

1 a 5 different ways to source needed technology

- Internal R&D

Development of technology and products by utilizing sources from the in-house development department and resources.

- Outsourcing

Hire an external part (company, consultant-firm) to carry out the development process for a certain project, product or component.

- Licensing

Hiring an external part to carry out the development process of an product, component or system on which the technology is patented or in some way intellectual protected.

- Alliances

When two or more firms or organizations create a collective R&D alliance or a cooperation where a certain product/process development is undertaken.

- Acquisition

If in-house technology does not fit or fulfill required targets and strategies, and the technology needed is developed by another company, a firm can make an acquisition of the external company be able to gain from its technology, knowledge and people.

In the industry, Internal R&D is common in order to keep control of and keep availability high of technology and knowledge. Outsourcing of R&D is nowadays common as well, with an increasing commonality among strong player, as for instance Toyota Industries. Acquisitions are common when the need of new technology becomes acute or importance of rapid development arises. For instance can a large company make an acquisition of a smaller firm in order to gain from its technology and knowledges, as the small firm might enjoy from greater financial resources.

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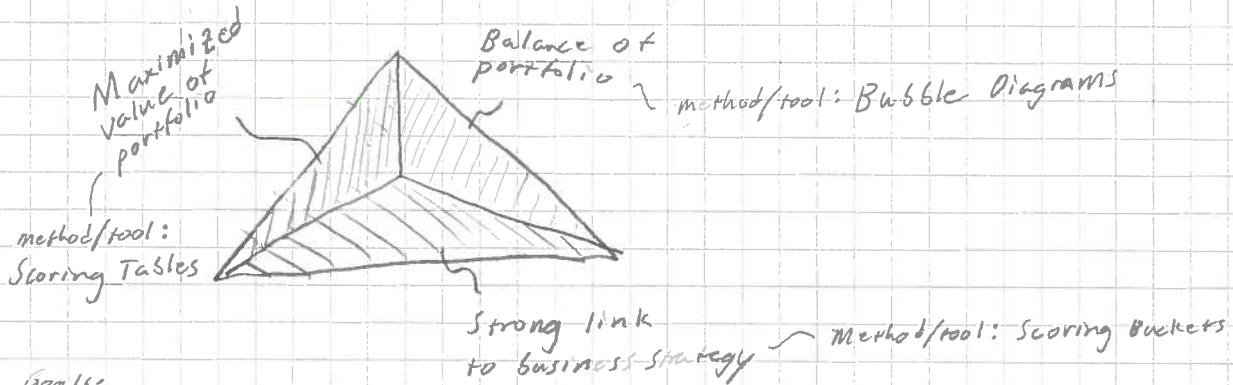
1b) A dominant design is a design that sets industry and market standards, and makes the base on which companies in the business develop and sale their products.

A product, not necessary the first of its kind, of a certain category or type that makes a major penetration of the market and sets standards for the product category and its features. The design of this product is called the dominant design.

An example of a dominant design might be that a car should have four wheels, a steering wheel, seats in it and some kind of engine that drives the wheels. (simplified example)

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a) Goals with Project Portfolio management:



Goals:

Maximized value of portfolio: The project portfolio should contain projects such that the value brought by the portfolio is maximized for the firm.

Balance of portfolio: The project portfolio should contain a mix of project types (Advanced R&D, breakthrough or radical, platform or next generation and derivative) so that it contains long and short term and low and high risk projects.

Strong link to business strategy: The project portfolio should be composed and managed in a way so that it makes possible achievement in progress towards the Business strategy and its goals.

Methods and tools:

Maximized value of portfolio: Scoring tables

A project is evaluated against critical issues and objectives and criteria for the grade of fulfillment of these issues and objectives are set up. For instance a project is evaluated with respect to an issue or objective, 10 points means fulfillment of all criteria, 0 points = fulfillment of no criteria set up.

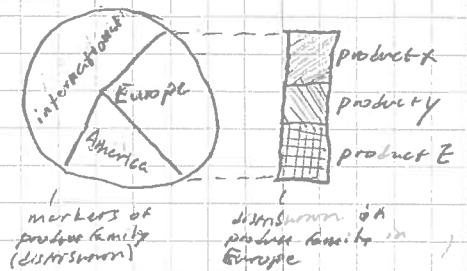
illustration

Project	1 point	4 points	7 points	10 points
Issue 1	crit. crits	crit. crits	crit. crits	crit. crits
Issue 2	crit. crits	crit. crits	crit. crits	crit. crits

Strong link to business strategy: Strategic Scoring Buckets

A "bucket" is set up showing for instance distribution of a product family is graphed. Within each market distribution within the product family is graphed. This might be done to show a great variety of aspects and market situations.

illustration

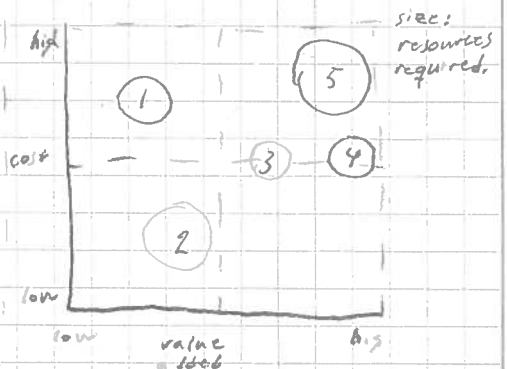


Balance of portfolio: Bubble Diagrams

Creation of diagrams showing different aspects or features and their relation to each other. This is done by placing bubbles in the diagram with their size representing required resources for each project.

