GLOBAL SUPPLY CHAIN MANAGEMENT INITIATIVE

KRANNERT’S SUPPLY CHAIN CENTER
Thank you for being part of GSCMI – the Global Supply Chain Management Initiative housed at the Krannert School of Management at Purdue University. GSCMI focuses on the global supply chain of suppliers, service providers and assemblers that are the heart of the modern global marketplace. This initiative started back in 2005 and takes a multi-functional view of the GSCM challenge. We are pleased to report an exciting year of activities involving students, faculty staff and industry partners. You will see photographs and details from our Spring conference focused on “Supply Chain Risk and Business Continuity Planning” held on February 23 (details at https://krannert.purdue.edu/centers/gscmi/events/2018-spring-conference/). You will also read about and see the photographs that communicate the enthusiasm of student teams from universities across the globe participating in the case competition. Faculty have been involved in sponsored projects and grant related research working with student teams. A grant from the European Union enabled a team of faculty (Professors Berenguer, Senicheva and Iyer) to work with students on a global supply chain project along with Procter and Gamble. The project was an opportunity to use live data and discussions with managers to generate useable results – you will hear more details as the project concludes and reports are released. Another project, working with INDOT – Indiana Department of Transportation, focused on the impact of autonomous commercial vehicles and related technologies and their economic impact across the supply chain. This project offers students an opportunity to focus on the future of transportation – both how it might unfold and how it might impact stakeholders. INDOT senior management, with Pam Fisher as the lead, have been a great partner in the execution of this project.

We invite you to peruse this Annual report to get more detail, engage in a photo-journey with us, and join us in thanking the many industry and government representatives, students, staff and faculty who helped us generate the vitality needed to keep the center growing. As you learn about the current activities at the center, we invite you to share ideas, comments and opportunities with us. All it takes is a phone call to Steve Dunlop or an email to gscmi@purdue.edu to start the collaboration. We will work with you to create solutions for your question using our team of graduate students and faculty. The upside for all is that great ideas are the core to student learning, business competitiveness and faculty research. We understand that problems and their solutions do not fall into neat functional area boundaries, so our Krannert faculty engagement across disciplines will ensure that we address problems with the breadth that is appropriate. We look forward to another year of successful collaboration. Thank you to all for your contributions to the center.

A Message From Center Director

Ananth V Iyer
Director DCMME and GSCMI
Susan Bulkeley Butler Chair in Operations Management
Professor of Management
Krannert School of Management
Purdue University
A CENTER WITH COLLABORATION IN MIND

Technology doesn’t stop progressing, and it is the responsibility of every individual to stay up with the newest technological breakthroughs. On a campus dedicated to research and learning, it is only applicable that an initiative dedicated to the management and advancement of manufacturing create an opportunity for those who wish to see the newest technologies first-hand. The Engagement Center is a place where students, professors, and even the general public can learn and experience the some of the newest technologies as well as understand their applicability and usage in a manufacturing setting. The Engagement Center contains a number of different technologies. Starting from the right side of the room as you walk in, there is a computer which runs a live stream of the six cameras placed throughout the room. The cameras record a live stream, and with a simple code, the computer that live streams the camera feed can run a video analytics tool which counts the number of individuals that enter the center. Moving along the right-side wall and wrapping around to the right corner of the room, a visitor can see six 3D printers. Five of the 3D printers are used in conjunction with the industrial design department, and the last printer is the GSCMI’s own. The 3D printers are used to print out a number of different objects including holders for some of the other technologies in the center, center logos, Purdue logos, and a number of other different objects. With 1000s of different free designs online, almost any object can be 3D printed. For the more artistically inclined, custom designs can be made using the software that accompanies the

