How digitalization can solve the auto industry's most pressing challenges

The automotive industry is facing a range of historic challenges. With each passing year, pressure is growing for manufacturers to offer more sustainable, fuel efficient vehicles as well as commercially viable electric cars. Furthermore, vehicles grow more interconnected and computerized by the day, posing complex design and service challenges. On the other hand, the incorporation of computers in vehicles also promises a strong advantage to companies that can deliver the greatest value to customers with data-driven products.

Meanwhile, more and more consumers are participating in car sharing, prompting automotive companies to re-examine how they can remain profitable despite falling demand. The steady advance toward smart, autonomous vehicles also makes it imperative that manufacturers prioritize innovation and have the capacity to gracefully pivot to entirely new product categories. And of course, COVID-19 has demonstrated that the entire market can be turned on its head seemingly overnight. This shows with impressive clarity that flexibility in the adaptability of cost structures is becoming a competitive factor

There is no question that digitalization will be key to automotive success in the years ahead. Companies that holistically embrace digital technologies and put them at the core of their operations will be more agile, more innovative, and able to introduce new, better quality products and new digital service offerings in faster time frames.

In this article, we'll explore a few key examples of how digital enterprises in the automotive space will have an invaluable advantage on their competitors.

Moving with true agility

Like many industries, the automotive industry is evolving at a record pace. The changes expected of automotive companies are larger and more challenging than anything we've seen in decades and possibly even in living memory. Companies need to be able to innovate and retrofit existing operations like never before to remain competitive as the ecosystem of the electric car becomes commonplace. But efficiently pivoting to provide quality products in radically new categories is easier said than done.

A holistic embrace of digital technologies will prove essential in creating the agility needed to transition successfully. As an example, digital twins will be a key part of this process. By leveraging the Internet-of-Things, cloud computing, AI and advanced data analytics, companies can create highly-accurate digital twins of their products, production, and value chain at large.

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This offers an unprecedented level of transparency into everything from new product designs to day-to-day operations and the performance of products in real-time. It creates truly endless opportunities for optimization. As an example, a manufacturer could design, test, prototype and predict the performance of a new vehicle entirely virtually - all of which dramatically reduces the number of prototypes needed to develop a new car.

Combining product design, production design and service into one value flow

As competition tightens while consumers buy fewer cars, it's crucial that manufacturers be able to deliver better products even as they transition to new categories. It will be imperative that automotive companies deliver exceptional value not only with new vehicles, but across a vehicle's entire life cycle.

Digitalization provides an elegant, comprehensive solution to this problem by enabling manufacturers to combine product design, production design, and service into one value flow. Traditionally, these functions have been siloed into distinct domains. With digital twins of real-life vehicles, manufacturing facilities, and new designs alike, companies can create better products with insights from a wealth of data at every point in a vehicle's life cycle.

At a digital enterprise, it becomes possible to predict the performance of a vehicle before it's built and design new vehicles with real-time insights from driver behavior and the performance of millions of vehicles. As an example, an engineering team could leverage insights from an AI that is analyzing maintenance data from dealerships around the world on a specific car model. With next-generation data analytics, companies can understand and improve the performance of their products in a manner that would not have been possible.

Putting digital technologies at the core of automotive operations

The potential of technologies like AI and the Internet-of-Things alone are very impressive. But it's not enough to use one or two of these emergent technologies. If automotive manufacturers are serious about boosting throughput, quality, and efficiently pivoting to new categories of vehicles, they need to synergistically combine technologies like the IoT, cloud, data analytics and so forth to unlock the full benefits.

In recent years, Siemens customers, both OEM's and Suppliers have been leading significant automotive digitalization projects worldwide. Core of those initiatives has been to develop and implementing digital cloud-based platforms. One key goal in this endeavor has been to leverage existing on-premise IT-Infrastructure to further optimize engineering and factory-operations.

However, companies quickly realized that without comprehensive digital twins of their products and their production, they were only scratching the surface of the value offered by the cloud. As a result, Siemens worked in collaboration with customers to create digital twins that offered deeper transparency by leveraging data analytics, closer integration, and identified opportunities for optimization across the entire value chain by creating closed loops between engineering and production.

Becoming the carmakers of tomorrow

It's clear that automotive companies are facing unprecedented challenges. While daunting, the disruption occurring in the industry is also an opportunity for tremendous growth - but only if manufacturers can move with agility and efficiency. Digitalization will prove key to making that happen. Manufacturers need to look very carefully at their current strategy and ask themselves if they are doing enough today to digitalize for the market of tomorrow.