Views on the cost assessment undertaken in the 2019 price control in England and Wales

First European Forum on Regulation of Water Services

Alan Horncastle, Partner

3 December 2019

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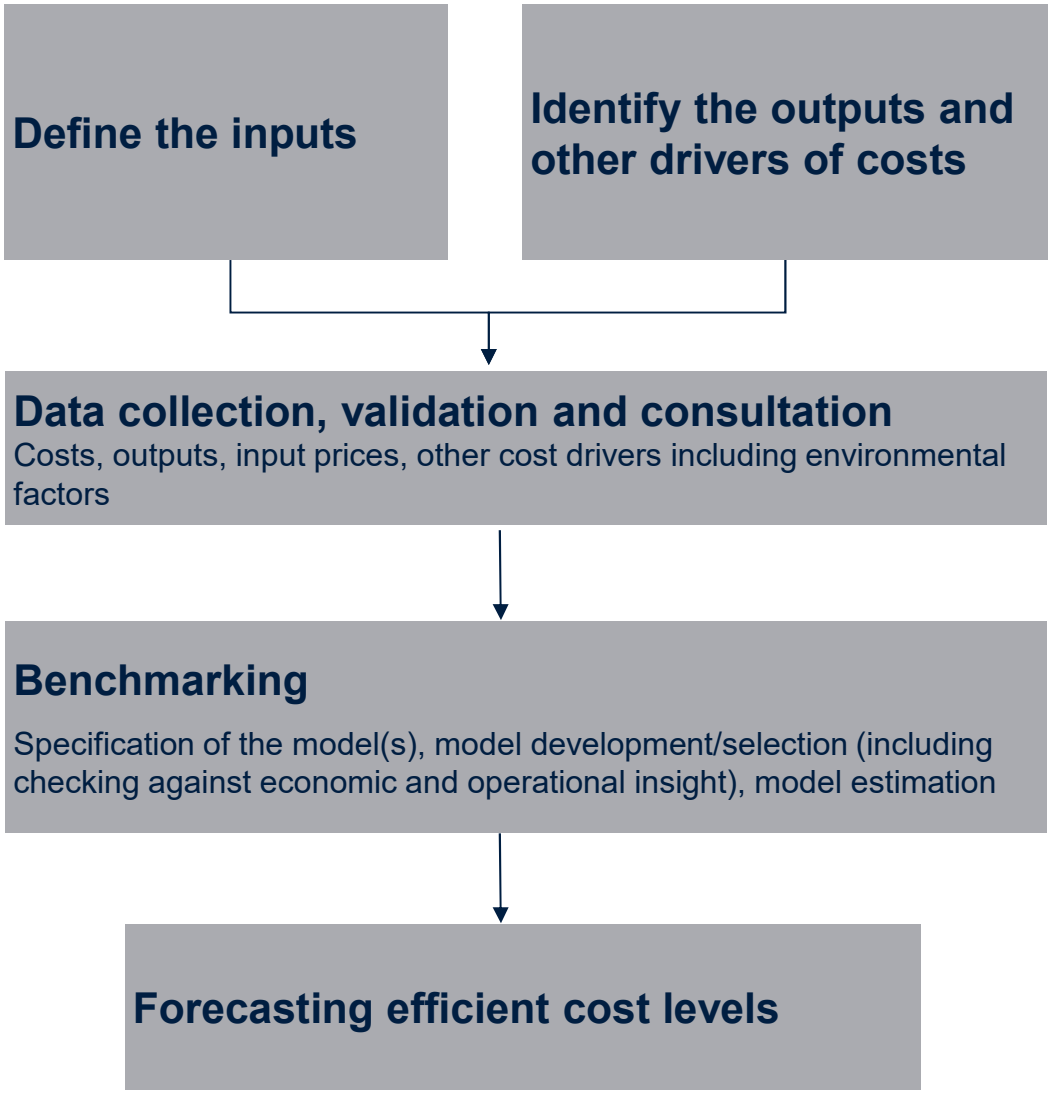
Overview

- **Ofwat's process:** how its cost benchmarking was developed in PR19
- **what went well**
- **what could be improved going forward**

Ofwat's benchmarking process at PR19



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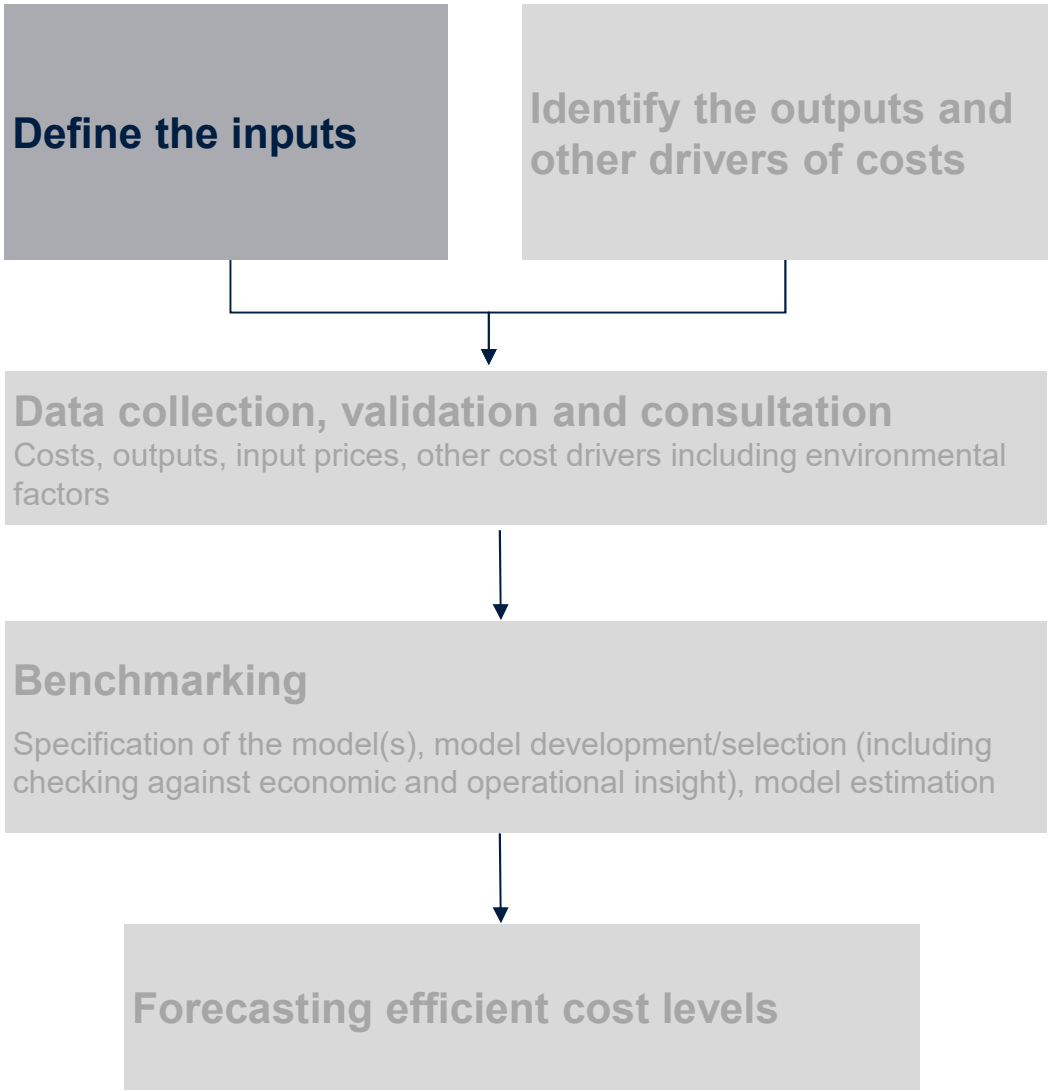

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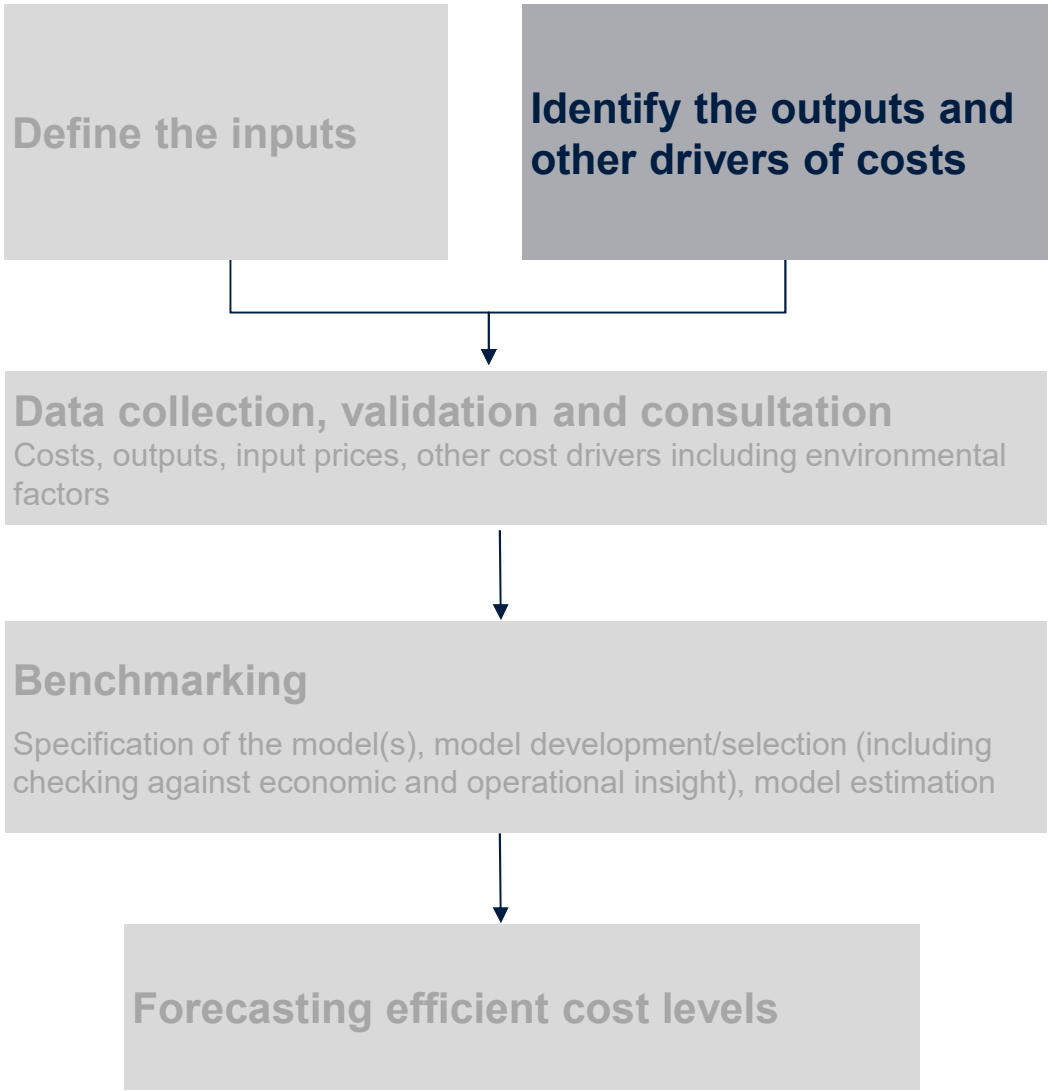

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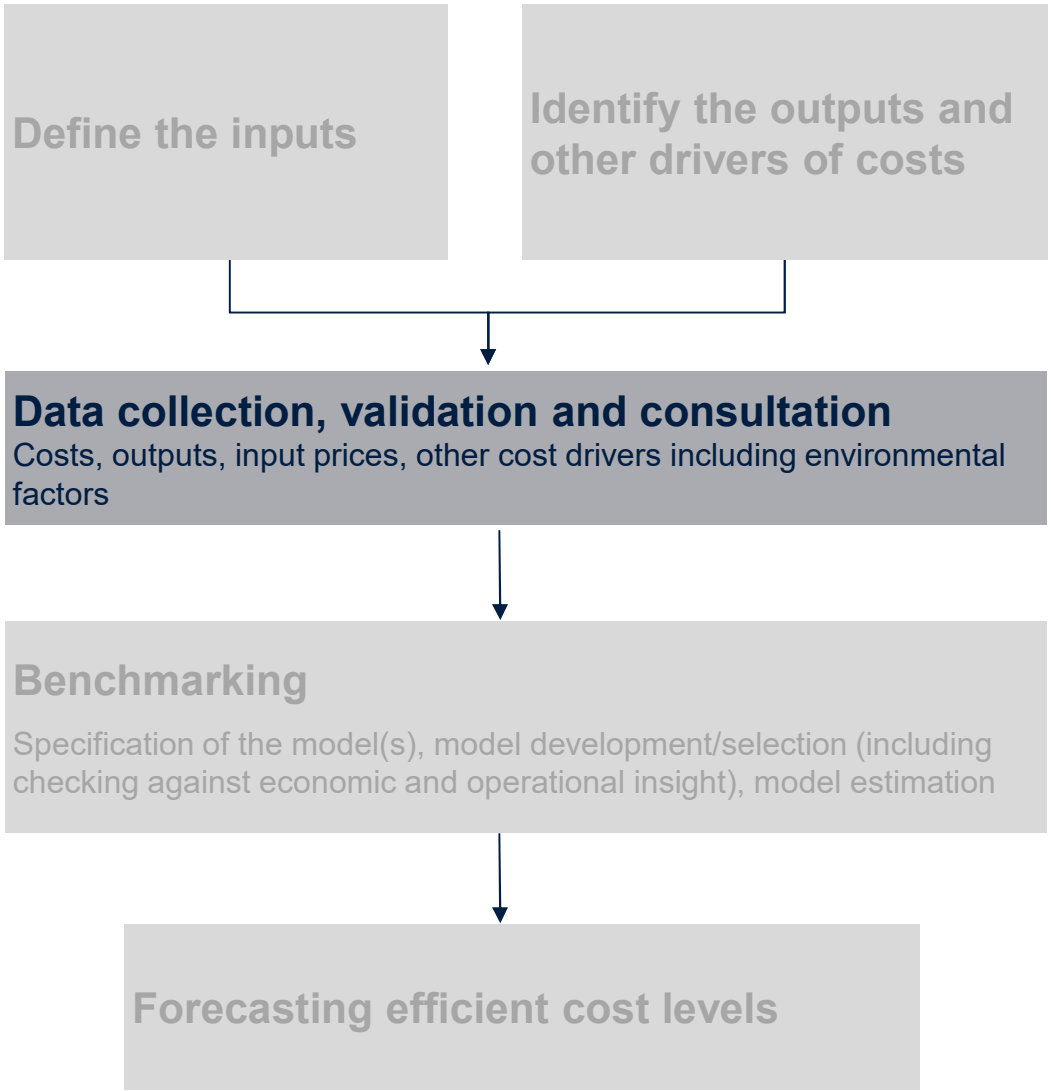

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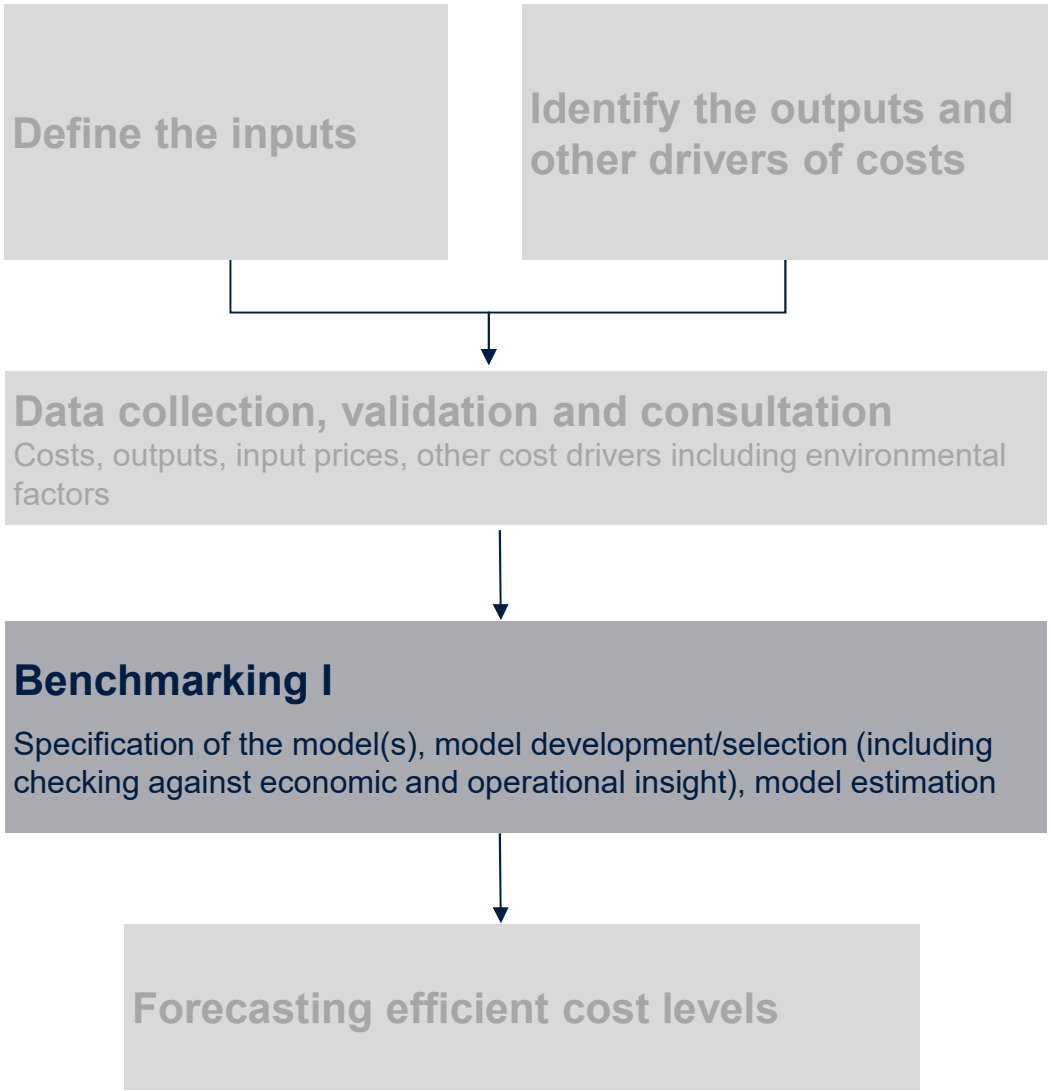

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Define the inputs

Identify the outputs and other drivers of costs

Data collection, validation and consultation

Costs, outputs, input prices, other cost drivers including environmental factors

Benchmarking II

Specification of the model(s), model development/selection (including checking against economic and operational insight), model estimation

Forecasting efficient cost levels

Model name	WW1	WW2
Dependent variable (log)	Wholesale water total	
Connected properties (log)	1.034***	1.021***
Lengths of main (log)		
Water treated at works of complexity levels 3 to 6 (%)	0.005***	
Weighted average treatment complexity (log)		0.524***
Number of booster pumping stations per length of main (log)	0.236*	0.256***
Weighted average density (log)	-2.026***	-1.635***
Squared term of log of weighted average density	0.142***	0.114***
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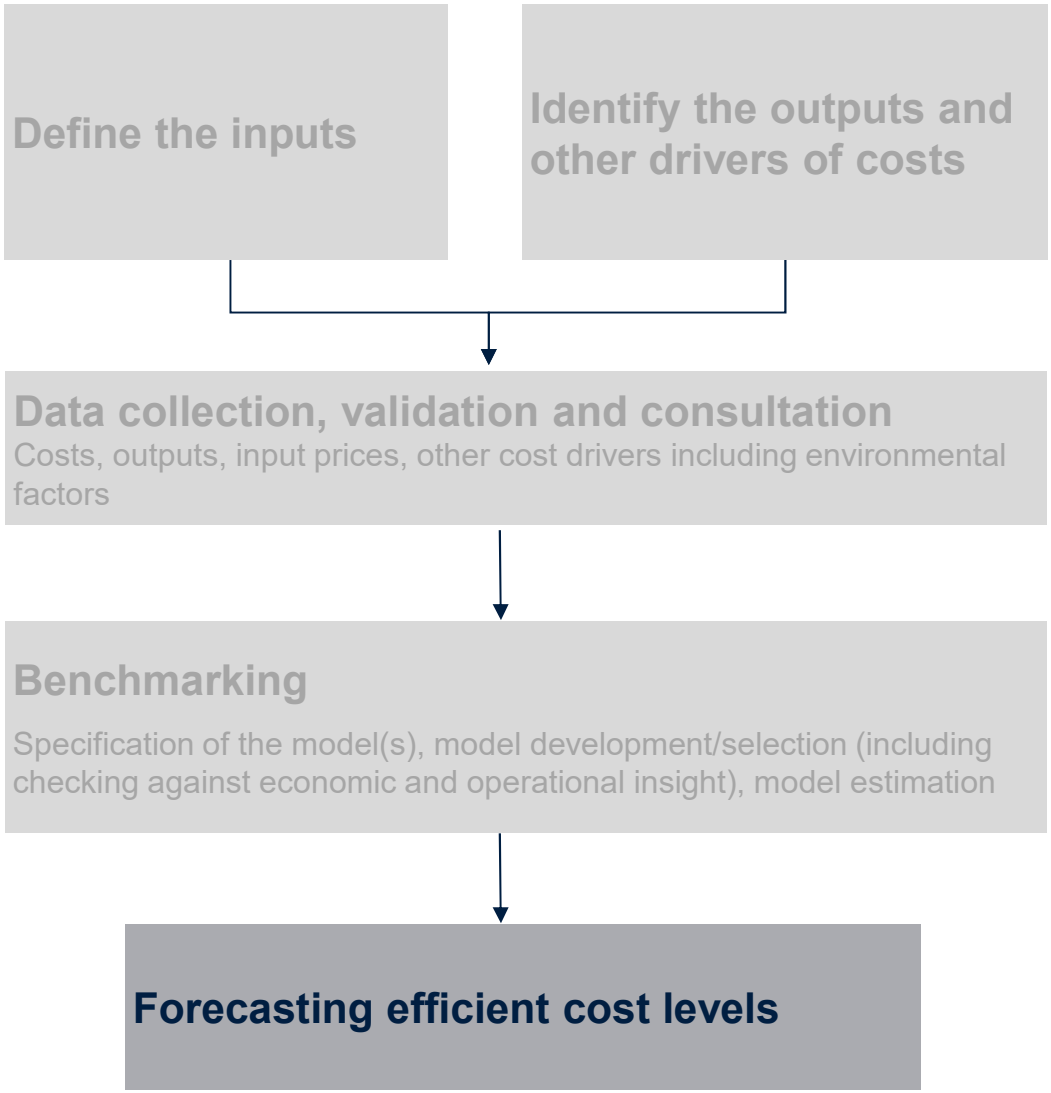

Ofwat used the econometric models to estimate each company's efficient costs for the next control period (2020/21–24/25).

- First, Ofwat generated cost predictions using the model coefficients over the historical period and applied these to forecasts of company cost drivers.
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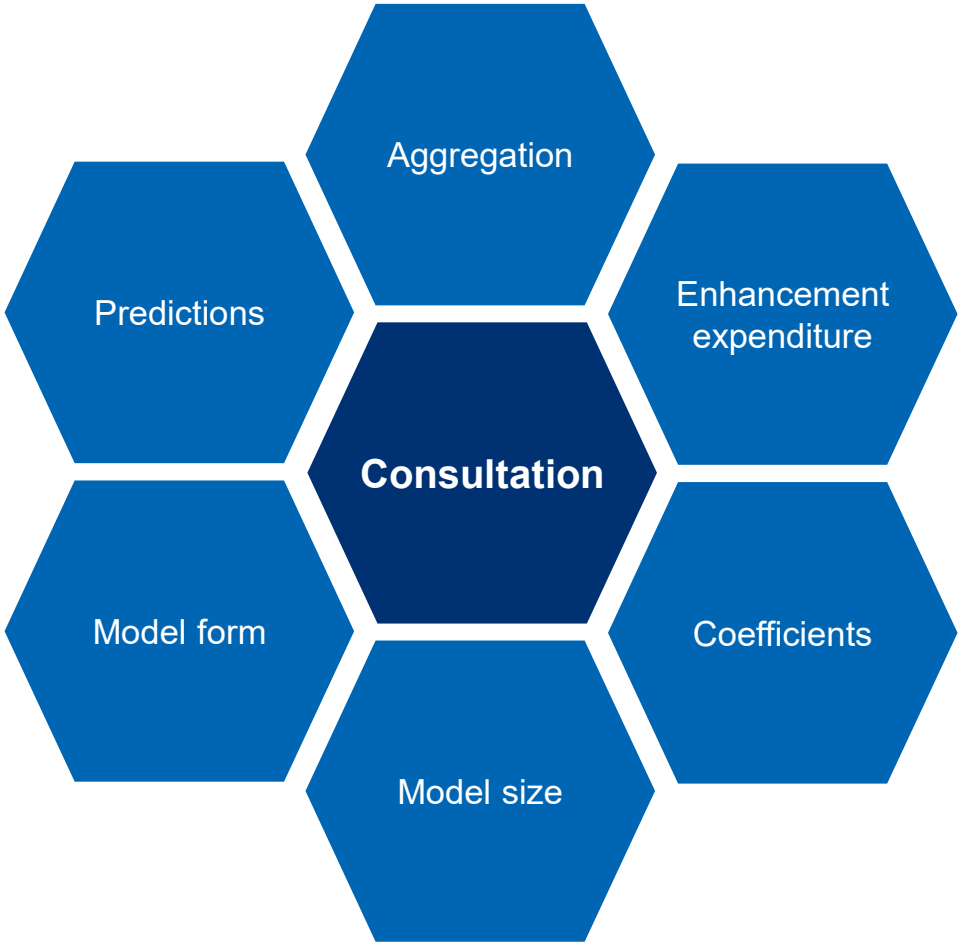

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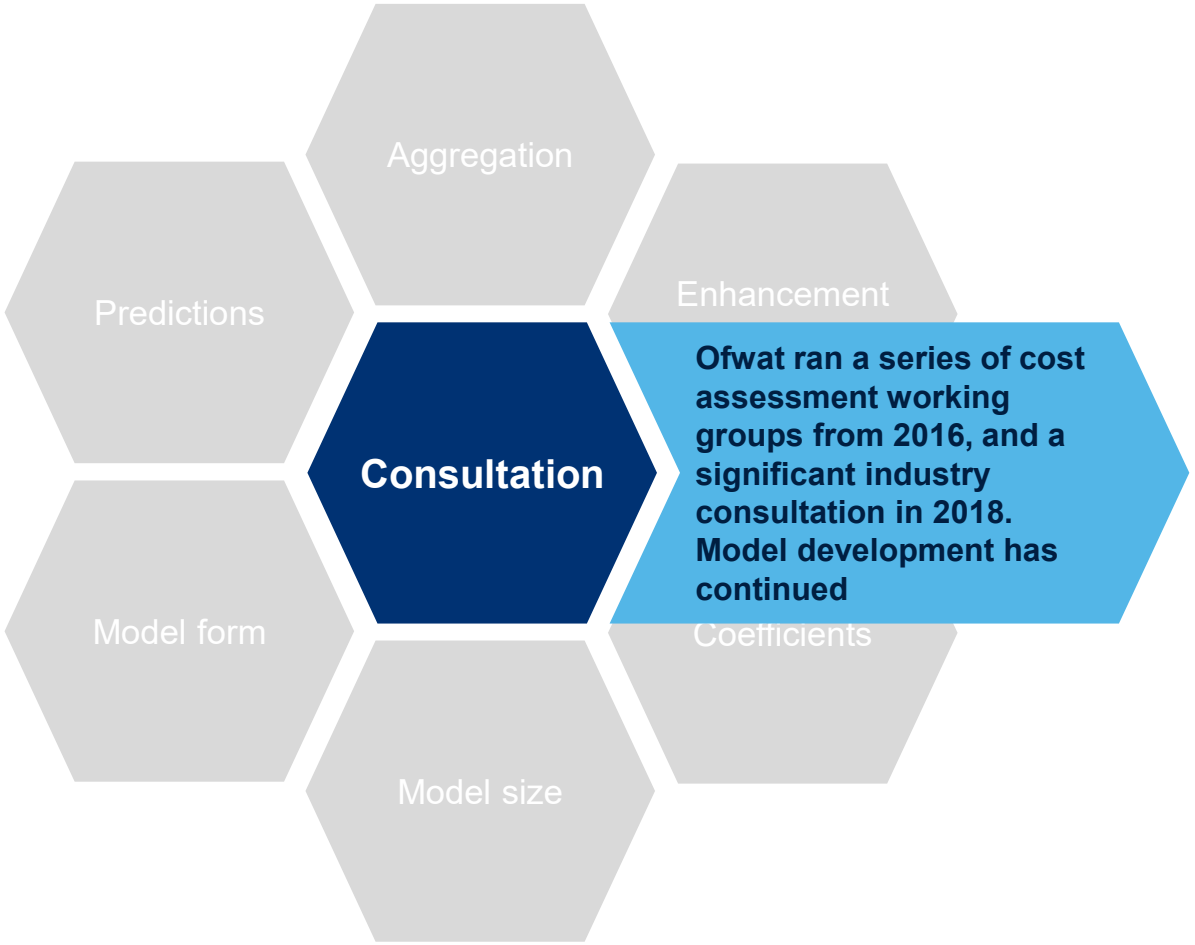

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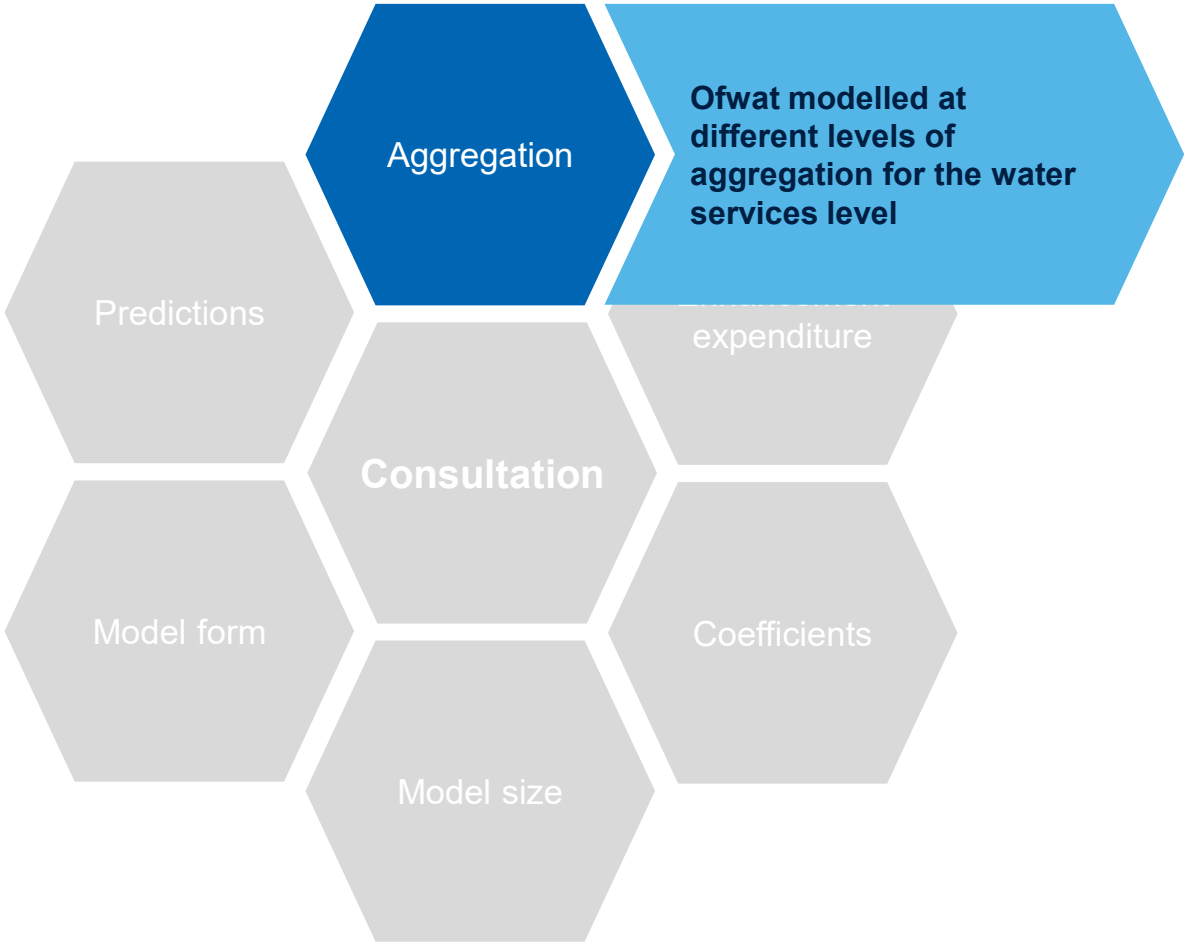