TAKE A VIRTUAL TOUR OF THE SMART LEAN ENGAGEMENT CENTER AT GSCMI.ORG

During the academic year, the Engagement Center has regular operating hours of 8AM-5PM, M-F located in STEW 162.
3D printers. Next to the 3D printers is the Light Guide System (LGS). LGS is a powerful industrial training tool that incorporates a touch screen, touch pad, and virtual display that can allow users to virtually assemble, repair, or more generally, virtually complete a task. Users can also code their own training programs in the LGS as well as scan using the virtual display to create interactive, realistic training programs. Next to the Light Guide System is the barcode scanning technology. The barcode reader is an electronic device that can read and output printed barcodes to a computer. Scanning technology is familiar to most as a simple and quick way to transfer information with a simple barcode scan. Moving along the wall of technologies, next up is the Google Glass. Google Glass was the first of its kind with regard to an optical head-mounted display designed in the shape of a pair of eyeglasses. Google Glass was designed to be a hands-free device that has a camera that can take pictures & videos, operate google applications, and operate other free applications built by third-party developers. The next technology shown is the robotic arm which is in the general manufacturing area. The robotic arm can be programmed easily by showing it which movements to make, when to grab an object, and when to place it back down. This programming is a very simple version of machine learning. The far-left wall of the center has two large-screen TVs. The first TV is used to live-stream the Microsoft Hololens. The Hololens is the newest, and arguably the best, mixed augmented reality device. The Hololens can examine a user’s environment and create an augmented reality setting that can be manipulated. The Hololens can create augmented reality training sessions which allow a user to complete a task virtually and then physically. An application that can be used with the Hololens is the Scope AR application where a user can complete a circuit box in augmented reality and then physically. Finally, the other large screen TV is used to demonstrate how drones are used in industry and for personal use. Drones have been gaining traction for uses such as inventory control and even product delivery. The center has three drones – two mini drones and one larger drone that can record drone view.

Matt Foust, MBA 2018

When you work at GSCMI, you work in multi-functional, diverse teams much like in a full-time job, and these experiences are invaluable for future professional endeavors.

One aspect of working in GSCMI is that it allows students to lead teams and work on real-world issues which is a great way to prepare for successful future leadership roles.

While working at GSCMI, students work with professors, industry professionals, and fellow students which allows these students to develop exceptional communication and networking skills.
Q: From an IE student’s perspective, please describe the importance for your career goals in joining up with the management department to work on projects? Why not just work with IE on projects?

SJ: Industrial Engineering at its core deals with optimizing processes to improve utilization of the 3 M’s in any industry – Manpower, Material and Money. Positive results can be seen only when solutions are developed, tested and implemented. IE offers me an opportunity to learn the ‘Development’ part of the process and the Management department plays a key role in teaching the ‘Implementation’ part. In order to grow and sustain in today’s world, I feel one needs both these skillsets, and this is the reason why I joined GSCMI in the first place. GSCMI is one such unique place where I get to apply whatever I have learned with my IE background in a real time scenario and make an impact in some of the worlds leading companies.

Q: What value have you gained so far working with GSCMI on projects?

SJ: I’d like to stress on two things that I have learned from working with GSCMI on projects. First – the difference in working for a course project and working with a company project. Before joining Purdue for my Masters, I had just one internship and did not have much experience of working with a company. I had often heard people telling me that working on a company project is far more different and rather difficult than working on a course project. With GSCMI, I got an opportunity to work directly with professionals from the industry that had immense knowledge and experience in dealing with company issues. When you work on a course project, you never think of the problems that one might face while implementing the solution, or you have all the data available before you even start the analysis. But, when working with a company, at every step you need to think about feasibility of implementing the solution. You need to gather data from several different sources and then try to understand it on your own. You need to understand what the company’s real objective is and then try to explain the solution in their own terms. You are questioned at each and every step of your analysis by the company’s leadership and stakeholders because the company’s future is at stake. GSCMI gave me an opportunity to experience all this which I don’t think can be learned anywhere else. Second – working in a team and people management. At GSCMI, everyone works in teams. We have people from diverse backgrounds like Ops, Supply Chain, IE, Business Analytics, and Finance. We all delegate tasks among ourselves, handle problems together, brainstorm ideas in case of road blocks, and deal with clients together. There are so many new things I get to learn from my team mates- their way of thinking, approaching a problem, handling clients- which no course can teach you. Since we have such a diverse group of students, everyone has their own approach towards solving problems which indirectly makes DR. PAT BRUNES, IE, TVS PROGRAM LEADER

“The IE and Krannert collaboration with TVS Motors has been a very fruitful endeavor for our students, faculty, and TVS. The collaboration between IE and Krannert is important to ensure that TVS managers develop a holistic toolkit in operations research utilized at multiple organizational levels in a sustainable manner, much like their exceptional quality management system.”
the entire process much more creative, innovative and interesting. I remember while working on a project with Cummins, even though our main goal was to develop quantitative models, we had a hard time understanding the data that was provided to us. Luckily, one of our teammates had some experience in manufacturing. He made sure that we all understood the technical terms in the data, and then using his technical acumen and our analytical skills, we developed the final model which Cummins was very happy with. This is what GSCMI has to offer – diverse minds working toward a goal.

