Engineering in the Age of IT

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At its core, engineering remains the application of science in order to solve real-world problems. What has changed is the degree to which information technology (IT) is embedded in engineering work.' It's no longer just a value-addedit is working its way into the engineer's toolkit at all stages of design, construction, and operation.

In mechanical engineering, advanced modelling and simulation tools give design teams the ability to test their designs virtually before producing a working prototype – saving time and money. From miles away, civil engineers are plotting what looks to them like a clear path through road construction, pension debt, even the temperature of fresh asphalt, leaning heavily on data from sensors and geographic information systems that illuminate how bridges, roads or water systems will perform under various loads. IT comes into play through smart grids, which allow real-time algorithms to control energy demand and supply through lines. "There are electrical engineers who know the algorithm," he said. The aerospace industry, also reliant on IT from end to end, is monitoring performance and readying forecasts for aircraft systems using digital twins.

This integration is transforming engineering. Engineers nowadays are expected to have knowledge not only in materials, forces, and structures but also in data analytics, cybersecurity, and software systems. The dilemma is obvious: how can one preserve the thoroughness of classical engineering while at the same time adopting the agility and speed of IT?

However, the return on investment is very great. More intelligent designs, safer systems, and more environmentally, friendly solutions can be achieved if engineering and IT collaborate closely. The engineer of the future will be a person capable of uniting the two spheresrooted in physics and mathematics fundamentals, but at the same time, having a good command of the data and digital systems vocabulary.