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Expanding the Global Reach of the Twenty-First-Century Research University

Suresh V. Garimella

"Make no little plans; they have no magic to stir men's blood and probably themselves will not be realized. Make big plans; aim high in hope and work..."

—Daniel Burnham, architect

The American research university has been the most powerful driver of innovation and economic growth since the end of World War II. U.S. public and private universities put into place the foundational scientific advances upon which the country built the world's most prosperous economy, the largest middle class in history, the internet, and Silicon Valley.

In the twenty-first-century global economy, the boundaries of the American research university are global. "We must, indeed, hang together or, most assuredly, we shall hang separately," as Benjamin Franklin said in a very different time and situation.

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To go truly global, our universities are building broad partnerships on the basis of long-term, mutually beneficial, and culturally respectful relationships in selected countries around the world. The keys to success in international engagement are comprehensive, integrated efforts focused on research education and technology transfer on the framework of a sustainable business model.

Acting Locally, Thinking Globally

It is in this global context that we at Purdue University have reimagined our international programs here at home—starting with our faculty and students. Global engagement positions our faculty and students to understand emerging business challenges, strengthens our international alumni network, and provides access to valuable global intellectual networks.

This article describes the ways that Purdue has approached and implemented our global engagement strategy. Overall, we coalesced our efforts around the major big-issue research strengths at the university, such as agriculture, water, energy, public health, food production/security, sustainable economic and environmental development, and information technology. We then asked: How can this research be used to enrich the student experience, both for the domestic students seeking overseas experience and for the large cohort of international students at Purdue, in a mutually beneficial relationship with our international partners?

Our recent efforts have taught us that an initial requirement for success is a core of passionate faculty across a range of schools and disciplines. In international engagements, we strive for parity, for agreement between equals, and for shared leadership. It was important to align our efforts among research, education, study abroad programs, and corporate and alumni engagements. We have put into place a sustainable business model and embraced the flexibility needed to adapt to changes and recognize new opportunities.

The International-Engagement Value Proposition

The value of global engagement varies from partner to partner, organization to organization, and discipline to discipline. For Purdue, the paramount value proposition is to be the best we can be as a research and learning institution with the finest and most diverse students, faculty, and staff.

As members of a leading research university, our engineers, scientists, and scholars work on the most pressing global challenges related to water, food, security, energy, climate change, and healthcare delivery. To make a difference in these areas,

we must engage in mutually beneficial partnerships with countries, governments, companies, academic institutions, and nongovernmental organizations.

Purdue's global engagement aims to deliver powerful learning and research experiences for its students, faculty, and staff. It creates new opportunities for students and faculty in different disciplines to witness in person and understand the global forces that are shaping our economy, the human community, and the future. In the process, the university discovers new approaches to education.

Social and cultural currency counts for citizens and institutions in the global economy. In order to build this capital, we aim for every student to graduate from Purdue having had an industrial internship, a research internship, or a global experiential learning opportunity (and, in many cases, more than one of these in the same experience). Focused efforts over the last four years have led to an increase by more than 85 percent in credit-bearing study abroad participation, and Purdue is now in the top twenty-five schools in terms of study abroad.

The potential economic impact to our home state of Indiana—by bolstering international opportunities for the state's businesses and encouraging foreign investment in Indiana ventures—is significant. Further, these engagements are empowering Purdue to help our state become a high-tech hub of innovation, driven by a prepared and educated workforce.

Yet another driver for our global engagement—indeed an overarching reason for it—is the potential exposure to new problems and new ideas that increase our knowledge, creativity, productivity, and impact. While pure intellectual curiosity often undergirds the desire for global engagement, the recognition of multiple vantage points from which to assess challenges can make us more agile and innovative.

Choosing International Partners Strategically

Global engagement at a university often begins with decentralized initiatives emerging from faculty networks, which need support at the institutional level through communication and connections across campus. University leaders need to recognize the internationally relevant research of individual faculty members, departments, and schools, and can help integrate research efforts with student exchange programs, in turn encouraging international experiences at both the undergraduate and graduate levels.

It is the university-level initiatives spanning multiple colleges and academic units that present a different challenge. These initiatives can take years to develop

and entail some risk if not carefully managed. They should be guided by clear criteria and include sound financial-support models. They should likewise be targeted at a select set of countries and institutions. Moreover, each initiative should involve multiple units at the university and combine education, research, and engagement.

