**Company Context and Relevance to the Research**

**1. Introduction to the Company**

Celonis SE is a global leader in **process mining and execution management solutions**, founded in 2011 and headquartered in Munich, Germany, with offices across Europe, North America, and Asia. Celonis develops advanced software tools that help organizations visualize, analyze, and optimize their business processes using event data.

The company’s flagship product, the **Celonis Execution Management System (EMS)**, combines process mining, task mining, automation, and analytics into an integrated platform. It enables enterprises to extract event logs from transactional systems (such as SAP, Oracle, and Salesforce), discover process flows, detect inefficiencies, and recommend improvement actions.

Celonis’ mission, *“Unlocking the world’s processes,”* aligns with the objectives of this master’s thesis—enhancing the analysis and understanding of software system event logs to improve model accuracy, process transparency, and operational performance. Its focus on hybrid process intelligence and AI-driven optimization provides an ideal industrial context for applying and validating the proposed research.

**2. Relevance of Celonis to the Thesis Topic**

The master’s thesis **“Mining Method Application for Software System Event Log Analysis”** aims to design a hybrid process mining method that improves model accuracy and interpretability by combining two complementary discovery algorithms (Inductive Miner and Heuristic Miner) with **Generative AI (GAI)**–based interpretation.

Celonis’ EMS shares a similar philosophy, integrating **data extraction, discovery, conformance checking, and continuous improvement** into one platform. The thesis approach extends this industrial framework by introducing an additional AI-assisted analytical layer that leverages **LLMs (Large Language Models)** and **embeddings** to enhance log correlation, activity labeling, and deviation interpretation.

This alignment makes Celonis an ideal industrial partner for comparison and validation, as both the company and the thesis share a goal of transforming raw event data into actionable process insights through automation, hybrid intelligence, and iterative refinement.

**3. Similarities Between Celonis’ Approach and the Proposed Thesis Solution**

| **Aspect** | **Celonis Approach** | **Thesis Proposed Approach** |
| --- | --- | --- |
| **Data Source** | Extracts event logs from ERP, CRM, and IT systems | Uses raw software system logs (app/OS/k8s/services) |
| **Process Discovery** | Proprietary mining algorithms based on Inductive Miner principles | Hybrid Inductive + Heuristic Miner combination for improved accuracy |
| **Conformance Checking** | Built-in fitness, precision, and performance evaluation in EMS | Custom evaluation with enhanced KPIs and GAI explanations |
| **AI Integration** | Machine learning for automation and recommendations | GAI layer for labeling, correlation, deviation interpretation, and prioritization |
| **Continuous Improvement** | Execution Management loop for re-optimization | Feedback loop for re-mining and parameter tuning guided by GAI agents |

Both approaches emphasize **data-driven improvement** through iterative refinement, automation, and process transparency. The thesis expands Celonis’ industrial model by embedding GAI support for **semantic interpretation** of logs and **adaptive orchestration** of discovery algorithms.

**4. How the Thesis Enhances or Complements Celonis’ Framework**

While Celonis EMS provides a powerful platform for enterprise process optimization, this thesis contributes an academic and experimental layer that complements and extends its analytical capabilities.

The proposed **GAI-augmented hybrid mining method** enhances Celonis’ framework in several ways:

* **Semantic enrichment:** AI agents infer activity semantics, case notions, and missing attributes from unstructured log data.
* **Hybrid accuracy:** The combined Inductive + Heuristic Miner approach balances precision, fitness, and interpretability.
* **Explainable conformance:** LLMs transform technical deviations into human-readable insights and recommendations.
* **Adaptive orchestration:** GAI agents dynamically tune parameters and select mining strategies based on prior outcomes.
* **Feedback-driven learning:** Each iteration incorporates evaluation metrics and GAI summaries to refine the next mining cycle.

These improvements contribute to a more **intelligent, explainable, and flexible process analysis pipeline**, bridging academic innovation and enterprise-grade process mining.

**5. Broader Industrial Impact and Collaboration Potential**

Celonis operates globally with clients across manufacturing, finance, logistics, telecommunications, and healthcare. Each of these sectors relies heavily on accurate process visibility and performance monitoring — areas that directly benefit from the research outcomes of this thesis.

By aligning the proposed solution with Celonis’ technology stack, potential collaborative outcomes include:

* Benchmarking the hybrid mining algorithm against Celonis EMS benchmarks.
* Integrating GAI-driven correlation and labeling modules into Celonis pipelines.
* Testing explainability modules on real enterprise logs for interpretive validation.
* Exploring academic–industrial partnerships to enhance AI interpretability in process mining.

This synergy demonstrates how academic research in **GAI-supported event log analysis** can contribute to Celonis’ mission of enabling continuous, data-driven business improvement.

**6. Conclusion**

Celonis SE represents the most suitable industrial context for validating the thesis *“Mining Method Application for Software System Event Log Analysis.”* Both the company and the research aim to unlock the value of event data by making processes more transparent, accurate, and actionable.

Celonis’ focus on hybrid process intelligence and the thesis’s contribution of AI-driven semantic interpretation form a natural complement. Together, they illustrate the convergence of academic innovation and enterprise practice toward a next-generation **intelligent process mining ecosystem**.

**DIAGRAMS ACCORDING TO MY THESIS TOPIC**

**Figure 1. Base Workflow**

This figure presents the baseline event log mining process developed in this thesis. It begins with raw log collection and preprocessing, followed by template extraction, correlation, trace building, and hybrid process discovery. The workflow concludes with model evaluation and performance reporting, establishing a complete feedback-driven loop for continuous refinement.

A diagram of a process

AI-generated content may be incorrect.  
*(Based on PlantUML script: Base Workflow)*

**Figure 2. AI-Enhanced Event Log Mining Workflow**

This figure illustrates the AI-augmented version of the event log mining pipeline. Generative AI components, including embedding services and LLM-based labelers, are integrated into the data preprocessing and analysis phases. The workflow shows how AI enhances log interpretation, event correlation, and prioritization of process deviations.

A diagram of a process

AI-generated content may be incorrect.  
*(Based on PlantUML script: AI-Enhanced Event Log Mining Workflow)*

**Figure 3. Sequence Diagram**

This figure visualizes the sequential interactions between system components during one mining execution. It demonstrates the flow from log collection through preprocessing, GAI-enhanced labeling, hybrid discovery, conformance evaluation, and report generation. The diagram also captures the iterative feedback cycle that supports re-mining and improvement.

A screenshot of a computer program

AI-generated content may be incorrect.  
*(Based on PlantUML script: Sequence Diagram)*

**Figure 4. GAI Workflow**

This figure integrates the GAI agents into the event log mining process. It shows how data preprocessing, hybrid mining, and conformance evaluation are supported by GAI modules that interpret results, provide explanations, and guide iterative refinement. The feedback loop ensures that the system continuously learns and improves its accuracy.

A diagram of a process

AI-generated content may be incorrect.  
*(Based on PlantUML script: GAI Workflow)*

**Figure 5. GAI Agents Overview**

This figure defines the roles of the four GAI agents within the event log mining framework.

* **Log Data Curator:** cleans, normalizes, and prepares heterogeneous log data.
* **Insight Summarizer:** converts metrics into textual insights and highlights business implications.
* **Pattern Interpreter:** identifies recurring behavioral patterns, anomalies, and root causes.
* **Mining Orchestrator:** adjusts algorithm parameters, ranks issues by impact, and coordinates iterative runs.

Together, these agents form the intelligent layer that connects traditional process mining with adaptive, explainable AI support.

A diagram of a company's process

AI-generated content may be incorrect.