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Fortune Telling, Estimating and Systems Engineering

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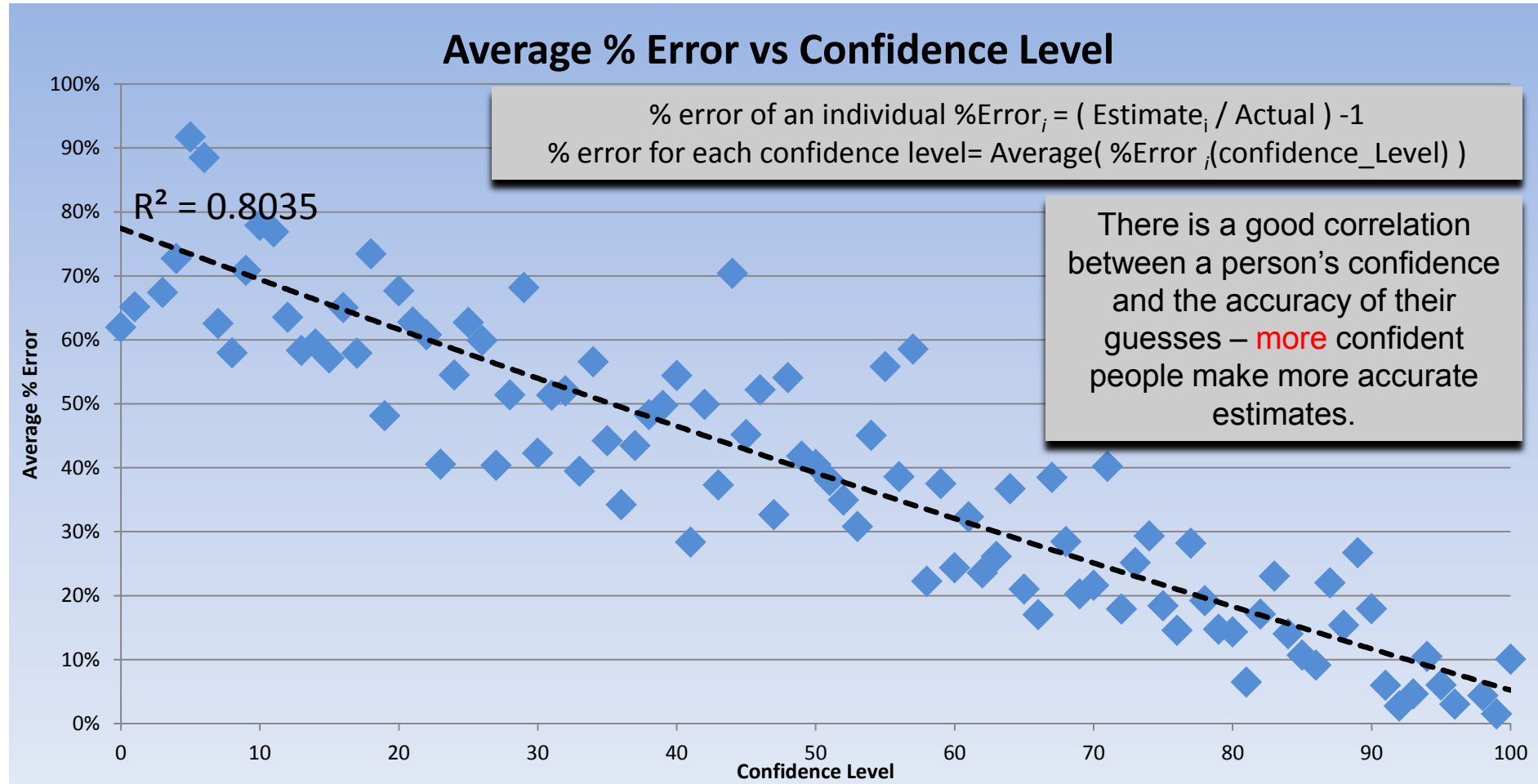
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The detail can be
found in the paper!



There is a good correlation between %Error & Confidence



On the whole people are able to self-assess their own confidence

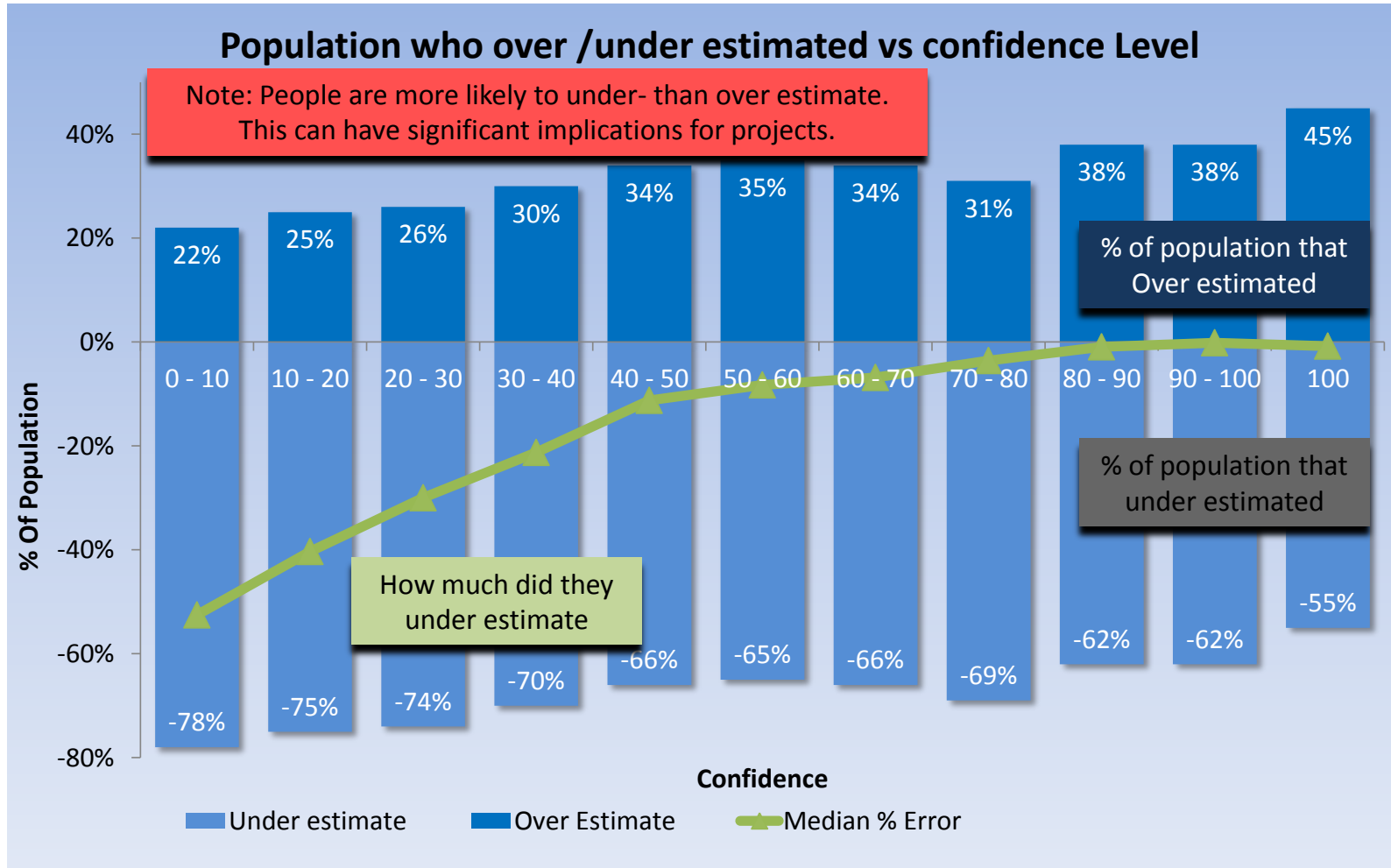


Confidence vs Accuracy			Confidence									
			0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60	60 - 70	70 - 80	80 - 90	90 - 100
Accuracy	ERL 9	-5% / +5%	20	19	31	27	41	59	54	93	86	116
	ERL 8	-9% / +10%	27	27	24	36	40	53	42	51	45	38
	ERL 7	-17% / +20%	49	30	39	40	48	67	39	37	18	11
	ERL 6	-29% / +40%	77	72	55	68	74	69	51	40	15	3
	ERL 5	-45% / +80%	114	88	56	59	70	70	32	24	7	4
	ERL 4	-62% / +160%	124	95	74	77	62	52	21	19	4	2
	ERL 3	-77% / +320%	140	93	70	39	35	44	17	15	6	2
	ERL 2	-87% / +640%	117	51	41	25	13	16	3	3	3	1
	ERL 1	-93% / +1280%	65	37	11	10	6	5	2	3	2	0

