



REPORT

The Future of Design and Simulation Workflows

Keysight Survey Reveals Data Sharing and Analysis as Biggest Challenges Facing Designers

In December 2018, Keysight Technologies commissioned Dimensional Research to conduct a survey measuring time-to-market barriers for design and test engineers across the globe. This report focuses on the challenges identified by survey respondents in design and simulation workflows. The results showed that while design engineers are facing many challenges, the most pressing are in the areas of data sharing and analysis. These findings underscore the need for a new way to connect design and test data across the workflow.

Executive Summary

This research finds there is tremendous opportunity to reduce time-to-market across the design and simulation phases of the electronic product development lifecycle. Most challenges slowing the lifecycle today can be distilled down to data movement and tool integration. Nearly every company surveyed is trying to leverage and compare design simulation data to test results. This research shows that information sharing across the workflow is one of their biggest challenges. In fact, 9 out of 10 companies surveyed revealed that correlating test result data takes months.

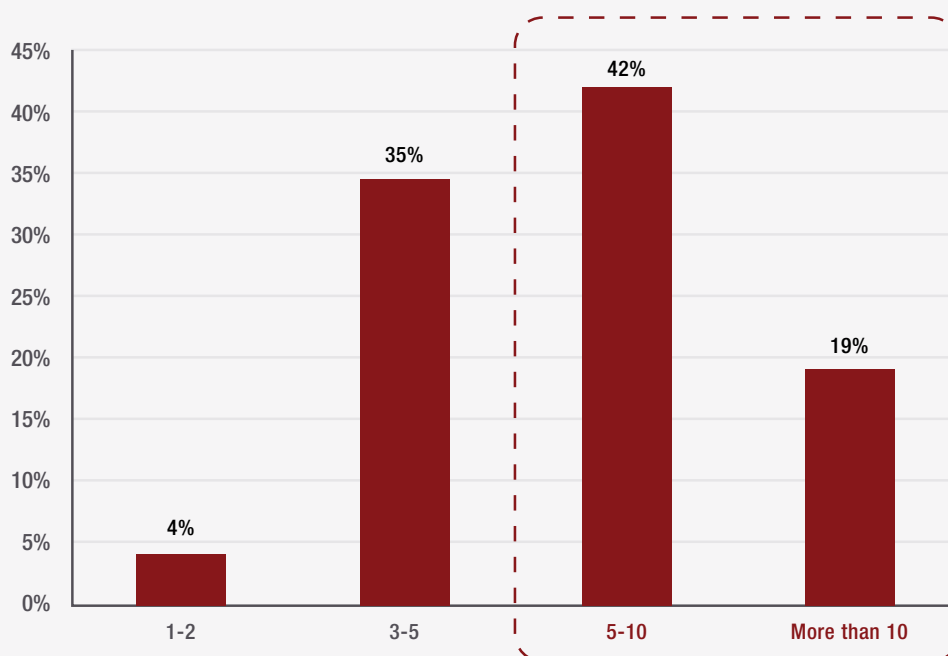
The data correlation issue is likely driven by the numerous tools used throughout the development lifecycle. According to the survey results, over 50% of designers use more than 5 different tools for simulation and design. These software tools are not integrated and require hours of coding each week to enable data sharing. The magnitude of that integration effort is amplified by the fact that nearly every company is devoting more resources to the maintenance of in-house tools. Respondents universally stated that an integrated solution capable of being used by design, verification, test, and production teams, and that could leverage shared data, would accelerate their electronic product development.

Results

Designers have long complained about the many different software tools they use to do their design and simulation work, but how many tools are they actually using? According to the survey results, 61% use 5 or more tools for design and simulation, while almost 20% use more than 10 tools.

