Time Cost Component of Project Analysis

by

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Abstract

This study aims at examining the cost component of project analysis with respect to the strategic budgeting and decision making process within corporate enterprises. This work suggests the decision making and execution processes and cycles can be evaluated as cost components of project analysis frameworks. If the decision making process can be executed in a shorter period of time, unrealized gains in revenue or cost savings could then be realized altering many of the risk frameworks and profiles enterprises currently use. The study examines data provided by a 2012 Fortune 25 company that spans a diverse girth of cultures, industries, and business units. The corporation donating the data, names of the projects and the actual dollar figures used are concealed due to the extremely propriety nature of the data and possible negative market implications of the data.

Keywords: Project Management, Project Analysis, Finance, Risk,

Introduction

Initiatives can be comprised of, but is not limited to, projects that relate to operations, information technology, company acquisitions, distribution and logistics, sales, customer service or satisfaction, procurement, real-estate, and human resources. Due to rapid changes in technology and social and business trends, project benefits and horizons are evaluated on shorter cycles. Specifically, the mismatch between economic and budgeting cycles, with project analysis cycles, present a complexity of contending urgencies within the corporate arena (Banholzer, 2012).

The corporate valuation process of projects has maintained the same principles for decades. The academic foundations of net present value (NPV), internal rate of return (IRR), and payback, have largely stayed the same. These evaluation techniques are found in most project management and evaluation textbooks used by practitioners and academics alike. These processes use forecasted cash flows and a discount rate in order to evaluate the profitability of a project (Truett & Truett, 2004). Enterprises then compare the results of these models to hurdle rates and key leaders decide the fate of these projects. These processes often differ among corporate bodies and the tools they use are proprietary.

In most corporate arenas, Schelling's Game Theory is the predominant driver of decisions. While Schelling's is not the only driver in decisions being made, large strategic initiatives, either intentionally or inadvertently, align with the principles of

game theory. Game theory attempts to predict how competitors would react to a decision. Those assumptions of the reaction may have an impact on the decision in how the project is delivered (Baniak & Dubina, 2012; Dodge, 2012). Finkelstein, Hambrick and Cannella (2009) discuss the intangibles executives face when making decisions.

Like the project analysis process, although much less precise, all organizations have a process which assess and measure risk. Only one thing is certain and remains a consensus among enterprises: risk must be evaluated and managed. The *how* this is done among corporate organizations is, again, often proprietary information. Key principles of risk such as value (Wallis, 2012), relationships between risk management and strategic planning (Kelly, 2012), quantifying risk (Hampton, 2009) and individual bias (Achampong, 2010) outline some probable assumptions with respect to risk and how companies evaluate, understand and accept risk.

Also the variations in which time value of money can be calculated and the realized gains are too broad for this study. Time value of money has not been figured into any cost savings or revenue generation in the analysis that follows; though, if studied, would substantially support the conclusions of this analysis.

Risk, project evaluation and time to develop a new perspective on how projects are evaluated is vitally important in today's corporate arena. In *Playing to Win*, William Banholzer (2012), Chief Technology Officer for The Dow Chemical Company, asserts that understanding the competing priorities between business,

planning and execution cycles is necessary to maintain competitive in the current global landscape.

Assumptions

Assumptions are generated within the study to generate a baseline framework in which decisions are made. For many assumptions, these differences in processes carry no impact because the end result is the measured amount of time it takes to complete a task:

- There are four quarters in a fiscal year.
- Companies meet and convene to discuss large scale planning for budgetary purposes once a year.
- The average time it takes a company to create, execute and deploy a project or initiative is six months.
- The timeframe of measuring the success of a project and the lasting impacts of the project are limited to about three to five years.
- The tools to measure the validity of most projects are Net Present Value, Internal Rate of Return, Modified Internal Rate of Return and Payback.
- Specific *hurdle rates* companies use have not been taken into consideration.
- Every project is weighted equally as having significant importance to the organization.

- The money used to fund the projects is of a capital budget nature where a certain risk profile and asset portfolio are created.
- Project analysis and modeling happens in multiple business units, across multiple planes of an organizational hierarchy.
- The benefits of a project can be measured.
- Benefits of the project can be a combination of external revenue, internal revenue or cost savings.
- Time value of money does exist for every company but is not needed or computed for the generalization of this study

LITERATURE REVIEW

Definition of Variables

Many variables exist in order to evaluate projects and are independent to a project or initiative. The independent and dependent variables are used to generalize conclusions across a wide variety of initiatives:

Independent Variables	
Variable	Definition
Benefits	The expected generation of a revenue or cost savings in a given quarter.
Net Present Value	The Net Present Value (NPV) of the project
Cost	Total cost (development, maintenance, materials, etc.) of the project
Dependent Variables	
Variable	Definition
Decision Cost	The cost of the decision making process expressed as a loss of benefits.
Decision Cost Impact	The impact of the decision making process expressed as a percentage of the cost.
Lost Value	Value of unrealized benefits due to the decision making process.

The independent variables are those that are related to each project as a measure of the initiatives worth and are estimated by doing the necessary research for any project.

