



Public Private Partnerships (PPPs) in Transport: Performance Analysis – A Methodology

Champika Liyanage

Senior Lecturer, P3T3 Working Group Leader
University of Central Lancashire, UK





Presentation Overview

- Work involved in the COST project
- Methods applied
 - Case studies
 - Focus group
 - Delphi study
- Focus group findings
- Development of the Success Criteria
- Delphi Findings
- Conclusions





COST

- EU COST Networking project
- Public Private Partnerships in Transport – Trends and Theory
- 3 Working groups (WGs) and 2 Auxiliary working groups (AWGs).
- This presentation is based on Working Group 2 (WG2), which is on performance.





WG2

- **Title - ‘Success factors and Key Performance Indicators’**
- Targets PPP implementation by identifying success factors leading to successful projects and KPIs able to monitor performance.





Summary of Work Carried Out

Stage	Tasks Carried Out	Timescales
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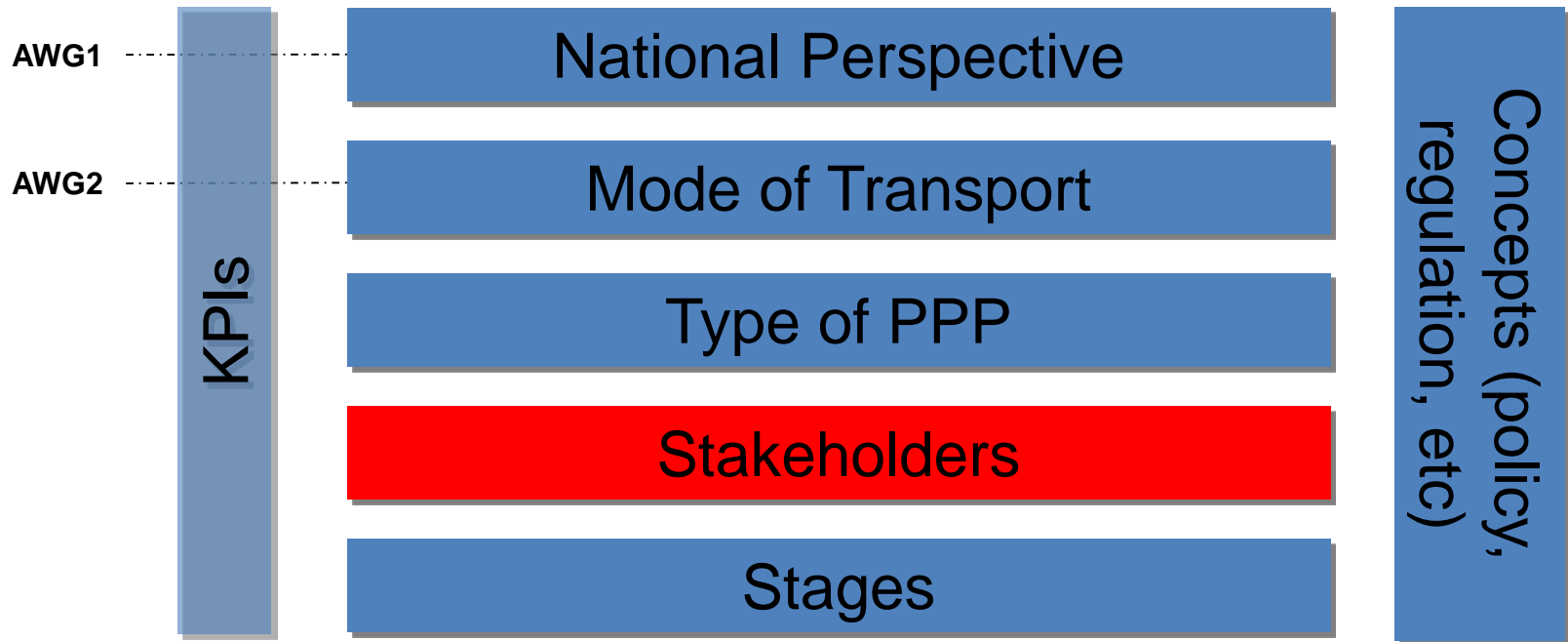
Summary of Work Carried Out

Stage	Tasks Carried Out	Timescales
Exploration	Literature Review Database Development of Performance Objectives Literature Analysis	Jan to Apr '11 Jun '11 Apr to Dec '11





Performance – Different levels



- Focus: Focus of the project will be on Performance of PPPs itself. So, no comparison will be made with other procurement modes.





