

# Evaluating Bids on Price and Quality: Implementations and Effects in Swedish Tenders of Public Transport

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vti



K2: Sweden's national centre for research  
and education on public transport



# Background

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- Two main criteria for awarding contracts in government procurement by auction (tendering):
  - Lowest price with a minimum acceptable level of quality (requirements).
  - Best price-to-quality ratio/Best value/Economically most advantageous tender.

# Background

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  - Best price-to-quality ratio/Best value/Economically most advantageous tender.
- Bidding in both price and level of quality
  - Some selected qualities (ex. vehicle fleet, past performance).
    - Other important qualities: Minimum acceptable level of quality.
  - Buyer must define a joint scoring rule for price and quality.
    - Highest score wins the auction.

# This study

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- Aim: Contribute to the limited knowledge on implementations and performance of scoring rules.
- Case: Swedish contracts for public bus service
  - Contracts active in December 2015 (n: 565), tendered 2007-2015, 206 awarded with scoring rule.
  - Contract dataset (Andreas Vigren, VTI/Dept. of Finance) expanded with data on implementations of scoring rules.



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# This study

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- Two research questions:
  - Were scoring rules implemented in accordance with what relevant theory suggests?
  - Did the use of scoring rule auctions lead to higher delivered quality measured as punctuality?



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# Lowest price vs scoring rule

- Challenge with Lowest price if the PTA does not have good knowledge on cost of additional quality:
  - The minimum level of quality may cost more than it tastes.
  - Or set too low given the PTA's willingness to pay for quality.
  - Examples: Emission level, number of buses, on-board wifi speed.



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  - Examples: Emission level, number of buses, on-board wifi speed.
- Theoretical benefit of scoring rules:
  - With a scoring rule reflecting how much the PTA values additional levels of quality in relation to price,
  - the operator can offer an optimal combination of price and quality given its cost of quality and the PTA's preferences.



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Letting operators offer a combination of price and quality suitable for their specific costs of production appears superior, but ...

... previous research has found that scoring rules frequently are poorly implemented, limiting or even counteracting their anticipated effects.

# Public bus services in Sweden

- 21 Public Transport Authorities (PTA)
  - Competitive tendering introduced in late 1980's.
    - Mature tendering organisations.
    - Only one PTA has in-house production.
  - Tendered traffic with the PTA's brand, colour and design.
    - PTAs sets time-tables with little involvement from operator.
    - Contracts between 8-10 years.
  - Operator: Vehicles, drivers and other input factors.



