Editor’s Note
Managing operations is—even under “normal circumstances”—not a job for those who like stability and predictability. Unforeseen and unplanned events happen, and must be factored into plans and schedules. When circumstances are outside the normal realm—as when you are in unfamiliar territory and/or when rare and unpredictable disasters strike—the operations function must react, react quickly, and restore capabilities and capacities as rapidly as possible to ensure that output and deliveries are met. In this issue of OTMatters, we focus on operations under adverse conditions. It is the theme running through the experience-based articles by OTM students Brian Huckins and Eric Baum; it is a component of our interviews with Board member David Caggil and faculty member Zigeng Liu; and it is a feature of the book review by OTM student Adam Plunkett. Hope you enjoy this issue of our newsletter.

Urban Wemmerlöv

Adverse Operations in Iraq
Brian Huckins, OTM 2010

Imagine your organization is in tough times. Your supply chain is stretched, and you are having difficulty coordinating your team. Consequently, you are constantly planning for the worst-case scenario.

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Left: U.S. troops at Iraqi construction site.
I faced that exact situation when I spent two tours in Iraq as a reservist. I am a 1st LT in the 432nd Civil Affairs Battalion of the U.S. Army Reserves. My unit’s mission was to rebuild Iraq’s decimated infrastructure. I like to say that this job is akin to “Peace Corps with guns.”

One project in particular represented my typical experience. In 2005, our unit was tasked with transporting a gas generator from the Iraq-Syria border to a power plant outside of Kirkuk, a trip of about 300 km. This generator weighed over 12 tons, needed an oversized truck, and could only be moved at a maximum speed of 15 mph. Additionally, there was only one road and some of the bridges were damaged or out, which created a bottleneck in the transport.

A significant portion of the project was spent planning because the project had to be coordinated between many groups. In order for the generator to arrive at its destination, our unit had to coordinate with the military command, the military commander of each of the regions the convoy passed through, the Army Corps of Engineers, and the Iraqi civilians who were building the power plant. The decision came down to execute this project 1.5 months before the Go date. At this point, general plans were designed. In the two weeks before the Go date, there was an intensive period of coordination, planning, and scenario building.

Another issue that our unit had to deal with was a stretched supply chain. The generator was built in Germany, shipped by rail to the Mediterranean, transported by ship to Syria where it was again transported by rail to the Iraqi border. Only when it arrived at the border would our unit have any control over the generator. Unfortunately, the arrival date was uncertain and the unit had plans for a range of days to begin the transport.

During the transport itself, the convoy would have to stop multiple times to wait for the road ahead to be repaired. Bridges had to be rebuilt or strengthened near the time of use by the convoy, otherwise they risked being destroyed. In this manner, the bridge repairs of the Army Corps of Engineers had to act in a just-in-time nature. And although this threw off the time-table, the convoy had no choice; there was only one road. Eventually, the generator was delivered. Maybe not on time, but the important thing was that it got there. There was a mindset among the unit that even if we couldn’t get it there by the planned date, you could still accomplish the mission.

My takeaways from this experience, and many similar ones, are several. The first is that planning is absolutely critical. When you are aware you will be operating under adverse conditions, the plan’s importance is magnified. Secondly, you need to stay flexible. Adverse conditions are, by definition, challenging. You need to prepare yourself that everything will not go according to plan. It’s important to be proactive and think through the situations for which you can plan. And although this threw off the time-table, the convoy had no choice; there was only one road. Eventually, the generator was delivered. Maybe not on time, but the important thing was that it got there. There was a mindset among the unit that even if we couldn’t get it there by the planned date, you could still accomplish the mission.