Q: What is your background and how did you get to where you are?
SJ: I come from India. I was born and raised in the beautiful city of Pune – also referred to as the ‘Oxford of the East’ due to the large number of educational institutes it has. I completed my undergraduate in Mechanical Engineering from the University of Pune. After my graduation in 2015, I took a gap of one year to pursue my interest in music after which I came to Purdue for my Masters. I am a percussionist. I learnt Tabla – an Indian percussion instrument for five years in school after which I shifted to playing drums. Back in India, I play for two bands – New Breed (pop rock genre) and Cat Kamikaze (post rock genre). Cat Kamikaze released its debut album – ‘Raining Cats’ in 2015. I joined Purdue in Fall 2016 in the MSIE program and started working with DCMME in Spring 2017. Even at Purdue, I play for a rock band ‘Vertigo 42’. It’s a good stress buster and keeps my creative instincts alive.

Q: What is your career goal?
SJ: Well, currently I am focused on gaining as much experience as possible in the domains of supply chain and operations. Quiet frankly, I haven’t thought much further about where I would see myself. I am more of a ‘go with the flow’ person and take life as it comes.
STUDENT SCHOLARSHIPS

STUDENT SCHOLARSHIP RECIPIENTS: Christine Rasquinha, Marquette Minner, Jessica Miller, Richard Luan-Jimenez, Darren Young, Margaret Rochford, Hannah Gates, Alexandra Rocholl-Werner, Blake Mawhorter Shekhar Jha, Deepali Jain.


Through the generous sponsored scholarships provided by our industry partners, students who express sincere interest in supply chain management and manufacturing management can benefit from Krannert’s highly regarded undergraduate and MBA programs.

STUDENT INVOLVEMENT
A special thank you to all who contribute to scholarship funding for our students.
The TVS India Internship organized by the GSCMI Center in conjunction with the TVS Motor Company was developed in 2006. Providing a unique study abroad internship opportunity in Bangalore, India, this trip assists students in developing a global business perspective while enhancing their resume profiles.

TVS is a Deming Prize winning two-wheeler manufacturing company producing motorcycles, scooters, and mopeds. TVS has been credited with many innovations in the Indian automobile industry, notable among them being the introduction of India’s first two seater moped. Krannert alumnus Venu Srinivasan (MSM ‘77) is the chairman and managing director of TVS Motor Company.

Participants have a distinctive occasion to take concepts learned in the classroom and apply them to real life business situations.
TVS provided me the opportunity to absorb textbook knowledge through application.”

TVS Intern
MSGSCM

TVS interns Man Lu and Jiani He standing in front of the Taj Mahal
AN INCREDIBLE EXPERIENCE TO WORK WITH ONE OF INDIA’S LEADING MANUFACTURERS

NICK MOLTER
TVS Intern MSBAIM

Nick Molter visiting the Taj Mahal.
STUDENTS: Jiani He (IE), Mauricio Iriondo (IE)  
PROJECT OBJECTIVE: Reduce NVA in Plant #1 stores through location study of parts and location

STUDENTS: Man Lu (MSSCM), Anuj Mehta (IE)  
PROJECT OBJECTIVE: Simulation to decongest traffic of trucks in Hosur location (includes inbound, outbound logistics of both 2W and 3W)

STUDENTS: Nick Molter (MSBAIM), Ji Jiang (MBA)  
PROJECT OBJECTIVE: Development of implementation road map of AR/VR and MR for entire plant operations, includes detailed study of pilot area and scale up plan

STUDENTS: Xiaoli Gao (MSHRM), K. Dahliwal (MBA)  
PROJECT OBJECTIVE: Consumers are the center-stage of great marketing companies. In order to influence consumers we must understand their needs, expectations, and buying behavior. The goal is to see if there are any rules that the company can decode and classify in order to help segment the market for better targeting of their brands.