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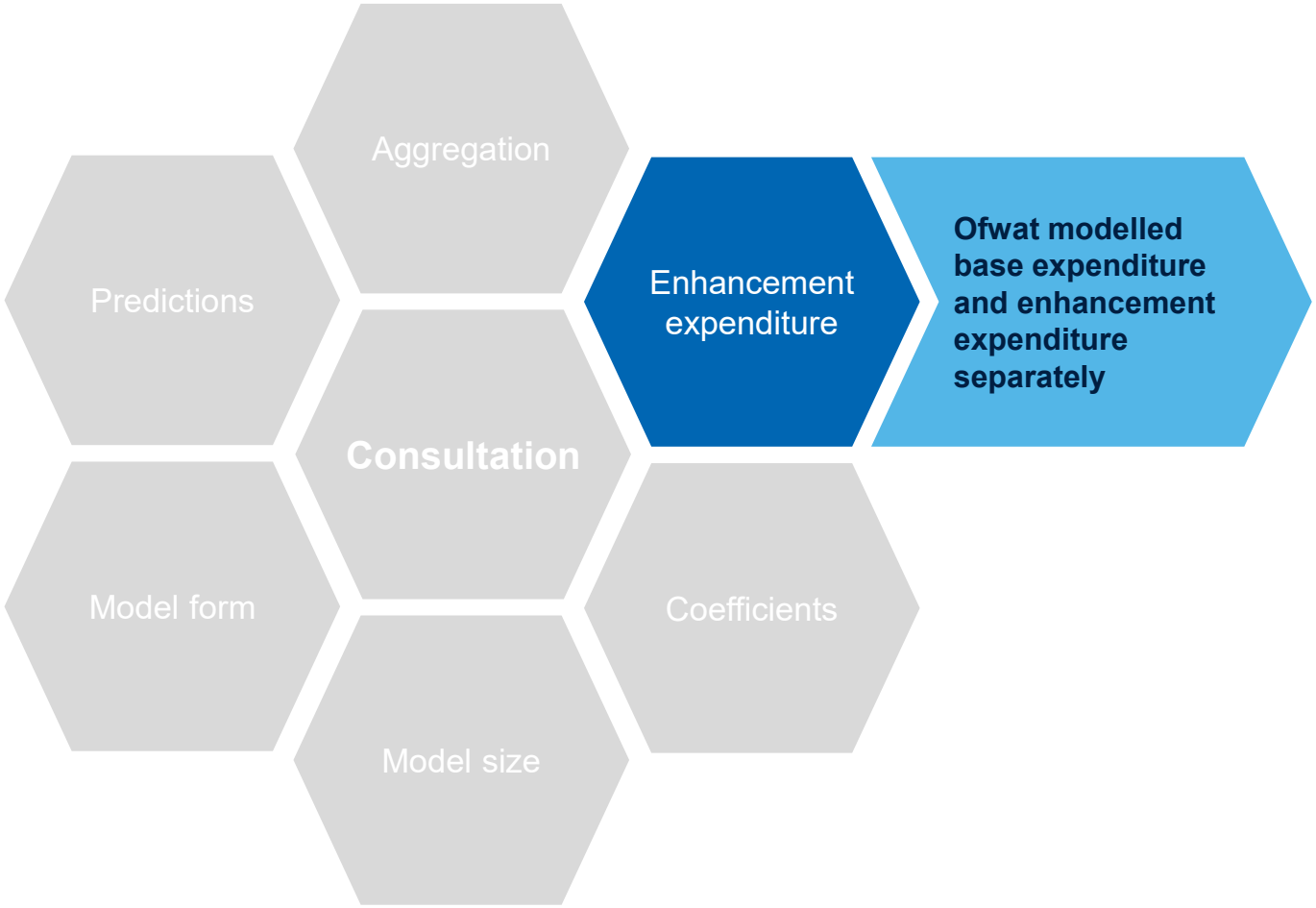

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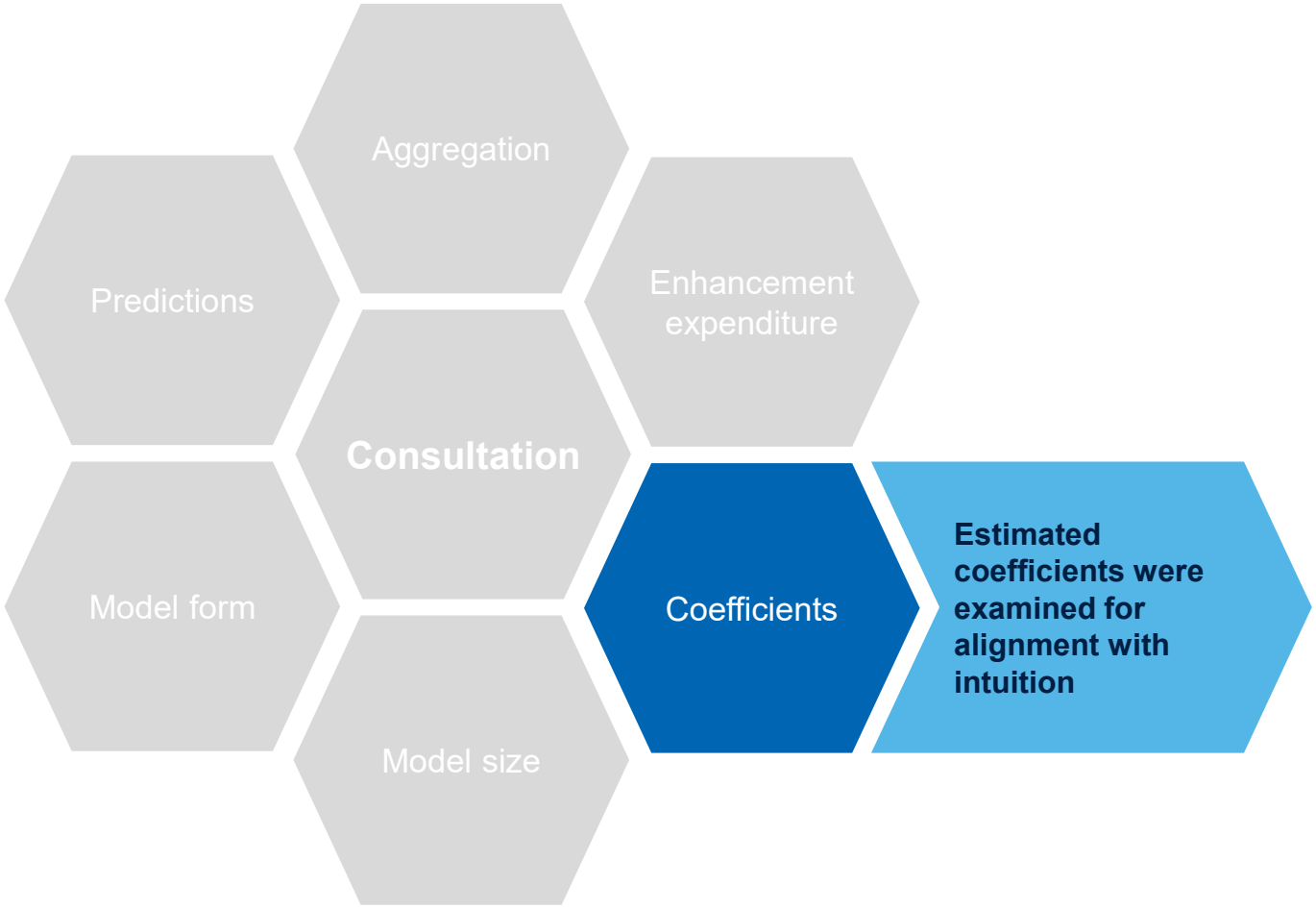

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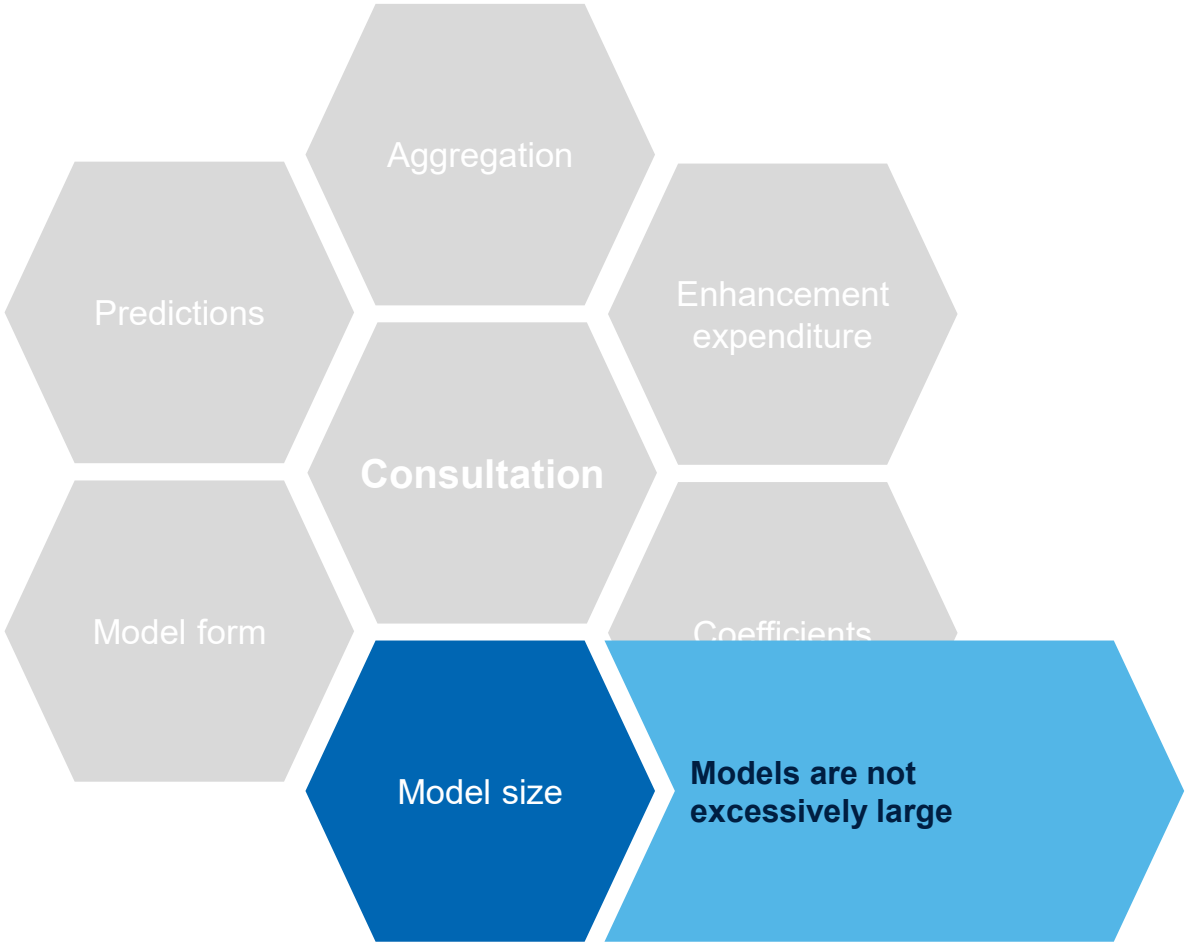

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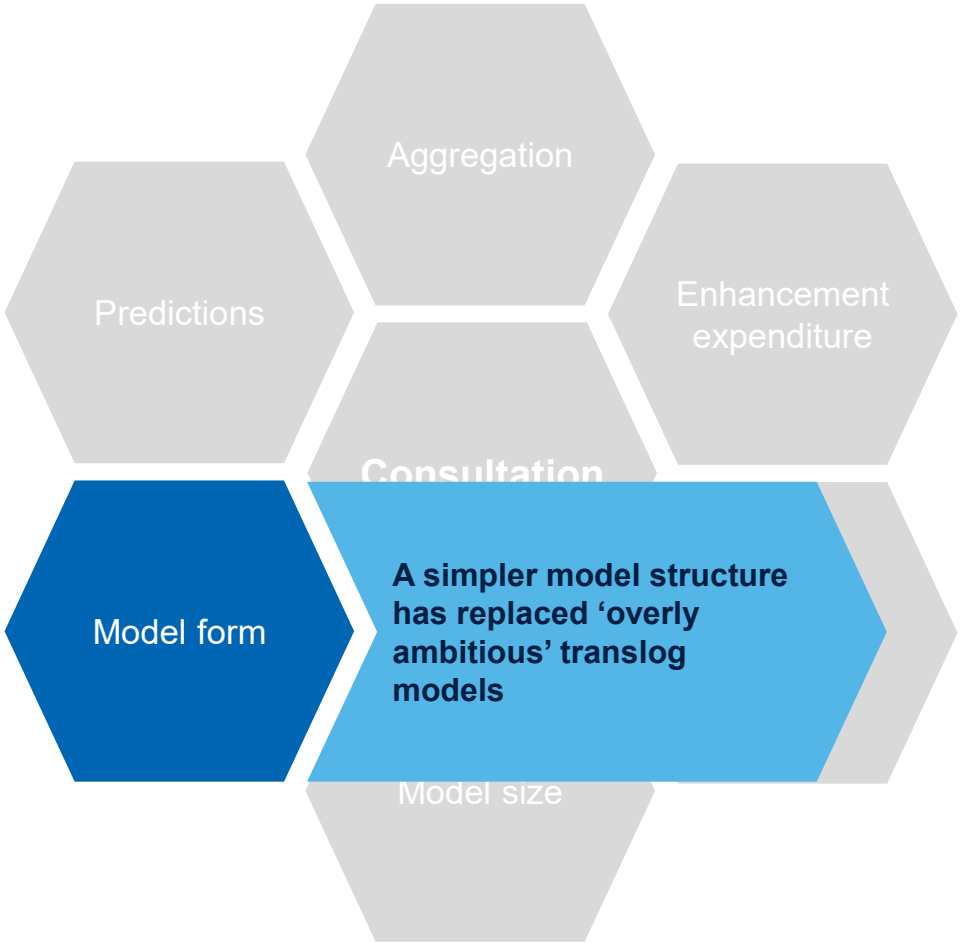

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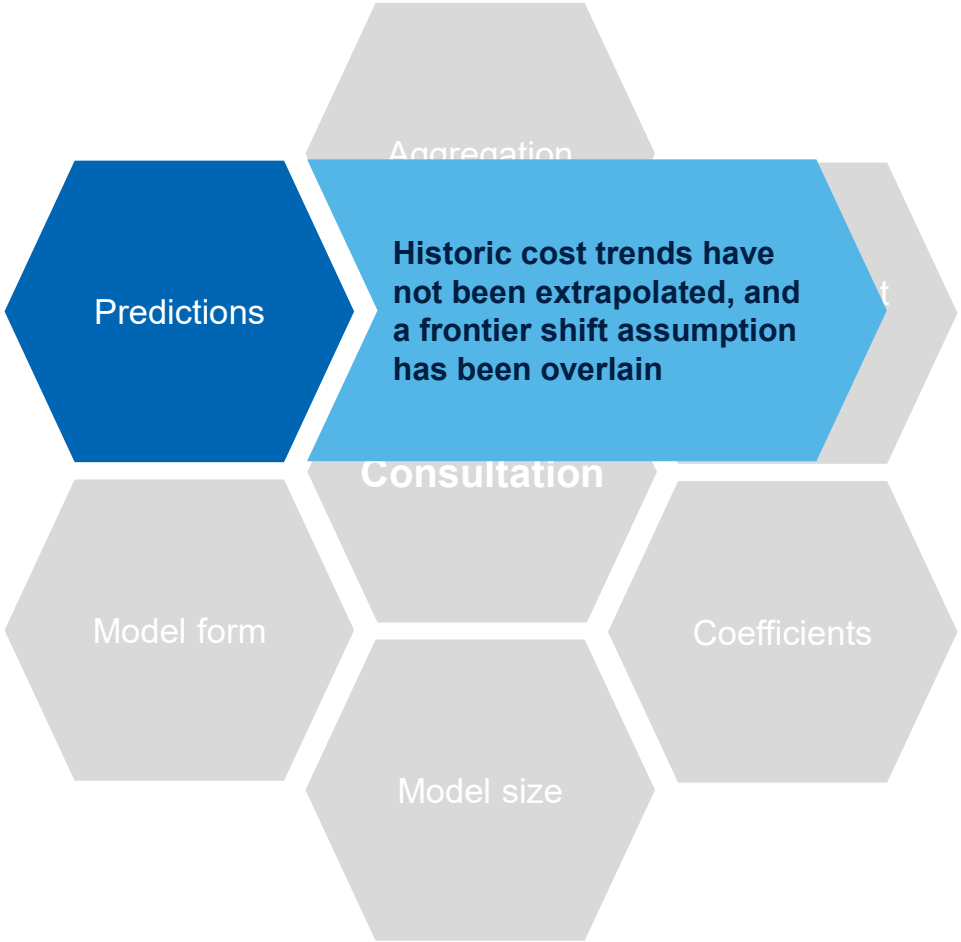

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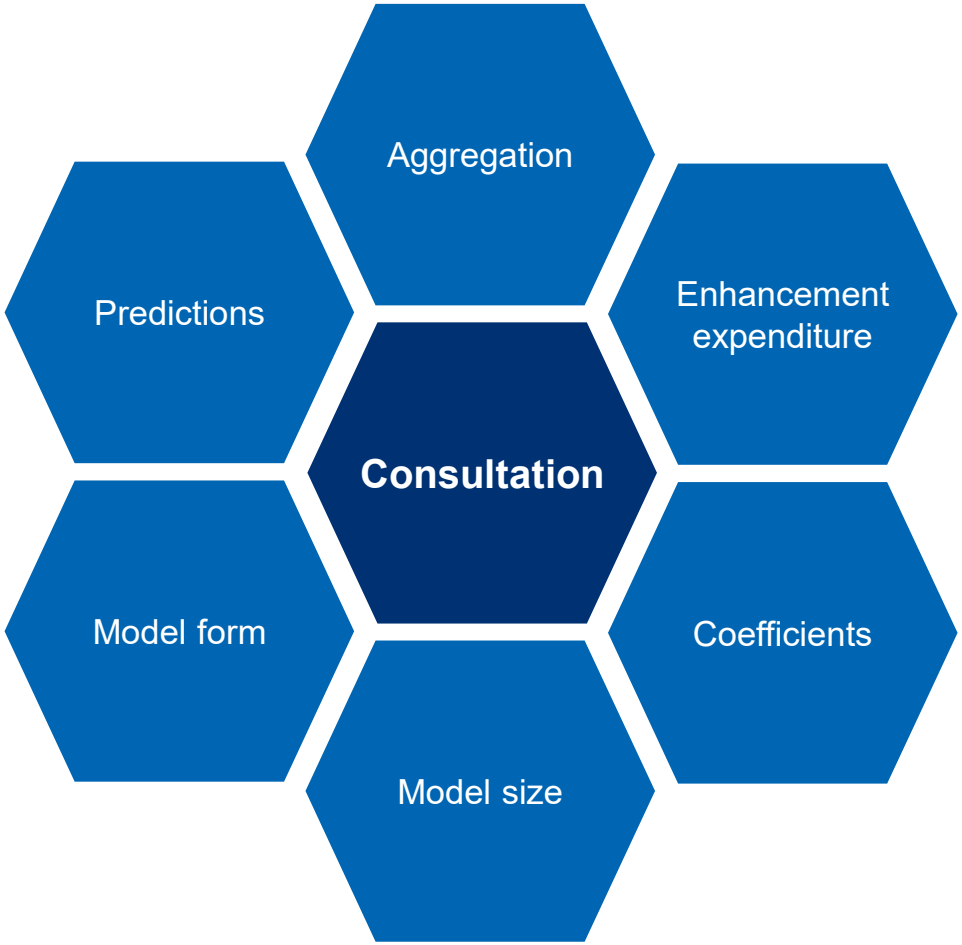

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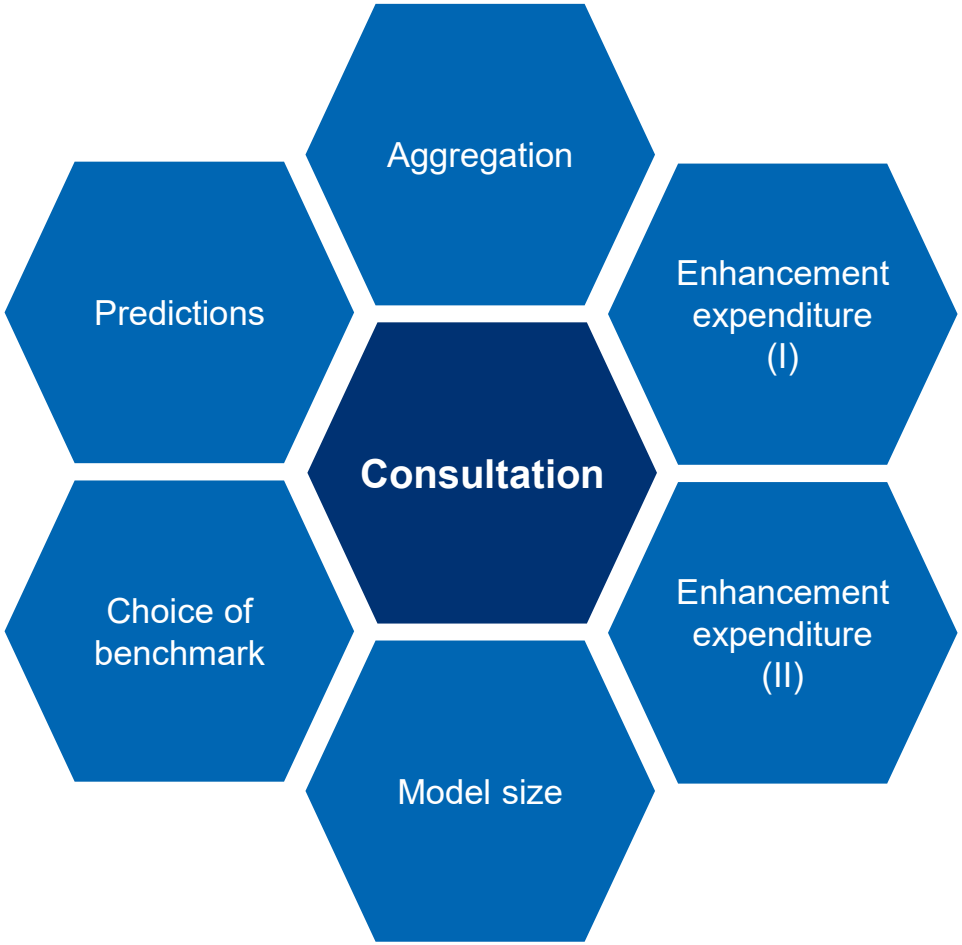

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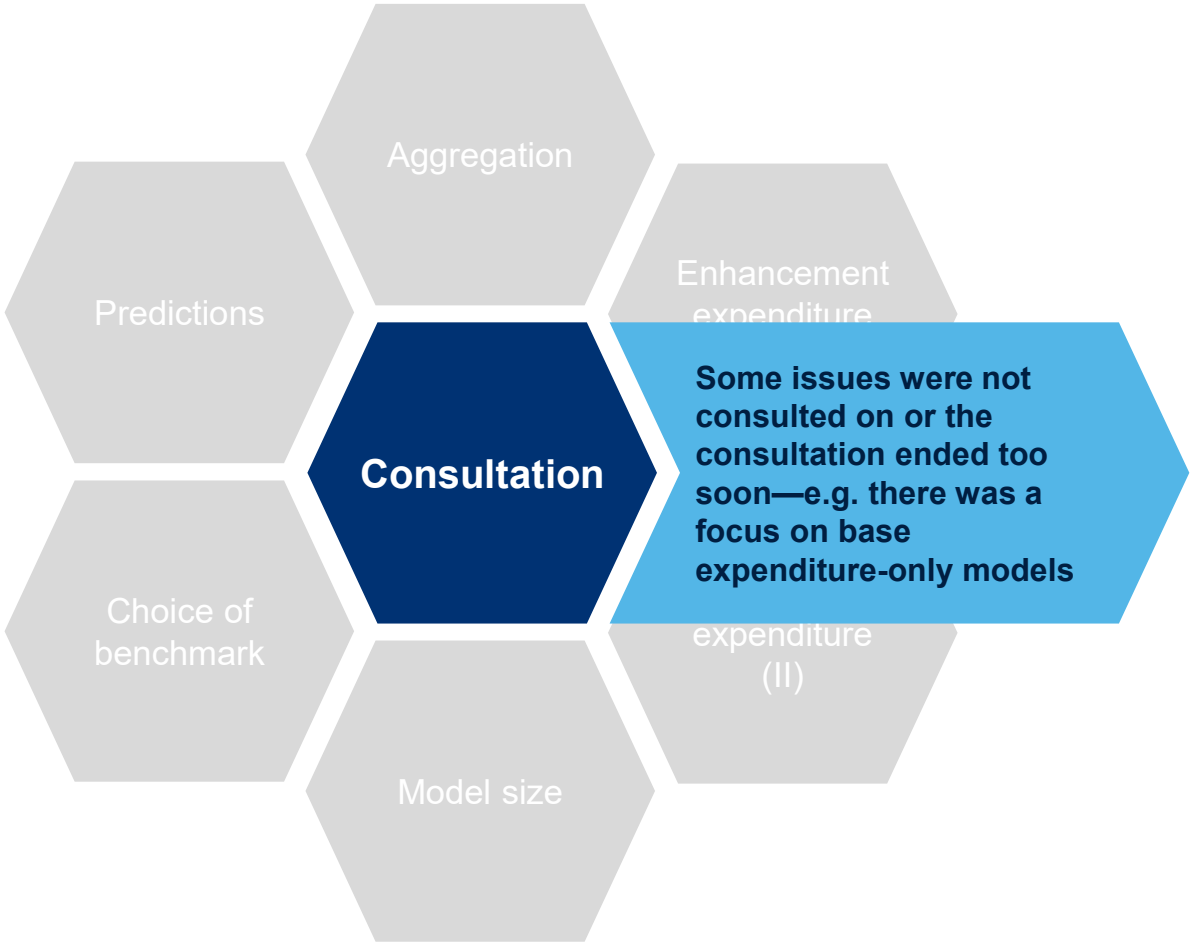

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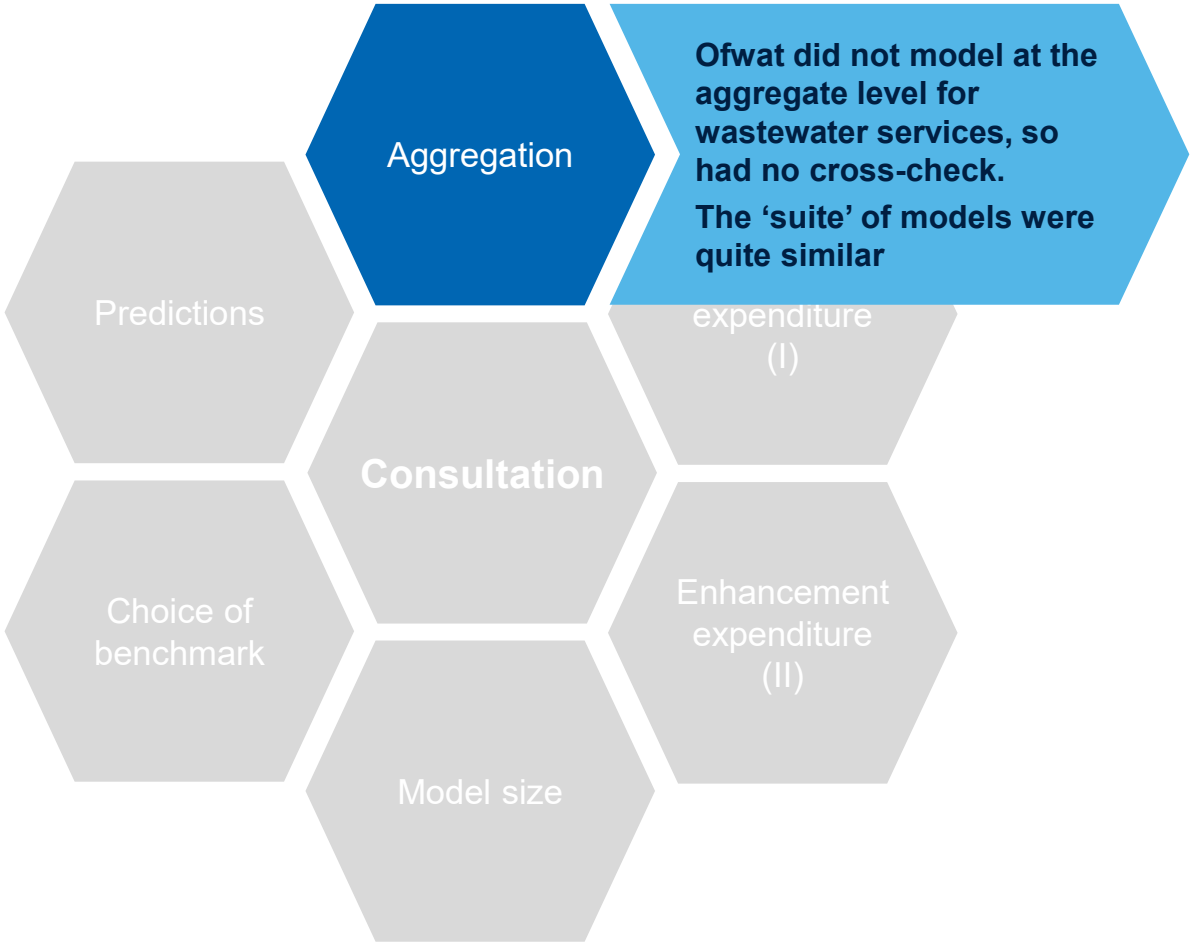