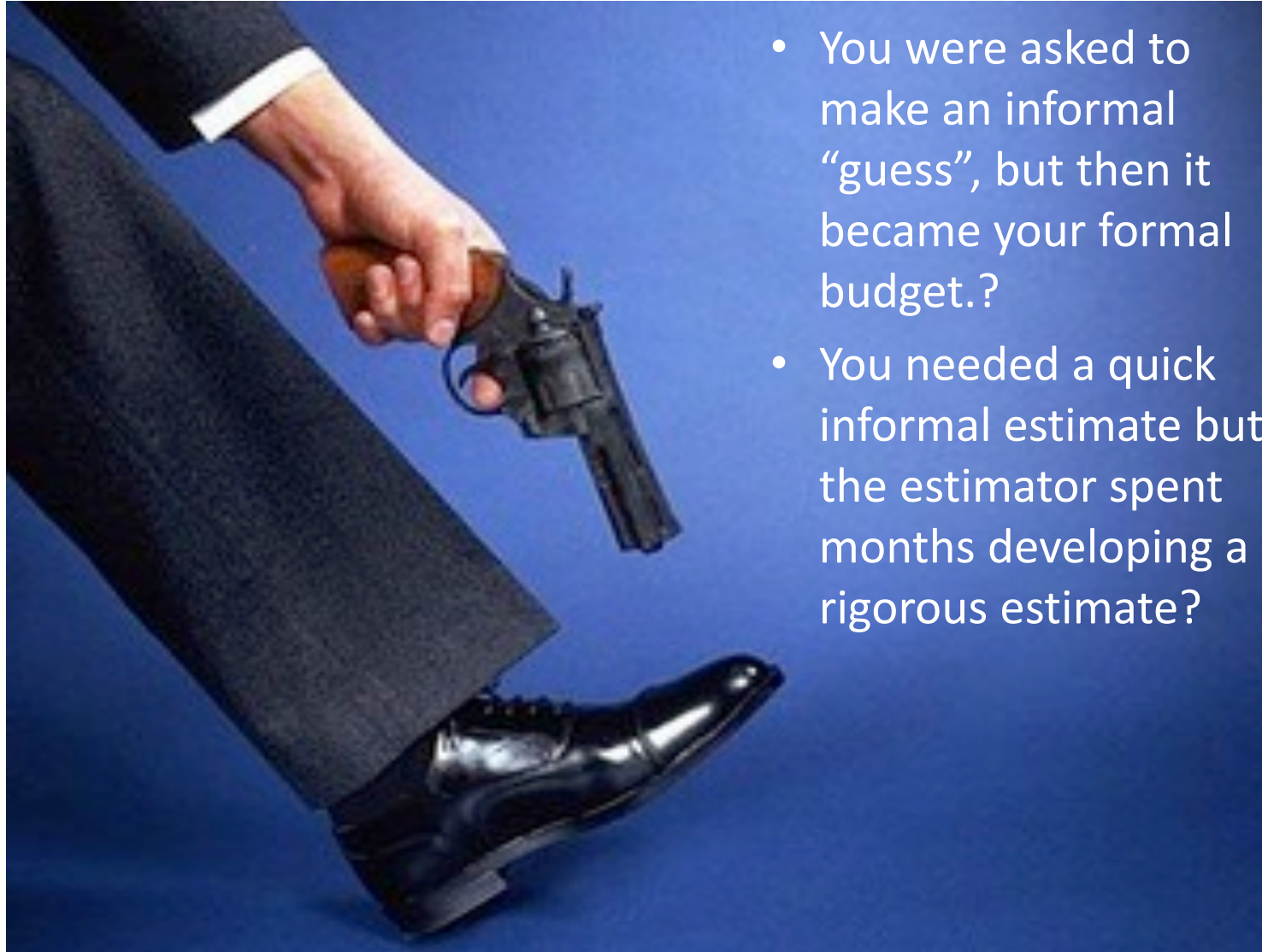
For 65% of the population, a persons confidence aligned with their estimate accuracy. But 1% of the population were overly confident. It seems that many estimators (28%) underestimated their abilities.

Key	Estimates	% of Population
Confidence higher than accuracy	24	1%
Confidence slightly higher than accuracy	237	6%
Confidence and accuracy align	2460	65%
Confidence slightly below the accuracy	708	19%
Confidence significantly lower than accuracy	331	9%
Total	3760	100%

As people become less confident, they tend to under estimate

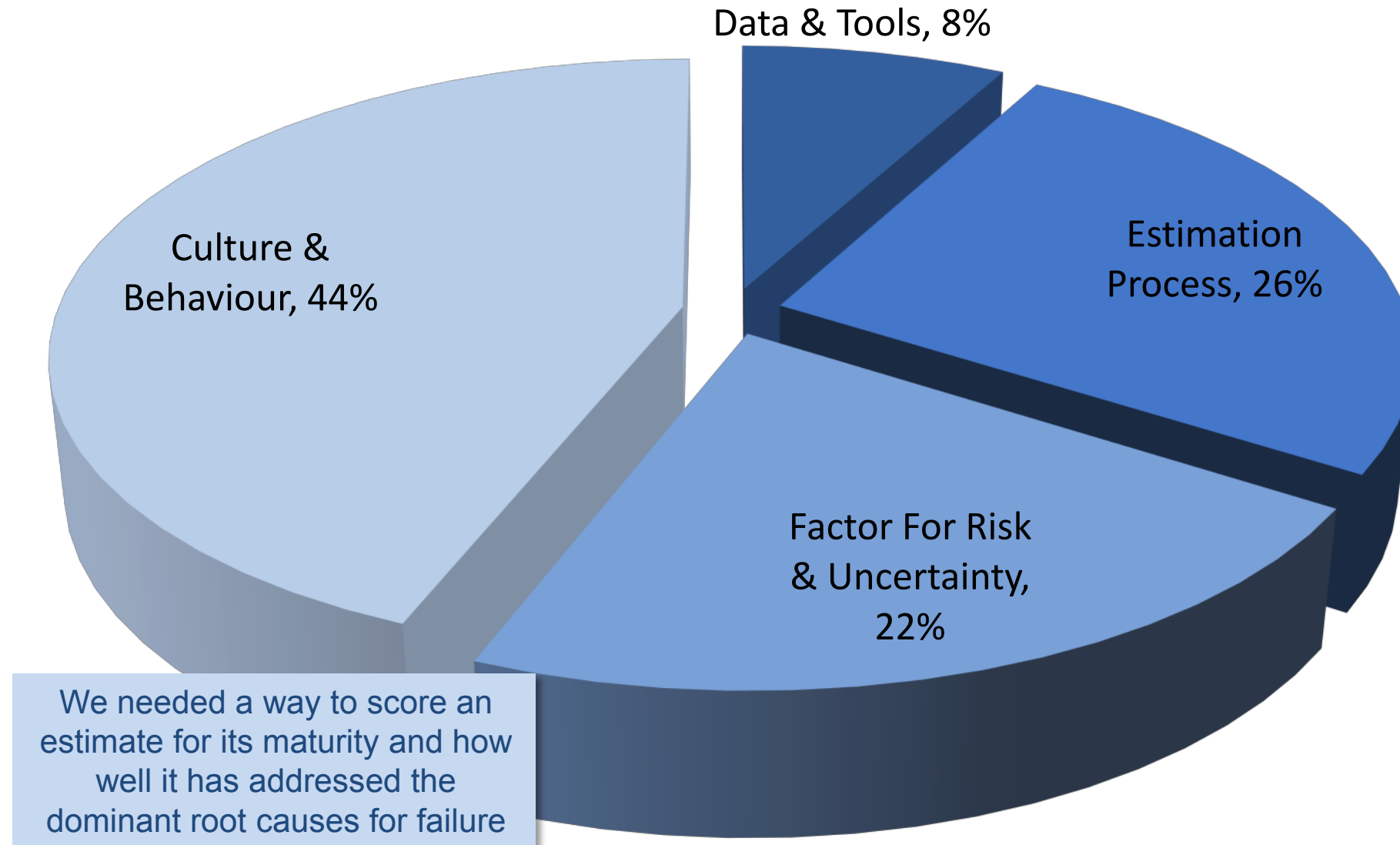


Has this ever happened to you?



- You were asked to make an informal “guess”, but then it became your formal budget.?
- You needed a quick informal estimate but the estimator spent months developing a rigorous estimate?

The source of estimate problems

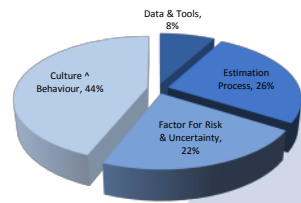


What matters rather than what we “moan” about!



We wanted to
understand what
really matters NOT
just what happens.

The Journey



Root Cause +
PFMEA analysis
(>120 causes)



Estimation Standard
intended to mitigate
dominant root causes.
55 Factors grouped
into 11 Themes



Assessed estimates
for their
compliance to the
standards.
134 completed
projects




ERL assessment – a
weighted
assessment that
can score an
estimate for its
maturity at
mitigating the
dominant root
causes for estimate
problems.

