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Quantifying the value of problem structuring interventions?

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Research Narrative

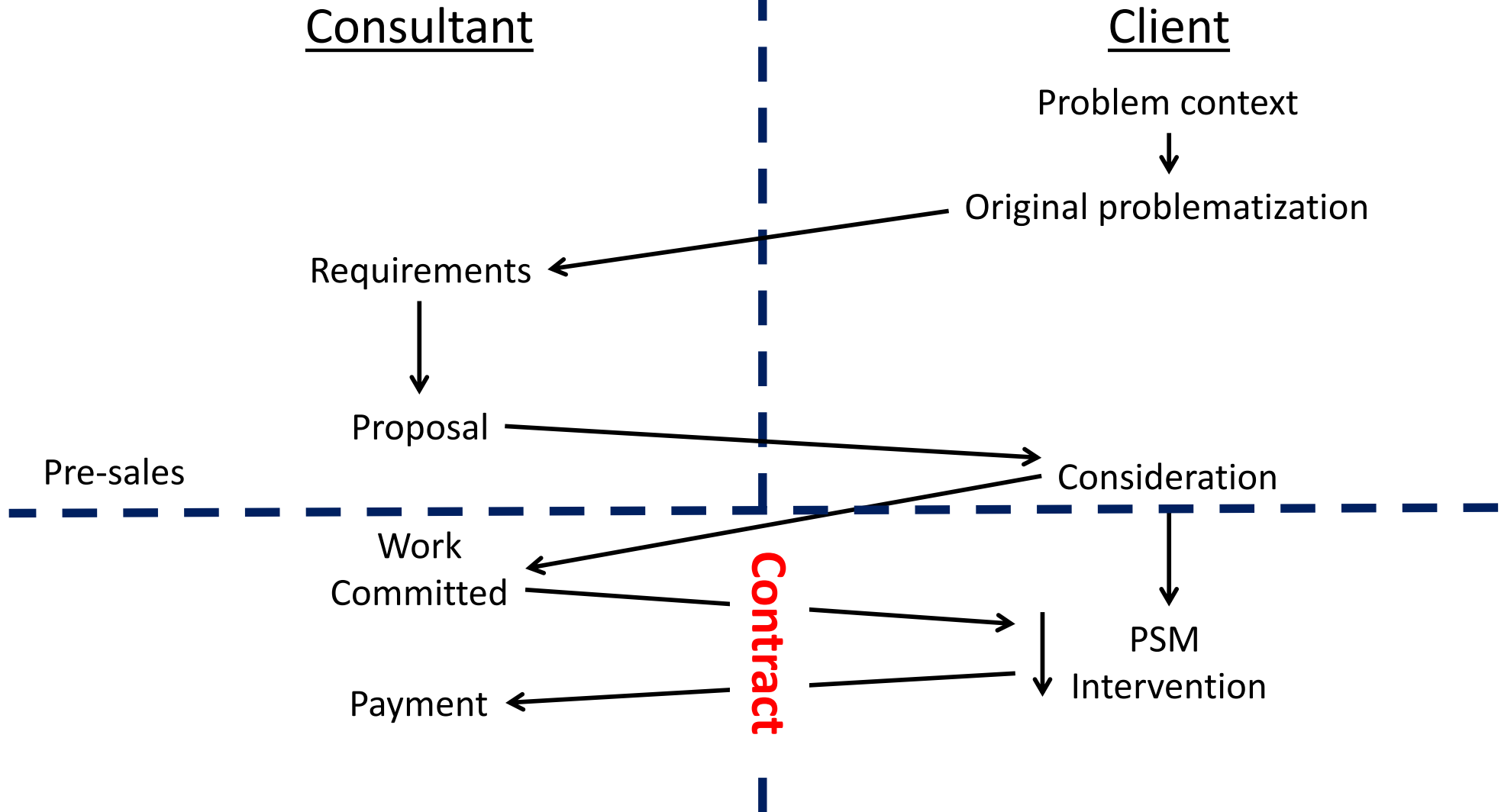
- Dealing with the problem of measuring the value of PSM interventions
- Introduce the category mistake/paradox at the heart of this problem
- Adopt an approach that borrows ‘freely’ from economic theory and *associate* the problem with information asymmetry in contract formation
- Suggest an avenue of research where value can be investigated empirically
- Discuss the difficulties of a research design to investigate this question but also the potential benefits

Puzzle, Category Error or Paradox?