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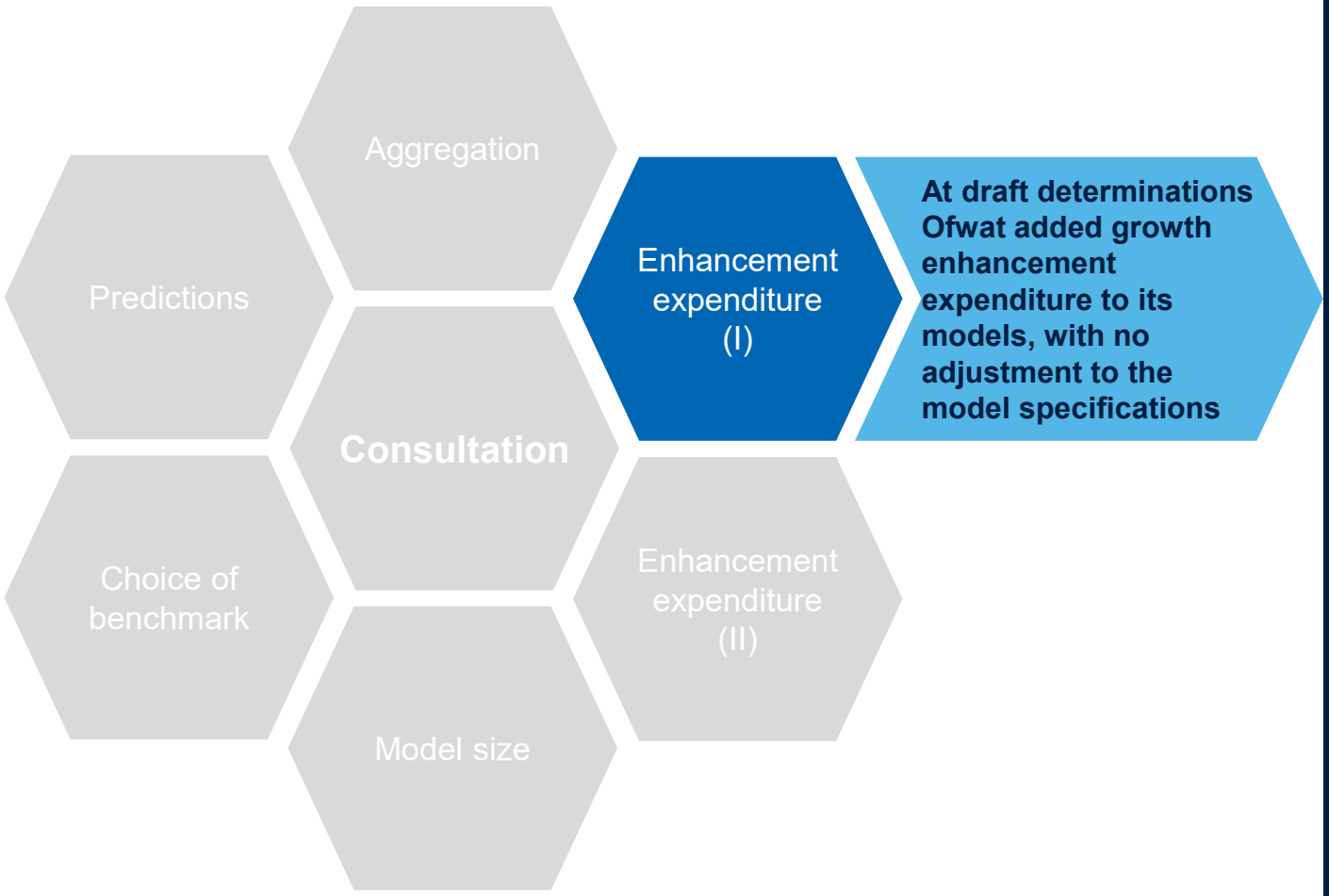

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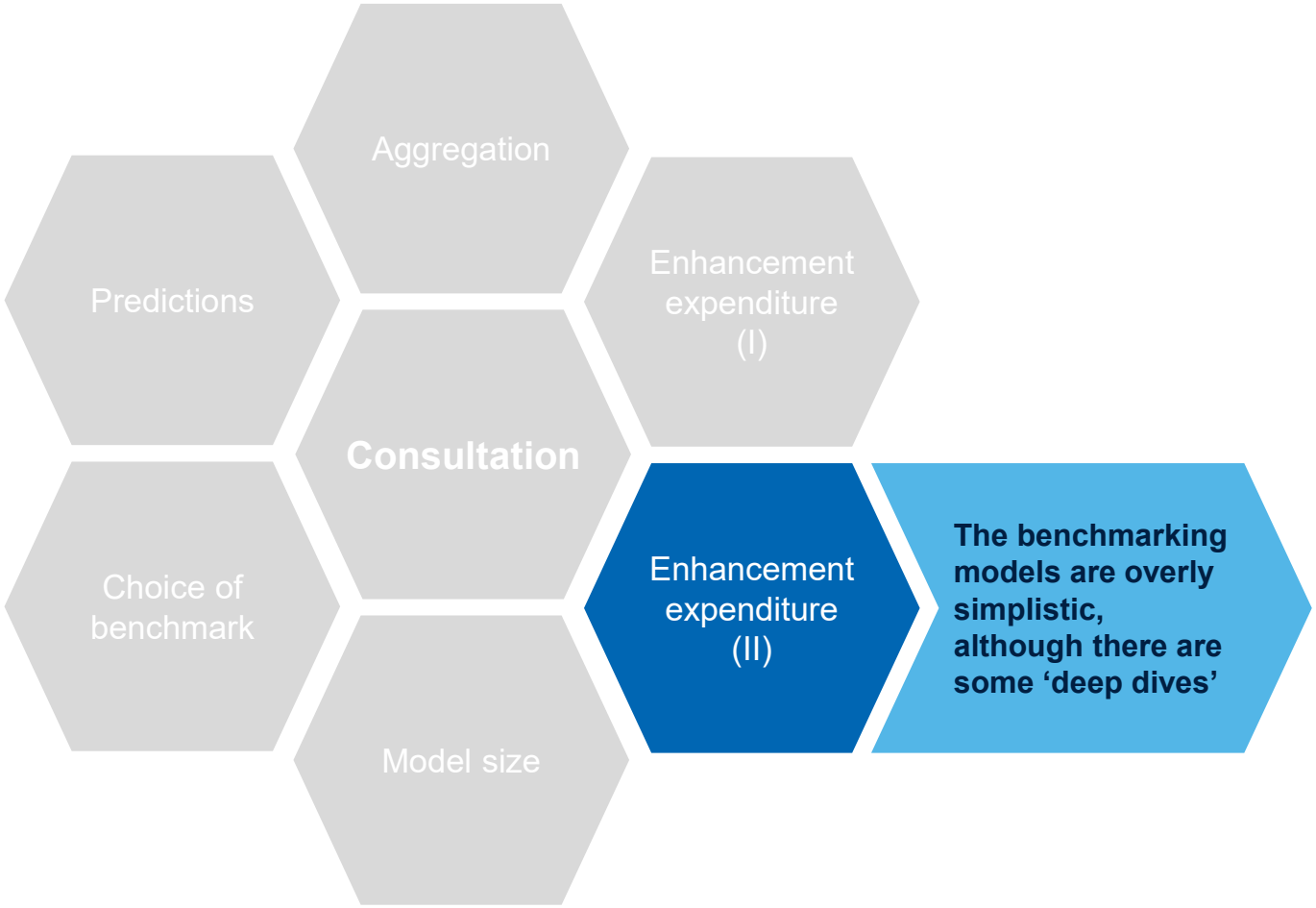

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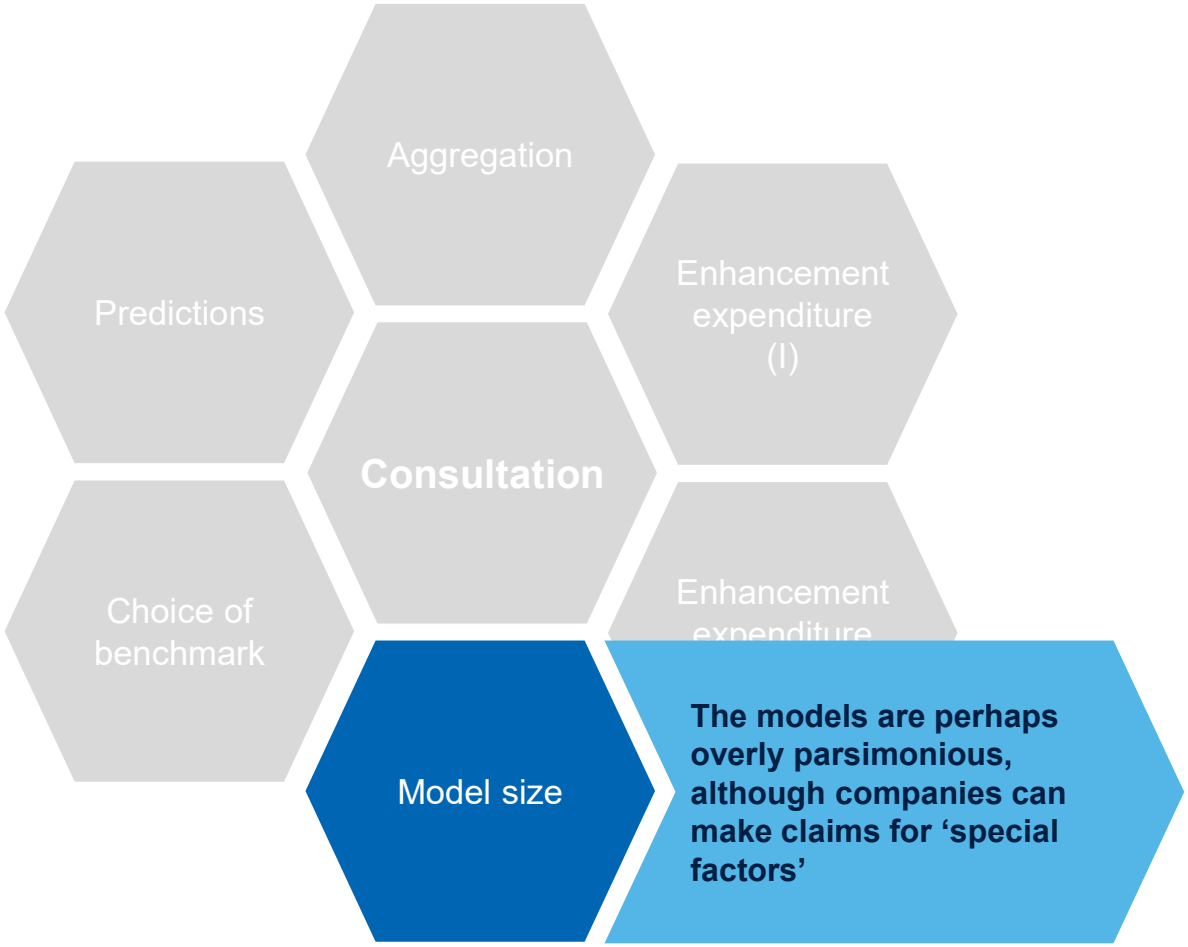

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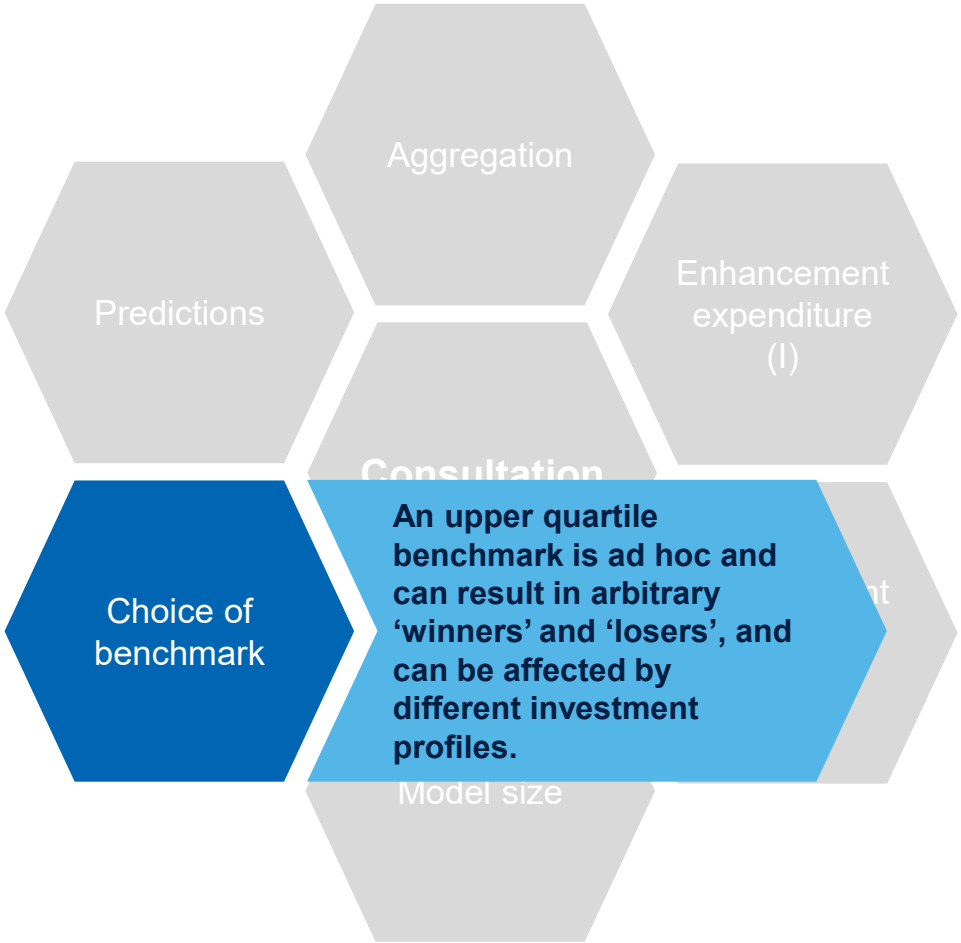

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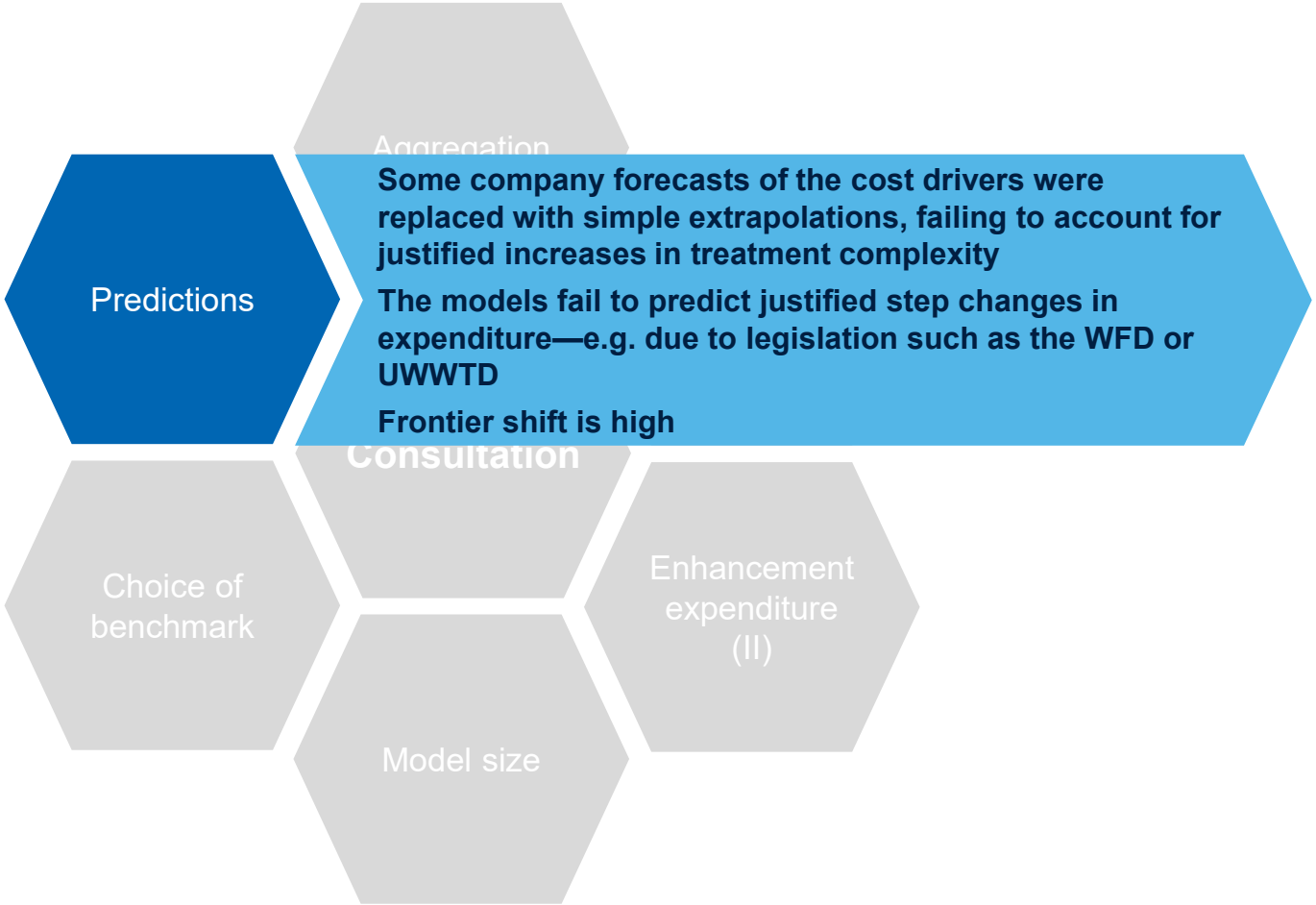

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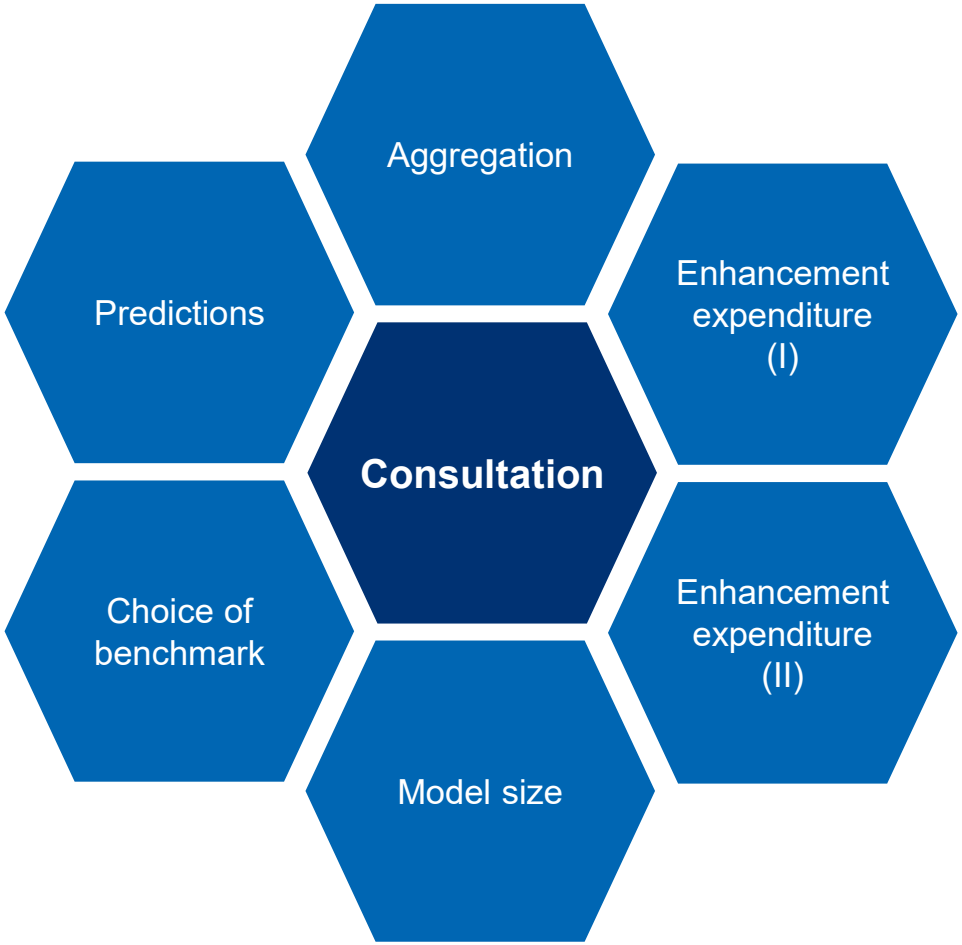

Any questions?

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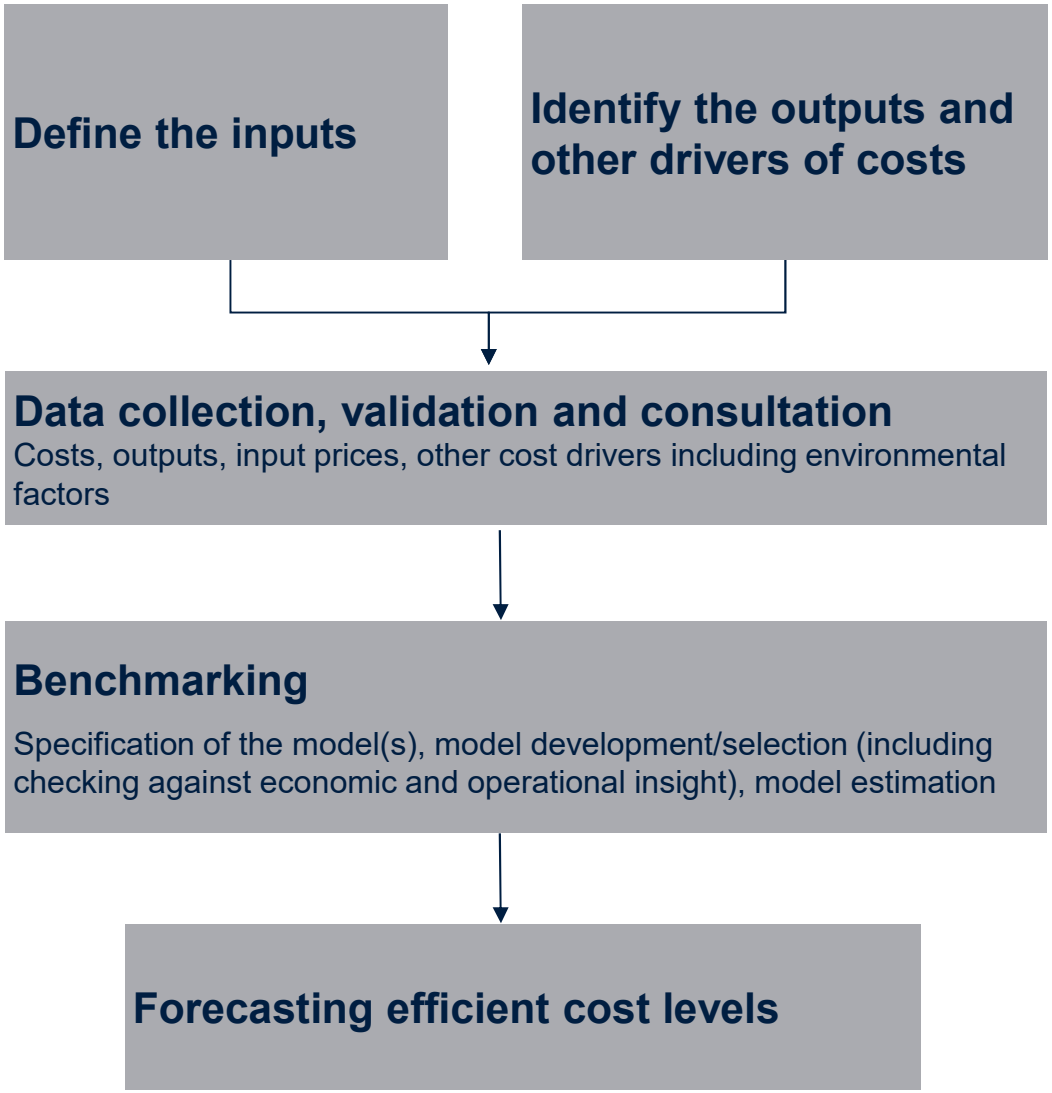

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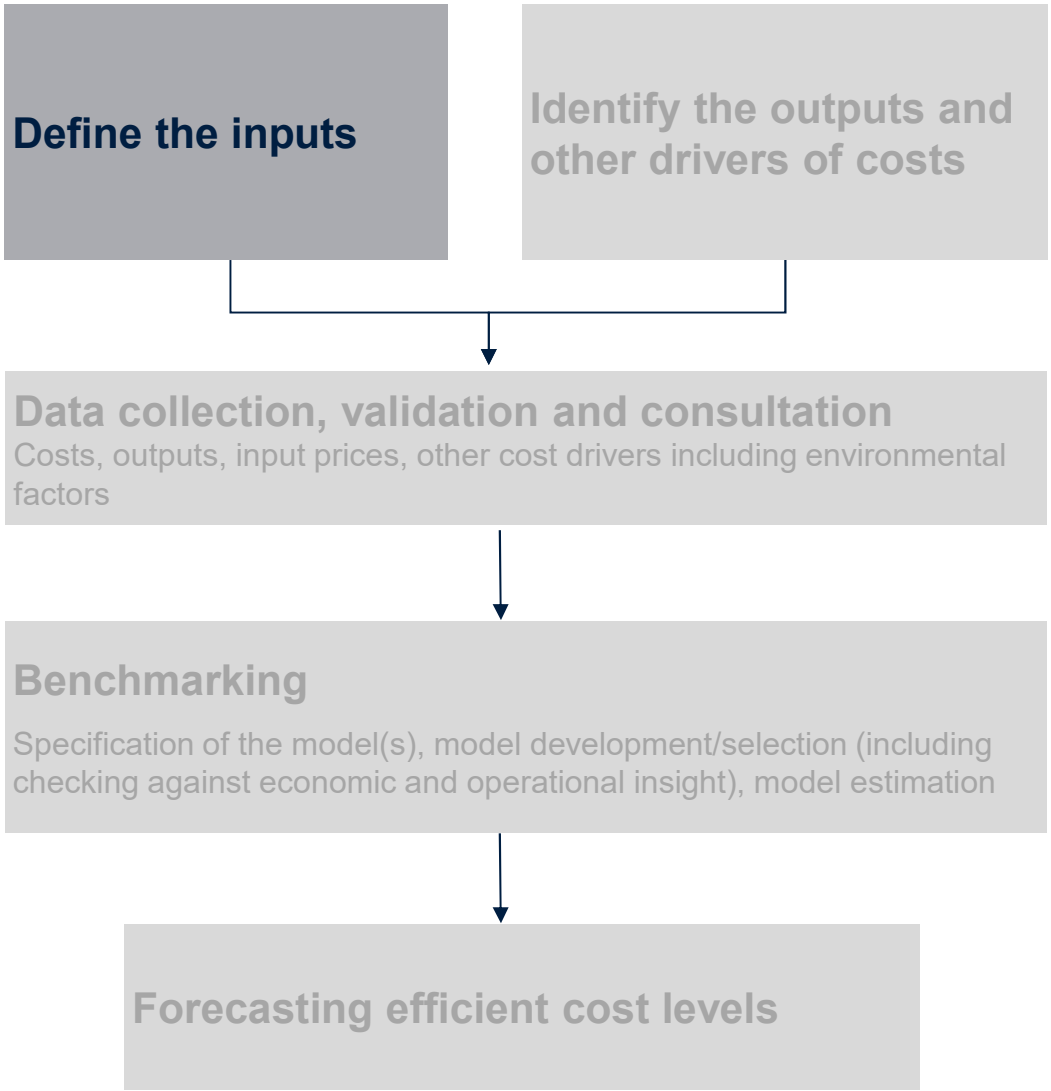

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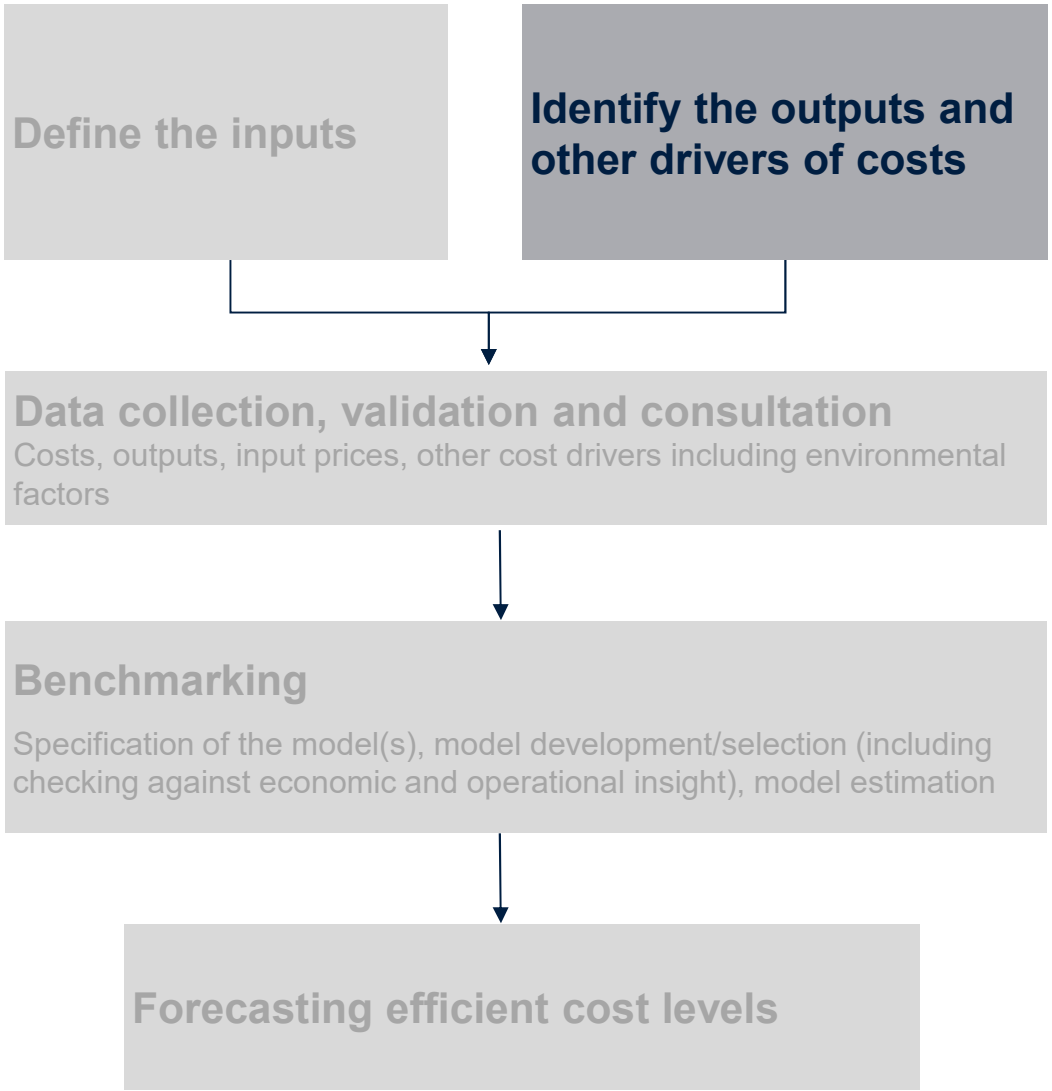