Example in the illustration is evaluation of the return between value added and cost for projects 1, 2, 3, 4 and 5.

illustration



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26 Three typical managerial dilemmas and subjects for trade-offs are:

Competitors are ahead

Recall for instance the Applied Materials Case, when they discover that their competition is way ahead.

Despite a well planned and hit for well-executed development the dilemma and trade-off issue to solve is to either stick to plan or make changes. What risks does a change bring? What do we win if we succeed and what do we lose if failure?

Cutting development cycle time

In order to reduce time to market, how can we cut the development time? Do we really need to be first on this market? If yes, should we outsource, hire people or kill/put on hold other projects.

Dilemmas regarding cutting cycle time are complex and can not be executed in the same manner for all cases.

Projects budget can not be held

When project budgets can not be held, and senior management are determined to cut costs, where should the R&D manager start? Do we "over-design" our designs? Does our prototypes cost too much? Can we increase capacity with less people.

Those situations have many possible loose ends. Here the right decision regarding organization, processes, tools and methods are crucial. Also, the communication with senior management, project managers and functional managers is important in order to avoid pitfalls and to come up with solutions that helps to maintain or increase productivity of the firm's development.

3.5

3 a) Barriers, and their underlying reasons are:

- Competence

People from different departments have different backgrounds, education, knowledge and skills. This means different perspectives on issues and also different "languages". These differences make integration of departments difficult since you have to learn how to interpret information shared from people that don't share your competence and therefore not your professional language as well.

- Culture

Differences in cultures in world-wide organization is a barrier since different cultures means different ways of interacting and sharing information with people up and downwards as well as in the lateral direction in organization.

- Organization affiliation

Situations are when a function is a minority or people from certain functions are minorities in projects or project teams. This might for instance be an economy accountant in a development team consisting of mostly engineers. This decreases the sense of organizational affiliation which is crucial for an effective and positive cross functional integration.

- Status

People or functions might have difficulties carrying out cross functional integration when participants or functions have different status or perceived status in the organization. This difference makes natural communication hard.

- Time Pressure

Tight time schedules or deadlines moves away focus from putting value to cross functional integration since one might prefer to focus on finishing their own tasks and not putting thoughts to for instance sharing information with other functions.

- Information availability

When new information is collected or created it has to be done available to other parties of interest.

- Geographical distance

Big distances means wireless communication that might not work properly and time-zone differences which narrows down the choice of hours during days when communication is possible. This makes the events of natural communication rare which hinders a rich, two way, early and frequent communication.

- Goals

Different functions might interpret goals different. This is a barrier when communicating about the goals and to work together against the goals. Goals should be formulated so that they can be interpreted by members from different functions.

6) The mechanisms can be divided into two categories;
Organizational and Lateral mechanisms.

Hierarchical rules,
rules, programs & procedures
planning & goals
narrowing span etc.

Organizational mechanisms: Up/down in the organization

Direct contact
liaison roles
integration roles
Task forces
CFT
Matrix

- Hierarchical Authority: Setting clear organizational rules which describes who is in charge of what and who to answer to.
- Rules, programs & procedures: Organizing and defining frameworks, tools, methods, and procedures to work according to.
- Planning & Goals: A clear planning of the project and clearly set-up goals that people from different functions can interpret and work towards.
- Narrowing Span of Control: In order to reduce uncertainty the span of control should be narrowed down. Less people directly below a manager => lower uncertainty and narrower span of control.

Lateral mechanisms: Between functions

- Direct Contact: Enhance the cross functional integration by direct contact between functions: Face-to-face contact on daily basis instead of email.
- Liaison Roles: Setting up roles that applies to liaisons from different functions when working in cross-functional project teams.
- Integration of Roles: Enhancing cross-functional integration through integration roles from different functions: Roles that implies working within different areas creates ambidextrous roles that encourages communication between departments and that becomes "multilingual".
- Task Forces: Focused problem solving work groups that includes people from different functions.
- Cross Functional Teams (CFT): When properly managed, projects carried out using CFTs can be done more effective and efficient. CFTs involve people from different functions and encourages people to be involved in the project from the beginning and to communicate with all the other people (functions) within the team.
- Matrix Design: Designing matrices (House of Quality, Pugh, Gantt and so on) makes people from different functions interact and contribute with their respective knowledge and perspectives.