At Purdue, we have chosen our international engagements carefully and strategically. Alumni strength and student connections were key factors in the choices. The goal was not to start from zero but to build upon connections, foundations, and potentials that already existed in the countries we chose. The strategy was to engage as equals with all the stakeholders with whom we enter into partnerships.

Ultimately, we identified two strategic partners: India and Colombia. India offers a place where Purdue can further strengthen its reputation and bolster student recruitment, long-term recognition, and partnerships with universities, companies, and government. As the fast-advancing economy in the world's largest democracy continues to develop, the opportunities only appear to be growing for high-level cooperative research, joint educational programs, student exchanges, and mutual intercultural development.

Colombia offers very different opportunities. Purdue has a history of involvement in the nation and key strengths we can employ in agricultural and economic development as well as sustainable tourism. Continued—and enhanced—engagement in Latin America is driven by the desire to diversify our international student population and contribute to the development of our own hemisphere.

Engagement with India

Institutionally, Purdue has numerous previous and current academic collaborations with India in agriculture, engineering, management, the sciences, information technology, pharmacy, veterinary medicine, and the liberal arts. The number of Indian institutions with which we have been involved numbers in the dozens. The university has the largest enrollment of Indian undergraduate students of any in the United States, with nearly 1,000 currently enrolled and an additional 1,000 Indian graduate students. These students come from every major Indian metropolitan area as well as diaspora communities living on six continents. Purdue also has more than 120 faculty of Indian origin. Indian students make up over 20 percent of our international student body, and with the help of funds provided by Indian alumni, a small number of merit-based scholarships are available to help attract the best and the brightest students. There are more Purdue

alumni in India than in any country other than the United States, with the number of active alumni exceeding 2,500.

In 2014, Purdue designated India as a top strategically important country for future collaborations and defined five goals and accompanying metrics to guide the partnership: (1) bilateral academic mobility; (2) alumni relations and advancement; (3) institutional and programmatic partnerships with “anchor” Indian universities; (4) corporate and government partnerships; and (5) branding and communication.

In order to achieve these goals, we enlisted our vast network of partners. An early action was to convene a Purdue-India Executive Council. Composed of eleven Purdue alumni and friends at the highest reaches of business, government, and academia, the council serves as an advisory board to the university on Purdue’s Indian engagement initiatives.

In 2017, Purdue partnered with India’s Science and Engineering Research Board. The board, similar to the U.S. National Science Foundation, has agreed to fund a cohort of visiting Indian doctoral students at Purdue to spur research collaborations in sustainable water and energy systems, public health, transportation, and other areas. We also have built deep collaborative research and educational relationships with the Indian Institute of Technology Madras and the Indian Institute of Technology Hyderabad.

These existing and emerging areas of cooperative effort are built on relationships with alumni, many of whom stand out for the great success and recognition they have achieved in their respective fields. Our alumni include the founders of automotive, pharmaceutical, IT, and financial companies; members of parliament; and many renowned academics. We consider it a priority to connect with and engage our Indian alumni, who themselves are building a robust network of Purdue alumni groups in cities throughout India.

On the corporate front, our burgeoning relationships with Indian businesses include TVS Motor Company, a two-wheeler manufacturer, and Dr. Reddy’s Laboratories, a multinational pharmaceutical company. In addition, Purdue and the state of Indiana have entered into a long-term agreement with the India-based IT company Infosys, through which we will work together to “up-skill” two thousand newly announced Indiana employees of Infosys in areas including digital agriculture, cybersecurity, biopharma analytics, and artificial intelligence.

This initial effort will expand to courses for thousands of employees Infosys plans to hire across the United States in the next few years. In the longer term, we will provide continuing education to keep mid-to-upper-level management

employees' business skills up to date. This professional development will go hand in hand with collaborations on new research and innovation projects. With the growing need for computer science skills, we will "cross skill" humanities, social science, and other majors to contribute to our tech-driven local, national, and international economy.

In summary, Purdue's partnership effort with Indian institutions has benefited from strong commitment and support from top university leadership. Our approach, based on convening and empowering broad coalitions across campus toward specific goals that include supporting high-level collaborative research, student exchanges, alumni involvement, and the development of a range of institutional relationships, corporate partnerships, and intercultural exchanges, has proven to be one type of effective model.