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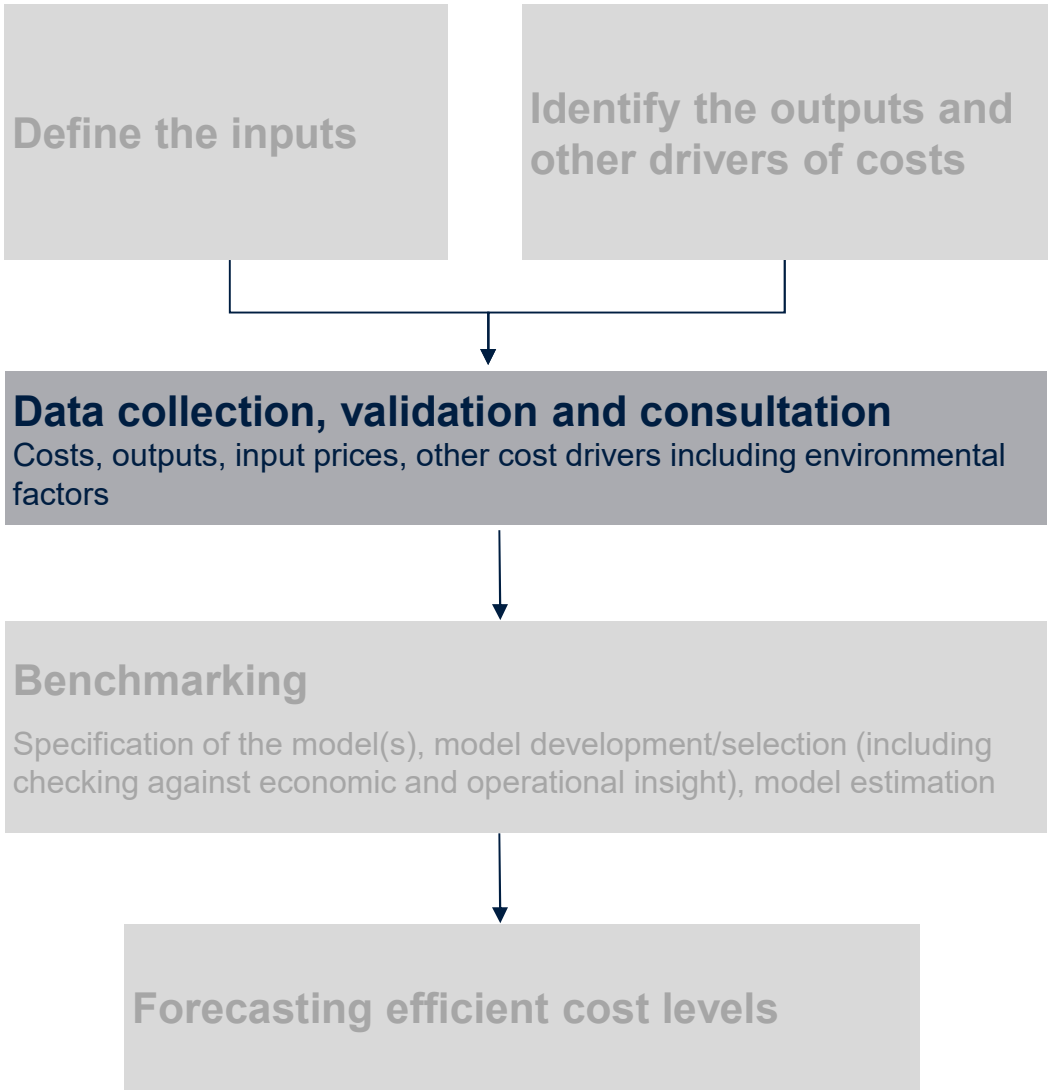

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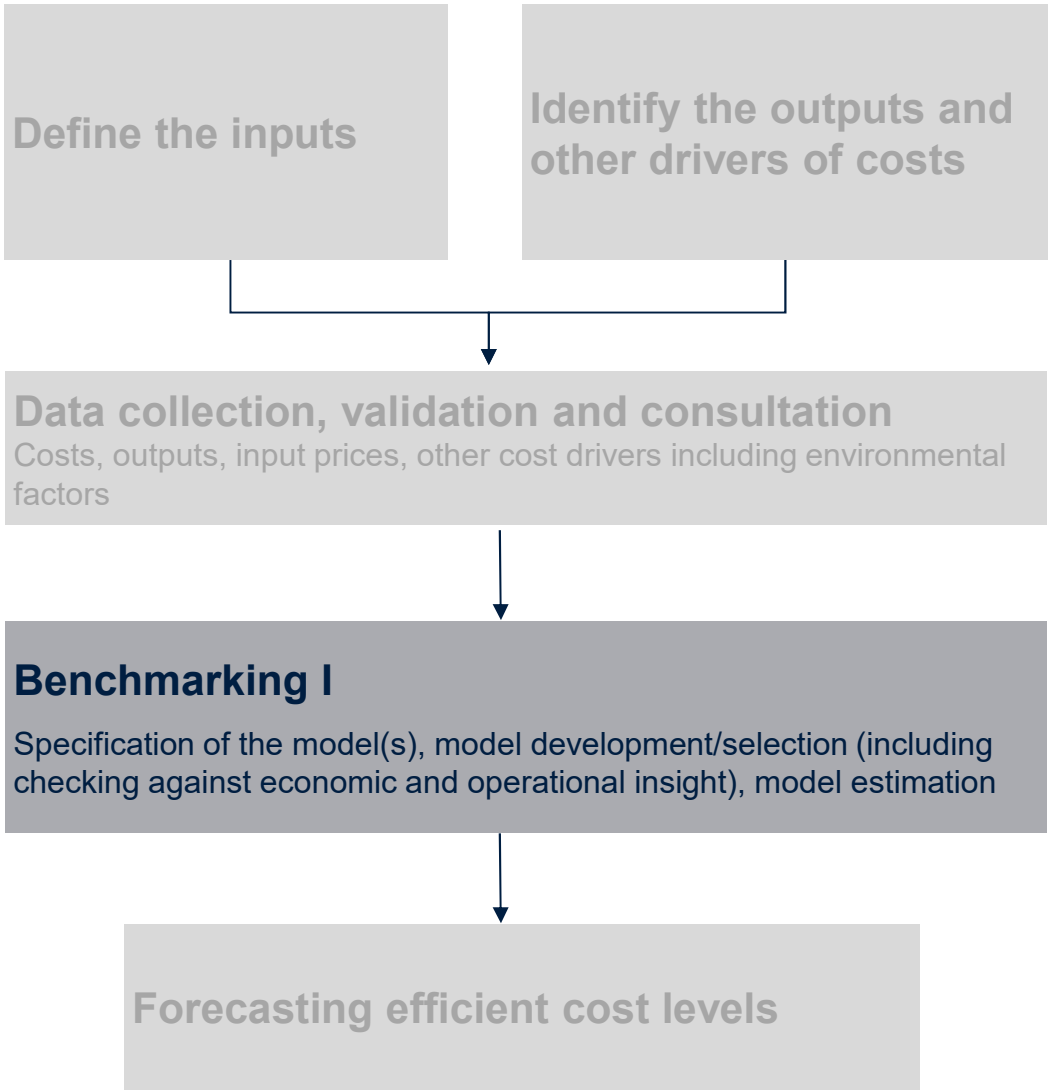

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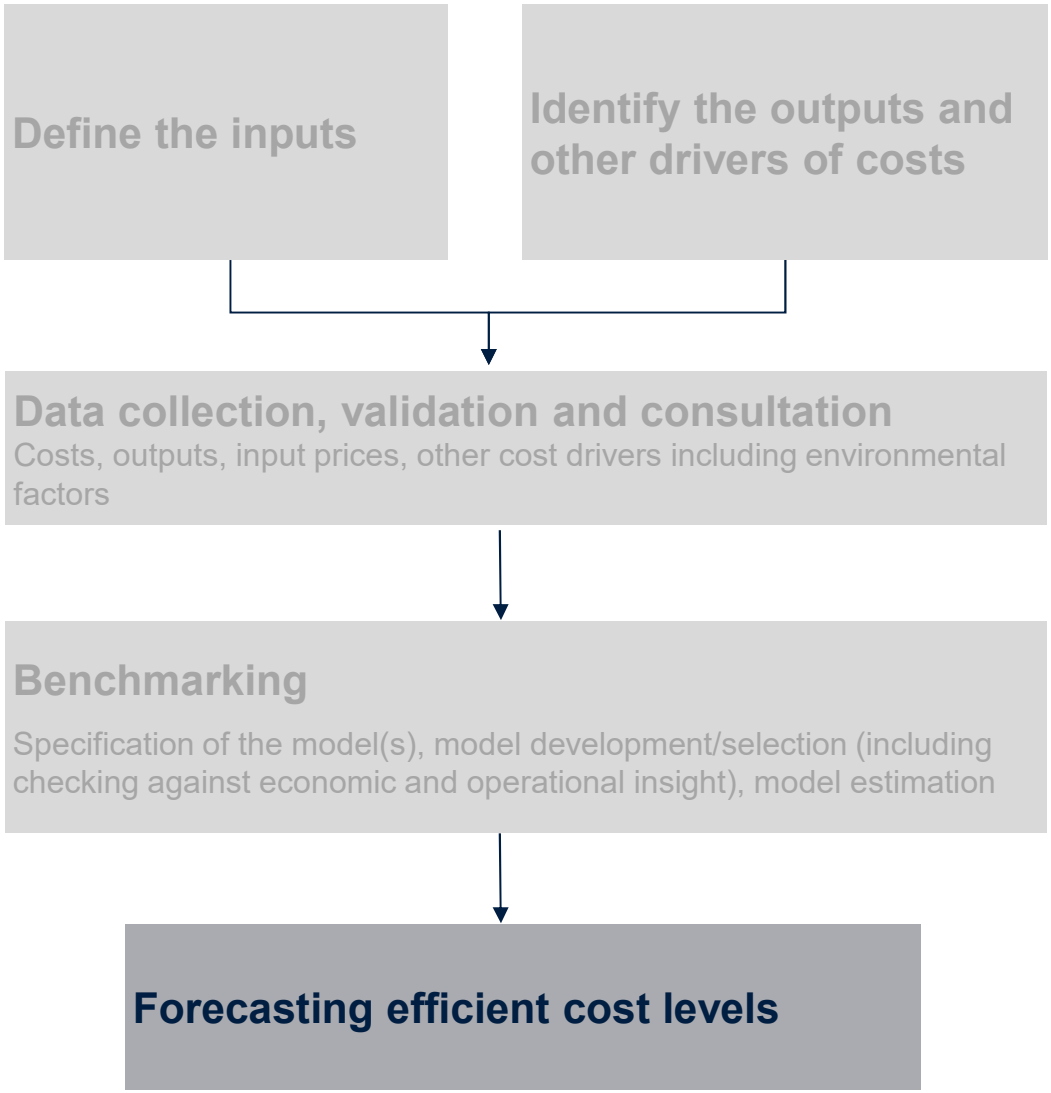

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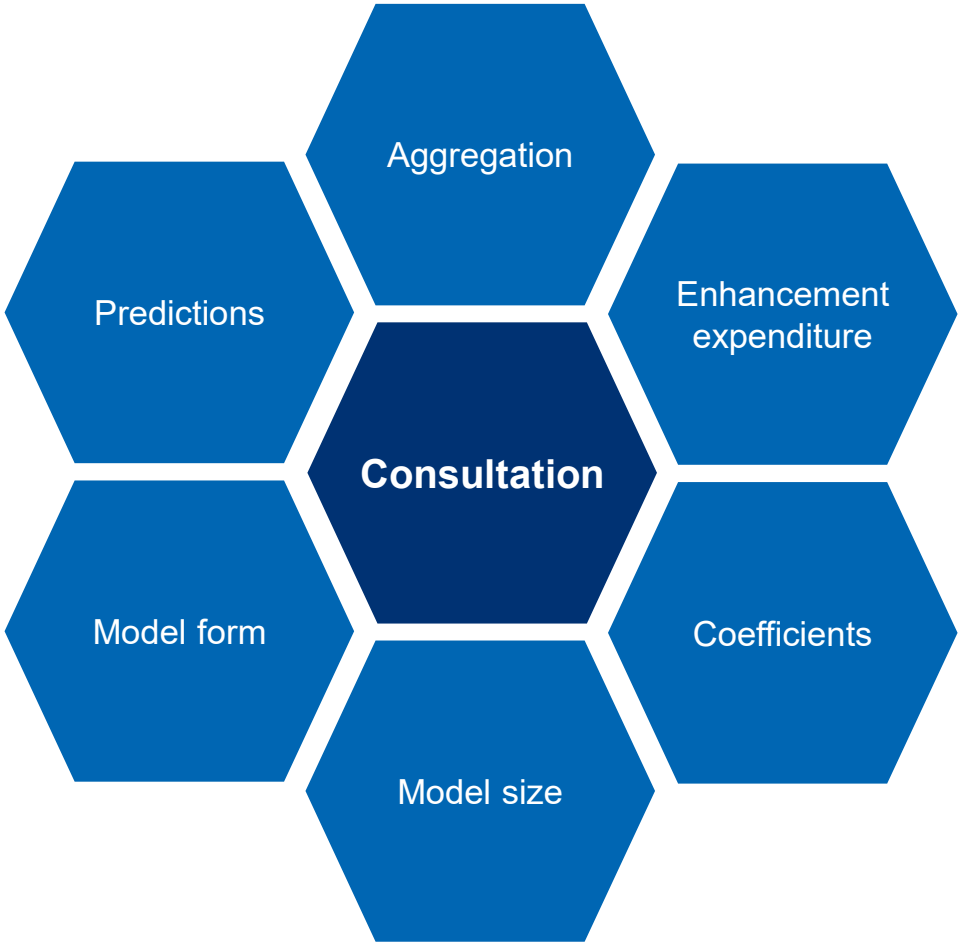

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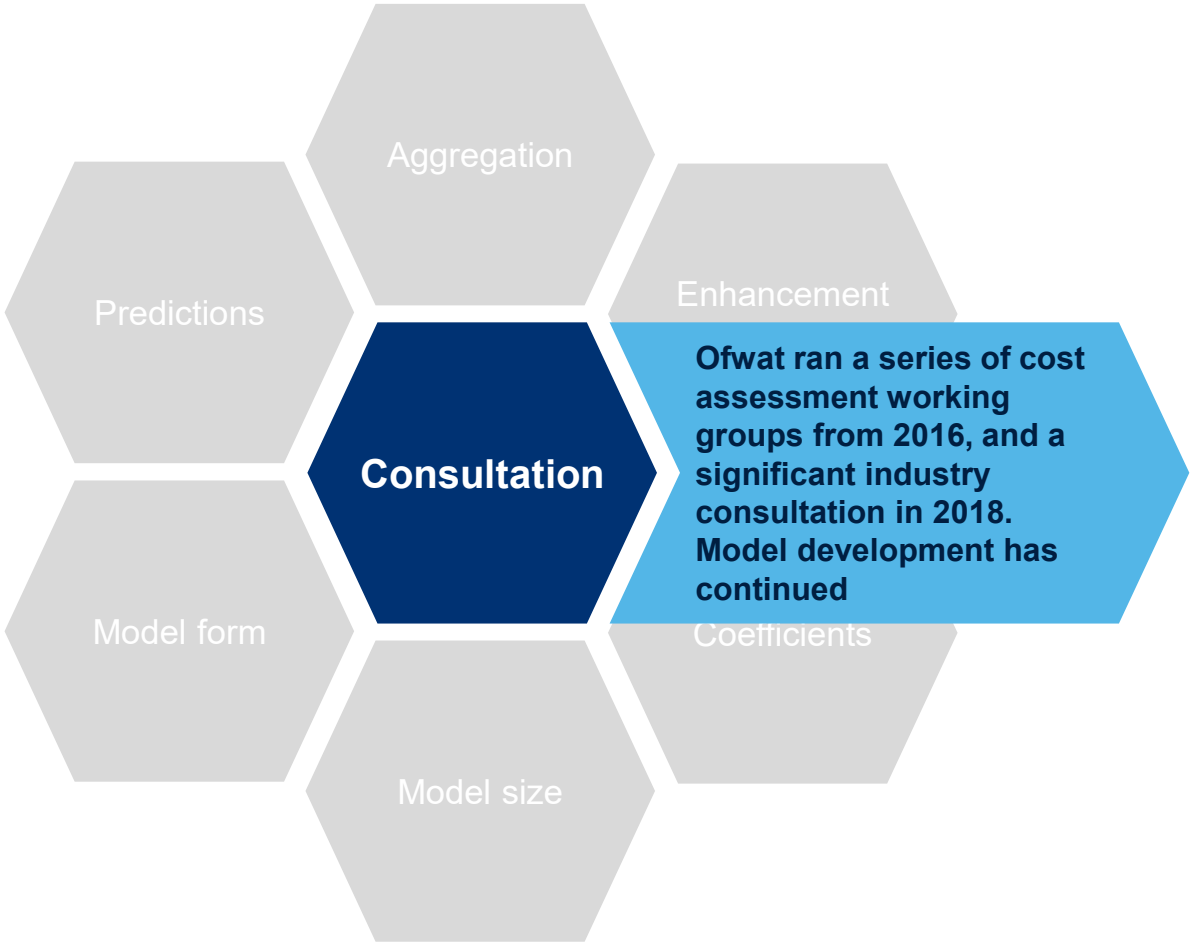

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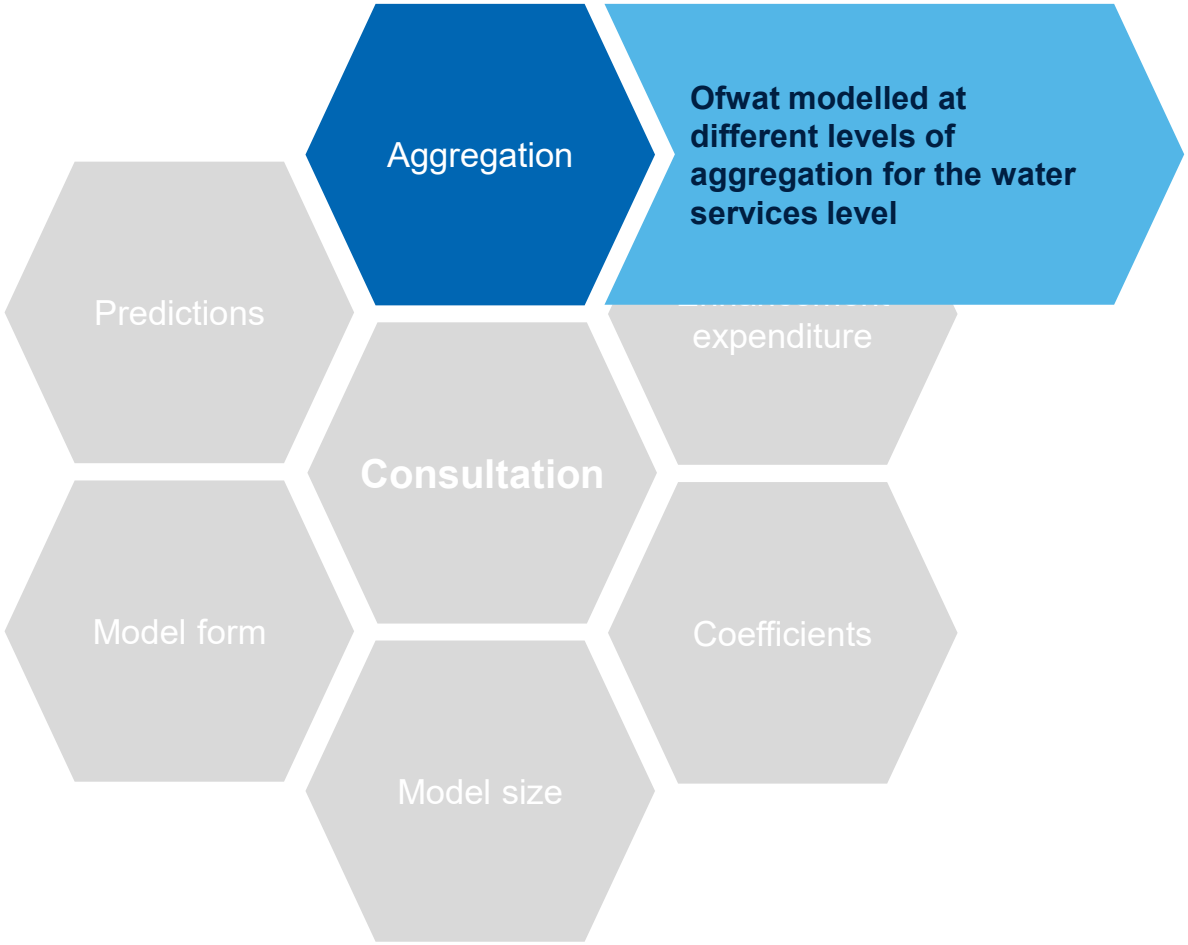

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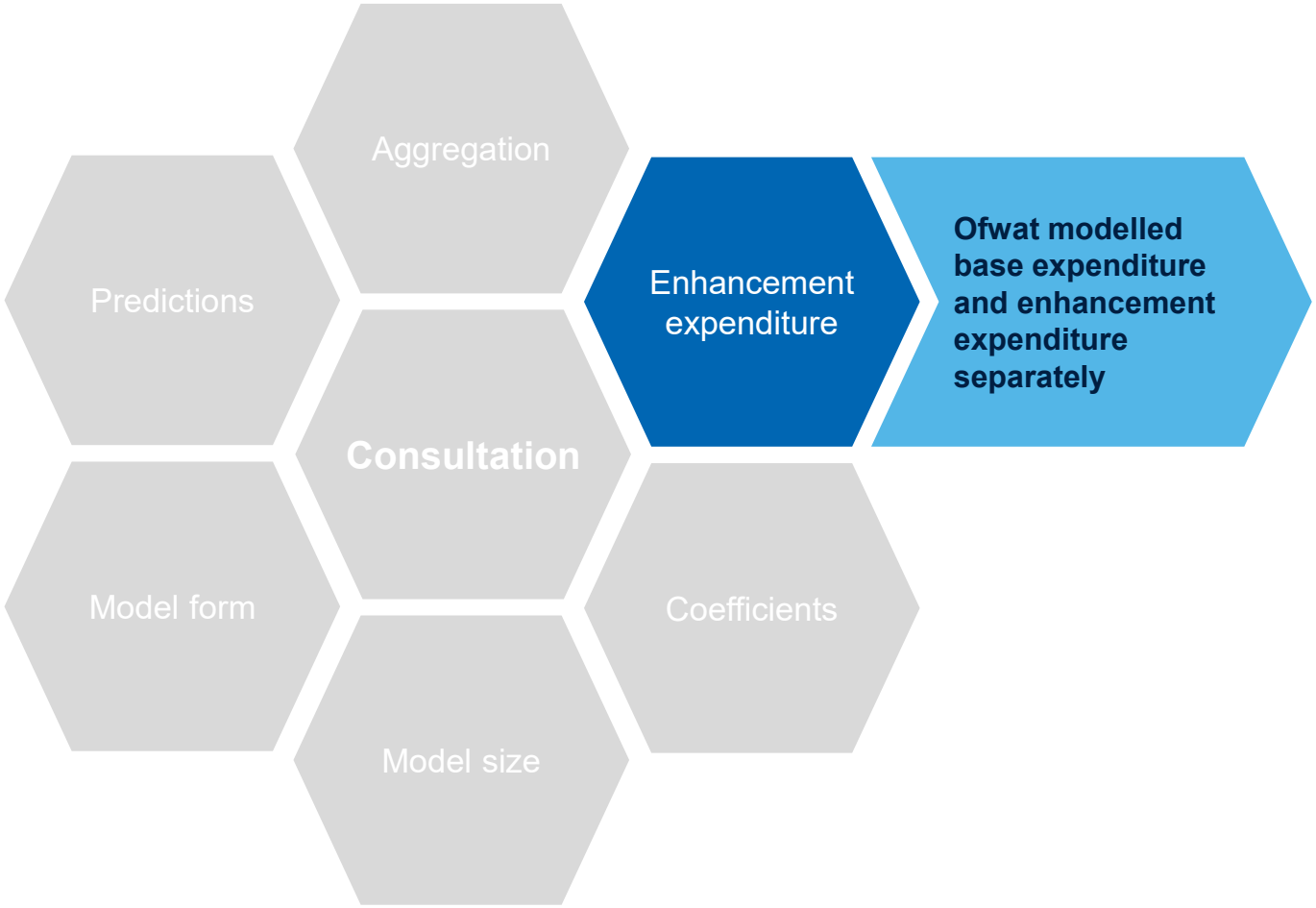

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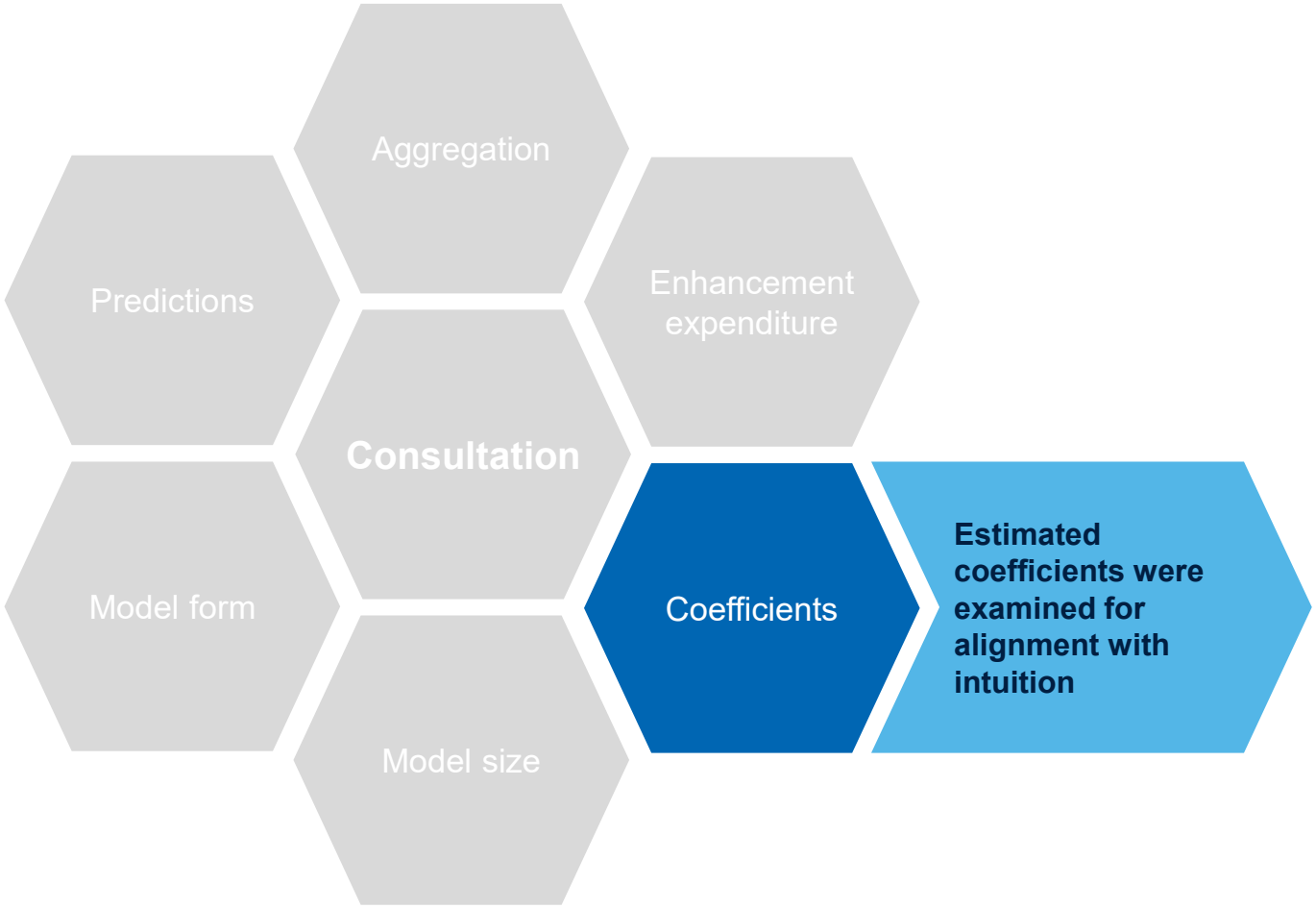

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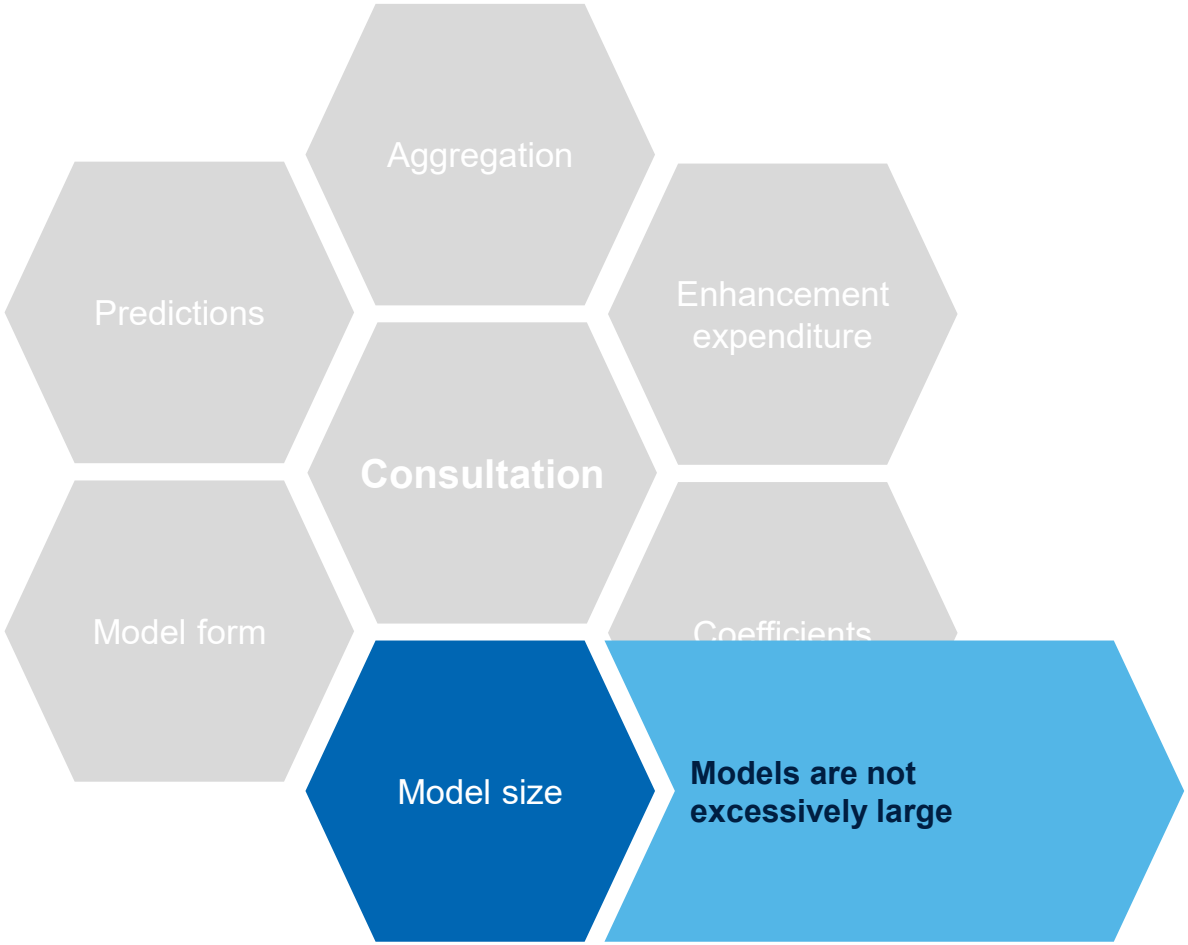