The dependent variables are then calculated and manipulated using the independent variables and seek to create an understanding of the value of time as a cost component of the project. If a company takes one year to evaluate a project with a lifespan of three years, then 25 percent of the original project cost is allocated to the decision making process. In this case, the decision making process is now added to the original project cost. If the same company only needed one quarter to decide on the project, the cost of the decision making process would be 75% less.

Decision theory

The overarching theme in decision theory that extends from behavior to economics, to project analysis, and management is game theory. Game theory has minimal relevance in perfectly competitive industries where many small companies compete in a finite pool of resources, and become more profound as the scale of business increases, but remains at the heart of all decision making regardless of company, industry, or economic principles.

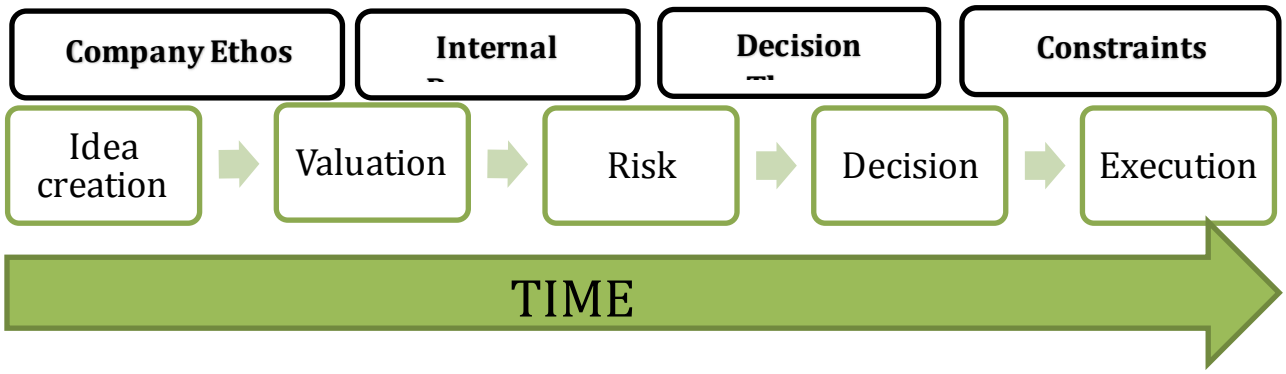

Figure 1

Company ethos will generate idea creation and part of the valuation process, then internal processes kick in and begin speculating on value and risk. Then the frameworks drive the decision. This internal conversation around how this new or improved product will be responded to by competitors and consumers. Constraints will either allow a project to be accepted or rejected and often involve resources (such as money, time and people) but can extend into other areas such as short and long term strategy, industry trends, etc.

Risk management

Risk management varies among enterprises, and how risk is managed depends on the tactical and strategic positioning of the organization. Each company analyzes risk differently based on a multitude of factors including, but not limited to, life and work experience, professional and political beliefs, ethics, vision, innate generational attitude and leadership differences.

Every risk analysis follows this simple framework although the components and analysis may be extremely complex. A key component to keep in mind is, in the

last 10 years, the idea and perception of risk has changed drastically. Depending on the industry, companies may or may not have the same level of emphasis on risk and reward. Due to the financial collapse of 2006 to 2008, many companies have revisited their risk analysis processes and built constraints to prevent future market impacts. The necessity of risk in the market place is essential to the life of Western economies:

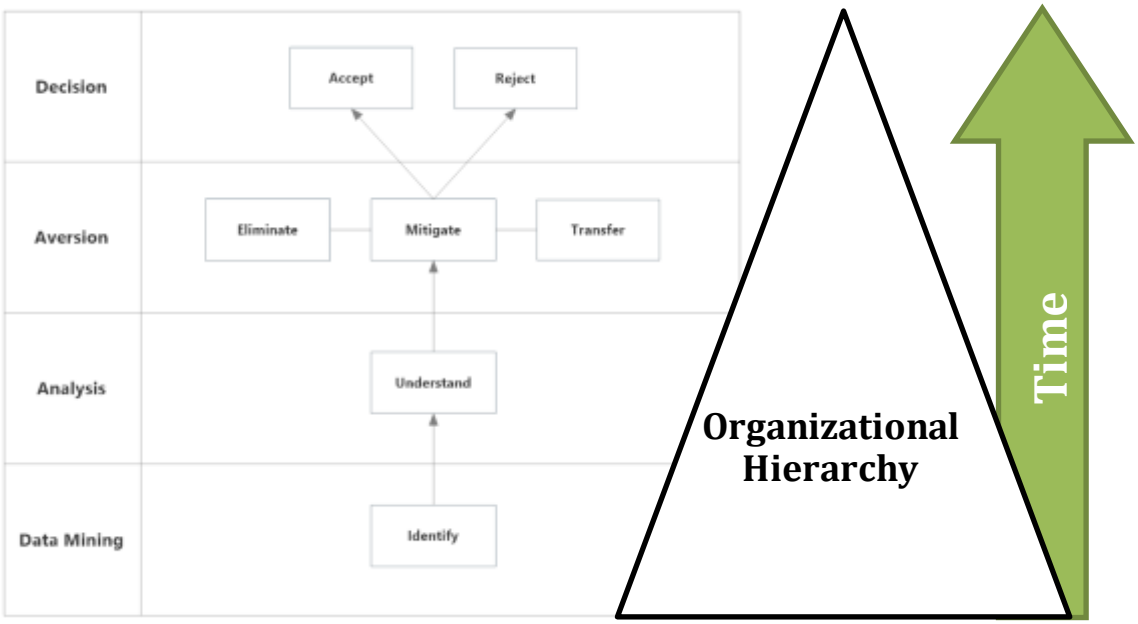

Figure 2

Figure 2 indicates how the risk process works with the organizational hierarchy to flow information from the bottom to decision makers at the top. Depending on the organization, this process can be a streamlined process where ideas go through a quick cascade of models and a decision is made, or extremely complex where every box in the model has an owner, and at the top of the process are a group of decision makers that collaborate in making a decision.