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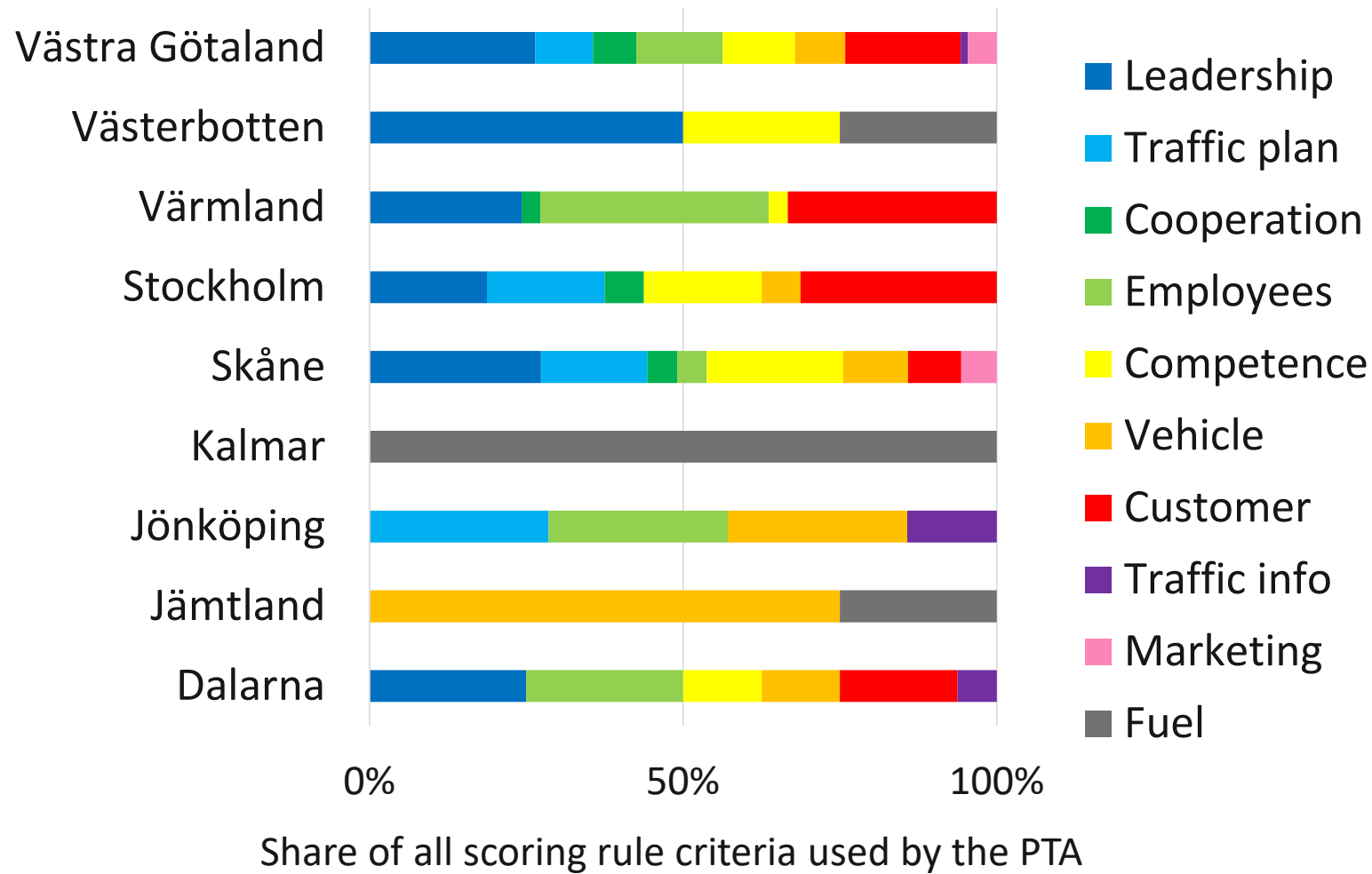
## Too what degree were scoring rules used?

County	Value, milj. €	Scoring rule, % of n	Low bid won, % of n	Win bid/Low bid, mean
Dalarna	47.8	100%	83%	1%
Jämtland	14.7	75%	83%	0%
Jönköping	32.4	100%	73%	2%
Kalmar	26.8	100%	100%	0%
Skåne	172.0	94%	68%	1%
Stockholm	464.6	100%	89%	0%
Värmland	41.7	83%	9%	9%
Västerbotten	82.9	15%	.	.
Västra Götaland	338.8	33%	45%	7%
Östergötland	.	27%	.	.

Counties with no scoring rule contracts: 9

Counties with in-house production: 1

## What qualities are included in the scoring rule?



## **Crit. 1      Organisation and leadership**

- |     |   |
|-----|---|
| 1.1 | How the management creates a culture where the customers demand, needs and expectations are of the highest importance.                                    |
| 1.2 | How the management on all levels monitor all results of the operation, not only economical.   |
| 1.3 | How you decompose and present visions, strategies, goals and plans of action for different areas of responsibility and individual employees.              |
| 1.4 | How you organise the operations with respect to responsibility and mandate for governance and development of the processes of the operation.              |
| 1.5 | How you make sure that information needed for the operations are relevant and reliable and made accessible for users within and outside the organisation. |

...

...

5 of 13 criteria which are then:

- graded (1-5)
- assigned varying weights
- aggregated to a total score.

The total score for quality is then combined with the total score for price, with some formula.

Verifiable?

- At the time of bidding
- During the contract

## How were scoring rules implemented?

County	Quality criteria, n	Quality criteria letters, n	Equal weight
Dalarna	16	2036	No
Jämtland	2;5	559;576	Yes
Jönköping	7	4593	Yes
Kalmar	1	215	Yes
Skåne	6-13	395-3142	No
Stockholm	2-4	170-1494	No
Värmland	10	3671	Yes
<u>Västra Götaland</u>	11;12	7729;1894-3089	Yes; No

One A4 with text: About 3 000 letters.

