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Picking the Right Process Improvements

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Agenda

- Selecting Processes for improvement – what the CMMI® says about it
- A general approach – what's the problem
- More specific details – a solution
- Fitting it Into a Process
- Summary

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OPP SP 1.1: <u>Select</u> the processes or subprocesses in the organization's set of standard processes that are to be included in the organization's <u>process-performance analyses</u>.

QPM SP 1.3: <u>Select</u> the subprocesses of the project's defined process that will be <u>statistically managed</u>.

OID SP 1.1: <u>Collect</u> and analyze process- and <u>technology-improvement proposals</u>.

OID SP 1.2: <u>Identify</u> and analyze <u>innovative improvements</u> that could increase the organization's quality and process performance.

CAR SP 1.1: <u>Select</u> the <u>defects</u> and <u>other problems</u> for analysis.

OPF SP 1.3: <u>Identify</u> <u>improvements</u> to the organization's processes and process assets.
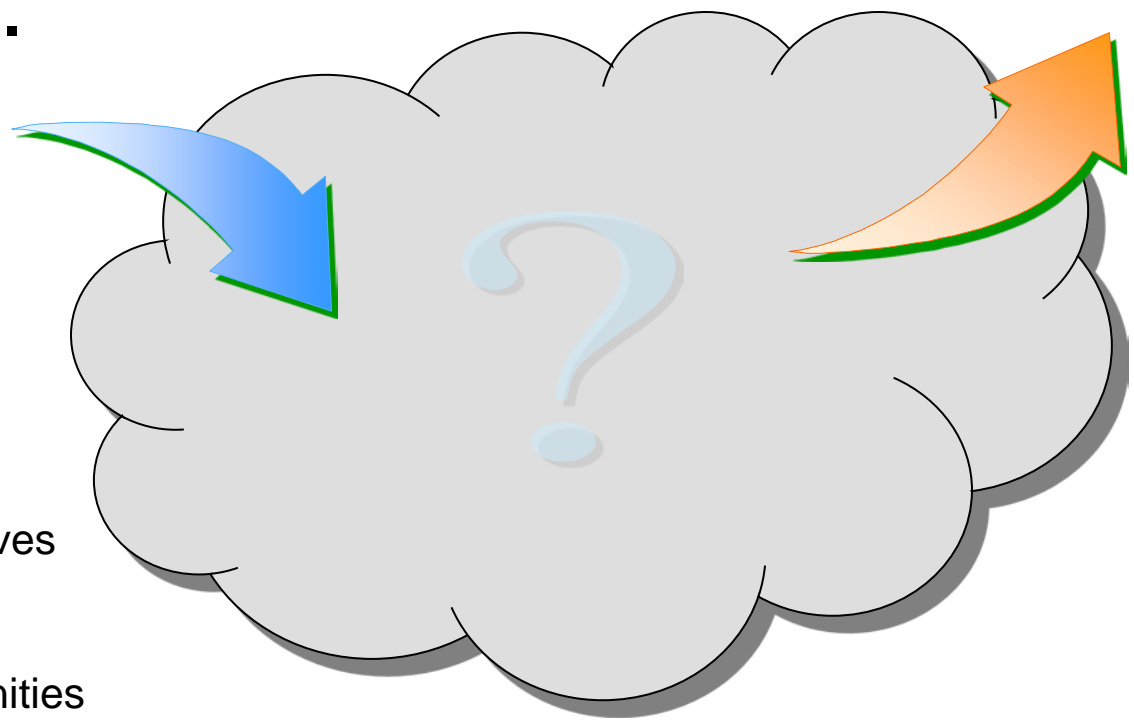
Underlining has been added

Possible Process Improvements

. . . How do I determine this

Prioritized Improvement Projects

Given this . . .

Organizational Goals
Organizational Objectives
Project Needs
Lessons Learned
Improvement Opportunities
Critical Processes

. . .

