



True Cost Benefit Analysis Framework

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Introduction

- **There are many decision making processes in the marketplace**
 - DoD
 - OMB
 - Agency Level
 - Commercial/Industry Processes
- **Whether it's an analysis of alternative, alternative analysis, portfolio analysis or cost benefit analysis cost is not enough to support decision making.**

**What is required is that in the context of a problem or opportunity
an analytical comparison of effectiveness / value to cost**

Agenda

- **Decision Process**
- **Scenario**
 - Define Problem or Opportunity
 - Develop Alternatives
 - Cost view
 - Benefit view
 - Identify Assessment Criteria
 - Compare & Select Alternative
 - Document & Justify
- **Summary**

Decision Process

- 1. Recognize Problem or Opportunity**
- 2. Develop Possible Alternatives**
- 3. Identify Assessment Criteria**
- 4. Compare & Select Alternative**
- 5. Document & Justify**
- 6. Execute**
- 7. Post Audit Review**

Scenario



Look Ma No Hands Inc

Your company,
Look Ma No Hands Corporation,
is considering developing a system which
will allow automobiles to operate on autopilot.

Develop Possible Alternatives

As a new player, there are several ways to enter the market. Each alternative has its own set of risks, benefits, business value, technical and programmatic complexities.

1. Go It Alone

- Develop a proprietary offering that is completely homegrown

2. Piggy Back

- Integrate with established products, software or services market share through partnerships or sales channels

3. Mash Up

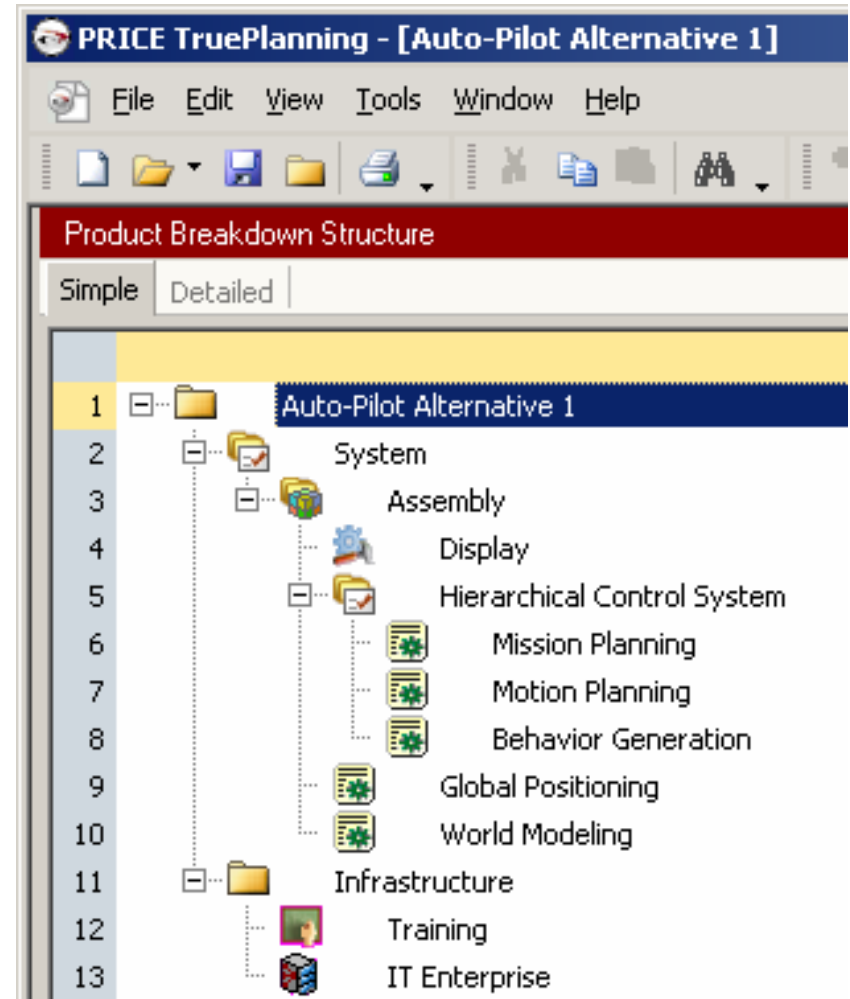
- Glue existing products, software and services together in a unique offering.

The challenge is getting to an “apple to apple” comparison to determine which is the best alternative.

Alternative 1: Go It Alone

Your company will need to develop and support the infrastructure, software, hardware and services to support this offering.

