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Parametrization of Engineering Values  
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## Presentation Outline

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- Motivation for the development of the work
- Objectives
- Methodology
- Development
- Conclusions
- Further developments





## Motivation for the development of the work

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- Free competition among stakeholders has been set by the European Commission leaving to the withdrawn of engineering fees from the Portuguese legal Framework;
- It is important to have studies and references as tools to support evaluations, audits or support the definition of the estimated value;
- Ordem dos Engenheiros is frequently questioned about these tools for those specific purposes;
- As an example, the Accounts Court continuously supervises Public contracts, namely engineering services.

## Objectives

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- The study on the Parametrization was ordered by Ordem dos Engenheiros to improve its awareness in terms of methodological approaches and decision support;
- The scope of the study was centered in services as Design, Coordination and Construction Supervision;
- The methodologies should take in consideration different type of works, complexity as well as competences and forecasts in terms of engineers/other technical staff involvements.



## Methodology

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To develop the work the further methodology was followed:

- Literature review on the topic at International level;
- National references, legal framework, public procurement information review (portal BASE and tender actions);
- Identification of the approach for each type of service and parameters to consider;
- Establishment of assumptions for each approach;
- Development of the methodologies;
- Test/validation and observation of results facing real situations;



## Development

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### 1<sup>st</sup> look – Methodological approaches

In general, the references propose several types of approach:

- Time spent with services;
- Estimated time to deliver a service;
- Reference values by area or volume based on databases or other data;
- Percentage of the construction estimated value;

These approaches set the general framework for the Literature Review.





## Development

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### International Review

The review approached methodologies and references in different countries from Germany to Canada, UK, France, Switzerland, Brazil, United States.

From this, several different practices were identified but there is a trend to establish support decision tools based on percentage of construction estimated value, considering a multi-stage services that run from preliminary design to end of warranties period.





## Development

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### National Review

The National Review approached:

- The former legal framework;
- The scope of the different engineering services;
- The framework of the engineering profession (grades, competencies);
- The legal framework related with the engineering services;
- References and guidelines in terms of salaries;
- The legal framework in terms of construction works characterization.





## Development

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### Methodological approach

Considering the collected data, free trading policy, public procurement practices, in brief, the following approaches were set for each one of the engineering services:

- Design - percentage of the construction estimated value;
- Design coordination – percentage of the design service;
- Supervision - estimated time to deliver the service;



## Development

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### Supervision services survey – Public procurement (Portal BASE)

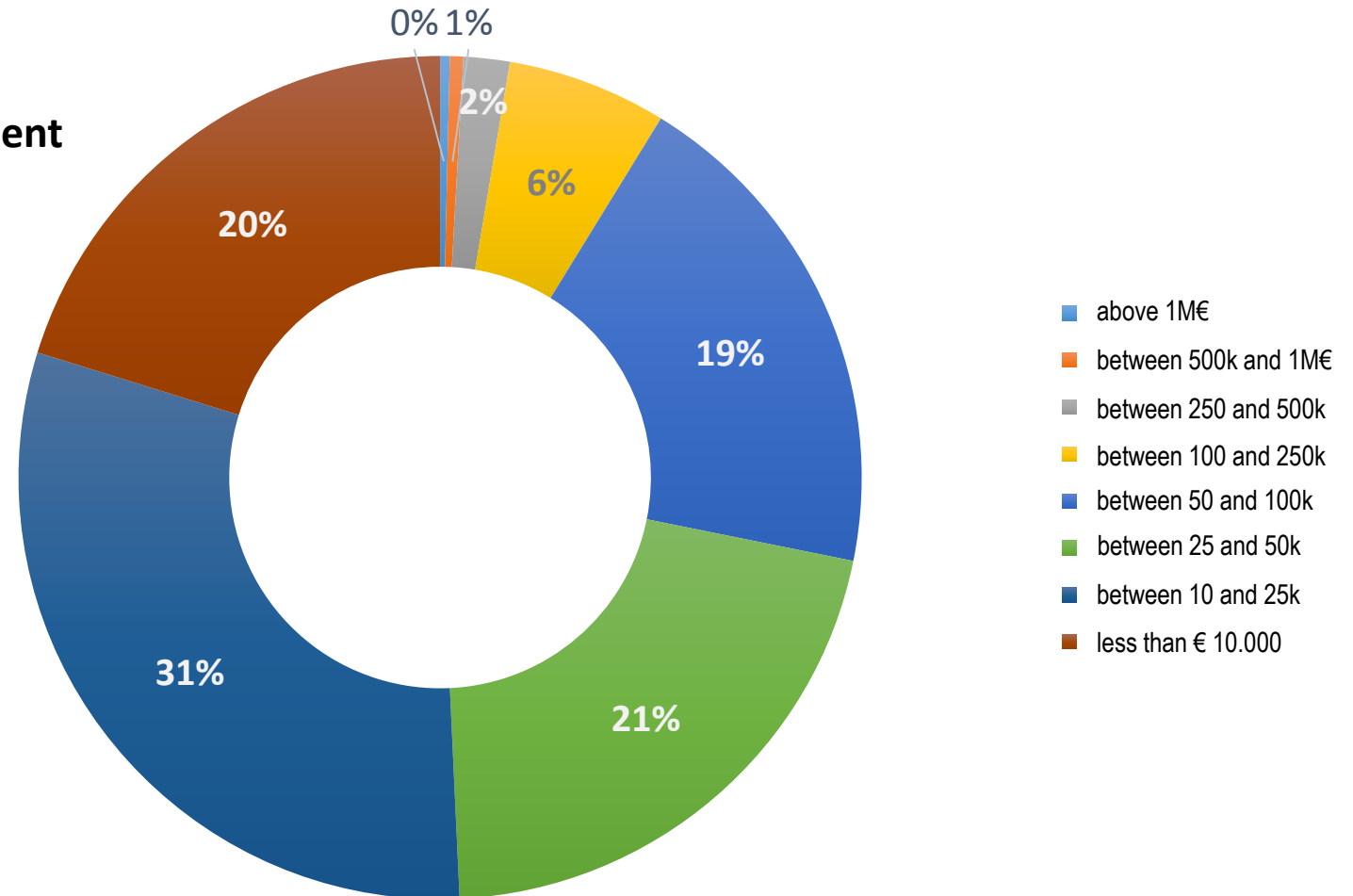
- 1356 construction supervision contracts were identified on the platform;
- The average time of these contracts is 343 days;
- The average value is € 55.000,00 (€ 24.500,00 the median);
- The graphic on the next slide highlights the relevance of the contract values on the overall sample;