Model	I	II	III	IV
Estimator	OLS	RE	FE	HT
Scoring rule contract	0.016	0.001	.	-0.044
ln(Trips)	-0.016	0.029***	0.032***	0.032***
Vehicle km	0.012	0.027	.	0.065
ln(Trips)*Vehicle km	-0.002	-0.004*	-0.004*	-0.004*
City traffic	0.106**	0.030	.	-0.137
Temperature	-0.000	-0.001	-0.001	-0.001
Precipitation	-0.007***	-0.007**	-0.006**	-0.006**
Temp*Precipitation	0.001***	0.001**	0.001**	0.001**
Constant	0.865***	0.503***	0.570***	0.526***
Month and Year	Yes	Yes	Yes	Yes
BUS2010	Yes	Yes	No	Yes
Observations	838	838	838	838
R-squared	0.419	0.327	0.663	.

**Dependent variable:** Punctuality  $\in [0, 1]$ .  
Less than: 30 sec. early/3 min late.

#### Accounting for systematic differences in punctuality

Ex: Routes with more trips often run in denser traffic and on a more complex road grid.

RE: Random effects  
FE: Fixed effects  
HT: Hausman Taylor

Monthly data on 16 routes August 2014 to April 2019. Västra Götaland (2nd most pop. region).

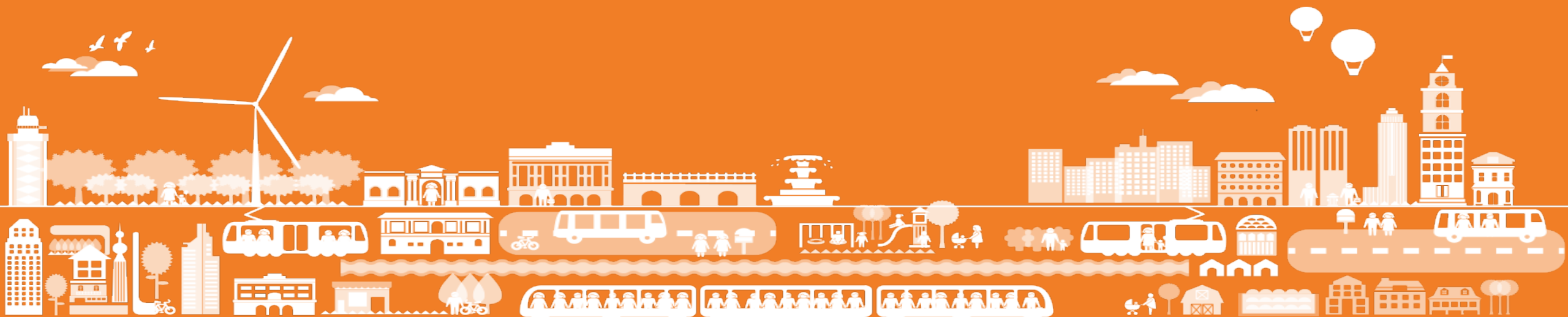
\* $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