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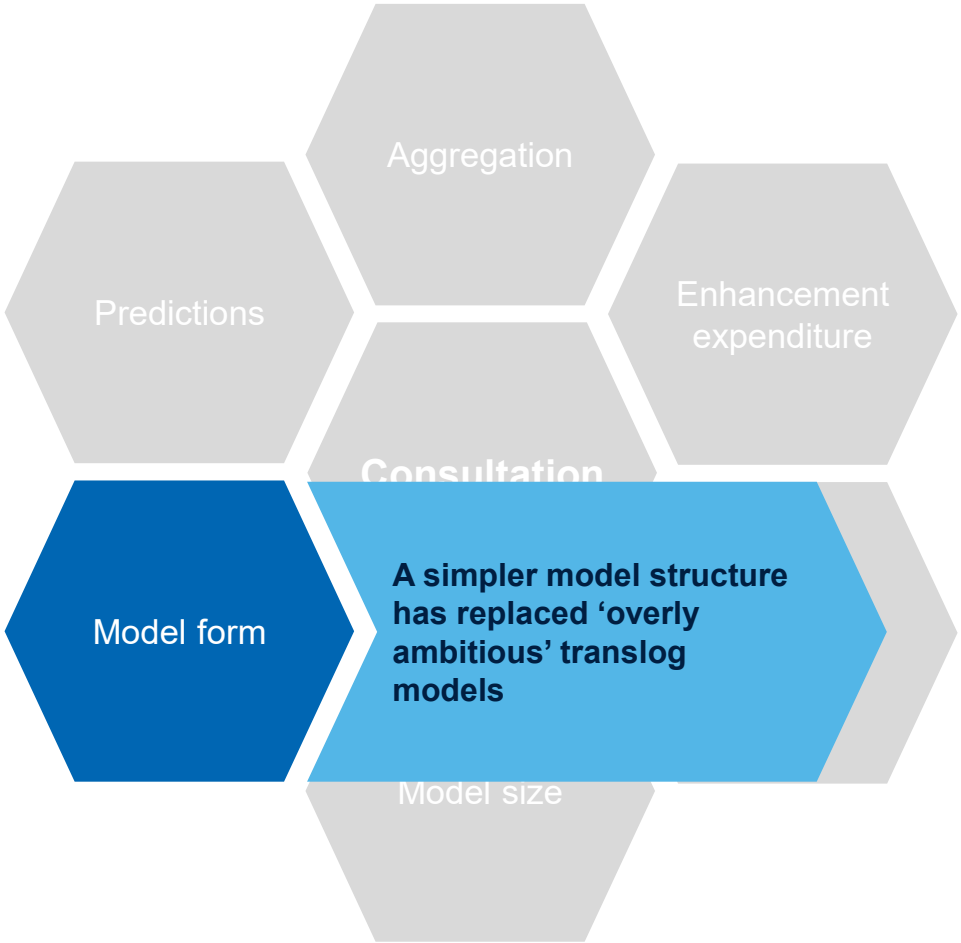

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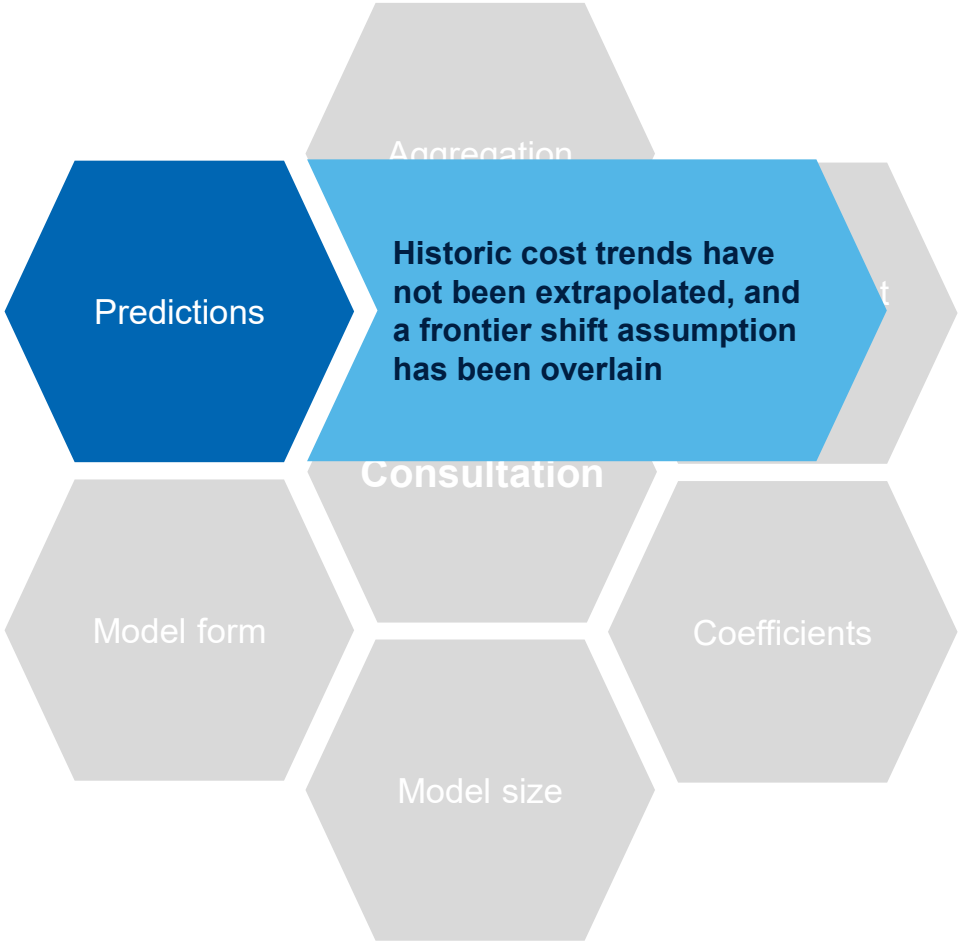

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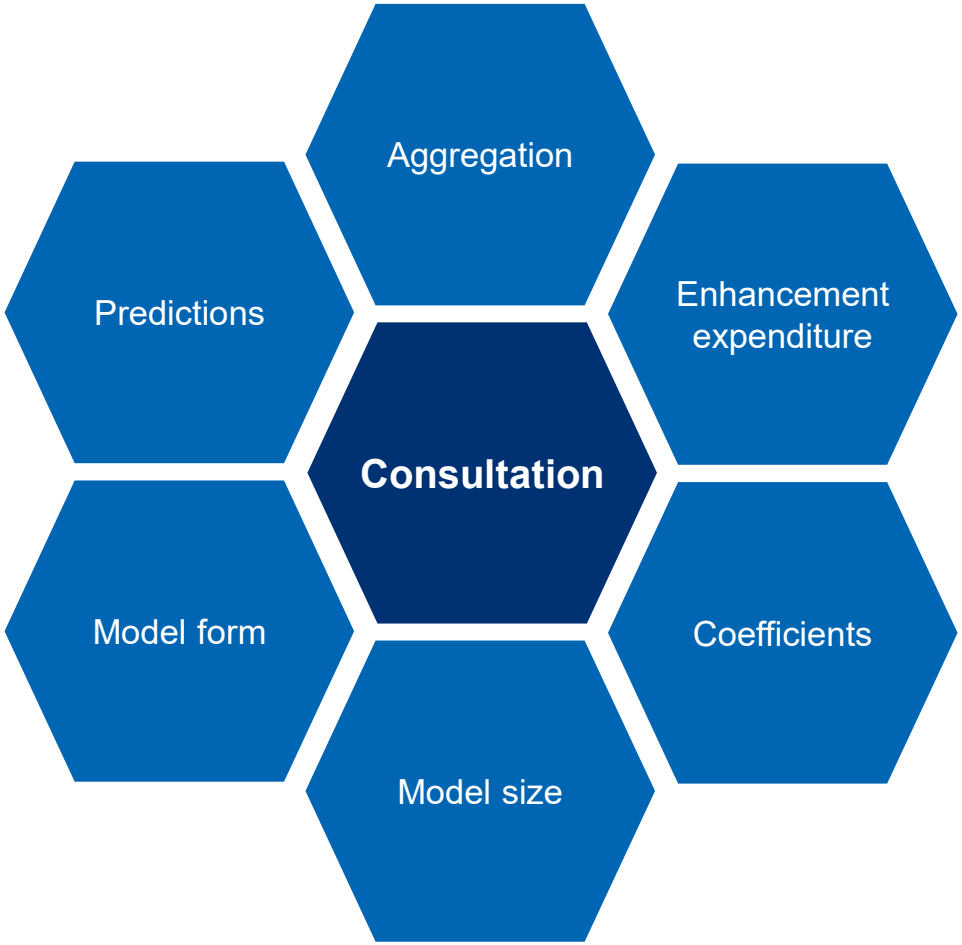
As a result, the cost assessment is more robust than that in PR14



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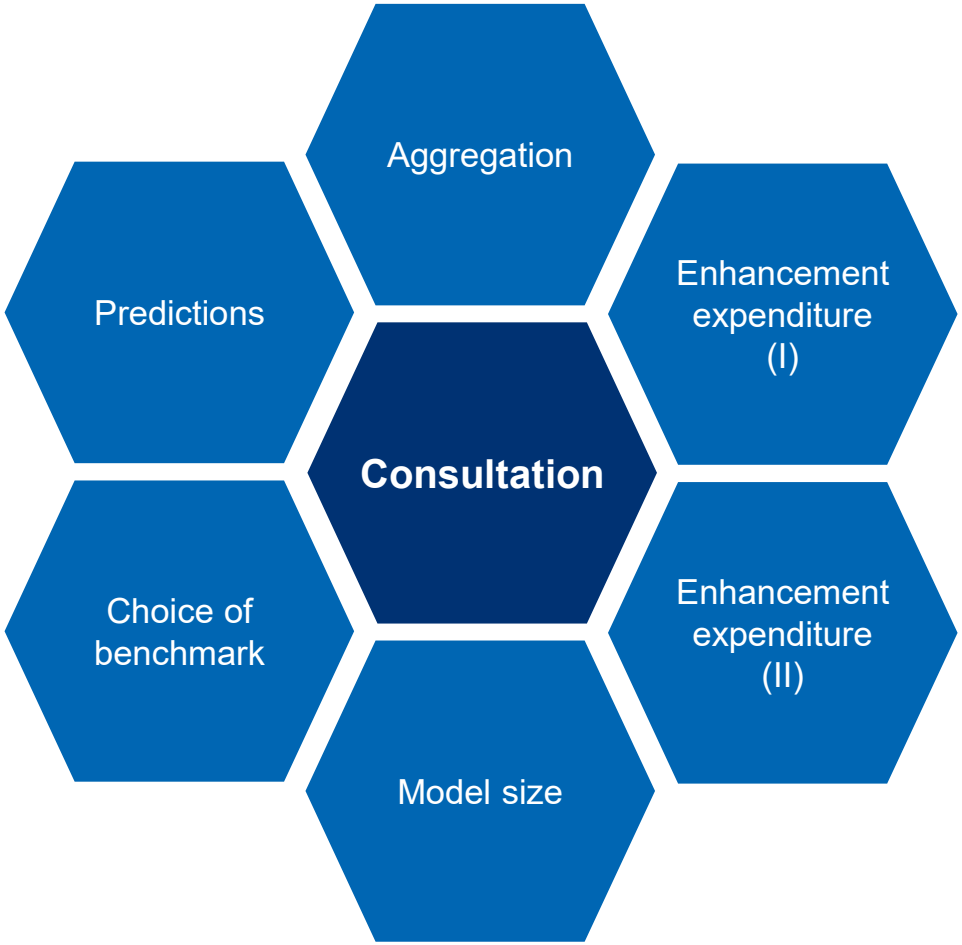

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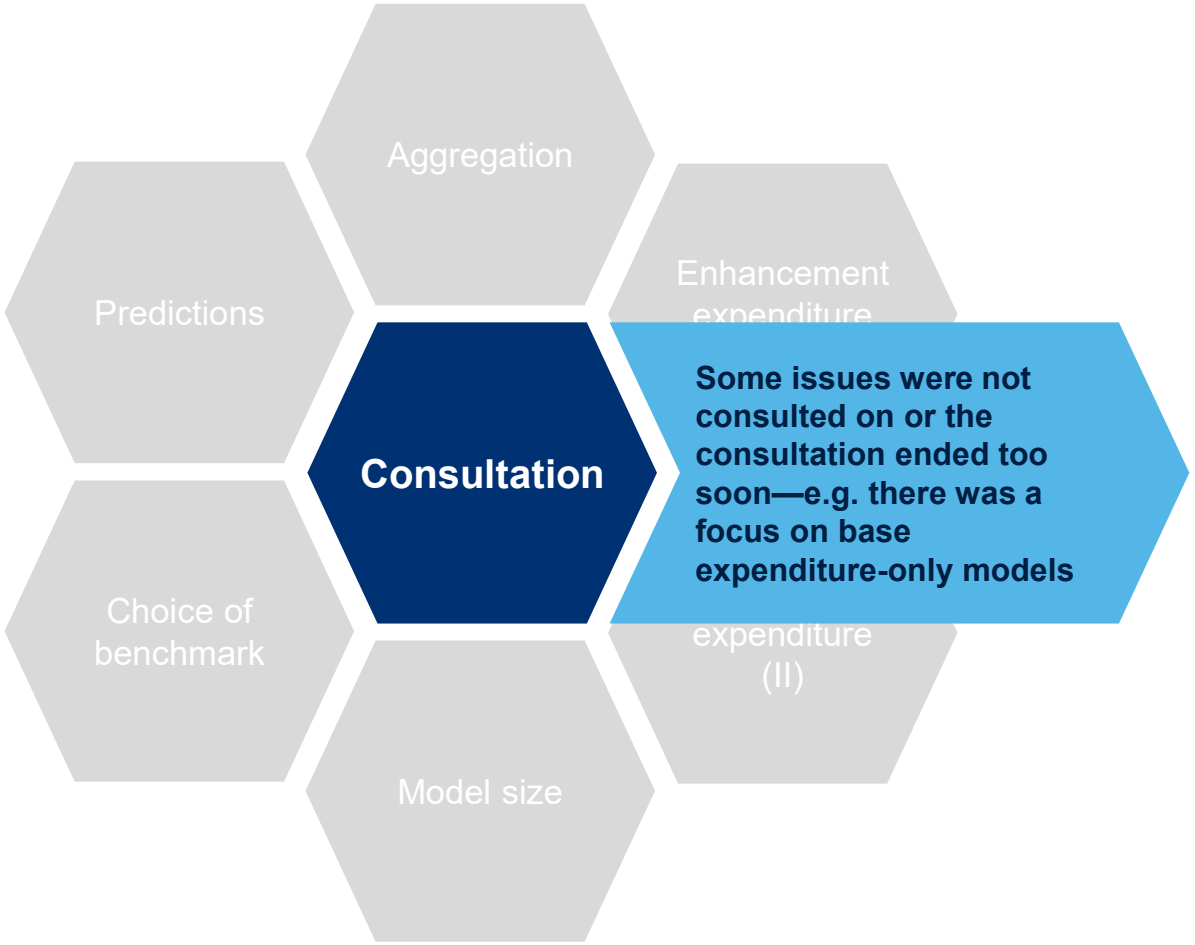

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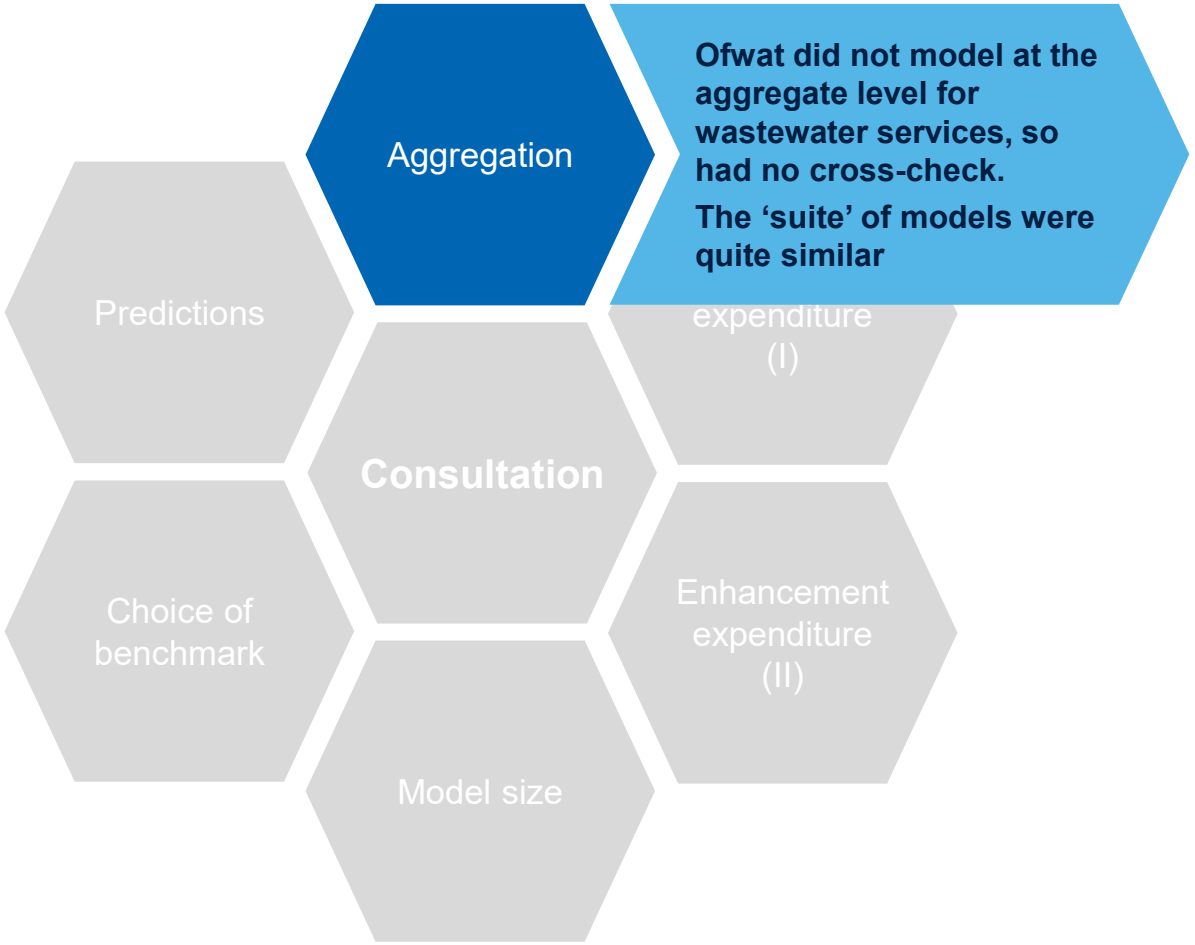

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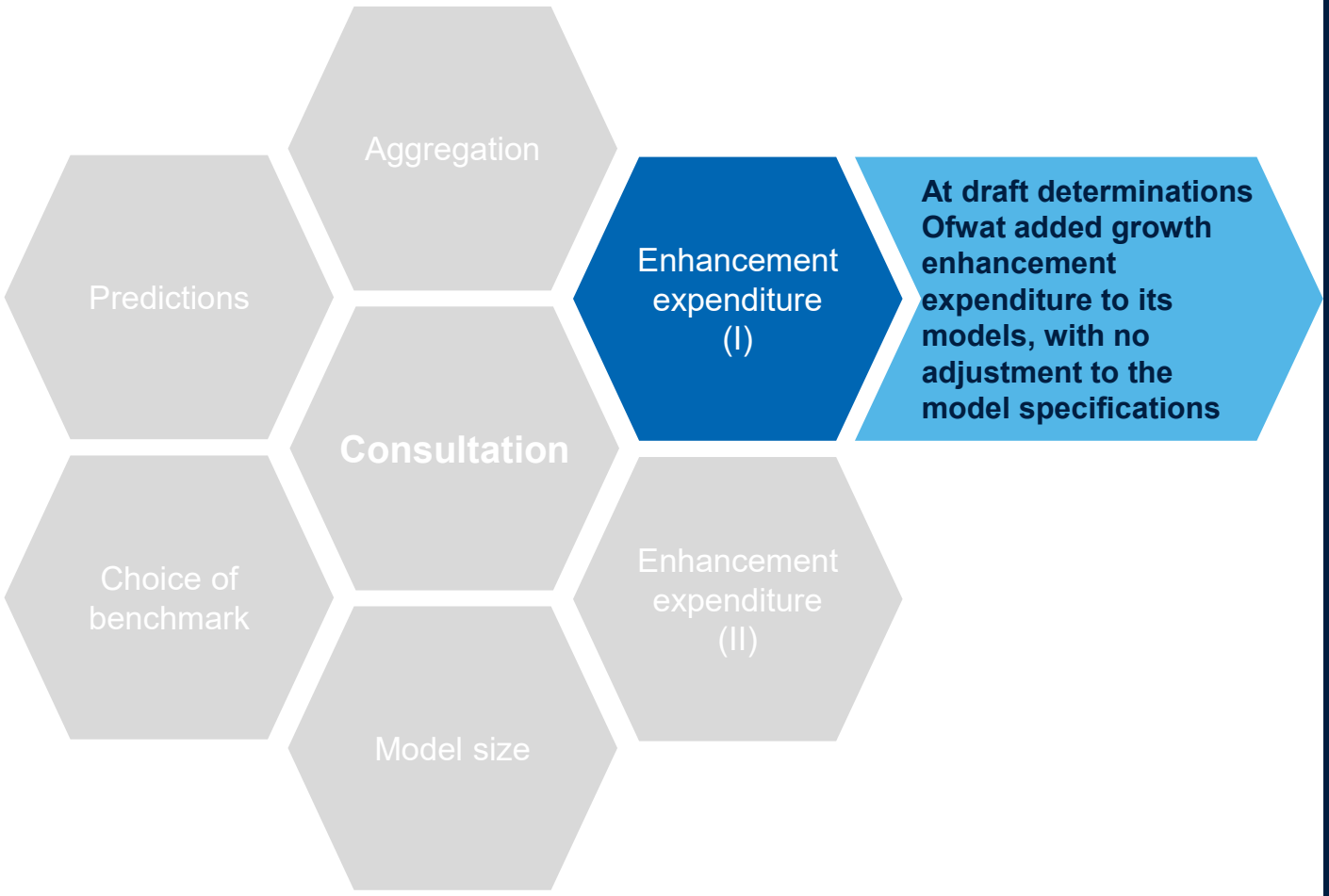

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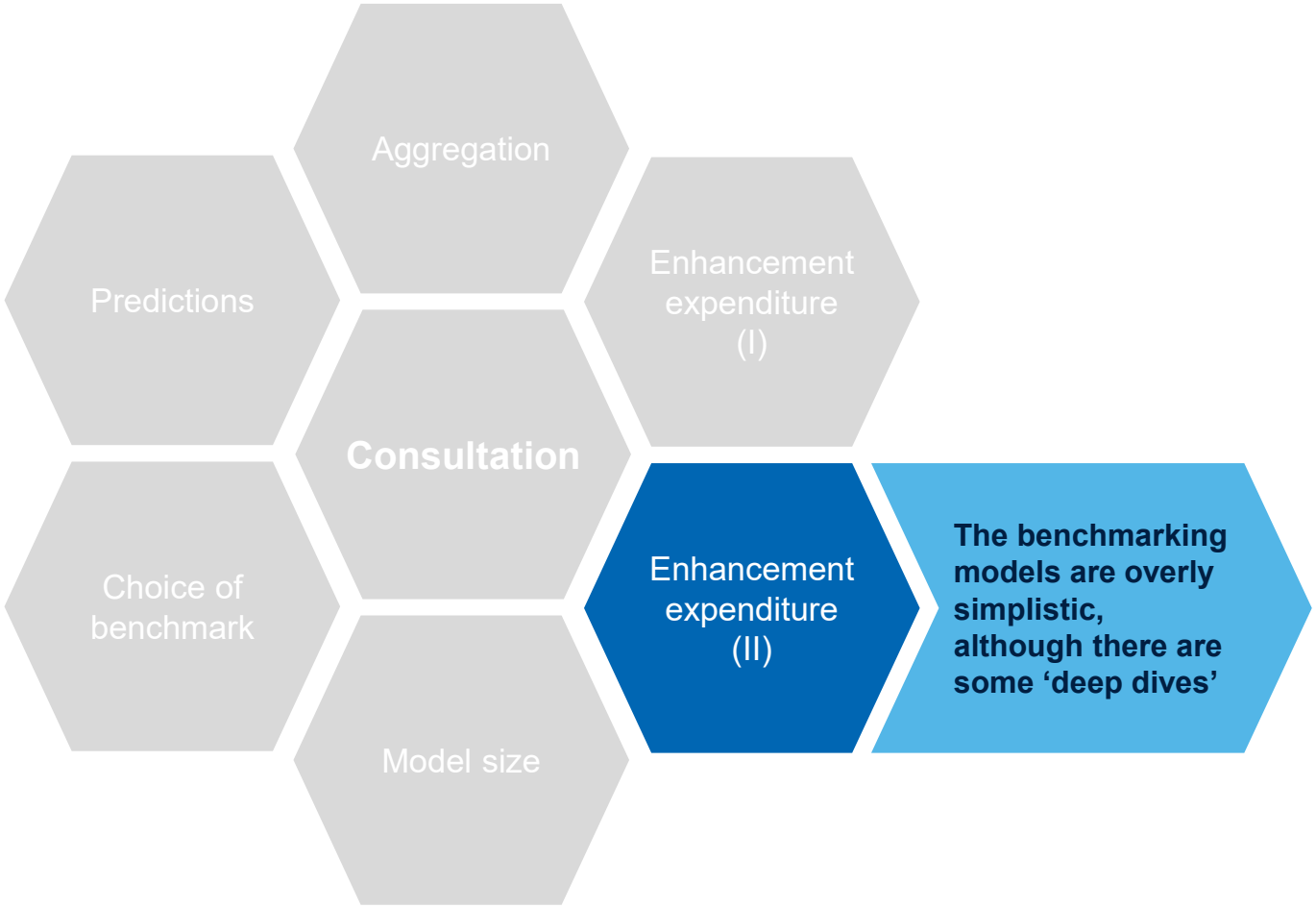

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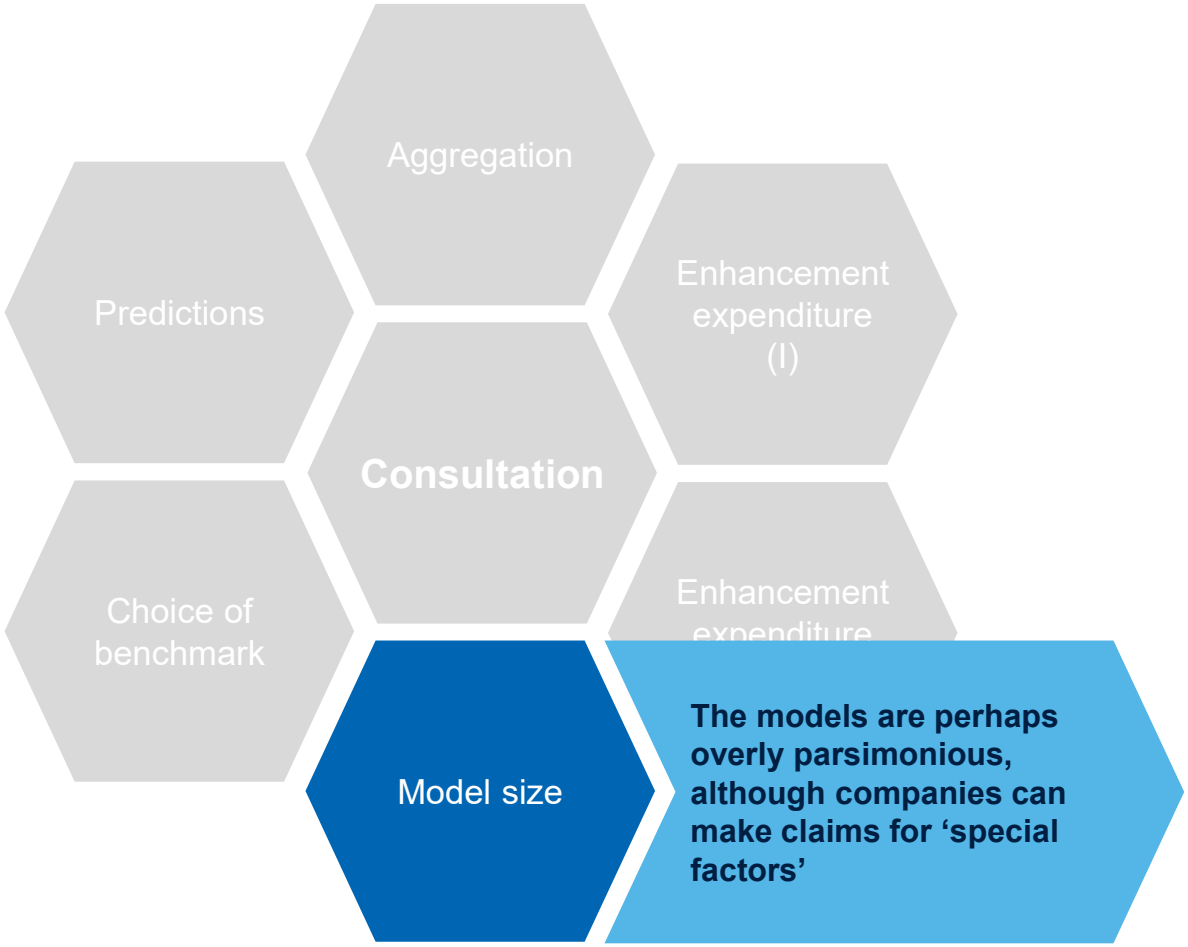

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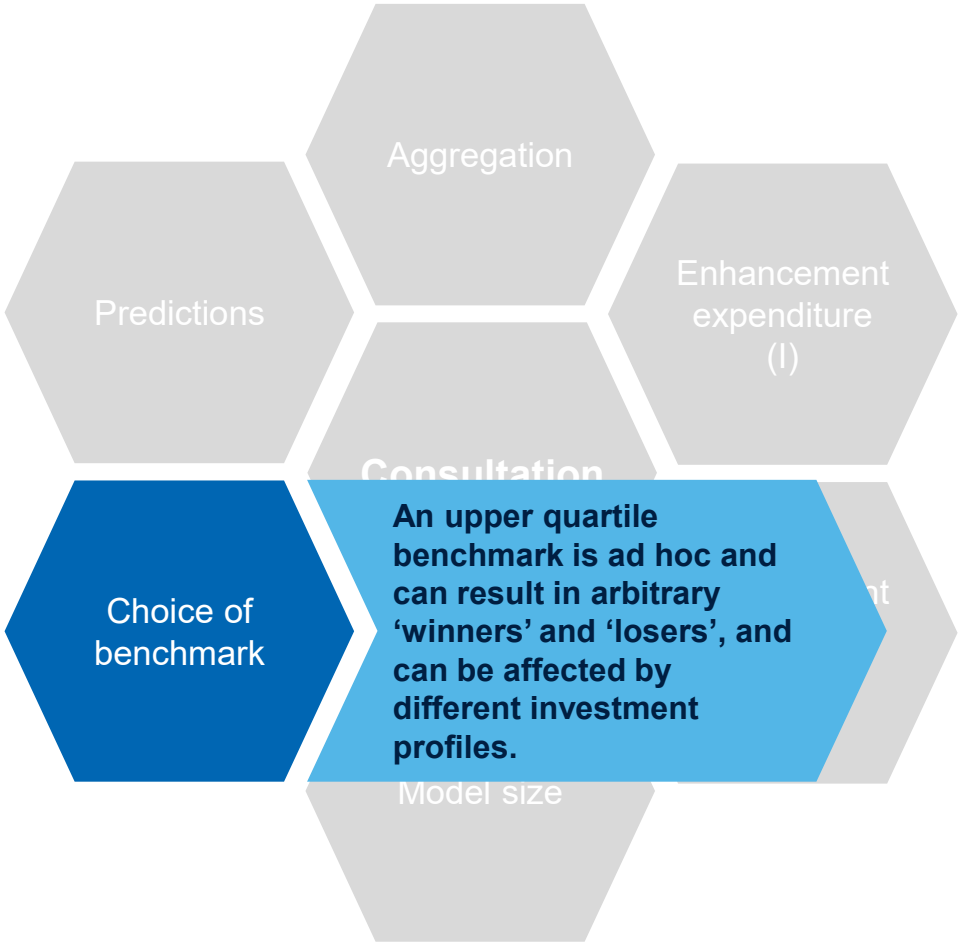