Estimate Readiness Levels

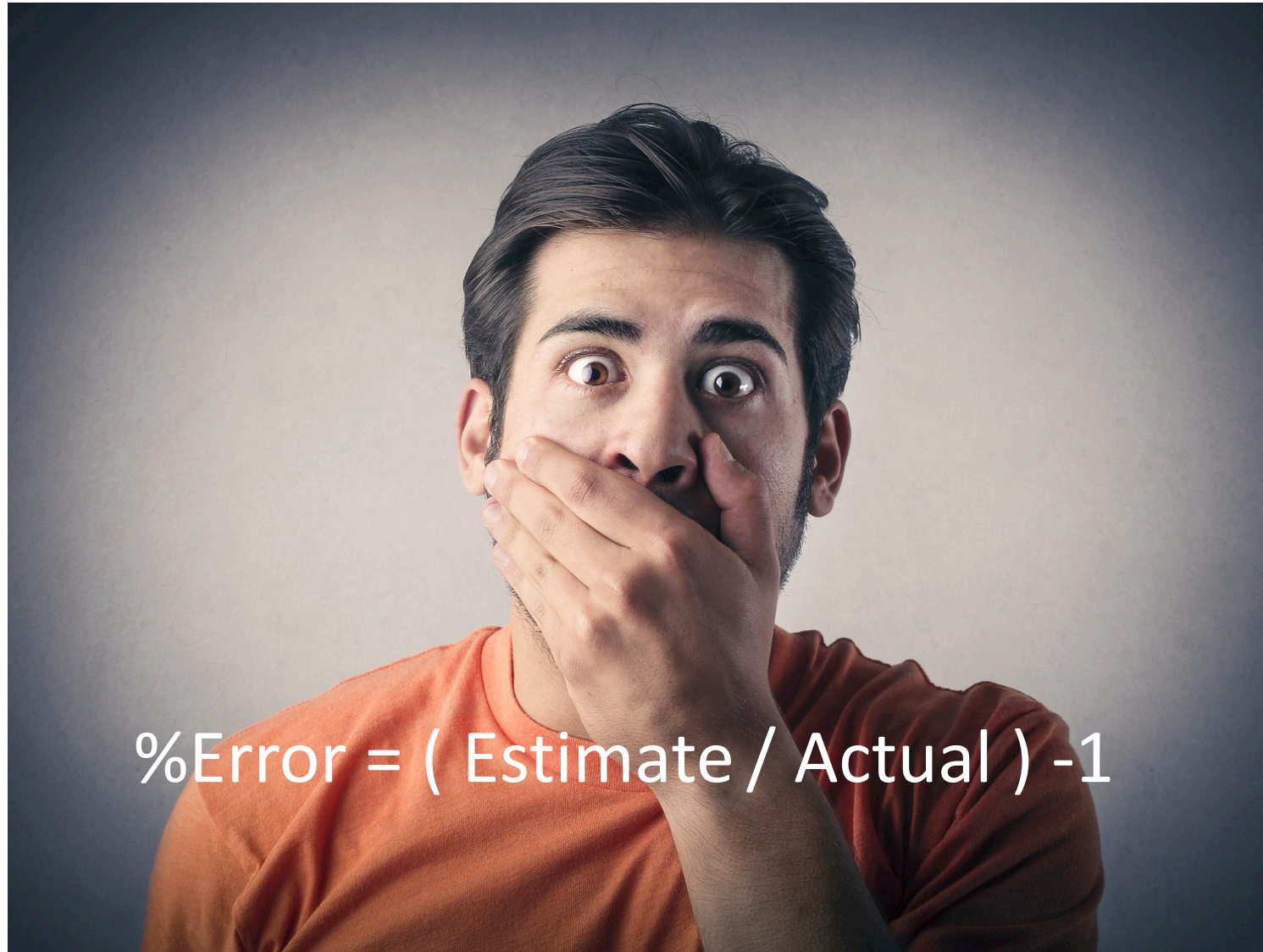


A score between 1 and 9 representing the “maturity” of the estimate and its readiness for use.



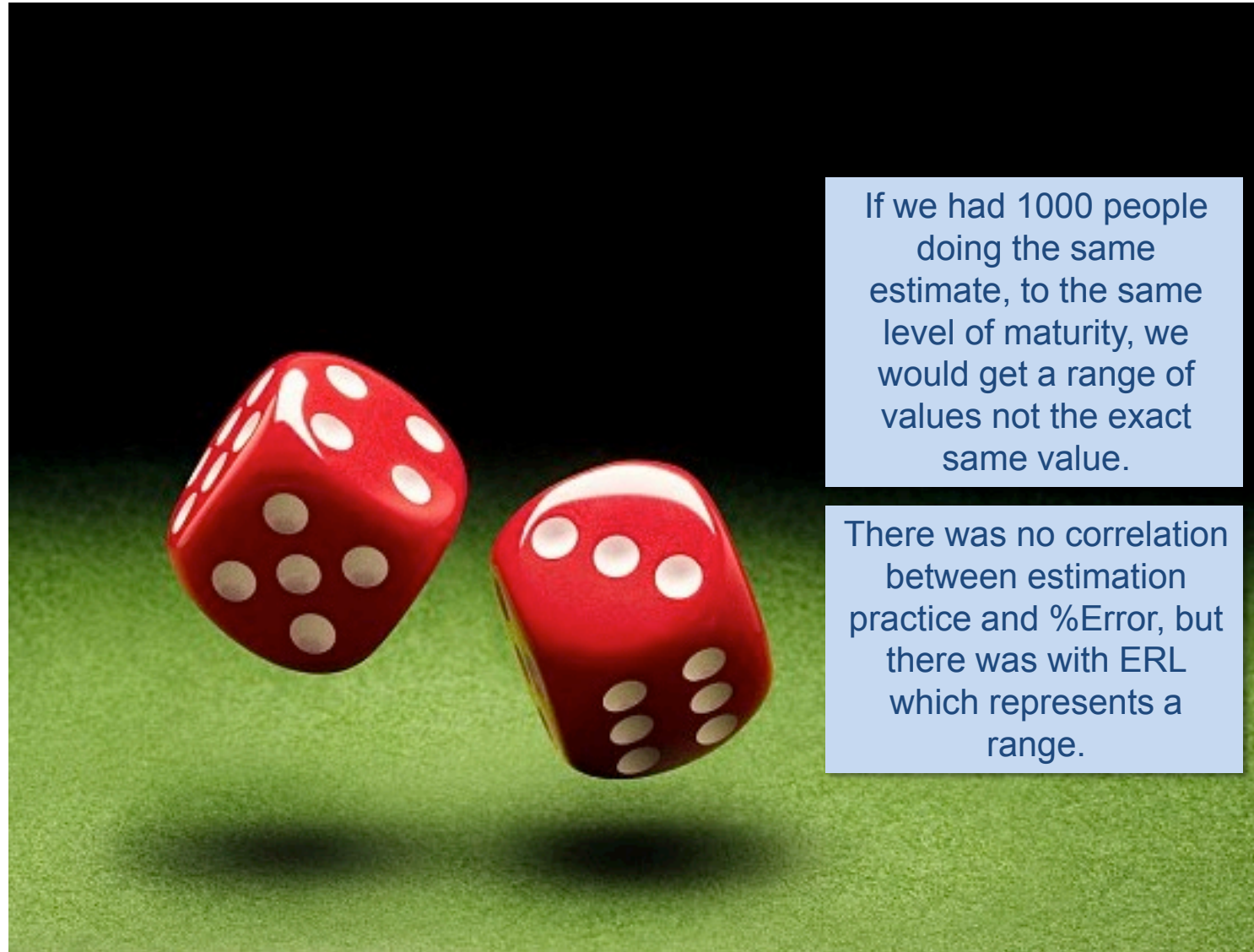
Level	Precision	Use
ERL9	-5% / +5%	Annual budgeting and post contract budget baseline
ERL8	-9% / +10%	Contract Signature / Memorandum of Understanding
ERL7	-17% / +20%	Request For Quotation
ERL6	-29% / +40%	Request For Proposal
ERL5	-44% / +80%	Request For Information
ERL4	-62% / +160%	Exploring Trade Options
ERL3	-76% / +320%	Exploring Strategy
ERL2	-86% / +640%	Exploring Expectations
ERL1	-93% / +1280%	Do not use this estimate

Measuring estimate accuracy (%=Error)



$$\%Error = (Estimate / Actual) - 1$$

We had to correlate to ERL not to %-Error



If we had 1000 people doing the same estimate, to the same level of maturity, we would get a range of values not the exact same value.

There was no correlation between estimation practice and %Error, but there was with ERL which represents a range.