Performance Objectives

- A set of Performance Objectives were developed using Stakeholder categories:
 - Private sector objectives
 - Public sector objectives
 - Users objectives



PUBLIC SECTOR OBJECTIVES



Objective	Category (element)
- User satisfaction	Operational
- Liberalization of the market	Strategic
- Innovation (come up with innovative solutions)	strategic/operational
- Risk allocation, risk reward ration	financial/strategic
- Traffic risks	Financial/Strategic
- Value for money	Financial
- Project management skills/experience	Operational
- Knowledge/technology transfer	Operational
- forming long term relationship (maximize opportunity)	Strategic
- Building trusts	
- Management of expectations	Strategic
- Import skills from the market	Strategic
- Development of policy/regulators	Strategic
- Specialize in regulations/procurement	Strategic
- Ongoing monitoring	Operational
- Institutional reform	Strategic
- Service differentiation	Strategic/operational
- Find the right balance between expectations between private entity, government and user	strategic/operational
- Health and safety	Strategic/operational
- Introduction of user charging	Financial
- To minimize costs, maximize user benefits	Strategic/financial
- Efficiency (whole life cycle costing)	Operational
- Effectiveness	Operational
- Sustainability	Strategic/operational





Literature Review Database

- The database consisted of 67 individual articles.





Literature Analysis

- Using Content Analysis (Exploration – Qualitative).
- Both manually and with the Use of QSR NVivo Software.
- The use of content analysis was mainly used to identify:
 - The list of CSFs and KPIs given within these literature.
 - The frequency of occurrence of these CSFs and KPIs to identify the significance of these.
- *Mladenovic et al., BEPAM Journal (Analysis of CSFs) – Already published.*





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Theory Building	Questionnaire Survey Case Studies KPIs target Table – Focus groups Case Analysis Success Criteria – Development of a methodology	March '12 Mar '12 to Mar '13 Jun '13 Mar to Dec '13 Dec '13 to Apr '14





Simple Questionnaire

- Simple Questionnaire (1 or 2 pages) – Open ended
 - Ask people to respond freely
 - 3 CSFs (Critical Success Factors)
 - 3 KPIs (Key Performance Indicators)
 - Why?
 - About 500 copies were distributed but only got 18 back: the number was insufficient to come to robust conclusions.





CASE STUDY STAGE





Case study template

- Case study template (P3T3 template) was developed in Dec 2012.
- In Performance section of the template:
 - Performance indicators explicit in contract; If so, list the performance indicators?
 - Penalties connected with the KPIs; If so, list them.
 - Can you identify the key factors that are critical to the project's success or failure? If so, list them and highlight their significance in a 5-point likert scale.





Case study analysis

- Both qualitative (descriptive) and quantitative (statistical) analysis.
 - *Voordjik et al.* (using Pattern Matching method)
 - *Ribeiro et al.* (Urbal rail)
- Using the aforementioned analysis, finally developed a methodology for success criteria.
 - *Liyanage and Vilalba-Romero, Transport Review : Awaiting confirmation for publication*





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Theory Testing	Applying the Success Criteria to 26 roads and bridges	Apr '14 to date





Main Outputs

- Success Criteria – A Methodology





Summary of Work Carried Out

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Theory Testing	Applying the Success Criteria to Road Cases	Apr '14 to date
Theory Refinement	Delphi study	Jun '14 to date





Main Outputs

- Weighting System for the Success Criteria





Summary of Work Carried Out

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Theory Testing	Applying the Success Criteria to Road Cases	Apr '14 to date
Theory Refinement	Delphi Study	June '14 to date
Transferability	Linking WG2 work with other WGs (national profiles and decision models)	Further work





Main Outputs

- Performance Measurement System (PMS) – on a draft form





PERFORMANCE MEASUREMENT SYSTEM (PMS)





First set of findings from the empirical results

- Development of set of Key Performance Indicators (KPIs)
- Set of **9** KPIs
- Set of **29** Questions to measure these KPIs (Performance Measures)
- Scale of Measurement
 - 5-point Likert scale : 1 to 3, 1 to 5 and -2 to +2
 - Binary scale : Yes/No
- Maximum Success Value:
 - E.g. 5-point likert scale: 5 could be the max. value for success.