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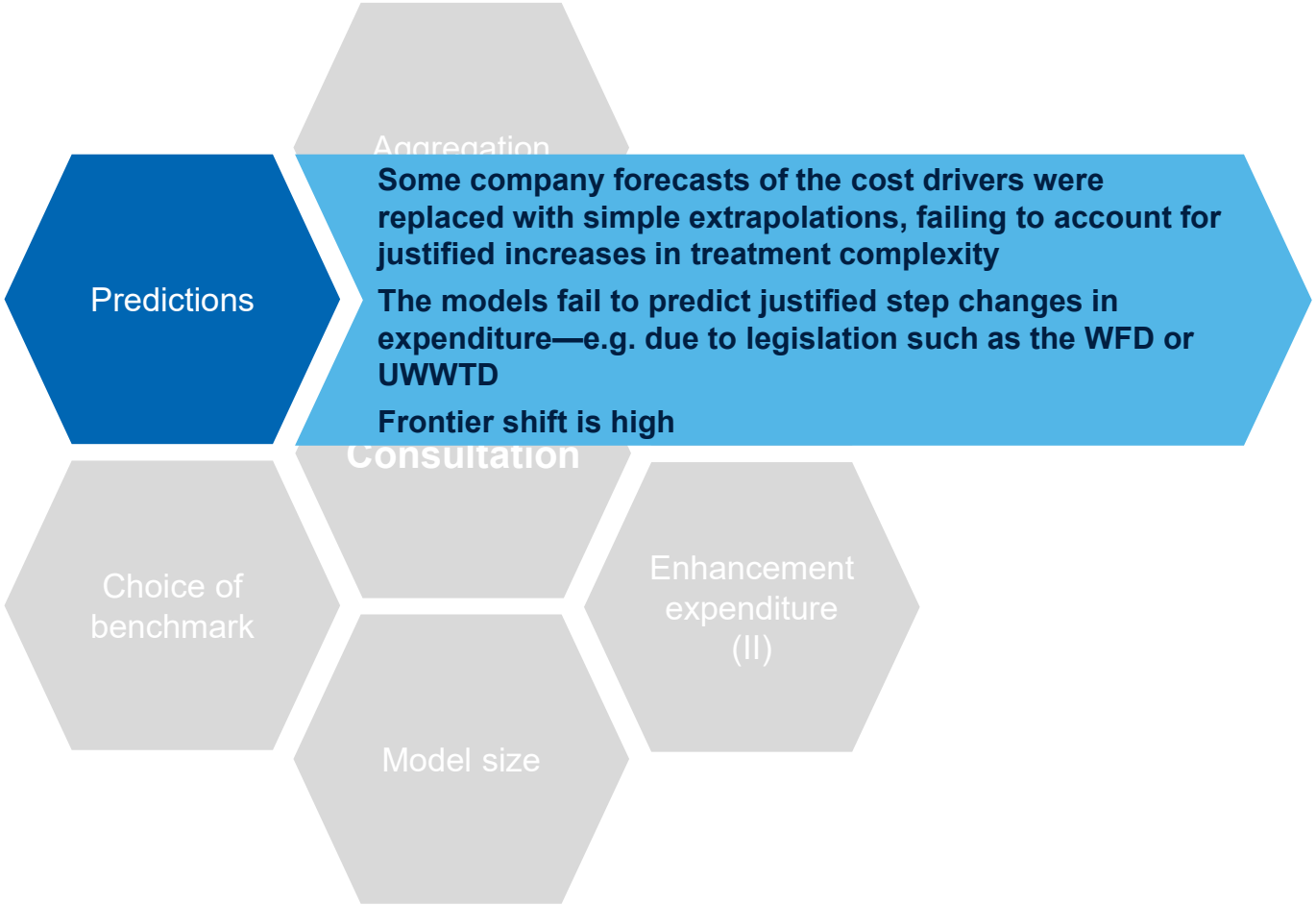

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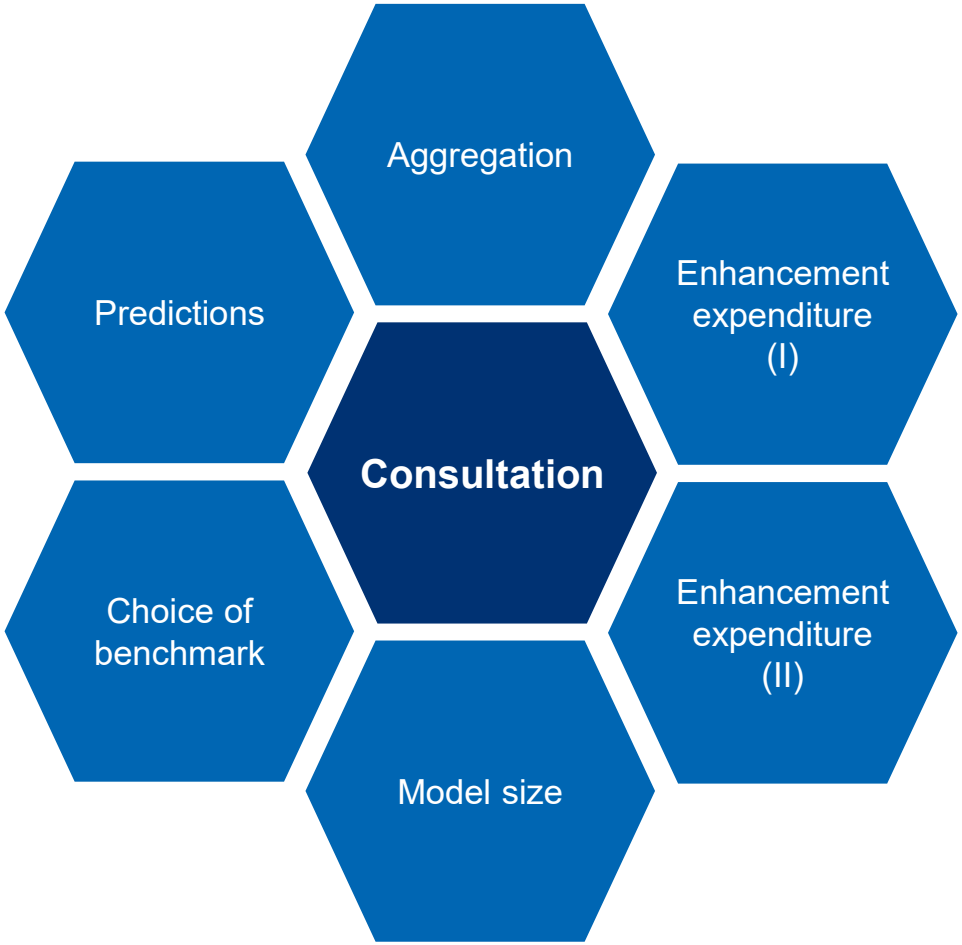
As such, there is still room for improvement



Any questions?

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Views on the cost assessment undertaken in the 2019 price control in England and Wales

First European Forum on Regulation of Water Services

Alan Horncastle, Partner

3 December 2019

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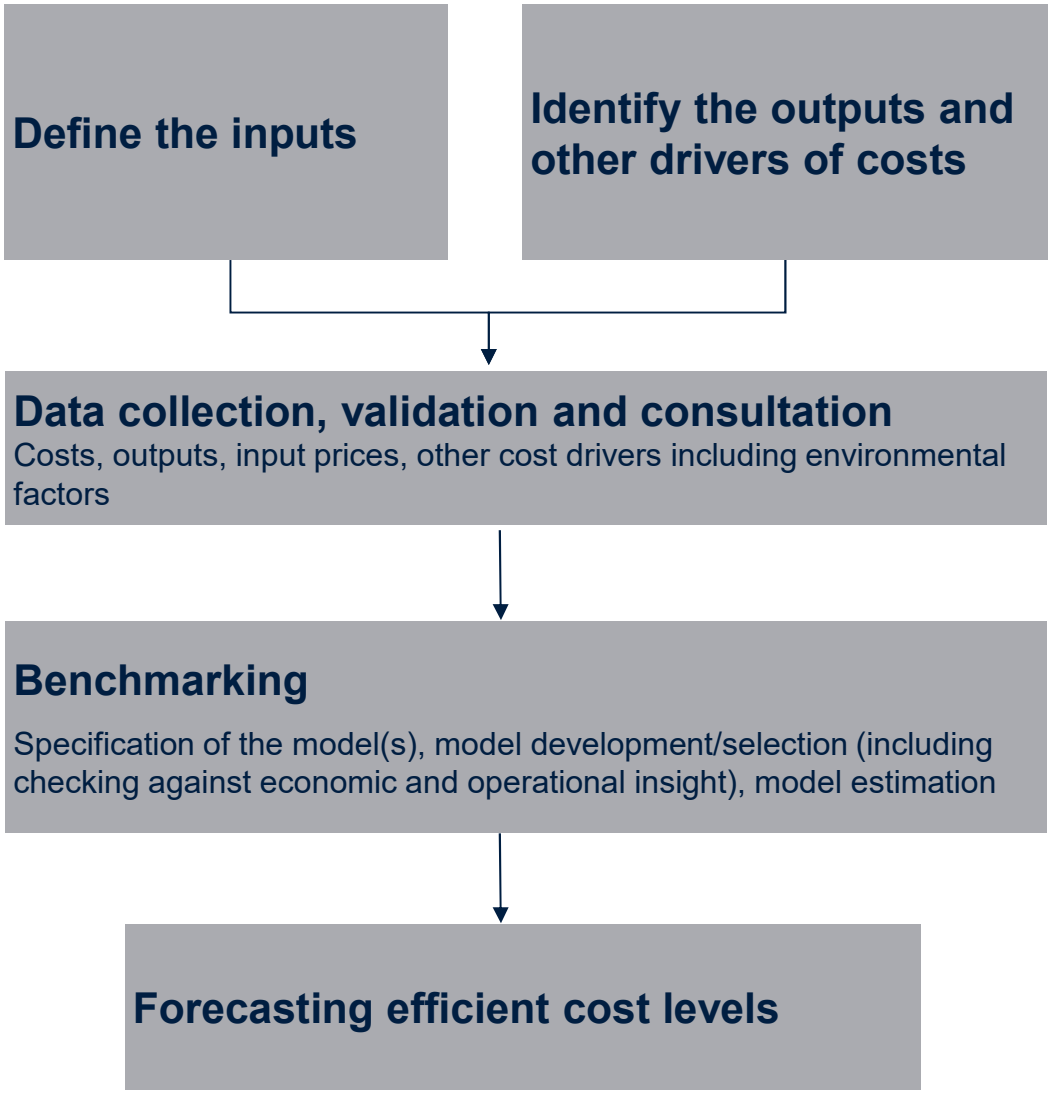
Overview

- **Ofwat's process:** how its cost benchmarking was developed in PR19
- **what went well**
- **what could be improved going forward**

Ofwat's benchmarking process at PR19



Regulation of the England and Wales water sector started in 1989, upon privatisation.

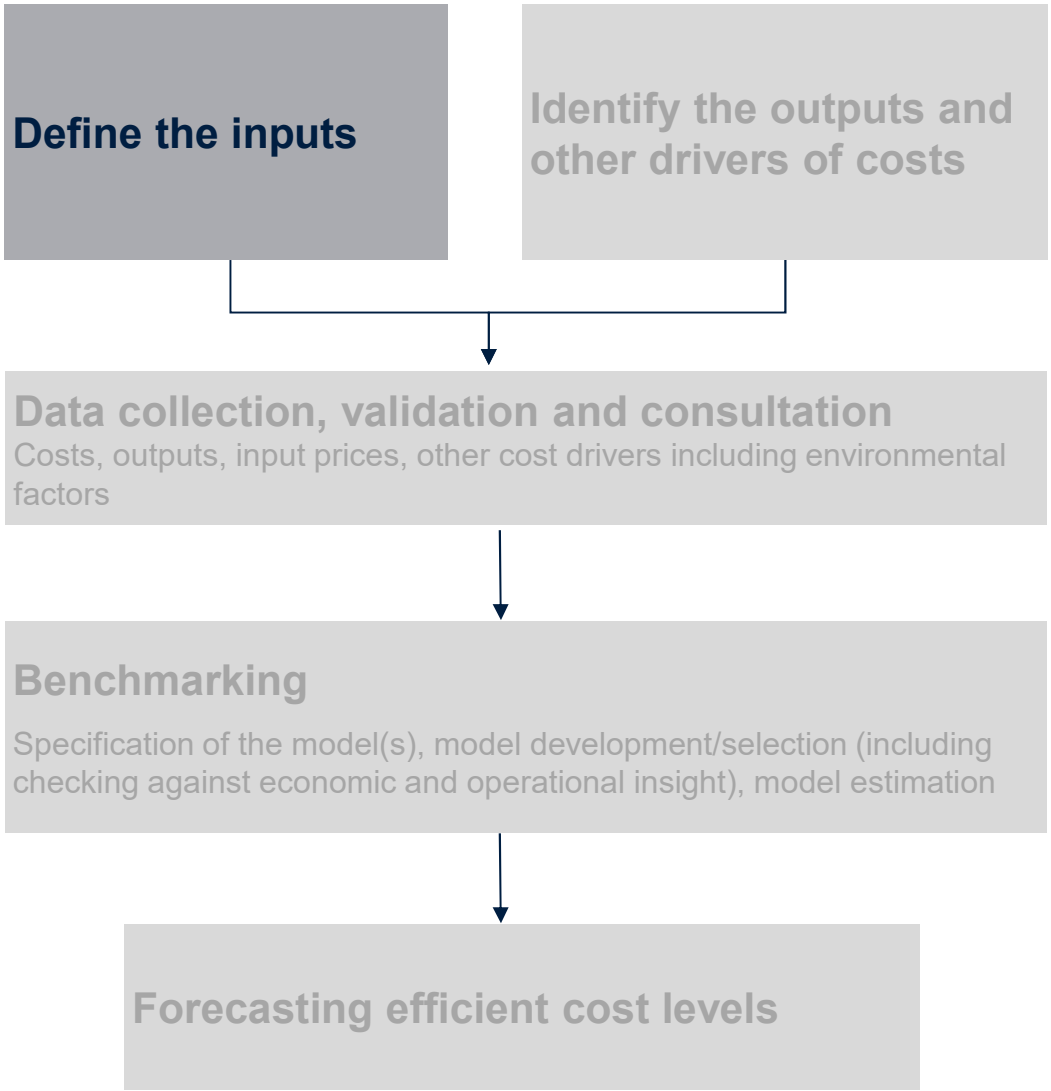
Up to the price control review of 2009 (PR09), Ofwat modelled operating expenditure and capital expenditure separately—the former using econometric modelling, and the latter using econometric modelling of capital maintenance and unit cost comparisons (the 'cost base report') for capital maintenance and capital enhancement expenditure.

Up to PR09, Ofwat's approach remained very consistent and included publishing annual efficiency reports.

Ofwat's benchmarking has been examined in detail in a number of price control appeals and water merger inquiries. The latest price control appeal was Bristol Water (2015).

Ofwat takes on board insights from each appeal when developing its approach for the next price control review.

See: CMA (2015), 'Bristol Water plc A reference under section 12(3)(a) of the Water Industry Act 1991'

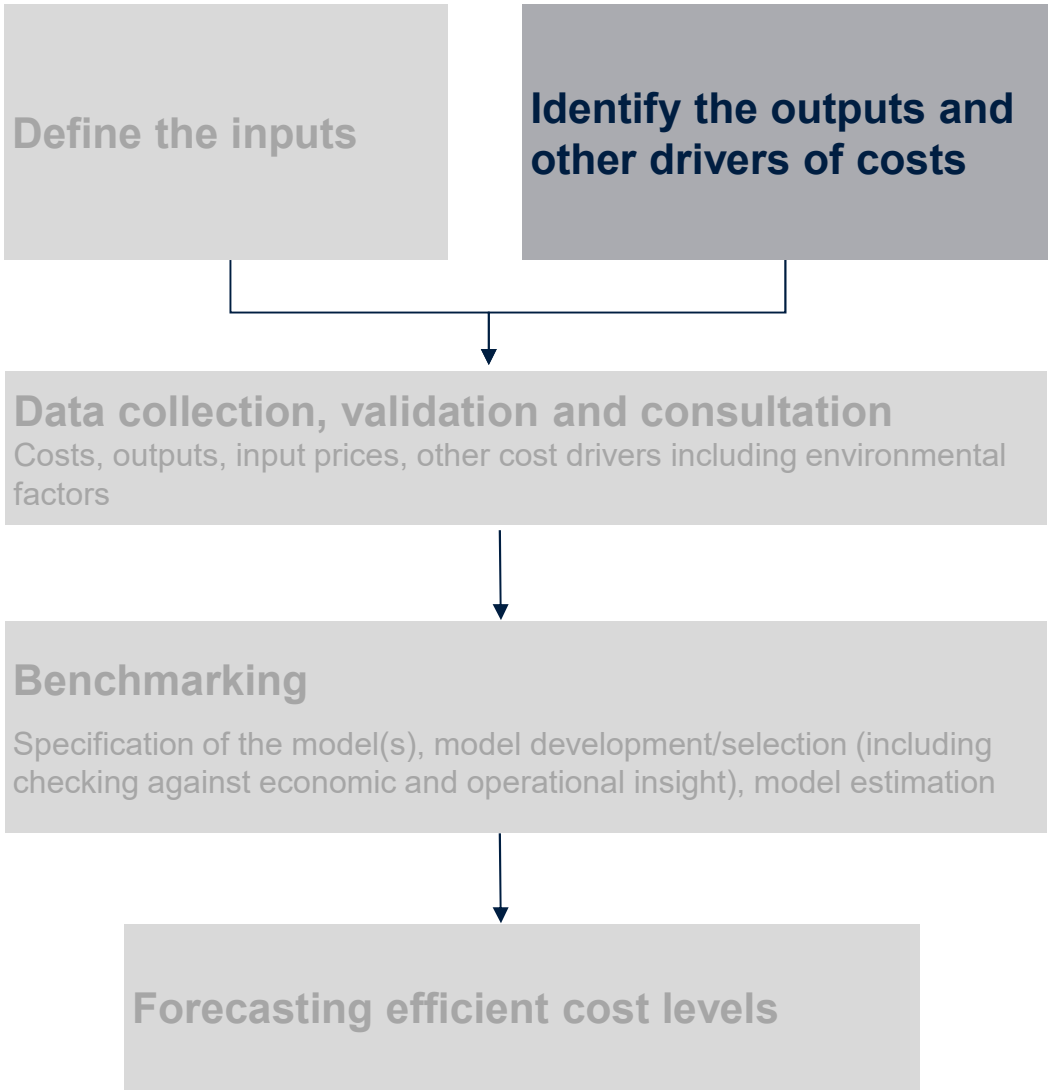


In its initial assessment of plans, Ofwat benchmarked water companies through the use of econometric models of **base expenditure (BOTEX)**, which consists of operating expenditure and (a seven-year average of) capital maintenance expenditure.

Enhancement expenditure was considered separately, as Ofwat considered that 'enhancement costs tend to be non-routine and company specific'.

In its slow-track draft determinations, Ofwat modelled **BOTEX plus** (base expenditure plus some elements of enhancement expenditure). This was because:

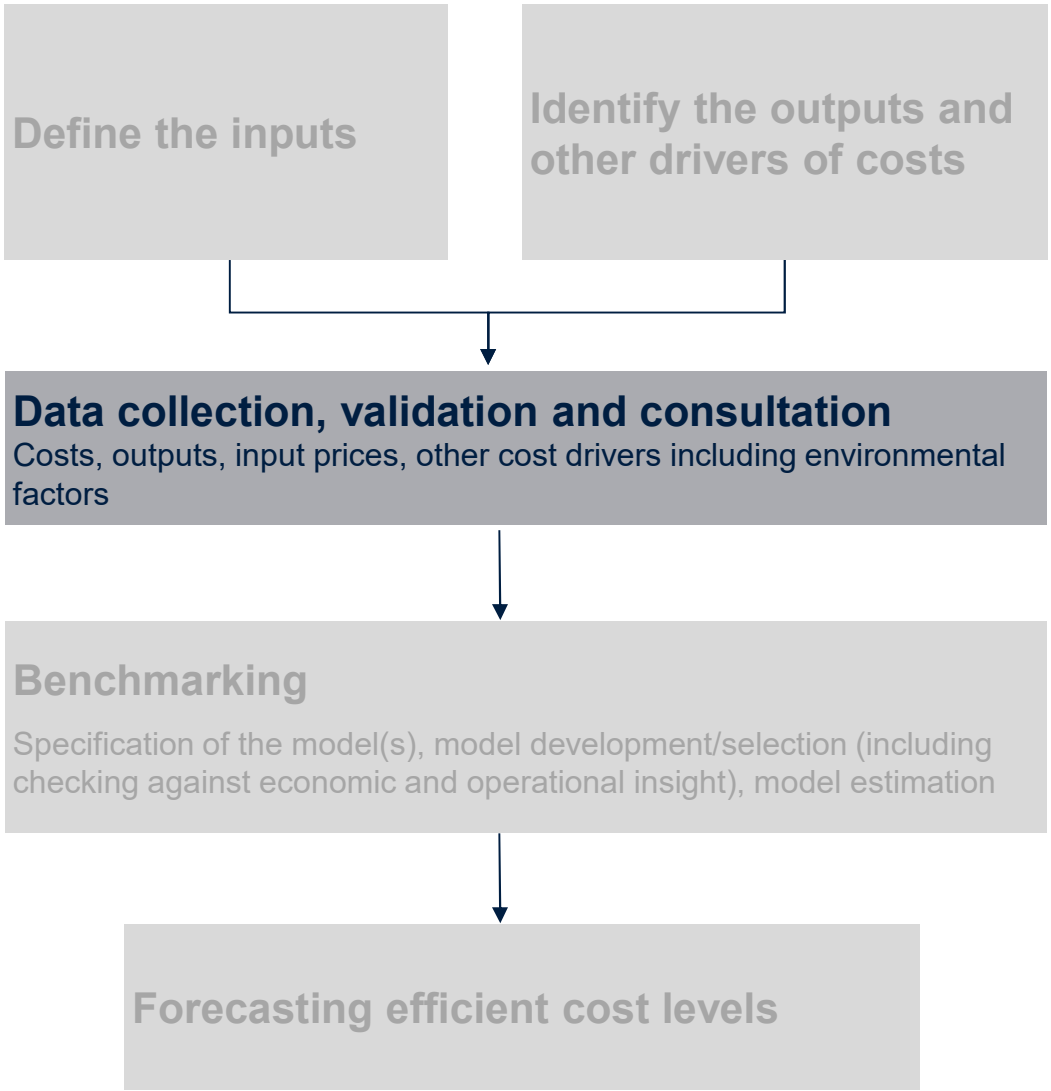
- Ofwat considered that growth-related expenditure was 'routine';
- growth-related enhancement can be explained by similar cost drivers to operational and capital maintenance (e.g. company scale);
- Ofwat did not expect to see a significant step change in what drives growth enhancement expenditure during PR19.



For wholesale water and wastewater, Ofwat (2019) found that four key categories of cost driver were consistently important.

- **Scale variables**, to measure the size of the network and/or the level of output
- **Complexity variables**, to capture the complexity of required treatment or the complexity of the network
- **Topography variables**, to capture energy requirements for transporting or pumping water or wastewater
- **Density variables**, to capture economies of scale at the treatment level and costs resulting from operating in highly dense (or sparse) areas

Ofwat (2019), 'Supplementary technical appendix: Econometric approach', January.



During 2016 and 2017, Ofwat ran a series of **cost assessment working groups** (CAWG) with the industry, to develop:

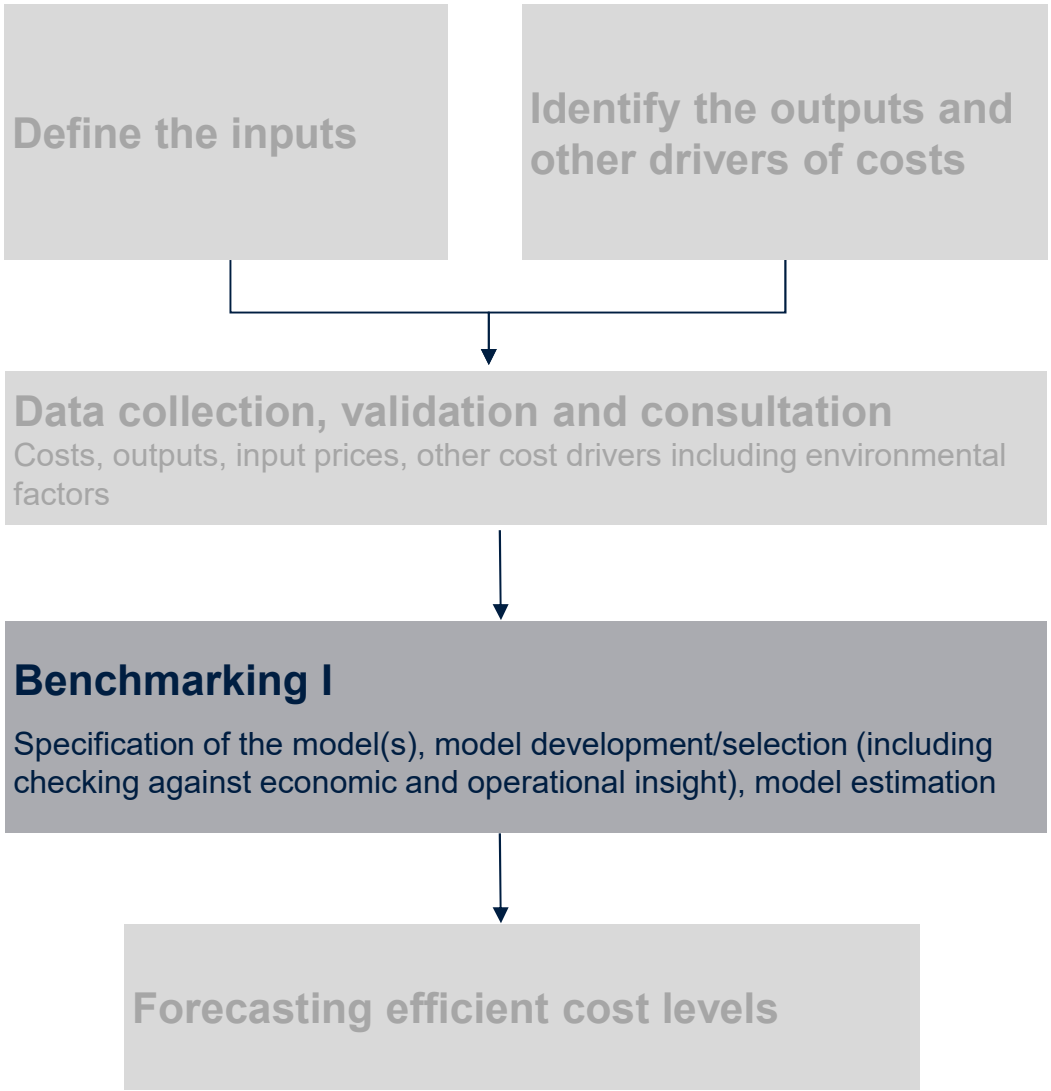
- the data;
- cost assessment tools for PR19.

In July 2017, companies submitted data on costs and cost drivers over the six-year period 2011–12 to 2016–17. The data was subject to extensive quality assurance and was shared with the industry.

In March 2018, Ofwat issued a **cost assessment consultation**.

- 13 water companies and Ofwat submitted a number of cost models across the value chain. In total, 382 models were submitted.
- Each company then commented on the models that had been submitted.
- In February 2019, Ofwat published its approach and decisions regarding econometric modelling for PR19, including its model specifications.

Ofwat (2018), 'Cost assessment for PR19: a consultation on econometric cost modelling', March.



Ofwat's approach to model development and assessment was as follows.

- Engineering, operational and economic insight was used to specify an econometric model and form expectations about the relationship between cost and cost drivers.
- The estimated coefficients were:
  - assessed as to whether they were of the right sign and magnitude;
  - examined for robustness (stability and consistency across specifications and statistical significance).
- Ofwat checked the risk of perverse incentives from including endogenous drivers.
- It examined the statistical validity of the model.
- It considered the estimation method—random effects (RE) was used as it reflected the panel structure of the data, and was supported by statistical tests.

Ofwat (2018), 'Cost assessment for PR19: a consultation on econometric cost modelling', March.

Define the inputs

Identify the outputs and other drivers of costs

Data collection, validation and consultation

Costs, outputs, input prices, other cost drivers including environmental factors

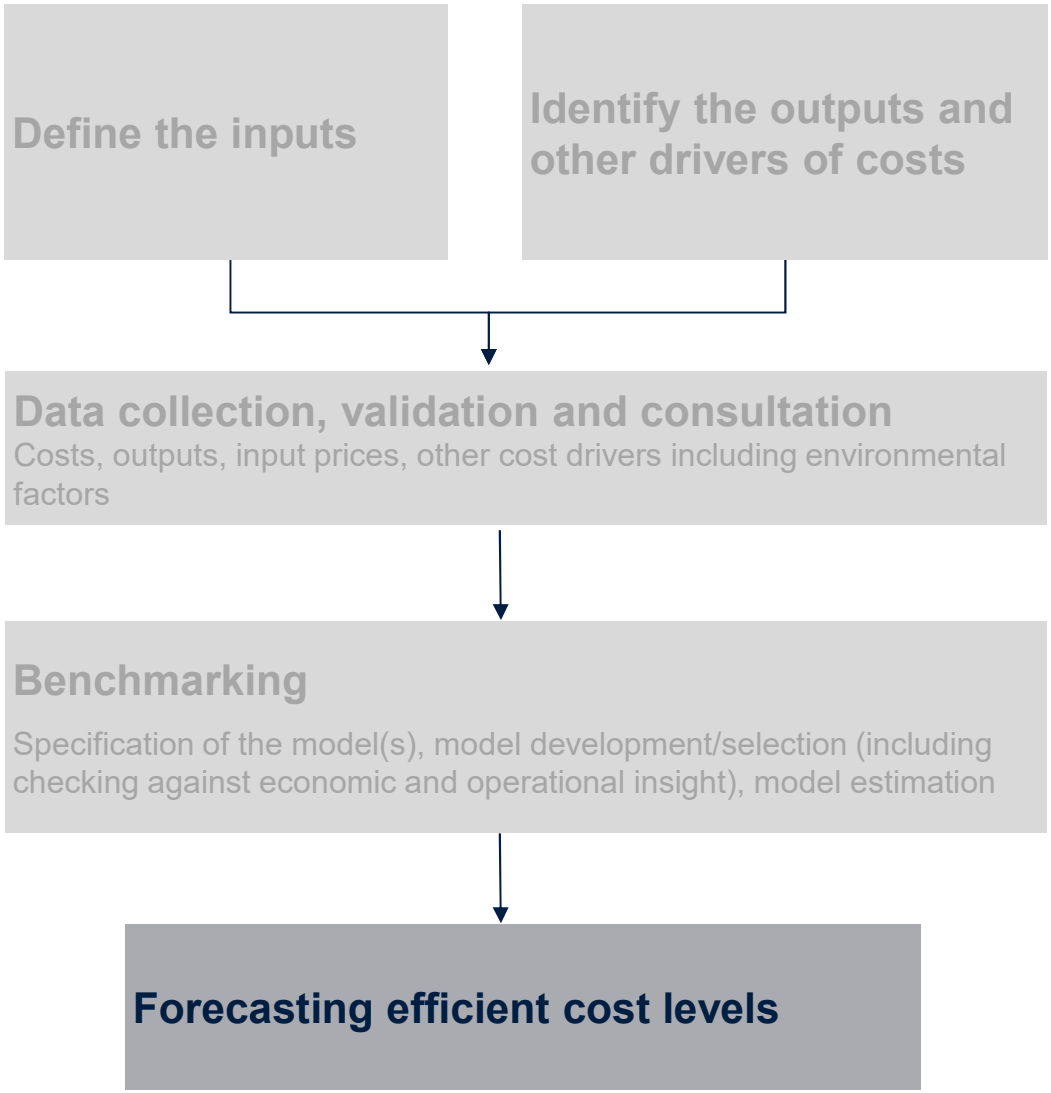
Benchmarking II

Specification of the model(s), model development/selection (including checking against economic and operational insight), model estimation

Forecasting efficient cost levels

Model name	WW1	WW2
Dependent variable (log)	Wholesale water total	
Connected properties (log)	1.034***	1.021***
Lengths of main (log)		
Water treated at works of complexity levels 3 to 6 (%)	0.005***	
Weighted average treatment complexity (log)		0.524***
Number of booster pumping stations per length of main (log)	0.236*	0.256***
Weighted average density (log)	-2.026***	-1.635***
Squared term of log of weighted average density	0.142***	0.114***
Constant term	-1.732	-3.230***
Overall R-Squared	0.98	0.98
Number of observations	124	124

Ofwat (2019), 'Supplementary technical appendix: Econometric approach', February



Ofwat used the econometric models to estimate each company's efficient costs for the next control period (2020/21–24/25).