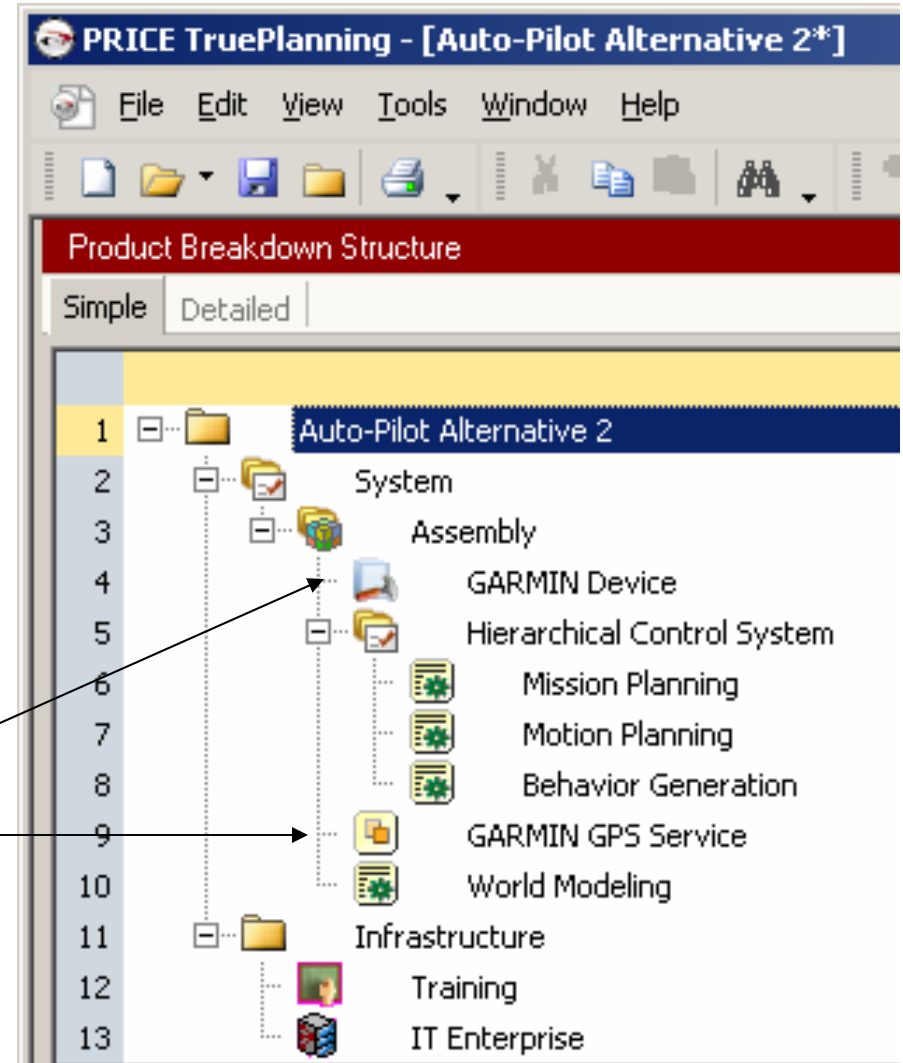
This involves the development of a display device, the system and software to manage the automobiles position and steering, and infrastructure to support the service (call center, data center, etc)



Alternative 2: Piggy Back

Your company is considering partnering with a popular commercial GPS service and hardware provider to:

- Reduce barriers of entry
- Gain access to their customer base
- Access distribution channels.



Alternative 3: Mash Up

Your company is considering an aggressive partnering strategy that leverages the top providers in each hardware, software and services category.



GARMIN



The screenshot shows the PRICE TruePlanning software interface. The title bar reads "PRICE TruePlanning - [Auto-Pilot Alternative 3*]". The menu bar includes File, Edit, View, Tools, Window, and Help. Below the menu bar is a toolbar with various icons. The main window displays a "Product Breakdown Structure" with two tabs: "Simple" and "Detailed". The structure is a hierarchical tree view with the following items:

- 1. Auto-Pilot Alternative 3 (Folder)
- 2. System (Folder)
- 3. Assembly (Folder)
- 4. GARMIN Device (File)
- 5. Hierarchical Control System (Folder)
- 6. Tartan HCS (File)
- 7. GARMIN GPS Service (File)
- 8. EVOC World Modeling (File)
- 9. On Star (Folder)
- 10. Training (File)
- 11. Infrastructure Service Agreement (File)

Arrows from the logos on the left point to the corresponding items in the tree: GARMIN points to "GARMIN Device", Evoc points to "EVOC World Modeling", and On points to "On Star".

Assessing the Alternatives

Cost Perspective

- There are a lot of technical implications within each alternative.

	Go It Alone	Piggy Back	Mash Up
COTS	0%	20%	100% COTS
New Design	100%	80%	25%
Integration	Few Integration Points	Some Integration Points	Many Integration Points
Stakeholder Involvement	Medium	High	High
Glue Code	Low	Medium	Very High
Familiarity with Product	High	Medium	Low
Evaluation & Tailoring	Low	Medium	Very High

But what about the Benefits?

Assessing the Alternatives

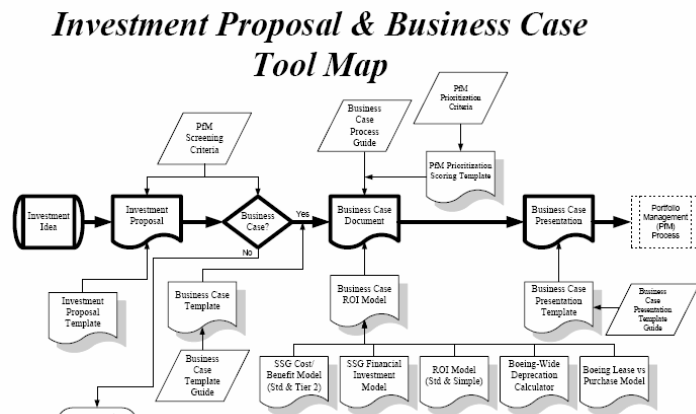
Benefit Perspective

There are many business implications within each alternative

- Leveraging existing products & services could reduce the amount of time to bring an offering to market.
- More partners increase management complexity
- The amount of start up costs or capital investment
- Are there government regulations that may impede the offering?
- Lack market presence or brand awareness
- What is the window of opportunity?

How are these captured, quantified and linked to the estimate?

There are many documented processes on HOW to do this, BUT not systems to help you do this!