STUDENTS: P. Perumareddy (IE)  
PROJECT OBJECTIVE: Improving utilization of TVSM vehicle handling system

“TVS program enriches students’ overall academic experience at Purdue by exposing them to various functions on TVS’s value chain, including Product Design, Human Resources and Leadership Development, Operations, Logistics and Supply Chain Management, and Customer Relations and Marketing Management, under guidance of highly qualified mentors in a global learning environment. Students, working in small teams, get to apply what they learn in the classroom to practical problems with real-time feedback from clients. It also enriches students’ cultural experiences. Students live a vastly different way of life for three weeks – life full of both joys and challenges. Students develop life-long friendships with each other and with hosts in India. Overall, a time- and cost-efficient, high-value, life-changing experience in a global environment.”
Do more than you can.”

Originally from the closed town of Sarov, Russia, Dr. Olga Senicheva started teaching at Purdue in August 2016. Describing her time here so far, Olga reflects on her most satisfying moments as an instructor, “moments when you can sense that you have a connection with the students- to be able to sense that they get it.” As an instructor it’s important to know that you are reaching your students, engaging with them, and helping them reach their goals. “You never know what to expect from students.” She describes watching them learn, sometimes fail, but giving them the opportunity to work through things as one of the most satisfying things about working with students. Part of that learning comes through real-world out of the classroom experiences which are vital in preparing students for full time work. Olga, who currently assists with center projects, sees the invaluable experience offered to the students through GSCMI projects and events. The center offers professional industry interaction, deadlines, and results from teamwork. Collaboration is key, and Olga mentions the unique opportunity that GSCMI projects offer through interaction with other faculty members and students on a regular basis. Olga currently assists with the Proctor and Gamble project facilitated by GSCMI. Regarding her research interests, Olga focuses on inventory management which was her PhD focus while studying in Hamburg, Germany. Looking forward, Olga perceives she may pursue further research related to agricultural supply chain development as agriculture is such a vital part of the Midwest. When Professor Senicheva is not teaching or researching, you’ll probably find her in one of three places- with a suitcase or book in hand or on a yoga mat.
OLGA SENICHIVA
Krannert Faculty &
GSCMI Project Lead

BRIDGING INDUSTRY, STUDENTS, & FACULTY.
When Hurricane Katrina hammered the U.S. Gulf Coast in August 2005, it caused massive flooding in New Orleans, displacing more than one million people and forcing most businesses to close. The Folgers coffee plant, then owned by Proctor & Gamble, was the first major industry in New Orleans to reopen after the hurricane, becoming operational within three weeks. A management decision to focus on helping employees enabled the plant to recover quickly. The company offered employees $5,000 interest-free loans and temporary housing near the plant, among other benefits. "They took care of the employees the first thing," said Sergio Barbarino, a research fellow of Procter & Gamble Research and Development, speaking at the annual conference of the Global Supply Chain Management Initiative (GSCMI) in Purdue Memorial Union. "The employees stayed, instead of being relocated somewhere else, because the company completely took care of them."

The Folgers plant also received assistance from suppliers and even competitors. "They went out of their way to help us," Barbarino said. He and other speakers at the recent conference, entitled "Supply Chain Risk – Business Continuity Planning," shared real-world examples of how organizations have responded successfully to natural disasters and other unplanned events, minimizing disruption through risk-management and planning.

"Business continuity planning is probably one of the key components of our business," said Sriman "Srisu" Subrahmanyam, Senior Vice President of Business Transformation for KAR Auction Services. "It's not just a service but it's a product that we offer to our insurance providers and they hold us accountable to deliver on an annual cycle." He recounted how the Carmel, Indiana-based company was able to allocate resources quickly during Hurricane Harvey last August, recovering and selling tens of thousands of damaged vehicles. The company deployed about 900 tow trucks from 35 states to the Houston area within four days.

"You cannot avoid the disruption, but you can plan so that you can react really fast and minimize any kind of cost overruns or resource limitations that you may have – and do it better than anyone else can," Subrahmanyam said.