Time

The principle of *time is money* is derived from the academic scope around time value of money. Essentially, the shorter the process, or transaction, or the shortest time in which money is recognized, or costs are saved, the better. Time is extremely important in business especially as the global economy evolves and more businesses are placing emphasis on speed to market and innovation.

The competing priority is that some perception exists that time can help delude risk. For instance, due diligence that is completed in a week versus a month, some perception that decision makers may have is that the project completed over a month will be much more robust than those due diligence projects completed in a week. What if, a vast majority of the time, both types of analysis provide the same conclusion? Shortening initial investments in time will often alter the risk profile, as discussed above, while providing increased initial value. A shorter process does not mean being less accurate or incomplete, rather, emphasis is placed on those pieces of the process that add the most value to the final decision.

Putting the pieces together

Understanding how decision theory, risk management, and time influence each other is essential in building business processes to encompass the most value. Associating a cost or revenue to the time it takes to get a proposed project from infant stages to a profitable adulthood is a revolutionary thought. A simple value equation would look something like this:

Projected cash flows – cost of time = true value

Decision theory, risk analysis and time has a role to play in the entire process and each part of the process is considered critical.

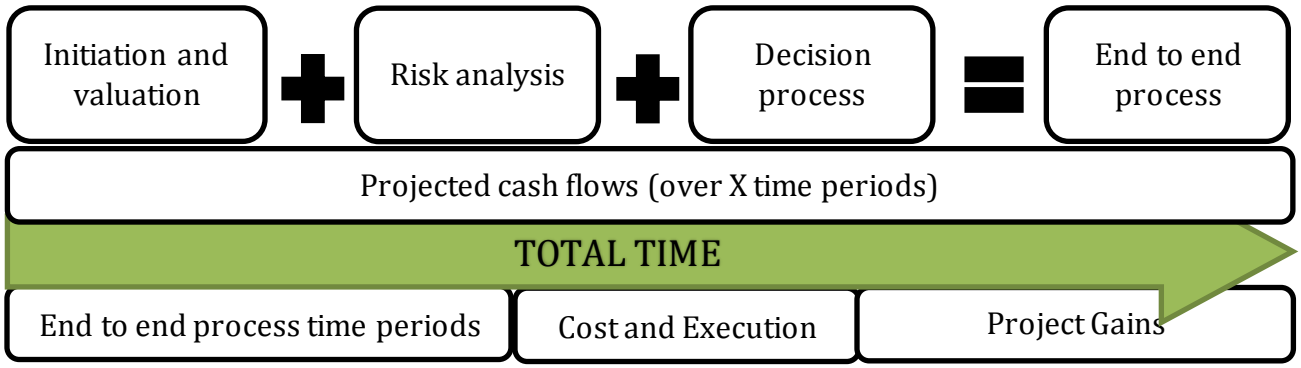

Figure 3

This visualization sheds some light on why many projects are evaluated over a five-year time period. Decades ago, during the era of conglomerates in the 1950's and 1960's, the strategic horizon may extend over 10 to 15 years, thus, further compound the impacts of project gains. The longer the scope of the project, the less impact the planning pieces of the end to end process have on the total project cost. As the decision horizon in the corporate world continues to move closer to today, companies are finding time horizons on strategic decisions may be three to five years. Does efficiency exist in a process that takes 18 months to make a decision that may only last three years? This area is where enterprises have significant updating to do with respect to current processes and also where significant value and competitive advantage can be obtained. Generally speaking, the cost and execution of a project is fairly inelastic, while the process in which a decision is made is where opportunity lies.

Decision Theory

The modern ideas of decision can be described as eccentric mathematical models that vary in perception depending on the researcher. The frameworks in which these theories work are generally the same: a cause and effect bombardment of corporate decision making for competitive advantage and industry position. For that point, the most relevant decision theory is game theory (Buchanan & O'Connell, 2006).

Dodge (2012) showcases Schelling's Nobel Laureate awarding winning work in economics with respect to game theory and application. Dodge covers the foundations of game theory and how organizations interact with each other both in the same industry and across different industries. The themed concept is that no decision can be made without the consideration of what competition will do in response to that decision. Like a large game of organizational chess, this form of decision theory takes on huge act and react responses and translates well on a large strategic scope. Within the scope of project evaluation, game theory brings an interesting twist in rationally choosing one project over another.

Baniak and Dubina (2012) build a comprehensive review of game theory and the impacts on the innovation process and discuss a varying degrees of organizational interactions including how game theory applies to strategic competition and cooperation. The main impacts develop the necessity for decision theory and how impacts of innovation and business trends can be analyzed. Most notably, the authors dive into an elaborate discussion on game theory and

innovation. This is especially relevant given the global condition of the economic and competitive world today where innovation has enormous leverage.