My takeaways from this experience, and many similar ones, are several. The first is that planning is absolutely critical. When you are aware you will be operating under adverse conditions, the plan’s importance is magnified. Secondly, you need to stay flexible. Adverse conditions are, by definition, challenging. You need to prepare yourself that everything will not go according to plan. It’s important to be proactive and think through the situations for which you can plan. But it is also important to be reactive. If assumptions, conditions, or deadlines change, you need to be able to adapt. In a climate where supply chains are getting longer and organizations are getting leaner, it is only a matter of time before your organization is operating under adverse conditions. Make sure you are prepared for those conditions, and are prepared to react to any changes that occur.
I interned as a project engineer at Archer Daniel Midland’s corn processing plant in Cedar Rapids, Iowa, during the summer of 2008. ADM built the plant in the 1970’s, and it grinds over 450,000 bushels of corn per day (a typical semi-truck can hold 1,000 bushels). My role involved planning a large improvement to the elevator and load-out facility.

Cedar Rapids, the second-largest city in Iowa, was in the middle of another hot summer. Storms were common, and we experienced our fair share through the early summer. At first, the rain was well received, as river levels had previously been low. However, we kept getting downpours that would drop inches of rain at a time. At the beginning of June, flooding had been reported to the north, and water levels were rising. On Wednesday, June 11, the river was nearly cresting the bridge on I-380 and many streets were flooded. The plant, safely located out of town, was protected from the rising water levels. On Wednesday evening, the situation got worse; it poured again.

Many employees stayed home Thursday morning because their homes were in danger or they were on the other side of the bridge. The plant used the municipal water system, but since the flood had compromised much of the system, it didn’t seem right to use the water to process corn while people needed fresh water to drink. The plant manager decided to throttle back production. The plant was a 24/7/365 operation, which meant it had not been completely shut down in years. The personnel on my team walked through the procedures to safely bring the processing to a halt. The facility, which usually hummed along at a rapid pace, was eerily silent by 5 p.m. As it turned out, the flood provided an opportunity to perform much-needed maintenance work. At the same time, our co-generation facility kept running in order to supply power to the city because many of the city’s power plants were shut down.

I learned a few things that summer. First, it took the whole summer to get the plant back to full production, which showed me how devastating a disruption can be. Secondly, it showed how dependent/independent we were of the municipal systems. On one hand, we had to stop using the water, but on the other, we were able to keep the power on due to our co-generation plant. Lastly, although this was a 500-year flood, it is always important to have emergency plans in place. Even though this plant was a 24/7/365, we still had plans to successfully bring it off-line.
“Chasing the Rabbit”, by Steven Spear, focuses on “companies and organizations that manage to stay ahead of the pack for years or even decades at a time.” Through case studies of Toyota, the U.S. Naval Nuclear Submarine Program, Alcoa, Pratt & Whitney, and selected healthcare organizations, Spear illuminates the qualities that allow these organizations to excel. The main tenets of Spear’s thesis are that these organizations continually Design, Improve, Share, and Develop.

Designing includes setting up processes and systems in terms of what output is being pursued, who will perform what steps in what sequence, and how exchanges of materials and information will be made available across steps. The key insight is that these steps need to be designed so that the system relays relevant information to the operator. If a process breaks down, the system should be designed to shut down. If the system continues to function, it will affect both the quality and productivity of the system.

Improving incorporates using the system to rapidly identify problems, swarm them with resources, and quickly resolve them. Improving should be run akin to the scientific method. When a problem is identified, a hypothesis should be developed to determine the cause. This hypothesis should be rigorously tested with outcomes looking to match expectations. If outcomes and expectations match, then the solution should be implemented to solve the problem.

Sharing signifies that if a problem is solved one place, it should not have to be solved at another. Information must travel around the organization in a meaningful way. Just as problem solving is contextual, so is sharing. A solution that is broadcast out generally may not have the desired effect. But a solution that is sent out in the context of the problem, symptoms, solutions, and actions will have an easier time being incorporated by those who listen.

Lastly, developing involves training all personnel in this process. When anyone can identify problems, analyze them, and solve them, the organization functions much smoother. This means that not only should one practice developing, improving, and sharing, but those who know should teach others how to do it. Leaders need to instruct subordinates in the methods, and instead of focusing on outcomes, should focus on the process. If the processes are ingrained in the employees’ psyche, the outcomes will assuredly come.

