

# Smart Engineering Solutions with Validated Key Performance Indicators

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## Summary

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*This position is created with aims to study possibilities of introducing modern technical KPI measurements framework and to smart engineering systems using blockchain. Sample scenarios, as a result, will be produced for collecting KPI-s in SMEs about engineering systems with environmental impacts taken into account.*

Research field:	Mechanical engineering
Supervisors:	Kristo Karjust Dr. Kati Kõrbe Kaare
Availability:	This position is available.
Offered by:	School of Engineering Department of Mechanical and Industrial Engineering
Application deadline:	Applications are accepted between November 16, 2020 00:00 and December 16, 2020 23:59 (Europe/Zurich)

## Description

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Smart engineering solutions with customized approach are gaining more popularity. To monitor these solutions it is common practice to use KPIs. New digital ecosystems and innovative technologies allow getting data in automated and trusted way. Trustworthiness is important to compare and evaluate data in the supply chain and make management decisions. In large data quantities the question of validity and trustworthiness can be solved using blockchain technology. Blockchain builds trust through the following five attributes - it is distributed and sustainable; secure, private, and indelible; transparent and auditable; consensus-based and transactional; orchestrated and flexible. The hash-based architecture for blockchains is able to maintain data integrity and a secure way to verify the integrity of data as well. To create necessary trustworthiness of input data for the AI platform uses blockchain technology on top of data collection layer assuring data integrity.

### Tasks:

- Target is to monitor and analyse the actual needs of production enterprise and provide immutable facts for external stakeholders
- Smart engineering solutions performance measuring methods analyse
- Collecting economical and technical KPI-s for production enterprise and external stakeholders
- Blockchain integration for KPI collection to make it auditable, transparent and trustworthy
- Automated data collection systems of production processes and supply chain
- KPI measurements collection concept development in micro and macro level
- Creating KPI blockchain based measurement system for production enterprise

As an output of the doctoral thesis, sample scenarios will be produced for defining KPI-s and its secure measurement for smart engineering solutions. These scenarios are evaluated primarily from the perspectives of enterprise value; environmental impact; economic marketplace and transparent competition.

### Requirements

- The call is open for candidates with a wide range of backgrounds in engineering.
- Practical and project related (research) competences and knowledge in supply chain engineering and IT is required.



- High level of motivation towards developing sustainable and smart engineering systems with novel performance monitoring elements.



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