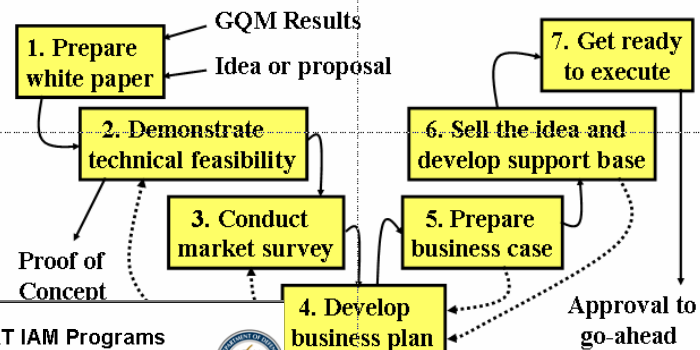


mike.stratton@coeing.com 4-19-2004

Figure 3: Investment Proposal and Business Case Document and Template M

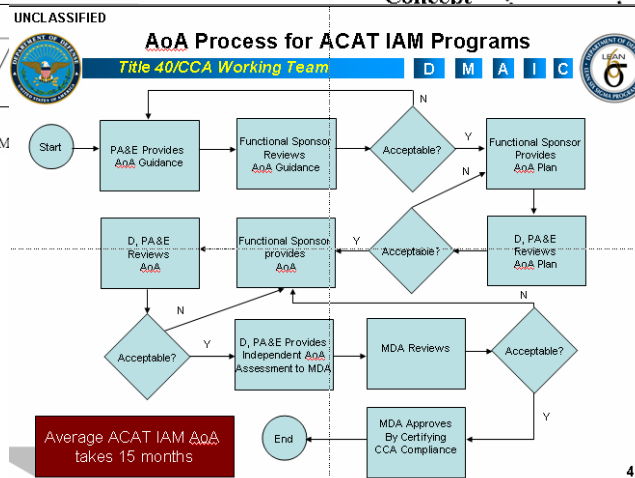
UC SIE University of Southern California Center for Software Engineering

The Business Planning Process



Copyright RCI, 2001

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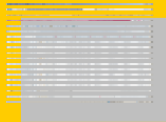
Challenges

Organizations struggle with

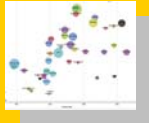
- Consistent identification and quantification of risks/benefits.
- Linkage between business choices and their impact on technical approach.
- Quantification of non-financial benefits/risks
- Generating a credible return on investment
- Ability to normalize and evaluate the alternatives

PRICE TruePlanning Framework


ANALYTICS/DECISION MAKING




Dashboard




Knowledge Management



Knowledge Bases



Metrics



Business Case Analysis

COST MODELING

- Manufacturing
- IT Infrastructure
- Software Engineering
- Operations & Support
- Systems Engineering
- Project/Program Management
- Hardware Development & Production

BENEFIT MODELING

- Increase Revenue
- Process Effectiveness
- Cost Avoidance
- Operational Efficiency
- Opportunity Creation


WEB SERVICES/API



Project Portfolio Management



Application Lifecycle Management



Product Lifecycle Management

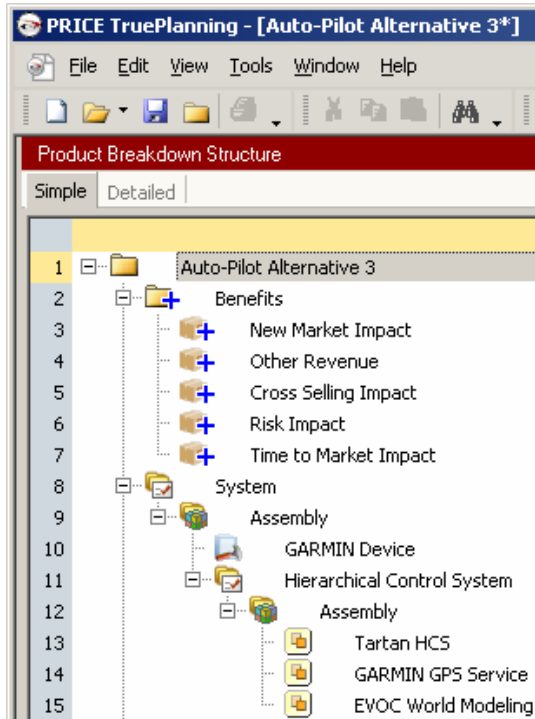


Enterprise Resource Management



TruePlanning Value Model

- **A standard models that indicate business value and provides common definition and calculation methodology.**
 - Promotes consistent identification and quantification of risks/benefits
 - Linkage between business choices and their impact on technical approach
 - Quantification of non-financial benefits/risks



- Human Resource Impact
- Employee Productivity Impact
- Employee Turnover Impact
- System End-of-Life Impact
- Material Procurement Impact
- Legacy Hardware and Software Impact
- Other Cost Impact
- Infrastructure Impact
- Scrap Impact
- New Market Impact
- Existing Market Optimization Impact
- Cross-selling Impact
- Other Revenue
- Accounts Payable Impact
- Accounts Receivable Impact
- Risk Impact
- Time to Market Impact

Assessing the Alternatives

Benefit Perspective

	Go It Alone	Piggy Back	Mash Up
New Market Impact	No Partner/Channel	Partner/Channel	Many Partners/Channels
Cross Selling Impact	No Partner/Channel	Partner/Channel	Many Partners/Channels
Time to Market	2 years	1 year	<1 year
Revenue	Low	Medium	High
Risk Impact	Very High	High	Low

Each alternative has pros and cons but...
What is important to the organization?

Identify Assessment Criteria

Getting to “apples”

Business Value is the benefit for the enterprise, represented in financial and non-financial terms, that is a result of the solution or services, as evidenced by a direct contribution to the corporation’s market position or revenue, results that solve customer business needs, customer cost savings or financial benefits, or technology investments that advance the industry.

Business Values					
		Score (1=Low, 5=High)	Weight (Total = 100%)	Weighted Score	Notes
1	Support of Strategic Alignment	2.50	20.00%	10.00	
2	Business Process Impact	2.50	20.00%	10.00	
3	Architectural Compliance	2.50	20.00%	10.00	
4	Risk Avoidance	2.50	20.00%	10.00	
5	Payback	0.00	20.00%	0.00	
6	Total		100.00%	40.00	