- In Engineering Consultancy Ltd it has been found difficult to articulate the value of PSM Interventions to customers
- Checkland and Scholes (1999, p. 299) state that due to the single intervention nature of Soft Systems Methodology (SSM) it is not possible to measure, in any meaningful sense, the impact of the methodology. They went to some lengths to dissuade practitioners from thoughts of trying to measure its value. In effect, they treated this as a type of *category error* by stating that the “*does it work question*” is “*undecidable*”
- One way forward is to try and answer the question *post hoc*, but leads to the problem of the counterfactual, a possible paradox

Event history of an engagement:

Scenario 1

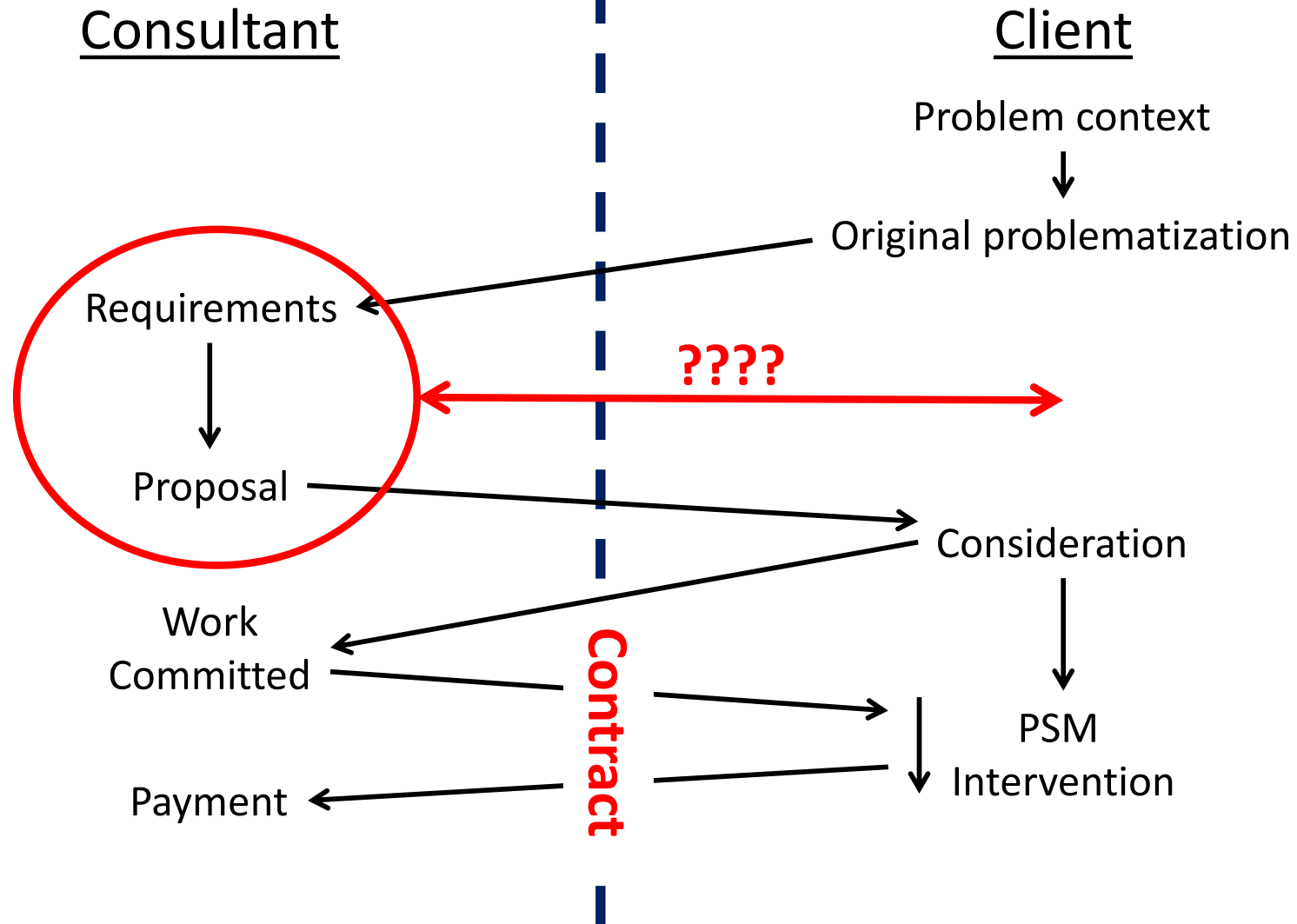


Analysis Scenario 1

- Contract embodies an information asymmetry (Akerlof, 1970) arising from a deficient original problematization – what client *really* knows what the problem is?
- Committed amount of work in contract inadequate to deal with the problem to the satisfaction of the client
 - Fixed price: consultant bears risk
 - Variable (cost-plus-x): client bears risk

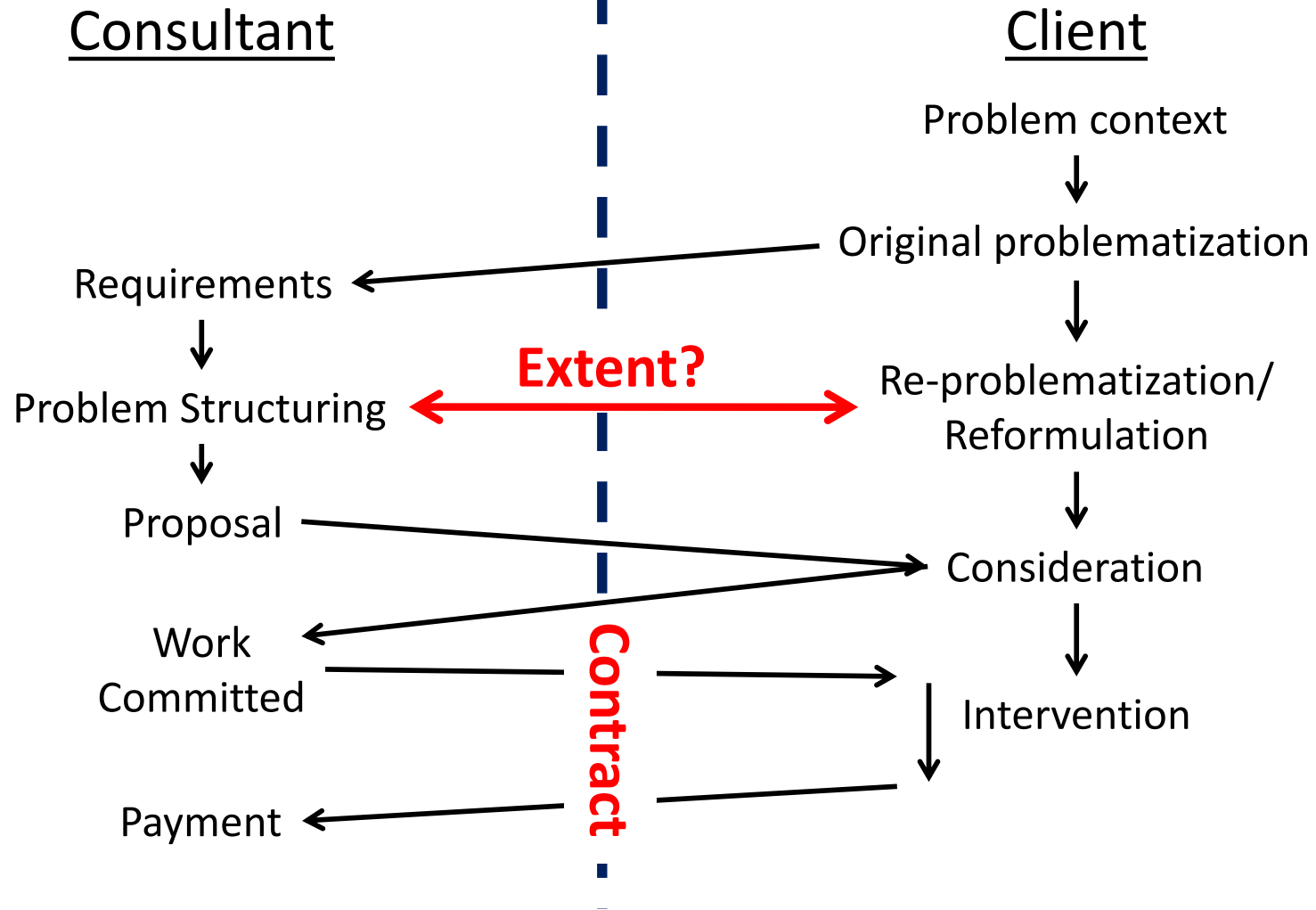
Event history of an engagement:

