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CONSULTING > SOLUTIONS > OUTSOURCING

Suggestions for Improving Measurement Plans:
A BMP Application in Spain

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Agenda

- **Introduction**
  - ✓ IT Project Trends
  - ✓ How to control T&C Costs?
- **BMP: Balancing Multiple Perspectives**
  - ✓ Objectives
  - ✓ The Procedure
- **A Spanish BMP Application**
  - ✓ The BMP Questionnaire (BMP-Q)
  - ✓ Presentation of the Sample
  - ✓ BMP-Q: the measures
  - ✓ Results & Feedback
    - ❖ Viewpoints
    - ❖ Measures
    - ❖ Causal Relationships
    - ❖ Cost of the T&C process
- **Conclusions & Prospects**

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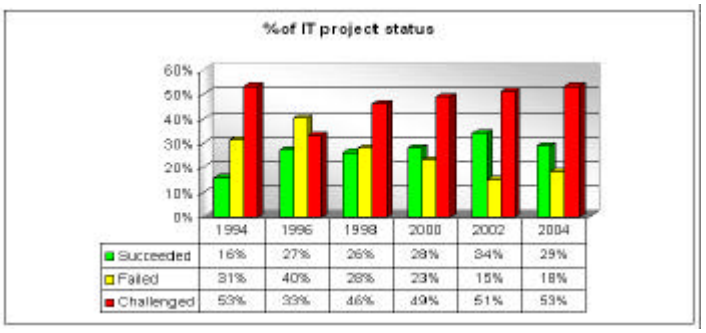
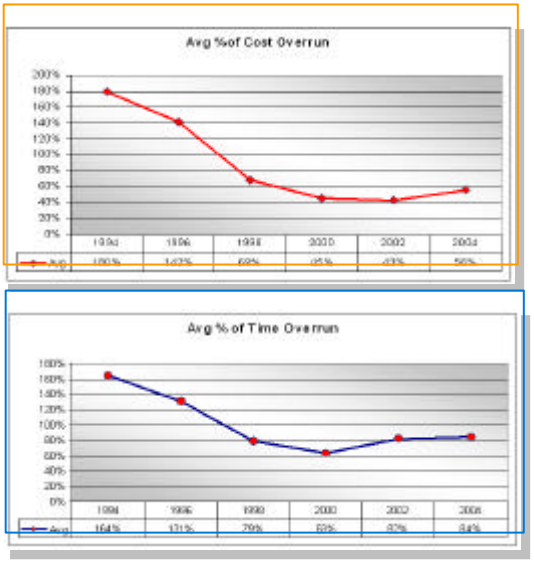
Introduction
IT Project Trends

- Projects failure: three (3) major causes
  - ✓ Amount of Tracking & Control (T&C) resources
  - ✓ Lack of historical data
  - ✓ Limited ability of internal staff to estimate effort & costs
- Several studies confirmed these trends along ten (10) years
  - ✓ Chaos Report (Standish Group): figures from 1994 to 2004



	1994	1996	1998	2000	2002	2004
Succeeded	16%	27%	26%	28%	34%	29%
Failed	31%	40%	28%	23%	15%	18%
Challenged	53%	33%	46%	49%	51%	53%

Introduction
How to Control T&C Costs?

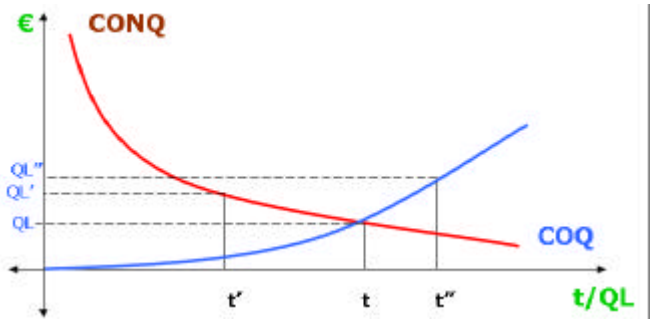


- Perspectives typically analyzed
  - ✓ Time & Cost
  - ✓ Typical PM approach
  - ✓ Other viewpoints?
  - ✓ Estimating (dis)ability: reskilling?

