# Evaluation of the efficiency of fully mechanized wood harvesting system based on fleet management system data

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**Keywords.** Industry 4.0. Digital forestry, FMS, telemetry, Poland

**Abstract.**

The European Union has been increasingly developing and implementing ambitious strategies such as the European Green Deal, EU biodiversity strategy for 2030 or the new EU forest strategy for 2030. Simultaneously, over the last few years, economy and society have been experiencing challenging changes in terms of digitization and technological advances (hardware and software) that are increasing the performance of data acquisition, processing and transmission. The implementation of the term Industry 4.0 has been shaping the discussion about how ecosystem and, more specifically, forestry can benefit from this development.

The advancement of the mechanization processes in the forestry sector have enabled to achieve higher productivity, efficiency and safety levels. The "Precision forestry" aims to evaluate the performance of these technologies and exploit modern tools to obtain more detailed information in order to improve the decision-making process. In addition, in order to have a clear idea of the work context, the availability of the data about the forest plans is necessary.

This study aims to evaluate the effective benefit of automatic data collection through the fleet management system (FMS) of two forest harvesters and two forwarders in Pine forests in Poland. The study also aims to determine how the use of a FMS can help forest companies to manage their fleet and take advantage of long-term monitoring. Focusing on performance indicators of fuel consumption and CO2 emissions, as well as on the engine parameters, combining the StanForD data and the Can Bus data.

The exploration of data was performed following a Big Data approach, from the creation of an aggregate dataset, pre-elaboration (data cleaning, exploration, selection, etc.) using GIS and R software. Linear models were used to understand the influence of the StanForD and Can Bus data on the work element obtained from the automatic time study..