# Conclusion

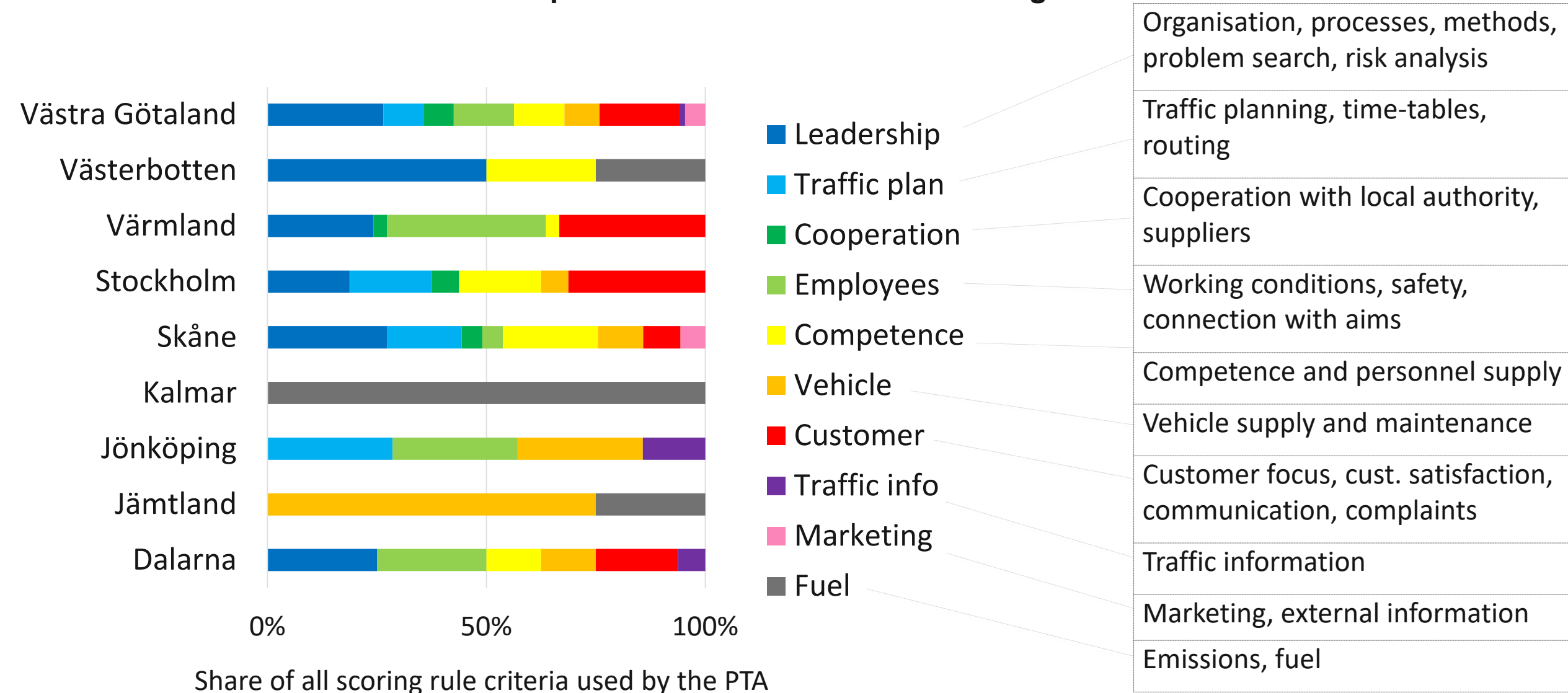
- Empirical findings
  - Implementation: Large variations, high complexity, vague criteria and low verifiability of evaluated qualities.
  - Effect on quality: No support of a positive effect of scoring rules.
- Policy recommendations
  - Need for national guidelines.
  - Evaluate only verifiable quality, as theory suggest.
    - If to attain better value.
    - Lower risk of applications of review.
  - More caution in promoting scoring rules and other procurement policies supported by theory but lacking empirical support.
  - Do not underrate Lowest price award criteria with a minimum level of acceptable quality aligned with the buyer's preferences.



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## What qualities are included in the scoring rule?



Evaluation dimensions	Point:	1	2	3	4	5
<u>Approach</u>	<u>Systematic</u> <i>Processes, methods, systems are established.</i>	Systematic missing	Systematic initiated	Partly Systematic	Essentially Systematic	Systematic
	<u>Integration</u> <i>Coherent with other approaches.</i>	Integration missing	Integration essentially missing	Partly integrated	Essentially integrated	Integrated
	<u>Proactive</u> <i>Proactive to failure, problem and risk.</i>	Reactive	Essentially more reactive than proactive	Partly proactive	Essentially proactive	Proactive
<u>Evaluation and improvement</u>	Systematic	Evaluation and improvement missing	Evaluation and improvement essentially missing	Partly systematic evaluation and improvement	Essentially systematic evaluation and improvement	Systematic evaluation and improvement

A	Angreppssätt			Utvärdering och förbättring			Delsumma		Summa
	B	C	D	E	F	G	H	I	J
	Poäng 1-5	vikt	BxC	Poäng 1-5	vikt	ExF	D+G	vikt	HxIx10
1.1		0,4			0,6			0,2	
1.2		0,4			0,6			0,2	
1.3		0,4			0,6			0,2	
1.4		0,4			0,6			0,2	
1.5		0,4			0,6			0,2	
2.1		0,4			0,6			0,3	
2.2		0,4			0,6			0,3	
2.3		0,4			0,6			0,2	
2.4		0,4			0,6			0,2	
3.1		0,4			0,6			0,5	
3.2		0,4			0,6			0,5	
4.1		0,4			0,6			0,5	
4.2		0,4			0,6			0,5	
5.1		0,4			0,6			0,3	
5.2		0,4			0,6			0,3	
5.3		0,4			0,6			0,4	
<b>Total</b>									