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. . . How do I determine this

Prioritized Improvement Projects

Given this . . .
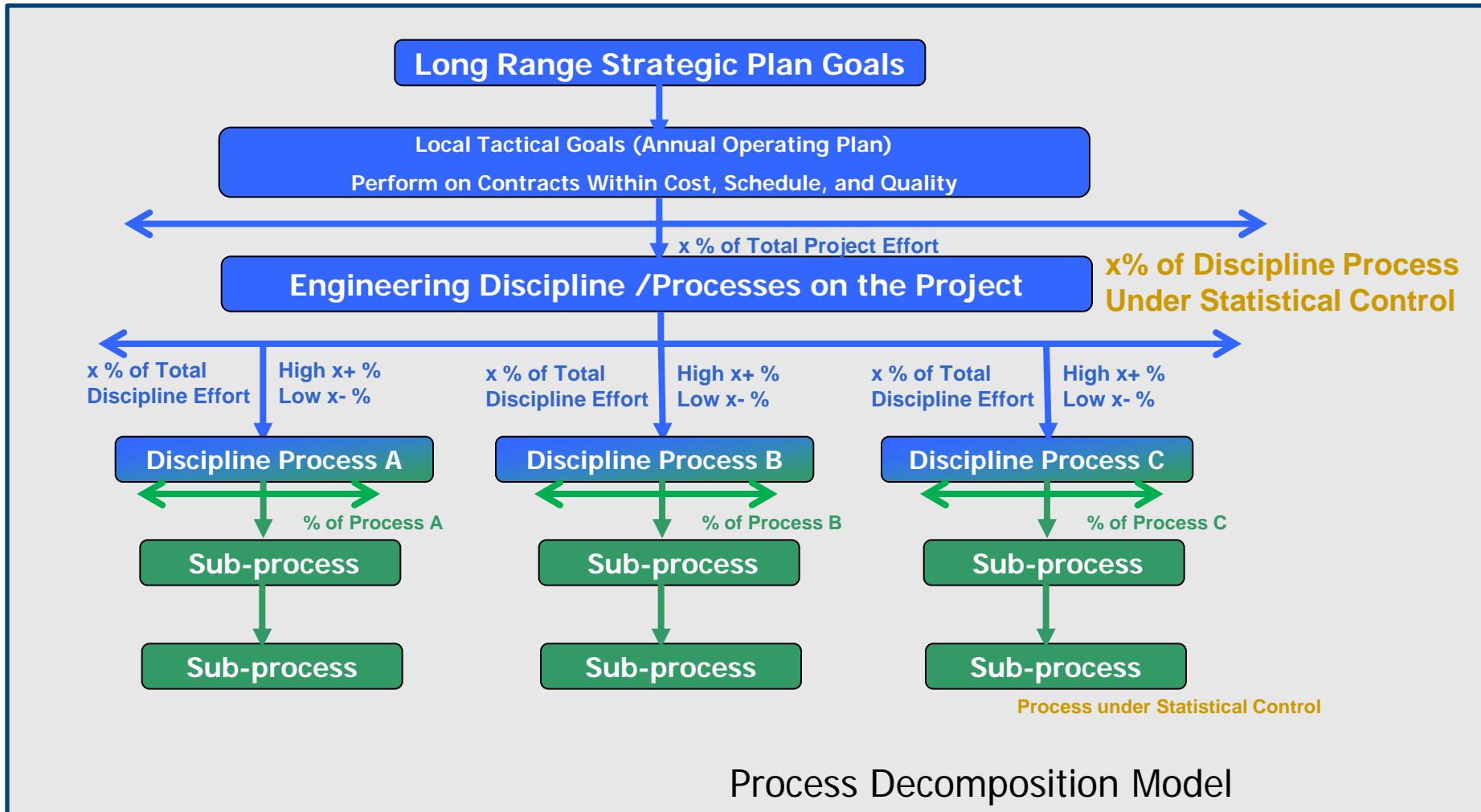

Organizational Goals
Organizational Objectives
Project Needs
Lessons Learned
Improvement Opportunities
Critical Processes
. . .

Trade Study ?
(But . . . Where will you get data?)

5

Initial Selection of Improvements

Long Range Strategic Plan Goals

Local Tactical Goals (Annual Operating Plan)

Perform on Contracts Within Cost, Schedule, and Quality

x % of Total Project Effort

Engineering Discipline /Processes on the Project

x% of Discipline Process Under Statistical Control

| x % of Total Discipline Effort | High x+ % Low x- % | x % of Total Discipline Effort | High x+ % Low x- % | x % of Total Discipline Effort | High x+ % Low x- % |

Discipline Process A

Discipline Process B

Discipline Process C

% of Process A

% of Process B

% of Process C

Sub-process

Sub-process

Sub-process

Sub-process

Sub-process

Sub-process

Process under Statistical Control

Process Decomposition Model

Initial Improvement Candidates Selected by Each Engineering Discipline
Using Their Process Decomposition Model

