**Session 11: Portfolio management**

Creating project plans to focus product development

Long-term competitiveness of a manufacturing company depends on the success of its product development capabilities. It is essential for creating new industry industry standards and migrating to new niche markets and even renewing the whole organisation.

**Case study of PreQuip: Manufacturer of large scientific Instruments**

They analysed their current project portfolio and saw that many of the projects in the pipeline didn’t reflect the needs of the market anymore.

*Problems:*

1) their current projects required far more resources than the organization could support.   
  
The last years they kept adding projects, this led to an even stronger decline in productivity and they had to compromise on quality.

Because of the strain on resources, delays were inevitable.

2) they focussed on projects that were not most critical to the business. The strategic objectives had little influence on project selection.

Engineers chose projects because they found it interesting or because marketing department requested it.

3) many engineers were spending a lot of their time on nonproject-related work.   
Too much time spend on fixing problems on previously introduced products.

4) too much focus on dealing with short-term pressure, not enough on the strategic long-term mission.

*Solution* = aggregate project plan.

-> set of projects and how they are supposed to evolve over time.

Map them - to see where possible gaps exist in their current development strategy

- to show what development capabilities should be strong

-> company’s development strategy is consistent with project portfolio.

*What actions were taken?*

Eliminating a significant part of their existing projects

Start new projects that fit the business strategy and don’t exceed capacity constraints.  
Map their ‘As Is’ projects and ‘To Be’ projects

-> focus more on a new platform

**How to map projects?**

Define and map different projects

-> 5 different types

**Derivative**

= cost reduced versions of existing products, add-ons or enhancements for the process.   
-> development work was divided in 3 categories

* incremental product changes
* new packaging or new feature
* incremental process change
* incremental changes on several dimensions

**Breakthrough**

= significant changes to existing products and processes

-> e.g. revolutionary technologies/materials

**Platform projects**

= middle of development spectrum (harder to define)  
 = represents significantly better system solution

Good platform gives the opportunity for fundamental improvements (in cost, quality and performance)

-> offers considerable competitive leverage

The more mature the industry, the more important platforms .  
Link with industry life cycle:

- in early stages of growth: innovative & dynamic companies dominate

- later stages: fewer opportunities for breakthroughs

The relationship between platform and derivative projects depends on the industry.

-> ex. where companies should respond quickly to changes and fashion and consumer tastes, best to use ‘hyper-variety’ strategy with a lot of derivatives.

**R&D**

= creation of know-how and know-why of new materials and tech  
 = high risk process, outcome is uncertain

-> translates eventually into commercial development

**Alliances and Partnerships**

= can be formed to pursue any kind of the project types from above

Relying on only one or two of the categories from above will lead to suboptimal use of resources, unbalanced portfolio offering and less than competitive market position.

**Planning future development**

It is important that the portfolio is periodically reviewed to ensure the development activities stay on the right track.

=> *Steady stream sequencing strategy*

=> improve company’s market position while encouraging knowledge transfer.

(Example: plan a new platform 2 years and 3 derivatives every year)

Alternative strategy = *Secondary Wave Planning*

This strategy is more appropriate for companies with multiple product lines, each with their own platform, but more time between succeeding generations.

How does it work?

* Bring platform to market with few derivatives introduces
* When it is challenged by competitors, develop derivatives to strengthen and extend the viability of the product line’s existing platform.

=> Wave of derivative projects extends the platform life and upgrades product offerings

* After receiving feedback from market, competitors and emerging market needs, start developing new platform.

**Long term goal: Building critical capabilities**

Value of aggregate project plan over the long-term:

* ability to shape and build development capabilities
* vehicle for training employees
* create formal career path
* identify weakness in capabilities
* improve development processes
* incorporate new tools and techniques into development environment

=> it gives direction and clarity to the overall development efforts, it helps lay the foundation for outstanding performance.

2. Choosing innovation projects

**Mahindra Tractors Case**

World’s largest producers of tractors.  
Noticed that people used tractors ⅓ for farming purposes and ⅔ for personal transport.   
 -> opportunity for a new kind of tractor to better serve this market

-> Initially a lot of technical problems and didn’t do market research  
 -> sent out protypes to seek feedback

-> built new assembly line

**Development Budget**

*Capital rationing* = allocation of finite quantity of resources over different possible uses.

-> important role for R&D investment decisions

=> then rank ordering of possible projects to determine which will be funded.

How is decided what budget to reserve?

* benchmark with industry
* benchmark with firm’s own performance

*R&D intensity* = ratio of R&D expenditures to sales

Notes:

* a lot of variation between industries ( a lot of R&D in pharma etc)
* a lot of variation between companies in the same industry (R&D focus?)

**Quantitative Methods for choosing projects**

[A] Discounted Cash Flow Method

= analysis to evaluate projects. Assess whether anticipated future benefits are large enough to justify expenditure.

-> Take into account: payback period, risk and time value of money

1. Net Present Value (NPV)

If value > 0: project will generate wealth

NPV can also be used to calculate the *Discounted Payback Period*, this is the time required to break even on a project using discounted cash flows.

Often used with best-case and worst-case cash flow estimates.

NPV = Present value of Cash Inflow - Present value of Cash Outflows

1. Internal Rate of Return (IRR)

What rate of return does this project yield?

Discount rate that makes the NPV of the investment zero.

Calculated by Trial And Error

[B] Real Options

Developing new technologies = investing in own learning and development capabilities

=> Developing projects can create valuable future opportunities

Thus: some managers argued that new product development decisions should be evaluated as *Real Options*

*= application of stock option valuation methods to investments in nonfinancial assets*

Financial model on which the method is based:

Stock options: Call option: enables investor to purchase the right to buy at specified price (exercise price).