KPIs target tables

KPIs	Performance Measures - Criteria	Scale	Success Max. Value	Case study 1
Contract project specifications	1. Has the deliverables specified clearly in the contract?	1 to 5	5	?
	2. Are the roles and responsibilities of different parties involved in the contract are clearly defined?	1 to 5	5	?
	3. Are minimum standards for condition of infrastructure and equipment specified in the contract?	1 to 5	5	?
	4. Are there any performance targets?	1 to 5	5	?
	5. Is the method of measuring performance targets clearly defined?	1 to 5	5	?
	6. Are there penalties for non-compliance?	1 to 5	5	?
	7. Does the contract have procedures for amendments, dispute resolution or termination?	Yes/No	Yes	?
	8. Has the contract proceeded without renegotiations?	Yes/No	Yes	?
	9. Are there any guarantees specified in the contract?	Yes/No	Yes	?



AUTHOR				Gilles Chomat / G. Bonnet	J.T. Voordijk Hans	Chris Boyles / Champika
PROJECT			TOTAL 28	Tram	Tunnel	Road
COUNTRY				France	Holland	UK
<u>KPIs</u>	<u>Questions</u>	<u>Success Criteria</u>	<u>Remarks</u>	<u>Caen TVR (O&M,Public Service Concession)- France</u>	<u>Coen Tunnel- France</u>	<u>BNRR M6 toll Road</u>
Contract project specifications	Has the deliverables specified clearly in the contract?	1 to 5	Please specify whether the deliverables are given in-depth.	4	3	4
	Are the roles and responsibilities of different parties involved in the contract are clearly defined?	1 to 5	Are there any deviations in terms of the roles and responsibilities ? If yes, Why? What was the outcomes (succuess/failure)?	4	4	5
	Are minimum standards for condition of infrastructure and equipment specified in the contract?	1 to 5	Are these standards quantitative or are these dealt with conditions or procedures (qualitative)?	3	5	5



Success Analysis – Mean Value?

- Mean value?
 - Mean value cannot be assessed because we did not have a uniform scale: some had 1 to 5, - 2 to +2 and Yes/No

To what extent has the objectives being achieved?	1	2	3	4	5
Has the financial outcome been equal or better than expected for the private partner?	-2	-1	0	1	2
Has the contract proceeded without renegotiations?	No		Yes		
Legal challenges to outcomes	Yes		No		





Success Analysis – Mean Value?

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To what extent has the objectives being achieved?	1	2	3	4	5
Has the financial outcome been equal or better than expected for the private partner?	-2	-1	0	1	2
Has the contract proceeded without renegotiations?	NO			Yes	
Legal challenges to outcomes	Yes			No	

Medium

Negative

Positive





Success Analysis - Colour Coding?

- Colour Coding According to the traffic light system.

To what extent has the objectives being achieved?	1	2	3	4	5
Has the financial outcome been equal or better than expected for the private partner?	-2	-1	0	1	2
Has the contract proceeded without renegotiations?	No		Yes		
Legal challenges to outcomes	Yes		No		

- Many Greens means Success?
- Many Reds means Failure?
- Many Yellows means – Neither Success nor Failure?





Evaluation of Success

- Define Success
- Altogether **26** cases were selected from the P3T3 database.
- Combination of Quantitative (Statistical) and Qualitative (QCA) analysis.