Formulating The Trade Study

	A	B	C
1	1. Names of Evaluation Team Members		
2	TM_01	Huey	
3	TM_02	Dewey	
4	TM_03	Louie	
5	TM_04	Moe	Blue cells are for data entry.
6	TM_05	Curly	
7	TM_06	Larry	Data entered appears on other sheets for consistent labeling.
8	TM_07	Shep	
9	TM_08	Daffy	1. Identify the evaluation team members
10	TM_09	Porky	2. Identify the evaluation criteria
11	TM_10	Elmer	3. Identify the improvement candidates to be evaluated
12			
13	2. Evaluation Criteria - Critical factors for process performance		
14	Evaluation #	Short Description	Verbose Description
15	1	Low Risks	Improving the process has a low risk of success, i.e., it is executable
16	2	High Benefits	Improving the process has a high benefit return
17	3	High Org Impact	Improving the process "scales" up to large portions of the organization
18	4	Business Goal Alignment	Improving the process has tight alignment with business goals
19	5	Voice of Customer (VOC)	Improving the process has high customer visibility, or addresses a (potential) customer concern
20	6	High Process Criticality	The process to be improved is considered critical to a program or the business
21			
22	3. Improvement Candidates		
23	Candidate #	Short Description	Verbose Description
24	2009-01	Requirements Process	Improve Requirements Process
25	2009-02	Configuration Management Process	Improve Configuration Management Process
26	2009-03	SW Design Process	Improve SW Design Process
27	2009-04	HW Design Process	Improve HW Design Process
28	2009-05	Verification Process	Improve Verification Process
29	2009-06	Validation Process	Improve Validation Process
30	2009-07	Integration Process	Improve Integration Process
31	2009-08	Lab Scheduling Process	Improve Lab Scheduling Process

Sheet tabs: **Data Set-up** / Weight the Criteria / TM_01 / TM_02 / TM_03 / TM_04 / TM_05 / TM_06 / TM_07 / TM_08 / TM_09 / TM_10 / Decision Mat...

Ready — 100%

7

Weighting the Evaluation Criteria

	A	B	C	D	E	F	G	H	I
1		Criteria							
2	Evaluator	Low Risks	High Benefits	High Org Impact	Business Goal Alignment	Voice of Customer (VOC)	High Process Criticality	sum	check
3	Huey	20	20	10	20	20	10	100	ok
4	Dewey	10	10	20	10	20	30	100	ok
5	Louie	15	15	15	30	10	15	100	ok
6	Moe	10	15	10	15	20	30	100	ok
7	Curly	15	15	25	20	25	0	100	ok
8	Larry	5	15	20	23	22	15	100	ok
9	Shep	10	20	15	25	15	15	100	ok
10	Daffy	5	15	10	20	25	25	100	ok
11	Porky	5	10	10	20	30	25	100	ok
12	Elmer	10	40	5	5	30	10	100	ok
13	Total	105	175	140	188	217	175		
14									
15	Mean	10.50	17.50	14.00	18.80	21.70	17.50		
16	Std Dev	4.97	8.58	6.15	7.22	6.24	9.79		
17	Mean + 2SD	20.44	34.66	26.29	33.25	34.17	37.08		
18	Mean - 2SD	0.56	0.34	1.71	4.35	9.23	0.00		
19									
20	Range: High	20	40	25	30	30	30		
21	Range: Low	5	10	5	5	10	0		
22									
23	Hi Check	OK	Check	OK	OK	OK	OK		
24	Low Check	OK	OK	OK	OK	OK	OK		

Sheet tabs: Data Set-up | **Weight the Criteria** | TM_01 | TM_02 | TM_03 | TM_04 | TM_05 | TM_06 | TM_07 | TM_08

Ready

Each Evaluator has 100 points in total to assign to the criteria.

The total must sum to 100, otherwise the "check" column will show an error.

"OK" means that all the data lie within two standard deviations of the mean.