- **Q**: so, which % of project budget for T&C process should be the proper one for improving results?

Introduction

How to Control T&C Costs?



Legend:
- ✓ CONQ = Cost Of Non Quality
- ✓ COQ = Cost of Quality
- ✓ QL = Quality Level

- Objectives: determine the right Break-Even-Point (BEP) by:
  - ✓ Improving Estimation abilities:
    - ❖ Gathering & using historical data (e.g. CMMI PP, OPD), at least initially using external repositories for benchmarking purposes (e.g. ISBSG)
    - ❖ Do not using in a non-critical manner estimation models such as COCOMO or SLIM
    - ❖ Learn & apply Statistics (101-features!)
  - ✓ Choosing & applying the proper number of measures for T&C process:
    - ❖ How many measures we use? Are the right one? Are they properly linked through the *strategic map*? How much do they cost (% of project budget)?

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BMP: Balancing Multiple Perspectives

General Issue & Objective

Q: how can a proper balance of perspectives and indicators be selected when managing a portfolio of projects?

The famous Linus's blanket

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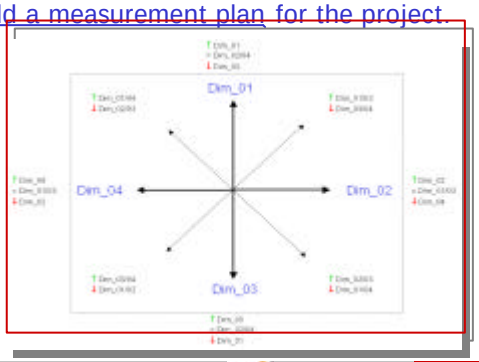
The real issue is **not** to reduce the cost of the measurement process,

but optimising it against the informative value provided by the number of measures/indicators balancing them by each perspective of analysis.

BMP: Balancing Multiple Perspectives

The Measurement Procedure

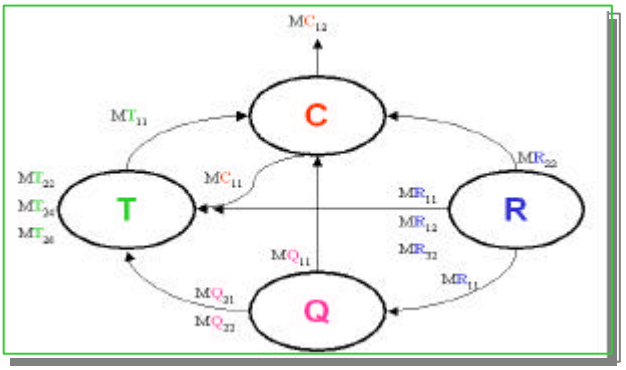
1. Determine the dimensions of interest in the project.
2. Determine the list of the most representative measures associated with each dimension.
3. For each of the measures selected, identify which other control variables might be impacted negatively.
4. Figure out the best combination of indicators and the causal relations between them in order to build a measurement plan for the project.



BMP: Balancing Multiple Perspectives

Causal Relationships

- **Not sufficient** to perform steps#1 and #2 (*design a measurement plan*)
- Next (**required**) step: establish coherent and proper relationships among goals through measures (i.e. the BSC *strategic map*) for achieving both single perspective goals, as well as overall organizational ones



Time	• MT_{11} – Milestone Dates • MT_{22} – Problem Report Status • MT_{24} – Change Request Status • MT_{26} – Test Status
Cost	• MC_{11} – Earned Value • MC_{12} – Cost
Quality	• MQ_{11} – Defects • MQ_{21} – Defect Containment • MQ_{22} – Rework
Risk	• MR_{11} – Staff Experience • MR_{12} – Staff Turnover • MR_{22} – Functional Change Workload • MR_{32} – Resource Utilization