Scenario 2



Event history of an engagement:

Scenario 2



Example: Scenario 2

It's the largest public sector contract ever won by HP worldwide, and the Foreign and Commonwealth Office (FCO) has found the perfect partner for its ground-breaking IT infrastructure upgrade. We hear from some of those involved.



HP Labs Bristol

Mike Yearworth, Chris Tofts and Richard Taylor led the work of HP Labs' Open Analytics team, which 'scientifically' analysed the FCO's real IT and advised HP on the most cost-effective bid.

"We helped the bid team understand the risks involved and demonstrated to the FCO how the deal would work in reality, using our mathematical-based models and years of experience. It's performance engineering that few competitors can match."

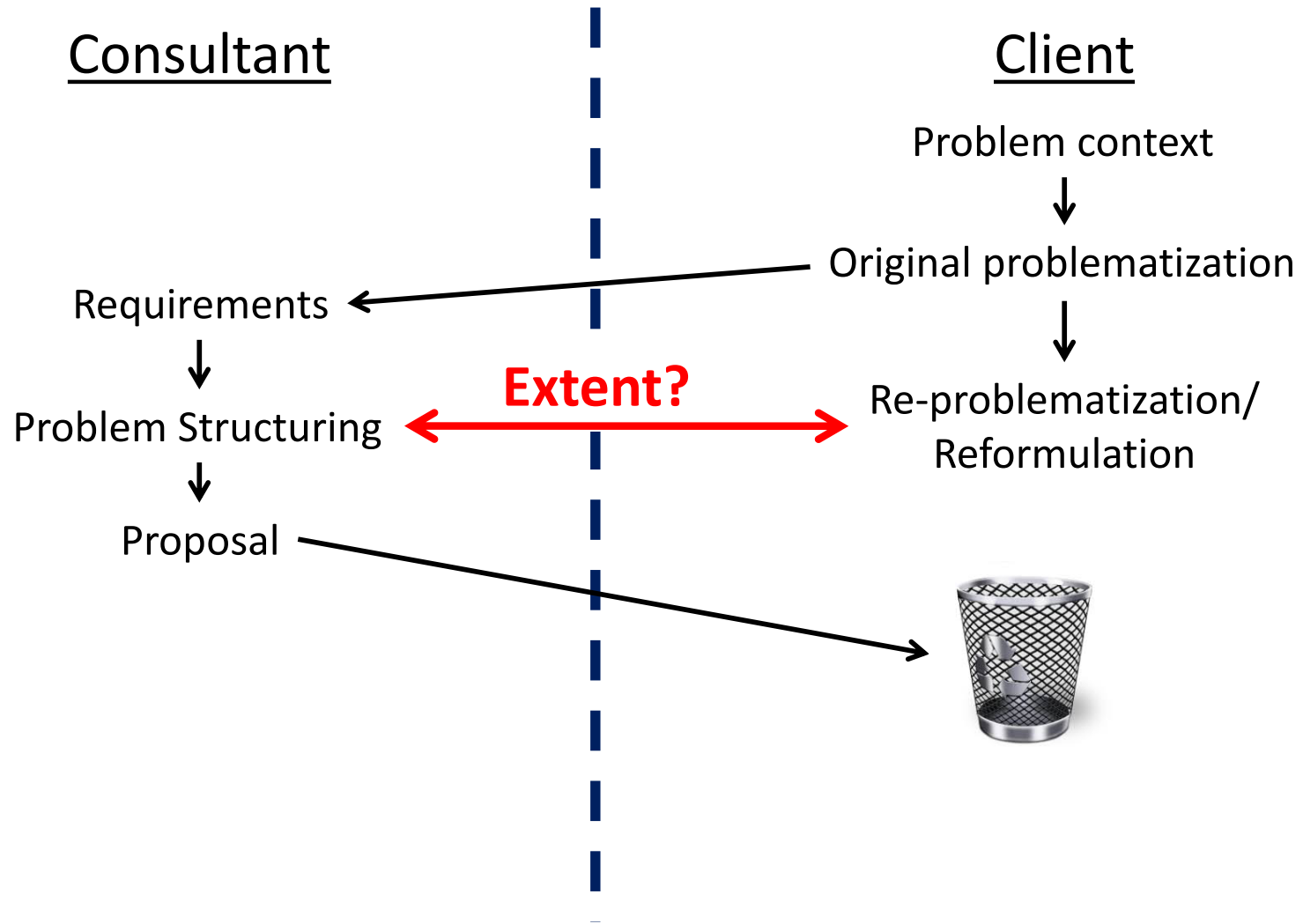
About project Future Firecrest

- > Length of contact: seven years with an option to extend for a further three years
- > Value: £180 million
- > Goal: a new global IT infrastructure, delivered by HP in partnership jointly with FCO Services, that provides a single online organisation for all FCO locations. The new adaptive IT infrastructure will be flexible and resilient to respond to events and emergencies that the FCO encounters on a regular basis.
- > Timescale: Roll-out of new hardware, software and services globally over a two-year period

