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Traceable Machine Vision Systems To The Si Metre Definition For Advanced Manufacturing

Original

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TRACEABLE MACHINE VISION SYSTEMS TO THE SI METRE DEFINITION FOR ADVANCED MANUFACTURING

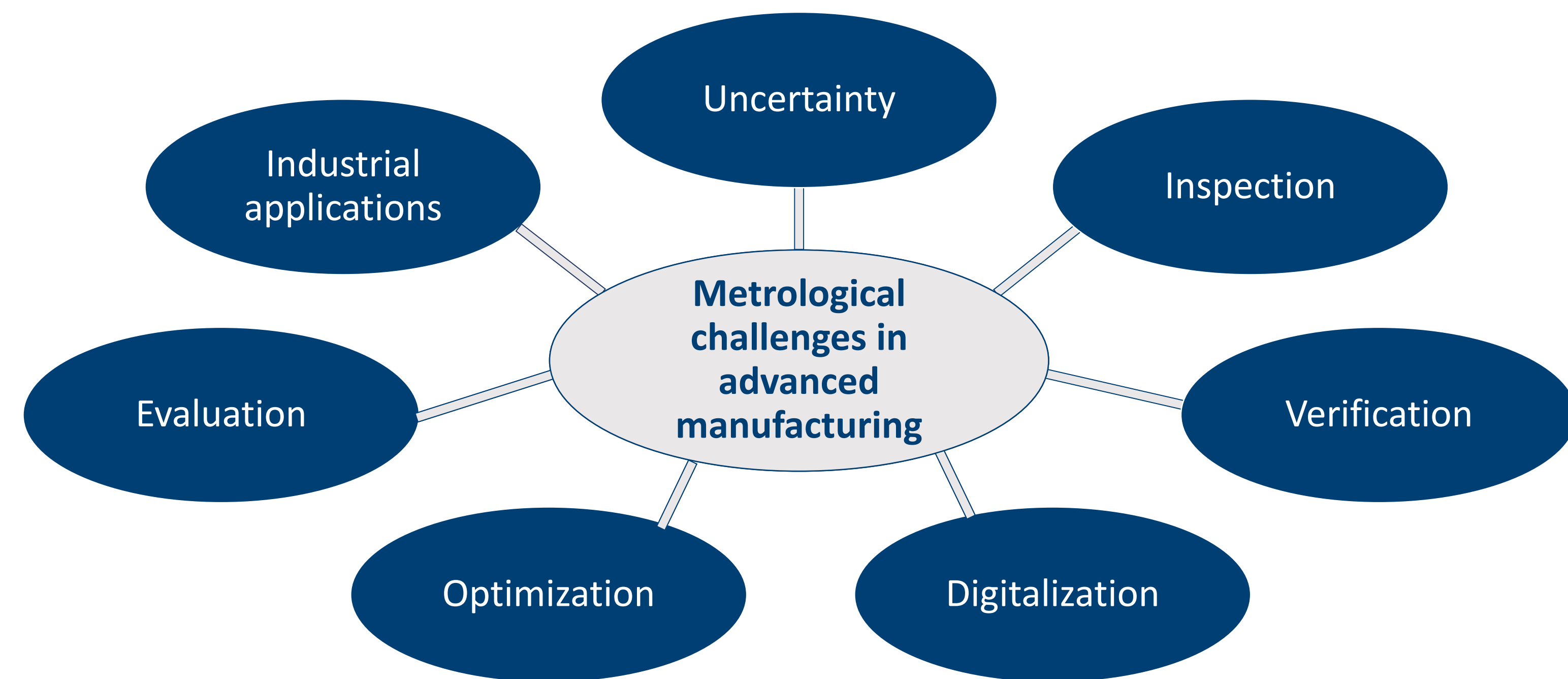
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INTRODUCTION

In advanced manufacturing, metrology faces significant challenges : → addressing the measurement of new products with complex geometries at multiple scales and embedding → integrating measurement processes into cyber-physical systems [1].