NB: also explicitly required by ISO 9001:2000 (§4.1 lett.c)

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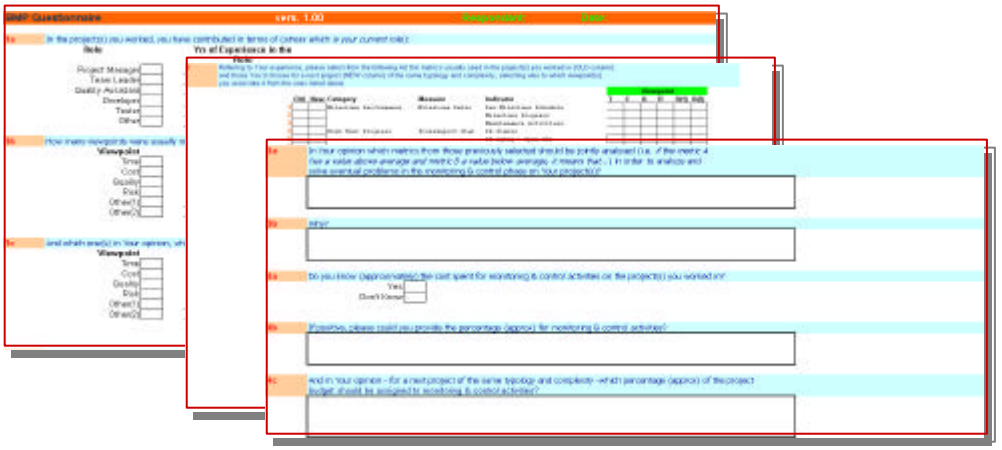
Applying BMP

BMP-Q: the Questionnaire

http://www.geocities.com/lbu_measure/gestlime/bmp.htm

4 sections:
- ✓ Respondents profile & viewpoints
- ✓ Measures
- ✓ Causal Relationships
- ✓ Cost for "Tracking & Control" (T&C) process



Applying BMP

BMP-Q: the Measures

http://www.geocities.com/lbu_measure/gestlime/bmp.htm

1a	1	Respondents profile by project role (# and %)
	2	Experience profiles for current project role (# and %)
1b	3	# analysis viewpoints (OLD)
1c	4	# analysis viewpoints (NEW)
2	1	# selected measures (OLD)
	2	# selected metrics (NEW)
	3	# affected viewpoints (NEW)
	4	Avg # of measures by viewpoint (# and %)
	5	Ranking of selected measures by: abs value, respondent project role, analysis viewpoint
3a	1	List of causal relationships among measures
	2	Ranking of relationships by: abs value, respondent project role, analysis viewpoint
4a	1	% respondents knowing amount of costs for m&c (monitoring & control) activities
4b	1	Max, Min, Avg and Med for the returned values (%) – OLD
4c	1	Max, Min, Avg and Med for the returned values (%) – NEW

Applying BMP

http://www.geocities.com/lbu_measure/gestlime/bmp.htm

BMP-Q: Previous Analysis (2005-)

- Maturity levels when using & applying measurements can vary a lot among countries
  - ✓ Educational programs in SwEng, ICT market demands, cultural resistance to measurement, etc...)
- Planned from the start to propose the analysis in different countries and target of respondents
  - ✓ Academic & Industry people
  - ✓ High and Medium-low Experience