A strategic perspective exists when making decisions. Many boards and executives have a myriad of priorities when making decisions from organizational focus to shareholder profitability. These decisions also have an intangible avenue that is difficult to measure. Finkelstein, Hambrick and Cannella assert that an organization's success or failure can be traced back the actions or inactions of the organizations executives, top management teams, and boards of directors. Their work dives into the intangible areas of decision making such as company ethos, aversion to risk, and how these areas may impact strategy and success. The authors also dive into less noteworthy areas such as business fatigue, social connections, personality, and experiences, to name a few (Finklestein, Hambrick & Canell, 2009).

Another influence in decision making can be found inside the hierarchical aspects of an enterprise. In an attempt to optimize accuracy, organizational focus and innovation, all organizations install a process that feeds information to the right levels of decision making process. Kang discerns the variation in decision making and equates these variations to aspects such as a leader's perceptions of subordinates and the information they are providing and a view into predictability of human nature (Kang, 2010).

Paulson (2009) researches prospect and economic theory and how these two theories may impact individuals (the framework can be paralleled to the enterprise level). Paulson relates prospect theory to economic theory and delves into utility

theory, all of which are relevant to enterprise decision making practices. This article further adds that evaluation processes for proposals need to be robust covering a multitude of perspectives.

Enterprise Risk

Enterprise risk management is how companies quantify risk in order to make business decisions. Risk may mitigated through research, due diligence, and methodically making decisions. Each process through measuring, assessing and deciding on an opportunity comes at a cost. That cost may present itself as an economic cost (market study for example) or as an opportunity cost (the time it takes to process risk). All of these areas require time and this is a competing priority in today's global arena where strategic organizations create competitive advantage through strategic agility (Hampton 2009). Kelly (2012) asserts that risk should be assessed in all phases of strategic planning and should align with organizational goals across all platforms of an organizations.

Value and risk become difficult to measure especially when innovation is in the discussion. Wallis (2012) develops an understanding of value around risk management developing a framework in which the decision horizon operates by quantifying the value the decision making process has with respect to risk. The process will either add to or take away from this value.

Achampong (2010) discusses key components to risk management and how risk relates to strategic planning. The literature also discusses key pieces of risk theory such as SWOT analysis. An understanding for both internal and external risk

factors must exist in order to understand how those variables may impede strategic planning. The SWOT analysis is a well-established tool that aids in defining and understanding risk from both an inner and outer organizational perspective.

Individual bias has an important role in risk management. Connecting personal philosophy and human traits such as generational and cultural differences and beliefs to the implications they have on risk management is difficult (Blaskovich & Taylor, 2011). Individual bias has a unique role in a person's willingness to take on risk. Taleb (2010) discusses highly improbable events and how they affect the world. Taleb's thoughts lend well to any section but when looking at the literature through a risk framework, the book provides perspective around cause and effect of events. This book both makes the case for and against ventures of great risk with improbable results.

Process in action

The following is a walkthrough of the process and manipulation of data in order to reach the conclusions. Each step will be spelled out in order to provide clarification through the process and be specific through the handling of the data.

	Execute	Q1		Q2		Q3		Q4		Year 1	
	Cost	Cost	Income	Cost	Income	Cost	Income	Cost	Income	Cost	Income
Project 1	3.65	0.62	1.43	1.46	3.01	1.46	4.71	0.62	6.41	7.82	15.56

Figure 4

The original data is in the format as shown above. The data is extended out over 3-5 years as a projection of expected cash flows. When the data is consolidated the following was formed summarizing the data into yearly cash flows.

	Execute Cost	Year 1 Cost	Year 1 Income	Year 1 Cash Flow	Year 2 Cash Flow	Year 3 Cash Flow	Year 4 Cash Flow	Year 5 Cash Flow
Project 1	3.65	7.82	15.56	7.75	11.91	11.40	11.40	11.91
Project 2	5.42	11.08	23.31	12.23	17.65	17.65	17.65	17.65
Project 3	1.11	2.74	1.00	-1.75	-0.78	-0.63	**0.00**	**0.00**
Project 4	0.00	0.01	33.97	33.96	33.96	33.96	33.96	33.96
Project 5	8.59	28.13	103.90	75.77	88.76	84.36	84.36	88.76
Project 6	12.21	33.22	20.98	-12.24	0.90	-0.03	-0.03	0.90
Project 7	1.50	3.17	4.66	1.49	3.12	3.00	**0.00**	**0.00**
Project 8	6.04	14.43	25.97	11.54	17.85	17.58	17.58	17.85
Project 9	0.74	1.94	22.31	20.37	21.39	21.11	21.11	21.39
Project 10	3.84	4.90	17.98	13.08	14.09	16.92	16.92	14.09

Table 1

Notice, the highlighted zeros mean those projects are only analyzed over three years. This table just summarizes the quarter data into years for ease of evaluation for the next set of calculations. The negative cash flows on some projects may be an indication that projects are no longer projecting profits or there may be intrinsic or intangible variables of those projects that make them of intrinsic value versus a hard calculated value. No clear indication or answer for the negative cash flows exist, but they remained in the data and evaluated. These happened to be the first 10 projects of the data and other portions of the data will exclude these *outliers* in projects.