Partnerships in Colombia

Purdue's involvement in Colombia began formally with a 2010 agreement with the Colombian government that has since expanded to include all of the country's important constituencies—government ministries, higher education, private-sector companies, and NGOs.

The Purdue-Colombia relationship has broadened and deepened, taking on projects including agriculture, supercomputing, student exchanges, and economic development. In 2014, Purdue president (and former Indiana governor) Mitch Daniels led a delegation that met with Colombian officials including President Juan Manuel Santos and the ministers of agriculture, education, and treasury, as well as university leaders and CEOs. A key to fostering the early stages of this relationship was a Purdue alumnus from Colombia, who headed Latin American operations for a large U.S. multinational and chaired Purdue's Engineering Advisory Council.

In 2016, at the invitation of President Santos, Purdue entered into a multiyear agreement to co-create a master plan for sustainable development of the Orinoquía region of Colombia, with an initial focus on agriculture and tourism. Located just north of the equator, the 270,000-square-mile area makes up three-fifths of Colombia's landmass. The population is sparse and the topography includes wide plains, tropical savannas, and forested areas. Colombians have long believed that the Orinoquía has the natural resources and beauty to become a prosperous region through sustainable productive agriculture and ecotourism, thus raising the fortunes for all of Colombia.

We agreed. As a land-grant university, this is what we believe in and do best: harness knowledge, science, and research in a way that can be meaningfully

applied to improve lives. To be sure, Purdue works continuously with its partners to understand problems and use a science- and systems-driven approach to guide development decisions. Several of the graduate students taking part in this particular project are from Latin America. When the project is successfully implemented, we all envision a prosperous Orinoquía—economically, environmentally, and educationally. It will be a region that has the strength to be both self-sufficient economically and to contribute meaningfully to Colombia’s future.

Other Purdue-Colombia efforts have grown out of this partnership, including U.S.-government-supported projects such as Cacao for Peace and the Farmer-to-Farmer program. Purdue helped Universidad EAFIT in Medellín build the high-performance computing know-how and infrastructure to create new educational programs; the school’s supercomputer places among the top twenty in Latin America. Outstanding Colombian high school students and undergraduates study at Purdue; nearly two hundred undergraduate students from the top universities in Colombia have pursued semester-long research programs. The flow of students in the other direction is equally notable, with Colombia serving as the number-one South American destination for Purdue’s undergraduate students engaged in short-term and semester-long programs.

A long-term relationship with Colciencias, Colombia’s national science foundation, provides support for students pursuing graduate degrees at Purdue. As a result, more Colombian students are pursuing doctoral degrees at Purdue than from any other country in Latin America.

In summary, our efforts in Colombia are multidisciplinary, research- and education-based, collaborative, mutually beneficial, and sustainable over the long term.

Financial Sustainability

University-level initiatives must be built on a solid financial model. As a state-funded public research institution, Purdue must act as a careful steward of the state’s taxpayer support.

We have used internal university funds sparingly to seed selective efforts to initiate programs that add value for our students. Beyond that, our financial commitment—largely in human resources—comes from existing research grants, corporate support, and Purdue alumni who support research and programs in their local areas. We have also instituted flexible new financial and contractual arrangements to address the often complex international regulatory issues that must be navigated.

With global engagement, we need to keep our eyes on the prize. In this case, it is not dollars but comprehensive research projects that materially benefit our international partners and their citizens, advance the work of our faculty, and enrich the academic and cultural experience of our students. Yet financial sustainability must be planned into any engagement opportunity from the outset—or else, it is destined to be short-lived.

Conclusions, Questions, and Answers

We do not have all the answers about international engagement at Purdue University. But we think we are asking—and answering—some of the right questions, and we will keep talking and listening to international partners, alumni, faculty, and students.

Above all, we have recognized that with limited resources—human and financial—there is a need to focus and be strategic. The potential and opportunities for global engagement are high for all concerned. Purdue and other research university counterparts are building stronger twenty-first-century global institutions whose activities necessarily expand beyond the borders of our own state and region. Moreover, through global engagement, we are part of a virtuous cycle of continually advancing international scientific, economic, and cultural development. That's planting a fertile field from which international diplomacy and understanding can grow. **SD**