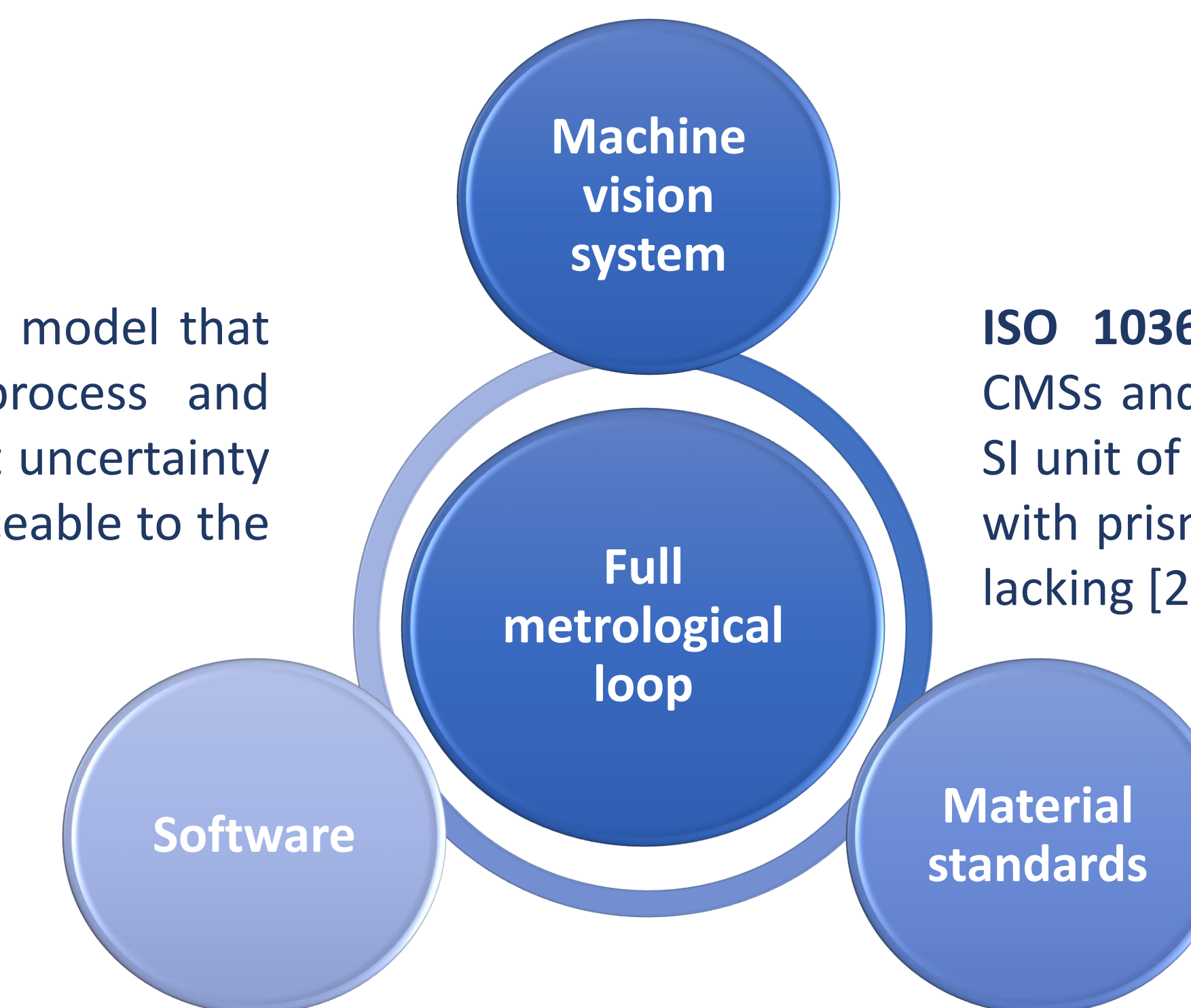


METHODOLOGY

Machine Vision Systems :

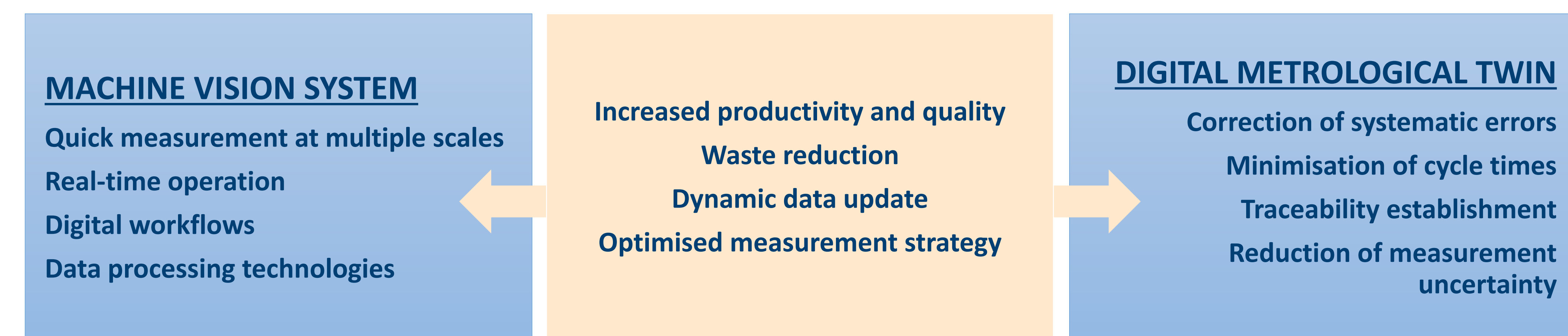
- automated inspection, quality control and precision measurement in many industries, such as aeronautics, pharmaceuticals, medical devices, electronics and semiconductors;
- dynamic adaptability to environmental and system changes;
- creating a reliable closed-loop feedback system.