"Check" means some data are outside this range, and a rationale should be evaluated.
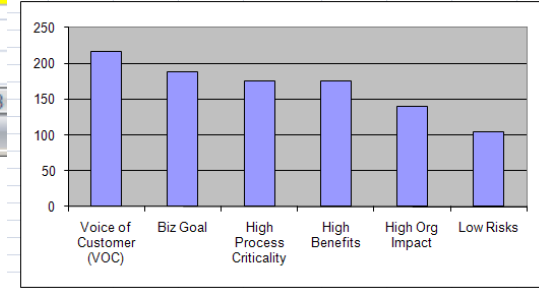
Evaluated the Candidates

Team member: Huey

Proj. #	Improvement Project	Low Risks	High Benefits	High Org Impact	Business Goal Alignment	Voice of Customer (VOC)	High Process Criticality
2009-01	Requirements Process	3	4	3	4	5	5
2009-02	Configuration Management Process	3	4	3	2	3	3
2009-03	SW Design Process	4	3	2	2	3	2
2009-04	HW Design Process	2	2	3	2	3	5
2009-05	Verification Process	3	2	2	2	2	2
2009-06	Validation Process	3	3	3	3	2	3
2009-07	Integration Process	2	3	3	2	4	3
2009-08	Lab Scheduling Process	3	3	4	4	4	3
2009-09	Peer Review Process	4	4	3	4	5	5
2009-10	Modeling Process	4	2	2	4	2	2
2009-11	Management Process	3	4	4	4	2	3

Evaluation Criteria

> Rate each improvement project against each evaluation criterion as to how the project satisfies the criterion.
>
> 5 is best, i.e., the project greatly satisfies the evaluation criterion.

Sheet tabs: Weight the Criteria | **TM_01** | TM_02 | TM_03 | TM_04 | TM_05 | TM_06 | TM_07 | TM_08 | TM_09 | TM_10 | Decision Matrix

Computed the Weighted Evaluation Scores

	A	B	C	D	E	F	G	H	I	J
2						Criteria				
3				Low Risks	High Benefits	High Org Impact	Business Goal Alignment	Voice of Customer (VOC)	High Process Criticality	Total Weighted Scores
4		Candidate	Weight =>	105	175	140	188	217	175	
5		2009-01	Requirements Process	31.00	34.00	34.00	32.00	34.00	38.00	34009.00
6		2009-02	Configuration Management Process	35.00	34.00	33.00	36.00	33.00	34.00	34124.00
7		2009-03	SW Design Process	37.00	31.00	27.00	29.00	29.00	28.00	29735.00
8		2009-04	HW Design Process	26.00	31.00	32.00	30.00	33.00	41.00	32611.00
9		2009-05	Verification Process	30.00	33.00	34.00	34.00	39.00	38.00	35190.00
10		2009-06	Validation Process	32.00	34.00	32.00	30.00	21.00	32.00	29587.00
11		2009-07	Integration Process	27.00	36.00	31.00	33.00	30.00	25.00	30564.00
12		2009-08	Lab Scheduling Process	32.00	31.00	37.00	38.00	38.00	36.00	35655.00
13		2009-09	Peer Review Process	33.00	37.00	31.00	34.00	44.00	45.00	38095.00 <== Highest Score
14		2009-10	Modeling Process	29.00	25.00	25.00	34.00	23.00	25.00	26678.00
15		2009-11	Management Process	31.00	35.00	34.00	36.00	31.00	37.00	34110.00

Data above is computed from other sheets.
Highest ranked project is indicated by "Highest Score"

Sheet tabs: Weight the Criteria / TM_01 / TM_02 / TM_03 / TM_04 / TM_05 / TM_06 / TM_07 / TM_08 / TM_09 / TM_10 / **Decision Matrix**

Sum of each evaluator's "raw" rating, for each evaluation criterion.

Sum of each "raw" rating times it's associated evaluation "weight".