Defining Success

- Project management perspective:
 - Time, Cost and Quality
- Stakeholder perspective:
 - Public, Private and User
- PPP contract perspective:
 - Contract, Process, Results





Categorisation of KPIs and Performance Measures against the three perspectives – an example

KPIs	Performance Measures - Criteria	Perspectives		
		Project Management	Stakeholder	Contract Management
Construction Phase	Was the project completed on time?	Time	Public	Process
	Was the project completed within budget?	Cost	Public	Process
	Was the project completed according to the specifications and design?	Quality	Public	Process
Finance	Was finance available when needed?	Time	Private	Results
	Did the project result in financial benefits to user?	Cost	Users	Results
	Has the financial outcome been equal or better than expected for the private partner?	Cost	Private	Results





The three perspectives together

Project Management	Stakeholder	Contract Management
Quality (16) Time (3) Cost (13)	Public (19) Private (8) Users (5)	Contract (15) Process (9) Results (8)
<i>= The 'Overall' Success</i>		





Evaluation of the success criteria – An example

Category / Sub-Category	No. of performance measures under each perspective and KPI (A)	Score (Success – Failure) (B)	No. of Success factors (C)	Percentage of Success (D)	Conclusion (E)
QUALITY	16	10-3	10	63%	S/F
Contract Specifications	9	6-2	6	67%	s
TIME	3	2-1	2	67%	S/F
Tendering process	1	0-1	0	0%	f

An element of the Project Management perspective.

A KPI that comes under an element.

Number of success answers – Number of failure answers
Neutral answers are ignored (e.g. 3 of a 5-point likert scale, or 2 of a 3-point likert scale).

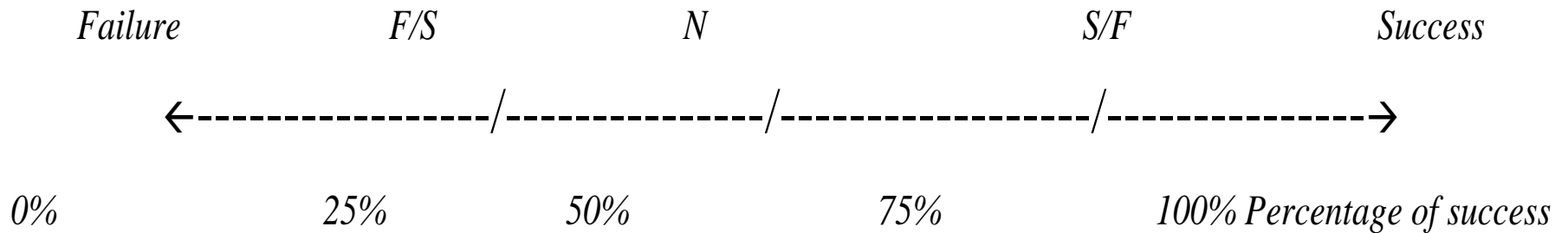
% of Success
 $(D) = (C) / (A) \times 100\%$

Final result – derived through both quantitative and qualitative analysis. This is presented in Capital letters for each main element and simple letters for each KPI.





Scale for deriving conclusions to evaluate the success criteria



S (or s) = Success;

F (or f) = Failure;

N (n) = Neutral;

S/F (or s/f) = More Success than Failure; and

F/S (or f/s) = More Failure than Success.