The most interesting chapters of “Chasing the Rabbit” are toward the end. Spear’s latest research has focused on bringing his approach to the U.S. healthcare industry. Operational inefficiencies and defective operations can have astounding impacts on our health and the cost of the healthcare system. The statistics Spear cites are not for the faint of heart. However, there is hope. A few healthcare organizations have begun to embrace these principles. After learning from Spear and his colleagues, one nurse remarked, “I thought I was a problem solver, but I realized I had just been solving the same problem year after year.” Once she learned to identify problems, swarm them, monitor them, and share solutions, her organization has become much more efficient, and most importantly, safer.

The second interesting application of these principles pertains to crisis management. Spear believes that these “high-velocity” organizations handle crises differently than a typical organization. Because they have built up processes to constantly analyze their work, they are more prepared to handle the disruptions that affect modern operations. They don’t view a crisis as a crisis, but rather another problem, albeit larger, that needs to be solved.

An example of this took place at Toyota in 1997. One of its main suppliers, Aisin, had a fire at its plant, which caused a shutdown of production. Analysts predicted this would inhibit Toyota’s production for weeks. However, by the end of the week, Toyota was up and running at 90% capacity. How was the company able to defy industry projections? First off, its employees were trained to recognize problems and respond. Less than one day after the fire, Toyota had rushed 400 engineers to Aisin to begin to redesign its processes. Because Toyota had a close relationship with suppliers, it was able to respond quickly. Secondly, once the firm was able to develop a new process for building valves, it disseminated that information quickly to many small suppliers. Lastly, no one panicked. Although this was a serious shock to their system, the managers at Toyota calmly went about assessing the situation, developing a solution, and getting everyone on board.

“Chasing the Rabbit” builds off Spear’s earlier work, “Decoding the DNA of the Toyota Production System” (Harvard Business Review, Sept/Oct 1999). This time his analysis explores the organizational processes behind high-functioning organizations that allow them to consistently outdistance the competition. The book is a thought-provoking read.
OTMatters: How did you become involved with OTM and become a member of the Advisory Board?
I had met Laurie Benson at several networking events. She is well connected in the local community and was the CEO of Inacomp; a provider of hardware, software, and training services. Laurie suggested that I speak with Andy Jakubzcak (Erdman Center Director) regarding mentorship opportunities. After mentoring and becoming familiar with the OTM curriculum, Urban Wemmerlöv (Executive Director) asked that I join the Advisory Board. It has been most rewarding, professionally. I learn as I mentor.

OTMatters: How have you and Alliant Energy benefited from the relationship with OTM?
We are building a long-term relationship with the hope of providing employment opportunities when the economy recovers. As I continue to define the challenges and opportunities associated with the utility industry, it is my desire that the Erdman Center OTM MBA candidates seriously consider applying their skills, experiences, and academic learning to address significant issues facing our industry.

OTMatters: How does Alliant Energy protect its operations from adverse circumstances?
Alliant Energy invests in business continuity and disaster recovery planning to ensure we respond in a timely manner to many types of outages ranging from weather catastrophes, operational failures, pandemics, and terrorist events. There is significant oversight of the grid by federal and state agencies with considerable penalties for non-compliance.

We trigger formal organizational structures (Emergency Operations Center and Crisis Management Team) in the event of a disaster or a catastrophe to ensure timely restoration efforts. Our plans balance cost and risk. The current plans are well defined at a high level to reduce ongoing costs while more detailed plans react specifically to different types of events by procuring hot sites, supplies, and additional resources.

We also subscribe to weather hedges occasionally and develop extensive demand models to ensure we either generate or procure sufficient energy to meet demand.

OTMatters: How do you use Information Technology to better prepare yourself for adverse circumstances?
Information Technology is extensively involved in detecting adverse circumstances (control systems in generating plants, life-cycle management of critical assets, trading transactions, etc) as well as documenting plans consisting of organizational structures, roles and responsibilities, calling trees, procurement needs, locations, and additional resources.
Professor Zigeng Liu is a new faculty member in the Department of Information and Operations Management. She completed her Ph.D in Industrial Engineering and Management Sciences at Northwestern University. She also has a Master's degree in Physics and Astronomy from Northwestern and a BS in Physics from Peking University. Her research interests include supply chain disruptions.