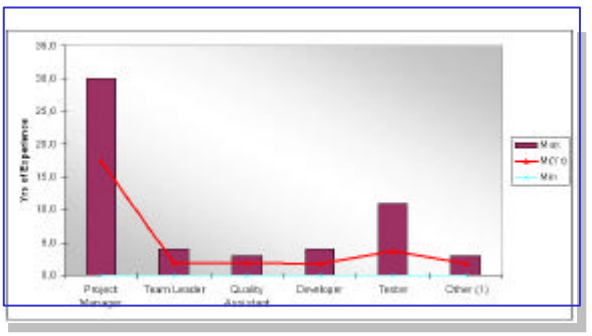
Year	Country	Sample	# respondents
2005/06	Canada	MSc, BSc and PhD students	6
2005/06	Germany	ICT Professionals	10
2006	Turkey	ICT Professionals with a MSc or PhD degree	15
2006	Turkey	ICT Professionals	21

Applying BMP

The Sample

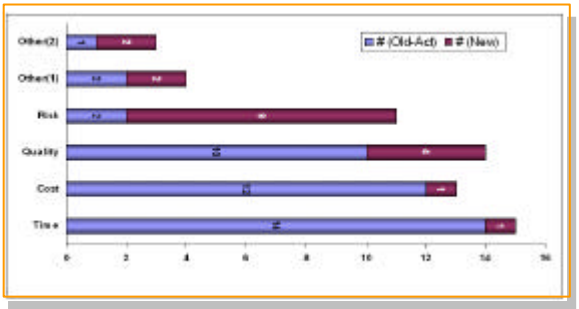
	Spain
Sample Id.	**S1**
# of Respondents	15
Type of Respondents	ICT Professionals (2 companies)
BMP-Q gathering time	Q4/2006 – Q1/2007

Q1a. Profiles



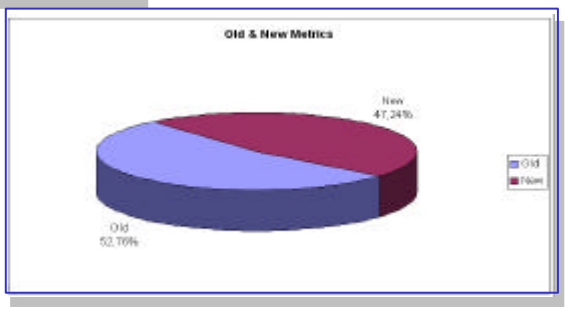
Applying BMP

Results



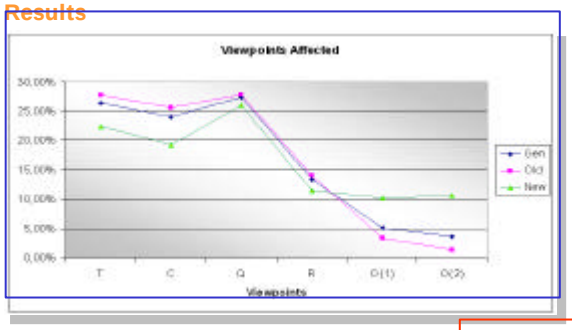
Q1b-c. # of PoV – Current & Past Projects vs Next Projects

Q2.1-2.2. # of Measures – Current & Past Projects vs Next Projects

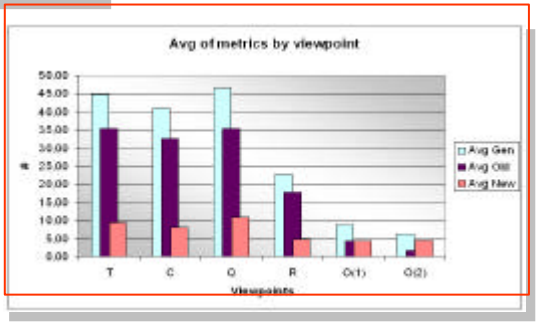


Applying BMP

Results



Q2.3. PoV affected and Avg # of measures by viewpoint



Applying BMP
Results

Q2.4. # of Measures – by Project Role

Project Role	#	# OLD	# NEW	Avg # (OLD)	Avg # (NEW)	Comments
Developer	2	41	19	20	9	c.a. 2:1 ratio between old/new measures
Project Manager	2	30	32	15	16	
Tester	4	57	37	14	9	c.a. 3:2 ratio between old/new measures
Team Leader	4	67	10	17	4	c.a. 7:1 ratio between old/new measures
Quality Assistant	2	25	25	12	12	
Systems Engineer	1	21	5	21	5	c.a. 4:1 ratio between old/new measures