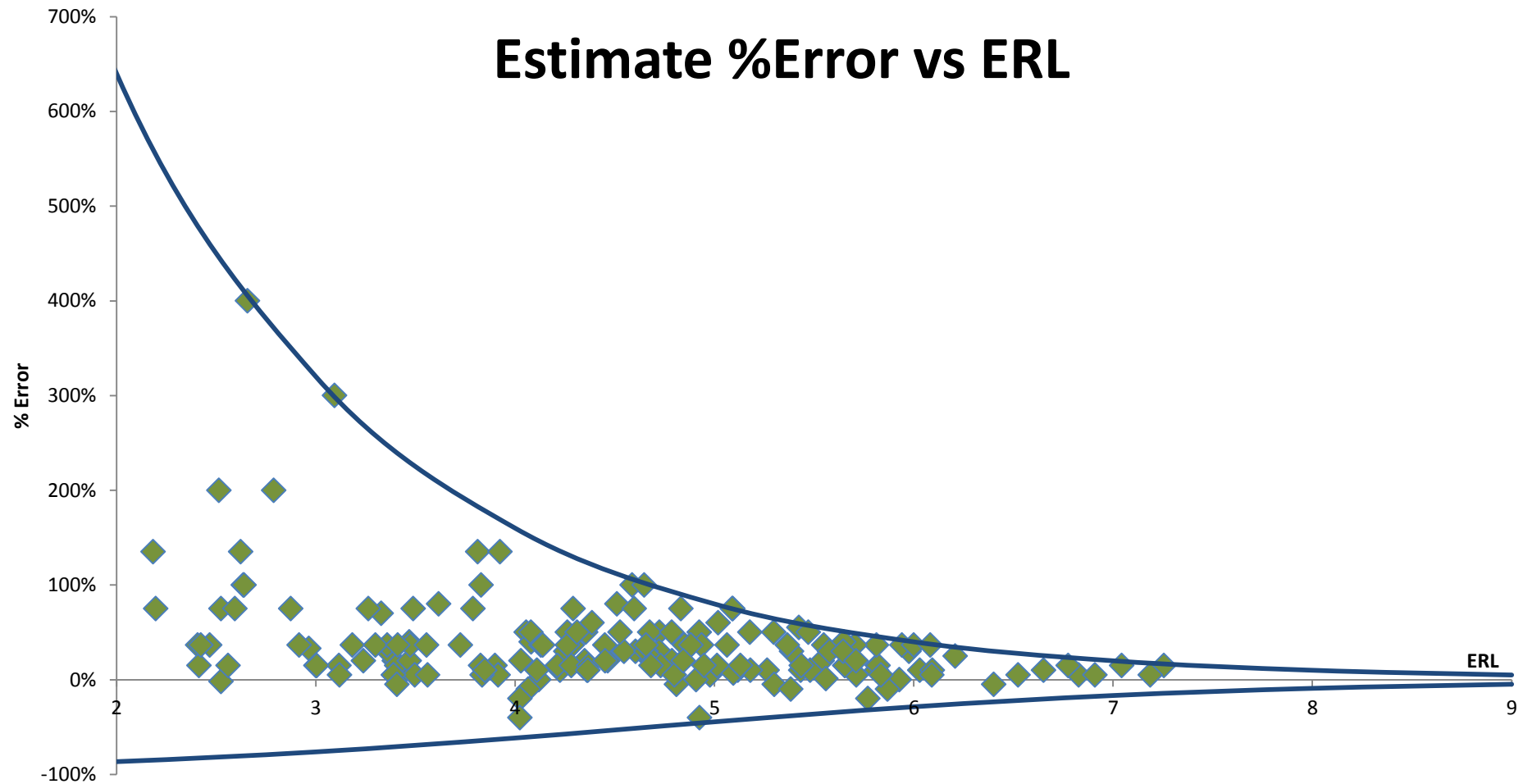
Calibration



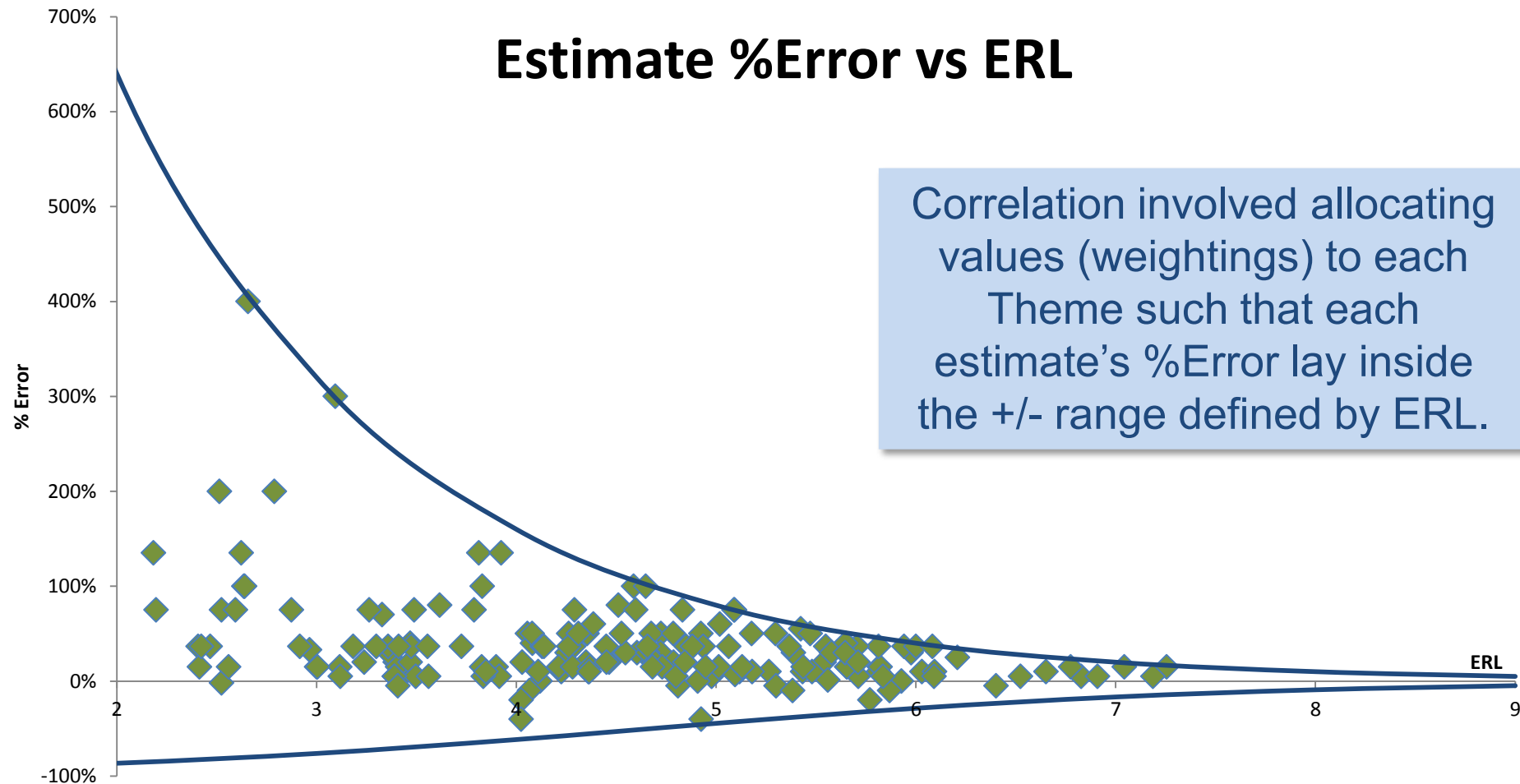
1. Project Understanding
2. Risk & Uncertainty
3. Estimator competency
4. Historic data
5. Estimate documentation
6. Estimate effort

The 55 Factors of the estimate standards are allocated to 11 Themes.
134 estimates were scored, based on a pre-defined criteria, for how well they met each Theme

Estimate Accuracy vs ERL



Estimate Accuracy vs ERL



Ask the audience!

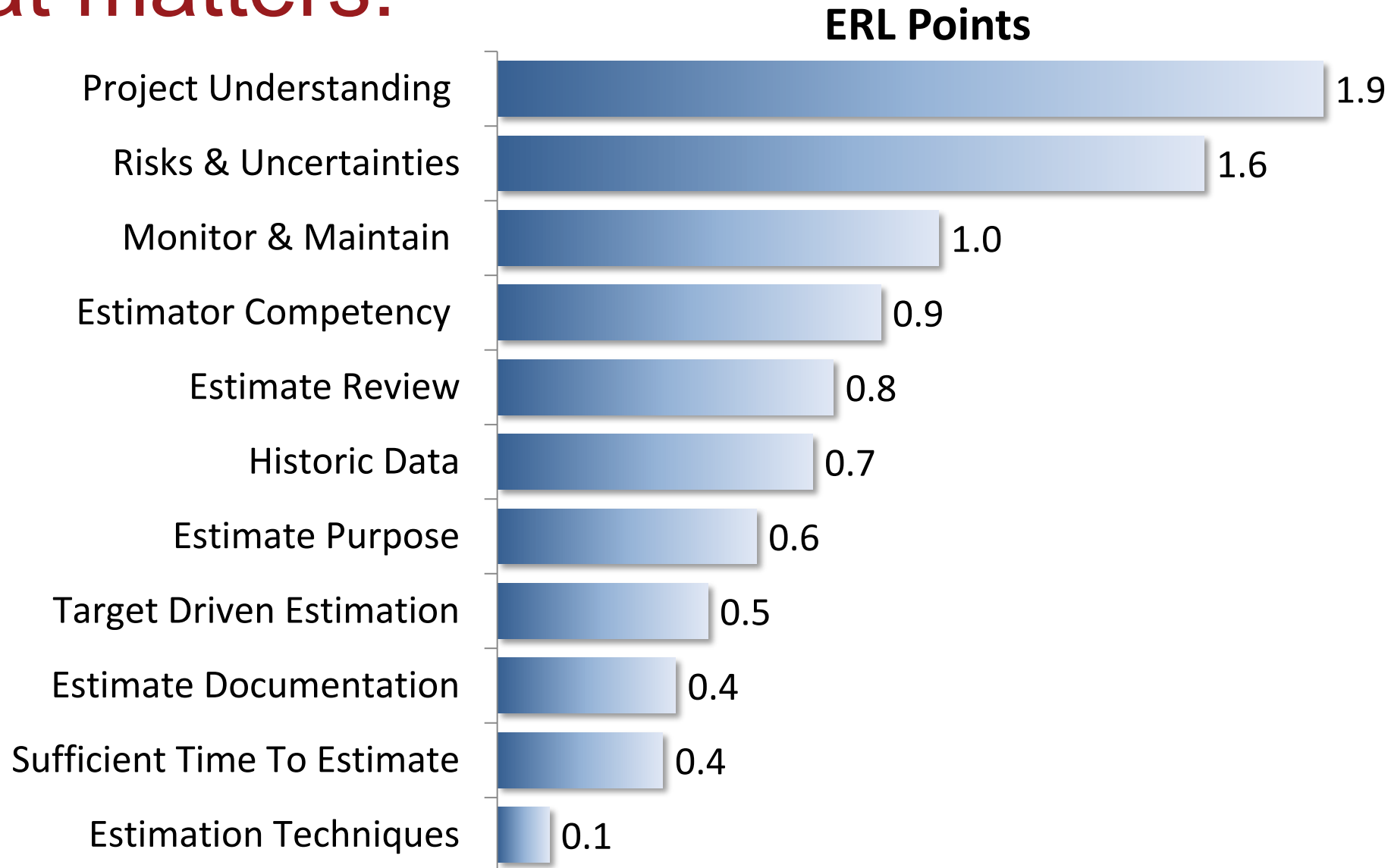


What's Matters Most?