Digital Metrological Twin: numerical model that depicts a specific measurement process and indicates an associated measurement uncertainty for a specific measurement value traceable to the SI metre unit.



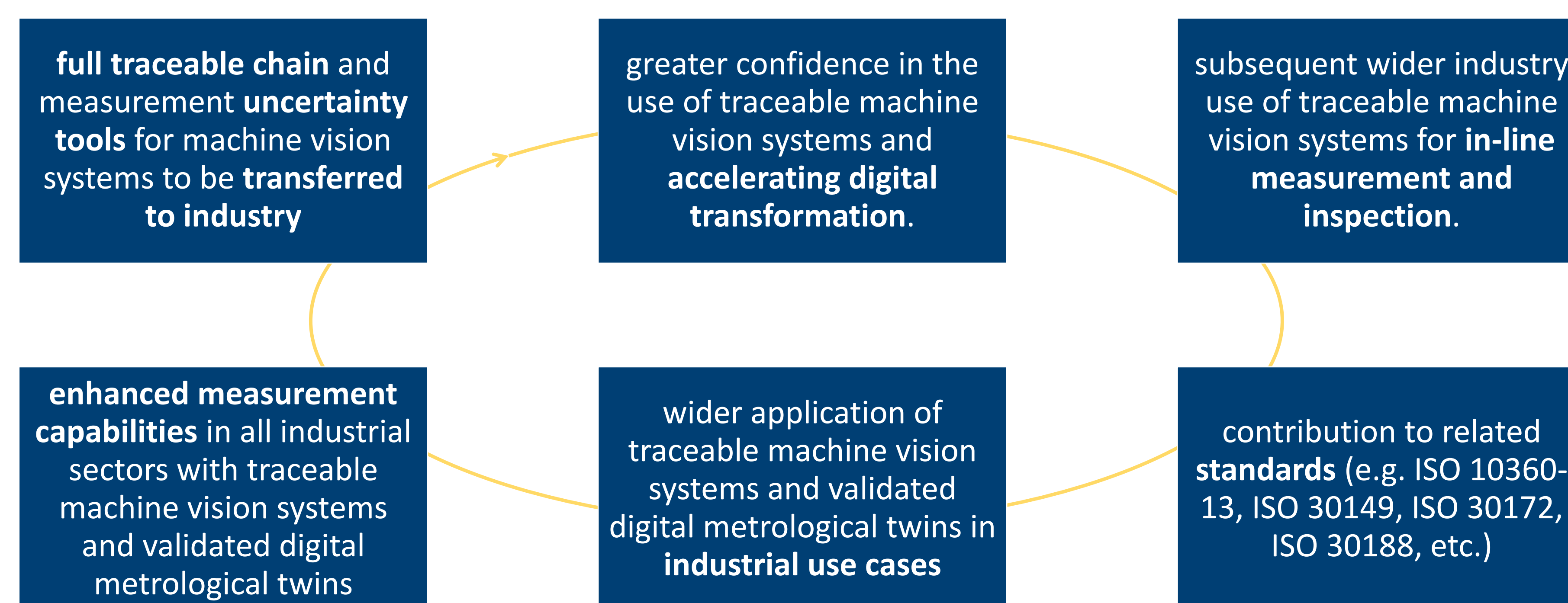
ISO 10360-13:2021: traceability of optical 3D CMSs and contains two spheres traceable to the SI unit of length. Nonetheless, material standards with prismatic and complex shapes are definitely lacking [2].

Currently, no metrological standards or validated digital metrological twins have been established at National Metrological Institutes/Designated Institutes for machine vision systems as 'ground truth' for the verification of commercial metrology machine vision systems offering real-time (in-line) measurements in industry.



OUTCOMES

The final objective of the project 236IND08 DI-Vision [3] : optimise production processes via enhanced productivity and flexibility, assured safety, and reduced environmental impact by minimising material waste and energy consumption in industrial applications.



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22DIT01-ViDiT



23IND08-DI-Vision



23IND12-Adam

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- [1] Przyklenk, A. et al. (2021) 'New European Metrology Network for advanced manufacturing', *Measurement Science and Technology*, 32(11), p. 111001. Available at: <https://doi.org/10.1088/1361-6501/ac0d25>.
- [2] ISO 10360 part 13 2021 Geometrical Product Specifications (GPS)— Acceptance and reverification tests for coordinate measuring systems (CMS) - Part 13: Optical 3D CMS (Geneva: International Organization for Standardization)
- [3] <https://projects.lne.eu/jrp-di-vision/>