The business drivers for global design have evolved. In the early days, chip design companies were attracted to regions that could offer a lower cost basis. Today, the businesses that deploy global design teams do so primarily because they want access to the best talent for the job—wherever that talent happens to be. As emerging markets mature, the cost advantage diminishes, but the talent advantage grows significantly.

As a result of this shift in emphasis, global design is becoming a practical necessity for growing design companies. What was initially a cost benefit has become, for many, a solution to talent shortages.

At Synopsys, we see global design from both sides of the fence. We offer support and services to our global customers, and we are practitioners of global design ourselves—both in developing IP and working alongside customer design teams in a professional, consulting role.

Our global presence has grown with our customers’ needs (Figure 1). For example, we opened our first office in India in 1995 in order to be close to, and, therefore, provide effective support for key customers. Over the years, our experience—both in-house and as a services and support provider—has given us valuable insight into the challenges that companies face when growing globally.

Communication: the essence of the problem and the solution
In the early days, chip companies discovered that it was difficult to make a success of global design without plenty of face-to-face meetings, which usually meant a lot of time spent in the air, travelling between design centers. The cost and time impact of this approach to managing remote teams is, of course, not always the most efficient use of a company’s resources.

To be clear: the co-location of global teams for short periods of time is extremely valuable. My experience is that it is especially useful at the kick-off of a new design project, when it can both aid team-building and ensure a common understanding of objectives and plans. Short periods of co-location are also extremely valuable at points of the project where there is a high level of ambiguity or when significant latitude for creativity exists.
When teams are co-located, communication happens naturally and there is less chance for ambiguity. Experts suggest that human communication consists primarily of body language and paralinguistic cues, with less emphasis on the words themselves. When teams are dispersed across different continents and cultures, it greatly increases the chances of somebody misunderstanding something.

Cultural differences enrich our lives and are something to be celebrated. But for a program manager in charge of a global project, there is no substitute for experience when it comes to understanding, respecting and managing different cultures and their communication styles. For example, when someone on your team in a culturally reserved region tells you—in an understated way—that they “might have a problem”, you should probably call them urgently. On the other hand, when team members from other more emotive regions may well raise “urgent” issues, you would not want to over-react (the sky might not, in fact, be falling).

Alongside the “soft” skills that enable managers to get the best out of cross-cultural teams, there is no substitute for having strong program management practices that allow team leaders to manage by objectives and track the status of tasks and deliverables globally. All of these skills are fundamental to being able to develop and retain capable teams regardless of their location.

Co-located design teams have been able to operate with informal management practices for years because the presence of local communication has provided enough transparency and consistency to compensate. Managing remote teams demands better management discipline.

The good news for businesses operating in multiple geographies is that the availability of managers with global experience has improved with time. For example, in our domain, India now has a 20+ year legacy of global semiconductor design experience. Meanwhile, China and the Southeast Asian countries are rapidly maturing and are producing far more engineering graduates than the West.

**Transcending time zones**

However, those who restrict their search for engineers to India, China and Asia, will miss out on other pools of talent. For example, Synopsys has made a significant investment in Armenia, which has resulted in a large IP and PDK development team. One of our recent service projects involved Synopsys consultants from Pacific, Central and Eastern US time zones, as well as the UK, France and the UAE (United Arab Emirates). The project demanded that we bring together the skills and experience that engineers in the geographies possessed, and they happened to reside in six different locations.

Having a global team that operates in multiple time zones may tempt some to think that they can “chase the sun” by handing off designs from one continent to the next and get a productivity benefit. That may be possible for some tasks, like physical verification, but in our experience, it’s a high-risk strategy. Reducing design to an “assembly line” activity ignores the fact that design is fundamentally a creative process, and to deliver excellent design, engineers need to develop a deep understanding of the function, block or application area, and work within local teams to complete tasks. Attempting to exploit shift work in the design process will dramatically increase communication overhead, which could ultimately damage productivity.

**Ingredients for success**

The proper use of technology is critical in enabling global design. Centralizing data helps ensure transparency—everyone has the same set of tools, flows and design data. Providing central access to data through a datacenter alleviates many of the potential issues that would otherwise hinder data management and revision control.

Users need a secure way of accessing their design data. We use a Synopsys-developed collaborative design technology called Design Sphere Access (DSA) to provide the infrastructure to manage our compute farms, revision control and secure remote data access. DSA provides design team members—whether Synopsys’ or our customers’ engineers—access to the data from the datacenter through a secure, thin-net client infrastructure. Common access to data and revision control is the base layer of our infrastructure.