- Estimate Documentation
- Estimate Purpose
- Estimate Review
- Estimation Techniques
- Estimator Competency
- Historic Data
- Monitor & Maintain
- Project Understanding
- Risks & Uncertainties
- Sufficient Time To Estimate
- Target Driven Estimation



What matters!



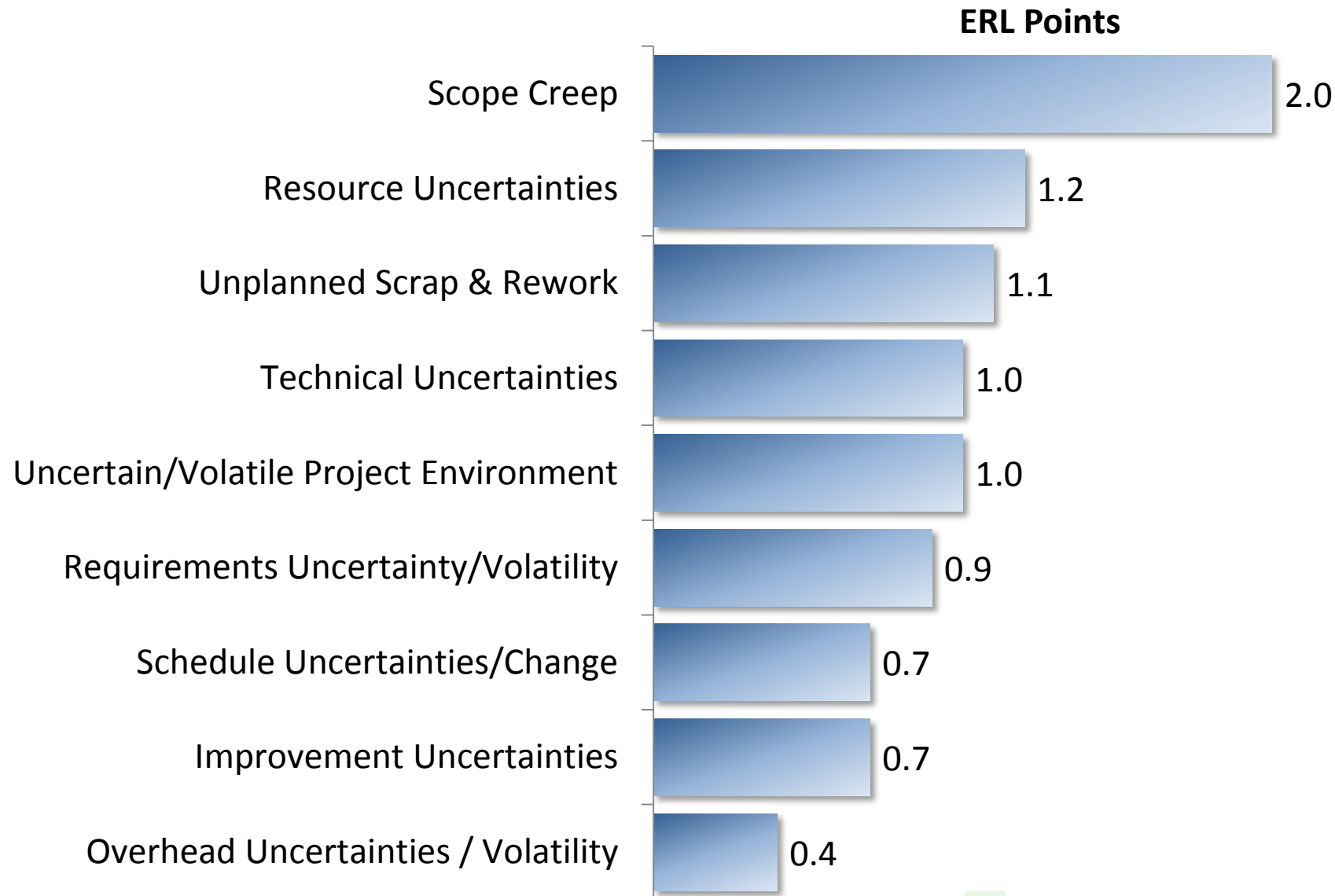
Ask the audience!

A close-up photograph of a man with a shocked or surprised expression, his eyes wide open and his hand covering his mouth. He is wearing a dark suit jacket. The image is used as a background for the text overlay.


What's your greatest source of risk & Uncertainty?

- Improvement Uncertainties
- Overhead Uncertainties / Volatility
- Requirements Uncertainty/Volatility
- Resource Uncertainties
- Schedule Uncertainties/Change
- Scope Creep
- Technical Uncertainties
- Uncertain/Volatile Project Environment
- Unplanned Scrap & Rework

Sources of Risk & Uncertainty



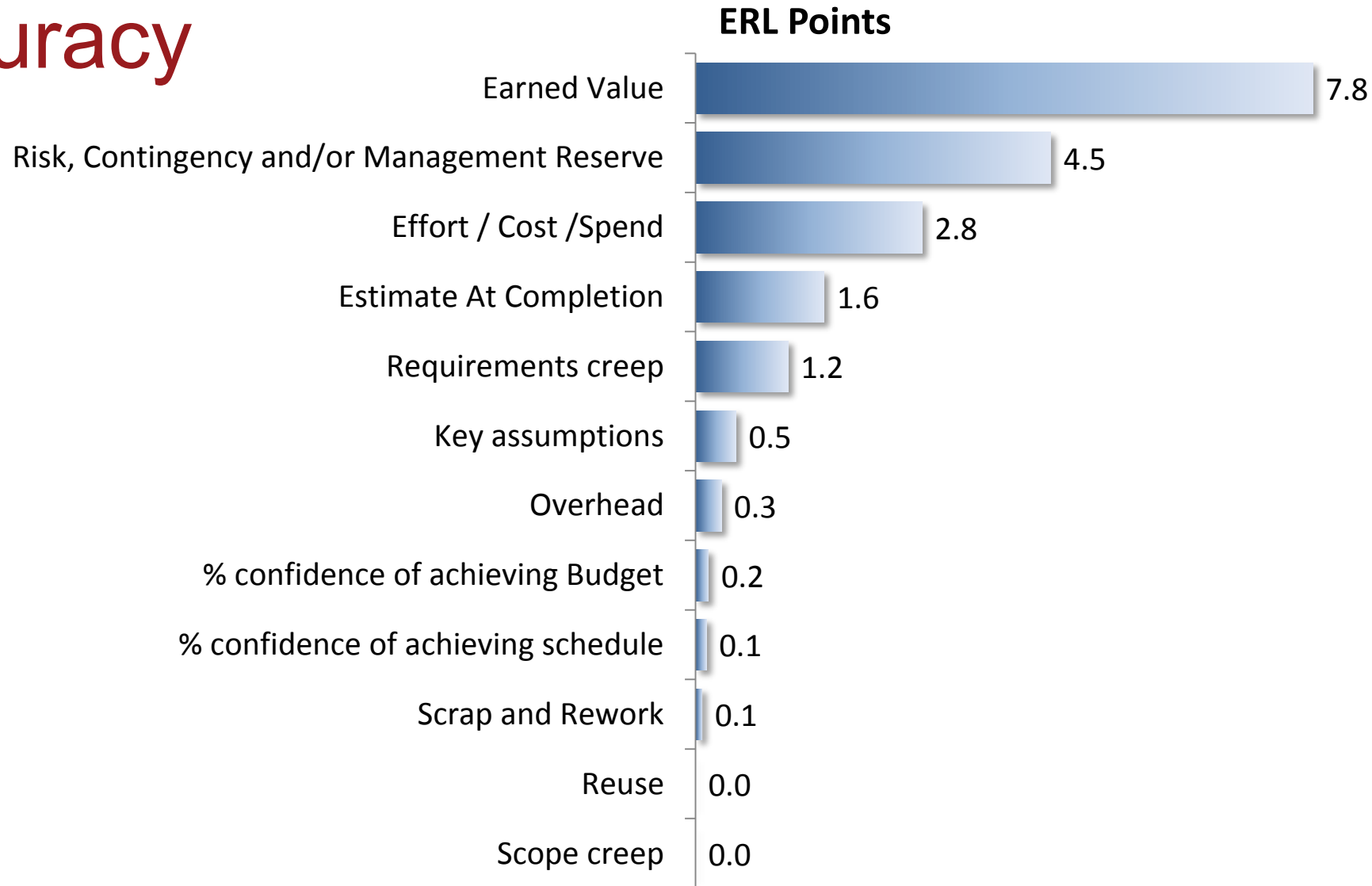
Ask the audience!

A hand is holding a yellow measuring tape against a green chalkboard. On the chalkboard, there is a bar chart with five bars of increasing height and a curved arrow pointing upwards and to the right. A semi-transparent text box is overlaid on the left side of the chalkboard.

During project execution, what is most important to monitor?