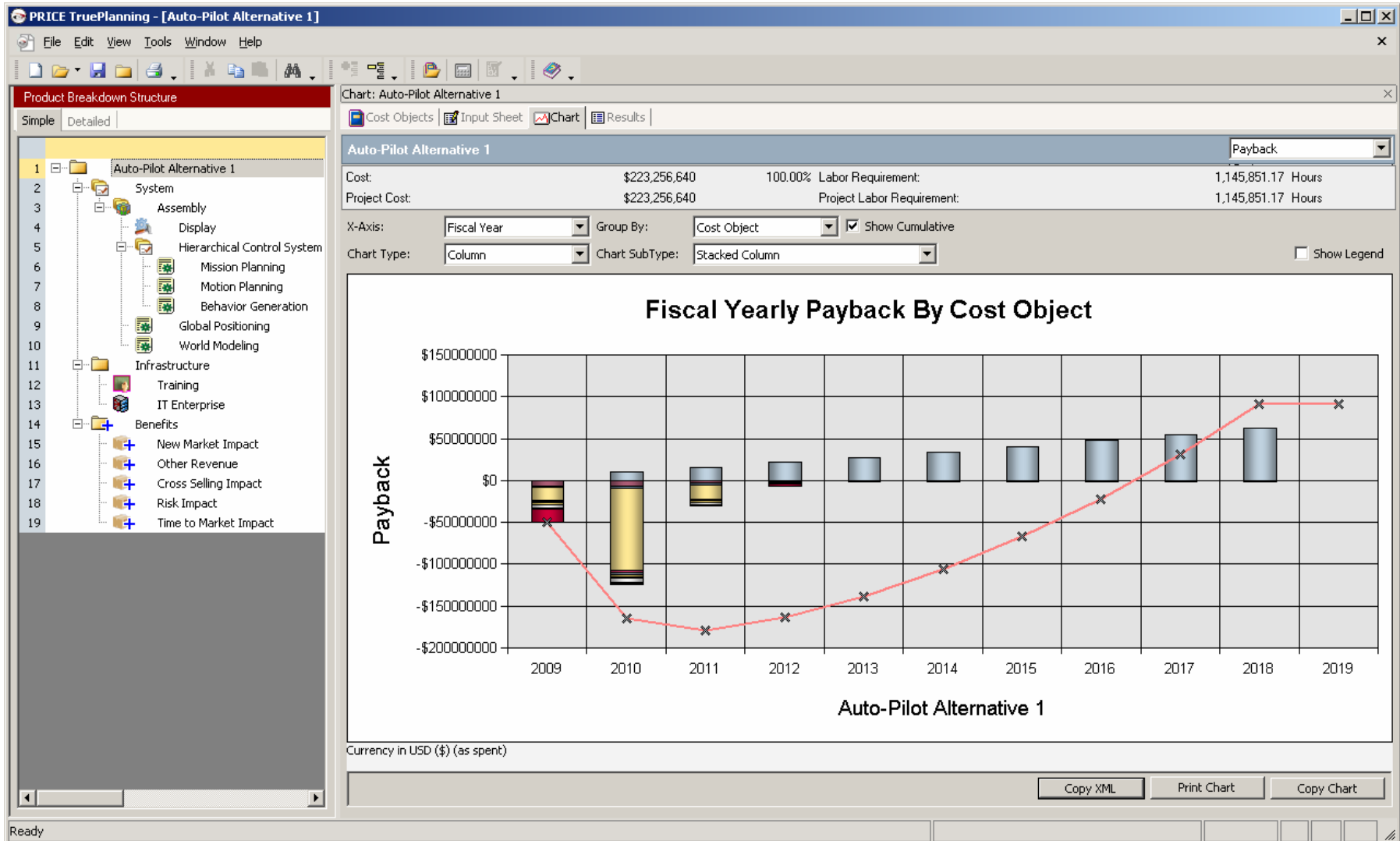
- **TruePlanning Business Values defined and quantified at the project level**
 - Ability to normalize and evaluate the alternatives
 - Generating a credible return on investment

Identify Assessment Criteria

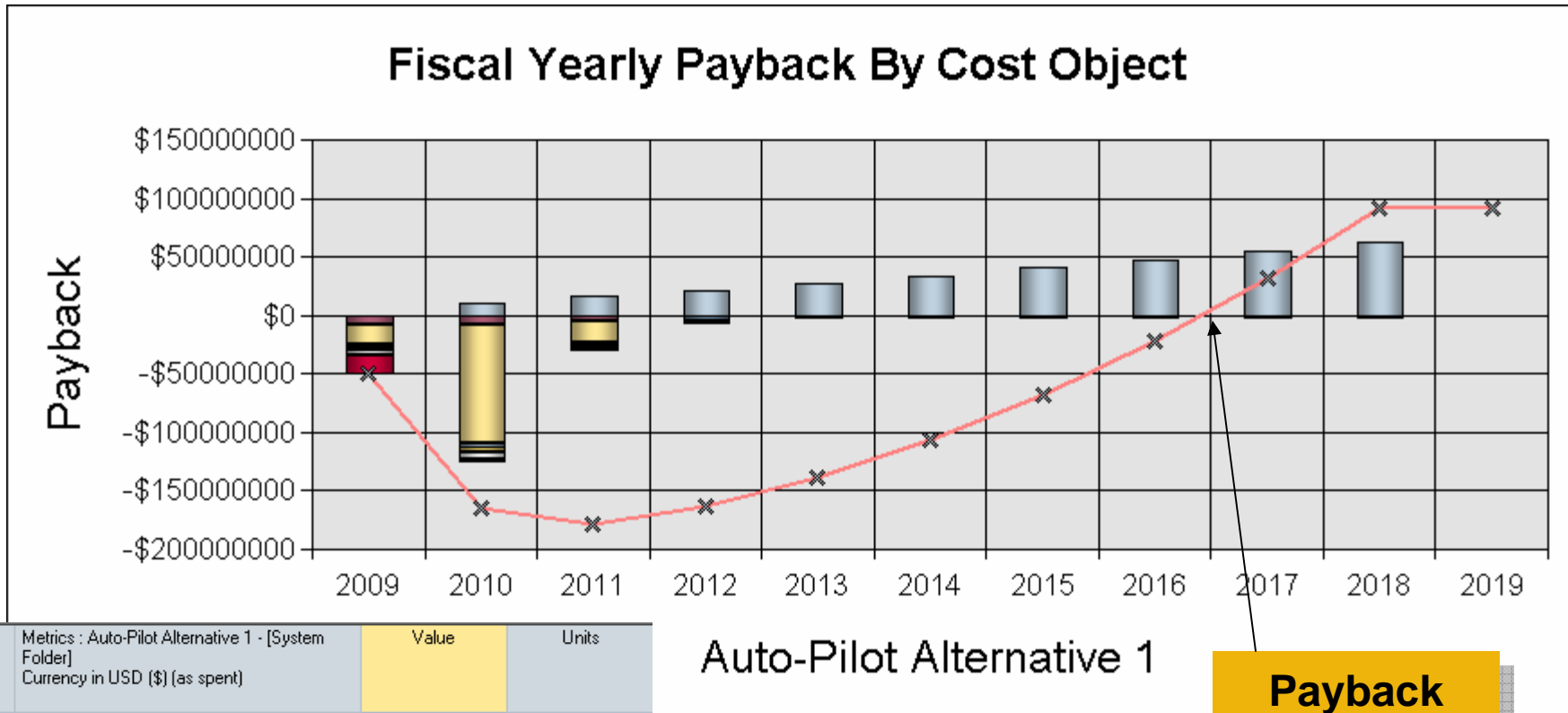
		Total	Support of Strategic Alignment	Business Process Impact	Architectural Compliance	Risk Avoidance	Payback
1	Auto-Pilot Alternative 1	60.00	4.00	12.00	20.00	4.00	20.00
2	Auto-Pilot Alternative 2	60.00	8.00	12.00	12.00	8.00	20.00
3	Auto-Pilot Alternative 3	76.00	16.00	12.00	2.00	6.00	40.00

