A systematic analysis of new maintenance elements and factors of farm mechanization to be checked in the era of smart technologies.

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**Abstract.** The progressive digitalisation and electrification in agricultural yards require a rearrangement of the current management and maintenance models of tractors and implements. A checklist and guidelines for the maintenance of the digital electrical-electronic components of agricultural yards have been developed. The research focused on specialised tractors as they have always been one of the most essential agricultural machines to acquire a deep knowledge of their characteristics and components in three case studies: hybrid tractor with on-board monitor and VRA fertiliser spreader, tractor with on-board monitor with VRA sprayer, fully automated tractor (robot).

Booklets of the use and maintenance of machinery or singular components have been analysed and considerations on the increase of maintenance because of the higher technological level have been done. As it was possible to observe, there are some critical aspects due to the passage from traditional farming to 4.0. Many valuable resources, like computers, monitors and actuators, have been introduced, but this complicated the maintenance process, which is often producers’ responsibility. This aspect has caused an increase in users’ distrust of the so-called smart farming. The article discusses the issues and benefits of electrification and digitalisation of farm machinery and presents the challenges in its implementation for agriculture in Italy. The cases considered have demonstrated the high operational capacity of autonomous, electric or hybrid tractors and at the same time, they have highlighted the urgency of adopting innovative maintenance strategies, new tractors drivers’ skills, and modern agricultural practices to maximise the operational efficiency of these agricultural machinery and studying new maintenance and repair coefficient now obsolete.