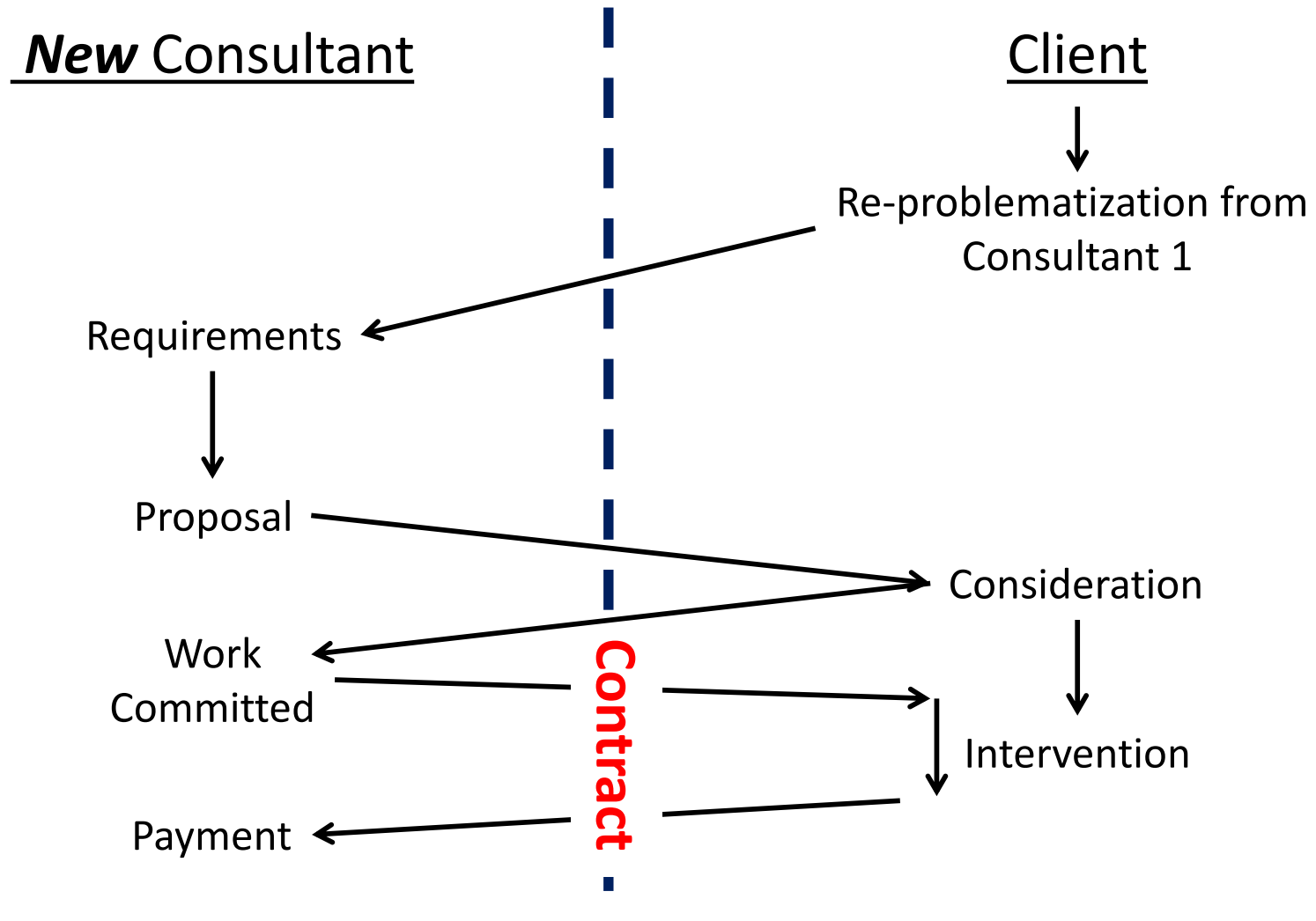
Analysis Scenario 2

- Any problem structuring prior to contract award is likely reduce risk (assertion, but testable), but how much is enough and who pays?
 - Depends on who bears risk usually
- Likely to depend on a number of factors
 - Messiness of the problem
 - Industry
 - Relative power
 - Incumbent/newcomer
 - Domain knowledge
 - Past history (trust)
- However, some possible severe downsides

Scenario 3



Scenario 4



Example of avoiding Scenario 4

```

XP1024 = component(16666665.0,1)
rp8400 = component(7252,1.24)
cat2950 = component(2500000,1)
rp2470 = component(20489,2.6)
DL380 = component(500,1)
firewall = or(cat2950,cat2950)
front = or(DL380,DL380)
midcomms = or(cat2950,cat2950)
midproc = or(rp2470,rp2470)
backcomms = or(cat2950,cat2950)
backdb = or(rp8400,rp8400)
rearcomms = or(cat2950,cat2950)
rearBack = or(XP1024,XP1024)
system=and(firewall,front,midcomms,
midproc,backcomms,backdb,rearcomms,rearBack)
    
```

Excel Formula: $=1-(1-{\$E\$6*{\$E\$9*{\$E\$12*{\$E\$15*{\$E\$18*{\$E\$21*{\$E\$24*{\$E\$27*1}}^{\wedge}FLOOR({\$I\$5,1})}$