10
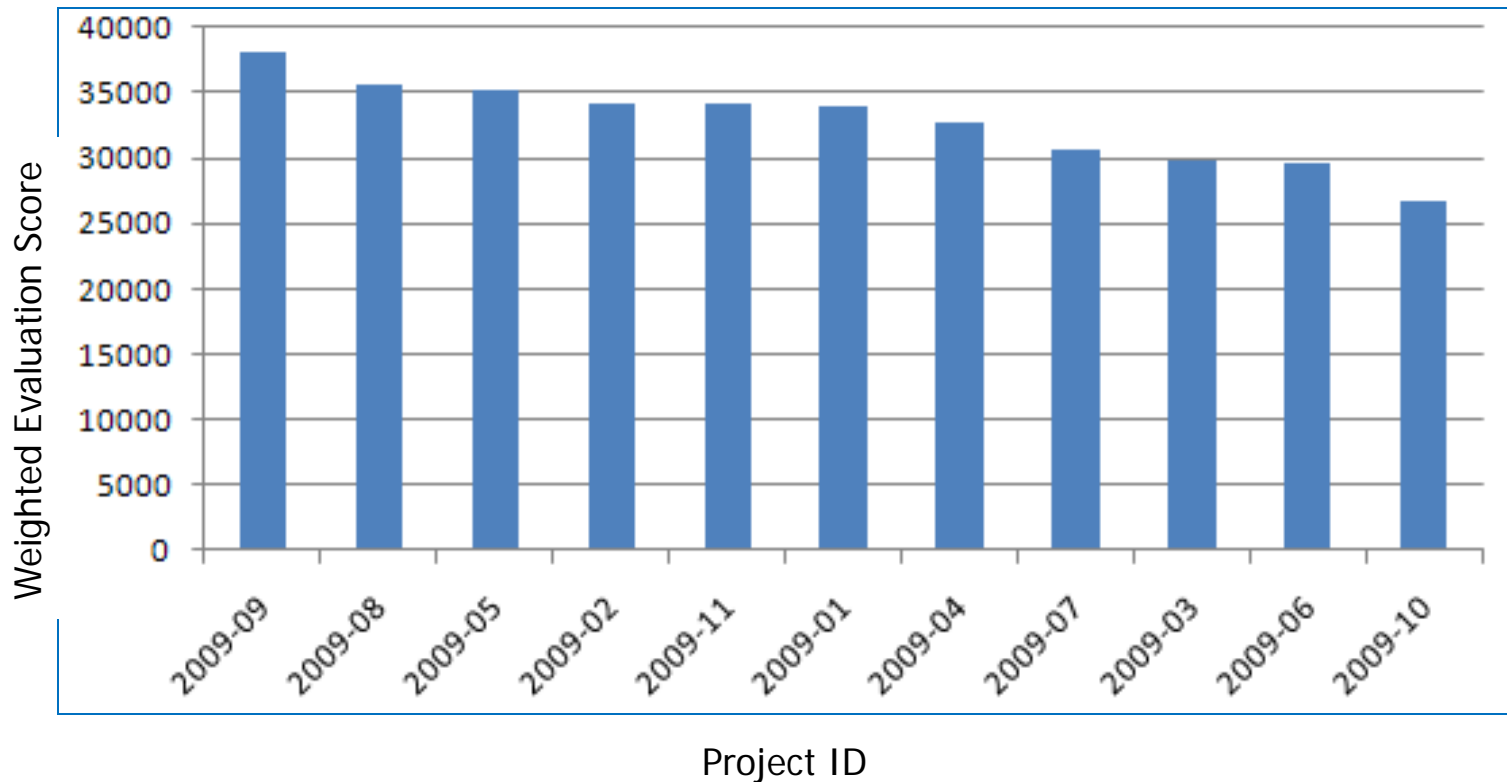
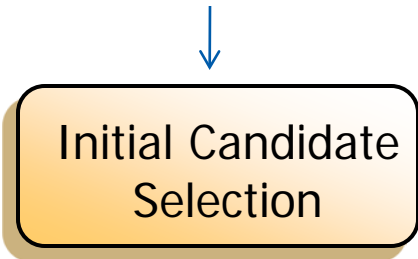Which improvement projects would you select if your resources were limited?

Fitting it Into a Process

- Performance Data
- Process Needs
- Improvement Info.
- Etc.

Evaluators (Process Improvement Steering Committee)

Develop
- Team Charter
- Membership
- Plan

Initial Candidate Selection

Process Improvement Selection

Selected Projects

PI Project #1

PI Project #2

. . . .

