CHAPTER 1

Portfolio Analysis and Management – What and Why?

The reasonable man adapts himself to the world; the unreasonable one persists in trying to adapt the world to himself. Therefore, all progress depends on the unreasonable man."

George Bernard Shaw

Businesses need to make investments to continue. A portfolio framework can add tremendous value when making investments, whether by a direct calculation using cash flow or by using proxies for value like revenue or market share. Your organization can make a significant leap forward by combining decision quality with portfolio management. A 30% increase in the value of an investment program is not uncommon when using portfolio techniques, as evidenced by both practice and literature.

Portfolio Management Connects Ideas with Execution

In the beginning, man created the project. And that project was good. It provided the basis of a company, and that company was fruitful and multiplied. That company begat more projects, and they too were good. Those projects bore fruit that contained the seeds of further projects, initiatives, and tests.

You get the point. Companies are composed of existing businesses, projects, and pilot experiments. Current cash is generated by existing businesses, near-term future cash is generated by projects, and longer-term positive cash flow may result from pilot tests. Projects and pilots are created to either improve existing businesses or to create new markets and products.

That is all good, but at some point, most companies must make difficult tradeoffs between long- and short-term results, growth rate, and efficiency. This book provides a framework for analyzing and making tradeoffs between those values.

Individual Asset Decisions

Most companies make investment decisions on a project-by-project basis using estimated future cash flow. The corporation typically provides standard input parameter assumptions about the external environment and some project target metrics, including internal rate of return (IRR) and net present value (NPV).

This approach assumes that IRR and NPV are proxies for the value added to the corporation. It is often a reasonable proxy and is the basis of the Capital Asset Pricing Model (CAPM), which is one of the main value frameworks used in the corporate finance field. In many cases, this approach does not lead to the best enterprise outcomes.

This individual lens may not place the opportunity in the specific context of your firm. It looks at cash out, cash in, timing, and risk. To find the value in the context of your firm, you need to apply the portfolio lens.

Many firms apply a qualitative strategic fit gate at the start, and that's the last time they think about portfolio fit. For most companies, there are more investment opportunities than resources to do them. For

every positive investment decision, something else must be given up or delayed. That imposes a cost that offsets the investment value.

The concept is known as opportunity cost. In an organization, the opportunity cost of a new investment is a function of the investment, the existing inventory of opportunities, and organizational goals. It can be determined using portfolio methods and tools.

The portfolio lens brings in other considerations. It starts with the same numbers as an individual analysis, but then examines the investment from multiple perspectives. It puts the investment into a different context for more thorough tests of whether the investment makes sense for your firm specifically. The methods used can range from simple, indirect, and crude to sophisticated and direct. Portfolio analysis provides a holistic view to help a firm determine the best set of coordinated decisions, rather than a reductionist individual view to select individual projects.

What 'IS' Portfolio Management?

Asking this question in 1960 would have yielded an answer about the efficient frontier risk and reward tradeoff inherent in stocks or other financial instruments. When we go into the business asset realm and look at all the tradeoffs, we must expand the definition. Risk and reward are important, but external analysts use other characteristics of a company's performance to judge it. Tradeoffs between those characteristics must be considered.

Portfolio Analysis is the process of using portfolio techniques to understand the attributes of a portfolio and the best decisions for an enterprise. Portfolio Management is making decisions using the insights from portfolio analysis to help a firm achieve its goals and aspirations. Portfolio management lies at the intersection of portfolio analysis, decision quality, and economic and financial analysis. It allows us to allocate scarce resources towards the activities that will result in success.

The essence of investment opportunity analysis is comparison. How does the project look if we choose one decision over the other competing decisions? Portfolio analysis is at a higher level than standalone opportunity analysis; it puts individual opportunities into the frame of the enterprise. It asks, "What is the difference between the firm with this coherent set of decisions and the firm with a different coherent set of decisions?"

Strategy

There are many definitions of 'strategy.' As used here, it will mean a roadmap to achieve a platform or position from which to do business. A strategy statement can include goals, constraints, and position statements. It should not include specific actions. Actions are

important, but tactical. Strategy is a broad, intermediate description of what you will focus on to achieve your goals.

In this context, a firm's goal may be to have the best total shareholder return in its competitive sector. A strategy statement to achieve that goal could be "To be #1 in the sales in the US market by the 4th quarter of this year." Tactics might include changing the advertising campaign and dropping the price.

Strategy Decisions

Portfolio thinking can be used to test the viability of a strategy. How reasonable is it to believe that some proposed action or positioning will achieve the hoped-for results? Someone always has an idea that pushes the concept of what a firm does. Sometimes they're good ideas. Portfolio techniques can provide insight into the consequences of outside-the-box investments. By looking at interactions driven by risk or budget, portfolio analysis puts these decisions into the context of the organization's aspirations. They can also be used in high-level capital allocation, such as between business sectors, or vastly different product lines within a firm.