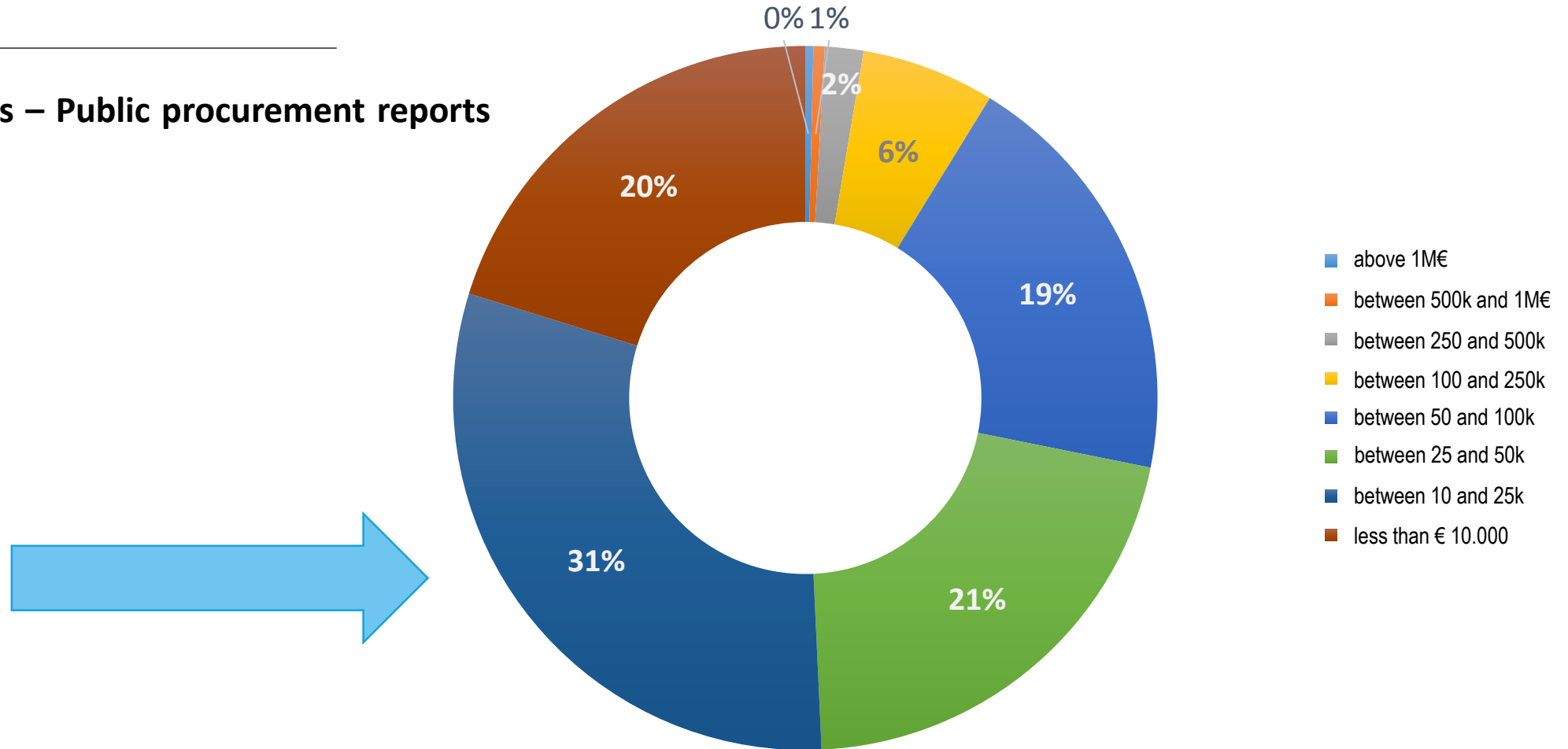
## Development

### Supervision services survey – Public procurement reports (Portal BASE)



## Development

### Supervision services – Public procurement reports (Portal BASE)

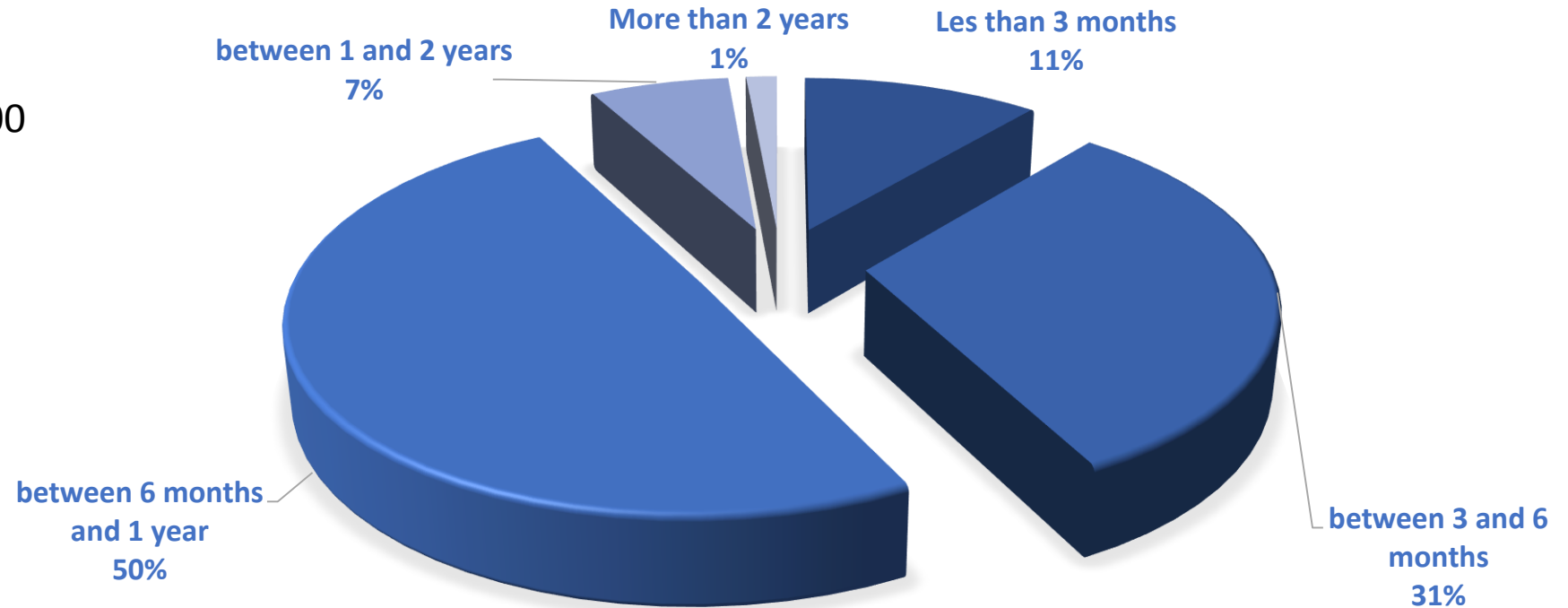


## Development

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### Supervision services – Public procurement reports (Portal BASE)

Contracts between 10 and 25.000



## Development

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### Supervision services – Public procurement reports (Portal BASE)

Looking to the contract scope, a vast scope of services was identified:

- Permanent supervision;
- Supervision and Safety coordination;
- Supervision, Safety coordination, Environment and Quality management;
- Supervision, Quality management, Safety coordination and Coordination of environmental management;
- Supervision, quality management, and Safety and Health coordination.





## Conclusions

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- The types of engineering services justify distinct approaches;
- Design services have a long practice in terms of scope of services definition (at legal framework level) and had practices in terms of setting values based on percentage of construction estimated value – auditing and forecast tools must look from other perspective to this tradition;
- The supervision services are less generalized and the singularities of the Portuguese approach led to other type of methodology;



## Conclusions

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- These services do not have, when compared with Design, a broad support in terms of scope definition, outcomes and resources. This usually comes on the specifications of the tender actions. This means that the scope and values can be broader and detailed aspects of the contracts must be considered for the evaluations;
- Correlation/Agreements of the Construction Types classifications must be made in order to promote streamlined understandings across the industry;
- Identically, the types of interventions should be all set on the legal framework and linked with financial policies;
- Both are essential to perform high detail analysis and to go further on the methodologies;



## Future work

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As stated, this is an ongoing process, meaning that further developments and validations are still to be accomplished.

In addition to the methodological approaches, the study identified several relevant aspects that must be worked in order to obtain construction industry improvements and streamlined approaches of the engineering services.





*Thank you!*



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