



SIEMENS

Rewire your business with model-based wiring harness development approaches

Improve harness design and manufacturing efficiency with **Capital E/E systems development solutions**

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Trend #1

Electrification and software integration is growing in all industries.



Trend #2

Customers' increasing demand for highly automated and electrically propelled vehicles translates to a growing wiring harness manufacturing industry.



Trend #3

Complexity in wiring harness development is rising with millions of possible vehicle configurations.



Trend #4

Organizations are looking to digitalization to improve competitiveness, operational efficiency and quality



Challenging trends in the wiring harness industry

The increase in electrical and electronic features in modern vehicles places **more emphasis on the wiring harness**, which transmits power and signals between actuators, sensors and ECUs.

But with growth come fresh challenges and new pressures on the industry. To support the greater number of electrical and electronic systems, some of which are very sophisticated, **wiring harnesses are becoming intensely complex.**

Unfortunately, the **engineering and manufacturing methods** that have been in use in the industry for decades are showing their limitations in this dynamic environment.

Wiring harness manufacturing continues to be an extremely labor-intensive process, approximately 85 percent of all operations are carried out manually.

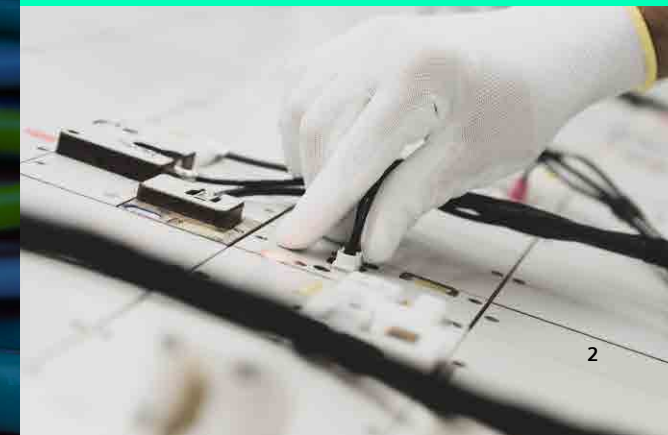
Therefore, it's not surprising that digitalization is more than a strong trend in the industry, for many companies it is a necessity if they want to survive in this challenging environment.

Even more troublesome is **the fragmentation between the harness design and manufacturing departments and systems**, which leads to manual data transfer and reentry between domains.

In short, the traditional manufacturing process is **slow, error-prone and inefficient**, and on top of that, **loss of tribal knowledge presents a very real risk** for you as a company in the wiring harness industry.

All this is forcing you to rewire your entire business processes.

Are you prepared for the challenge?



Master the challenges of the wiring harness industry with Siemens Wiring Harness Design & Manufacturing Engineering

Outdated processes and loss of tribal knowledge are jeopardizing your wiring harness business

Conventional wiring harness manufacturing methods are starting to creak under the weight of the challenges described before.

Changes to improve the manufacturability are often lost in the transition of data between teams.

High-level processes from design engineering through product and manufacturing engineering, as well as the generation of the manufacturing documentation, are completed with Microsoft Office applications and drawing-focussed tools. This leads to the next person in the chain having to recreate the non-digital information in another format or style.

Manual data sharing and reentry causes mistakes that cost money, need time to fix and, even worse, can jeopardize a good customer relationship.

With such a fragmented work-process, manufacturing engineers have little time for optimization and innovation, leading to suboptimal, inefficient processes from the beginning.

This way, new product introduction cycles can take months, and design changes up to a few weeks to be fully implemented.

Additionally, with current methods, creating work instructions is a difficult, time-consuming and challenging job that requires skill and expertise to complete accurately, and on time.

Work instructions that are late or low-quality can lead to inadequate and unsatisfactory workstations, and errors found during testing cause engineers to perform time consuming and expensive reworks.

Another serious challenge is tribal knowledge, i.e., information about processes, methodologies, and more that is unwritten, stored only in employees' memories, but often critical to success.

Employees that change roles or leave the company will take this information with them, undermining the process or product they once oversaw.

All this will have significant repercussions on your business if not addressed.

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Analysts predict that by 2023 the automotive wiring harness industry will grow to over 70 billion dollars in yearly revenue and more than 91 billion dollars by 2025.

Future Market Insights, 2016

A model-based flow unifies the previously fragmented domains of design and manufacturing

As we have seen, the **conventional wiring harness manufacturing methodology is vulnerable** to errors from fragmented processes, the loss of tribal knowledge, inconsistent or inaccurate costings, sub-optimal formboard design or manufacturing process design, and misplacing key information on the shop floor.

As a result, **manufacturing and overall costs can overshoot the quotation** made to the customer, and production quality can suffer.

A model-based flow **unifies the previously fragmented domains of design and manufacturing** by automating data exchange and providing engineers with access to cross-domain decisions.

Tribal knowledge is captured through integrated design rules that support automation, guide all engineers consistently and check designs for issues.

In a digital world, you can **create a digital thread** in which all of the functions, from architectural and functional design through to physical design, manufacturing engineering and after-sales service, can **all use the same data**.