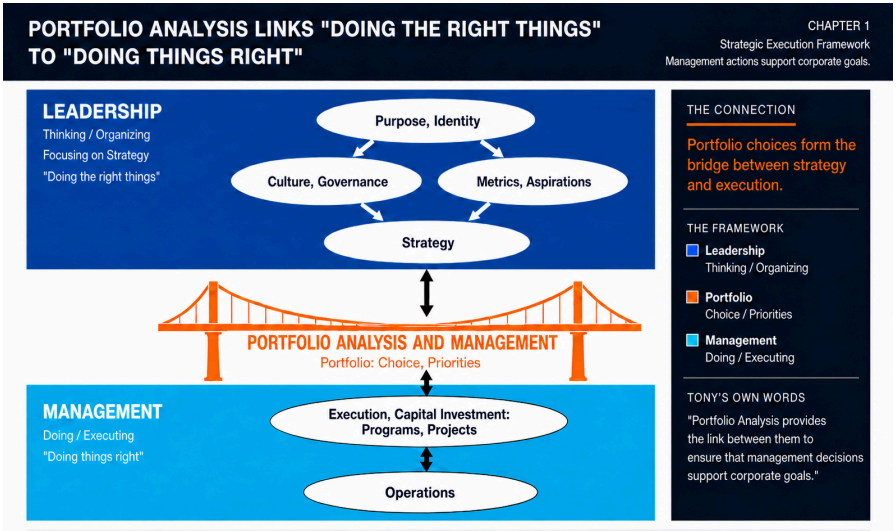
Indeed, as the world moves towards a lower carbon future, companies will have to make consequential decisions about their future. Those decisions will affect investment levels, return on shareholder investment, and a firm's "license to operate." Sustainability and renewable energy investments may be profitable for some, while for others it will simply be a cost of doing business. Portfolio analysis can help a firm balance competing needs and manage the pace of investments.

Strategic Execution Framework

The book *Executing Your Strategy* (https://amzn.to/2DezIoV) provides a valuable view of business functions in the context of aligning decisions in a firm through the Strategic Execution Framework (SEF). The firm's leadership creates the vision, environment, and metrics that feed into the strategy. The project and operations groups ensure that everything goes well after leadership sets the direction. Companies without a portfolio process use metrics such as NPV and hurdle rates as a substitute for explicit portfolio models. We can do better.

Portfolio analysis and management link the leadership (thinking) side to an organization's project and operations (doing) sides. The thinking side figures out what is the right thing to do; the doing side does the thing right. In the SEF, the **thinking/do-the-right-thing** part is where leadership occurs; the **doing/do-the-thing-right** part is where management occurs. Portfolio management is the bridge that provides feedback to both sides to ensure alignment between leadership and management.

Strategic Execution Framework



Source: Strategic Execution Framework. Strategic Business Portfolio Management, ch. 1.

> *The Strategic Execution Framework shows the canonical relationship between leadership and management. Leadership focuses on Doing the Right Things, while management focuses on Doing Things Right. Portfolio Analysis provides the link between them to ensure that management actions support corporate goals.*

In this framework, note that strategy is the culmination of vision, nature, and portfolio. Hence, a well-formulated strategy includes goals and metrics, organizational structure and culture, and governance. It must ultimately contain the connection to management and on-the-ground reality. A well-formulated statement of strategy might look something like this, "Using competitive advantage from our engineering expertise [nature], we will achieve first quartile performance and 5% growth [vision and metrics] by enhancing our base production [management]." The leaders of the organization must fully comprehend and embrace all aspects of the strategy.

Strategy can and should also include other aspects, such as the role of business development, M&A, exploration, and enabling functions like HR and facilities management.

Strategy does not have to be widely publicized *in detail* to the external world or even internally. However, key leaders throughout the organization must be informed and able to communicate and drive their organizations' roles. As an example of why NOT to be transparent

to the world, the 5% growth goal may best be kept under wraps because competitors could take advantage of perceived desperation.

Remember that strategy is not what you say—it's what you do. A stated strategy is an actual strategy only if management implements what they claim to be their strategy.

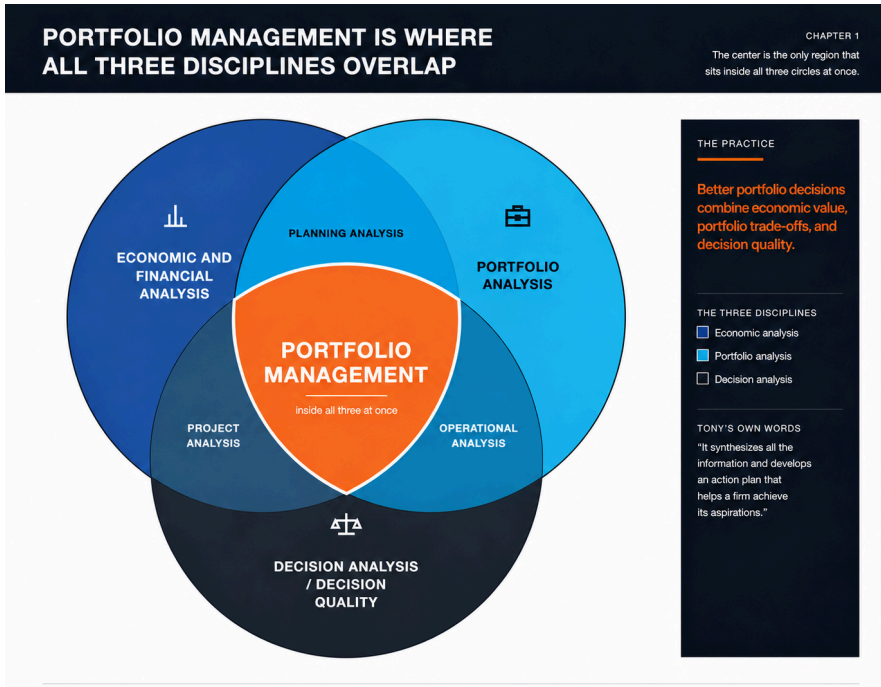
This book is not about strategy. Brilliant people have written about that in countless books and articles, but it is important to frame this view of strategy to set the stage for its role in portfolio management.

Every project decision, every opportunity rejected or accepted, is a portfolio decision. Our goal is to make better portfolio decisions using appropriate data and analysis methods. Our goal as portfolio analysts is to ensure that, to the extent practical, all decision-makers have a framework to align their decisions with organizational goals. Ultimately, portfolio management aims to allocate capital, people, or any constrained resource effectively, reduce business risk, and set realistic goals. Aligning decisions at all levels with strategic intent is the key to success.