OTMatters: Physics and Astronomy are quite different from Industrial Engineering and Management Science. How did you migrate from one field to another?
When I was in the Physics department at Northwestern, I met my advisor, Dr. Hopp, during a seminar. Like me, he holds a B.S. in Physics. He told me that I could make a smooth transition from Physics to IE. I do believe he was right, because all training I got from Physics has benefitted my study of IE. I think you need to have a very strong background in math and economics. However, the most important thing is to have been trained to know how to find the right methodology to solve a complex problem.

OTMatters: Can you tell us about your teaching interests?
I have an interest in teaching courses in operations management, operations research, and supply chain management. This year, I am teaching several sections of our required undergraduate course in operations management.

OTMatters: What is the focus of your current research, and can you give us an example of how it can affect an organization?
My current focus is on supply chain disruptions. As globalization extends supply chains while making them more vulnerable to disruptive events, supply chain risk management continues to grow in importance. It is a really hot topic in both academia and industry. Supply interruptions can be the result of large-scale natural disasters, terrorist attacks, plant fires, wide-spread electrical blackouts, financial or political crises, and many other scenarios. An example of a strategic risk event occurred on March 17, 2000, when a ten-minute fire at a Royal Philips Electronics semiconductor plant in Albuquerque, N.M., “touched off a corporate crisis that shifted the balance of power between two of Europe’s biggest electronics companies...” (Wall Street Journal, January 29, 2001). This fire destroyed several thousand chips for mobile phones and contaminated the clean room environment in the semiconductor plant, effectively shutting it down for weeks.

At the time, both Nokia and Ericsson were sourcing microchips from the Philips plant. However, while Nokia was able to quickly shift production to other Philips plants and some Japanese and American suppliers, Ericsson was trapped by its sole source dependence on the Philips plant. Consequently, Ericsson had no rapid response to the disruption, and wound up losing around $400 million in sales by the end of the first disruption-impacted quarter. Six months after the fire, Ericsson's market share of the global handset market had fallen by 3%, its stock price had decreased by 12%, and its mobile phone division reported a $2.34 billion loss for 2000. Ericsson never recovered the ground it lost during this crisis.

On the other hand, by the end of 2001 Nokia and Samsung reported large increases in market share, while Motorola showed a steady gain, in contrast to declines in the three previous years. Apparently, Ericsson’s loss was these other firms’ gain, since some customers shifted their purchases to other brands. Hence, supply chain disruptions can pose opportunities for strategic gain, as well as losses.

OTMatters: What insights from your research can managers hope to use in their everyday operations?
To find innovative and practical solutions to the problem of designing and managing robust supply chains, one needs expertise in supply chain management, stochastic modeling and analysis, game theory, optimization, and social networks. The key challenge is to develop models to aid in understanding and managing risks which go beyond routine variability. My adviser and I have developed a framework for considering tactical and strategic risks, which makes use of basic inventory...
OTMatters: What was your first position upon graduation from the Erdman Center?
I joined JohnsonDiversey as a Strategic Central Planner. My primary responsibilities in that role were to liaise between the business and the plants—providing seven plants with master production schedules, and managing inventory and service levels across 10 distribution centers. I was also responsible for identifying opportunities to optimize operation costs and improve process efficiency for our North American business, which includes the USA and Canada.

OTMatters: What is your current job, including title and responsibilities?
Currently, I am the Director for Global Planning in the Value Chain function in JohnsonDiversey. This is a support role in the organization focused on harmonizing and standardizing planning process across the various regions. I am part of the team that is responsible for envisioning the Planning Strategy, and aligning it with the overall Value Chain & Business strategies along three dimensions—people, processes, and technologies. I also benchmark internally and externally along the three dimensions and develop plans to close the gaps between our current state and the benchmarks. I am responsible for setting targets for the inventory and service level metrics, and assisting/guiding the planners in the regions achieve these targets.