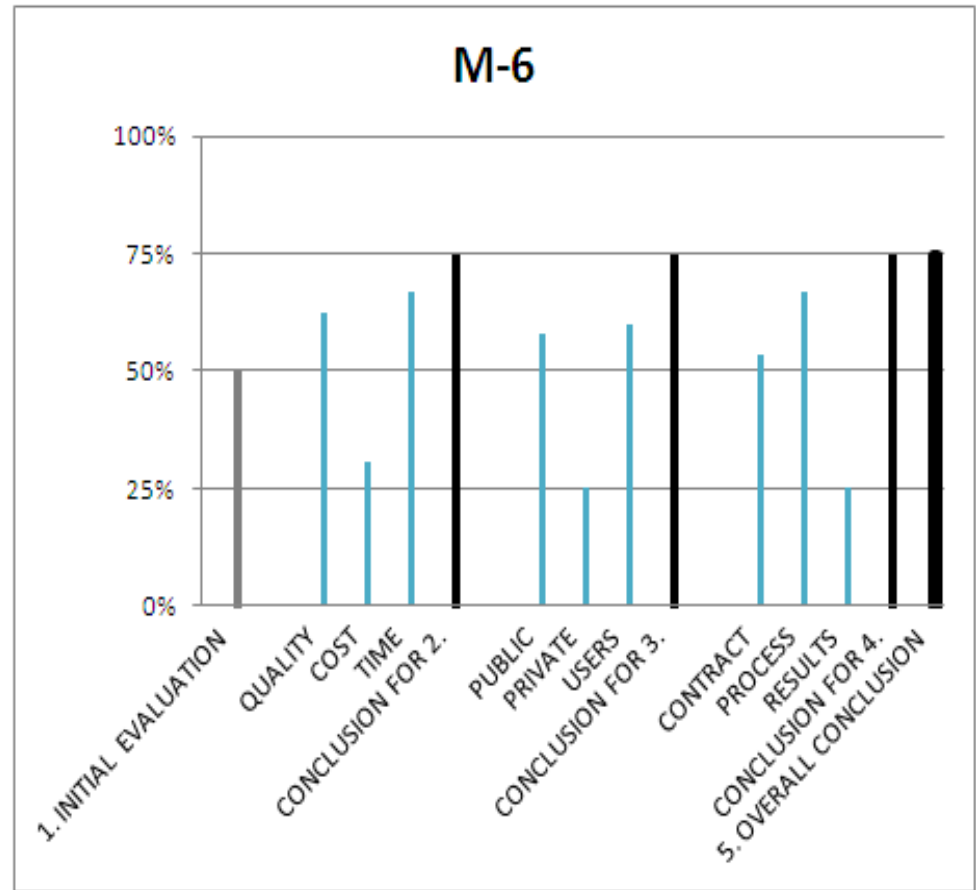




QCA analysis process

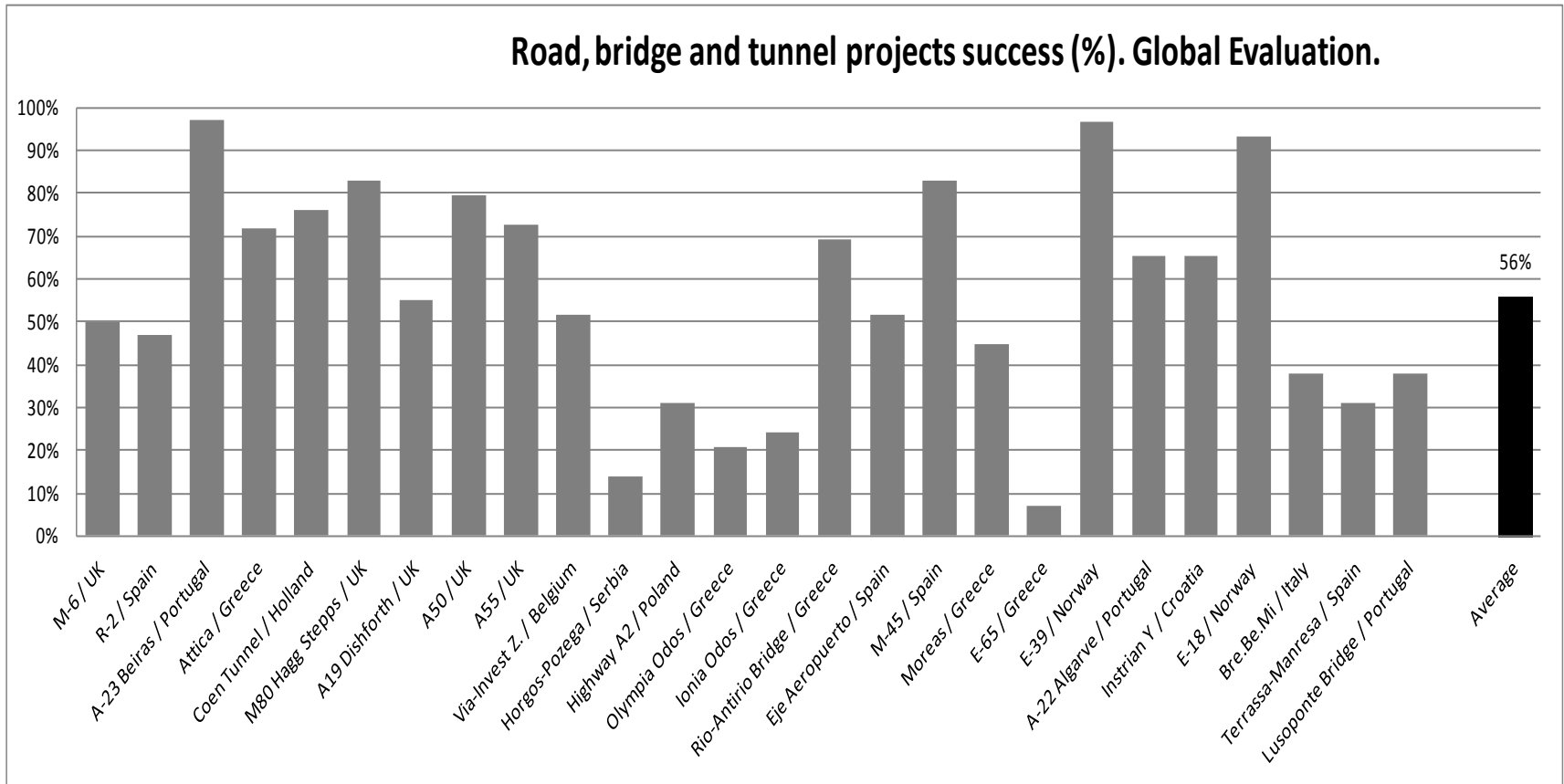
QCA Success Revaluation

1. INITIAL EVALUATION	50%	N
2. PROJECT MANAGEMENT PERSPECTIVE		
QUALITY	63%	S/F
COST	31%	F/S
TIME	67%	S/F
CONCLUSION FOR 2.		S/F
3. STAKEHOLDER PERSPECTIVE		
PUBLIC	58%	S/F
PRIVATE	25%	F
USERS	60%	S/F
CONCLUSION FOR 3.		S/F
4. CONTRACT MANAGEMENT PERSPECTIVE		
CONTRACT	53%	S/F
PROCESS	67%	S/F
RESULTS	25%	F
CONCLUSION FOR 4.		S/F
5. OVERALL CONCLUSION		S/F





Findings and Conclusions. Global project evaluation





Findings and Conclusions

CASE STUDIES	13 cases	Coen Tunnel Holland	M80 Hagg Stepps UK	A19 Dishforth UK	A50 UK	A55 UK	Via-Invest Z. Belgium	Horgos - Pozega Serbia	Highway A2 Poland	Olympia Odos Greece	Ionia Odos Greece	Rio-Antirio Bridge Greece	Eje Aeropuerto Spain	M-45 Spain
PERSPECTIVES /	No. of	Concl.	Concl.	Concl.	Concl.	Concl.	Concl.	Concl.	Concl.	Concl.	Concl.	Concl.	Concl.	Concl.