	A	B	C	D	E	F	G	H	I	J	K
1	Mttr	0	Amber at	2							
2	Mtta	0									
3	Total Cost	0									
4	Name	Fix Cost	Var Cost	Req Avail	Avail	AvDown	MxDown	Mttf	Mttr	Mtta	
5	system	0	0	0.95	0.99999597	2.6		7.8	rep	1	
6	firewall	0	0	0.99375	1	1		3	repcat2950	1	repcat29502
7	cat2950	0	0	0.92094306	0.99999996	1		3	2500000	1	0
8	cat29502	0	0	0.92094306	0.99999996	1		3			
9	front	0	0	0.99375	0.99999602	1		3	repDL380	1	repDL3802
10	DL380	0	0	0.92094306	0.99800399	1		3	500	1	0
11	DL3802	0	0	0.92094306	0.99800399	1		3			
12	midcomms	0	0	0.99375	1	1		3	repcat29503	1	repcat29504
13	cat29503	0	0	0.92094306	0.99999996	1		3			
14	cat29504	0	0	0.92094306	0.99999996	1		3			
15	midproc	0	0	0.99375	0.99999998	2.6		7.8	reprp2470	1	reprp24702
16	rp2470	0	0	0.92094306	0.99987312	2.6		7.8	20489	2.6	0
17	rp24702	0	0	0.92094306	0.99987312	2.6		7.8			
18	backcomms	0	0	0.99375	1	1		3	repcat29505	1	repcat29506
19	cat29505	0	0	0.92094306	0.99999996	1		3			
20	cat29506	0	0	0.92094306	0.99999996	1		3			
21	backdb	0	0	0.99375	0.99999997	1.24		3.72	reprp8400	1	reprp84002
22	rp8400	0	0	0.92094306	0.99982904	1.24		3.72	7252	1.24	0
23	rp84002	0	0	0.92094306	0.99982904	1.24		3.72			
24	rearcomms	0	0	0.99375	1	1		3	repcat29507	1	repcat29508
25	cat29507	0	0	0.92094306	0.99999996	1		3			
26	cat29508	0	0	0.92094306	0.99999996	1		3			
27	rearBack	0	0	0.99375	1	1		3	repXP1024	1	repXP10242
28	XP1024	0	0	0.92094306	0.99999994	1		3	1666665	1	0
29	XP10242	0	0	0.92094306	0.99999994	1		3			

Implications for Consultants

- Assuming scenarios 3 and 4 can be avoided then there might be a ROI that can be worked out for how much at-risk pre-sales problem structuring to do with the client
 - Measuring cost of sales, success rates, and intervention outcomes from pursuits with, and without, pre-sales problem structuring workshops with clients
 - H_0 – No impact on win rates
 - H_0 – No impact on intervention delivery issues
- Ongoing work with Engineering Consultancy Ltd
- Extent will be difficult to control for, but still a useful route to gain data and test these hypotheses

Theory: problem structuring and information asymmetry

- In the case of consultancy organisations the difference between Scenario 1 and Scenario 2 is sufficiently binary to make it worthwhile trying to measure if there is an effect
- Is it possible to gamify the scenarios to conduct laboratory experiments?
 - Yearworth & White (2014) GCD paper says that problem structuring behaviours are likely to be common in some organisations dealing with messes
 - Lami & Tavella (2018) present empirical evidence that problem structuring-like behaviours might be occurring in experimental workshops (using SCA and ‘non-psm’ control groups)
 - Almost any group work is likely to involve problem structuring (White – a problem structuring mentality)
- Is there anything left by way of a PSM intervention effect that can be measured in the laboratory?
- Maybe micro-processes of GDN can help?

Micro-processes

- 'Atoms' of group activity that could be measured
 - Articulating a CATWOE, forming a root definition, sketching a top-level purposeful activity system model (SSM)
 - Rounds of Issue Gathering, Preferencing, Voting (SODA/Group Explorer)
- Methods/Theories
 - Ethnomethodology (Franco & Greiffenhagen, 2018)
 - Activity Theory (White, Burger & Yearworth, 2016)
 - Situated Affectivity (Burger, White & Yearworth, 2018)

A Possible Game

- Two sets of teams
- Mock requirements document from random domains setting out a problem
- Produce a fixed-price bid based on specified costings after 3 hours
 - 1st set of teams free to interpret requirements and bid without any imposed method
 - 2nd set of teams ~~facilitated~~—directed through rounds of issue gathering and preferencing using group explorer
 - Both sets of teams have fixed 1 hour individual research time (i.e. not as a team)
- Measure if any effect on bid price as well as differences between the micro-processes of decision making
 - Consensus forming, avoiding group think, collected efficacy, shared ownership (measured via surveying team members)

Conclusions

- Two empirical settings where we can revisit the question of value of PSM interventions quantitatively
- The commercial setting, apart from research hypotheses mentioned, opens up for investigation how PSM interventions effect trust in the formation of contracts
- The simple game could be developed along experimental economics laboratory lines