	Execute Cost	Year 1 Cost	Year 1 Income	Year 1 Cash Flow	Year 2 Cash Flow	Year 3 Cash Flow	Year 4 Cash Flow	Year 5 Cash Flow	NPV
Project 1	3.65	7.82	15.56	7.75	11.91	11.40	11.40	11.91	44.17
Project 2	5.42	11.08	23.31	12.23	17.65	17.65	17.65	17.65	67.35
Project 3	1.11	2.74	1.00	-1.75	-0.78	-0.63	0.00	0.00	-2.91
Project 4	0.00	0.01	33.97	33.96	33.96	33.96	33.96	33.96	140.03
Project 5	8.59	28.13	103.90	75.77	88.76	84.36	84.36	88.76	345.87
Project 6	12.21	33.22	20.98	-12.24	0.90	-0.03	-0.03	0.90	-11.22
Project 7	1.50	3.17	4.66	1.49	3.12	3.00	0.00	0.00	6.37
Project 8	6.04	14.43	25.97	11.54	17.85	17.58	17.58	17.85	66.79
Project 9	0.74	1.94	22.31	20.37	21.39	21.11	21.11	21.39	86.74
Project 10	3.84	4.90	17.98	13.08	14.09	16.92	16.92	14.09	61.50

Table 2

Now, Net Present Value is calculated. A rate of 5% (0.05) is used as a baseline for all calculations. This rate should be an easily attainable rate for nearly all corporations. The specific rate will differ between enterprises and a wide variety of theories and recommendations exist regarding an applicable rate to use when in doubt. Likely, the most relevant, many companies use Weight Average Cost of Capital (WACC) as the rate. Other companies may adjust their rates depending on the business unit or division. These calculations are very straight forward with no twists. The NPV of each project is stated in the right column.

At this juncture some logic needs to take place in order to frame the next few calculations. Currently, for many organization, the execution of the project will look something like this:

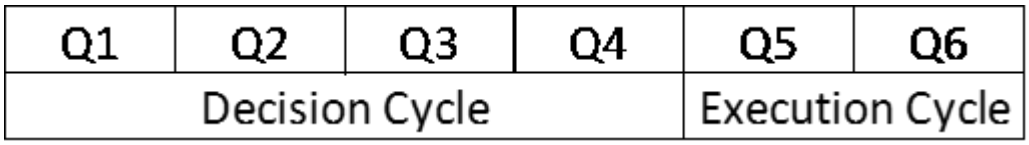

Figure 5

The decision cycle includes the time it takes to research, evaluate and decide if a project should be funded. The execution cycle is the time it takes to initiate the project from ground zero to recognizing cost savings or revenue generation. In all, the timeline of the projects would look something like this:

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Decision Cycle				Execution Cycle		Year 1 of Cash Flows			

Figure 6

In the above figure, the decision cycle is added into the cash flows because this is a substantial portion of the process. The new costs for the projects begin to take on a different look once the decision cycle is considered a cost of the project. The cost of the execution cycle will often stay relatively inelastic because speeding up the process of execution is often costly. The execution cycle is also much shorter and finding savings in this cycle can be much more difficult.

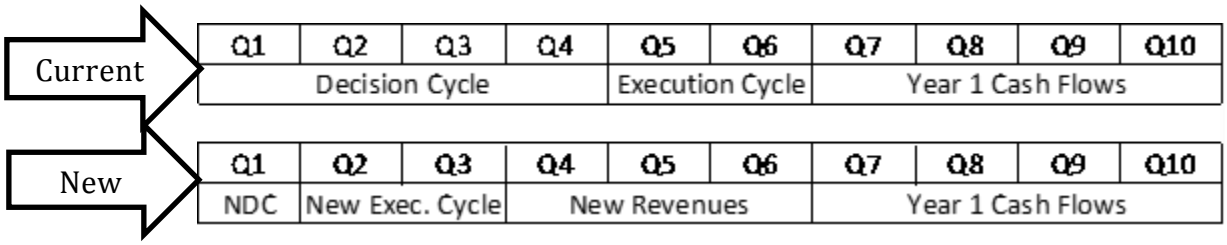

Figure 7

In the new logic, the decision cycle (NDC) is greatly shortened, thus cash flows are realized three quarters earlier. Essentially, over the same period of time, in a five-year evaluation, you gain three extra quarters (a 15% gain) in revenue or cost savings. Looking at the decision cycle as a cost and finding ways to shorten this

cycle may provide significant increases in project evaluation. In order to compute this, the numbers will be calculated in two ways. First, as realizing the entire decision making cycle as a cost component of net present value. And secondly as realizing an additional three quarters of revenue as an income and the impacts of the scenario on NPV.

In defining the cost of the decision cycle, the first four quarters or revenues are speculated as cost. These revenues can be thought of as an "opportunity cost" to the decision making process.

