Scope Creep: need strong change control to prevent or mitigate. Must establish the change control system early in the project.

HBS Article: value of scope creep; delays & overruns vs market opportunities. Scope creep can be to a firms benefit. Also stressed the importance of differentiating purpose from scope to help control creep. Purpose can be much broader, longer range than the project.

Project evaluation should not only occur at end of project. Want to have an evaluation process which occurs throughout the project. Should have so many points of intervention.

5 types of project termination. (ex. execution, extinction, …) **KNOW THESE AND BE ABLE TO GIVE AN EXAMPLE OF EACH.** Remember that some terminations are characterized as success such as termination by addition.

After Action Review (AAR): know the 5 questions, meant for learning and sharing, not to judge or punish.

Considering sunk cost to terminate a project. Sometimes managers cannot see it this way. Salvage value, inertia, bias, politics, social pressure, managers motivation. All these things can cause managers to lose the perspective of sunk cost. Can be easy to ignore sunk cost and the project starts ballooning. **KNOW HOW SUNK COST CAN FIT INTO A DECISION TO TERMINATE A PROJECT.** Motivation includes not wanting to look bad as a manager.
Class 12: Portfolio Management Concepts

Value to understand how the firm should prioritize products which are projects. This is the best application of portfolio management. But it can just as easily be applied to competing projects within a deck of projects that you have within the business.

“Portfolio” is a different view of project management. A good project manager may not necessarily make a good portfolio manager. This is not really like project management, see the definition below...

What is Portfolio Management? (definition) [wp13]

A dynamic decision process, whereby a business’s list of active new product projects is constantly updated and revised. In this process, new projects are evaluated, selected and prioritized; existing projects may be accelerated, killed or de-prioritized; and resources are allocated and reallocated to the active projects. The portfolio decision process is characterized by uncertain and changing information, dynamic opportunities, multiple goals and strategic considerations, interdependence among projects, and multiple decision makers and locations.

This describes the exact opposite of what you want as a project manager.
So what is the problem?

U.S. companies spend roughly $2.3 trillion on projects – defined as efforts that have a distinct beginning, end, and deliverable – every year. And yet, the vast majority of companies don’t even have a strategy for managing their projects in a way that captures their full value and effectively maps them to the needs of the organization. The consequence, close to $1 trillion in underperforming investments over the past five years.

So there is a huge amount of money spent on “projects”. This is why portfolio management of projects (especially if they are products) is so important.

Benefit of Portfolio Management

Having a portfolio management process is …

- Fundamental to new product development
  - How to decide what products to fund
  - How to have a balanced NPI approach
- Resource Allocation
  - Where do limited $$s go?
  - Where do scarce SMEs go?
- Project Selection
  - Unbiased approach to advance / cancel
  - Fills pipeline for today / tomorrow
- Business Strategy
  - Brings strategy to life
  - Ties actions to vision

NPI: New Product Introduction

Projects as well as products.

SME: Subject Matter Experts

Ties how you spend your money to what your strategy is. “Ties action to vision”
What does it all mean?

Business success:

**Project Management:** (This is the typical focus)

*Doing the projects right*

**Portfolio Management:**

*Doing the right projects*

---

Example: a particular business had 2 problems. They were consistently late and over budget. Their process for determining which projects to do amounted to “what did this brother or that brother want to get done in the business”. The focus of Mark’s project with them was helping them do the projects right and doing the right projects.

“Doing (the work) right” involves risk mitigation and communication (in this case). “Doing the right projects” involved giving them a portfolio management process they could apply. This enabled them to “do the right things right”.

---

**Doing the Right Things Right**
Why is it important?

1. Financial – to maximize returns / productivity
2. Maintain competitive position in market
3. Proper allocation of scarce resources
4. Forge link between selection and strategy
5. To achieve focus – great projects vs. little ones
6. To achieve balance – long vs. short
7. Prioritization communication within business
8. Objectivity in project selection

1. The goal of the firm is to increase profit/revenue. The firm is making choices to help it reach this goal.

2. What you are going to do, and that you have a plan. (Multi Generation Project Plan)

3. Maximize return from your resources.

4. When using portfolio management you have a plan to get your business where you want it to go. The business has direction.