- % confidence of achieving Budget
- % confidence of achieving schedule
- Earned Value
- Effort / Cost /Spend
- Estimate At Completion
- Key assumptions
- Overhead
- Requirements creep
- Reuse
- Risk, Contingency and/or Management Reserve
- Scope creep
- Scrap and Rework

The Correlation Between Monitor & Estimate Accuracy



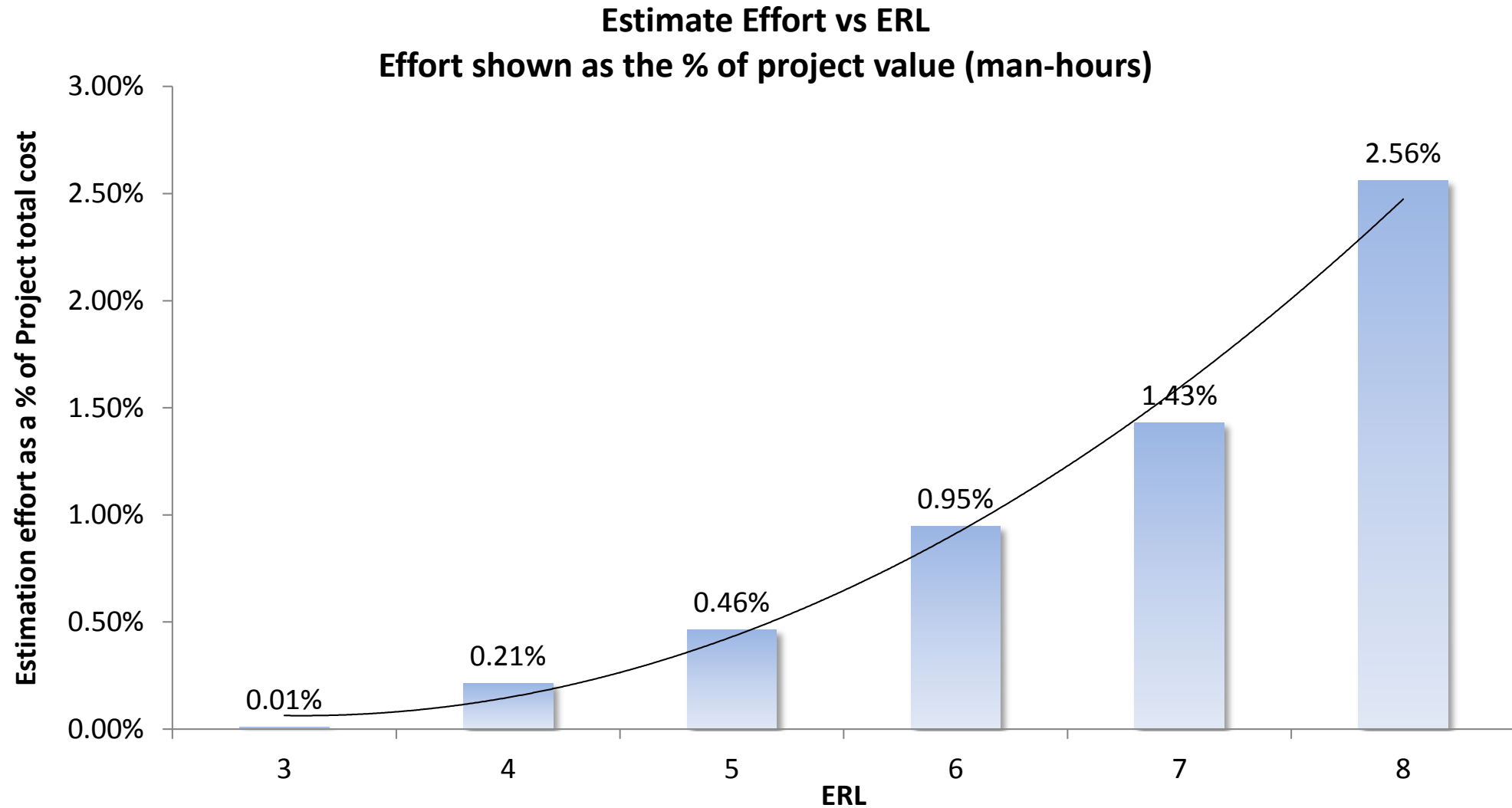
Ask the audience!



How long
does it take
to develop an
estimate?