- **Based on Look Ma's values we are able to assess the alternatives:**
 - Assign quantitative assessments for each value category
 - Document the justification
 - Evaluate the alternatives against each other

Compare & Select



Compare & Select

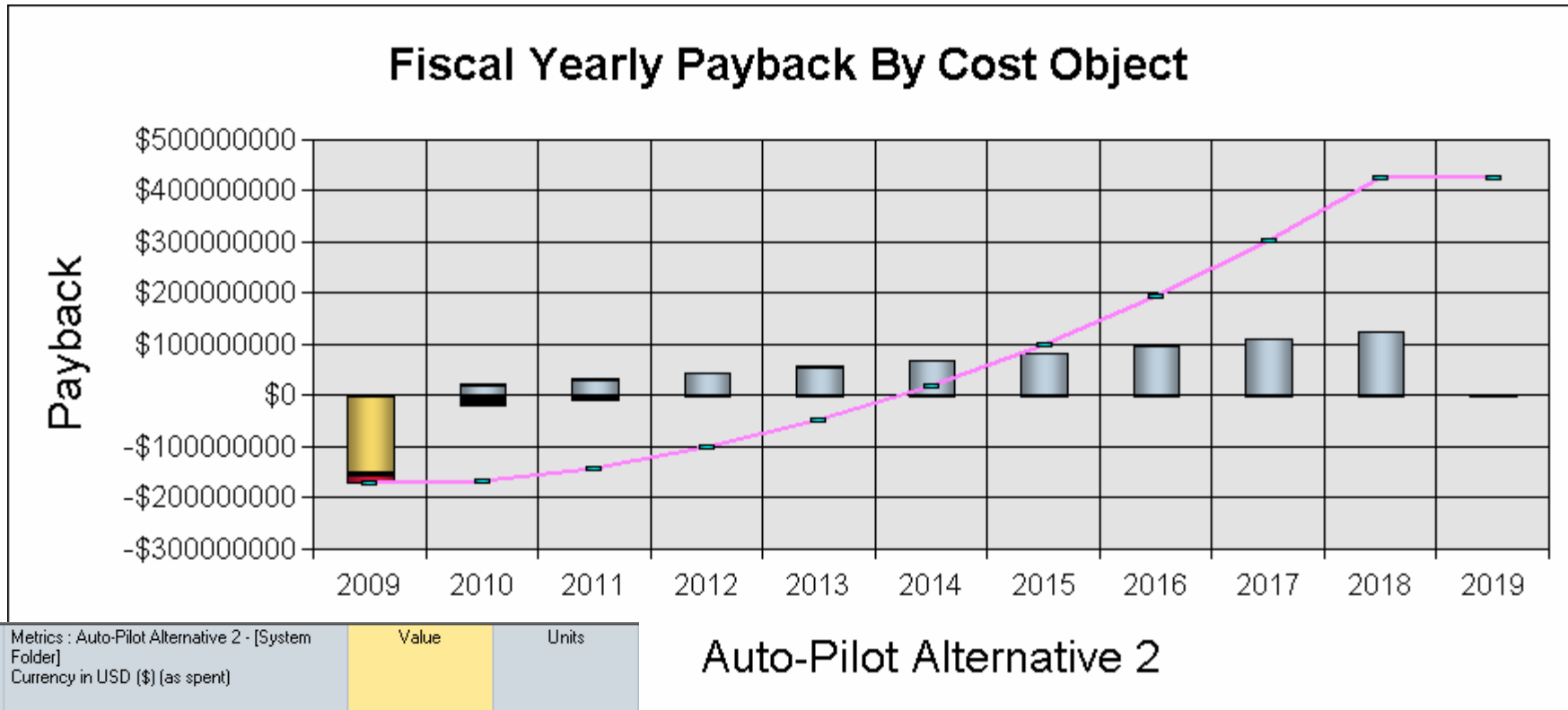


Metrics : Auto-Pilot Alternative 1 - [System Folder]		Value	Units
Currency in USD (\$) (as spent)			
1	Internal Rate of Return	7.30	%
2	Discount Rate	3.90	%
3	Net Present Value	35,438,305	\$
4	Payback Period	8.08	Years
5	Benefit-Cost Ratio	1.41	