1. INITIAL EVALUATION	29	S/F	S/F	N	S/F	S/F	N	F/S	F/S	F/S	F/S	S/F	N	S/F
2. PROJECT MANAGEMENT PERSPECTIVE														
QUALITY	16	S	S/F	N	S/F	S/F	N	F/S	F/S	F/S	F/S	S/F	N	S
COST	10	N	S/F	N	N	N	F	F	F	F/S	F/S	S/F	F/S	S/F
TIME	3	S/F	S	S	S	S/F	S	F	S/F	F	F	S/F	S/F	S/F
CONCLUSION FOR 2.		S/F	S/F	N	S/F	S/F	N	F	N	F/S	F/S	S/F	N	F/S
3. STAKEHOLDER PERSPECTIVE														
PUBLIC	19	S	S/F	N	S/F	S/F	N	F/S	F/S	F/S	F/S	S/F	N	S/F
PRIVATE	5	F/S	S	S/F	S/F	N	S/F	F	N	F/S	F/S	S	N	S
USERS	5	S/F	S/F	S/F	S/F	S/F	F	F	N	F	F	S/F	F/S	S
CONCLUSION FOR 3.		S/F	S/F	S/F	S/F	S/F	N	F	N	F/S	F/S	S/F	N	S
4. CONTRACT MANAGEMENT PERSPECTIVE														
CONTRACT	15	S	S/F	F/S	S/F	S/F	F/S	F	F	F/S	N	N	N	S
PROCESS	9	S	S	S	S	S/F	S/F	F	N	F	F	S/F	S/F	S/F
RESULTS	5	S/F	S	F	S/F	S/F	F/S	F	S/F	F	F	S	F/S	S/F
CONCLUSION FOR 4.		S	S	F/S	S/F	S/F	F/S	F	N	F	F	S/F	N	S/F
5. Overall Conclusion														
		S/F	S/F	N	S/F	S/F	N	F	N	F/S	F/S	S/F	N	S/F