5. Little projects are quick, low risk, small money. Not everything is a “great” project but are you (the firm) getting some of the great projects done?

7. The projects selected to go on must be in line with the goals of the business and these goals must be communicated to the business participants. Want a shared vision, a shared purpose. A portfolio process can get you this much better than haphazardly saying “all projects are important”.

8. Portfolio management adds objectivity into project selection and decision making. It does not MAKE it objective. There are other methods that you want to be subjective. It takes a very subjective process and adds subjectivity to it.
Inadequate Portfolio Management

These people did some research on quite a few firms, easily over 500. They looked at their portfolios, in this case very product orientated. They took the best 20% (in terms of portfolio performance), and the worst 20%, and then the entire business. Then they did an evaluation and asked the questions and ranked these categories. We can see that the top 20% way outscores the bottom. Even when the top 20 were not doing so well they still were doing much better than the bottom. The circled ones, Time, Balance, Number. The big three!

Yet even the worst do not do too badly with the projects being aligned with the objectives. And this is typically not the problem, it’s the other stuff at the bottom.
Inadequate Portfolio Management

- **A reluctance to kill projects**
  - Too many projects
  - Increased time to market / higher failure

- **Weak decision points**
  - Too many low value projects
  - Too few stellar winners

- **No rigorous selection criteria**
  - Wrong projects are selected
  - Many failures

- **No strategic criteria for project selection**
  - Projects not strategically aligned
  - Scatter gun effect doesn’t support strategy

The problems which arise with inadequate portfolio management. The arrows are showing one problem leading to another. The consequence is that you have too many projects. The consequence of too many projects is increased time to market and higher failure. The consequence of this (weak decision points) is too many low value products, no good kill triggers. Now you have all these things competing for money and you don’t have the big star projects that are successful.

If you don’t have criteria you don’t have alignment, if you don’t have alignment you’ve got a scatter gun approach to how you handle your projects.
Portfolio Management Challenges

- Resource balancing (same resource – many projects)
- Prioritizing projects against each other (NPV only)
- Making Go/Kill decisions (tunnel vs. funnel; drowning puppies)
- Too many minor projects in portfolio (tactics vs. strategy)
- All interlinked

Here we are looking at 5 important “Other Challenges”.

Consider multiple projects, now there is a resource balancing problem, may need the same resource across different projects. Even across different departments, R&D, Manufacturing, etc. Multiple projects are trying to suck out a particular resource.

Prioritizing projects against each other. One of the problems is the case where organizations only use NPV. Relying only on NPV can result in serious problems.

Go/Kill decisions. This is the idea of drowning puppies. There are a series of projects, which do you “feed”? Who gets the money to “live”? The projects are cute, loveable, it’s “your” project, but you only have “x” amount of food, and this many puppies! You have to find a way to rationalize your decision. So this expression represents the dilemma of trying to find a way to take care of projects that just don’t deserve to be feed.

Another illustration is tunnel vs funnel. You have a criteria or toll gate process among a number of projects, say you have 50 projects that feed into this process. Well it’s not a funnel if 50 projects come out the other end! That would be a tunnel. The funneling process should be culling out projects. If it’s not your funnel is really a tunnel and you haven’t added any value.

Too many minor projects, tactics vs strategy. Company has ancillary projects, add-ons. Spending all their money on enhancements instead of investing in the project that is the big win.

The illustration is showing that all these things are linked to each other. (from WP9)
Recent Advances in Portfolio Management

- Financial / Economic Models
- Scoring Models / Checklists
- Probabilistic Financial Models
- Behavioral Approaches
- Mathematical Optimization Procedures
- Decision Support Systems (DSS)
- Mapping Approaches

WE DISCUSS EACH OF THESE BULLETS IN THE FOLLOWING SLIDES.