PI Project #n

Monitored by Steering Committee

Process Decomposition Model

Evaluation Criteria (alignment with business objectives and project needs)
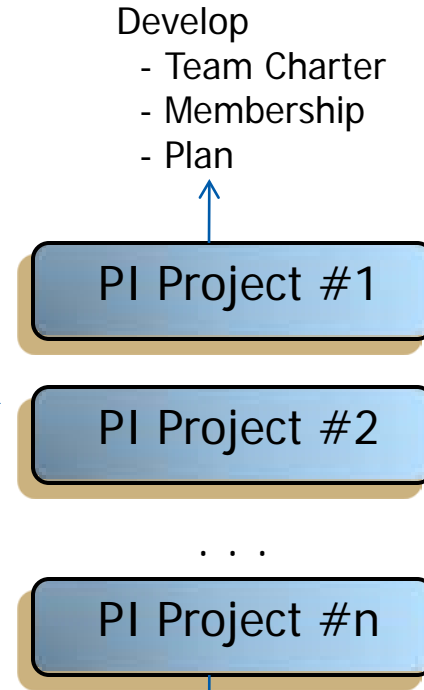
- SIPOC Description (Supplier, Input, Process, Output, Customer)
- VSM (Value Stream Map)
- Measurement & Analysis
- Establish Performance Baseline
- Evaluate Improvements
- Future State VSM
- Implement Improvements (Pilot)
- Establish Improved Baseline
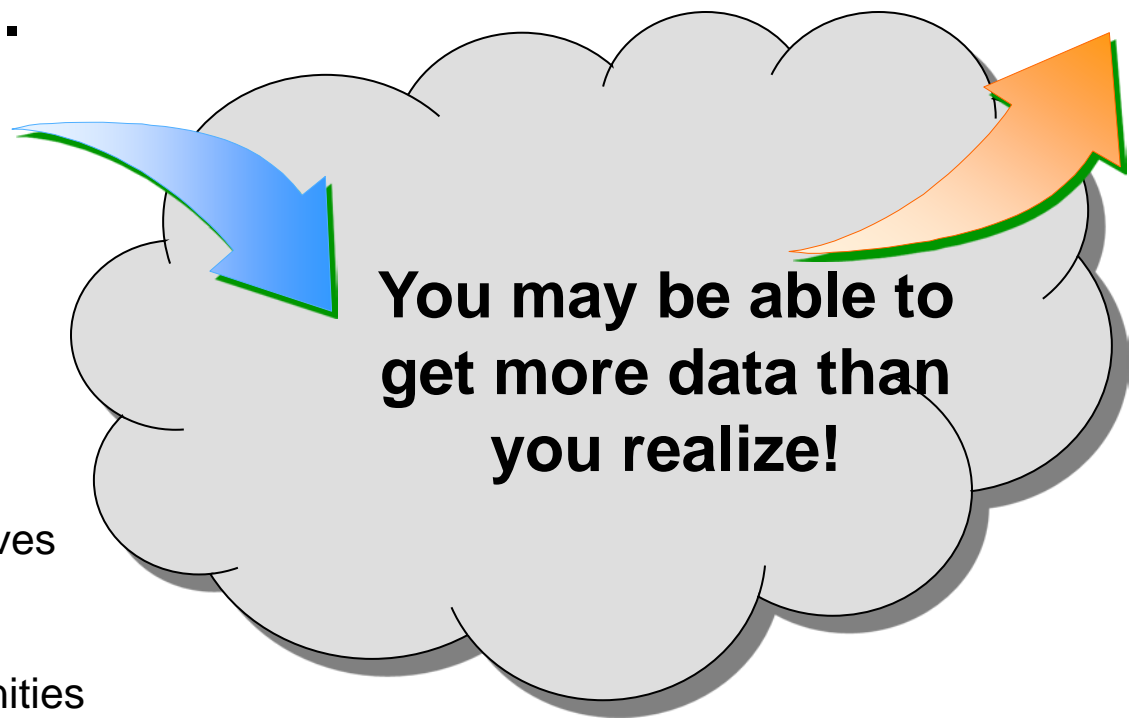- Verify Improvements

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Given this . . .

. . . How do I determine this

Prioritized Improvement Projects

You may be able to get more data than you realize!

Organizational Goals
Organizational Objectives
Project Needs
Lessons Learned
Improvement Opportunities
Critical Processes

You may be able to get more data than you realize!

Evaluation Criteria Description

- **Low Risk**: stated barriers to success of the process improvement (e.g. data availability, resources, time constraints). 5 represents low risk, 1 is high risk.

- **High Benefits**: relative anticipated return on implemented improvement to process performance. 5 represents high benefit, 1 is low benefit.

- **High Org Impact:** Scope of the organization that benefits (e.g. Site, Division, Sector, future projects) 5 represents high impact, 1 is low impact.

- **Business Goal Alignment**: supports current business goals directly or indirectly. 5 represents direct alignment, 1 means low alignment

- **Voice of Customer (VOC):** to what degree does customer perceive the improvement as a benefit. 5 represents high voice of customer, 1 is low voice of customer.

- **High Process Criticality:** to what degree is the process critical to business operations (e.g. high driver as an effort, or high driver on schedule's critical path, or high driver as a critical verification point, or high driver to safety/reliability/availability). 5 signifies the improvement impacts a process of high criticality, and a 1 impacts a process of low criticality.