Auto-Pilot Alternative 1

Payback Period

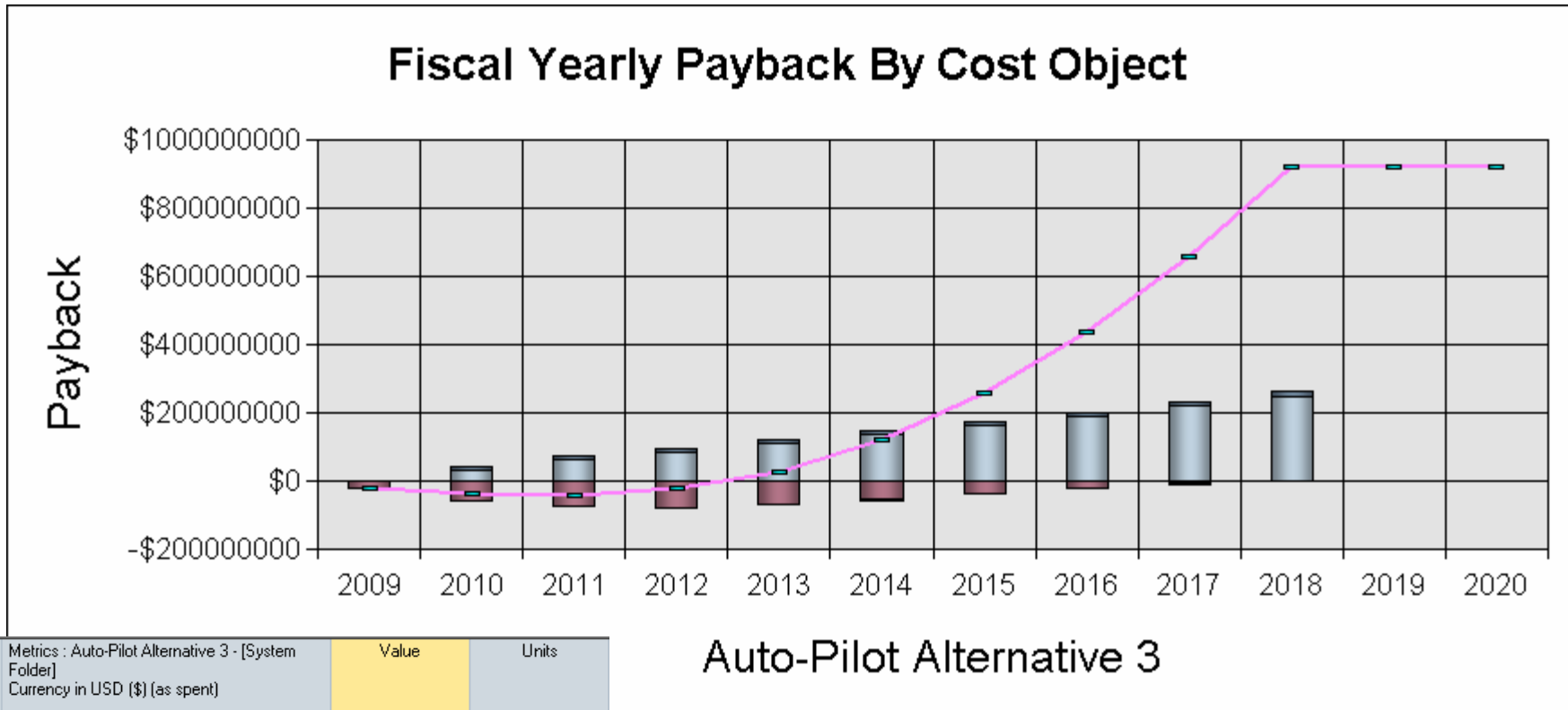
Compare & Select



Metrics : Auto-Pilot Alternative 2 - [System Folder]		Value	Units
Currency in USD (\$) (as spent)			
1	Internal Rate of Return	23.47	%
2	Discount Rate	3.90	%
3	Net Present Value	297,964,373	\$
4	Payback Period	5.08	Years
5	Benefit-Cost Ratio	3.01	

