HSLU Hochschule Luzern

Technik & Architektur

Master of Science in Business Engineering

Double Degree Master Thesis – Hochschule Luzern (HSLU) & University of Florence (UNIFI)

A FRAMEWORK FOR THE DESIGN AND IMPLEMENTATION OF A HOLISTIC VENDOR MONITORING SYSTEM

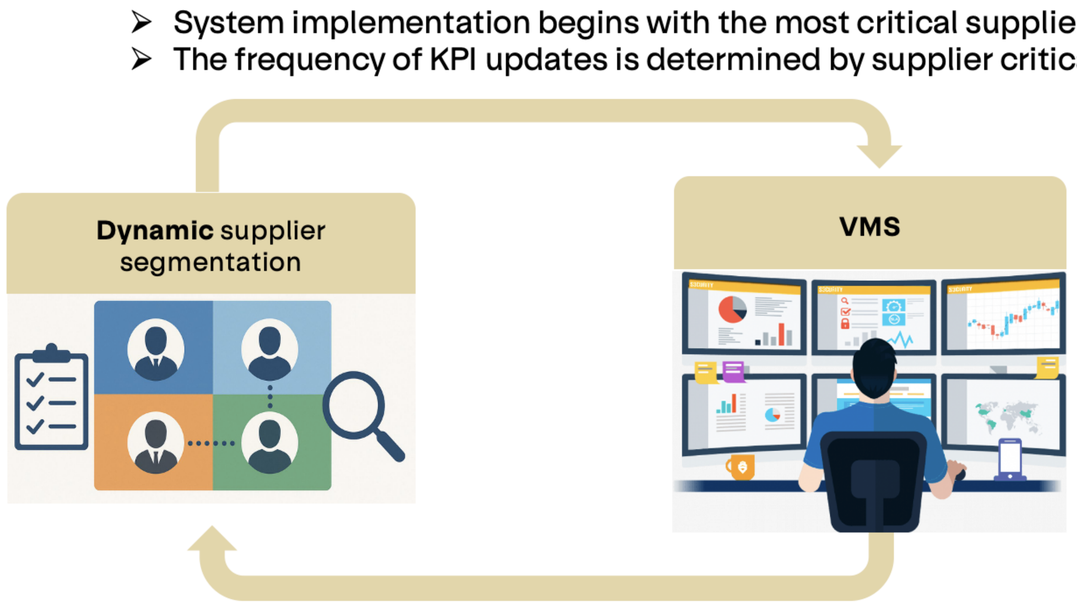

Figure 1: System Overview

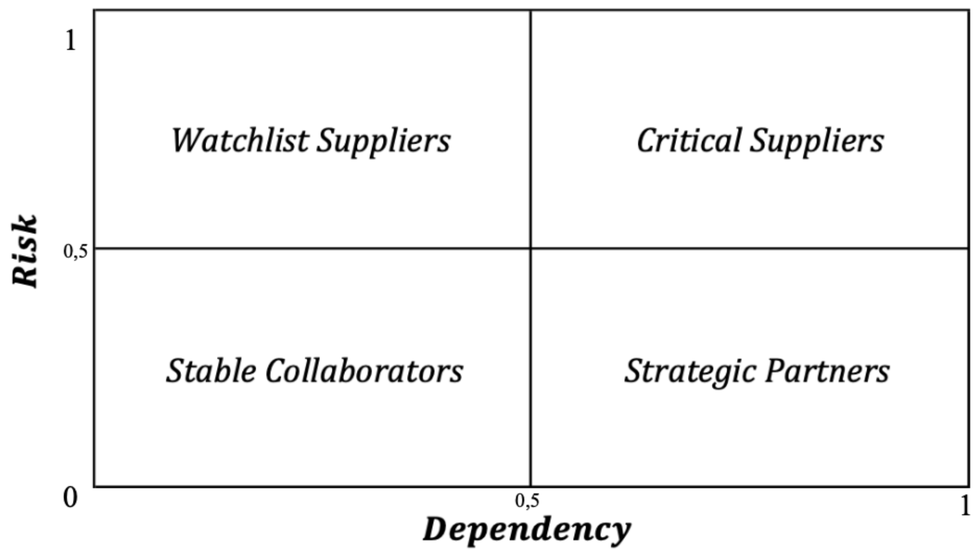

Figure 2: Segmentation Matrix

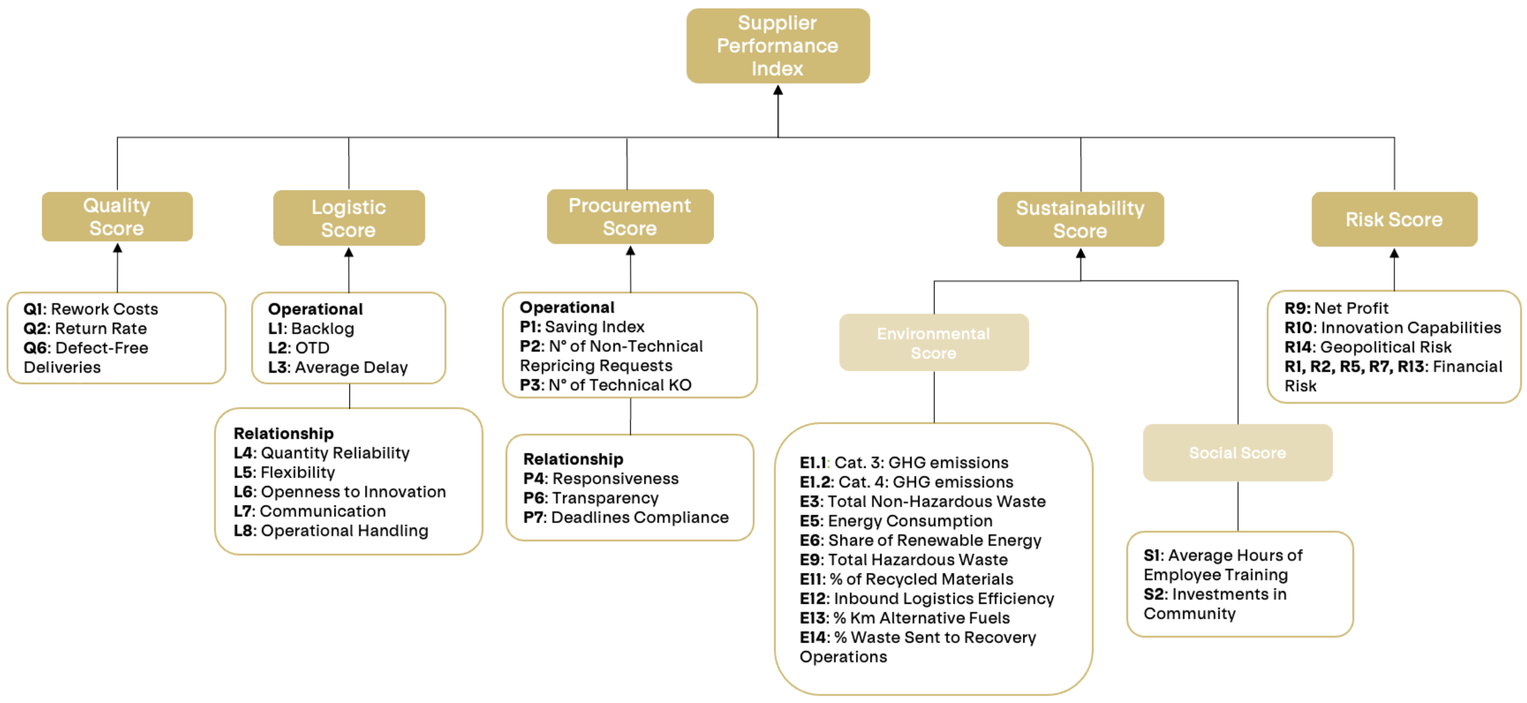

Figure 3: Vendor Monitoring System Architecture

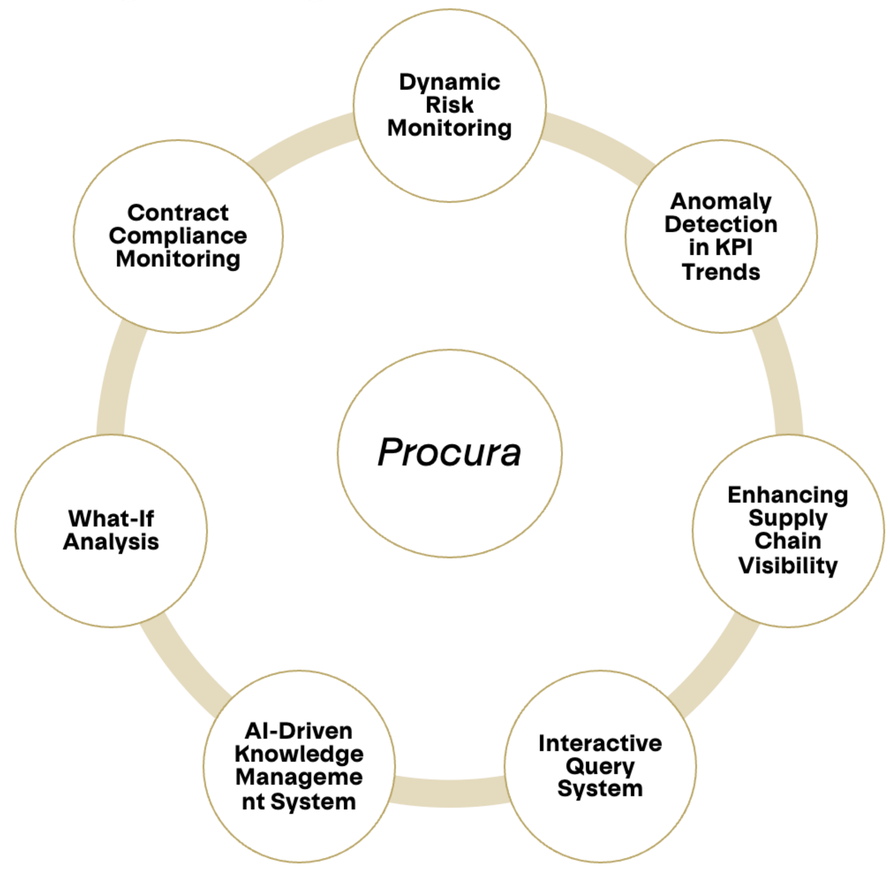

Figure 4: Procura: The AI-Assistant

Problem Statement

In the automotive industry, supplier management is increasingly challenged by fragmented information, siloed decision-making, and growing sustainability pressures. Performance data is typically collected by different functions, Logistics, Quality, Procurement, Risk, but rarely integrated into a single coherent system. As a result, companies often lack a 360° view of supplier