Having business and asset alternatives or options is at the core of portfolio analysis and management. If your business and assets have no alternative decision possibilities, portfolio management efforts will be fruitless. If no significant business options exist, the only course of action is to focus on operational efficiencies. However, this is **never** the actual situation. There are always options. Potential options for a given asset or investment include divestiture, purchase, slower development, faster development, different scale of development, different development concept (e.g., automation versus labor tradeoffs), partial divestiture, different working interest on a purchase, corporate dividend rate, and timing on any of the above.

A business will usually have a base case or momentum case for each of its assets. It is essentially a roadmap, budget, or plan of what the firm plans to do with an asset over the next few years. Sometimes they will have a plan B option too, which lays out an alternative action that is possible but is considered less valuable. It is always good to have options. If you have only one option or course of action with no possible alternatives, then no matter what happens, you can't improve the outcome. Having even one option on an asset in addition to the base case can only add value. Think of it this way. If the world unfolds as envisioned in your base case, you can continue down that path. If the base case is suboptimal, you can choose the alternative, but only if it is better. If it's worse, you will continue with the base case.

Where Portfolio Lives



Source: Portfolio Management at the Intersection of Economic, Portfolio, and Decision Analysis. Strategic Business Portfolio Management, ch. 1.

> *Portfolio Management is at the intersection of Economic, Portfolio, and Decision Analysis. It synthesizes all the information and develops an action plan that helps a firm achieve its aspirations.*

The options may not always be to your liking. If the manufacturing cost of a good exceeds its price, you can shut down the plant. While it may be an unpalatable and expensive choice, it is still better than producing at a loss, so it is the one you must make.

The decision to pursue some options may be subject to approval by another party, such as a partner or government entity. If we do not control the choice of action, it is not a decision but rather an outcome. *But we can treat it as a decision, understand the value of having control of the decision, and then act to maximize the likelihood of our preferred decision.* The point is to understand which decisions would be the best, then push to make those happen.

Creating and Selecting Alternatives – Example

To reiterate, if there are no alternatives, there is no decision to make, and we're done. You are operating your business, not managing it. However, options are needed to maximize performance when assets compete for scarce resources.

Consider the following scenario. You are the manager of Asset A. Your asset is performing well, and it is time to submit next year's budget.

You look at the asset and must decide how much capital to request for next year. You see three main distinct options:

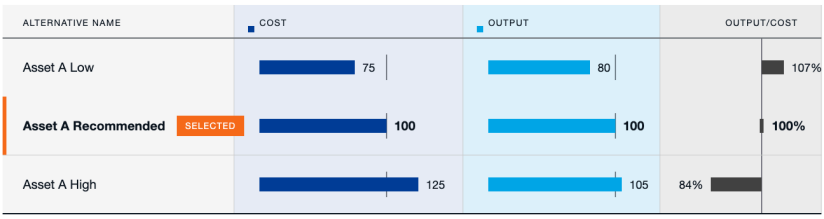
1. Recommended case, normal production, and profitability. Input is at 100; output is at 100. Output to input ratio (O/I) is 100%, (units are arbitrary)
2. Lower growth, lower cost case. Input is 75; output is 80. O/I = 107%, and
3. Higher growth, higher cost case. Input is 125, and output is 105. O/I is 84%.

The alternatives are summarized below.

Asset A Alternatives

THE RECOMMENDED CASE TRADES EFFICIENCY FOR OUTPUT

CHAPTER 1, ASSET A
Three alternatives for one asset. The most efficient one is not the one selected.



Cost and output share one scale, indexed to the recommended case at 100, marked by the short tick. Output/Cost is drawn either side of 100 percent.

FROM LOW TO RECOMMENDED
+25 more cost
+20 more output

FROM RECOMMENDED TO HIGH
+25 more cost
+5 more output

Source: Asset A alternatives table, Strategic Business Portfolio Management, ch. 1. Companion to the Asset B table on the same spread.

> *The asset manager selects the Recommended Case for Asset A. Although the low case was more "efficient," it had lower output. The Recommended case was a happy compromise.*

Imagine that under your corporate guidelines, any one of the alternatives is acceptable. How can the firm decide which alternative is best? In this context, the asset manager would typically speak with her boss, negotiate a bit, and request 125 while guaranteeing 80. Then they would agree on the recommended case of 100 input and 100 output. Everyone is happy.

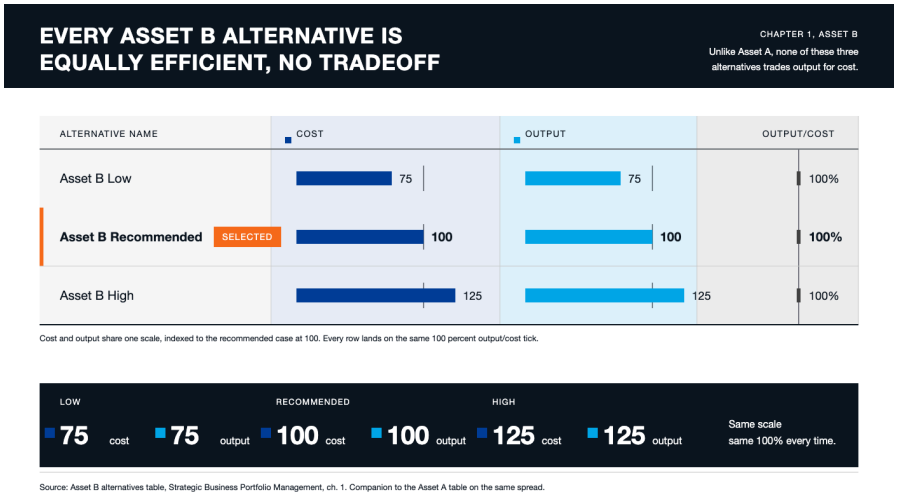
Consider another scenario. You are the general manager of Asset A and Asset B. Asset A is as above; Asset B has the following characteristics.