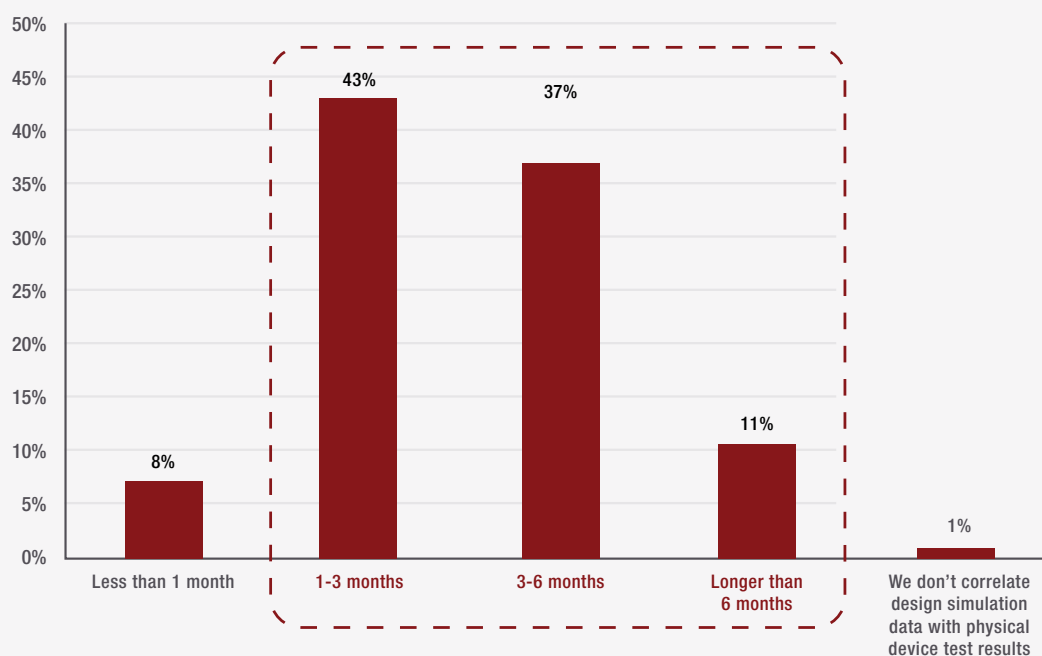
The time it takes designers to switch between these different software tools can be significant. The process often involves importing and exporting files, reconnecting ports and vias, and rechecking netlists. Designers also spend a great deal of time correcting errors resulting from the switch.

Approximately how many different software tools do you use for design?



After designers simulate and finalize their design, the next step is prototype and validation. Surprisingly, it takes companies a very long time to correlate their design and simulation data with actual physical device test results. Almost all respondents surveyed, 91%, require a number of months to correlate these results.

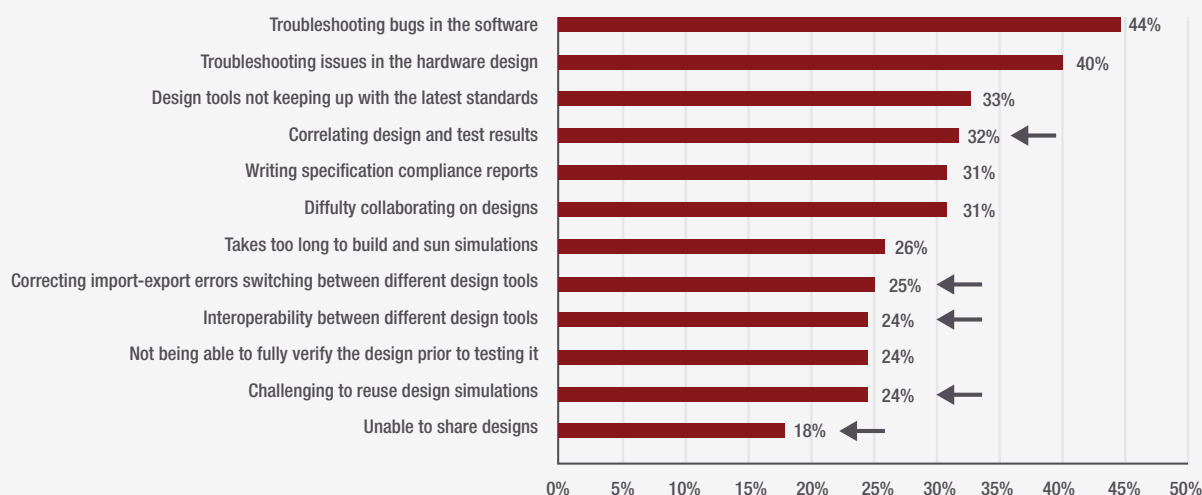
Approximately how long does it take to correlate design simulation test data with actual physical device test results?