performance, limiting their ability to identify systemic issues, benchmark suppliers, or make informed nomination decisions. At the same time, segmentation frameworks are frequently static, relying on lagging financial indicators or outdated classifications that do not reflect real operational performance. This separation between segmentation and monitoring creates a strategic blind spot: suppliers are categorized once but not dynamically re-evaluated as their performance evolves. The outcome is a reactive rather than proactive management of the supply base, with increased exposure to risks.

Methodology

To address these gaps, the research combined academic and industrial perspectives. A total of 115 candidate KPIs were identified through literature review, semi-structured interviews with the company's practitioners and an external expert, and the company's QMS. At the end, 37 KPIs were retained after a structured questionnaire assessing strength and feasibility of each KPI with a Likert Scale (1-7).

Solution Concept

The resulting framework integrates dynamic segmentation and performance monitoring into a single Vendor Monitoring System (VMS). Segmentation is based on two operational dimensions, risk and dependency, forming a four-quadrant matrix that evolves according to actual supplier performance rather than static classifications. Sustainability is embedded through 12 quantitative metrics, ensuring it becomes part of the overall system rather than an isolated pillar.

Managerial benefits include giving Procurement a structured voice in performance evaluation, fostering proactive supplier management, and enabling stronger cross-functional collaboration. Looking ahead, the concept also explores how Artificial Intelligence could enhance the VMS with advanced functionalities such as automated anomaly detection, predictive risk monitoring, and real-time decision support for buyers.

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