	Execute	Q1		Q2		Q3		Q4			
	Cost	Cost	Income	Cost	Income	Cost	Income	Cost	Income	DC Cost	New Cost
Project 1	3.65	0.62	1.43	1.46	3.01	1.46	4.71	0.62	6.41	15.56	23.38
Project 2	5.42	1.48	5.41	2.07	5.41	1.37	6.24	0.75	6.24	23.31	34.39
Project 3	1.11	0.78	0.25	0.28	0.25	0.28	0.25	0.28	0.25	1.00	3.74
Project 4	0.00	0.00	5.07	0.00	6.10	0.00	11.22	0.00	11.57	33.97	33.97
Project 5	8.59	5.01	11.88	4.84	22.57	4.84	35.44	4.84	34.01	103.90	132.02
Project 6	12.21	5.02	2.59	5.25	4.40	5.48	5.24	5.25	8.74	20.98	54.20
Project 7	1.50	0.38	0.70	0.42	1.17	0.45	1.17	0.42	1.63	4.66	7.83
Project 8	6.04	1.94	0.42	2.20	1.04	2.26	9.77	1.99	14.75	25.97	40.41
Project 9	0.74	0.29	3.00	0.30	5.96	0.31	6.17	0.30	7.18	22.31	24.25
Project 10	3.84	0.25	0.90	0.27	0.90	0.29	8.09	0.27	8.09	17.98	22.88

Table 3

In the above table, the *DC Cost* column represents the unrealized revenue gains or cost savings of Q1 through Q4 and the *New Cost* column encompasses the cost of the decision making process as well as the execution cost and first year Q1 through Q4 costs of the project. To look at this idea another way, in order to generate $15.56 million in revenue, the entire process (decision making and first year run and execute costs) actually cost the project $23.38 million to generate. In doing this for the first year of realized incomes actually generated a $7.82 million

loss. While the subsequent years would generate a positive revenue, the decision cycle has impacted the NPV of the project:

	Execute Cost	DC Cost	New Cost	Year 1 Cost	Year 1 Income	Year 2 Cash Flow	Year 3 Cash Flow	Year 4 Cash Flow	Year 5 Cash Flow	NPV	New NPV
Project 1	3.65	15.56	23.38	7.82	15.56	11.91	11.40	11.40	11.91	44.17	29.34
Project 2	5.42	23.31	34.39	11.08	23.31	17.65	17.65	17.65	17.65	67.35	45.15
Project 3	1.11	1.00	3.74	2.74	1.00	-0.78	-0.63	**0.00**	**0.00**	-2.91	-3.86
Project 4	0.00	33.97	33.97	0.01	33.97	33.96	33.96	33.96	33.96	140.03	107.68
Project 5	8.59	103.90	132.02	28.13	103.90	88.76	84.36	84.36	88.76	345.87	246.92
Project 6	12.21	20.98	54.20	33.22	20.98	0.90	-0.03	-0.03	0.90	-11.22	-31.20
Project 7	1.50	4.66	7.83	3.17	4.66	3.12	3.00	**0.00**	**0.00**	6.37	1.93
Project 8	6.04	25.97	40.41	14.43	25.97	17.85	17.58	17.58	17.85	66.79	42.06
Project 9	0.74	22.31	24.25	1.94	22.31	21.39	21.11	21.11	21.39	86.74	65.49
Project 10	3.84	17.98	22.88	4.90	17.98	14.09	16.92	16.92	14.09	61.50	44.37

Table 4

The newly figured NPV is significantly less than the original NPV as the costs of the decision making cycle are now figured into the projects. The following table shows the delta between the two NPV evaluations and what percentage of the original NPV was lost to the decision making process.

	NPV	New NPV	% Dec in NPV
Project 1	44.17	29.34	33.56%
Project 2	67.35	45.15	32.96%
Project 3	-2.91	-3.86	-32.74%
Project 4	140.03	107.68	23.10%
Project 5	345.87	246.92	28.61%
Project 6	-11.22	-31.20	-178.09%
Project 7	6.37	1.93	69.65%
Project 8	66.79	42.06	37.04%
Project 9	86.74	65.49	24.50%
Project 10	61.50	44.37	27.85%

Table 5

In aggregate, across the entire data set of 67 projects, the difference between these two net present value calculations was $4.96 billion. This is a significant cost, even over five years, for a company generating revenues of over $100 billion. This would relate to nearly $1 billion a year in revenue or cost savings for a company just in the decision making cycle. Again, this revenue and cost savings do not take time value of money or any reinvestment value into account.

The same projects will be evaluated with an extra three quarters of income. Bringing back *Table 7,* this evaluation will use Q1 as an expense for the decision making cycle, Q2 and Q3 as execution cycle and use the revenues of Q4, Q5 and Q6 as revenue components of the NPV evaluation. We then can compare the difference, in this scenario, of getting through the decision making process three quarters quicker to being realizing revenues and cost savings earlier in the project life cycle.