There are many reasons why it takes months for companies to correlate design simulation results with actual physical device test results. For example, data is often stored in different places and engineers are typically working on multiple projects at once. In addition, troubleshooting issues in both the software and hardware takes time.

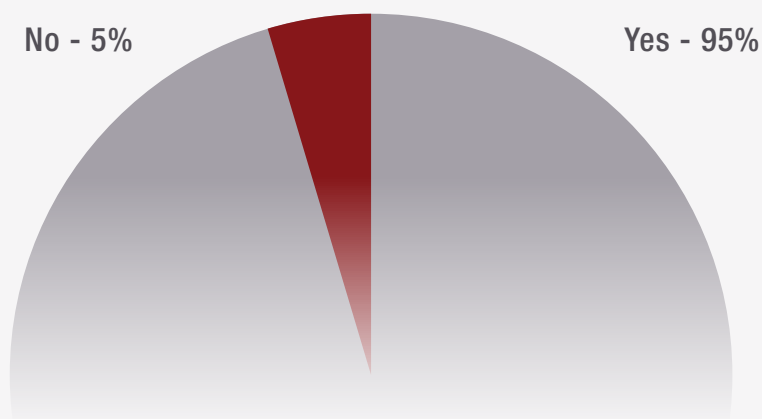
While a full one-third of those surveyed said that correlating design and test results was their biggest challenge, it isn't the only one designers face during design and simulation. The most cited challenge for 44% of survey respondents was troubleshooting bugs in the different software tools.

What are the biggest challenges you face in the design & simulation phase?
Select up to 5 answers.



Even though it takes so long to correlate design and test results, product development teams are not skipping this step. In fact, almost all survey participants, 95%, require data from design and simulation to test their physical product further down the product development lifecycle.

Is data from design & simulations used later for testing the physical product?

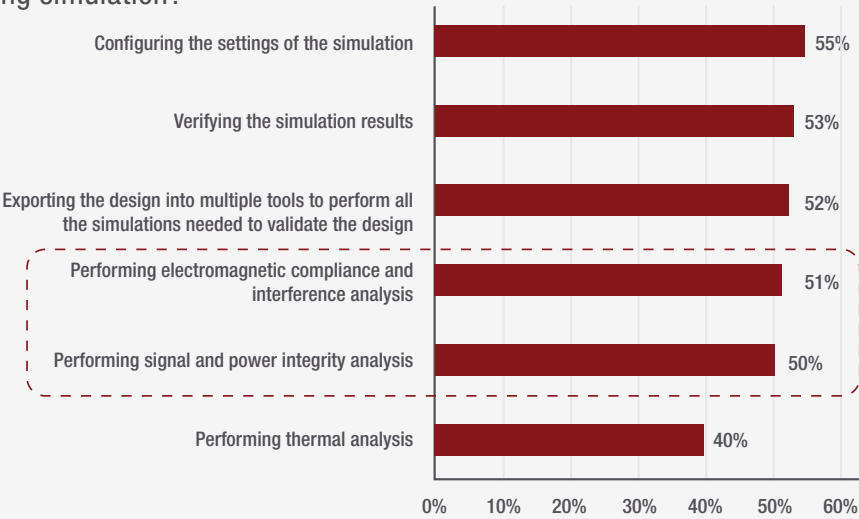


Growing Complexity Driving A New Workflow Approach

Modern electronic circuit designs continue to grow in complexity. Older designs consisting of just a few traces on a 2-inch, single-layer printed circuit board (PCB), have today been replaced by designs implemented on 18-inch PCBs, with 32 layers, 8,000 nets, and 12,000 components. These boards now handle multiple technologies, including DDR4, HDMI, PCIe, USB, and more.