- First, Ofwat generated cost predictions using the model coefficients over the historical period and applied these to forecasts of company cost drivers.
- Second, Ofwat estimated a historical benchmark (upper quartile) and applied a catch-up target. That is, a corrected OLS (COLS)-style approach was used but with the benchmark given by the upper quartile (e.g. between the 4th and 5th companies for water services). Ofwat (2019) states that 'the upper quartile level recognises imperfections of statistical analysis'.
- Finally, Ofwat overlaid a frontier-shift challenge of 1.5% p.a. over the period 2020/21–24/25. This was based on separate analysis using total factor productivity (TFP) growth rates using the EU KLEMS database.

Ofwat (2019), 'PR19 draft determinations: Securing cost efficiency technical appendix', July.

What went well…

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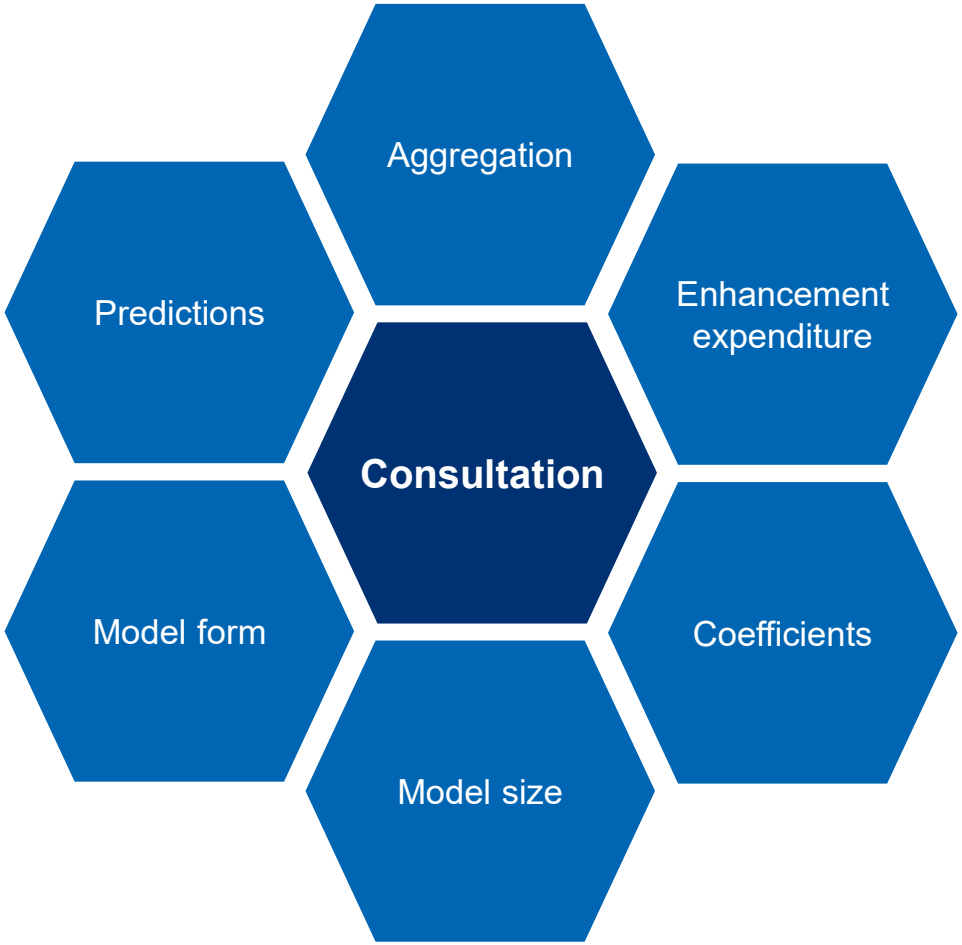

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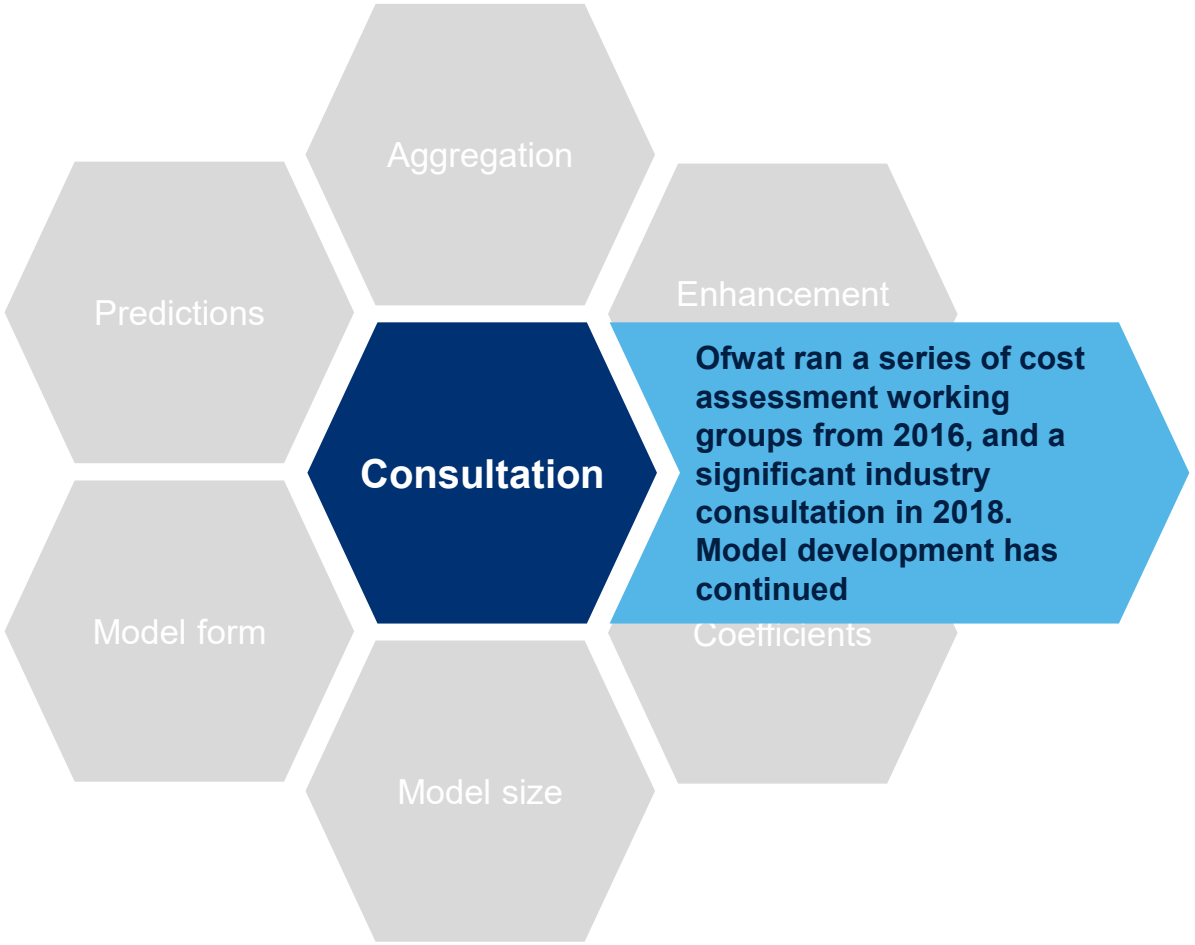

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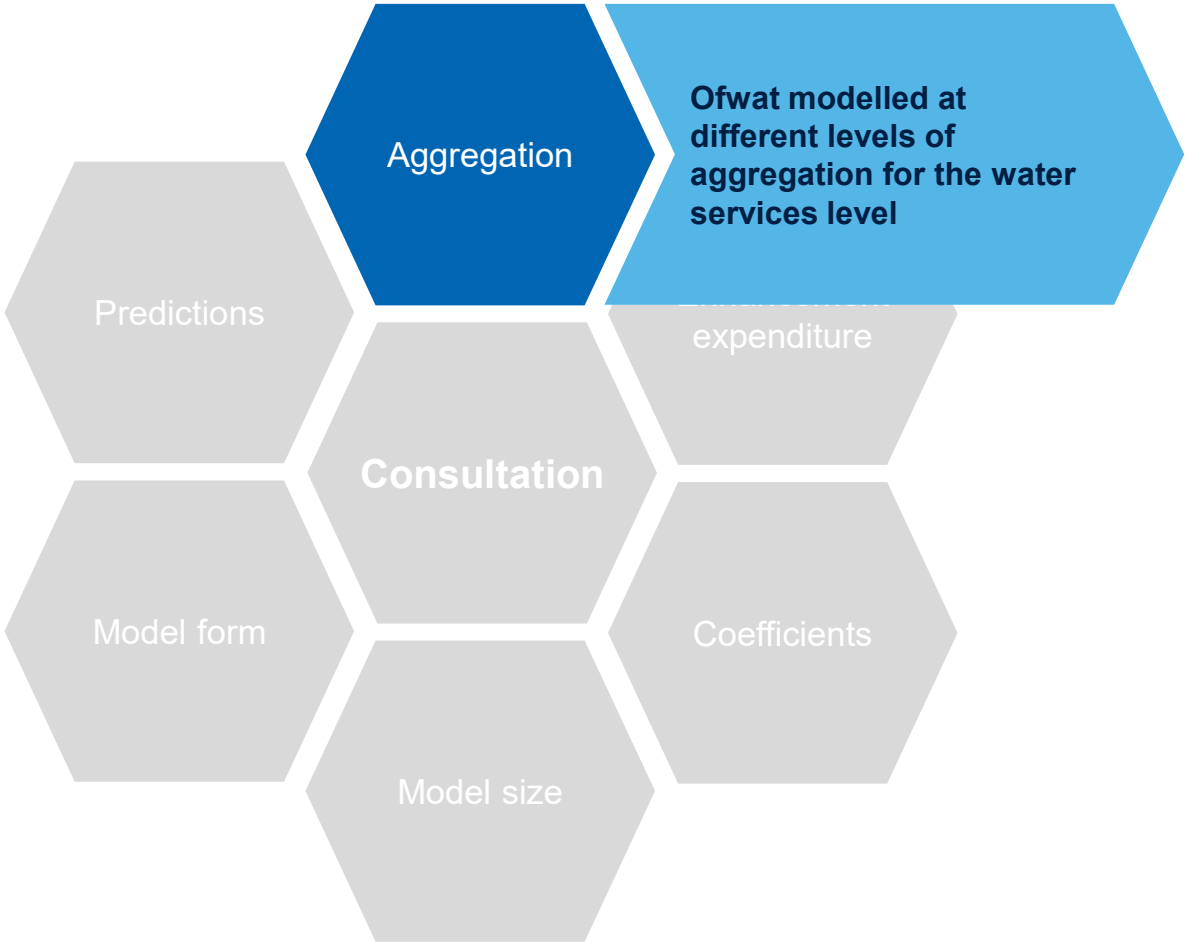

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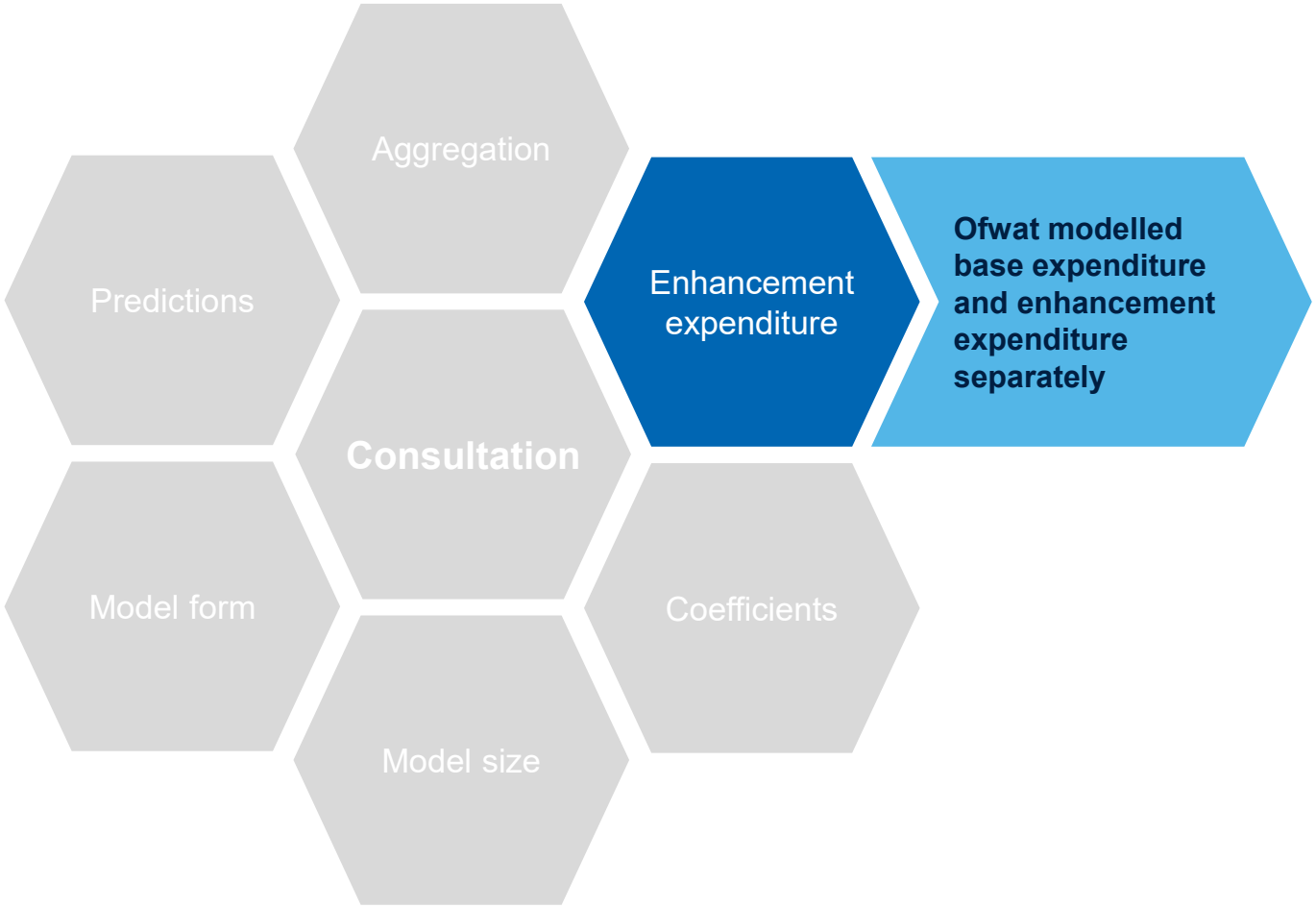

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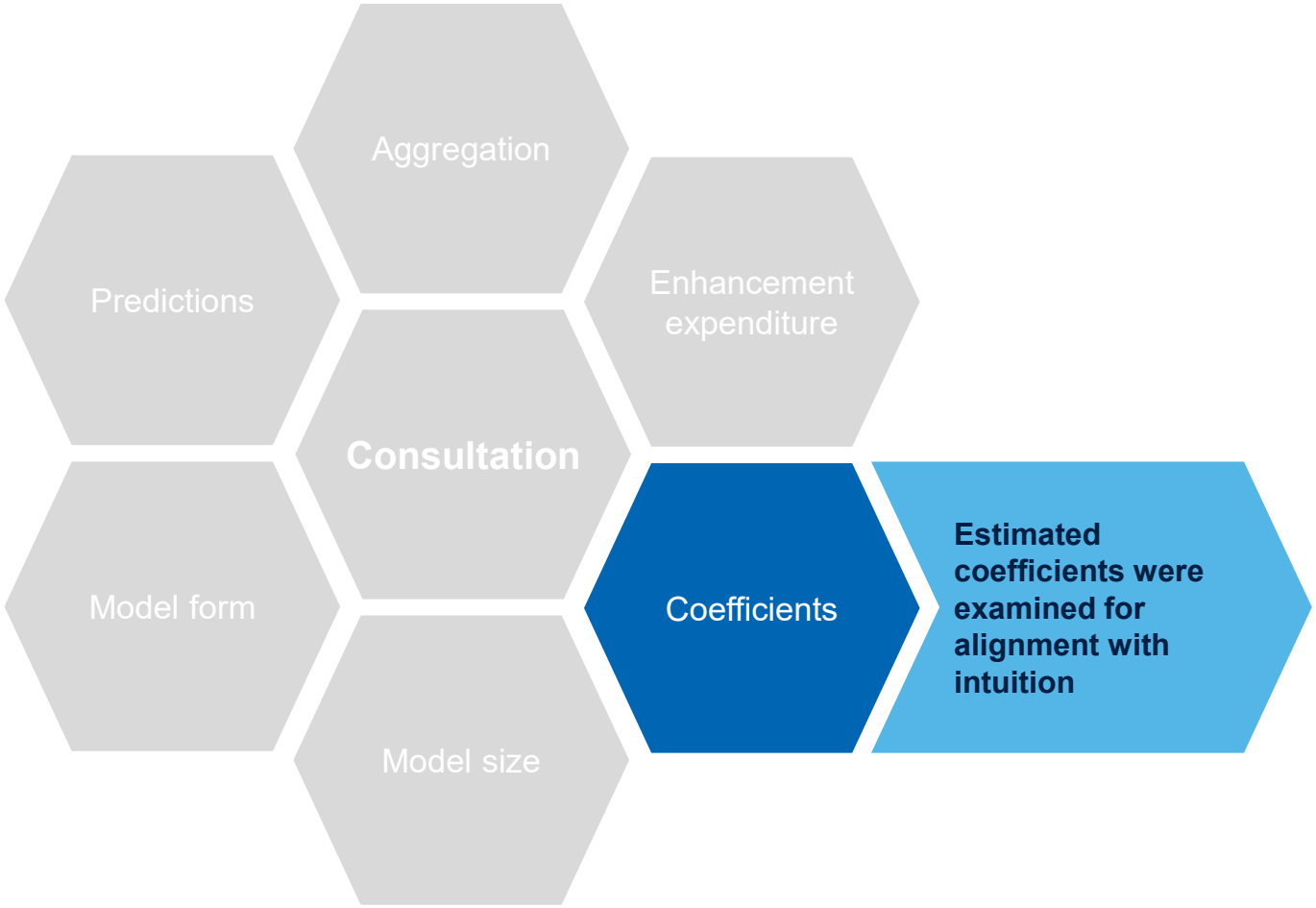

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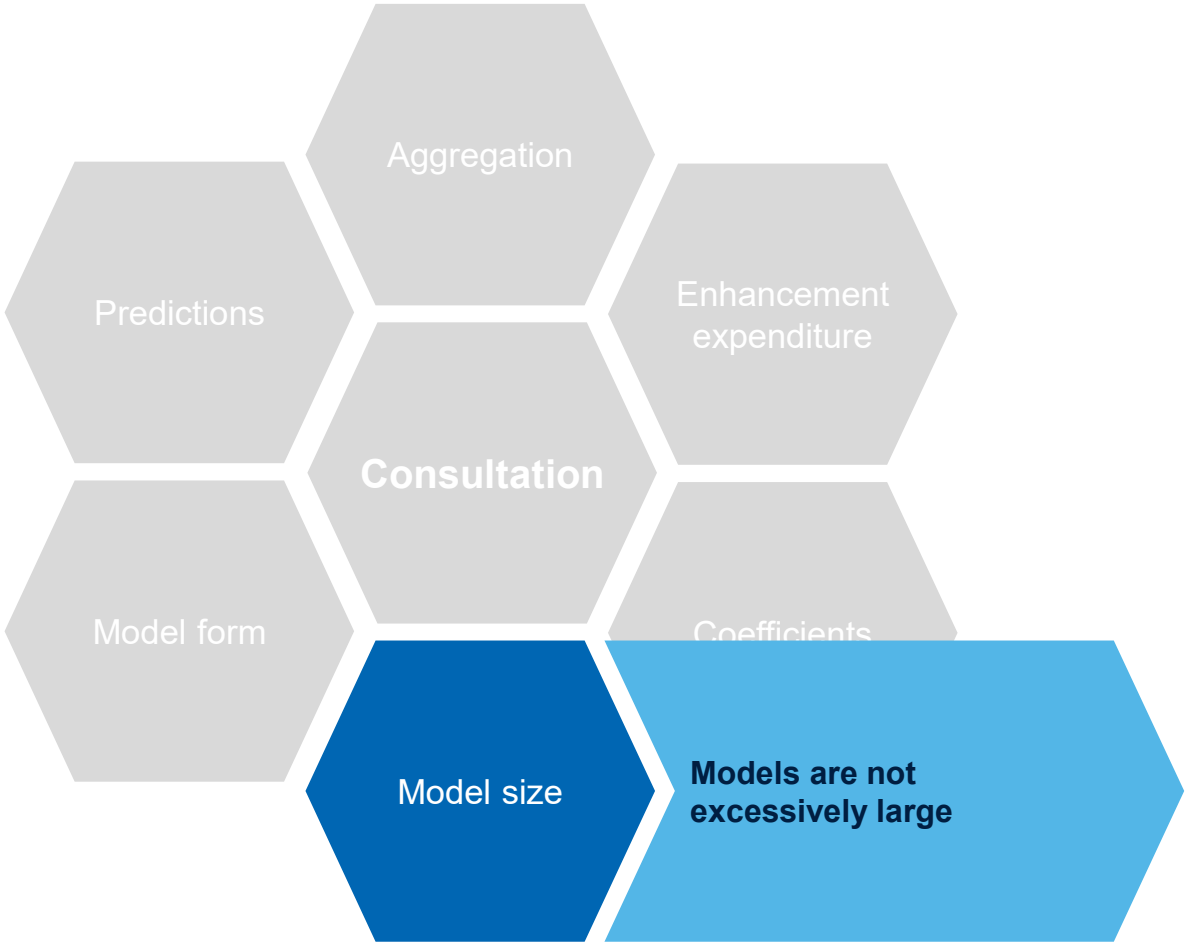

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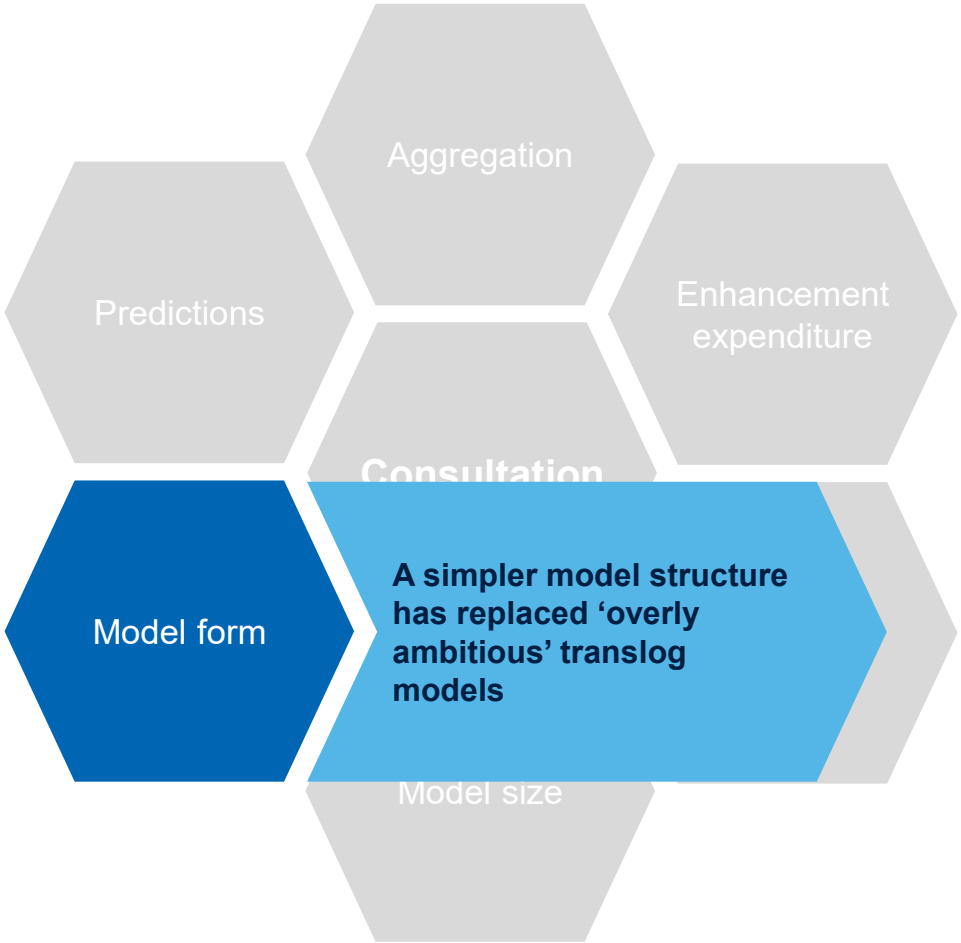

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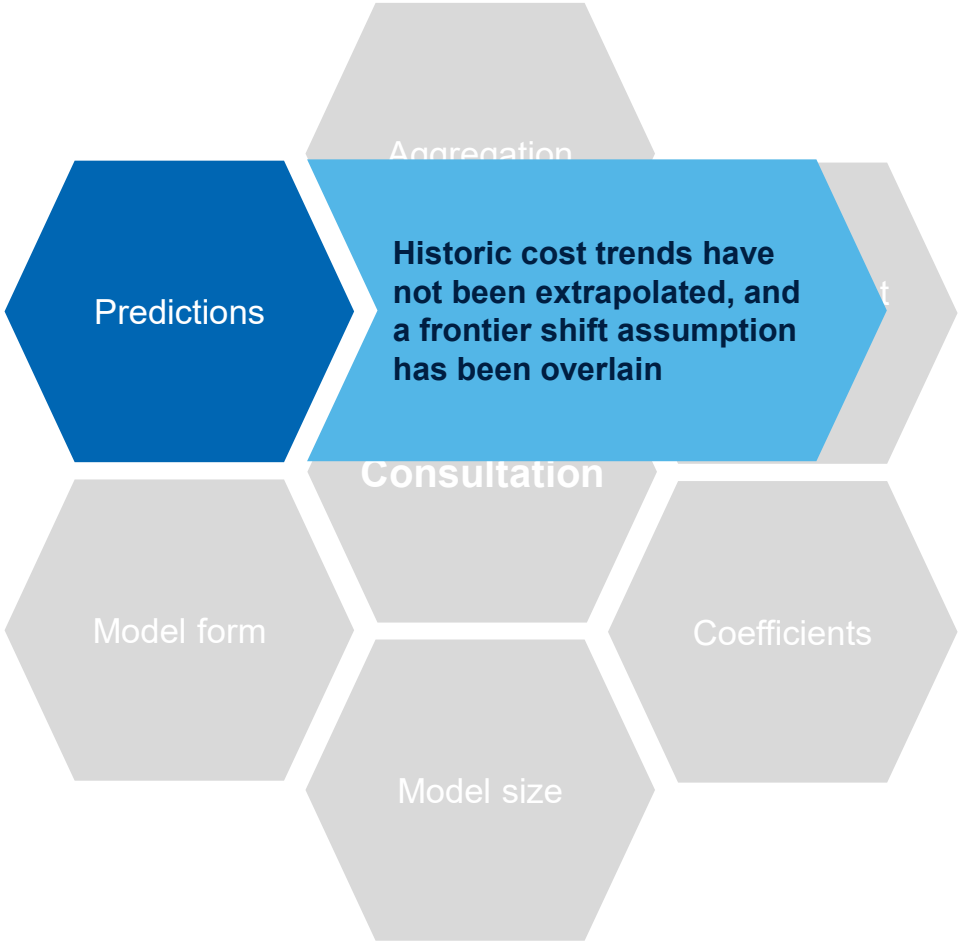

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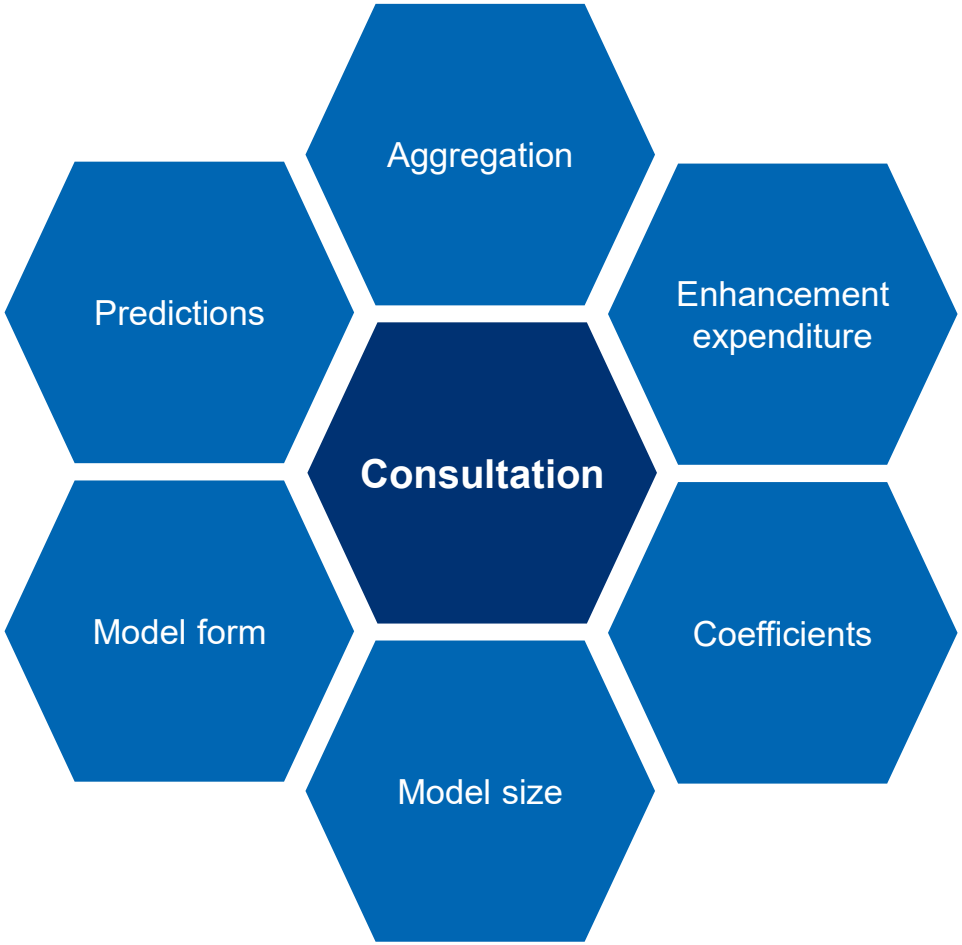

