



National Public Safety Summit on Forensic Sciences: The Foresight Project

Effectiveness and efficiency of forensic laboratories through standardized metrics

Presented by
Paul Speaker, PhD
West Virginia University, USA



FORESIGHT: Measure, Preserve, Improve

- WVU Forensic Science Initiative
- WVU College of Business and Economics
- U.S. National Institute of Justice



FORESIGHT: Measure, Preserve, Improve

- How do you know when you have a problem in your laboratory?
- How do you know if change was successful?
- Can you tie your objectives to tangible measures?



The Economic Problem

- Seemingly unlimited demands.
- Limited Resources
- How do you ration forensic science services?
- Intensified interest with the current global economy



FORESIGHT: Measure, Preserve, Improve

- Link data from casework, budget, and personnel
- Develop metrics to assess resource allocation, efficiencies, and value of services
- Preserve what works, and change what does not.



FORESIGHT: Measure, Preserve, Improve

- Business-guided self-evaluation of forensic science laboratories across North America.
- Metropolitan, regional, provincial, and federal agencies.
- Standardize definitions/metrics



FORESIGHT: Measure, Preserve, Improve

- FORESIGHT and European QUADRUPOL
- Global cooperation
 - improve forensic laboratory performance
 - increase the quality and efficiency of services
- Global participation
 - 9 countries from North America to Europe, Asia, Australia, South America, and African adoptions of LabRAT Tool
 - 49 laboratories: 15 National, 24 State, 10 metro



Opportunity Cost—What is the Cost of:

- 10 Cases in Trace evidence?
- 5 Cases in Explosives?
- 2 Cases in Digital Evidence?

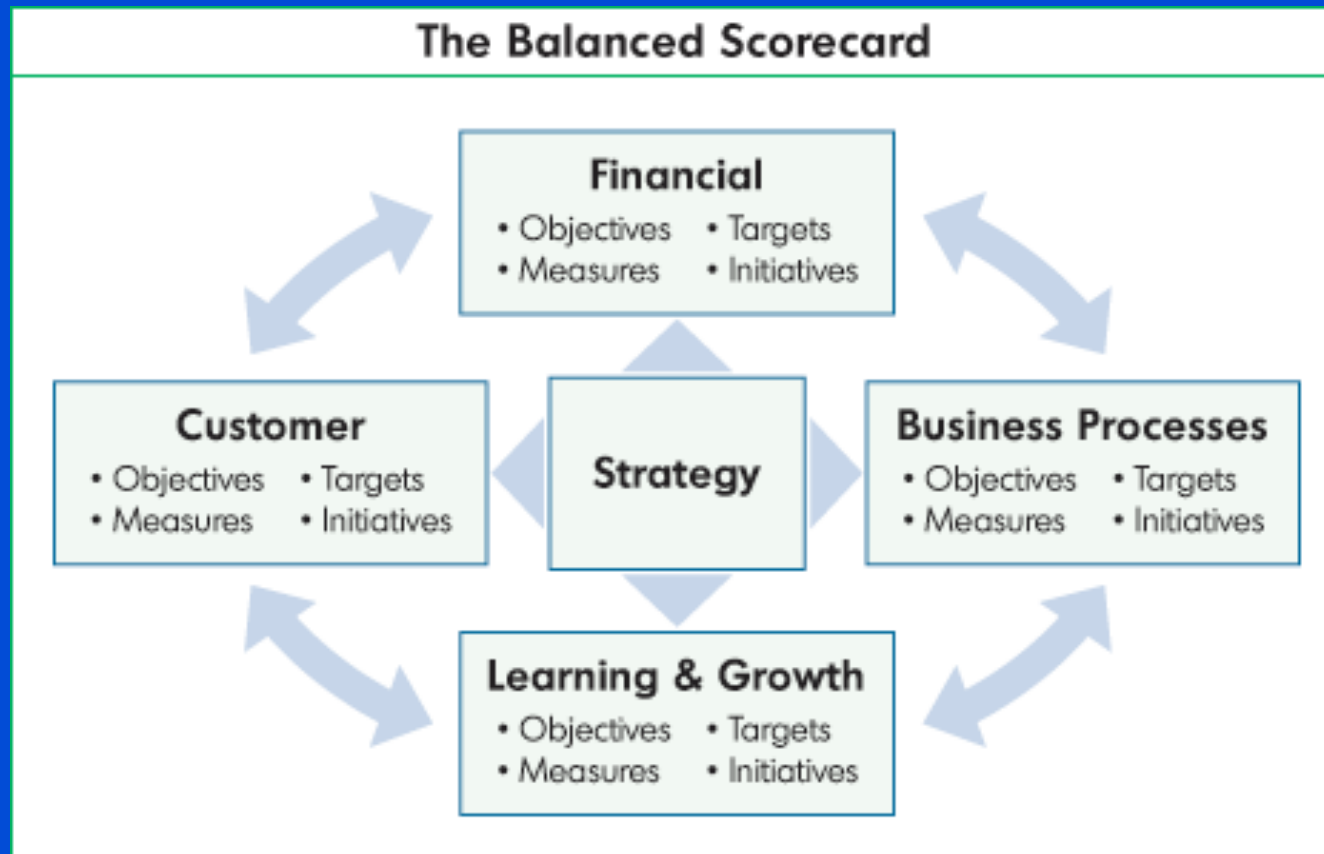


Opportunity Cost—What is the Cost of:

- 10 Cases in Trace evidence?
 - 67 Cases in Serology/Biology
- 5 Cases in Explosives?
 - 30 DNA Cases
- 2 Cases in Digital Evidence?
 - 14 Toxicology Cases



A balanced scorecard approach





Performance Ratios with for-profit firms

- Efficiency measures
- Short-term risk measures
- Long-term risk measures
- Return measures
- Market measures
- DuPont expressions