1. Recommended case. Normal production and profitability. Input is at 100; output is at 100. Input to output ratio (O/I) is 100%,
2. Lower growth, lower cost case. Input is 75; output is 75. O/I = 100%, and
3. Higher growth, higher cost case. Input is 125, and output is 125. O/I is 100%.

This project has an even profitability profile. The early dollars have the same profitability as the later dollars.

The alternatives are summarized below:

Asset B Alternatives



Source: Asset B alternatives table, Strategic Business Portfolio Management, ch. 1. Companion to the Asset A table on the same spread.

> *The Recommended Case for Asset B has the same investment efficiency as the other Asset B cases. It is a momentum case with the same budget as the previous year.*

If you negotiate separately with the two asset managers, you will spend 200 and have an output of 200. This exemplifies a bottom-up approach to decision-making. Consider each asset as an independent, self-contained decision.

But perhaps you noticed that for that same input of 200, a higher output can be achieved by allocating inputs differently between the two assets. Can you spot an alternative investment approach to the two assets that would yield more than 200 as the output?

Before I reveal the answer, think about what is needed to get to this point. First, the two assets need managers who think through their business and generate meaningfully different alternatives. You need standards for data and inputs to ensure comparability. With two assets and three options each, this is a computationally simple problem that can be solved in your head or on the back of an envelope. More significant problems spanning multiple years, more assets, and additional metrics would require computer models that run specialized algorithms to solve.

All of the above is easy. However, you need one more critical element to be successful; an organizational culture that values the sharing of information and incentivizes the honest sharing of analyses without gaming. Leaders, managers, and executives must be trustworthy and committed.

You probably figured out that the solution is investing in Asset A at the low case and Asset B at the high case, where you can achieve an output of 205.

A top-down approach, which takes a higher-level perspective, adds value compared to a bottom-up approach, as demonstrated by this simple example of portfolio thinking. Without those high- and low-case alternatives, there would have been no way to make an informed decision to improve the outcome.

Project management and decision analysis literature are replete with the concepts of alternative generation. Some references can be found in the Bibliography.

How Do You Know If Portfolio Analysis and Management Would Help?

It is common for organizations to ignore new methods and technologies. This is especially true when their results have been good historically. If it's not broke, they believe there's no need to fix it. You can expend an enormous amount of time and energy unsuccessfully trying to convince someone who doesn't want to change. But even if results are generally good, there are sometimes symptoms that the wheels are beginning to fall off.

Some of the symptoms below indicate a lack of analytical capability, some are due to hubris, some are governance issues, and some suggest a lack of insight into better ways to inform tactical and strategic decisions.

1. Often, a leader in the organization believes that resource allocation can be done better than first in, first out that meets hurdle rates. In the best cases, the leader will endorse efforts to develop portfolio perspectives in decision-making.
2. Project delays due to the misallocation of people, attention, or cash.
3. Surprise when, despite everyone's best efforts, organizational results are not met.
4. Opportunistic decision-making. Approval of bright, shiny objects while ignoring stated strategies.
5. Lack of sharing information and coordination between different investment silos.
6. Lower-level, relatively uninformed people making strategic decisions. (Almost anyone can make a "No" decision.)
7. Lack of enforced standards for analysis and description of investment opportunities.
8. Underperformance relative to competitors with similar assets.

The will to effect change to portfolio methods may have to wait for a crisis, but you can prepare for the inevitable by knowing that another way exists.

Key Takeaways

All business decisions are portfolio decisions. Putting the decisions explicitly into a portfolio perspective helps drive high-quality decisions and enterprise value. The essence of good asset portfolio management is comparing possible futures based on different strategies. The art is in the creation of those strategies and comparisons. Asset portfolio analysis reframes typical project analysis by placing discrete decisions into a higher-level context (typically the enterprise). The cost to do portfolio analysis is quite low, while the benefit can be extraordinary.

Detail – A Plan is Not a Forecast

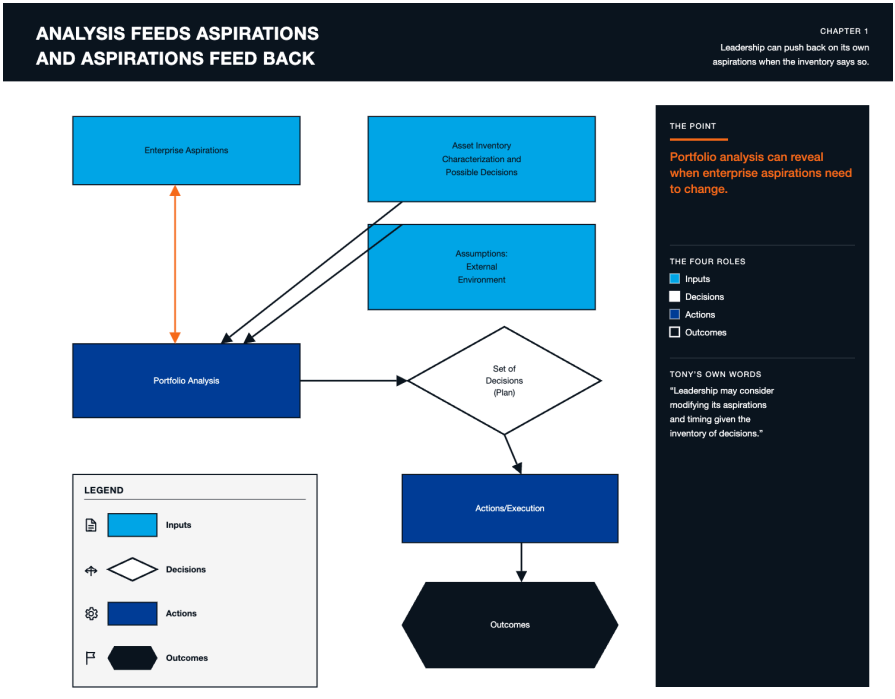
I will repeat throughout the book in some form that "A Plan is Not a Forecast." But why am I saying that in a portfolio book?

