



Once the Shovel Hit the Ground: A Qualitative Comparative Evaluation into Achieving Satisfaction in the Implementation of 27 Dutch Transportation Infrastructure Projects

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Overview

- ∞ Research background
- ∞ Qualitative Comparative Analysis of 27 Rijkswaterstaat projects
- ∞ Results and conclusions
- ∞ References (and extra slides)



Research background

- ∞ Focus of the research:
 - ∞ Evaluation of transportation infrastructure projects
 - ∞ Management and public-private cooperation
 - ∞ Project implementation, i.e. after contract closure (construction and delivery)

- ∞ Two case studies: A2 Maastricht & A15 MaVa (finished)
- ∞ Comparison of the two case studies (in review)



Research background

∞ Comparing patterns found in case studies: A versus F

Configuration	Conditions			Satisfaction	Events
	Source of the event	Response orientation	Cooperation		
A	Social	Internal		Low	9 (A15 MaVa)
B		Internal	Private actor autonomously	Low	6 (A2 Maastricht) 7 (A15 MaVa)
C		Internal	Public actor autonomously	High	2 (A2 Maastricht)
D	Physical	Internal	Cooperation between partners	High	1 (A2 Maastricht)
E	Physical	Internal	Public partner intermediates	High	1 (A15 MaVa)
F	Social	External		High	9 (A2 Maastricht) 7 (A15 MaVa)



Research background

∞ Comparing patterns found in case studies: **B versus C+D+E**

Configuration	Conditions			Satisfaction	Events
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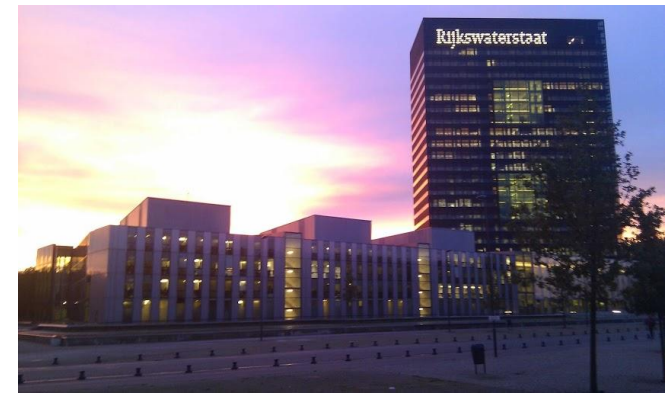


Research background

- ∞ Can we find further evidence for the patterns in the case studies?



- ∞ Comparative analysis of 27 Rijkswaterstaat projects
 - ∞ Attempt to test the patterns from the case studies + *additional factors*
 - ∞ Data were derived from the Rijkswaterstaat Project Database
 - ∞ Worked as a visiting researcher at Rijkswaterstaat for a year
 - ∞ Combining qualitative and quantitative data
 - ∞ More generalization at the expense of in-depth case knowledge



Comparison 27 projects

∞ Testing patterns from the case studies + additional factors?

	A2 Maastricht	A15 MaVa
Management	Internal-oriented: 50% of events External-oriented: 50% of events	Internal-oriented: 65% of events External-oriented: 35% of events
Cooperation	More cooperation-oriented, working together in responding to events	More acting autonomously, stressing boundaries between public and private partners
Satisfaction	Lower (50% of events) - Higher (50% of events) Qualitative: generally project was going well	Lower (60% of events) - Higher (40% of events) Qualitative: difficult project implementation
Contract type	D&C and 'alliance-ish' elements	DBFM
Scope	Integral project	Transportation infrastructure
Project size	Smaller	Larger



