Ontology Summit 2011: Making the Case for Ontology

Track 3: Value Metrics, Value Models & the Value Proposition

Ontology Performance

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Ontology Performance

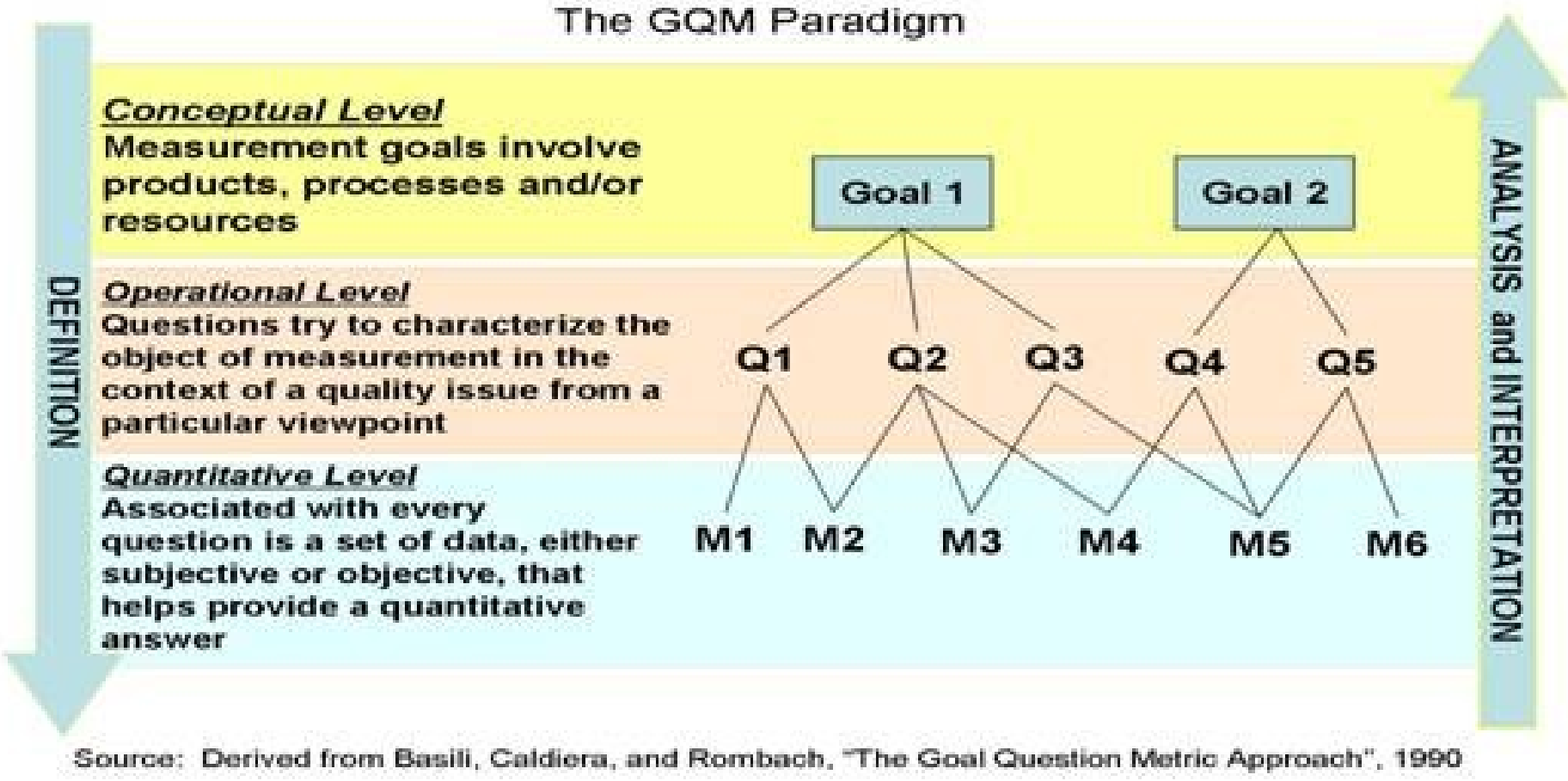
- How Much/Well does the Ontology or Related Semantic Technologies Improve or Impede Performance?
- How much does the Cost of Ontology Performance Affect the Value Proposition?
- How Well Can we Measure this?