A sequence that includes portfolio analysis looks something like the following:

We start with the possible decisions on your inventory of assets, the assumptions about the external business environment, and guidance from leadership on the firm's aspirations.

Portfolio analysis then tries to find the set of decisions that will best meet enterprise aspirations. Leadership may consider modifying its aspirations and timing, if corporate aspirations are unrealistic given the inventory of possible decisions and the external environment, hence the double arrow between portfolio analysis and enterprise aspirations.

Idealized Portfolio Plan



Source: Idealized Portfolio Plan. Strategic Business Portfolio Management, ch. 1.

> *Combine your inventory and assumptions into a model, use it to inform your actions, and then roll it all together into a plan. When you perform the lookback test, the results will match your plan exactly. Right?... Right?... Bueller?...*

In the end, portfolio analysis and leadership discussions yield a set of coordinated decisions. This decision set includes sequencing, timing, cost, and revenue projections that result from the decisions. This is "The Plan."

The next step is to execute the plan and reap your just rewards, which, of course, align perfectly with the plan. Simple right? Not so fast. It's all a little messier than that.

Two important factors cause plans to be poor forecasts: the corporate culture, including cognitive biases and incentives, and the external environment. The culture affects all the inputs into the portfolio analysis and the teams' ability to execute. The results are driven by the external environment, which is entirely outside of corporate control.

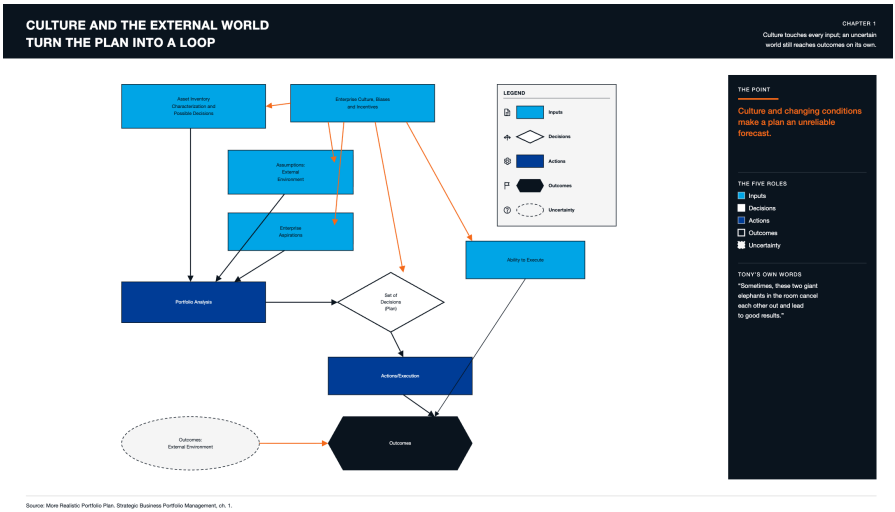
Sometimes, these two giant elephants in the room cancel each other out and lead to good results. Other times, they reinforce each other and drive results into the toilet.

In the first decade of the 21st century, my colleagues and I coined what we called the project mantra. "The project was late, over budget, and underperformed, but it was saved by the oil price." In that environment, even though all of the inputs were wrong, they canceled out, and good results came. Sure, it didn't go as planned, but who really cared? Everyone was making money. Then came 2015.

Oil prices dropped precipitously. Suddenly, the poorly forecasted projects were no longer saved by oil prices. It was easy to point fingers at the people who generated project economics and execution failures, but those were driven by the previous inputs and failure to fix the root causes in the project mantra.

The characterization of timing, cost, performance, and assumptions about the external environment are all driven by an organization's culture, biases, and incentives. Culture also drives the ability to execute. Processes and checks have their place, but they also often induce delays. I am not aware of any companies that are able to completely eliminate biases, maintain an objective culture, and avoid blaming others. Even if all that were true, it would still need an analysis culture that realistically looks at the range of possible outcomes based on an assessment of the external world. The forecast would not be a single point; it would be a range of possible outcomes.

More Realistic Portfolio Plan



Source: More Realistic Portfolio Plan. Strategic Business Portfolio Management, ch. 1.

> *In reality, a firm's culture affects the characterization of plans, assumptions, and aspirations. It also affects the ability to execute those plans. Then, between the time the plans are finished, and we see results, the world changes. The updated world seldom matches our input assumptions about the external environment.*

Most people are not trained to understand those types of results. They prefer "the number." Then if the number is met, everyone is happy; otherwise, blame is allocated.

I would love for firms to have a more objective and rigorous culture. Although it would be nice in theory, we must also recognize that it would impose costs. My preference is first to get people to stop thinking that plans are forecasts. Look at them as indicators and tools. For accountability, judge people on the aspects that are under their control.

Portfolio analysis and management is planning on steroids.

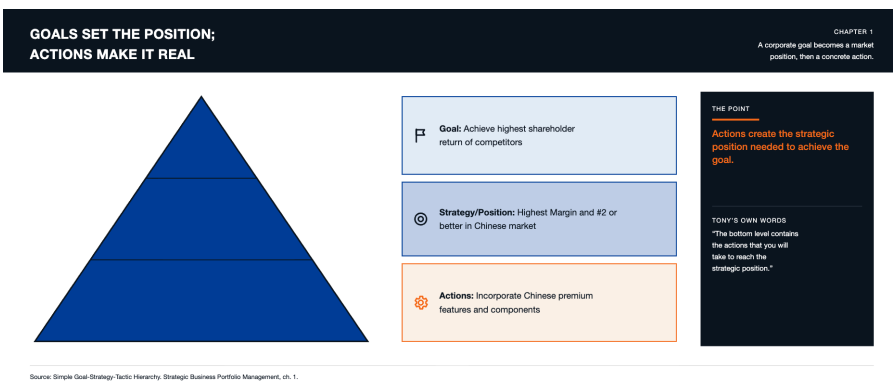
Detail – When is a Strategy Not a Strategy?