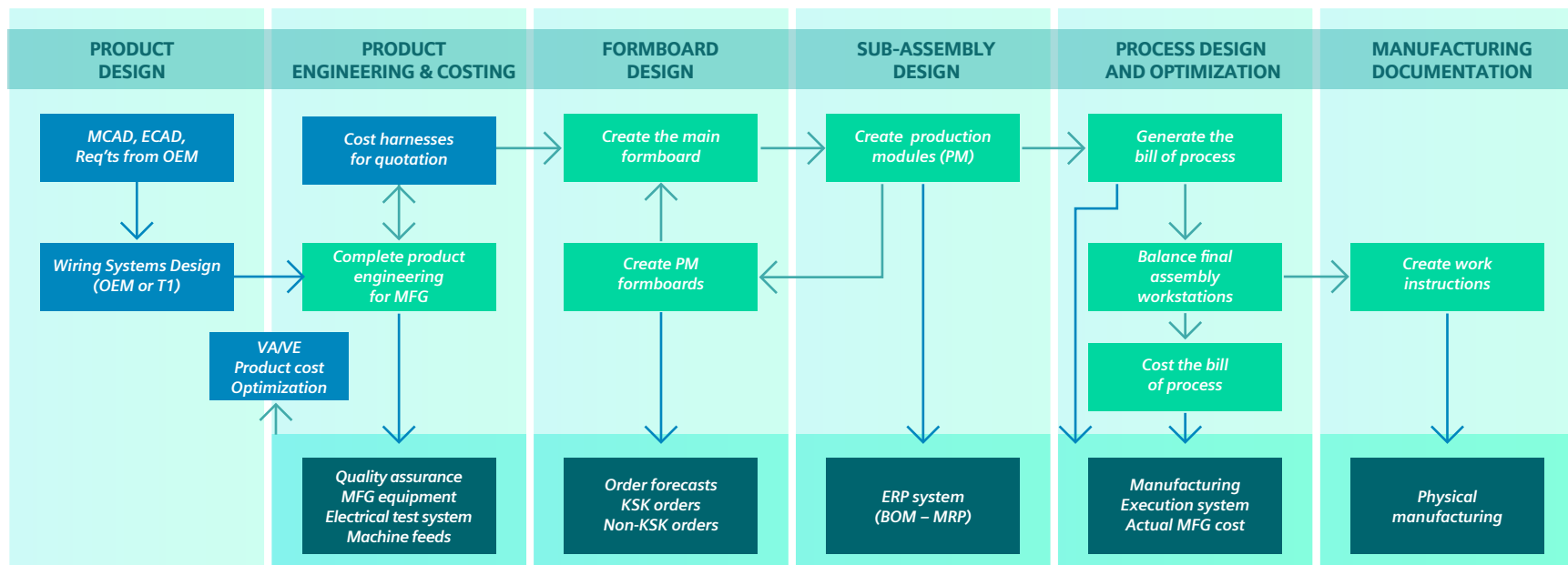
At each stage of the harness lifecycle, **each stakeholder can use the same data models** and have access to decisions that are made in other domains.

Using a digital thread, **design cycles are faster and issues can be caught and resolved earlier** in the process when they are much less expensive.

By also **reducing design rework**, data re-use minimizes costs and enables superior manufacturing efficiency.

Thus, you can **accelerate development cycles** to bring new products to market faster than ever – a critical capability for the future of the wiring harness business.

Wiring harness design through manufacturing process flow



The high level manufacturing engineering flow in the wiring harness industry.

Siemens Digital Industries Software proudly presents Capital™ wiring harness development software portfolio



Turn your company into a digital enterprise and benefit from the spectacular growth in the demand for wiring harness solutions with Siemens Wiring Harness Design & Manufacturing Engineering.

Learn more at [siemens.com/capital](https://www.siemens.com/capital)

What should you do?

There are three key aspects to digitalization and the model-based enterprise you should consider to thrive in the wiring harness industry.

The first is the use of **digital models** of the wiring harness product and the manufacturing process; together, they constitute the **digital twin**.

Automation is the second pillar: **Design rules** created by experienced engineers can be used to **automate the transformation of the digital twin** into bills-of-process, work instructions and other output formats.

This simultaneously **embeds tribal knowledge into the company's production flow**, safeguarding it from employee turnover.

The third pillar is **data re-use**. Instead of recreating or reentering data, in a model-based engineering flow, **data is created once and re-used to the greatest extent possible** by all upstream and downstream consumers.

Bringing harness manufacturing into the digital age

With an **entirely digitalized process**, from model-based planning and simulation to integrated manufacturing systems, you can **realize significant improvements** in efficiency and productivity.

Our solutions for your success

Siemens expanded **Capital™ wiring harness development software portfolio** can help you thrive in the highly complex wiring harness industry.

As part of the **Xcelerator portfolio** of software, services and application development platform, **Capital is integrated with adjacent Siemens solutions**, including the Teamcenter® portfolio for product lifecycle management, **NX™ software** for mechanical design and **Mendix** low code development environments, which creates **the world's most comprehensive wiring harness development solution** to efficiently engineer and manufacture today's smart products.

Reduce design errors

-50%

Quote-to-production cycle time

-30%

Formboard design time

- 85%

About Siemens Digital Industries Software:

Siemens Digital Industries Software is driving transformation to enable a digital enterprise where engineering, manufacturing and electronics design meet tomorrow. The Xcelerator portfolio helps companies of all sizes create and leverage digital twins that provide organizations with new insights, opportunities and levels of automation to drive innovation.

For more information on Siemens E/E systems development solutions, visit www.siemens.com/capital or follow us on [LinkedIn](#) and [Twitter](#).

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Americas: **+1 314 264 8499**
EMEA: **+44 (0) 1276 413200**
Asia- Pacific: **+852 2230 3333**

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