Maria Crowe, former President of Manufacturing Operations at Eli Lilly, recalled how another 2017 hurricane, Hurricane Maria, disrupted operations at the Indianapolis-based pharmaceutical company's insulin plant in Puerto Rico. "The group there was very well-prepared," Crowe said. "Their reaction to the hurricane was very fast. We had the plant up and running within two weeks after the storm." The hurricane caused a power blackout that turned the island into a cash economy, as credit card networks were cut off. Fortunately, the Lilly plant had an on-site credit union with a well-stocked ATM that worked on a back-up generator, an enormous benefit to employees. "There is nothing more critical in any of our businesses than the people," said Crowe, who spent 35 years at Lilly. "I don't care what facility you have, how much money you have, what products you have, if you don't have people who are capable and can get to work safely and go home safely, you really don't have anything at the end of the day. The safety of the employees in Puerto Rico was our No. 1 concern." Professor Ananth Iyer, GSCMI Center Director, shared examples of how the United States Coast Guard and other organizations responded effectively to unexpected events. The Coast Guard rescued 33,500 people following Hurricane Katrina, deploying 26 cutters, 38 helicopters, 27 aircraft and 119 boats. More than 5,600 Coast Guard men and women participated in the rescue effort. Well-prepared for the disaster, the Coast Guard was able to move its assets out of the hurricane's path and then move them back for the rescue effort. The organization also reprioritized its tasks nationwide to respond to the disaster. The Coast Guard's flexibility and agility helped keep its costs under $20 million. "Because they just reshuffled the tasks they did, at the backend it did not increase costs that much," Iyer said. Gary Henriott, chairman of the Henriott Group, a Lafayette-based company that provides insurance, risk management and consulting services, outlined the steps companies can take to evaluate and manage risk in their supply chains. While risk management takes time and money, the
benefits are considerable, he said. Among them: keeping a business running and maintaining product quality. "To me, the most important thing is the reputational impact," Henriott said. "We all have reputations as corporations. That's why we're working together. That's why I'm a part of your supply chain and someone else is a part of mine."

The challenge for a lot of companies is finding the money to anticipate risk and "get ahead of it," said Tom Sanger, Director of Intel Corporation's Supply Chain Transformation. What worked at Intel was producing a 10-year growth plan that showed where the company was headed and the risks it faced. "Being able to get the risks tied to the actual business growth plan was key," Sanger said. Cindy Farrer, Vice President - Global Supply Management at Allegion, and Timothy McDonnell, Director of Global Supply Strategy and Risk Management at Allegion, described how the company addresses risk in its supply chain. Allegion, which provides security products and solutions, evaluates supplier risk through two scorecards: a performance scorecard and a risk scorecard. The scorecards serve as tools for commodity managers as they strive to improve supplier performance. "They can have a good conversation about risk and what it means to our company," McDonnell said.

MARCIA CROWE, Former president of manufacturing operations, Eli Lilly

2018 GSCMI SPEAKERS:

SERGIO BARBARINO
Research fellow of Procter & Gamble Research and Development

ANANTH IYER
Senior Associate Dean
Susan Bulkeley Butler Chair in Operations Management, Purdue University

TOM SANGER
Director of Supply Chain Transformation
Intel Corporation

SRIRAM (SRI SU) SUBRAHMANYAM
Senior vice president of business transformation for KAR Auction Services

MARIA CROWE
Former president of manufacturing operations
Eli Lilly

GARY HENRIOTT
Chairman - Henriott Group, Inc.

TIMOTHY MCDONNELL
Director - Global Supply Strategy and Risk Management
Allegion, PLC

CINDY FARRER
Vice President – Global Supply Management
Allegion, PLC
The GSCMI Center at Krannert School of Management, Purdue University hosts the annual Intercollege Graduate Case Competition. The competition consists of two phases: Phase 1 serves as a virtual qualifying round, and Phase 2 (involving the top 6 qualifying schools from Phase 1) occurs in conjunction with the GSCMI Spring Conference at Purdue University. These 6 teams will had the opportunity to showcase their skills and knowledge to conference industry judges.

CONGRATULATIONS PHASE 1 QUALIFIERS:

University of Arizona
MIT Sloan School of Management
University of Southern California
IIM Raipur
University of Michigan
University of Maryland
Purdue University

CONGRATULATIONS FINAL ROUND WINNERS:

1st: University of Southern California, Marshall School of Business
2nd: University of Maryland, Robert H Smith School of Business
3rd: University of Michigan-Tauber Student Group
The center has a vast variety of manufacturing and supply chain related projects provided by companies for work to be done by our students and faculty.