The word strategy, like the word portfolio, has many different meanings to different people.

This book blends two fields that use the word strategy differently (Decision Analysis and Portfolio), so I must clarify how I use it.

As a rule, my mental model is a hierarchy that consists of goals, strategies, and actions (or tactics). At a corporate level, the goal could be to achieve the highest total shareholder return (TSR) compared to competitors. The strategy to accomplish that goal defines a position—for example, having the highest margin and #2 in sales in a market (China). Then an action to achieve that goal could be to incorporate premium features in the Chinese market.

Simple Goal-Strategy-Tactic Hierarchy

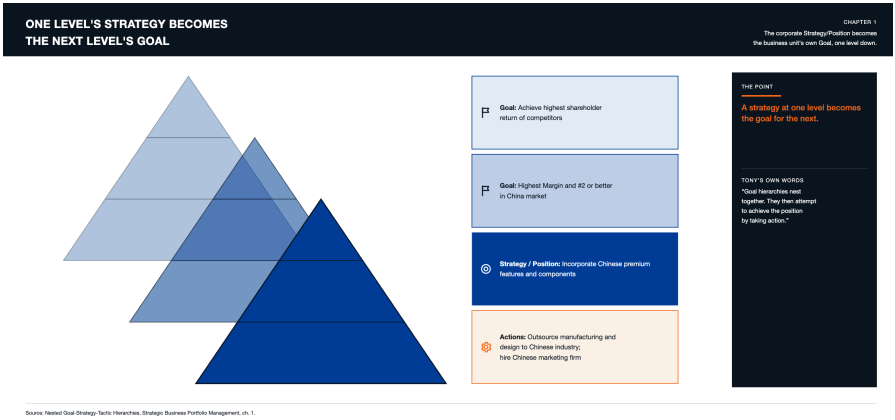


> *Think of this as a hierarchy. At the top of the hierarchy are your goals. They are set by the leadership to whom you report. They are a given. The next level contains what you have to achieve to reach that goal. The bottom level contains the actions that you will take to reach the strategic position.*

When you look at each of those three elements separately, they can each be goals (nouns) or actions (verbs). From the perspective of the highest level of the enterprise, it seems reasonable.

Let's go down to the next level in the organization, the one responsible for margins and market positioning. For them, the TSR goal is owned by the corporation. The lower-level organization's **goal** is the corporate **strategy**—Highest Margin and Market position in China. They will do this by incorporating Chinese premium features and components, and to make this happen, they will outsource manufacturing and design to Chinese firms.

Nested Goal-Strategy-Tactic Hierarchies



> *Goal hierarchies nest together. When setting objectives for your direct reports, they can take the strategic objective in the previous figure as their goal. They then attempt to achieve the position by taking action.*

Again, each of those three items is either a noun or a verb. It depends on your perspective.

This can continue down to as many levels as needed. This objectives and strategy framework is similar to work done by John Doerr and documented in his book, *Measure What Matters*.

When developing a strategy, the goals are treated as a given decision or destination. The Strategy becomes the focus of what you will do to achieve the goal.

The Use of 'Strategies' in Decision Analysis

In the Decision Analysis field, Decision Analysts often create multiple strategies or strategic themes for consideration. In the above China case, they might have created a strategic theme that stressed volume over margin, so it was light on the premium features but came in at a much lower price point. Or perhaps they considered a global standardization approach that largely ignored geographic differences and focused on reducing costs through economies of scale. Each of those strategic themes could have design, marketing, and manufacturing dimensions.

Decision Analysts typically create three to six strategic themes with three to ten independent dimensions. The aim is to discover what tradeoffs exist between the different themes, then select the best theme or create one that steals from several others to create a

hybrid strategic theme. Instead of goals, positions, and actions, a DA decision hierarchy has given decisions, focus decisions, and tactical decisions. The selected hybrid strategy (set of focus decisions) is similar conceptually to a corporate strategy. Even when working on a small project, the analysts and project teams consider the focus-level decisions to be their "strategic" decisions. They are strategic to that project but not to the overall firm.

This would all happen before the corporation or organization selects the strategy they will follow. Within the Strategic Execution Framework, the chosen combination of dimensional decisions becomes the strategy at that level. Portfolio analysis and management ensures that the selected actions align with the strategy.

When you create a strategy, it is best not to think of it as an unchanging set of positions or actions. It is more like a hypothesis to test—a well-constructed, logical, data-supported hypothesis capable of achieving the hoped-for goals. But executives are not clairvoyant—they don't have an infallible crystal ball. The world may change, and events may happen that render the strategy meaningless. In that case, they need to redirect their efforts. But in the meantime, employees in the organization have their 'North Star' to guide their actions and decisions.

The short answer to this section's title is that a strategy is not a strategy when it is a goal or action. Strategies define the 'what.' Goals define the 'why.' Actions define the 'how.' Ultimately, strategy is not an action it is a way to position your firm to achieve its goals. You make decisions as well, but you need the strong position from which to take action. There are other ways to think about strategy. Indeed, there are volumes written about it. But this is how I think about strategy and use the word in this book.

Detail – How Does Innovation Fit In?

Like sharks, if companies stop moving, they die.