- GOAL

Analyze *Ontology Technology* to better understand *the performance impact on systems* in multiple domains from the viewpoints of the *Developer and End User*

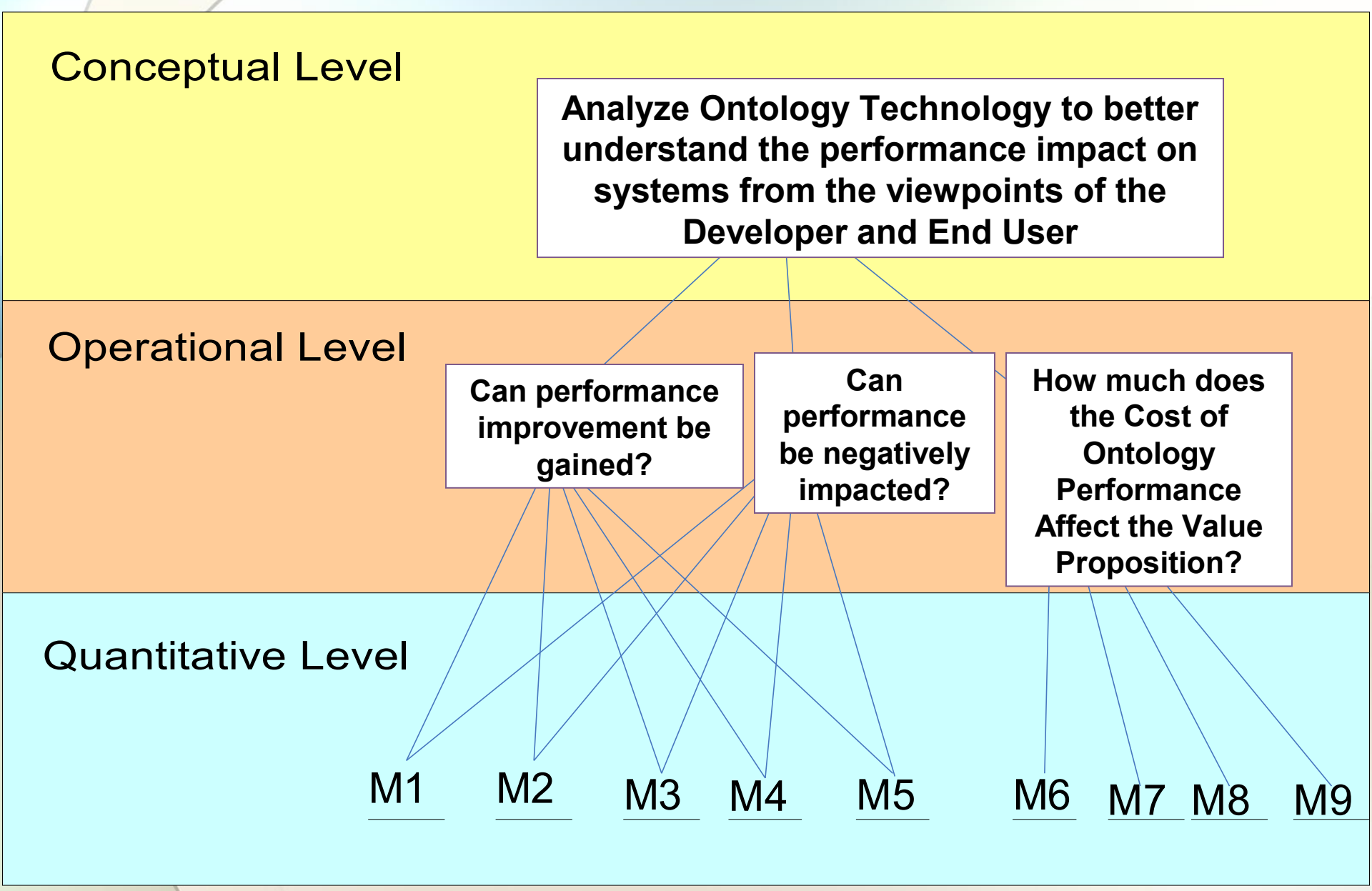
Ontology Performance: GQM Model

- Using GQM to determine what to look at



Source: Derived from Basili, Caldiera, and Rombach, "The Goal Question Metric Approach", 1990