Comparison 27 projects

∞ Analysis step 1:
data matrix

Average level of
completeness is
73%, with M 74%
and SD 17%

Project	Data	CONT	SCOPE	SIZE		MAN	COOP	SATIS		Completeness
				Raw (k€)	Cal.			Raw	Cal.	
P.0008	2013	1	0.33	278146	0.67	0.67	0.33	13.00	0.67	59%
P.0029	2013	1	0.00	274787	0.67	0.33	0.00	16.00	1.00	102%
P.0034	2013	1	1.00	620693	1.00	1.00	1.00	15.00	1.00	49%
P.0059	2011	1	0.33	114215	0.33	0.67	0.00	15.00	1.00	70%
P.0077	2012	1	0.67	276962	0.67	0.67	0.33	14.00	1.00	76%
P.0094	2013	1	1.00	319694	0.67	1.00	0.67	11.67	0.33	83%
P.0095	2012	1	0.00	97741	0.33	0.67	0.33	14.67	1.00	69%
P.0096	2011	1	0.00	103709	0.33	0.33	0.00	12.00	0.33	85%
P.0102	2011	1	0.00	48783	0.00	1.00	0.00	14.00	1.00	76%
P.0149	2013	1	0.67	686322	1.00	1.00	0.33	11.00	0.33	41%
P.0165	2011	1	0.33	211000	0.33	0.33	0.00	9.67	0.00	96%
P.0179	2013	1	0.00	121555	0.33	1.00	0.33	9.67	0.00	46%
P.0190	2013	0	0.67	2268904	1.00	0.00	0.00	8.67	0.00	65%
P.0196	2012	1	0.67	127013	0.33	1.00	1.00	15.33	1.00	77%
P.0200	2011	1	0.00	55391	0.00	1.00	0.00	15.00	1.00	90%
P.0218	2012	0	0.67	2187177	1.00	0.67	0.33	10.67	0.33	67%
P.0227	2013	1	0.67	300261	0.67	0.67	0.00	11.33	0.33	56%
P.0247	2012	0	0.00	683008	1.00	1.00	1.00	16.00	1.00	89%
P.0272	2013	1	0.33	547430	0.67	0.67	0.67	14.67	1.00	74%
P.0319	2013	1	0.00	54750	0.00	0.33	0.00	15.00	1.00	89%
P.0351	2013	0	0.00	332229	0.67	1.00	0.67	14.67	1.00	45%
P.0631	2013	1	0.00	9488	0.00	1.00	0.33	15.33	1.00	88%
P.0641	2012	1	0.00	163773	0.33	1.00	0.00	16.00	1.00	101%
P.0755	2013	1	0.00	159293	0.33	0.33	0.00	14.67	1.00	68%
P.1106	2013	1	0.33	21473	0.00	0.00	0.00	9.00	0.00	56%
P.2355	2012	1	0.00	42997	0.00	0.00	0.33	10.67	0.33	85%
P.2365	2012	1	0.00	320761	0.67	1.00	0.00	12.67	0.67	63%

Comparison 27 projects

∞ Analysis step 2: truth table

No.	CONT	SCOPE	SIZE	MAN	COOP	SATIS	N	incl.	PRI	Cases
8	0	0	1	1	1	1	2	1.000	1.000	P.0247, P.0351
28	1	1	0	1	1	1	1	1.000	1.000	P.0196
21	1	0	1	0	0	1	1	0.909	0.875	P.0029
32	1	1	1	1	1	1	2	0.898	0.854	P.0034, P.0094
19	1	0	0	1	0	1	7	0.884	0.864	P.0059, P.0095, P.0102, P.0179, P.0200, P.0631, P.0641
23	1	0	1	1	0	1	2	0.875	0.819	P.0008, P.2365
24	1	0	1	1	1	1	1	0.875	0.834	P.0272
31	1	1	1	1	0	0	3	0.724	0.568	P.0077, P.0149, P.0227
17	1	0	0	0	0	0	6	0.681	0.597	P.0096, P.0165, P.0319, P.0755, P.1106, P.2355
15	0	1	1	1	0	0	1	0.493	0.000	P.0218
13	0	1	1	0	0	0	1	0.330	0.000	P.0190

Number of logical remainders: 21



Results and conclusions

- ∞ Analysis step 3: Truth table minimization (= results) for satisfactory outcomes

		incl.	cov.r	cov.u	Cases
1	CONT*SCOPE*MAN*COOP	0.907	0.181	0.091	P.0196; P.0034, P.0094
2	CONT*scope*MAN*coop	0.871	0.491	0.237	P.0059, P.0095, P.0102, P.0179, P.0200, P.0631, P.0641; P.0008, P.2365
3	CONT*scope*SIZE*coop	0.883	0.272	0.019	P.0029; P.0008, P.2365
4	scope*SIZE*MAN*COOP	0.929	0.236	0.128	P.0247, P.0351; P.0272
	Solution	0.891	0.746		

CONT = D&C

SCOPE = integral

MAN = externally-oriented

COOP = cooperation-oriented

SIZE = larger

cont = DBFM

scope = solely transport (small scope)

man = internally-oriented

coop = contract-oriented

size = smaller



Results and conclusions

- ∞ Conclusion, some highlights
- ∞ In project implementation...
 - ∞ Externally-oriented management and public-private cooperation are indeed important contributors to satisfaction in transportation infrastructure project implementation (confirms case-study results of A2 Maastricht and A15 MaVa)
 - ∞ Smaller projects with a single spatial function (narrow scope) can be managed satisfactorily with less cooperation, and thus more strictly by contract
 - ∞ Larger, integral projects need more externally-oriented management and a more intensive public-private cooperation beyond the contract