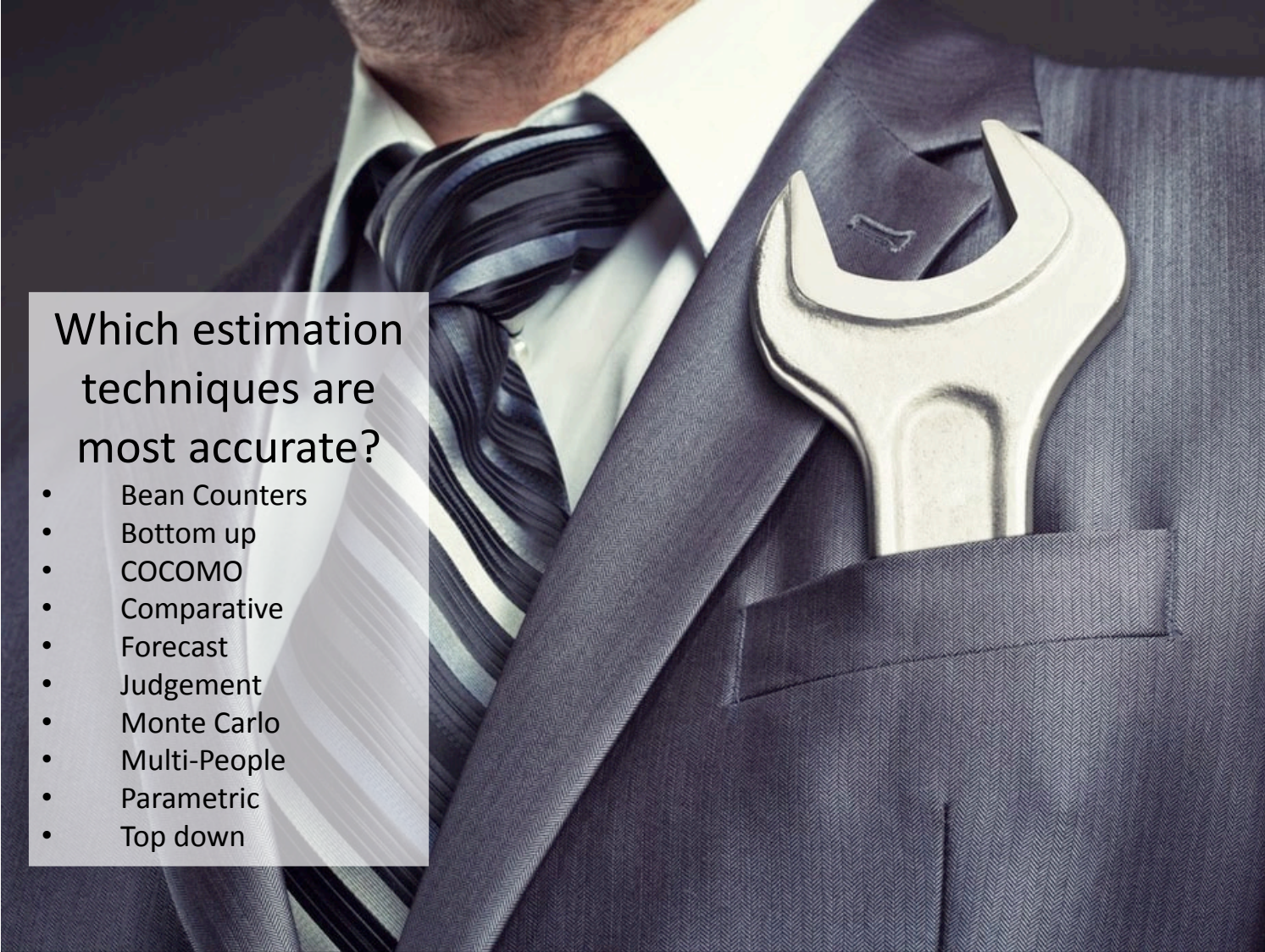


Estimation Effort vs ERL





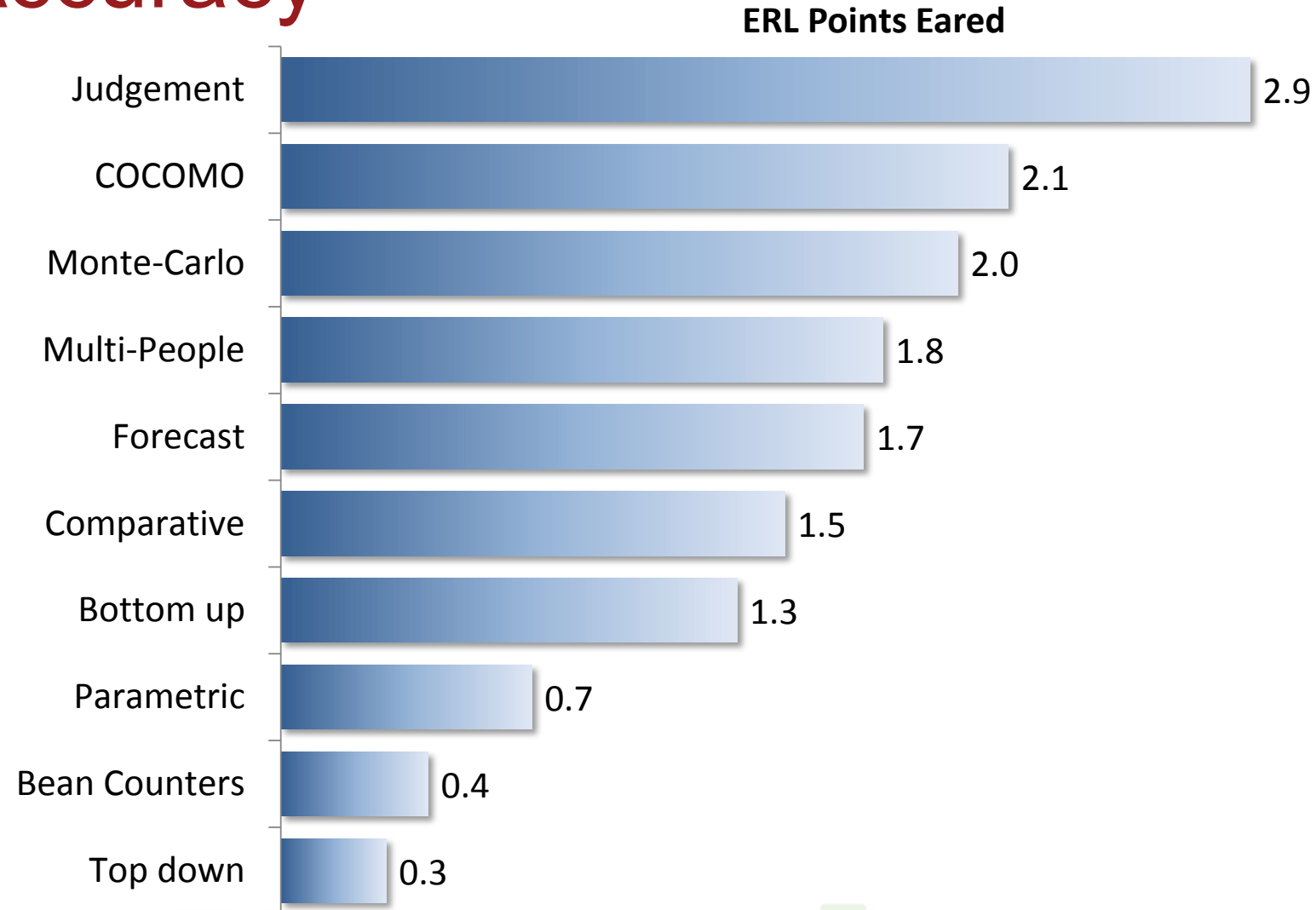
Ask the audience!



Which estimation techniques are most accurate?

- Bean Counters
- Bottom up
- COCOMO
- Comparative
- Forecast
- Judgement
- Monte Carlo
- Multi-People
- Parametric
- Top down

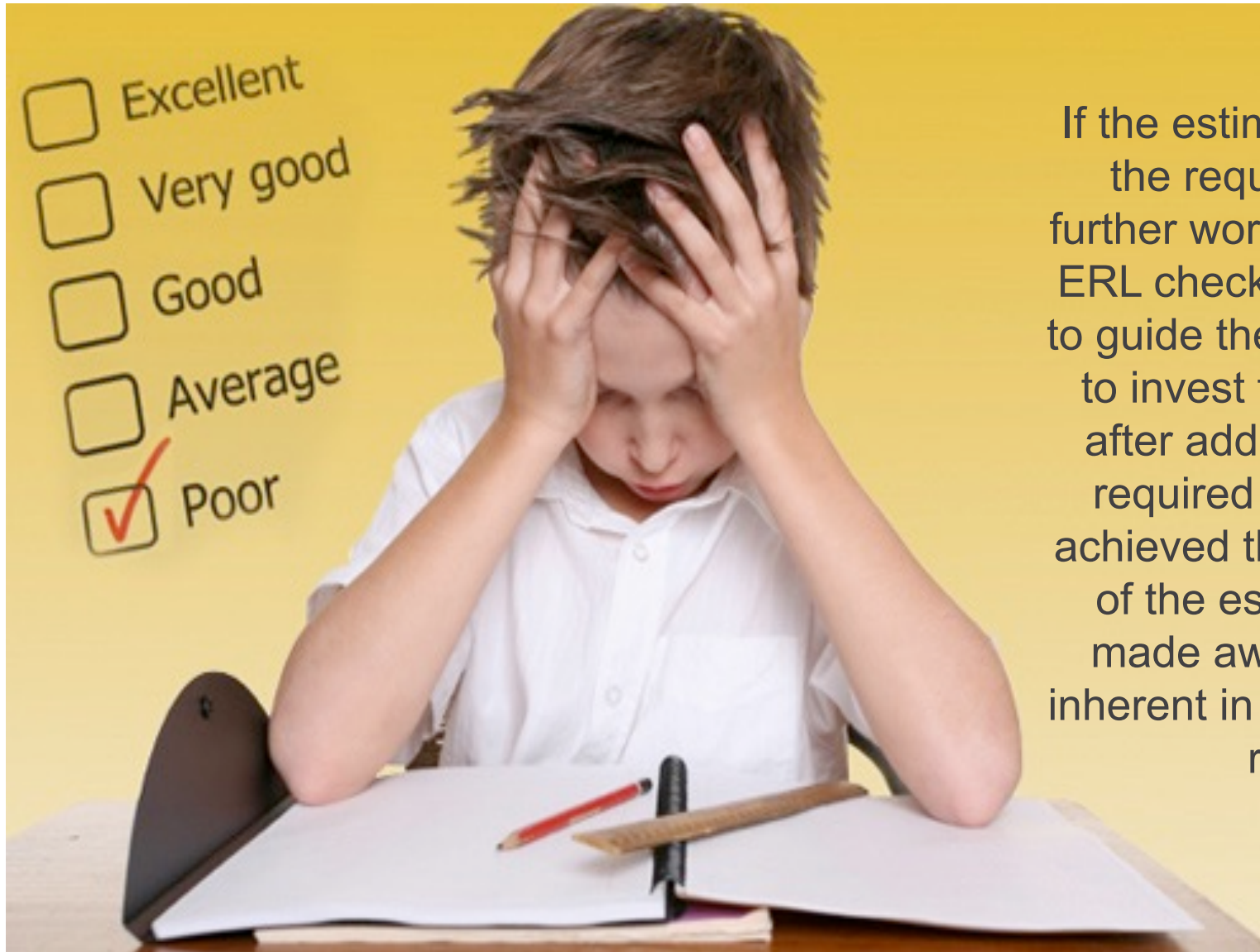
The Correlation Between Technique & Estimate Accuracy



The ERL Assessment

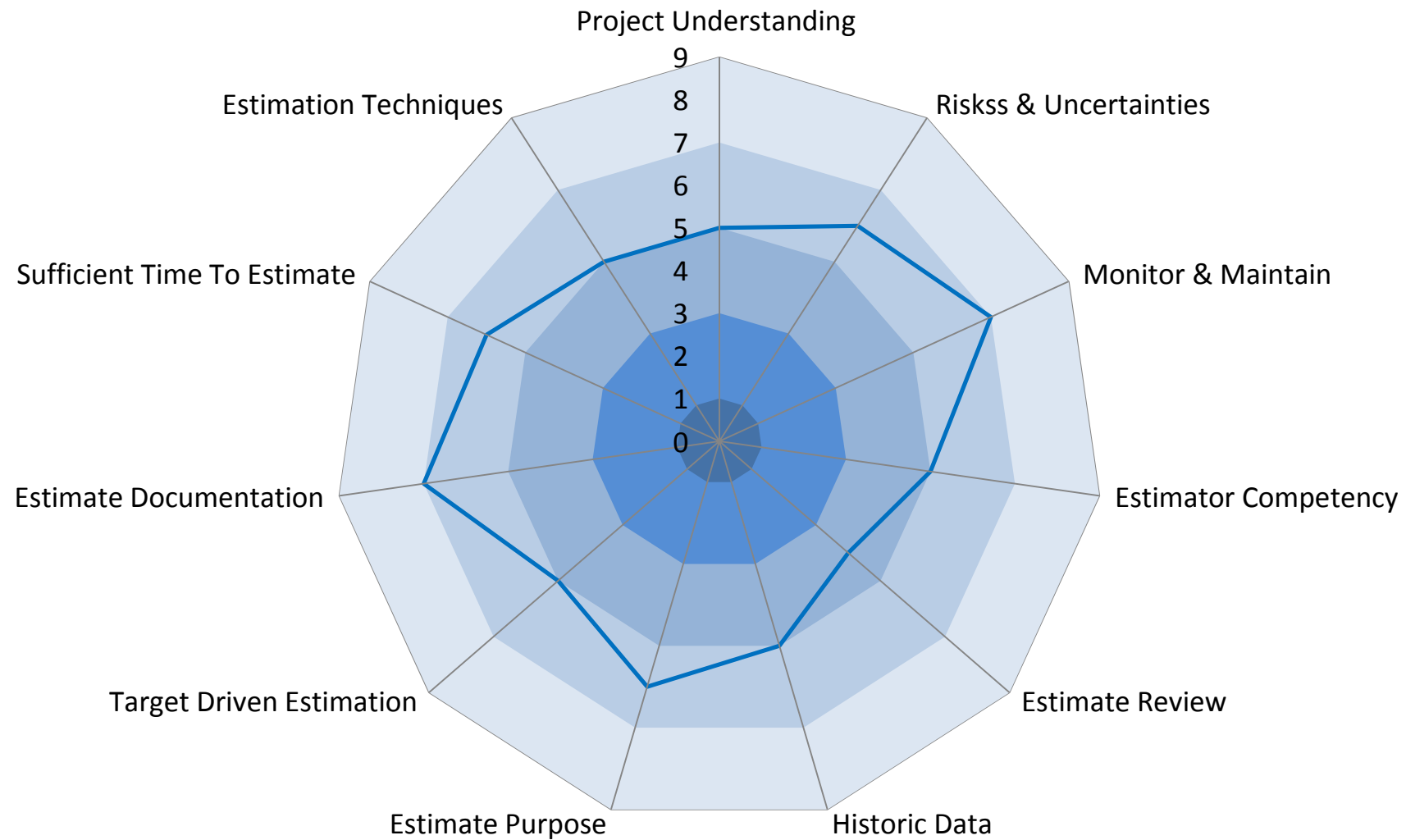


What happens if you can't make the grade?