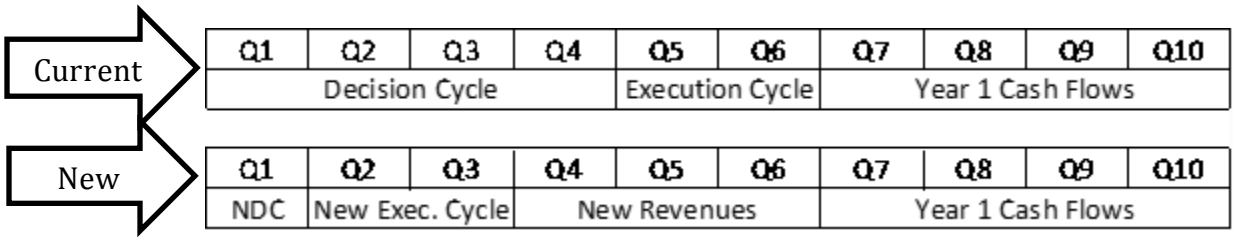

Figure 8

In figuring the new NPV based on the new income, the new revenues (Q4 through Q6) are added to the first year's income. This will still keep the project ending on the same timeline, yet add three additional quarters of income to the project. Since the project has already been executed, the cost for Q4 through Q6 is also taken into account:

	NPV	New NPV	Q4-Q6 Revenue
Project 1	44.17	29.34	52.25
Project 2	67.35	45.15	74.45
Project 3	-2.91	-3.86	-3.27
Project 4	140.03	107.68	161.41
Project 5	345.87	246.92	404.19
Project 6	-11.22	-31.20	-12.23
Project 7	6.37	1.93	8.08
Project 8	66.79	42.06	83.43
Project 9	86.74	65.49	100.53
Project 10	61.50	44.37	75.36

Table 6

The *Q4-Q6 Revenue* column is the NPV calculation with the newly recognized revenues of the new execution process.

While the decision making process is still seen as a cost, the cost has been significantly reduced:

	NPV	New NPV	% Dec in NPV	Q4-Q6 Revenue	% Inc NPV
Project 1	44.17	29.34	33.56%	52.25	18.31%
Project 2	67.35	45.15	32.96%	74.45	10.53%
Project 3	-2.91	-3.86	-32.74%	-3.27	12.63%
Project 4	140.03	107.68	23.10%	161.41	15.27%
Project 5	345.87	246.92	28.61%	404.19	16.86%
Project 6	-11.22	-31.20	-178.09%	-12.23	8.98%
Project 7	6.37	1.93	69.65%	8.08	26.78%
Project 8	66.79	42.06	37.04%	83.43	24.91%
Project 9	86.74	65.49	24.50%	100.53	15.90%
Project 10	61.50	44.37	27.85%	75.36	22.53%

Table 7

In aggregate, making a decision in one quarter versus one year would net a $2.63 billion increase over the original NPV of the projects. This type of revenue generation and cost savings allows a company to take on a much different risk profile with respect to the decision making process. In aggregate, the total revenue gains of an optimal decision making and evaluation process would be worth over $7.5 billion over five years.

This analysis simply compares what would happen to the NPV of projects given the circumstances outlined above. An understanding does exist that shortening decision making cycles may entail an enormous shift in corporate frameworks, budgeting and accounting practices, and risk profiles. Significant value exists in making decisions in an optimal environment where risk profiles are enhanced to encompass a shorter decision making timeframe.

Findings

Regardless of the project, nature of the project, costs, revenues or timeframes, the NPV of a project is significantly impacted when the decision making process is also seen as a cost to the project. In some cases, the decision making consumed any positive cash flow from the project. This may be an indication as to why some companies experience negative cash flows within their finances while all numeric research would suggest positive outcomes:

	NPV	New NPV	% Dec in NPV	Q4-Q6 Revenue	% Inc NPV
Project 1	44.17	29.34	33.56%	52.25	18.31%
Project 2	67.35	45.15	32.96%	74.45	10.53%
Project 3	-2.91	-3.86	-32.74%	-3.27	12.63%
Project 4	140.03	107.68	23.10%	161.41	15.27%
Project 5	345.87	246.92	28.61%	404.19	16.86%
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Project 8	66.79	42.06	37.04%	83.43	24.91%
Project 9	86.74	65.49	24.50%	100.53	15.90%
Project 10	61.50	44.37	27.85%	75.36	22.53%
Project 11	202.79	140.93	30.50%	242.89	19.78%
Project 12	153.65	99.73	35.09%	166.94	8.65%
Project 13	731.50	478.35	34.61%	799.48	9.29%
Project 14	146.31	59.73	59.18%	207.31	41.69%
Project 15	717.00	542.56	24.33%	792.66	10.55%
Project 16	17.22	10.91	36.65%	20.94	21.60%
Project 17	149.35	113.51	24.00%	170.25	13.99%
Project 18	365.33	200.90	45.01%	422.18	15.56%
Project 19	17.27	10.92	36.73%	22.07	27.81%
Project 20	69.86	45.82	34.41%	86.12	23.29%
Project 21	30.35	17.98	40.76%	35.82	18.03%
Project 22	198.12	144.21	27.21%	219.54	10.81%
Project 23	115.73	84.58	26.91%	136.26	17.74%
Project 24	61.06	40.73	33.29%	65.15	6.69%
Project 25	166.35	127.46	23.38%	138.69	-16.63%
Project 26	86.81	62.69	27.79%	105.69	21.74%
Project 27	363.50	274.05	24.61%	403.30	10.95%
Project 28	17.23	5.52	67.96%	16.23	-5.81%
Project 29	224.34	144.11	35.77%	259.37	15.61%
Project 30	647.07	487.23	24.70%	731.65	13.07%
Project 31	13.18	-0.53	103.99%	9.78	-25.75%
Project 32	681.89	511.75	24.95%	761.34	11.65%
Project 33	488.35	349.60	28.41%	540.25	10.63%
Project 34	1306.67	965.52	26.11%	1534.99	17.47%
Project 35	87.42	65.53	25.03%	108.26	23.84%
Project 36	158.76	107.01	32.59%	178.63	12.52%
Project 37	535.59	390.34	27.12%	616.79	15.16%
Project 38	112.94	73.09	35.28%	128.99	14.21%
Project 39	187.30	139.09	25.74%	214.30	14.42%
Project 40	476.23	344.19	27.73%	544.43	14.32%
Project 41	50.48	38.55	23.64%	55.45	9.85%
Project 42	90.98	66.24	27.19%	95.79	5.28%
Project 43	375.75	280.67	25.30%	404.30	7.60%
Project 44	47.21	30.40	35.60%	52.43	11.06%
Project 45	240.04	163.52	31.88%	270.38	12.64%
Project 46	1301.90	956.22	26.55%	1592.11	22.29%
Project 47	453.12	334.19	26.25%	499.53	10.24%
Project 48	42.79	27.57	35.57%	56.14	31.19%
Project 49	21.96	12.29	44.04%	25.41	15.74%
Project 50	120.03	89.33	25.58%	133.32	11.07%
Project 51	60.08	28.59	52.41%	67.37	12.13%
Project 52	603.15	451.87	25.08%	664.92	10.24%
Project 53	1208.98	937.06	22.49%	1337.44	10.63%
Project 54	510.03	375.88	26.30%	628.85	23.30%
Project 55	23.54	-1.20	105.11%	32.35	37.47%
Project 56	272.25	201.77	25.89%	298.67	9.70%
Project 57	2.05	-0.30	114.59%	1.95	-4.76%
Project 58	67.59	43.17	36.13%	80.39	18.94%
Project 59	31.39	-0.63	102.01%	39.99	27.41%
Project 60	253.17	182.76	27.81%	300.23	18.59%
Project 61	18.25	6.60	63.81%	23.05	26.34%
Project 62	-18.78	-24.38	-29.81%	-20.59	9.66%
Project 63	302.52	213.09	29.56%	356.76	17.93%
Project 64	138.21	98.70	28.59%	172.68	24.94%
Project 65	445.38	330.25	25.85%	513.18	15.22%
Project 66	1377.77	1031.21	25.15%	1692.93	22.87%
Project 67	77.33	34.52	55.37%	82.28	6.40%
Totals	17451.02	12493.38	28.41%	20081.81	15.08%

Table 8

The original value of the portfolio of projects was $17.45 billion. When considering the decision making process as a cost, the portfolio decreases nearly $5 billion in value. When making a decision in one quarter versus one year, the value of the portfolio increases $2.6 billion in value. One could argue, the long decision cycle costs $7.6 billion in value of the portfolio.

CONCLUSIONS AND IMPLICATIONS

The conclusions are interpreted from the data presented in as a general theme to the data. Because each project varies in cash flows and expenses, the conclusions will aim to generalize the study in terms of percentages as an aggregate portfolio of assets and use specific projects as an example.

The decision making process decreased the value of a project in nearly all instances. While the sample size was limited, the conclusions came from projects across a broad range of industries but each company and industry would be impacted differently based on the decision making process. On average, the drop in NPV was 28.41%.

The NPV valuation had a positive impact given a shorter decision making process in all evaluations. On average, the rise in NPV was 15.08%. The largest increase was 37.47%. Depending on the cost to cash flow ratio will dictate the economic and opportunity cost of the decision making process.

The initial NPV valuation for all projects was $17.45 billion. Including the decision making process as an expense, the entire portfolio was now worth $12.49 billion. This equated to a 28.41% drop in portfolio value. This decrease means it cost this company almost $1 billion per year to decide on these projects over a five-year time horizon. Under a shorter decision making process, the same portfolio is worth $20.08 billion. The portfolio experienced a swing of $7.59 billion in assets done under current decision making process versus a streamlined decision making process.

The decision making process has enormous impacts on NPV of the projects and initiatives being examined and enterprises may have opportunity to generate increased revenues and cost savings by evaluating their decision making processes. The study asserts the following general conclusions:

- When the decision making process is assumed as the cost of a project, the NPV evaluations experience a decline in value.
- A shorter decision making process can lead to economic costs savings and revenues of significant impact.
- The nature of risk profile may change given shorter timelines due to increase in aggregate portfolio performance.

There are a series of implications that may have corporate managers and executives evaluating the time in which it takes to generate, research, analyze and execute projects and may include a review of how decisions are made from a hierarchal perspective and evaluating the bodies involved during the process. Lastly, a large portion of project expense can be attributed to the decision making process.

For this reason, it is vital to follow some recommendations based on the conclusions of the data:

1. Investing time in understanding the decision making process will result in a series of global rewards for the company.
2. Under the notions of game theory and hierarchical decision theory, refrain from spending too much time sizing up the competition. Time is money and

these competitive analysis studies in conjunction with the decision making process may not be adding as much value as perceived.

3. Risk is another area that may be worth observing to see if an enterprise spends too much time analyzing risk.

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