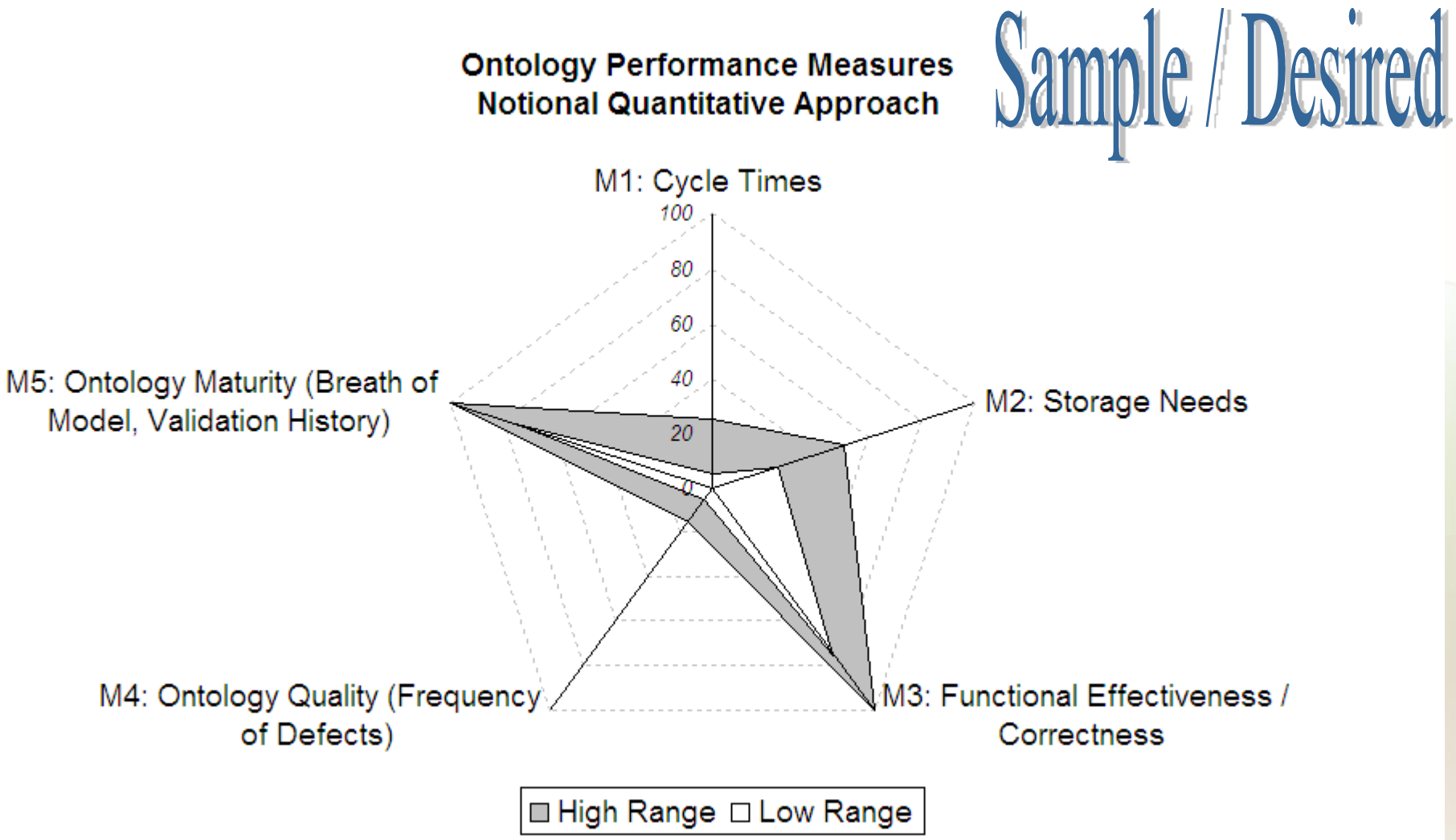
Ontology Performance: GQM Applied



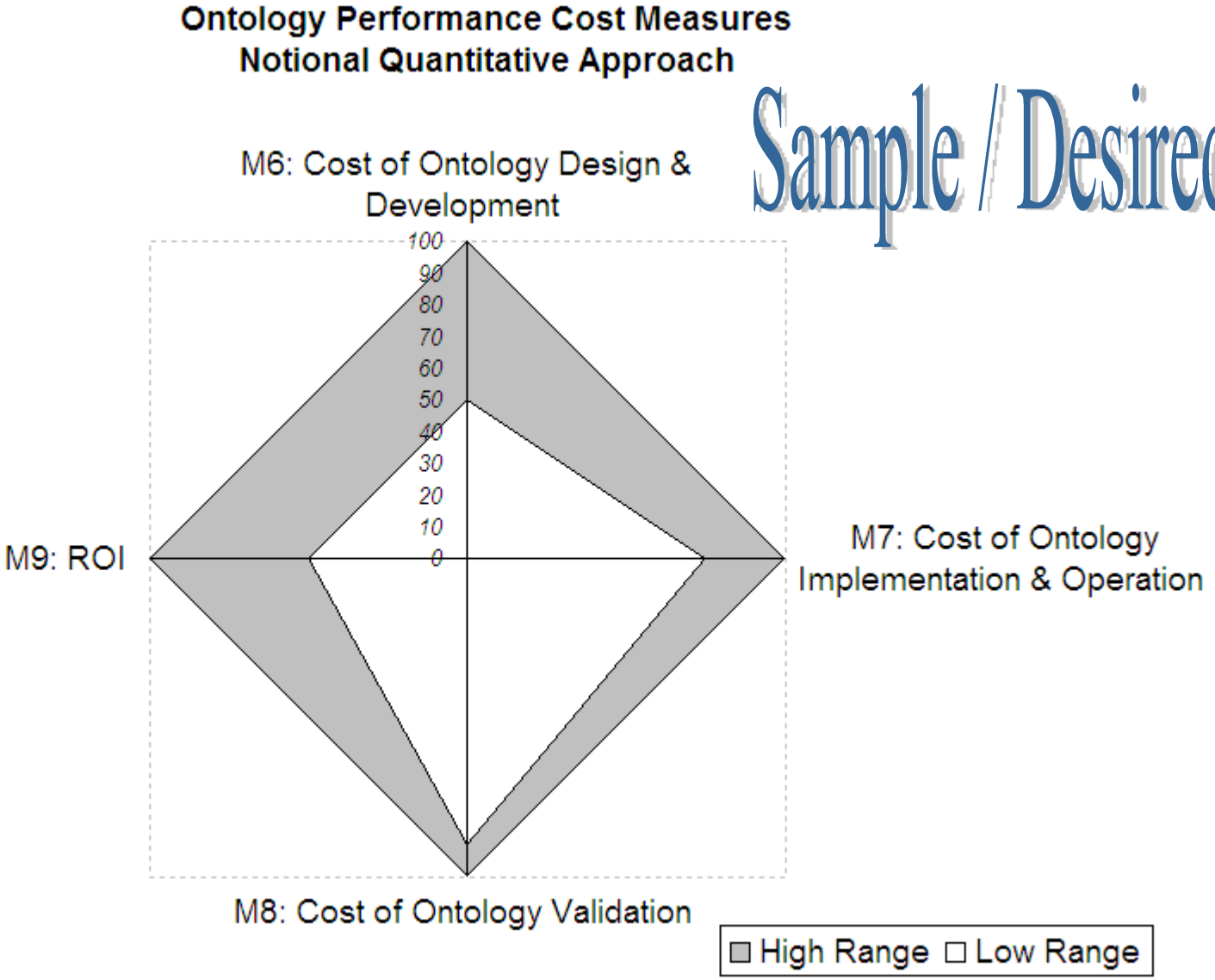
Ontology Performance: Notional Measures

- Can performance improvement be gained?
  - M1: Cycle Times
  - M2: Storage Needs
  - M3: Functional Effectiveness / Correctness
  - M4: Ontology Quality (Frequency of Defects)
  - M5: Ontology Maturity (Breath of Model, Validation History)
- Can performance be negatively impacted?
  - M1: Cycle Times
  - M2: Storage Needs
  - M3: Functional Effectiveness / Correctness
  - M4: Ontology Quality (Frequency of Defects)
  - M5: Ontology Maturity (Breath of Model, Validation History)
- How much does the Cost of Ontology Performance Affect the Value Proposition?
  - M6: Cost of Ontology Design & Development
  - M7: Cost of Ontology Implementation & Operation
  - M8: Cost of Ontology Validation
  - M9: ROI

Ontology Performance: Notional Radar



Ontology Performance: Notional Radar



Ontology Performance - Qualitative

- How Well Can we Measure? Tailor Qualitative from specific factors.

Magnitude	Ct Technical Factor	Cc Cost Factor	Cs Schedule Factor
1, Low	Meets requirements or minimal consequence	Budget estimates not exceeded, some money transfer required	Negligible impact, slight increase covered by available slack
3, Minor	Small reduction in performance	Cost estimates exceed budget by 1 to 5%	Minor slip in schedule (less than 1 month)
