Visual Tool for Project Selection

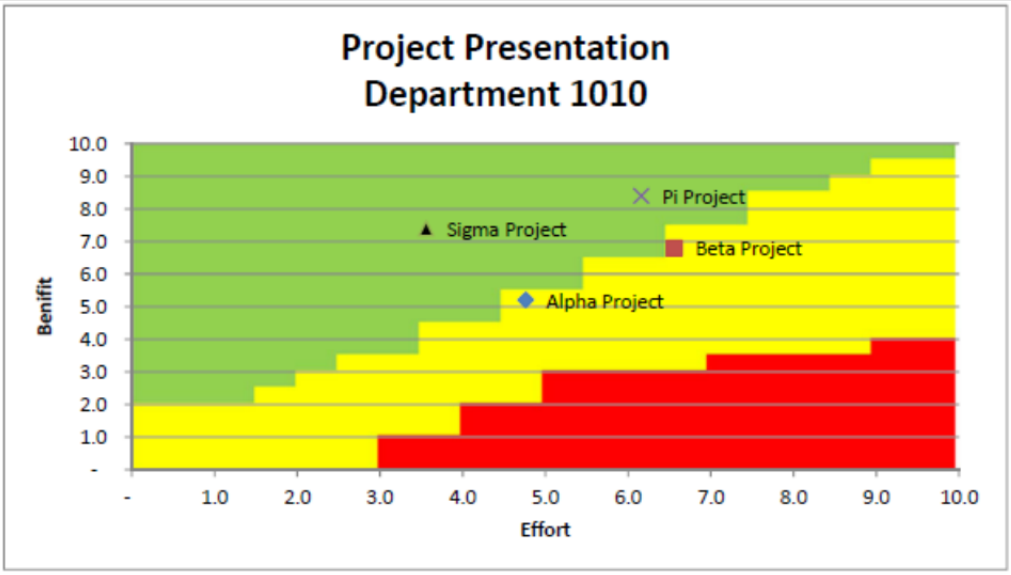
Introduction

In today's environment of visual management, a chart to identify project priority is beneficial for executive management to make decisions. Cost of Effort/ benefit analysis is a standard tool for evaluating projects. The need is to capture the components for each variable to have confidence in the decision.

This tool was developed for Warranty specific projects but can be applied to any type of an improvement outcome. The tool has two different components on the spread sheet. The project matrix (*Example 1*) has individual projects on each line with scores for each component. The Project Presentation (*Example 2*) is actually a graph made using a scatter diagram and can be added to any Management Report. The background was developed to visually identify which projects would have additional actions.

			BENEFIT									EFFORT										
ID	PROJECT TITLE	Status	Risk 1 (7) Severity	Risk 2 (3) Occurrence	Risk Total	Current 1 Estimated costs of current production		Current 2 Same method other parts (read Across) Forecasted Cost		Future Same method new programs Forecasted cost		TOTAL BENERT	Resource-Manpower Required		Implementation Cost-Capital Costs		Time to Implement-Project Timeline		Supplier Related-Level of Supplier involvement		Detection-Current method of detection for issue		TOTAL EFFORT	General Average Rate of Return (AAR)
	Importance Weighting:		0.70	0.3	0.60	0.20		0.10		0.10		*1.00*	0.20		0.40		0.10		0.10		0.20		*1.00*	
1	Alpha Project		5	7	3	5	1	3	0	1	0	4.8	7	1	3	1	3	0	5	1	9	2	6.2	0.8
2	Beta Project		7	9	5	5	1	9	1	1	0	6.8	7	1	9	4	3	0	5	1	5	1	6.8	1.0
3	Sigma Project		3	5	2	5	1	3	0	1	0	3.8	5	1	9	4	5	1	5	1	9	2	7.4	0.6
4	Pi Project		7	9	5	7	1	1	0	1	0	6.2	9	2	9	4	3	0	9	1	9	2	8.4	0.7
					0		0		0		0	-		0		0		0		0		0	-	
					0		0		0		0	-		0		0		0		0		0	-	

Example 1 Spread Sheet Project Matrix



Example 2 Project Presentation graph

Importance Weighting

On the matrix, weight factors have been defined for each variable of the components of Benefit and Effort. The assigned factor is highlighted in yellow on the matrix. The Importance Weighting sum for each component will be 1.00. This factor is a constant multiplier to the determined score for each variable.