Auto-Pilot Alternative 2

Compare & Select

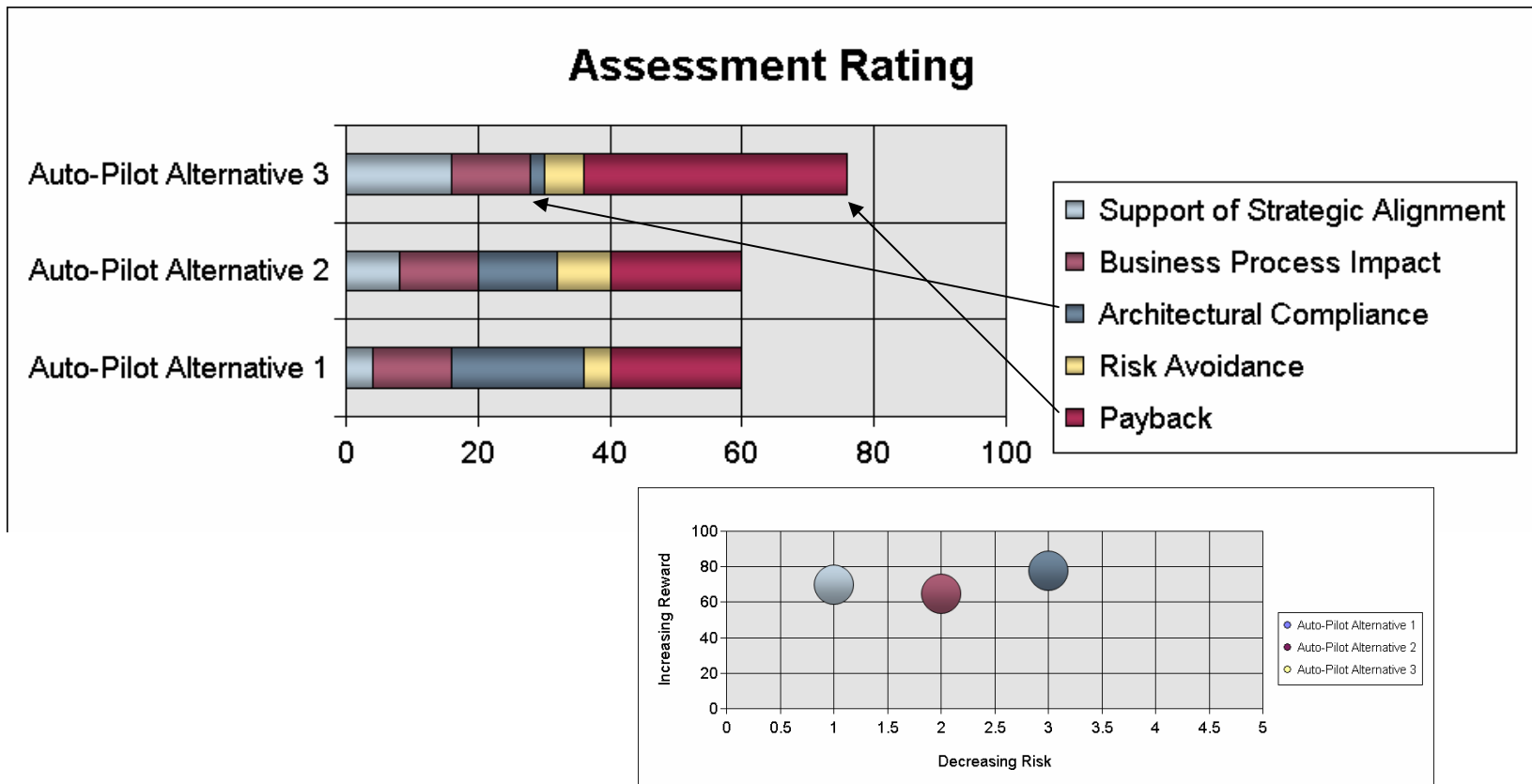


Auto-Pilot Alternative 3

Metrics : Auto-Pilot Alternative 3 - [System Folder] Currency in USD (\$) (as spent)		Value	Units
1	Internal Rate of Return	69.85	%
2	Discount Rate	3.90	%
3	Net Present Value	690,835,405	\$
4	Payback Period	5.08	Years
5	Benefit-Cost Ratio	3.14	

Compare & Select

Even though Alternative 3 has the most Architectural Risk its projected payback and alignment with the company strategic plan make it the Best Alternative.



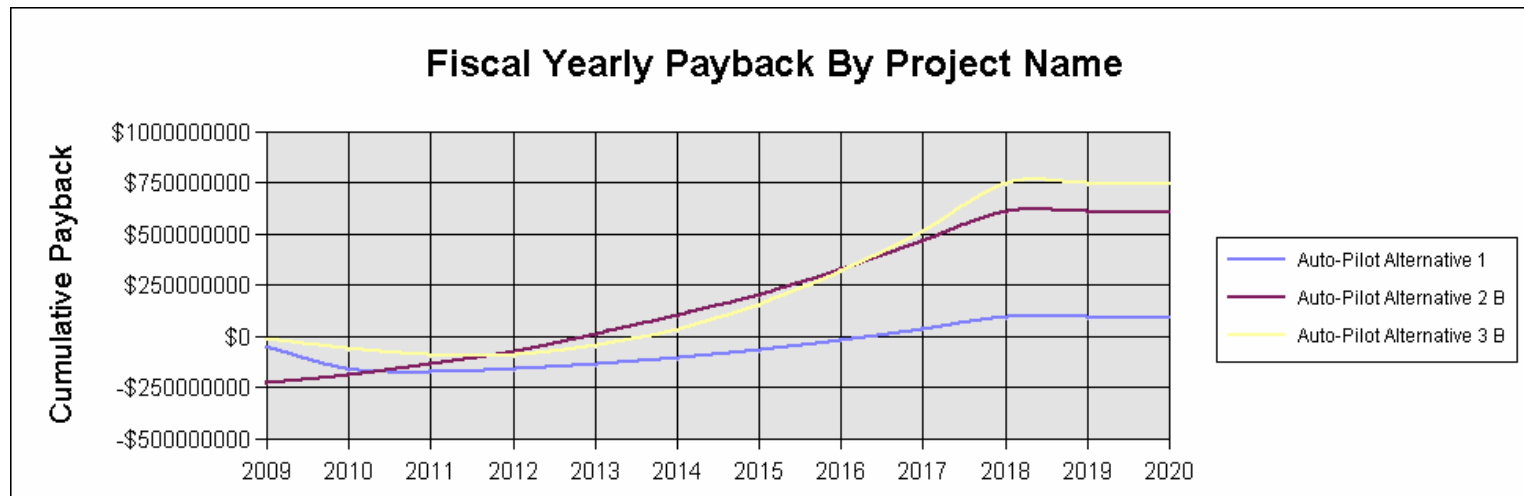
But wait!

- **Your lawyers tell you that one of proposed partners wants new terms which will add 6-12 months to negotiations and legal review**
 - This effectively eliminates the time to market benefit
 - Delays new market, cross selling and other revenue profiles by one year
 - Adds additional Risk due to partner instability
- **Your Chief Architect believes that they have an open source solution for the Mission & Motion Planning that will reduce development effort**
 - Improve software delivery by 12 months
 - 6 month time to market impact
 - Enable additional units to be sold earlier.

Now which alternative is best?