Forensic Laboratory Ratios

- Can we find a DuPont-type expression for the forensic sciences?
- What is “Return on Investment” for a laboratory?
- What return is desired?
- Possible ROI measures?
 - Cases/Total Budget



Forensic Laboratory Ratios

- Consider ROI as a maximization of Cases/Budget or minimization of Cost/Case
- ROI is a function of:
 - Efficiency/Productivity
 - Risk/QA
 - Economic conditions
 - Analytical Process



Forensic Laboratory Ratios

$$\text{Average Cost} = \frac{\text{Market Ratio} \times \text{Quality Ratio}}{\text{Productivity} \times \text{Analytical Process}}$$

$$= \frac{\text{Average Compensation} \times (\text{Tests/Case})}{(\text{Tests/FTE}) \times (\text{Personnel Exp./Budget})}$$

Example

Laboratory AAA

- Cost/Case = \$171.41
- TESTS/CASE = 2.54
- TESTS/ITEM = 1.51
- ITEMS/FTE = 736
- Average Comp = \$64,500
- Per Exp/BUD = 86%

Laboratory ZZZ

- Cost/Case = \$580.39
- TESTS/CASE = 7.46
- TESTS/ITEM = 2.94
- ITEMS/FTE = 421
- Average Comp = \$78,000
- Per Exp/BUD = 81%



Better Practices

- Share the stories behind better practices
 - *Forensic Science Policy & Management: An International Journal*
- Customize individual laboratory reports
- Extend the analysis of the metrics
 - Industry issues
 - Change over time

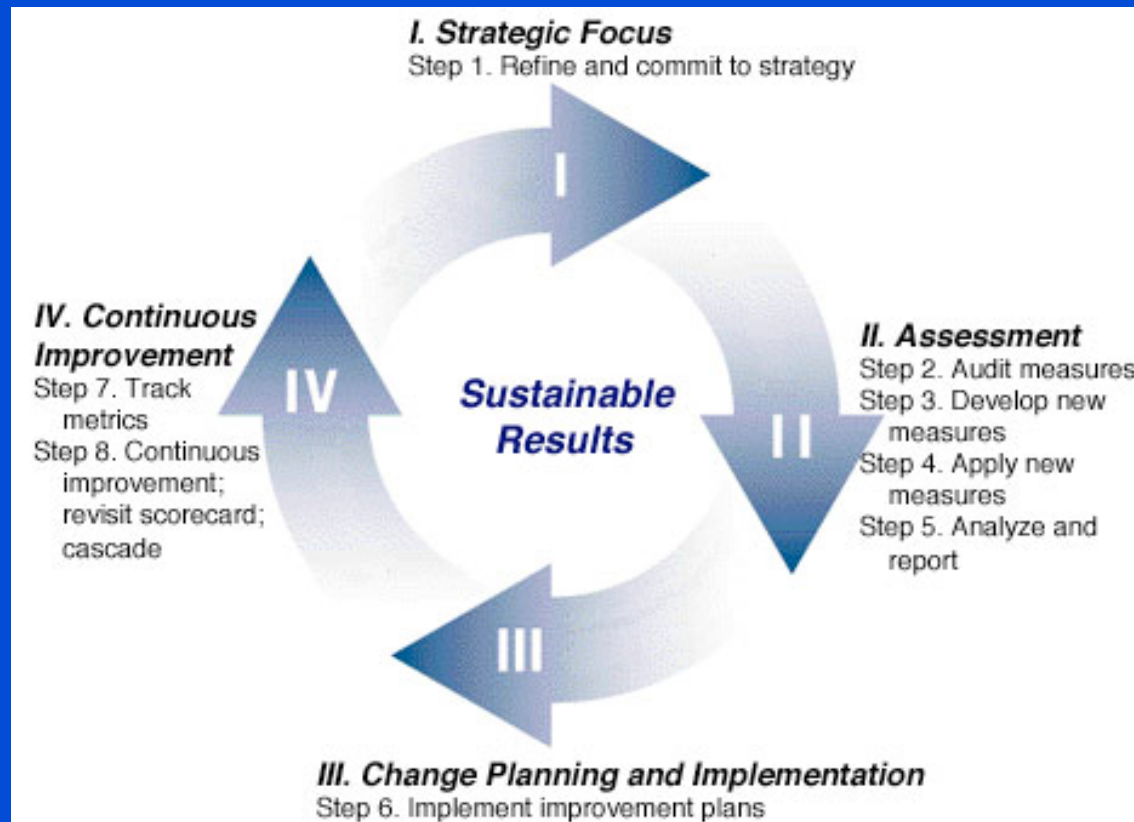


Application 1

- Provincial Laboratory—CFS in Toronto
- Presented Foresight ratios to managers in each investigative area
- Red Flag explanations
- Relate to better practice laboratories
- Formulate strategies to change



A balanced scorecard approach





Application 2

- Metropolitan/Regional Laboratory— Allegheny County in Pittsburgh
- Lowest average cost in toxicology
- Red Flags still waved
- Relate to mandate, strategy, and policies



Application 3

- Metropolitan/Regional Laboratory
- Headlines & legislative reaction
- Immediate implications of policy change on budget
- Backlog, accounting costs, and economic costs



Moving Forward

- Drive down results in the Balanced Scorecard
- “Better practice” stories to be told
- Greater global emphasis/participation
- Personnel detail and strategy
- Place within the Justice system



Moving Forward

- What is the ideal size of a laboratory?
- When is it better to outsource?
- What cooperative agreements make sense between jurisdictions?
- What is the best mix of investigative areas for a given jurisdiction?



Firearms & Ballistic: Cost/Case