Applying BMP
Results

Q2.5. Top selected measures by project role

General (n=15)

# Id.	Category	Measure	Indicator	T	C	Q	R	O(1)	O(2)	Old	New	Tot
34	Supportability-Mainten	Time to Restore	SysFailures and Restoration	6	7	9	6	1	0	27	2	29
1	Milestone Performance	Milestone Dates	Dev.Milestone Schedule	13	8	5	2	0	0	28	0	28
25	Functional Size-Stabil	Requirements	Requirements Stability	8	3	12	3	1	1	26	2	28
52	Process Effectiveness	Defect Containm	Req's Def. discovered after Req Ph	7	7	6	4	3	1	18	10	28
53	Process Effectiveness	Rework	Dev.Effort by Activ.vs Tot.Rew.Eff	9	7	7	2	2	1	14	14	28
2	Milestone Performance	Milestone Dates	Milestone Progress	13	7	4	3	0	0	27	0	27
15	Personnel	Effort	Staffing Level	5	9	8	4	1	0	16	11	27
20	Envir.-Support Resour.	Resource Utiliz.	Resource Utilization	7	10	6	3	0	1	18	9	27

Project Managers (n=2)

# Id.	Category	Measure	Indicator	T	C	Q	R	O(1)	O(2)	Old	New	Tot
25	Functional Size-Stabil	Requirements	Requirements Stability	2	0	2	1	1	0	6	0	6
1	Milestone Performance	Milestone Dates	Dev.Milestone Schedule	2	2	1	0	0	0	5	0	5
2	Milestone Performance	Milestone Dates	Milestone Progress	2	2	1	0	0	0	5	0	5
3	Milestone Performance	Milestone Dates	Maintenance Activities	1	2	1	1	0	0	2	3	5
34	Supportability-Mainten	Time to Restore	SysFailures and Restoration	1	1	2	1	0	0	5	0	5

Developers (n=2)

# Id.	Category	Measure	Indicator	T	C	Q	R	O(1)	O(2)	Old	New	Tot
20	Envir.-Support Resour.	Resource Utiliz.	Resource Utilization	1	2	2	1	0	0	4	2	6
19	Financial Performance	Earned Value	Cost Profile w/Actual Costs	1	2	1	1	0	0	5	0	5
34	Supportability-Mainten	Time to Restore	SysFailures and Restoration	2	2	1	0	0	0	5	0	5
53	Process Effectiveness	Rework	Dev.Effort by Activ.vs Tot.Rew.Eff	2	1	2	0	0	0	2	3	5
63	Customer Feedback	Survey Results	Customer Satisfaction Survey	1	1	2	1	0	0	4	1	5

Applying BMP

Results

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Q2.5. Top selected measures by project role

Team Leaders (n=4)

# Id.	Category	Measure	Indicator	T	C	Q	R	O(1)	O(2)	Old	New	Tot
7	Work Unit Progress	ProblReport Stat	PR Status – Open Priority 1/2 by Cl	1	1	3	2	0	0	7	0	7
8	Work Unit Progress	ProblReport Stat	PR Status – Open Priority ½ by Type	2	1	3	1	0	0	7	0	7
16	Personnel	Staff Experience	Staff Experience	2	2	3	0	0	0	4	3	7
2	Milestone Performance	Milestone Dates	Milestone Progress	3	3	0	0	0	0	6	0	6
4	Work Unit Progress	ProblReport Stat	PR Status	2	0	3	1	0	0	6	0	6
22	Physical Size-Stability	Lines of Code	SW Size by Config.Item	1	2	3	0	0	0	6	0	6
53	Process Effectiveness	Rework	Dev.Effort by Activ.vs Tot.Rew.Eff	2	3	1	0	0	0	3	3	6