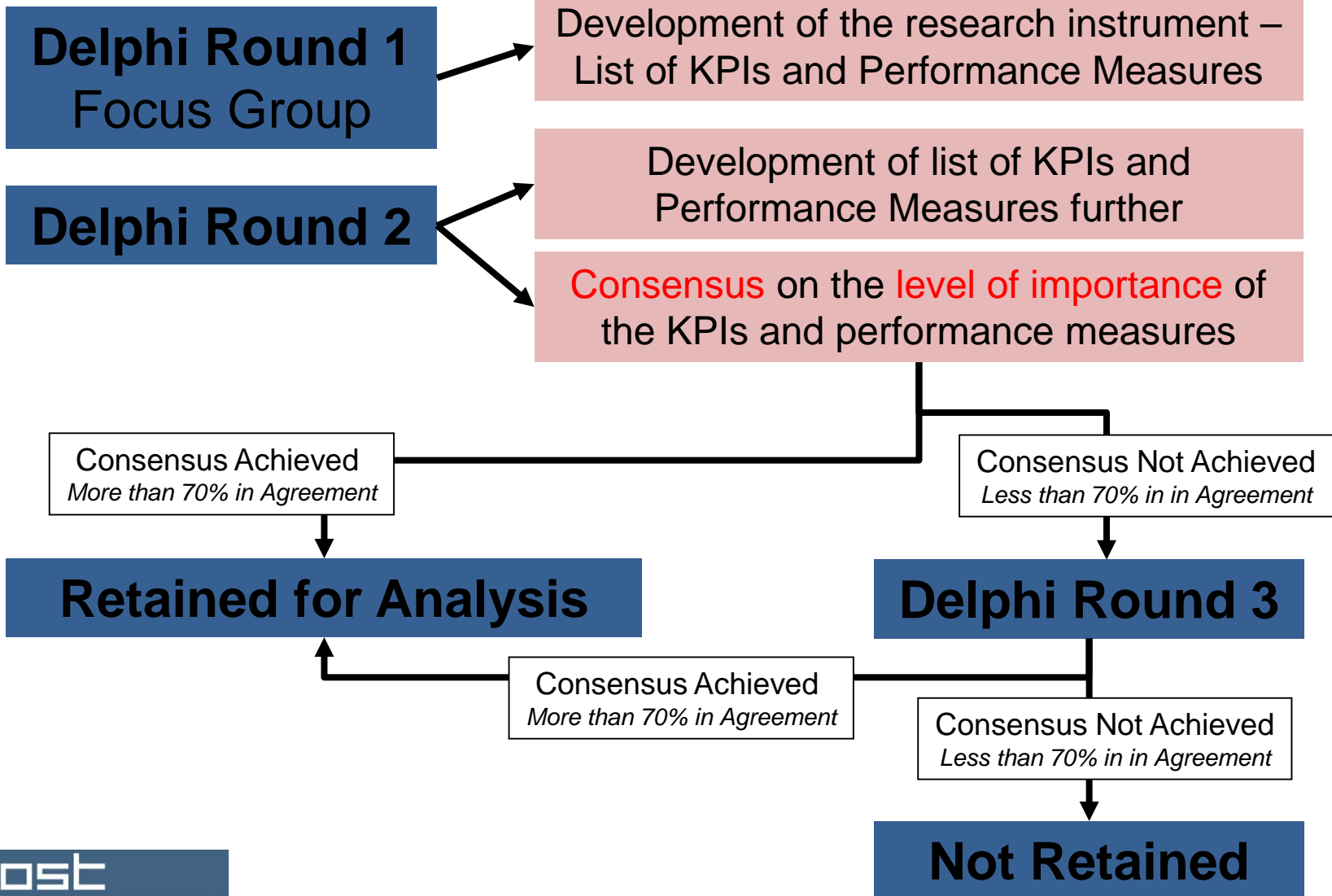
Delphi Study

- 3-round Delphi
 - Focus group
 - 2nd Round: 37 participants
 - 3rd Round: 34 participants
- [Delphi Questionnaire](#)