### PROCTOR & GAMBLE PROJECT OVERVIEW

The European Union grant offered faculty, students and staff a great opportunity to work with Procter and Gamble on projects that included business continuity planning with suppliers, manufacturing synchronization and container visibility optimization. Each of these projects was driven by detailed data and contracts and focused on generating quantitative estimates of the impact of optimizing the system and maximizing impact to the supply chain.

The Business Continuity project was led by Professor Gemma Berenguer. The simulation models for production were led by Professor Olga Senicheva. The manufacturing synchronization and container visibility projects were led by Professor Ananth Iyer. The goal of the synchronization effort was to produce all required orders on a weekly basis i.e., get to a goal of 100% weekly synchronization. But there were some key issues to consider, from differences in packaging, to differences in formulation to line production constraints to forecast variability. In addition, there were setup times that had to be kept track of as production shifted across products. With intense collaboration with P&G managers, and data at a highly granular level, the team produced a mathematical model to optimize the system that permitted both 100% weekly synchronization as well as a close to 5% projected reduction in capacity required. The project provided a great learning experience and will appear in various forms, from class exercises to cases to academic papers in future years.

The container visibility project involved a visiting faculty member from Turkey, Professor Cagri Haksoz, and Ananth Iyer. They applied ideas from their past methodological papers to the estimation of the optimal way to use container visibility to improve the supply chain. Their results suggest that waiting to gather data so that it helps in the choice of contingent actions may be preferred to acting too early. Similarly, the decision of when to get this information may depend on how significant the cost of delay is to the system and how expensive the cost of taking corrective steps to remain on schedule. The container visibility project’s results are expected to be used to understand the economics of different tracking schemes for global container flows.
## OUR PROJECTS

### PROCTOR & GAMBLE BOTTLENECKS

P&G was struggling to synchronize its detergent pods production to meet its current demand. They planned to either make capital investments for expanding their production capacity or optimize their existing production. The latter has been explored as a project by P&G with DCMME to make a small yet effective investment towards this synchronization problem. Initially, the team had first identified bottlenecks in the production process and explored the WIP inventory implications as an effect of shifting the bottleneck to achieve continuous production. This provided uniform running of the production with the least number of changeovers. Later, a linear programming optimization model was created to generate weekly production schedules such that, inclusive of all the changeover times, the total duration of production was minimized. The model created is being cross validated with different line loading scenarios to come to the most optimal solution to this production issue.

### PROCTOR & GAMBLE SYNCHRONIZATION

The P&G Project with Professor Senichiva and Dr. Iyer was initiated to find efficiency gains in the production processes of washing pods manufactured by P&G. The project was divided into four phases: Data clean-up, data analysis, applying agile methodologies, and JaamSim (a simulation software). Data clean-up involved different types of data in various formats that was collected from P&G. Macros were then developed to extract relevant data in specific formats to be analyzed. Next data analysis involved production logs being analyzed to find any trends or gaps in the production processes by checking production units, production time, and capacity utilization. Agile methodologies were then utilized to see if any changes in production processes could provide any efficiency gains. Finally, JaamSim (a simulation software) was utilized throughout the project to visualize the production processes and find any improvements that could be made in the future.
**CENTER’S INTERNATIONAL PRESENCE**

Bridging industry, students, and faculty around the globe through projects, conferences, and education.

- Company student projects
- International internships
- Graduate student assistants
- Scholarships
- Conferences
- Training courses

**WHIN SUPPLY CHAIN PROJECT**

The WHIN Supply Chain Leakage project is looking for a solution to identify the leakage in the supply chain in the 10-county region for manufacturing companies. The team is collecting information about the parameters that can help identify a supplier or vendor. The three key points that need to be understood are what certifications a company has, whether the company is a retailer/manufacturer/distributor, and finally the equipment that the company possesses. As of now, the focus is on getting data for the 80 companies through web scraping, and then the process will be replicated for all remaining websites. All of the data will be put into a searchable database.

