Team Cohesiveness
	Customer feedback	Degree of functional integration	Dynamic Time to Market
		Degree of team commitment	Degree of Parallelism
		Concurrency of activities	
		Degree of design effort on real customer priorities	
Testing	Product Functionality	Product Performance	Validation Testing
	Customer Acceptance	Customer-Perceived Value	User and Field Testing

Table 1. Critical Success Factors and Metrics for Stages of NPD Process

END OF CHAPTER 4