Delphi Rounds





Delphi Round 2

KPIs	Performance Measures - Criteria	Total responses	No. Positive responses	%	Interpretation	Mean	Consensus/ Retention
Contract Project spec. (9)	Are there penalties for non-compliance?	36	34	91.9	Important	4.5556	Yes/Retained
	Are the roles and responsibilities of different parties involved in the contract are clearly defined?	37	35	94.6	Important	4.3243	Yes/Retained
	Has the deliverables specified clearly in the contract?	37	32	86.5	Important	4.1892	Yes/Retained
	Does the contract have procedures for amendments, dispute resolution or termination?	37	27	73	Important	3.8919	Yes/Retained
	Are minimum standards for condition of infrastructure and equipment specified in the contract?	36	26	70.3	Important	3.7778	Yes/Retained
	Are there any performance targets?	37	25	67.6	Important	3.4865	No/Not retained
	Are there any guarantees specified in the contract?	37	19	51.3	Unimportant	3.4054	No/Not retained
	Is the method of measuring performance targets clearly defined?	37	12	32.4	Unimportant	2.9459	No/Not retained
	Has the contract proceeded without renegotiations?	37	10	27	Unimportant	2.9189	No/Not retained





Delphi Round 3

Performance Measures - Criteria	Total responses	No. Positive responses	%	Interpretation	Mean R3	Consensus/ Retention	Mean R2	R3-R2
Have/will user benefits been monitored?	34	29	85.3	Important	4.1765	Yes/Retained	3.3514	0.8251
Have user benefits been as large as expected?	34	22	64.7	Important	3.6471	No/Not Retained	3.0000	0.6471
Are the objectives specified in the contract SMART? Specific, Measurable, Achievable, Realistic and Time bound.	34	6	17.6	Unimportant	3.1765	No/Not Retained	3.4054	-0.2289
Are there any performance targets?	33	31	91.2	Important	3.9091	Yes/Retained	3.4865	0.4226
Are there any guarantees specified in the contract?	32	23	67.6	Important	3.7188	No/Not Retained	3.4054	0.3134





Assigning Weightings

Scale	Weight
≤ 4.28 to ≥ 5	4
≤ 4.01 to > 4.28	3
≤ 3.75 to > 4.01	2
< 3.75	1

KPI	Performance Measures – Criteria (P)	Mean	Rank	Weight (W)	Weighted Score (WS) N(P)*W	$\frac{\sum(WS)}{N(P)}$	Answer
Contract Project spec. (9)	Are there penalties for non-compliance?	4.5556	1	4	2(4)=8	20/9	2.2
	Are the roles and responsibilities of different parties involved in the contract are clearly defined?	4.3243	3	4			
	Has the deliverables specified clearly in the contract?	4.1892	7	3	1(3)=3		
	Are there any performance targets?	3.9091	17	2	3(2)=6		
	Does the contract have procedures for amendments, dispute resolution or termination?	3.8919	18	2			
	Are minimum standards for condition of infrastructure and equipment specified in the contract?	3.7778	20	2	3(1)=3		
	Are there any guarantees specified in the contract?	3.7188	21	1			
	Is the method of measuring performance targets clearly defined?	3.2500	27	1			
	Has the contract proceeded without renegotiations?	3.0606	30	1			





Performance Measurement System

- [An example](#)





Main Conclusions

- **Efforts to measure** the success of projects have been made by numerous researchers.
- **No single methodology** has proven to be the best due to the nature of construction projects and due to the complexity surrounding different contextual factors of projects.
- The **main contribution** of this research, however, is **not** these **final conclusions**; **but the methodology** adopted to derive conclusions at assessing success.
- The **KPIs should be systematically developed** in a **standardised** format according PPP policy regulations/frameworks.



Thank you for your attention!

Champika Liyanage

CLLiyanage@uclan.ac.uk

For more information please visit:

www.ppptransport.eu

www.benefit4transport.com