Once users can access the data—wherever they are—we need to establish consistent methodologies and flows so that engineers know what to expect from one another.

We developed the Lynx Design System (Figure 2) to enable design teams to standardize, visualize and manage their design flows. Having the ability to share common flows and methodologies across regional
design teams enables them to collaborate effectively and productively. We use Lynx internally to deliver on many customer engagements, and we deploy it to customers who are looking for a common, maintained design environment that enables their engineers to spend more time focused on the design and less time on the design flow.

An infrastructure that makes design data and metrics more transparent helps to improve communication and build trust, which is important within local teams as well as across global design centers. For example, Lynx’s management cockpit captures and reports a common set of design and project metrics so that everyone on the project team and/or management chain can share a consistent view of status and trends regardless of their location. Having on-demand access to such data enables project stakeholders to make informed decisions in real-time. Design teams are more productive if they can mine the right data and get it to the right users at the right time.

Managing global design successfully depends on reducing the barriers of communicating globally to the point where the benefit of leveraging the specialized or lower-cost talent outweighs the communication overhead.

What we still need to do
One of the challenges in any design is specifying it clearly. Ambiguity in specification impedes productivity and often leads to costly changes in the design downstream in the design process. EDA technologies can help design teams improve quality and clarity earlier in the design process, which improves designer productivity. If we can be really clear on what we’re building as well as how we’re going to build it, and automate as much of the process as possible, the task of leveraging global teams gets easier.

For example, on the hardware side, the use of design constraints and executable specifications for power and timing intent are proving invaluable in bringing clarity to the early part of the design process, which is further enhancing design productivity for both local and global teams.

Software is, meanwhile, becoming a bigger and increasingly important component of what our customers are designing. Embedded software development is another design activity that often occurs with distributed teams. Remote collaboration on software is not only required within companies, but throughout the product design chain as well: drivers, firmware, operating systems and application software must all be integrated, debugged and verified to run on the final product. System-level design tools, such as hardware and virtual prototypes, enable software engineers to start code development early in the design cycle—up to 12 months before first silicon—with a common representation of the target system hardware.

Global services and support
Global design teams need global support. We locate our support and services teams in the regions where our customers operate and organize them in a way that mirrors the global companies that we help. For example, we design our reporting structures to ensure open channels of communication across our global engineering teams regardless of their location.

We offer regular global training events to ensure consistency of practice and to establish recommended methodologies across geographies. We actively solicit feedback from global support teams.
Going global

to influence product roadmaps and methodologies so that our product development meets the needs of our global customer base. The Synopsys user group (SNUG) helps to promote and share best practices in design, tool and methodology use and currently holds conferences in 13 different locations.

We combine all of these activities to support the global design community.

The way to innovate

Global design is not just about access to lower-cost labor—it’s about using the best talent in the world for a given task, no matter where it resides. It allows businesses to benefit from additional capacity as well as the cost advantages of emerging regions.

Some design companies have given up on implementing global design as being too hard. Co-located teams can communicate more efficiently and naturally, which compensates for less effective management practices.

In deploying global design, there is no substitute for effective program management. We can simplify communication and build trust across remote teams and different cultures by enabling data transparency. And we can make data more transparent by standardizing our data flows and methods using established productivity tools and infrastructures.

Global design works. Talent is global, our customers are global, and it’s a practical necessity in today’s market. Those that master global design will maximize their ability to innovate.

About the author

Glenn Dukes, Vice President of Professional Services, has been with Synopsys for 20 years. In this capacity, he has global responsibility for all consulting teams and design centers as well as product development for Synopsys’ design flow offerings. Mr. Dukes has authored and delivered numerous papers at industry conferences, and is a credited contributor to the Reuse Methodology Manual, a widely referenced book of design best practices. Prior to his current job responsibilities, he has held various technical and management positions at Synopsys, including Staff Consultant, Applications Consulting District Manager, Director of Services, and Consulting Group Director.

Mr. Dukes has over 23 years of experience in semiconductor design and EDA. Before joining Synopsys, Mr. Dukes was an engineer with NCR Microelectronics, where he designed, verified and supported ASSP ICs. He also authored many papers and patents at NCR. He holds a BSEE from Rice University and completed graduate coursework in Engineering Management at the University of Colorado. §