Depending on how to stock price is relating to the exercise price, investors will exercise their option or not.

In our case the underlying value of the option are nonfinancial resources. An investor who makes an initial investment in R&D is actually buying a real call option to implement that technology later should it prove to be valuable.

* cost of R&D = price of call option
* Cost of future investment required to capitalise on R&D = exercise price

=> The returns to the R&D investment are analogous to the value of a stock purchased with call option

There are mixed beliefs whether or not this method leads to better investment decisions.

**Disadvantages** of quantitative methods

They can only be as accurate as their estimates are  
 it is difficult to anticipate future returns

=> Discriminate projects that are long term or very risky  
 => May fail to capture strategic importance of the investment decision

=> Potential to severely undervalue a project’s contribution

**Qualitative Methods**

Difficult to quantify and thus difficult to evaluate.

The management discusses the potential costs and benefits of a project.

[A] Screening Questions

Questions are divided into different categories. (Ex. Role of customer/Role of firm’s capabilities/Project timing&cost/…)

The next step is to create a scoring mechanism that adds weight according the importance of the question.

[B] Aggregate Project Planning Framework

Map R&D portfolio according to levels of risk, resource commitment and timing of cash flows.

=> Helps to identify capacity constraints and better allocate resources.

=> Identify gaps in development strategy

=> Encourages the firm to consider short-term cash flow and long-term strategy

Categorize projects into Derivative, Platform and Breakthrough projects.

[C] Q-Sort

Methods based on different individuals ranking projects and discussing their results afterwards.

**Combination of Quantitative and Qualitative methods**

[A] Conjoint Analysis

= a family of techniques that enables assessment of the weight individuals put on different attributes of choice.

=> estimate specific value individuals place on some attributes.

Decomposes complex decision into quantitative scores of relative importance.

[B] Data Envelopment Analysis

= method of ranking projects based on multiple decision criteria by comparing them to a hypothetical efficiency frontier.

How to assess a project score that is based on different criteria with different measurement units.   
  
Efficiency frontier = the range of hypothetical configurations that optimize a combination of features. Created by linear programming that combines these different measures.   
  
Afterwards, the distance of each project from this frontier will result in an efficiency value which we can then use to rank projects.

Advantage = enables comparisons of projects using multiple kind of measures.  
  
Disadvantage = Result of DEA is only as good as the data utilized.

3. Creating Bold Innovation in Mature Markets

Recently economic market conditions are getting tougher and tougher.   
How to deal with this trend? “Bigger, bolder, better innovation”.  
 -> have to come up with breakthroughs or game-changing products/solutions

(example Apple)

-> Not always drastic innovations (example Apple: Ipo, just easy-to-use/download mp3 system

**Different stages**

*Embryonic/Early stage*

* huge payoffs if you get it right

*After embryonic, before mature*

* many new products are introduced to market
* growth attracts competitors

*Mature market*

* evident customer needs are satisfied
* finding unsatisfied needs becomes more difficult
* only few sources of growth left

**Focus on renovation, not innovation**

Current economic conditions -> force companies toward smaller, less risky and less ambitious initiatives.

Why? Shareholders demands for ST profits  
 Mature markets & tough competition

Fewer new-to-world products, more improvements/modifications

=> Time-to-market lower, but also productivity lower.

YET: focussing on line extensions will only serve to maintain market share, not grow it.

**Five Innovation Vectors**After benchmarking studies, researchers identified 5 vectors that must be in place to undertake true innovation.

1. *Developing a strategic focus*

Develop business strategy that focusses the business’s R&D efforts to the most attractive arenas.  
How to develop?

* Setting goals and objectives for business innovation effort
* Delineate your strategic areneas
* Map your plan of attack: ‘How to win?’
* Allocate resources

1. *Fostering a fertile climate & culture*

Consistently innovation depends on the organizational climate and culture.   
These fostering environments require leaders and senior managers who drive and support innovation.

1. *Generating, capturing & handling ideas*

If you keep looking to traditional sources for new ideas, you get the same old concepts.  
So companies need a ‘Idea Factory’ in the front end of its development process.

-> find ideas from: employees, customers, trade, research, …

1. *Designing a next-generation, idea-to-launch process*

Moving from the idea stage to the marketplace.  
To do this relatively fast & effective a process needs to be in place

-> traditional gate-stage process => more agile, adaptive and faster process

Examples:

* Spiral development
  + deal with uncertain market conditions
  + build series of iteration in the process
  + have fast & accurate feedback

-> based on the premise that customers don’t know what they want until they see it

* Contextualizing your approach
  + different development process for different sectors
    - ex. emerging market, growing market, traditional market
* Room for Maneuver
  + create new capabilities and platforms which may serve as the springboard for a whole new family of products (ex. Post It)
* Removing Bureaucracy
  + Too much paperwork etc adds no value
  + try to remove and simplify as much as possible
  + create a lean manufacturing environment

1. *Deciding the right investments, picking the winners*

Effective portfolio management is required

Separate basic scientific research projects

and new and innovative projects

- > establish ‘Strategic buckets’

Leaders then decides about

* crucial ‘Go’ or ‘Kill’ decision
* proportion of R&D funding will go towards it development

If you rely too much on financials, there will be fewer innovative projects.

Managers must resist the slide towards the predictable renovation projects

=> Better to use scorecards

* strategic fit?
* attractive market?
* competitive advantage?
* can core competencies be leveraged?
* technically feasible?
* potential for reward? Is it worth the risk?

**Executive Challenges**

* Develop innovation strategy
* Make right investment decisions
* Establish the right climate and culture
* Launch idea generation and idea-to-launch process