References

- ∞ Some publications based on this PhD research
 - ∞ Verweij (2015). Achieving satisfaction when implementing PPP transportation infrastructure projects: A qualitative comparative analysis of the A15 highway DBFM project. [*International Journal of Project Management*](#).
 - ∞ Verweij & Gerrits (2014). How satisfaction is achieved in the implementation phase of large transportation infrastructure projects: A qualitative comparative analysis into the A2 tunnel project. [*Public Works Management & Policy*](#).
 - ∞ Verweij & Gerrits (2013). Understanding and researching complexity with qualitative comparative analysis: Evaluating transportation infrastructure projects. [*Evaluation*](#).
 - ∞ Verweij (2012). Management as system synchronization: The case of the Dutch A2 passageway Maastricht project. [*Emergence: Complexity & Organization*](#).
 - ∞ Reynaers & Verweij (2014). Kritisch kijken naar kansen: De schaduwzijden van DBFMO. [*ROmagazine*](#).
 - ∞ Verweij (2013). Ingewikkeld? Kijk goed om je heen! Sociale complexiteit in de uitvoering vraagt om een blik naar buiten. [*Infra*](#).
 - ∞ Verweij (2012). Systeemsynchronisatie bij gebiedsontwikkeling Avenue2 Maastricht: Overheid en markt doen beide waar ze goed in zijn. [*ROmagazine*](#).
- ∞ See www.stefanverweij.eu for more references
- ∞ Contact: verweij@fsw.eur.nl



Extra slide: project data

- ∞ The project data: 27 projects
 - ∞ Average completeness-level: 73% (M 74%, SD 17%)
 - ∞ Days from 'shovel in the ground' to 'now' divided by days between 'shovel in the ground' until (planned) project delivery date
 - ∞ Average satisfaction: 13.16 on a scale from 0 to 16 (quantitative)
 - ∞ Contract: 4 x DBFM, 23 x D&C
 - ∞ Few integral projects
 - ∞ Average project size: €k 386.206 (i.e. over € 386 million) (quantitative)
 - ∞ Periodical management reports (qualitative)
 - ∞ Information about management and cooperation orientations
 - ∞ Total of 202 pages



Extra slide: calibration

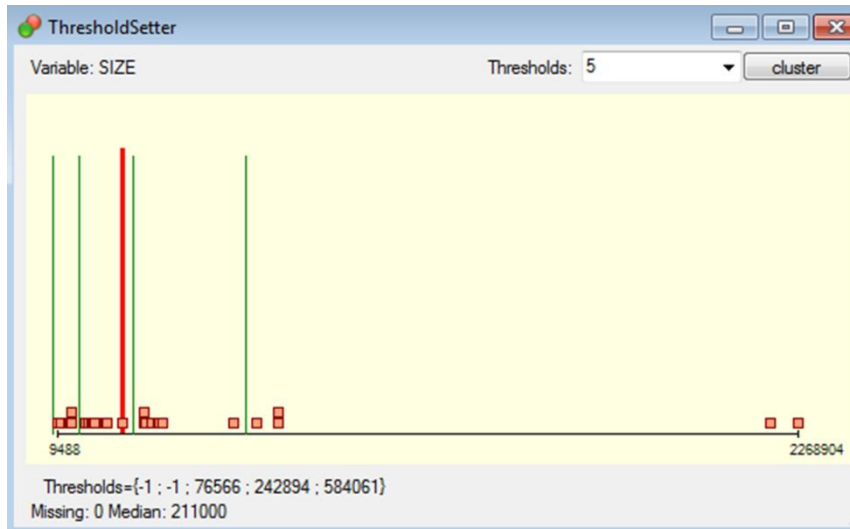
- ∞ Determining the fuzzy-set values of the projects: calibration

	Calibration: how are the fuzzy-set values arrived at?
Management	<ol style="list-style-type: none"> 1. Coding qualitative management reports of the projects on management indicators (total 202 pages) 2. Qualitatively cross-comparing projects, scoring
Cooperation	<ol style="list-style-type: none"> 1. Coding qualitative management reports of the projects on management indicators (total 202 pages) 2. Qualitatively cross-comparing projects, scoring
Satisfaction	<ol style="list-style-type: none"> 1. Calibrating project manager's quantitative periodic assessments using Tosmana Threshold Setter 2. 0.00 (8.67-10.17), 0.33 (10.18-12.34), 0.67 (12.35-13.50) and 1.00 (13.51-16.00)
Contract type	<ol style="list-style-type: none"> 1. Data derived from project managers and database 2. Direct coding
Scope	<ol style="list-style-type: none"> 1. Examining data from project descriptions from Project Database and MIRT Project Books 2. Direct coding
Project size	<ol style="list-style-type: none"> 1. Calibrating most recent prospective project costs using Tosmana Threshold Setter 2. 0.00 (9.488-75.566), 0.33 (76.567-242.894), 0.67 (242.895-584.061) and 1.00 (584.062-2.268.904)



Extra slide: calibration

- ∞ Example of calibration: project size and satisfaction
 - ∞ Similar cases are grouped together, different cases are separated
 - ∞ Tosmana Threshold Setter performs a cluster analysis



Extra slide: calibration

∞ Summary of calibrated conditions

	Lower fuzzy-set values 0.00 and 0.33	Higher fuzzy-set values 0.67 and 1.00
Management	Internally-oriented	Externally-oriented
Cooperation	More contract-oriented	More cooperation-oriented
Satisfaction	Lower	Higher
Contract type	DBMF	D&C
Scope	Narrow scope	More integral projects
Project size	Smaller	Larger