If the estimate falls short of the required ERL then further work is required. The ERL checklist has a feature to guide the estimator where to invest further rigour. If after additional work, the required ERL cannot be achieved then the customer of the estimate must be made aware of the risks inherent in the estimate they receive.

Benchmark the business.



Shocks & Surprises

It may not be possible to prevent a bad estimate, but it is possible to prevent it from being a surprise.



ERL is simple enough for most managers to understand



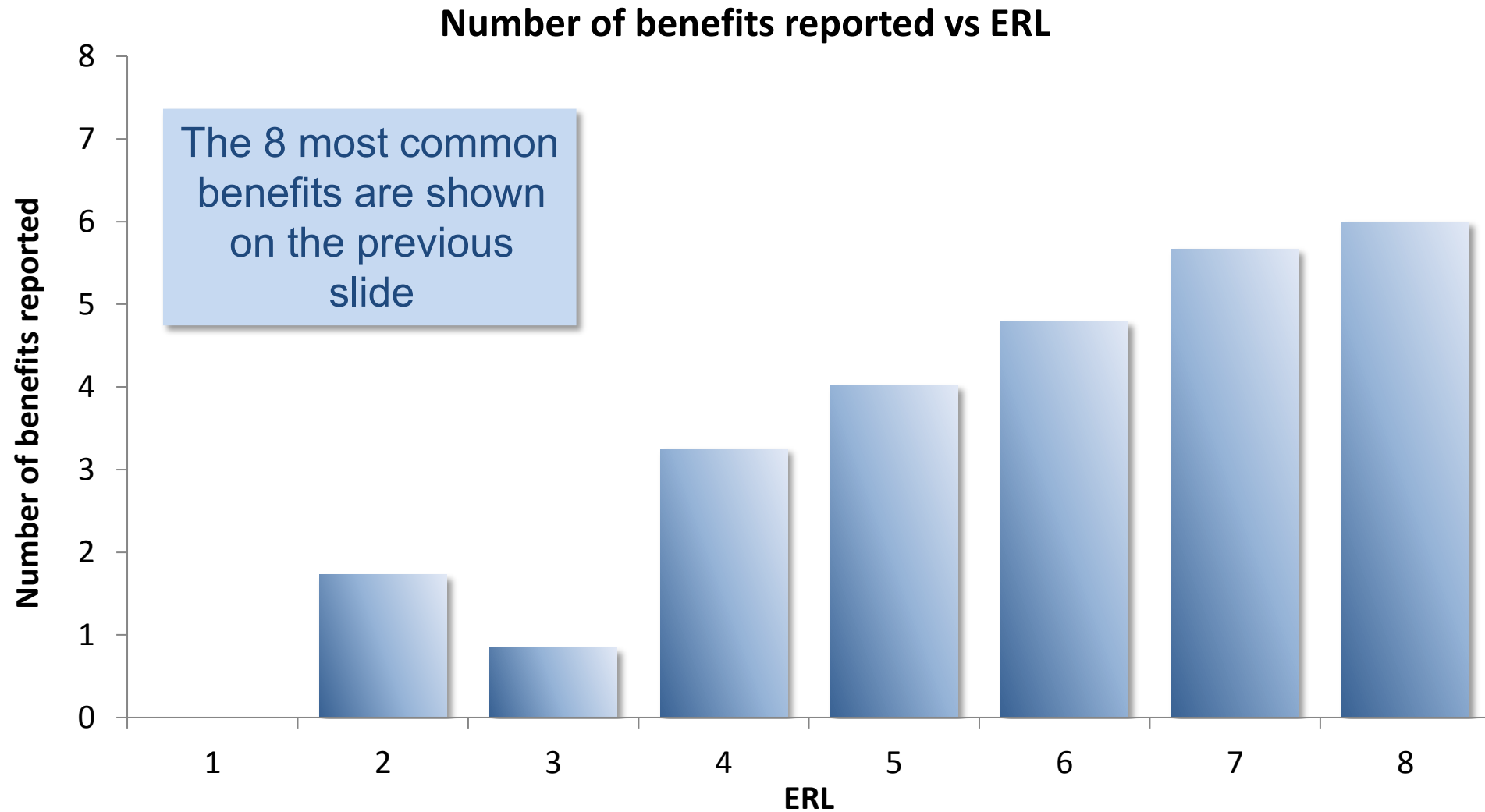


Estimation brings benefits!

Benefits Reported From Estimation



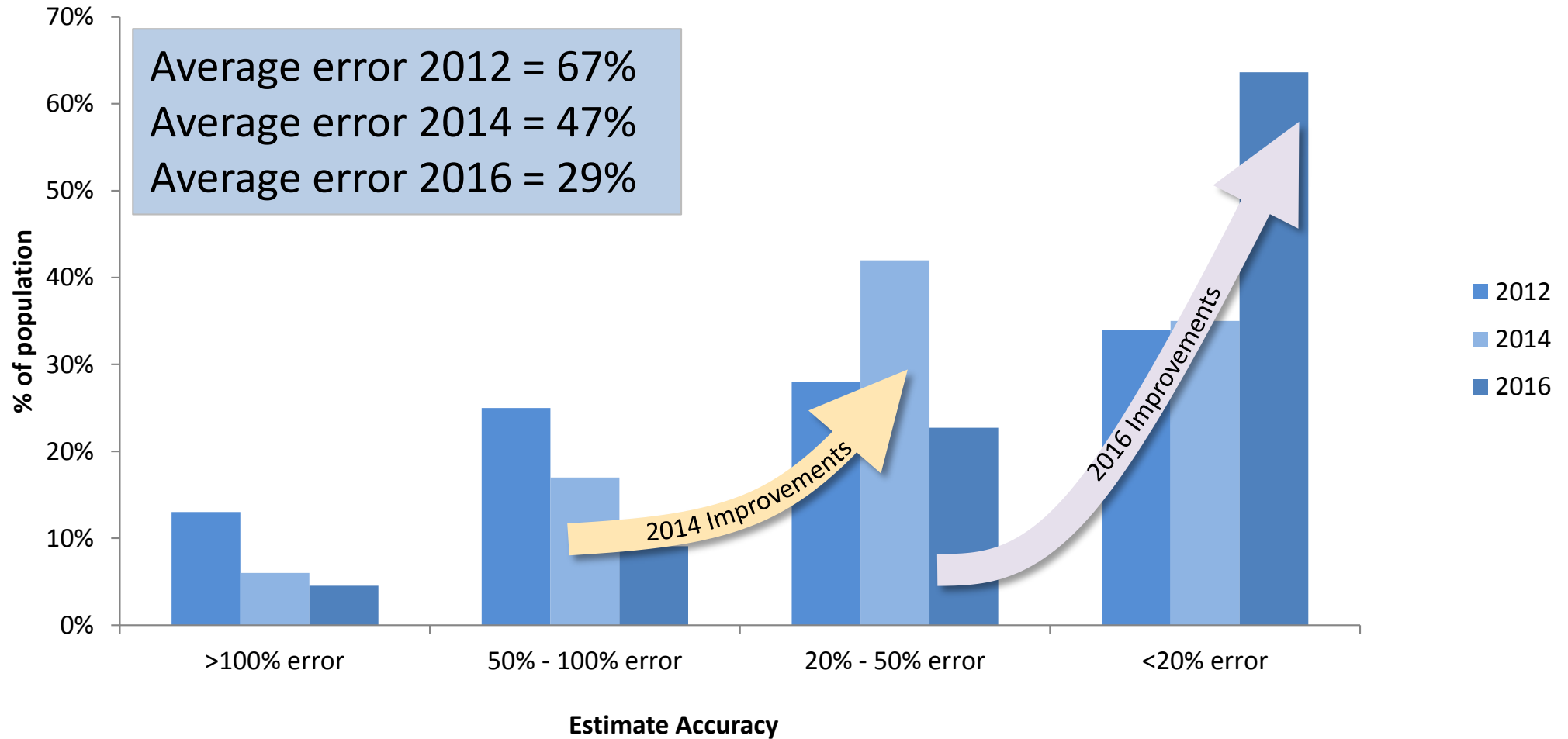
ERL vs number of benefits reported



Estimate accuracy is at all time high!



Estimate Accuracy: 2012, 2014 and 2016



Conclusions



- Estimate accuracy is no accident.
- Maturity is a continuum, not binary.
- ERL is easy to score and communicate.
- Higher ERL scores bring additional benefits
- Bad estimates should no longer be a surprise!

Questions?





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