5, Moderate	Some reduction in performance	Cost estimates exceed budget by 5 to 20%	Small slip in schedule (1 to 3 months)
7, Significant	Significant reduction in performance	Cost estimates exceed budget by 20 to 50%	Schedule slip in excess of 3 months
9, High	Technical goals cannot be achieved	Cost estimates increased in excess of 50%	Large schedule slip

Ontology Performance - Qualitative

- How Well Can we Measure? Tailor Qualitative from specific factors.

Magnitude	Ct Technical Factor
1, Low	Meets requirements or minimal consequence
3, Minor	Small reduction in performance
5, Moderate	Some reduction in performance
7, Significant	Significant reduction in performance
9, High	Technical goals cannot be achieved

	Low	Minor	Moderate	Significant	High
M1: Cycle Times	5	7	10	17	25
M2: Storage Needs	25	32	37	43	50
M3: Functional Effectiveness / Correctness	100	93	87	81	75
M4: Ontology Quality (Frequency of Defects)	5	9	11	13	15
M5: Ontology Maturity (Breath of Model, Validation History)	100	93	87	81	75

Ontology Performance

- Summary
  - Ontology Performance measurement, like other measurements, can be developed using the GQM model
  - May discover measurements in one area overlaps other areas
  - 'Goodness' of measures are subjective, but you can develop a scheme to support qualitative assessments
  - Area of opportunity for more research