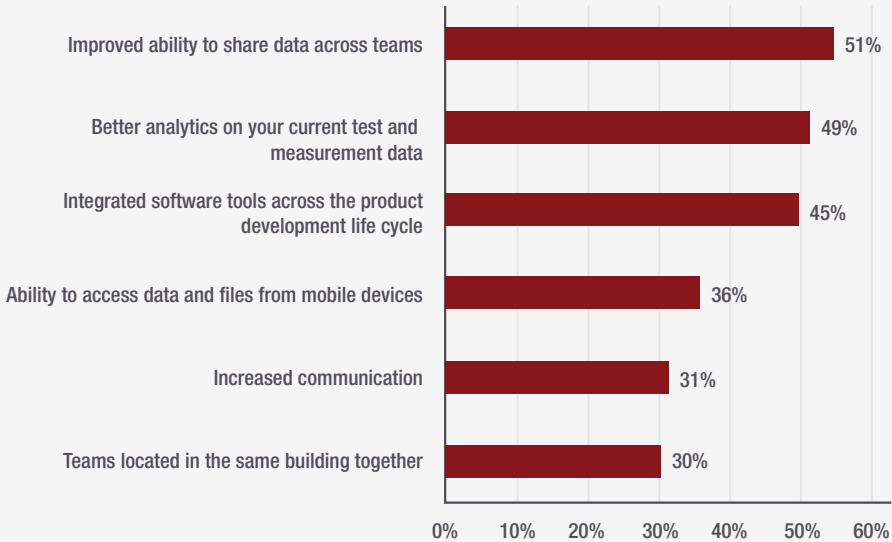
As a result, designers are being forced to run more analyses on increasingly complex boards. Half of the companies surveyed struggle with long electromagnetic simulation times and complex signal and power integrity analysis. Setting up and verifying simulations takes up even more time.

When using software to design electronic devices, which of the following take the most time during simulation?



Despite these challenges, the survey points to some clear areas of improvement for reducing the time-to-market of electronic products. 50% of respondents believe that an improved ability to share data across teams would have the biggest impact, followed closely by better analytics (49%) and integrated software tools across the product development lifecycle (45%).

In your opinion, which of the following improvements would have the biggest impact on reducing your time-to-market?



This survey confirms that companies still have enormous opportunity to help designers more easily share and analyze data across product development teams. With virtually all respondents requiring simulation data to use for product testing further down the development lifecycle, it is clear that the availability of software capable of connecting design and test will be increasingly essential for faster, better, successful product development.

Methodology

Keysight commissioned Dimensional Research to conduct this survey in the field. A total of 304 engineers, managers, and executives that design, validate, and test electronic devices completed the survey. The survey's aim was to understand the challenges associated with creating electronic hardware throughout the design to manufacturing development phases of the product lifecycle. The survey was administered electronically. Participants were offered token compensation for their participation.

About Keysight Technologies

Keysight Technologies, Inc. (NYSE: KEYS) is a leading technology company that helps enterprises, service providers, and governments accelerate innovation to connect and secure the world. Keysight's solutions optimize networks and bring electronic products to market faster and at a lower cost with offerings from design simulation, to prototype validation, to manufacturing test, to optimization in networks and cloud environments. Customers span the worldwide communications ecosystem, aerospace and defense, automotive, energy, semiconductor and general electronics end markets. Keysight generated revenues of \$3.9B in fiscal year 2018.

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