**WHIN EDUCATION PROJECT**

WHIN Education has built a network of company representatives interested in providing research to develop a global epicenter for agriculture and next-generation manufacturing empowered by smart “Internet of Things” platforms. The team is in the early stages of company interviews and has spread the word through interactive group sessions and a WHIN launch event. In April, WHIN offered a pilot training session, where the team helped to address technology and education issues companies may be facing.
OUR PROJECTS

INDOT SHELTER PROJECT

The INDOT Shelter project involves evaluating INDOT’s expected return on investment to create covered areas for equipment (vehicles and other assets) and identify alternative ways to create covers for equipment and all the associated costs. Currently, we are collecting data on INDOT’s equipment from publicly available records. Using the data, we intend to calculate the payback period of the equipment and compare it to the cost of constructing shelters. Furthermore, the team plans to project the impact of enclosures on equipment maintenance cost and performance, develop management strategies for equipment need and usage across districts and impact, and benchmark districts against each other to understand best practice. Lastly, the team plans to adjust management incentives to solve the agency problem. At the end of the project, the team presented their findings to INDOT and made recommendations based on the analytical and financial analysis done above.

INDOT P3 PROJECT

This project is an after-action review of the overall profitability and success of the collaborative effort of Indiana and Kentucky in developing the Ohio River Bridges Project. Indiana decided to fund its portion of the project by utilizing a Public-Private Partnership, or P3, approach with WVB Partners. There are multiple forms of P3 structures; the Ohio River Bridges Project is Design-Build-Finance-Operate-Maintain (DBFOM) in which the private entity is responsible for the entire construction of the bridge, financing the costs, as well as operating and maintaining the bridge over a specified period of time. The primary benefits of utilizing this option are improved life-cycle costs, improved timeline, and reduction of risk and liability. The team has worked to research and develop a present value analysis of the project by analyzing the funding structure of both INDOT and WVB Partners. They created a toll revenue projection model reflective of current traffic patterns that they also integrated into the overall funding structure. Currently the team is working to create a model to predict the operations and maintenance cost of all bridges involved in the project. Upon completion they will utilize this model in their comparison of the profitability of each party involved in order to quantify the gain or loss seen by INDOT by implementing the P3 structure. This project will move onto analyzing the economic impact and other additional factors affecting the overall evaluation of the bridges’ profitability.

INDOT ECONOMIC DEVELOPMENT PROJECT

In the INDOT Economic Development project, the project work is progressing as per the schedule and the team has completed mapping of I-65 and I-70. The mapping includes gas stations, restaurants, rest areas, emergency shelters, truck parking spaces and motels. Moreover, progress has been made on completing the same for I-64 to I-94. Data comparing Federal vs. State owned roads has been compiled. Data on green space from the state tax department has been acquired which will form the base for filtering out state owned green space. This project is in its early stages, and much more data will be compiled in the future.
Advocate Health Care, a leading healthcare services provider in Illinois, has 10 Medical centers where it wanted to reduce inventory costs and associated expenses in addition to eliminating expired product count in these medical centers. This task was challenging because of the necessity of these products for an individual in a hospital and due to the high costs associated with these medical products. Optimizing the inventory levels for improved efficiency and effective cost management proved to be one of the most important focus points for Advocate. The initial approach was to establish and implement a durable Requisition Infrastructure and improve the receiving processes by adopting Standard Operating Procedures (SOPs) for receiving the inbound freight and standardizing the receipt verification process. As this gave a better understanding of how the flow should be initiated, the team moved over to redesign the layout of the dock to accommodate the recommended changes. They used AutoCAD and SketchUp extensively to render and create 2D and 3D drawings of the layout for 4 critical centers and ran simulations in JaamSim to predict the improved turnover times. The main objective was to implement and improve metrics at the 4 critical centers first and then do a site-by-site analysis to suggest changes depending on the current state of the center. The project team also leveraged a lot of available data to gain insights and make better decisions with respect to the inventory reorder points and quantity. The project team comprised of individuals from Industrial Engineering, Global Supply Chain Management, Data Analytics and Business Management majors.
We are grateful to the many faculty at Krannert who participate in Center sponsored events, projects and research. Thanks to each one for their efforts to progress the scholarly works in Operations and Global Supply Chain Management.

**KRANNERT FACULTY**

ROY VASHER
ROBERT NIDA
ANGUS MCLEOD

**ADVISORY BOARD**

ROY VASHER
ROBERT NIDA
ANGUS MCLEOD
For ten years the GSCMI (Global Supply Chain Management Initiative) Center has been the focal point within the Krannert School of Management for promoting education, research and industrial engagement with those interested in supply chain management. The Center accomplishes this through various conferences, student competitions, and company projects that create venues for collaboration between firms, students and faculty across the state and around the globe. Bridging industry, students and faculty.

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