Operational efficiency is great, but you can squeeze only so much water out of a sponge. You can't grow by shrinking. At some point, revenue must also grow. There is often a need for a step change to continue growing and outperforming competitors.

Innovation may lead to that step change. But innovation is challenging. If it were easy, everyone would already be doing it. An organization must have a culture that allows for failure and is amenable to change.

Much simpler than step-change innovation is taking steps that shave a few cents off costs. They are more certain and have a tangible benefit. I am not here to criticize those actions. They are essential and they add

up. But as you do those steps, do your best to ensure they are in service to a longer-term growth goal and do not lead you into a blind alley.

Incorporating portfolio perspectives in decision-making is itself an innovation. Portfolio tools can help manage innovation efforts. The tools won't drive innovation, but they can be helpful in better directing and scaling the efforts.

When I pushed for and developed a database to help manage long-term planning data, the justification was that it was necessary to do our planning job. In the process, that database was an enabler for portfolio analysis. It was not practical to go directly into a significant organizational change from my role, but the database laid a foundation for portfolio analysis and management.

Detail – Some Important Definitions

Company, firm, organization, and enterprise all refer to the entity attempting to manage or improve its performance. It can be an LLC, LLP, partnership, or a publicly or privately owned corporation. It is an entity on behalf of which we are making decisions to improve or optimize performance.

Referring to the Strategic Execution Framework graphic.

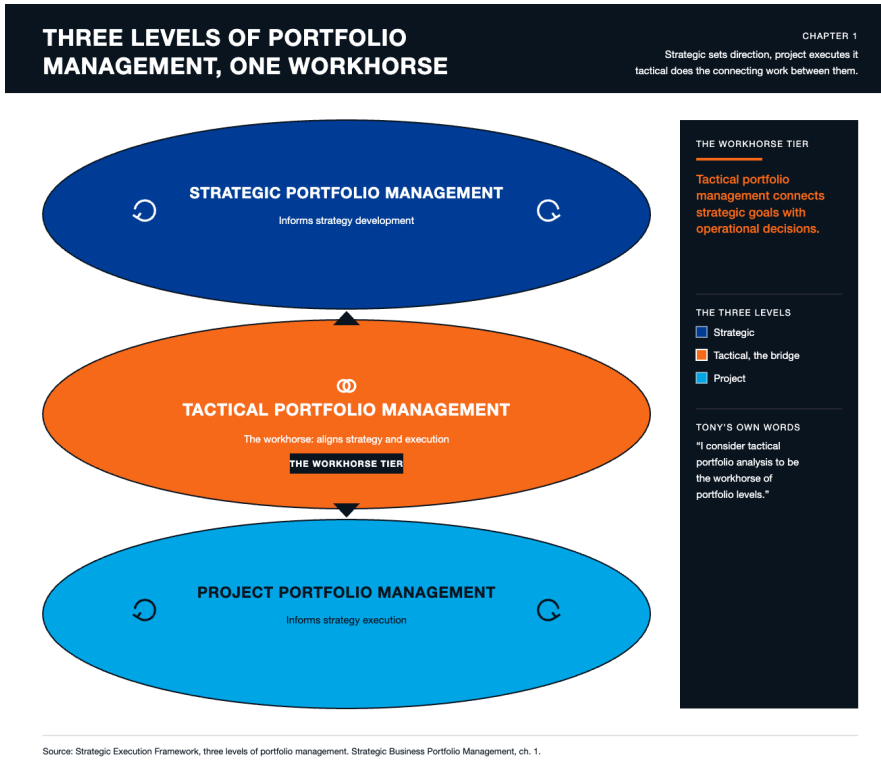
When the portfolio ellipse in the SEF informs operations and management and explicitly links project actions with enterprise aspirations, it is **tactical portfolio** analysis and management.

I consider tactical portfolio analysis to be the workhorse of portfolio levels. Decisions that can be informed by tactical portfolio analysis include:

1. Project alternatives, asset investment emphasis
2. Working interest
3. Project timing
4. Sub-optimizations – best greenhouse gas mitigation program, best exploration program, best kidney research program, best growth program for a single business unit
5. Budget and resource allocations
6. Acquisitions and Divestitures

When portfolio analysis informs strategy and leadership and is contained mainly in the top bubble, it is **strategic portfolio** analysis and management.

SEF High-Level Perspective



Source: Strategic Execution Framework, three levels of portfolio management. Strategic Business Portfolio Management, ch. 1.

> *Look closely at this graphic, and you can see the Strategic Execution Framework in the background. Work that is done by and for the leadership team is Strategic Portfolio Management. Work entirely contained within the management circles is Project or Operational Portfolio Management. Work that links Strategy to Operations is Tactical Portfolio Management.*

Decisions that can be informed by strategic portfolio analysis include:

1. Asset class balances (upstream-downstream-renewables, deepwater, LNG, conventional vs. unconventional, etc.). Clinical area balance for pharmaceutical firms.
2. Time preferences (short- vs. long-term)
3. Resource replacement – acquisition, divestiture, exploration, Research vs. marketing emphasis in a pharmaceutical setting
4. Key metric tradeoffs
5. Risk aggregation – exploration success and business correlation

When portfolio analysis and management are wholly contained in operations and program management, it is **project portfolio management** or **PPM**. Project portfolio management is used mainly for sequencing projects given short-term limitations in people, capital,

and infrastructure. PPM is more like queue management. A big part of PPM is aligning complementary resources so they mesh properly—like a zipper.

PPM often focuses on reporting and tracking progress. When is the product launch? When is the next phase gate? Is the project over or under budget? Knowing the status of a development pipeline is good, but it does not change a company's direction. It would seldom cause the type of thinking that will change a firm's strategy. By the time you are tracking your projects, the big decisions have been made

It adds a lot of value and is difficult to do well. There are many books and articles about PPM, so it will not be covered in detail in this book.