Weight factors can be determined by the Management team.

Benefits

On the benefit side of the matrix, we identify Potential and current costs. This is estimated by identifying the risk associated of the project, current and forecasted costs.

Risk

In ideal risk management, a prioritization process is followed whereby the risks with the greatest loss (or impact) and the greatest probability of occurring are handled first, and risks with lower probability of occurrence and lower loss are handled in descending order.

In the matrix, I have identified Risk a two different variables, Severity and Occurrence. The scoring is based on the AIAG Potential Failure Mode and Effects Analysis, Fourth Edition [1] scoring. Using the odd numbers for consistency and scoring using the closest to the description in the manual tables.

Risk 1 Severity	**Score**
Failure to meet Safety and Or Regulatory Requirements	9
Loss or Degradation of Primary Function	7
Loss or Degradation of Secondary Function	5
Annoyance	3
No effect	1

Risk 2 Occurrence	**Score**
Very High r:1000= 3.0; % defective= 0.3 or Ppm= 3,000	9
High r:1000=1.0, % defective =0.1 or Ppm= 1,000	7
Moderate r:1000= 0.7, % defective= 0.07, or Ppm= 700	5
Low r:1000= 0.5, % defective= 0.05, or Ppm= 500	3
Remote r:1000= 0.2, % defective= 0.02, or Ppm= 200	1

Most projects will use the information in the Process FMEA tables. The scoring is in the greyed areas and is summed to Risk:Total. The weight factor for this matrix variable is 0.60. This combined variable has

the highest weight factor on the matrix as it would be largest contributor to future impact to the company.

Current Costs

Financial impact is the primary justification for Improvement Project selection. Current costs can be identified and forecasted to estimate scoring.

The first on the matrix is Current 1. This is the estimated costs of the current situation. As mentioned in the summary, the original matrix was developed for Warranty Projects. The estimated costs in this variable would include total costs, through the life of the current production of the existing design or process. The explanations for each of the scores in the reference tables for this paper are examples and can be defined by the organization based on the types of projects.

The second variable of Current Costs, Current 2, is an evaluation of other programs or parts that use the same method. These costs may be current debits to the organization or may become a liability in the future.

Current 1 Estimated costs Warranty Life Current Production	**Score**
Greater than $500,000	9
250,000-499,000	7
100,000-249,000	5
50,000 to 100,000	3
Lest than 50,000	1

Current 2 Estimated costs Warranty Life Same method other programs	**Score**
200,000 +	9
150,000- 200,000	7
100,000-150,000	5
50,000-100,000	3
less than 50,000	1

Future Costs

This is an estimated future cost when the same condition is transferred to programs that have yet to be released. Estimate is the product based on a forecasted occurrence and cost of one defect.

In most cases, future programs will have changes incorporated into the design or process to minimize the occurrence of the issue to be resolved.

Future forecasted costs	Score
200,000 +	9
150,000- 200,000	7
100,000-150,000	5
50,000-100,000	3
less than 50,000	1

Total Benefit

This is the sum of the weighted variables for each individual project. On the Project Presentation Chart it is the variable used for the y-Axis. This number also becomes the numerator for the separate variable General Average Rate of Return.

The result should always be less than 1.0.

Effort

Effort is how much work is necessary to accomplish the specific project. Variables included address the actual manpower, in time, required by effected areas along with the costs to implement the project.

Resource-Manpower

In each project, dedicated resources will be needed to implement the change. This variable is used to identify a complexity of the requirements. The more levels of involvement increase the score. The definitions used separate the difference between Design and Process changes.

Resource- Manpower	Score
Customer, Organization, and Supplier Engineering Dedication, Design and Process	9
Customer, Organization, and Supplier Engineering Dedication, Design	7
Customer and Organization Engineering Dedication, Design and Process Organization	5
Organization Engineering Process	3
Organization Engineering Design.	1

Time Line	Score
More than 24 months	9
18-24	7
12 to 18	5
6 to 12	3
less than 6 month	1

Time Line

Time Line is the total time requirements required to complete the specific project. These definitions are in months.