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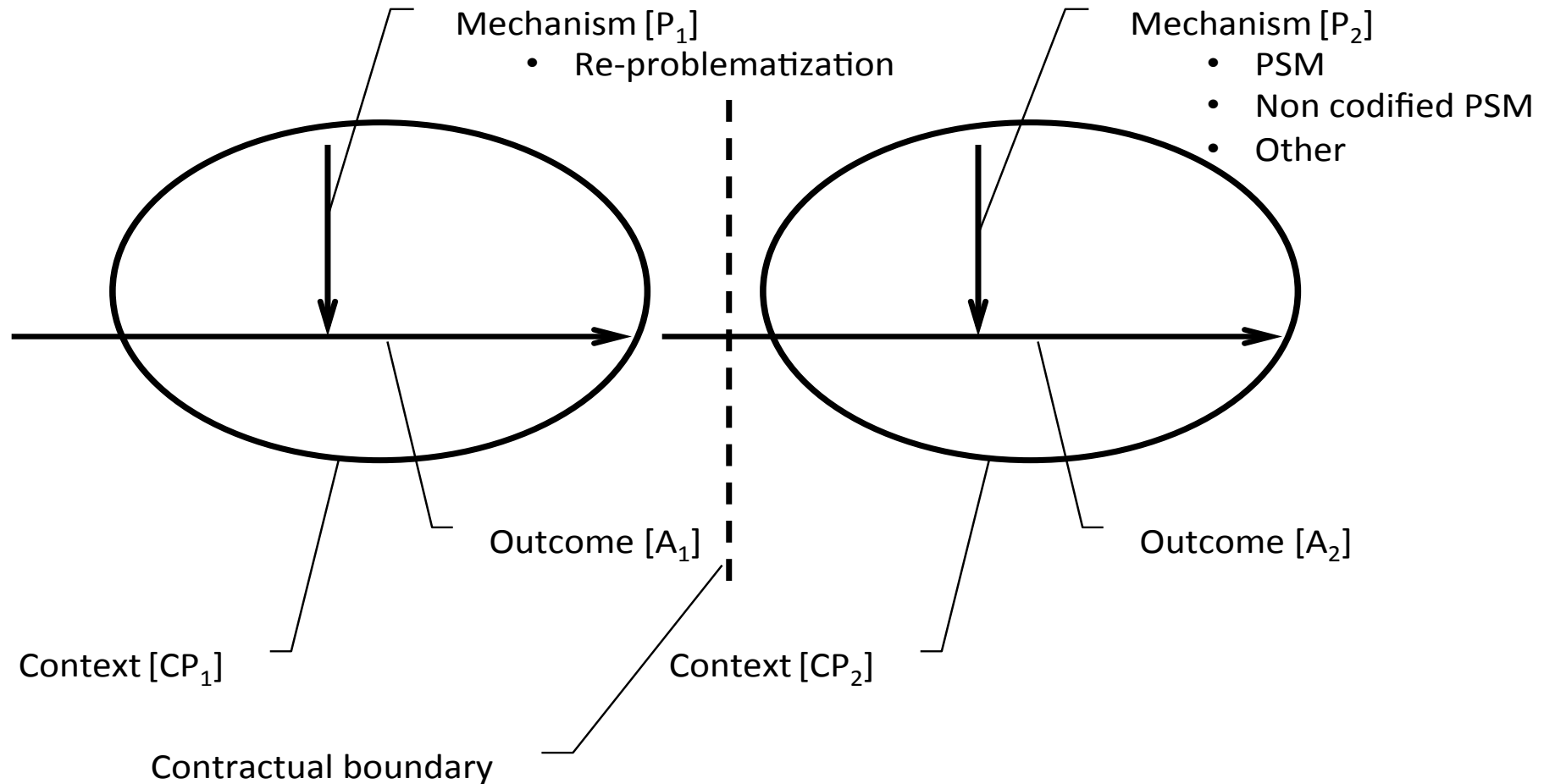
Questions?

Spare Slides

Mock Examples

- Scoping study on All Lane Running (ALR) – Highways Agency
- Pedestrian-ising the High-Street – Exeter City Council
- Establishing a business incubator mid-way between University and City Centre – Exeter City Council

CMO Model applied to a consulting organisation



(Pawson & Tilly, 1997)