A strategic portfolio analysis might lead a company to the conclusion that it needs to produce more oil from unconventional reservoirs. Then the tactical portfolio analysis could encourage them to add two more drilling rigs in the (unconventional) Permian Basin. Finally, the project portfolio analysis could suggest a sequence of wells to maximize short-term value and minimize logistics costs.

These three levels of portfolio analysis and management are not strictly separate. There is lots of gray space between them. Portfolios can be analyzed almost continually as results occur and circumstances change, or they can be monitored and analyzed periodically. Imagination and skill become the limiting factors in determining portfolio uses.

"**Portfolio**" has several uses in this book. It can mean the overall portfolio analysis and management process, as in "The exploration team was going to do portfolio." It can also mean the calculated outcome of a specific set of asset decisions, e.g., "Portfolio 3 shows low growth." Some people use the word portfolio in the way I use inventory—as a listing of elements, e.g., "She was managing a portfolio of projects." Be aware of these different uses.

In this book, the **inventory** or c**omplete inventory** is a list of all assets and potential decisions and characteristics of the elements in the list.

The **working inventory** is the subset of the complete inventory used in the analyses. It is appropriate in many cases to deliberately exclude some potential decisions from the analysis, for example, a base-business optimization might exclude acquisitions. This is driven by the frame and purpose of the analysis.

We will generate **portfolios, hypothetical portfolios, portfolio scenarios,** or **candidate sets** by logically combining working inventory elements.

Those hypothetical portfolios will be generated to test their ability to achieve organizational financial and operational goals or targets.

A portfolio **strategy** may have an asset theme (e.g., focus on deepwater production or low development cost), a financial theme (high corporate return-on-capital-employed [ROCE], revenue growth greater than 5% over the next 5 years) as inputs to a model, or it could be the output of whatever emerges from the model to achieve desired performance.

Insights will be gained by analyzing and discussing the strategies and portfolios needed to achieve or balance goals.

Once a hypothetical portfolio is decided as the "final" set of actions and appropriate adjustments are made, that becomes the basis of the **plan**.

Detail – Harry Markowitz and the Efficient Frontier

This is not an action-adventure tale or a Hardy Boys mystery; instead, it describes the efforts of the Nobel Laureate founder of portfolio theory, Harry Markowitz. Markowitz, along with William Sharpe and Merton Miller, won the Nobel Prize for Economics in 1990 based on his work in finance.

Figure 6 from Portfolio Selection, Markowitz1952

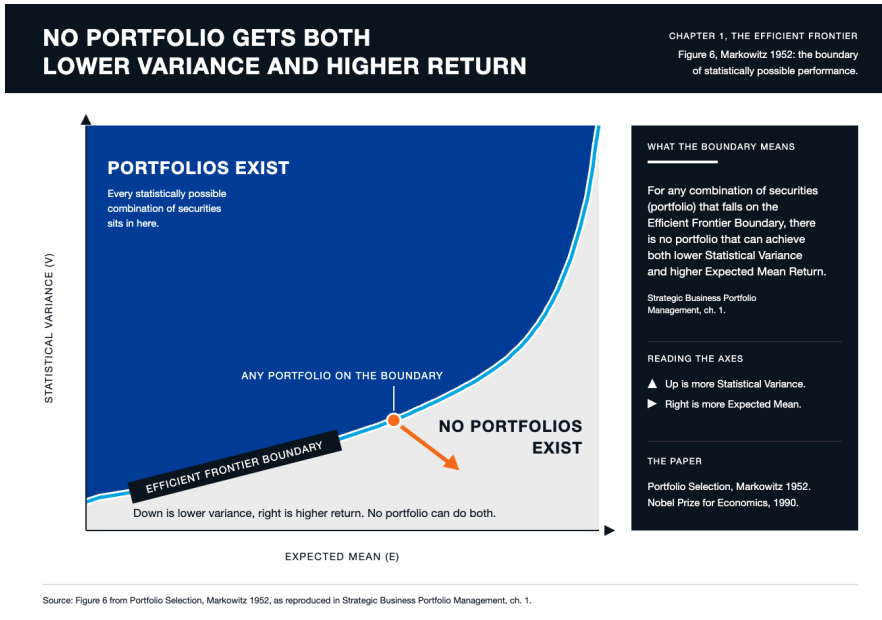


Figure 6 from Markowitz's seminal paper on portfolio optimization described portfolio combinations that formed the boundary of statistically possible performance. For any combination of securities (portfolio) that falls on the Efficient Frontier Boundary, there is no portfolio that can achieve both lower Statistical Variance and higher Expected Mean Return.

Markowitz's 1952 paper, "*Portfolio Selection*" in the Journal of Finance, introduced the idea of efficient combinations of securities to create portfolios. He showed that the most efficient combinations of securities are those for which a given return cannot be obtained with lower variance and a given variance cannot have a higher return. The boundary beyond which no combinations exist was later dubbed the efficient frontier.

In this context, E was the 'expected' mean value of a combination of securities, and V was the statistical variance.

Early asset portfolio analysis efforts in the oil industry used the same concept—looking for portfolios that maximized value with the lowest possible standard deviation. That approach never quite caught on. Executives care less about standard deviation than about financial and operational measures such as return on capital employed, revenue growth, and production levels. Investigating the trade-offs between important goals and values is essential, but the standard deviation of the corporation is not one of them.

People today still talk about efficient frontiers. In my experience, they often misuse the term. Markowitz's efficient frontier was an expected return versus variance frontier. That was useful in **his** context to measure risk and return for portfolios of financial securities. His efficient frontier is actually a Pareto frontier between these two metrics. When I talk about efficient frontiers, I usually mean the more general Pareto frontier rather than the specific Markowitz axes.