Implementation Capital

This variable uses the financial resources involved in the specific project. This would include changes to equipment and processes. Any changes to piece part cost that is assumed by the organization would be included in the sum for this calculation.

Implementation- Capital	**Score**
greater than 70,000	9
50,000-70,000	7
30,000-50,000	5
10,000-30,000	3
less than 10,000	1

Supplier Related

This variable takes into consideration the complexity of a change to a component within the project. In some cases, a component may have multiple organizations as customers and require change approval by all before implementation. When this is not a factor in the project a score of 1 is used.

Supplier Related	**Score**
Supplier Design multiple Customers	9
Supplier Design Organization is only Customer	7
Joint Design Organization is only Customer	5
Organization Design	3
	1

Detection

This variable is included in the Effort section of the matrix because it defines the ability to identify the issue within the current process. The scoring is based on the AIAG Potential Failure Mode and Effects

Analysis, Fourth Edition [1] scoring. Using the odd numbers for consistency and scoring using the closest to the description in the manual tables.

Detection	Score
Very Remote	9
Very Low	7
Moderate	5
High	3
Certain	1

Total Effort

This is the sum of the weighted variables for each individual project. On the Project Presentation Chart it is the variable used for the x-Axis. This number also becomes the denominator for the separate variable General Average Rate of Return.

The result should always be less than 1.0.

General Average Rate of Return (AAR)

Average Rate of Return (ARR) is an accounting method used for purposes of comparison. The major drawbacks of ARR are that it uses a profit variable, rather than cash flows, and it does not account for the time value of money.

The calculation is total benefit divided by total effort. A ratio greater than 1.0 would equal a pay back of less than twelve months.

The quotient presented in this matrix is an estimate based on the scoring of the individual variables and is not intended as a financial ratio.

Examples

Below are narratives that describe the examples used to create the sample Project Matrix and produce the sample Project Presentation for Department 1010 in this article.

Sample 1 Alpha

There is a loss of secondary function with an r:1000 of 1.25. Forecasted warranty costs are $165,000 with a second product line using the same design that has a forecast of $70,000. This design is not planned on future programs.

It will take a new component part change with only a new part # and drawing update. Overall costs will be $22,000. With a 6 month lead time of a current production part for the tier 2 supplier that would update the Tier 1 and Customer BOM. There is no current method to detect this issue in the process.

Sample 2 Beta

Over time the primary function of the component will not consistently work as designed. The Possible r:1000 is 2.3. Forecasted warranty costs are $193,000 with a three other product lines using the same design that has a forecast of $270,000. This design is not planned on future programs.

It will take a revised design of the product by both the Customer and the Tier 1. Overall costs will be $82,000 for tool and process changes. An 8 month lead time is required. The current method to detect this issue in the process may detect the issue.

Sample 3 Sigma

The consumer is complaining about the amount of effort that is needed to operate the component with an r:1000 of 0.65. Forecasted warranty costs are $100,000 with a second product line using the same design that has a forecast of $70,000. This design is not planned on future programs.

It will take a revised design of the product that includes Customer and the Tier 1. Overall costs will be $122,000 for tool and process changes. A 16 month lead time is required. There is no current method to detect this issue in the process.

Sample 4 Pi

There is a loss of primary function with an r:1000 of 2.6. Forecasted warranty costs are $290,000. No other product lines using the same design. This design is not planned on future programs.

It will take a revision to a component part of the Tier 2 that is used by 3 different customers. Change will be new part # and drawing update. Overall costs will be $110,000. With a 12 month lead time of for new part testing of the tier 2 supplier part. Tier 2 , Tier 1 and Customer will update drawings and BOM. There is no current method to detect this issue in the process.

Summary

Although this tool was initially developed for Warranty related projects, it can be used for other types of improvement projects. Table definitions, used to score components, can be adjusted by the organization although Project types must remain consistent to properly evaluate actions. Adjusted master files must be kept separate.

This tool is not intended to be a financial presentation of a cost/ benefit analysis. Using the Project Presentation in related reporting provides a graphic that would drive additional actions.

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References

[1] Potential Failure Mode and Effects Analysis (FMEA), Fourth Edition AIAG.