STUDENT-INDUSTRY INTERCONNECTION

TRANSFORMS THE FABRIC OF SUPPLY CHAIN

BY YOSSI SHEFFI, PHD

More and more companies today are finding innovative ways to collaborate with supply chain research centers. When the projects are well planned and supported, the benefits of such partnerships can be substantial. Supply chain professionals often are surprised by how much value they derive, and the students involved enjoy the unique experience of applying their classroom-based knowledge in the real world.

One initiative that has proven to be especially rewarding for both parties is collaboration on graduate program theses or capstone research projects. At the Massachusetts Institute of Technology (MIT) Global Supply Chain and Logistics Excellence (SCALE) Network, the typical research project process starts with finding prospective sponsor companies. Each center has an outreach program that companies can join to interact with faculty, exchange ideas, engage in research, and attend special events.

As part of their membership, partner companies can sponsor master's program research projects. Those who are interested pitch their project ideas, and the relevant center matches projects with students. Each research project is focused on answering a question, and that question must be research, rather than consulting-based. Examples of typical research topics include setting the optimal delivery frequency for products, improving demand forecasting, and finding how a vendor-managed inventory program can be cost- and value-justified.

"Students are very good at tackling clearly defined problems, especially ones that involve quantitative analyses and modeling where they have to collect data from a variety of sources," says Bruce Arntzen, executive director of the supply chain management program at the MIT Center for Transportation and Logistics. Research questions that require students to analyze scenarios or alternative solutions to understand the key drivers of decisions also are well suited to these projects, he adds.

For example, a pharmaceutical manufacturer wanted to reduce the levels of work-in-process (WIP) inventory it maintained. Achieving the goal required the company to find the right balance between minimizing inventory to achieve a cost savings and maintaining enough inventory to support the high level of customer service required in its business. One solution was to invest in more production capacity, so a supply chain management student team analyzed a series of scenarios based on multiple production stages and frequencies to understand the viability of this option. The research showed how scenario analysis can be used as a strategic tool that helps enterprises weigh such investment decisions in terms of WIP goals.

When developing successful research initiatives, access to data and personnel also is an important requirement. "[Partner] companies need to assign people internally who care about the project," Arntzen says. Although the students are not new to the supply chain discipline—on average, a supply chain management student has spent six years working in the industry—and already possess a high level of technical proficiency, sponsor companies need to allocate time and resources to support research teams.

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Several alumni from the MIT-Zaragoza Logistics Program run by the Zaragoza Logistics Center in Spain now work for the health care company Roche and have experience in the collaborative research process from both the student and corporate perspectives. They too emphasize that having the right team at both ends is key. Also, sponsor companies should try to start

MIT GLOBAL SCALE NETWORK RESEARCH OPPORTUNITIES

There are six centers in the Massachusetts Institute of Technology (MIT) Global Supply Chain and Logistics Excellence (SCALE) Network: The MIT Center for Transportation and Logistics in Cambridge, Massachusetts; the Zaragoza Logistics Center in Spain; the Center for Latin American Logistics Innovation in Colombia; the Malaysia Institute for Supply Chain Innovation; the Ningbo Supply Chain Innovation Institute China; and the Luxembourg Centre for Logistics and Supply Chain Management.

These centers offer supply chain master's programs that require graduate students to complete a research project. In most cases, these projects are carried out in collaboration with a corporate sponsor. MIT's new three-continent master's program also requires graduates to complete a capstone research project.

projects without an answer to the problem in mind. Instead, they should trust the creativity and research of the students in order to take advantage of the opportunity to co-create solutions.

Germany-based chemical company BASF also has been collaborating with the MIT Global SCALE network since 2011. During that time, the partnership has emphasized regular calls that involve students, project supervisors, and members of the team from BASF. In addition to having the right people on board, coming to the table with a clear understanding of the desired outcome is something the BASF participants have witnessed.

"Collect the data before starting the project interaction with the student; otherwise, the timeline cannot be kept," advises Inga-Lena Darkow, PhD, senior manager of the advanced business analytics program at BASF China. She adds that it's important to remember that the project advisor, usually a faculty member who is an industry expert, is an essential resource. "In many cases, the academic supervisor has to coach and support the student as well," she says.

The outcome of well-managed projects can be high-level in nature. Health care company Johnson & Johnson has sponsored several research projects. The organization tries to give graduate students "big strategic questions we are too afraid to ask ourselves," explains Carl Flatley, supply chain program director, medical devices, at Johnson & Johnson. "When conventional thinking says it can't be done, we know we are on the verge of a great research question for the next incoming class of students."

By comparison, benchmarking exercises that compare the performance of supply chains and very general projects with a global reach tend not to be a good fit for student research, Arntzen adds. Global benchmarking projects often are initiated by corporate headquarters, but companies usually experience more success when research topics are driven by business units or divisions.

Mutual gains

Clearly, ready access to a research resource is one of the main ways in which companies benefit from sponsoring a master's research project. Less obvious, though, is that the benefits of this type of partnership are distinct from those offered by commercial consultants. "Consultants are able to bring us benchmark data and tell us how we are performing relative to industry peers; implementing a best practice is simply the act of copying what is already being done by somebody else," Flatley explains, adding that the students are not limited by what is typical. "The insights [Johnson & Johnson] gets are truly pioneering. This is the engine of innovation and creativity that helps us define benchmarks of tomorrow."

Roche also is benefiting from this type of refreshingly unconventional research. Company representatives say that the graduate students bring clever questions and an

out-of-the-box mentality to problems that might have been left unanswered for lengthy periods. In addition, the students are close to the latest thinking in supply chain management and offer a strong analytical mindset to problem-solving.

Although the research is carried out in an academic environment, the results can be far-reaching. For example, a project that looked at reducing supply chain complexity yielded findings that became part of a pharmaceutical-industry-wide initiative implemented at more than 100 Roche affiliates.

The research projects also offer recruitment opportunities, which are valuable to both students and companies. Supply chain management professionals develop relationships with their student teams, and it's not uncommon for them to hire these individuals when they graduate. This is a significant benefit at a time when supply chain talent is at a premium.

Sponsored projects also provide valuable opportunities to apply classroom concepts in the commercial world. From a research perspective, students learn how to handle the challenge of obtaining the right data to support a company's project. "Often, you have massive amounts of data, but most of it is the wrong type," Arntzen says. Students must learn how to recognize this shortfall and correct it quickly because they have a relatively short time to complete the work. They also learn how to frame challenging research projects and professionally report their findings, says Satya Narayanan, director of the MIT-Malaysia Supply Chain Management Program at the Malaysia Institute for Supply Chain Innovation.

The students gain important professional skills as well. The research projects teach participants to work effectively in a team, manage a project, and interact with industry, Narayanan points out. Exposure to the commercial realities of conducting and applying research is invaluable, Arntzen adds. For example, even the most elegant technical solution to a problem still must be sold to the company's hierarchy and departments outside the supply chain domain that might have very different agendas. These real-world opportunities help students learn such important lessons early on in their careers.

Fostering innovation

Engaging with graduate students on research projects enriches these academic programs and delivers real commercial gains for companies. Flatley's summary of the benefits that Johnson & Johnson has captured could be applied to any company: "Problem-solving and innovation are important enablers in building competitive advantage into our health care supply chains," he says. The graduate students his company works with help drive innovation. They bring a unique perspective when addressing, as he puts it, "those questions to which the answer is perhaps unknown or the solution doesn't yet exist."

By offering fresh perspectives, experience with the most innovative schools of supply chain thought, and dedication to solid research, master's students can provide their corporate partners with ground-breaking solutions to present and up-and-coming industry challenges.

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