Compare & Select

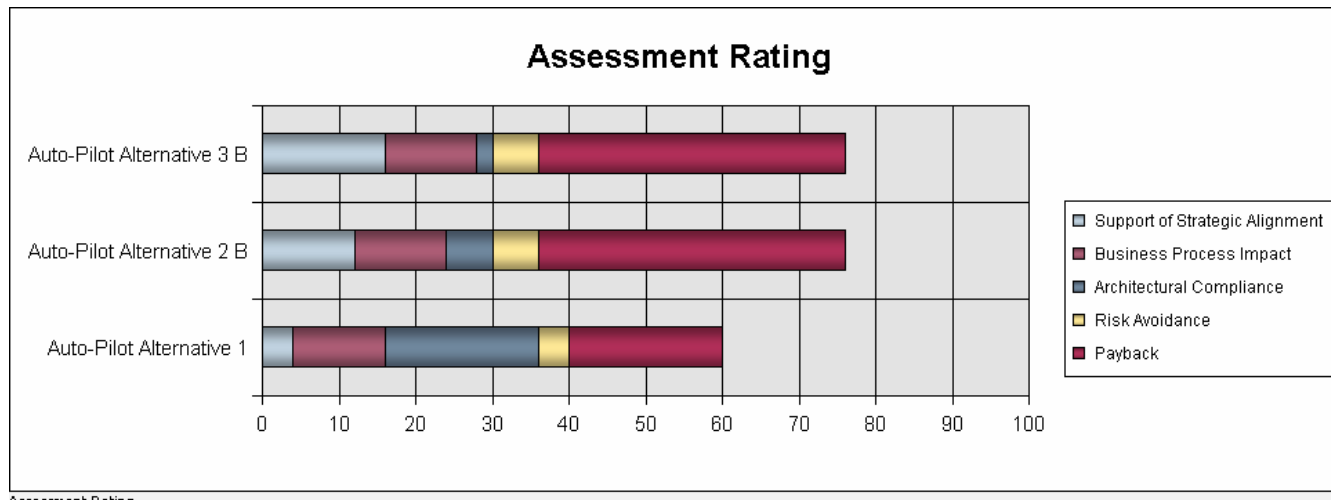
Alternative 2 improves significantly increasing its NPV to \$440M. Alternative 3 maintains a higher NPV of \$546M, however, Alternative 2 has an earlier Payback period.



Metrics : Auto-Pilot Alternative 2 B - [System Folder] Currency in USD (\$) (as spent)		Value	Units
1	Internal Rate of Return	27.99	%
2	Discount Rate	3.90	%
3	Net Present Value	440,485,581	\$
4	Payback Period	5.08	Years
5	Benefit-Cost Ratio	3.39	

Metrics : Auto-Pilot Alternative 3 B - [System Folder] Currency in USD (\$) (as spent)		Value	Units
1	Internal Rate of Return	45.73	%
2	Discount Rate	3.90	%
3	Net Present Value	546,756,986	\$
4	Payback Period	6.08	Years
5	Benefit-Cost Ratio	3.12	

Compare & Select: It's a Close Call!



From a business value and financial perspective both options are viable.

However, you now have solid quantitative analysis that:

- Is based on a historical data
- Developed in a structured, transparent process
- Consistent method for identification and quantification of risks/benefits.
- Links business choices and their impact
- Ability to normalize and evaluate the alternatives
- Generate a credible return on investment

Document & Justify

4.6 Alternatives Analysis
Describe alternative options, including the option of not implementing any project at all and a least one non-selected project option. State the reasons for not selecting each alternative. If at least one rejected alternative is not included, explain why.

Assessment Rating

Alternative	Support of Strategic Alignment	Business Process Impact	Architectural Compliance	Risk Avoidance	Payback
Auto-Pilot Alternative 3	~10	~10	~10	~10	~60
Auto-Pilot Alternative 2	~10	~10	~10	~10	~50
Auto-Pilot Alternative 1	~10	~10	~10	~10	~50

Payback (Benefits - (Folder)) C Total	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Benefits											
New Market Impact	\$124684896	\$0	\$30750000	\$63027246	\$80607200	\$110273600	\$136436628	\$162198681	\$190004170	\$219086658	\$249528913
Other Revenue	\$1819628	\$0	\$1020500	\$105045	\$107584	\$110274	\$113030	\$115856	\$118753	\$121721	\$124764
Costs Saving Impact	\$19192813	\$0	\$1020000	\$1004641	\$1079460	\$11027360	\$11303644	\$11589620	\$11875261	\$12172142	\$12476466
Risk Impact	\$754	\$784	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Time to Market Impact	\$491227	\$491227	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Benefits Total	\$1350056229	\$408891	\$41182569	\$73638832	\$94933194	\$121411234	\$147852662	\$173900158	\$201999163	\$231302422	\$262139124
Costs											
Costs Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Benefit	\$1350056229	\$408891	\$41182569	\$73638832	\$94933194	\$121411234	\$147852662	\$173900158	\$201999163	\$231302422	\$262139124
Cumulative Net Benefit	\$488891	\$41601491	\$115238124	\$212171598	\$33582741	\$480835344	\$654635591	\$856532684	\$1087920196	\$1350056229	\$1590056229

- Automatic report generation in Word
 - Charts
 - Tabular Data
 - Notes, Justification, Basis of Estimate Rational

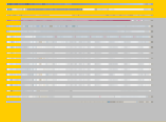
Summary

- **Organizations must develop capabilities that bring speed, accuracy and confidence to their decision making process.**
- **In dynamic environments, you need to connect models to decision support tools to make the right decision.**
- **An analyst (or application) that can only see from a cost-perspective is not enough to support effective decision making.**
- **Benefit modeling should be performed by people with the same skills as cost analysis - It requires the same rigor.**

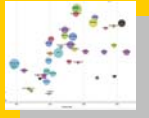
Have you calibrated your benefits lately?

PRICE TruePlanning Framework


ANALYTICS/DECISION MAKING




Dashboard




Knowledge Management



Knowledge Bases



Metrics



Business Case Analysis

COST MODELING

- Manufacturing
- IT Infrastructure
- Software Engineering
- Operations & Support
- Systems Engineering
- Project/Program Management
- Hardware Development & Production

BENEFIT MODELING

- Increase Revenue
- Process Effectiveness
- Cost Avoidance
- Operational Efficiency
- Opportunity Creation

WEB SERVICES/API



Project Portfolio Management

Application Lifecycle Management

Product Lifecycle Management

Enterprise Resource Management