Testers (n=4)

# Id.	Category	Measure	Indicator	T	C	Q	R	O(1)	O(2)	Old	New	Tot
52	Process Effectiveness	Defect Containm	Req's Def. discovered after Req Ph	4	2	2	2	1	1	8	4	12
15	Personnel	Effort	Staffing Level	2	3	4	1	1	0	6	5	11
4	Work Unit Progress	ProblReport Stat	PR Status	2	2	4	1	1	0	10	0	10
67	Customer Support	Req. for Support	Mean Response Time by Priority	2	2	3	1	1	1	9	1	10
1	Milestone Performance	Milestone Dates	Dev.Milestone Schedule	3	2	3	1	0	0	9	0	9
16	Personnel	Staff Experience	Staff Experience	3	1	2	2	1	0	6	3	9
25	Functional Size-Stabil	Requirements	Requirements Stability	3	1	3	1	0	1	9	0	9
26	Functional Size-Stabil	Requirements	Req.Stability by Type of Change	2	2	2	1	1	1	9	0	9
29	Functional Correctness	Defects	Severity-1 defects status	2	2	2	2	1	0	9	0	9
34	Supportability-Mainten	Time to Restore	Sys Failures and Restoration	2	2	3	2	0	0	7	2	9
53	Process Effectiveness	Rework	Dev.Effort by Activ.vs Tot.Rew.Eff	3	2	2	0	1	1	2	7	9
66	Customer Support	Req. for Support	Total Calls per Month by Priority	2	2	2	1	1	1	8	1	9

Applying BMP
Results

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Q2.5. Top selected measures by project role

Quality Assurance (n=2)

# Id.	Category	Measure	Indicator	T	C	Q	R	O(1)	O(2)	Old	New	Tot
20	Envir.-Support Resour.	Resource Utiliz.	Resource Utilization	1	1	2	1	0	1	3	3	6
1	Milestone Performance	Milestone Dates	Dev.Milestone Schedule	2	0	1	1	0	0	4	0	4
2	Milestone Performance	Milestone Dates	Milestone Progress	1	0	1	2	0	0	4	0	4
13	Personnel	Effort	Effort Allocation w/replan	1	1	0	1	0	0	2	1	3
14	Personnel	Effort	Effort Allocation by Dev.Activity	1	1	0	1	0	0	2	1	3
16	Personnel	Staff Experience	Staff Experience	1	1	1	0	0	0	2	1	3
25	Functional Size-Stabil	Requirements	Requirements Stability	1	0	2	0	0	0	2	1	3
29	Functional Correctness	Defects	Severity-1 defects status	1	0	1	0	0	1	2	1	3
30	Functional Correctness	Defects	Defect Density	1	0	1	0	0	1	2	1	3
34	Supportability-Mainten	Time to Restore	Sys Failures and Restoration	0	1	1	0	1	0	3	0	3
35	Supportability-Mainten	Time to Restore	Mean Time to Repair or Fix	0	1	1	0	1	0	3	0	3
52	Process Effectiveness	Defect Containm	Req's Def. discovered after Req Ph	1	0	1	0	1	0	2	1	3
53	Process Effectiveness	Rework	Dev.Effort by Activ.vs Tot.Rew.Eff	1	0	1	1	0	0	2	1	3
64	Customer Feedback	Perform. Rating	Composite Perfor.Award Scores	0	0	1	1	1	0	2	1	3

Sys Engineer (n=1)