Seven ways to describe the success of a project. Discussed on following pages.
Recent Advances in Portfolio Management

Financial / Economic Models

- Say you have a hurdle at 20% and two projects, A and B. We may use NPV to identify which project gets funded and which doesn’t.

- But there is a problem with this. Many businesses have one hurdle for all their products (projects). Even across divisions. But when it doesn’t take into account risk, you can have a project which delivers a 22% hurdle (B) but is twice the risk of the project which delivers 18% hurdle.

- This leads to the idea that the hurdle rate should be a inclined value rather than a constant. In this way the managers can see that the higher risk projects have a higher hurdle. In this light A is the winner and B gets dumped. But businesses are not doing this.

- Another problem with NPV. Say you have a given hurdle rate, it’s high. The problem you have is that for a short term project it’s not as hard to deliver 20% than a project which takes 4 or 5 years to reach fruition. Discounting 20% out 5 years requires incredible cash flow at that point to deliver the same kind of NPV as a 1 year project. What happens is that NPV favors short term projects (a peril of NPV) and penalizes long term projects. Even when using the same hurdle rate!

- Pro of NPV: it’s objective, treats all projects in an unbiased way (except long/short). Con is the quality of the information. Calculating before the project has even started.

3 Cons: Not good at comparing risk, not good on long term / short term, quality of the data is very suspect, especially revenue.
Recent Advances in Portfolio Management

**Scoring Models / Checklists**

- Benefit measurement technique
- Relies on subjective assessments (fit, competitive advantage, market attractiveness)
- Recognizes the lack of reliable financial data early in the project
- Used two ways
  - Compared to a cutoff / standard – basis for Go/No Go
  - Used to rank projects against each other – allocate until out of resources

The pro for scoring model is that it gets you past NPV. It starts looking at other things to think about when measuring the value of projects. Looks at things like FIT, how does this project fit in our strategy, competitive advantage, how trafficked is the market for this kind of product. And it clearly recognizes the lack of reliable financial data early in the project. Project must reach a certain score in order to be a go. Can rank the projects against each other when trying to allocate resources.

Recent Advances in Portfolio Management

**Probabilistic Financial Models**

- **Monte Carlo Simulation** – multiple scenarios to represent possible financial outcomes
- **Decision Tree Analysis**
  - tree and branch format
  - probability of each branch determined
  - expected value is probabilities of outcomes times financial consequences
- **Options Pricing Theory** (Real Options)
  - recognizes that investments are made in increments
  - analogous to buying options in the stock market
Recent Advances in Portfolio Management

**Behavioral Approaches**
- **Modified Delphi** – collective wisdom of decision-making group
- **Q-sort Method** – group sorting of options (high – low) until consensus formed
- **Paired Comparison Model**
  - Analytic Hierarchy Processes (AHP)
  - Series of pairwise comparisons
  - Decisions analyzed by computer – outcome is a rank order

Compare a set of 2, throw out the loser. Repeat until you have only one left.

**Pro:** they are systematic, you have a system.

**Con:** they can be biased.

**Soft Issues**

**Behavioral Approaches**

Delphi

Talking about the value of a project outside the financial piece.

**Recent Advances in Portfolio Management**

**Mathematical Optimization Procedures (MOP or MOM ?)**

- Optimal solution models
- Maximize an objective (profit)
- Considers constraints (resources)
- Different tools
  - Linear Programming
    - Statistical Decision Theory
    - Game Theory
    - Probability Theory
  - Judgment and experience not considered

**Con:** only focused on numbers, does not get into the softer issues.

**Mathematical Optimization**

Can be very unbiased but only looks at the financial piece.