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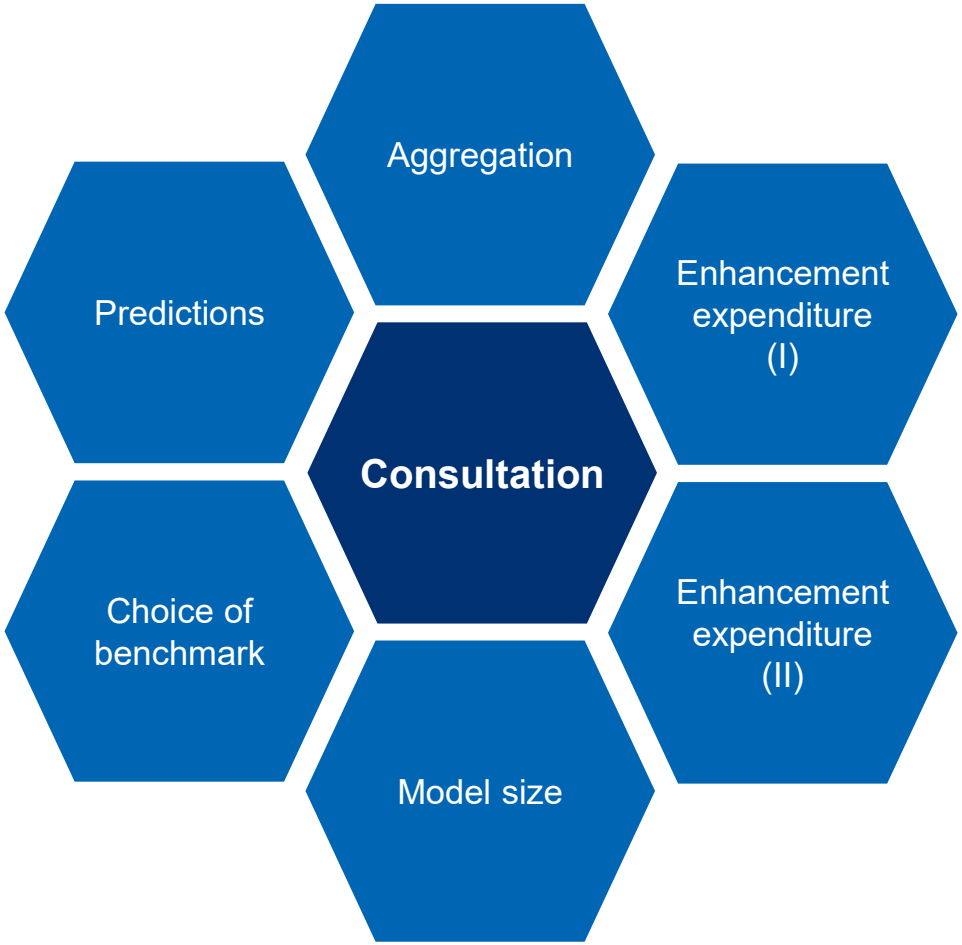

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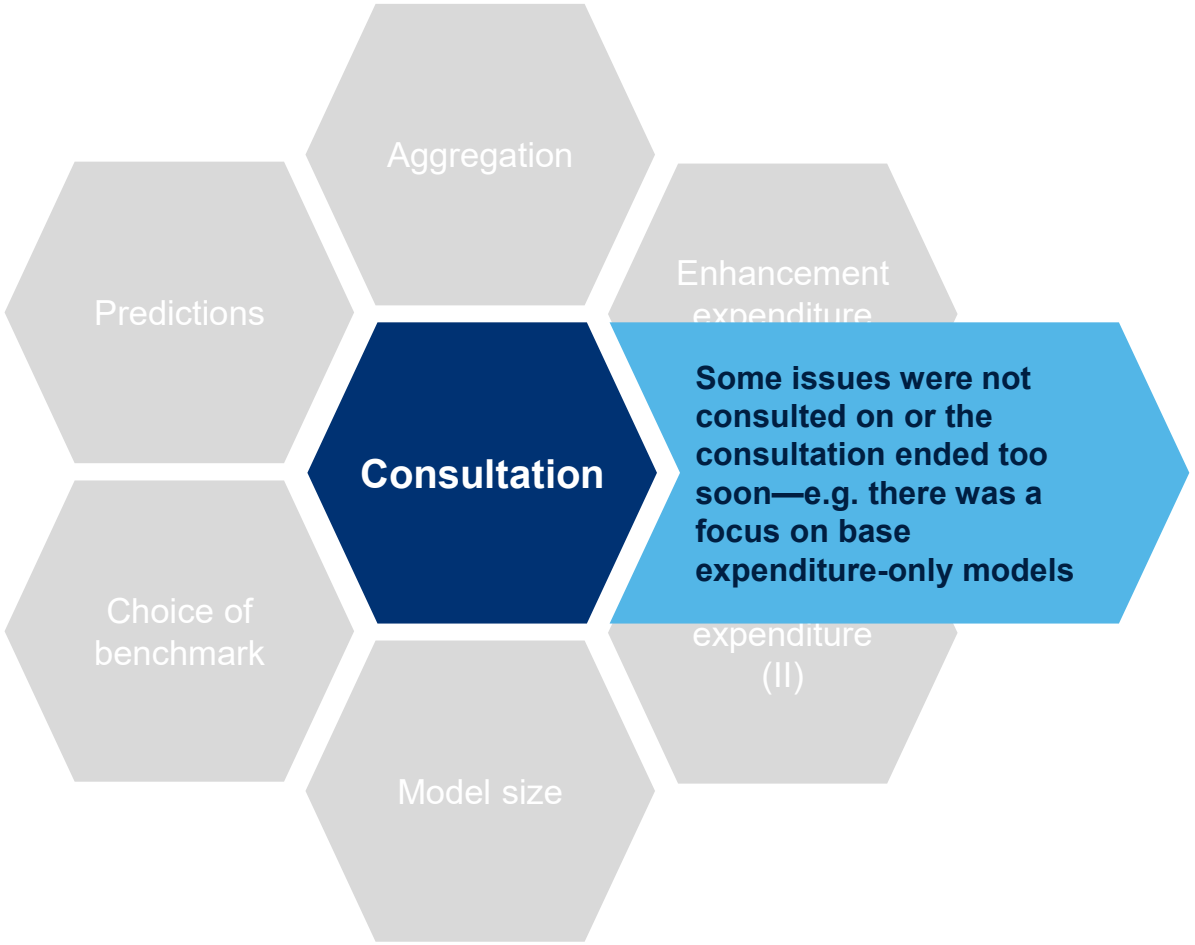

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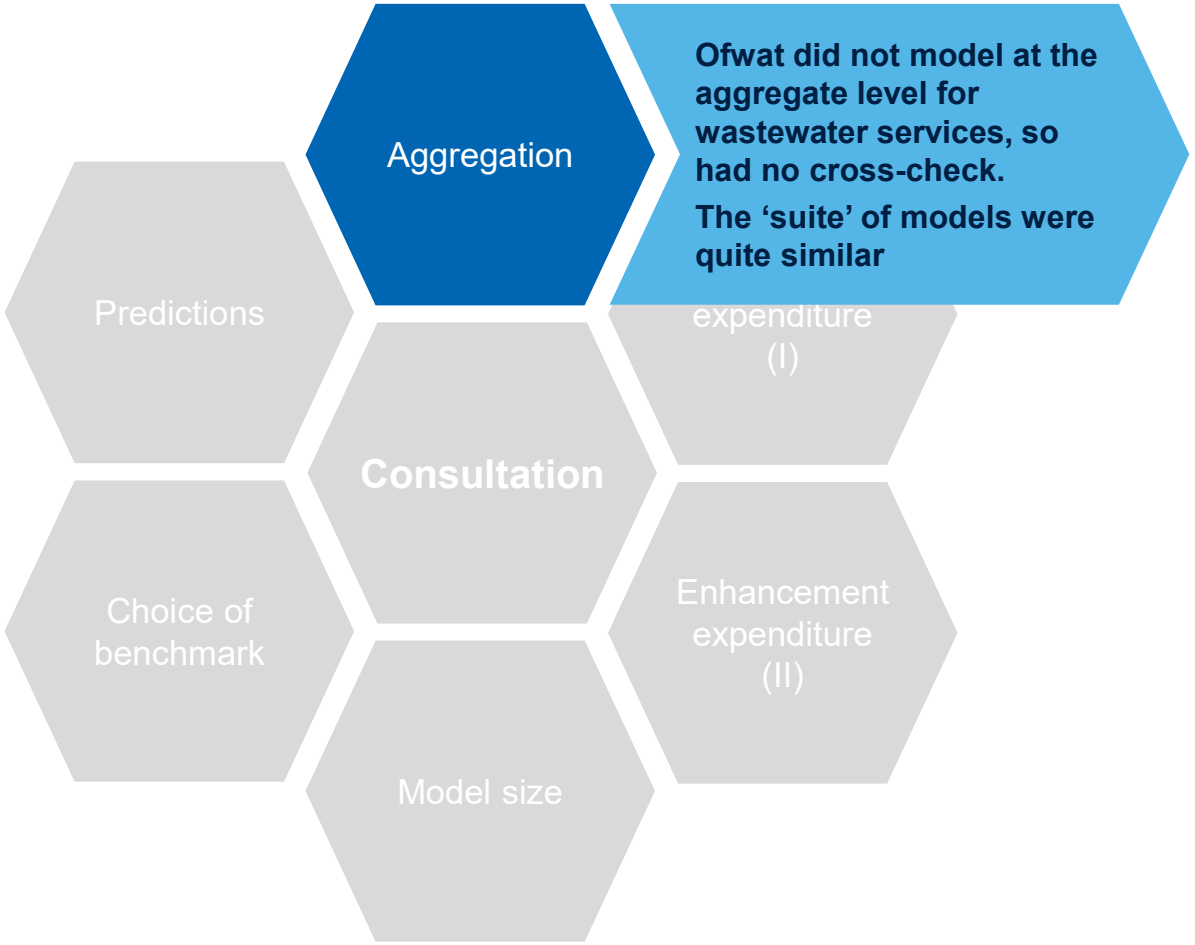

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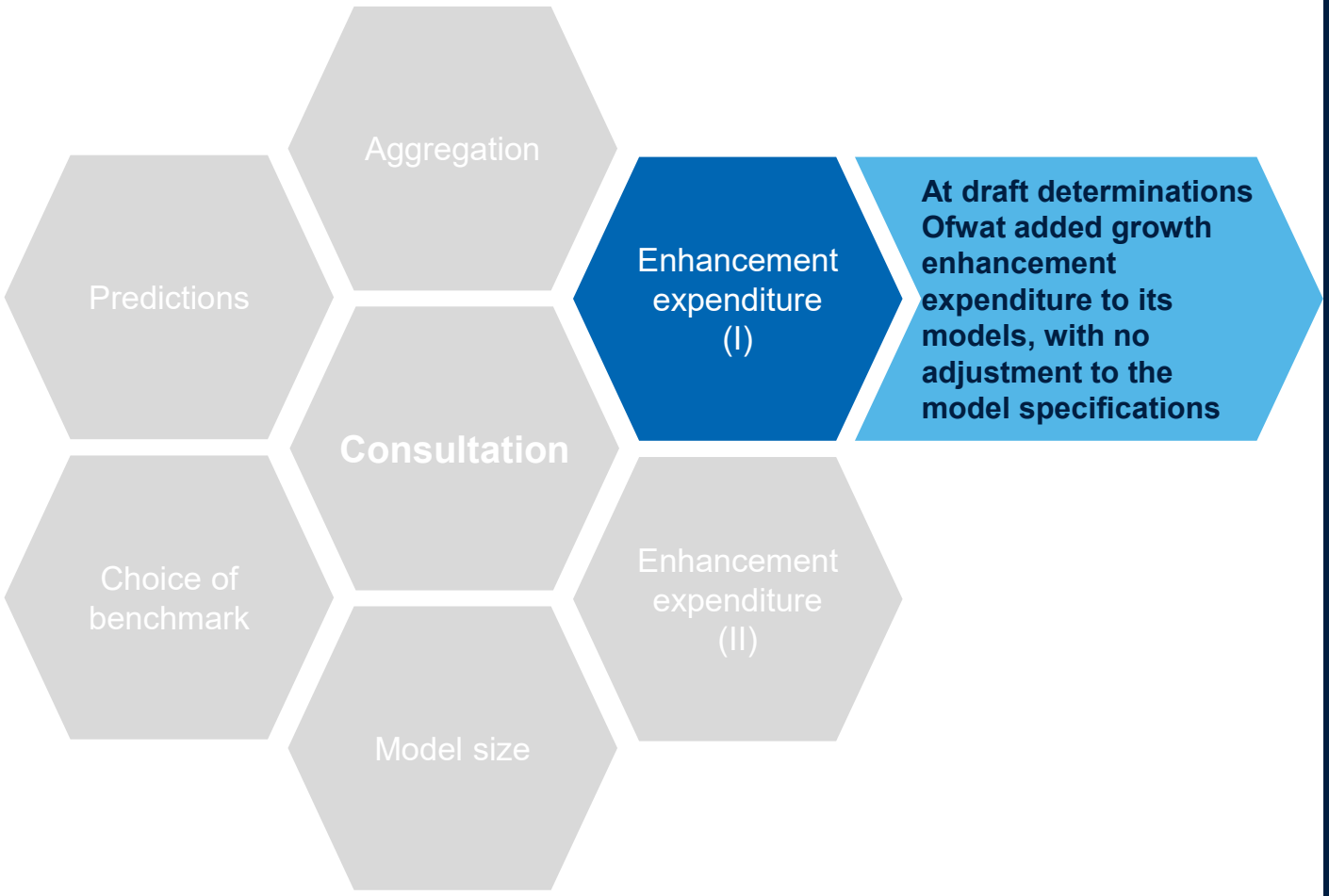

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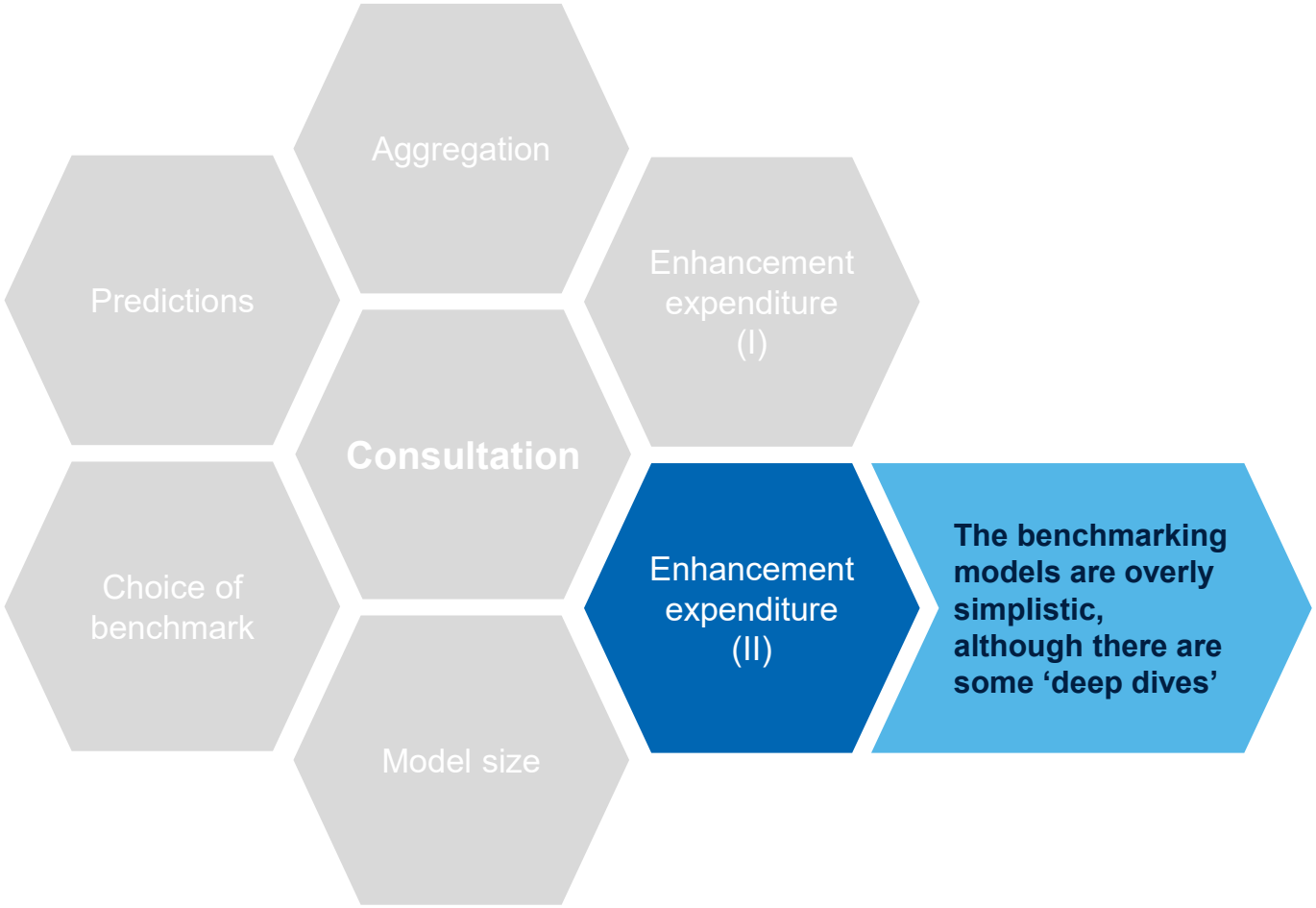

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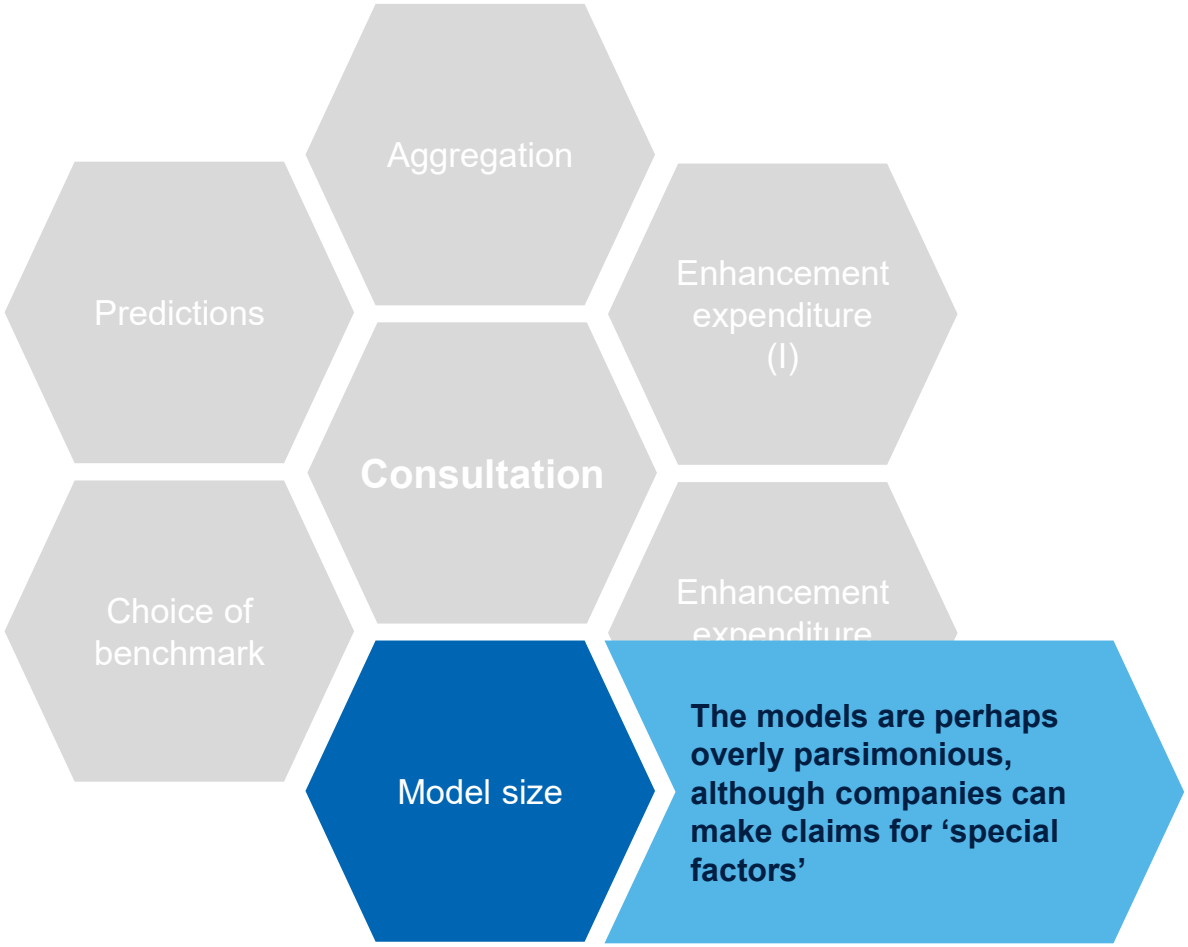

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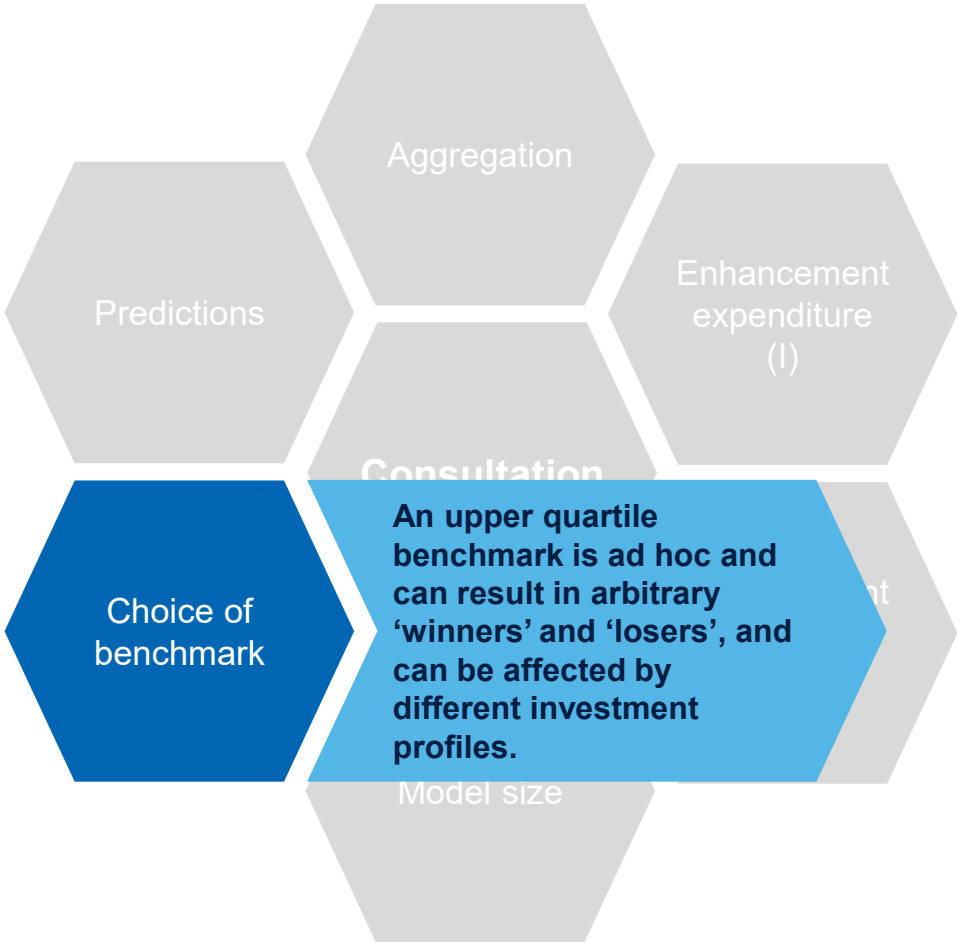

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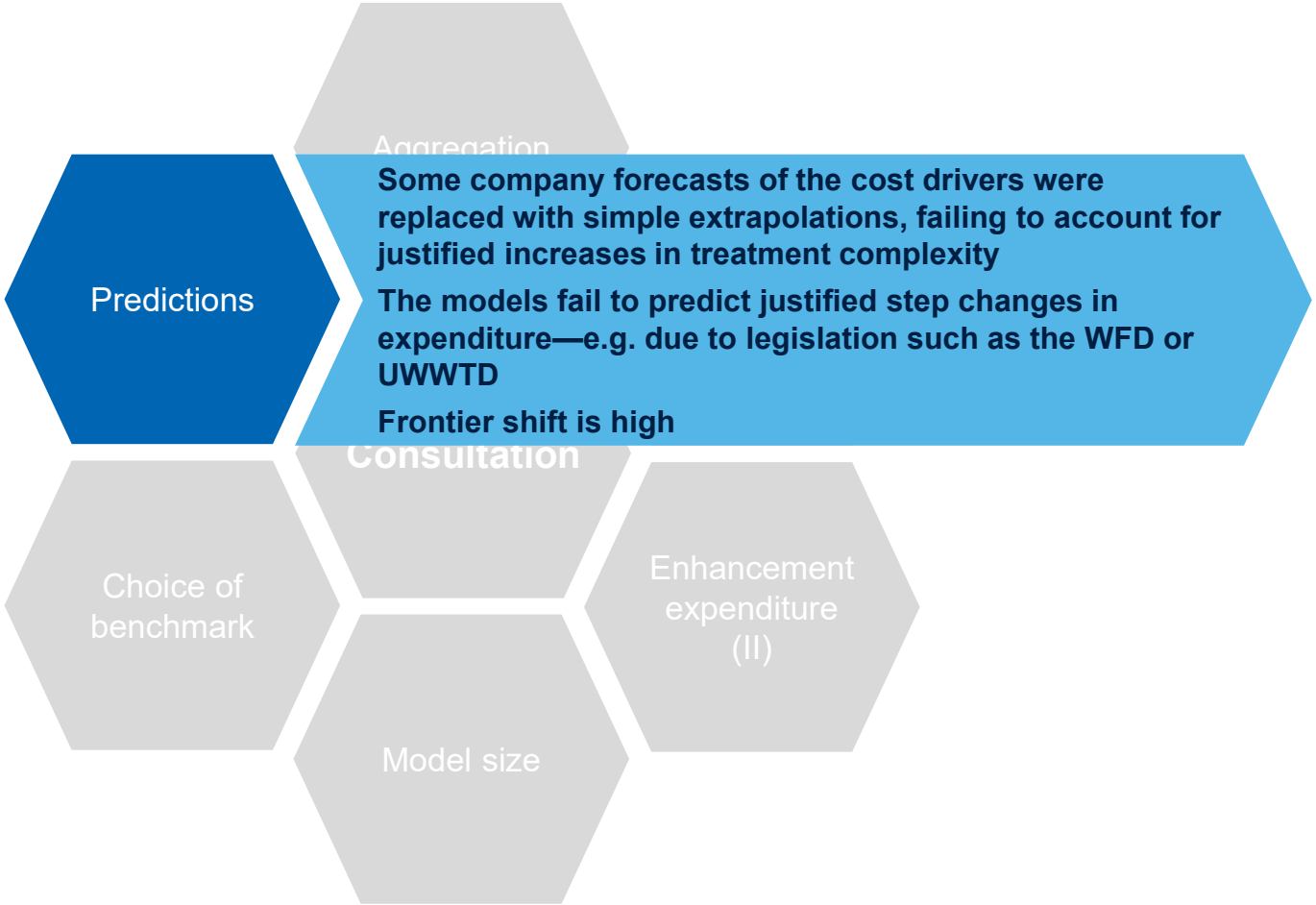

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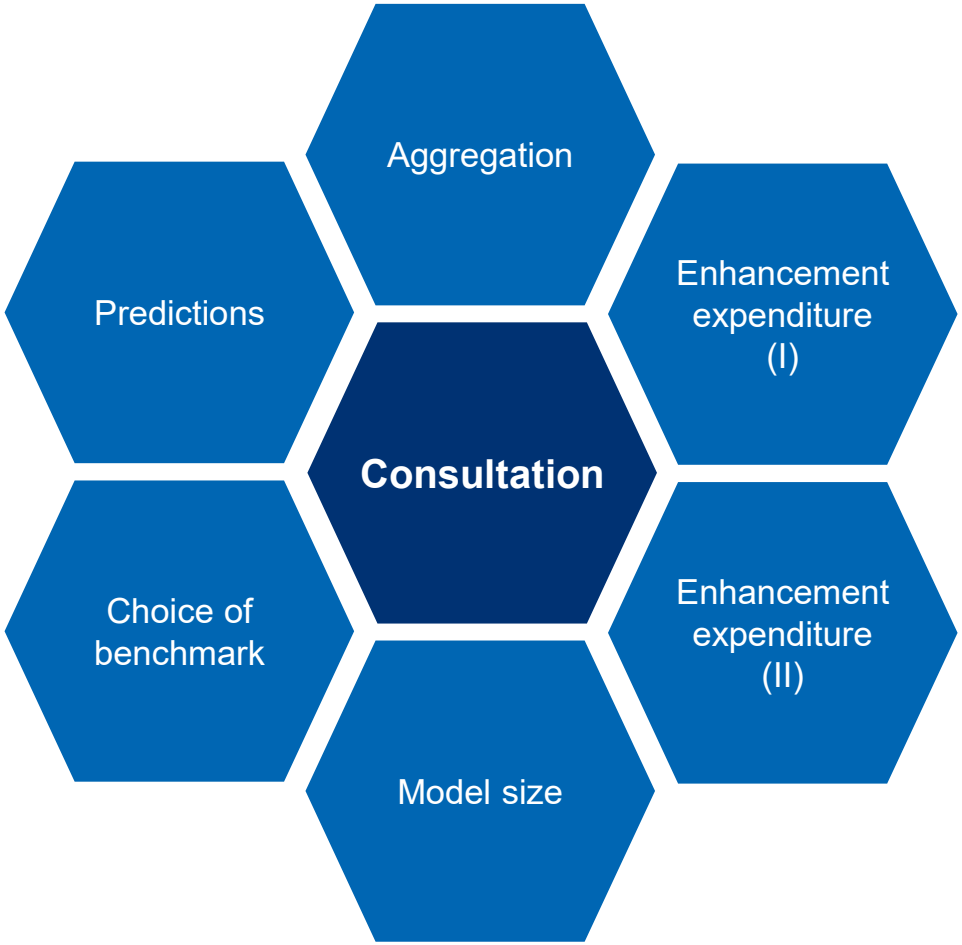

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