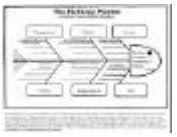
# Id.	Category	Measure	Indicator	T	C	Q	R	O(1)	O(2)	Old	New	Tot
4	Work Unit Progress	ProblReport Stat	PR Status	1	1	1	1	0	0	4	0	4
5	Work Unit Progress	ProblReport Stat	PR Aging – Open PRs	1	1	1	0	0	0	3	0	3
52	Process Effectiveness	Defect Containm	Req's Def. discovered after Req Ph	0	1	1	1	0	0	3	0	3
55	Technology Suitability	Req. Coverage	Critical Tech. Requirements	1	0	1	1	0	0	3	0	3

Applying BMP
Results

Q3. Causal Relationships

S1

- 13 out of 15 answered (spread usage of measures into measurement programs)
- Two main relationships detected:
  - ✓ Staff experience & Milestone Progress (by PM, QA, SysEng)
  - ✓ Defectability & Work Unit/Milestone Progress (by Dev, Testers)
- Rationale:
  - ✓ It appeared a more visibile mid-long term view by PM, QA, SysEng
    - ❖ Have this kind of approach in their DNA, clear link between cause-effect
  - ✓ 'Day-by-day' planning by Dev, Testers
    - ❖ Achieving milestones and reducing defectability seem to be the main goal for reporting results to mgr



Applying BMP
Results

Q4. Cost of the T&C process

S1

- Only 4 out of 15 answered about the current cost of T&C process
  - ✓ Respondents were: 3 PM, 1 TL, 1 Tester
  - ✓ Average/Median value close to 18-20%, with a minimum 15%
- Expectations: allocation around 18% of project budget
  - ✓ main increments asked by team leaders
  - ✓ project managers more prudent than other roles (confirming actual %)
  - ✓ Median higher than Average

	Past-Current	Next	Diff.
Max	30.00%	30.00%	0.00%
Median	17.50%	20.00%	+2.50%
Avg	20.00%	17.69%	-2.31%
Min	15.00%	5%	-10.00%

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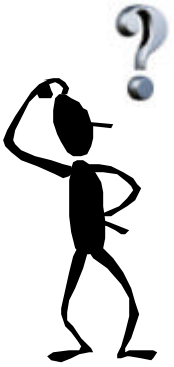
~~Conclusions & Prospects (1/2)~~

- Project managers often consider only two dimensions for tracking & control of their projects (Time, Cost): at least, the Risk perspective should be also taken into account;
  - ✓ Further perspectives (eg: Quality) could be also be useful if considered from the planning phase on. Even more challenging, a multi-perspective approach – as in the BSC – is suggested.
- There does not exist a "magic number" of indicators to track, but the goal is to optimize costs and informative value derived from that amount of indicators, establishing also the causal relationships among their related goals.
- BMP (**B**alancing **M**ultiple **P**erspectives) proposes a 4-step procedure to select an appropriate balance of indicators from the various perspectives taken into account (e.g. Time, Cost, Risk and Quality) and focus on the core indicators from each of them, thereby helping the project manager in tracking and control activities.

Conclusions & Prospects (2/2)

- This application with two samples of respondents from Spain revealed that there is enough room to work on about:
  - ✓ **Perspectives**: usually measures are chosen mainly taking care to Time and Cost perspectives; the new desired perspectives would be Risk and Quality, no matter the project role.
  - ✓ **Measures**: Project Managers are more open to introduce new measures than Team Leaders, Developers and Systems Engineers. About measures per viewpoint, there is a growing demand of quality measures (followed by time & cost). The measure more selected is #34 (System Failure & Restoration).
  - ✓ **Causal Relationships**: Staff experience & milestone progress is the more stressed link (central role of people), before defectability & work unit/milestone progress.
  - ✓ **Cost of T&C process**: The amount of budget to allocate in software projects for T&C process is quite stable within a 15-18%, a bit lower than actual. Few people know how much T&C process cost.
- Due to its inner multidimensional nature, future joint usages with methods, tools and frameworks taking into account concurrent dimensions (e.g: QEST/LIME) will be investigated.

Grazie per la Vostra attenzione!
Thanks for Your attention!



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