This is a tool when maximizing something, in this case profit, and you have constraints, in this case resources. Uses different tools, in this case linear programming and the others listed. Not seen very often.
Recent Advances in Portfolio Management

**Decision Support Systems (DSS)**
- Mathematical Model using intervention
- More flexible than MOMs
- Rely on statistical methods, simulation, and optimization models to guide management through the decision process
- Requires considerable work, data, and analytical understanding to be effective
- Limited use due to time required

Still relies on statistical methods of simulation. The difference is that it gives management some flexibility at putting inputs in that are not just financial.

Adds some subjectivity to the MOM.

So the great thing about this is it’s more robust, it has more flexibility, it takes into account non-financial and financial.

The problem with it is that it requires a huge amount of time and data.
Recent Advances in Portfolio Management

**Mapping Approaches**

- Typically Bubble Diagrams
- Projects on X-Y plot
- Extensions of other portfolio models
  - Boston Consulting Group (Stars, Cash Cows, Dogs, Wildcats)
  - GE / McKinsey (Industry attractiveness’ vs. Business strength)

This is a very powerful technique. We will use it a lot. This is one of the most useful ways, in addition to the financial models, to help us with portfolio management.

A way to look at a portfolio of projects and see if they add up.

High Risk & Low Return = DOG  But this helps us realize that we have low risk high return projects as well, these are the stars. Low return & low risk means just milk that product/project for what it is worth. Wildcats are the ones where there is a lot of risk but also a lot of opportunity for return.
Requirements for Effective Portfolio Management

1. Corporate goals, objectives, and strategies - the basis for project selection
2. Senior management closely involved with project selection to drive strategy
3. Good communication between senior management and project management
4. Portfolio method meshes with decision framework of business
5. Portfolio methods for information display only, not optimization decisions
6. Selection method that accommodates change and interactions of goals
7. Selection method that accommodates decision making at different levels of the organization
8. Select technique that accommodates risk
9. Organization structure and support systems

1. Cannot optimize the mix of projects if the company has not defined it’s goals.

2. If top leadership is not involved the problem arises that lower level managers who are selecting do not have all and as good as information upon which to base their decisions.

3. Point is that senior management must know exactly what is going on with the project, that they are looking at a broad base, project team must know what senior management is evaluating them on.

4. If the organizations decision framework is not collaborative it will not work. Make sure that whatever method of communications the company uses among management, that the project is using the same method for portfolio management.

5. Displays help start the conversation and help you look at what is going on. Run the projects against a filter (comparator), see what the outcome is, look at the outcome and debate it. People will want to move something within the framework to a place they want it to be but where it did not score to. Don’t change the output, look at the underlying input.

6. If there is a change in the market there should be a change in that projects scores.

7. See above
8. Method must be able to capture the different levels of risk between multiple projects.

9. Is there a way to collect the data easily? It can get complicated. IT plays a big role.

Portfolio Management Goals

- Value Maximization
  - NPV / ECV / Check List / Scoring Model
- Balance
  - Long vs. Short Term / High vs. Low Risk / Markets / Technologies / Project Types
- Strategic Direction
  - Spread by project type / area / market / etc.

[EACH OF THESE ARE EXAMINED BELOW]

3 basic goals of portfolio management. One of these must be the most important to the company. All three cannot be equally important.

The “right” portfolio management method depends on the goal of the business

1. Maximize value!

2. Long term, short term,… this may be the number 1 goal.

The goal of the business will help you create your portfolio method.
Portfolio Management Method: Maximizing Portfolio Value

- Net Present Value
- Bang for Buck Index (NPV / $ remaining to spend)
- Expected Commercial Value (considers risk)
- Productivity Index (variant of ECV)
- Option Pricing Theory (Real Options – fairly new approach)
- Dynamic Rank-Ordered List (blends multiple criteria)

Maximize Portfolio Value

Different ways to measure product/project. NPV is quick and a good comparison.

Expected commercial value looks at NPV and discounts it by realizing that there is a probability of commercial success and a probability of technical success. Remaining Cost * Probability of Success. If just using NPV you would select the largest and be done. But if you want to recognize risk look at something like this.

