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Identifying and constructing leading indicators for monitoring and controlling performance of engineering projects

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PMSs (Performance measurement systems)

PMSs classical models:
- Performance Measurement Matrix (1989);
- Performance Pyramid System (1991);
- Balanced Scorecard (1992, 1996);
- Integrated Performance Measurement System (1997);

Gap analysis:
1) Balanced scorecard has been used across the world, whereas many other frameworks have tended only to have regional appeal;
2) The practices in industries are not following the rapid academic rhythm.

Model input

Improving Project Performance Measurement

Relationship between lagging and leading indicators

10 Knowledge areas (PMBoK)

Requirements trends
System definition change backlog trend
Interests trends
Requirements validation trends
Requirements verification trends
Work product approval trends
Review action closure trends
Facility and equipment availability trends
Risk exposure trends
Risk treatment trends
Process compliance trends
Technical measurement trends
Defect/ error trends
System affordability trends
Architecture trends
Schedule and cost pressure

18 SE Leading indicators vs. 10 PMKAs

Lagging indicators are dominant in the PPM, but leading indicators are not yet well developed.

Preliminary mapping result after reading through

It can be concluded that it’s feasible to apply some measurement methods in Systems Engineering like SE leading indicators in the general project management.

SEM (Systems engineering measurement)

Characteristics:
- Providing visibility into expected project performance and potential future states;
- Providing predicative analysis based on trend information or significant correlation.

18 SE Leading indicators

Requirements Trends
System Definition Change Backlog Trend
Requirements Validation Trends
Requirements Verification Trends
Work Product Approval Trends
Review Action Closure Trends
Facility and equipment availability trends
Risk Exposure Trends
Risk Treatment Trends
Process compliance trends
Technical Measurement Trends
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System affordability trends
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Schedule and cost pressure