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4. Learning Points and their connection to the course goals:

Cross Functional Teams (CFT):

- Learnings about advantages of CFTs when properly managed: Fast, Effective and Efficient projects thanks to different perspectives, and a broad set of ideas that can be evaluated faster.
- What a CFT is and how it should be composed, 6-8, max 10 members with an even mix of functions represented, Difference from Cross Functional Integration which mostly describes communication patterns between up and downstream departments, CFT \Rightarrow All functions involved early.
- Specific requirements on a CFT team leader; Multilingual and great interpersonal skills, Senior with experience.
- Barriers regarding communication and management: Diversity in competence and experience makes communication a challenge. Management related barriers can be management support and not realizing importance of interpersonal dynamics skills.

The learning points of CFTs can be related to course learning goals of pre-requisites of an Effective and Efficient product development process since before starting a project, knowledge about the project and its type should be investigated in order to evaluate if a CFT is of good use in the project. CFTs are also related to Methods & Tools in product development since CFTs enhances impact of using methods & tools such as QFD, OFM, DFA and so on thus diverse set of perspectives. CFTs also relates to Organizational issues & Dilemmas in product development, since CFTs might put organizational requirements to a development department if use of CFTs is to be carried out.

Stage-Gate-Processes

Reasons to usage of stage-gate-processes: Greater overview of projects, reducing risks, Mapping of cost structures, increased control and continuous review of project to create knowledge for making go/kill/re-iterate-decision.

Different processes commonly used:

Stage-gate: Project consists of stages and gates. The stages is where work is done in order to meet deliverables set up for following gate, the gates are build up by criteria that the project should fulfill before the work can proceed. Here a decision of go/kill/re-iterate is taken. Waterfall: A process where work is passed on to next phase when completed. Agile: A process where stages are more iterative, to come up with optimized results before handing over to next stage.

Learning points from Stage-gate-processes can be connected to course learning goals of Processes in Product Development, since the stage-gate process itself is a process within product development. Learning points can also be connected to course learning goals of Tools & Methods in Product Development since Stage-gate processes involves usage of tools and methods.

4. Design for environment (DFE)

Driving forces:

Shortage of raw materials, transparent communication, customer requirements and international laws and restrictions.

Methods and Tools

LCA (life cycle assessment), MET-matrix (Material, Emissions, Toxics) and Cradle-to-Cradle (evaluation of every step in the development cycle).

DFE for:

- Companies: Marketing tool, internal policies, competition
- Consumers: Strive for less consumption, electrical cars, awareness of environment.

DFE learning points can be related to course learning goals of Tool & Methods in Product Development, since DFE involves use of a number of tools and methods when deploying environmental approach. DFE also connects to Processes in Product Development since the entire process of development must be included when deploying DFE, from start of designing to end of product lifecycle. DFE connects to Strategic issues and dilemmas since it affects marketing, project portfolio management, visions in the business strategy to be able to deploy DFE and use DFE as a marketing tool.

Project Start-Up

Learning points include different prerequisites when starting projects depending on if there is a Market-pull or a technology push that is behind a project start up. The report also enlightens the need of clear project definition (goals, objectives, bounds, budget) before start-up.

The learning points can be connected to course learning goals of Processes in Product Development, since a market pull and a technology push driven project requires different processes. Market pull \Rightarrow mature market and defined needs \Rightarrow fast development, maybe with an Autonomous Team or a heavy-weight Cross functional Team. Technology push might require a stage-gate process for conscious review of feasibility and market needs. This also connects to Organizational issues and dilemmas and Methods & Tools of Product Development.

Defining prerequisites of a project before start up also connects the topic to Prerequisites for an Effective and Efficient Product Development Process, since it calls for in detail defining what is needed to know before starting a project.

5a

Documentation of information and progress: To avoid waste of knowledge all progress and new information should be done and documented available for others involved in the project so that they can work with updated material. Waste of knowledge is to not making the information available.

Collect necessary information before taking decision: Making decisions too early make knowledge collected later a waste.

Too detailed work before gathering feedback from downstream departments. Use the knowledge available as early as possible to avoid over-working a design that is not feasible

1.5

5/6 Three views of a platform:

Processes: A range of products or a product family sharing processes means that they share processes required to design, manufacture or assembling the products. That can be for instance sharing a manufacturing process or a production line and activities performed within the processes.

People & Relations: A number of products can be developed, manufactured, assembled and sold by the same people with their respect :- relations. If a range of products are designed by the same designers, and manufacturing technology is designed by the same manufacturing engineers the platform of the products is the people and their relationships

Knowledge & Skills: A range of products that are developed with help from a set of skills and knowledge, Have a common platform in the skills and knowledge used for the development as a common platform.

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