Productivity Index, ECV compared to resources capability. Must have the right people to make it happen.

Options is a way of valuing future decision opportunities. A risky first step may be offset by a future step which has more value.

Dynamic Risk Ordering combines a few of these assign a percentage to each method you use.

Can use software approaches with scoring.

Caution: The sophistication of these models far exceeds the quality of the data!
Financial Criteria Tool

Expected commercial Value

Helps recognize risk as opposed to just NPV.

Portfolio Management Method: Maximizing Portfolio Value

- Scoring Models
  - Multiple approaches
  - Determine what to consider
  - Weight each factor
  - Operational definition to rating
  - Rate each criteria (done by gatekeepers / senior mgmt.)
  - Complete scoring (done at tollgate review)
  - Prioritize by final rating

Scoring Models

Operational definitions are very important particularly regarding the scales. Must have this at the beginning before you rate.

Many approaches, just determine what to consider. Pick the things which are important to the firm. Weighting can be good but don’t have so many factors that the weight percentages become too low.

Must kill the dead wood and put the resources on other more productive projects. What is important to the business, what is your strategy, what is the criteria to weigh against, apply operational definitions.
Portfolio Management Method: Seeking the Right Balance

- Bubble Diagrams
  - Dimensions (fit, importance, probability of success, time, $$$$)
  - Risk-Reward Diagrams (next slide)
  - Variants of Bubble Diagrams (P&G 3-D – see paper # 9 pg 7)
- Charts for Portfolio Management
  - Capacity Utilization
  - Project Timing
  - Project Types
  - Market / Product / Technologies
  - Customer Needs Profile
- Finding Balance

Balance

This is asking where you want to be in the market.

Project Timing: balance completion times.

Need balance for timing.

Bubble Diagram
Bubble Diagram Approaches

<table>
<thead>
<tr>
<th>Rank</th>
<th>Type of Chart</th>
<th>Axis #1</th>
<th>Axis #2</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Risk Vs. Reward</td>
<td>Reward: NPV, IRR, benefits after years of launch; market value</td>
<td>Probability of Success (technical, commercial)</td>
<td>44.4</td>
</tr>
<tr>
<td>2</td>
<td>Newness</td>
<td>Technical Newness</td>
<td>Market Newness</td>
<td>11.1</td>
</tr>
<tr>
<td>3</td>
<td>Ease Vs. Attractiveness</td>
<td>Technical Feasibility</td>
<td>Market Attractiveness (growth potential, consumer appeal, overall attractiveness, life cycle potential)</td>
<td>11.1</td>
</tr>
<tr>
<td>4</td>
<td>Our Strengths Vs. Project Attractiveness</td>
<td>Competitive Position (our relative strengths)</td>
<td>Project Attractiveness (market growth, technical maturity, years to implementation)</td>
<td>11.1</td>
</tr>
<tr>
<td>5</td>
<td>Cost Vs. Timing</td>
<td>Cost to Implement</td>
<td>Time to Impact</td>
<td>9.7</td>
</tr>
<tr>
<td>6</td>
<td>Strategic Vs. Benefit</td>
<td>Strategic Focus or Fit</td>
<td>Business viable, NPV, financial fit attractiveness</td>
<td>9.0</td>
</tr>
<tr>
<td>7</td>
<td>Cost Vs. Benefit</td>
<td>Cumulative Return ($)</td>
<td>Cumulative Development Costs ($)</td>
<td>5.6</td>
</tr>
</tbody>
</table>

These are possibilities for the axis of the bubble diagram.

When looking at your portfolio you’ll use 2 at least. Never just one.

Show the different types of something vs something and then how often it is being used.

