



COGNITWIN – Cognitive plants through proactive self-learning hybrid digital twins

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**IA Coordination and
Performance Indicators
Definition**

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Publishable summary

This report presents the Coordination and Performance Indicators Definitions for COGNITWIN project.



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Description of the deliverable content and purpose

This report presents a short description of administrative and technical coordination of the COGNITWIN project followed by the definitions of various key performance indicators. A detailed description on project coordination is presented in deliverable 8.5 (Risk Assessment and Management Action Plan).

1. Administrative Coordination

Administrative coordination of the project will be carried out the project coordinator. Here, detailed working methods and implementation routes will be agreed. Under the umbrella of this WP 8 (Project Management), all the activities necessary to comply with the EC contractual obligations will be grouped. All partners will provide the needed information to monitor project achievements and they will contribute to the production of administrative reports and documents for the European Commission (Reports, Financial Statements etc.). Additionally, the risk elements will be reassessed regularly and used to link the progress to the capacity to impact in the industrial innovation and SSH domains. A comprehensive analysis of potential failure modes will be carried out. Detailed description of administrative coordination is presented in D 8.5 (Risk Assessment and Management Action Plan). A recurring meeting plan (every 2 weeks) to track administrative progress of the project has been established.

2. Technical Coordination

Scientific & Technical Coordination of the COGNITWIN project will be carried out in this task. Here, the business / technical relevance and excellence of the project innovation lines and results is assessed and reported. During technical coordination, it will be ensured that technical aspects of the project are being implemented smoothly. This task will be carried out by the Scientific Coordinator who will monitor all technical work implementation in all WPs and will be responsible for identification of any inconsistencies among specifications/development work and among technical WPs. Scientific coordination will ensure that all scientific aspects of the project are properly implemented from both technical perspective and pilot preparation and operation point of view. Teams consist of relevant members from all the partners are being established to facilitate the coordination activities. Templates have been prepared for each pilot and technology providers to receive their input. A recurring meeting plan (every 2 weeks) to track technical progress of the project has been established.

Recommendations for corrective actions will be issued as and when applicable. A periodic recommendation for revising project objectives will be issued, considering achievements, general trends and development outside the project. External experts will be involved to verify effectiveness of the results and meetings will be organized on a regular basis. Results will be measured by means of proper indicators.

3. Innovation Impact Measurement and Governance

Innovation Management is being carried out in this task. Here, an agreement on detailed working methods and implementation routes will be made. Under the umbrella of this task all the activities necessary to comply with the IA contractual obligations and control points will also be grouped. The task involves the practical organization and management of the principles and concept for project



results monitoring and control against innovation objectives. Recommendation for corrective actions will be issued for conflict situations if need. A periodic recommendation for the revision of objectives will be issued.

4. Key Performance Indicators

In order to achieve COGNITWIN project objectives, a set of measurable key performance indicators (KPIs) are defined, mainly in the following two categories:

4.1 KPI for Pilots

Each pilot has its own set of KPIs as presented in Table 1.

Table 1: KPIs of all the 6 pilots in COGNITWIN project.

<p>Pilot 1: Hydro Gas Treatment Centre (GTC) Cognitive Digital Twin</p> <ul style="list-style-type: none"> • Reduce suction rate overall by 10% • Reduce energy consumption in GTC by 15% • Maintain balanced flow distribution to different chambers within $\pm 5\%$ • Decrease process disturbance by preventive maintenance by 5% • On demand filter bag change
<p>Pilot 2: SIDENOR – Cognitive Digital Twin of Steel Ladle</p> <ul style="list-style-type: none"> • Lifetime of refractory lining: Reference of 80 heats for total ladle relining and partial relining (slag line) at 40 heats • Reduction of the critical refractory depth for renewing the refractory lining: Initial refractory has 6 or 7 inches (155 mm or 180 mm) in different parts of the ladle. Final value of 50 mm is considered safe.
<p>Pilot 3: Elkem - Optimization of Silicon Process</p> <ul style="list-style-type: none"> • Post tap-hole silicon yield will be increased by 2% • Overall energy efficiency in the tapping and refining process is increased by 5 % • Hit rate of intended product grade after refining is improved by 20 % • Product quality variation is reduced by 30 % • Dust emissions to the workers environment is reduced by 40 % • Lifetime of the refining ladles are increased by 20%
<p>Pilot 4: Sumitomo SHI FW – Boiler Operations</p> <ul style="list-style-type: none"> • Improved boiler operating efficiency, target 0.05-0.10 % improvement on average • Lower operating costs, target 100-200 k€ saving in annual boiler O&M cost • Smaller emissions, target to decrease emission peaks and overall levels up to 30 % • Improved reliability and availability, target 0.5-1.5 % improvement in plant availability • Improved safety, target incident rate in process disturbances causing Lost Time (LTI) is ~ 0.00
<p>Pilot 5: Saarstahl AG – Tracking System for Rolled Bars in the Rolling Mill</p>



<ul style="list-style-type: none"> • Improve rolling line efficiency by 15%. • Reduce both energy consumption (10%) and process emissions (10%) • 90% improvement in the automatic error detection.
Pilot 6: Noksel – (COGNITIVE) Digital Twin Powered Condition Monitoring (and Control) in Steel Pipe Manufacturing Industry
<ul style="list-style-type: none"> • No errors in anomaly detection (both types 1 and 2) • Reduction in machine downtime (% 10) • Reduction in energy consumption (% 10)

4.2 KPIs for dissemination

KPIs of the dissemination activities will be measure ad provided in Table 2.

Table 2: KPIs of all the dissemination activities in COGNITWIN project

Dissemination Activity	Target Audience(s)	KPI
White Papers	All stakeholders	>=3
Demonstrator	Industry	>=7
Participation in Exhibitions	Industry, IT service providers	>=2
Participation in Workshops	Industry, IT service providers	>=4
Participation in Conferences	Industry, IT service providers	>=4
Organisation of Workshops with External Exploitation Partner	Industry	>=2
Presentations to Potential Customers	Industry	>=10
Organisation of Workshop, Conference, Special Session	Research community	>=3
Journal Publications	Research community	>=5
Conference Publications	Research community	>=20
Dissemination outside EU	Industry, IT service providers	>=3
Participation in Clusters	Members of EU Projects in process industry and AI/ML	>=10
Liaisons with National Initiatives (e.g., I4.0, IDS, etc.)	Manufacturers, Policy Makers, Integrators of Industrial Solutions	>=10

5 Conclusion:

A coordination plan (administrative and technical) and the definitions of various key performance indicators for each pilot and dissemination activities are presented in this report. A brief description on innovation impact measurement and governance is also provided.