Portfolio Management Method: Linking to Strategy

- Approaches
  - Top-Down (Strategic Buckets Model)
  - Bottom-Up (start with individual project – screen)
  - Top-Down / Bottom-Up
- Strengths & Weaknesses
  - Huge models and framework to implement
  - Require both business and project strategy
  - Requires tremendous amounts of data

Strategies: Breakthrough, new to market current with capabilities, new to market, new to us. So you set up your buckets, in this example we’ll use Doing, New to Us, New to World.
The firm loads the buckets for the comparison, but they do not compare the projects against each other (this is not advisable because the project risk levels differentiate them). So they compare “doing the projects”, whichever projects are in the bucket. They compare and rank the contents of each bucket against themselves. Whatever is in the bucket is compared and ranked. Then they draw the line with regard to money.

How much they can spend in each bucket. Whatever is below the spending line is not done.

<table>
<thead>
<tr>
<th>Doing</th>
<th>New to Us</th>
<th>New to World</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
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</tr>
</tbody>
</table>

It’s a **TOP DOWN** approach all the way from strategy at top to deciding which project to do at the bottom.

In **BOTTOM UP** we look at the individual projects and screen them against some kind of screen (scoring for example). This tells us what goes into our portfolio mix.

Can do both methods for a kind of sanity check.

**Pros**: Firm must have it’s strategy though out. Must know how it needs to allocate it’s money.

**Cons**: this is a gigantic model you have to deal with. If you don’t have IT supporting it it ends up being lots of excel spreadsheets. Lots of data is required, for example, if using NPV must have all the financials behind the projects.
Strategic Buckets Method

This is an example of what we were doing above. They have not shown the budget cutoff lines. The lines represent the constrained resource, in the above example it was money.

Everything below the line waits!

Methods & Performance

The best businesses from a ROI standpoint do these things very well. The point the authors are making is that the method works!

Define your strategy, decide on goals, come up with scoring systems for the project, start working on those projects.

This process works. The companies that do this return the best (based on the research of the authors).
Performance of Various Methods

Scoring the success of the portfolio method to the performance metric. Looked at how the companies ranked, the different ways they used. The most successful were using the green methods to measure how they were doing on the performance metrics listed.

Key: the companies that were doing the worst over relied on the financial model. It’s counterintuitive. You might think financial methods would be the best way to go on high value projects. Why is this not the case? Note that none of the financial methods are green. NPV as a process is very good, but when applied to something like this there is a lot of risk to it. The model you base your NPV calculations on is very weak when all you have is a product on a piece of paper. How good is your costing information? There are many things to consider.

The above red companies are placing a lot of their eggs in the financial model basket, but their financial model is based on crappy data!

The companies which use more subjective methods such as strategic models, bubble diagrams, perform better in aligning the project they should do.

Must use some financial information, just be careful how you use it.

<table>
<thead>
<tr>
<th>Performance Metric</th>
<th>Strategic Method</th>
<th>Financial Method</th>
<th>Scoring Model</th>
<th>Bubble Diagrams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projects are aligned with business objectives</td>
<td>4.06</td>
<td>3.76</td>
<td>3.95</td>
<td>4.11</td>
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<tr>
<td>Portfolio contains very risky value projects</td>
<td>3.71</td>
<td>3.37</td>
<td>3.82</td>
<td>3.70</td>
</tr>
<tr>
<td>Spending reflects the business strategy</td>
<td>3.72</td>
<td>3.50</td>
<td>3.50</td>
<td>3.40</td>
</tr>
<tr>
<td>Projects are done on time - no grudgeback</td>
<td>2.22</td>
<td>2.79</td>
<td>3.13</td>
<td>2.30</td>
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<tr>
<td>Portfolio has good balance of projects</td>
<td>3.00</td>
<td>2.60</td>
<td>3.26</td>
<td>3.20</td>
</tr>
<tr>
<td>Portfolio has right number of projects</td>
<td>2.93</td>
<td>2.50</td>
<td>2.70</td>
<td>2.25</td>
</tr>
</tbody>
</table>
Conclusions

- Formal methods work
- No one right approach
- Beware of over-reliance on financial methods
- Look more to strategic approaches
- Consider scoring tools for prioritization
- Bubble diagrams are useful
- Just do it!