Prior to this position, I worked as a Planning & Logistics Manager at our largest plant. I drove the Lean culture within the organization by promoting Lean philosophy and deploying Lean tools such as Pull for production scheduling, Kanbans for raw and part materials, and visual management systems for production planning. I was also responsible for outsourcing some of our material handling processes to our 3PL Provider.

OTMatters: What major projects have you been working on in your career?
I am currently working on a couple different very interesting projects. JohnsonDiversey will be implementing a process called Integrated Business Management (IBM). This will redefine the way we plan and manage our business. We have piloted this process in the one region, and are now developing a plan to roll it out globally. This initiative requires me to identify business requirements; design effective solutions cross-functionally which can be successfully deployed across a complex supply chain with multiple partners, and successfully drive implementation. Part of implementing this process will include managing the change required in the processes, and attitudes/behaviors of people in the company.

The other project is the implementation of an Advanced Planning System across the various regions. The challenge in this project is to ensure that the planning processes in all regions are relatively the same while catering to and meeting the needs of the different business models in each region. Deploying the right functionalities of the tool considering the varying maturity levels of the planning processes is another interesting challenge.

OTMatters: What future goals do you have?
I would like to gain some experience in managing larger operations with accountabilities for portions of the P&L. I would also like to broaden my understanding of planning in various industries. I would also like to partner and engage with academic institutions as a visiting lecturer or serve on the board of programs like OTM. I have had opportunities to serve as a mentor, and enjoy it as well.

OTMatters: How do you think the MTM program helped you in your career? Any particular class, project, internship?
The MTM program provided me the opportunity to develop very deep understanding of process improvement methods and techniques available. Moreover, it taught me how to adapt and apply the concepts to business scenarios. At the same time, the curriculum allowed me to get exposed to a variety of other areas in a business giving me a holistic view of the business. The seminar course on Cellular Manufacturing tied all aspects of implementing and managing change in an operations
models to help calculate short-term costs, and relies on a game theoretic model to analyze long-term market share impacts.

Since collecting data is time-consuming and expensive, it is not practical for firms to carefully estimate all of the parameters used in our framework. From a managerial perspective, we are interested in identifying the most important factors that affect the firm’s risk exposure from a given component, so that management can target their preparedness efforts on the products where they will have the greatest impact. Since it is not reasonable to expect a firm with thousands of components to estimate all of the model parameters for every part in their portfolio (e.g., because some of these, such as customer loyalty coefficients may require significant analysis), our numerical results suggest that a simpler model consisting of only a few important factors can reliably identify the high-risk components. We further have shown that the single most important factor can make reasonable predications of which components in the firm’s catalog pose the highest risks. The data collection overhead of this single factor is similar to that for a single factor method currently being used in industry, although it can predict risks much more accurately.

OTMatters: How do you like living in Madison so far and being a part of the University of Wisconsin community?
So far, so good. Madison is a beautiful city and everybody in our department is really nice.

environment. Through that course, and some work I did as a graduate assistant (for the same course as well), I have developed the analytic horsepower to analyze a project/process from multiple angles, and arrive at an optimal solution. I say optimal because there is always room for improvement! I drew upon a lot of materials from my courses on Lean, Quick Response Manufacturing, Cellular Manufacturing, Change Management, and Quality Improvement as I implemented the process change.

OTMatters: Knowing what you know now, what advice do you have for the students in the program?
Use this opportunity to learn as many areas as you can—you will rarely get an environment and opportunity in the future like the ones the MTM/OTM program provides. Businesses are beginning to focus more on process effectiveness to deliver strategy. Organizations are even structuring themselves to facilitate processes. So, definitely include a course (or more) that are targeted to improving processes. Finally, develop a good network among colleagues in the OTM program and other programs in the business school. The education and network is something you take with you. I wish you all the best!
On September 18, the Erdman Center traveled to Harley-Davidson. The visit included a tour of the Pilgrim Road manufacturing facility, a tour of a Milwaukee Harley-Davidson dealership, and presentations by Rod Copes (SVP International Sales, Marketing and Business Development—and an Erdman Center Board member), Jim Haney (VP and CIO), and Pat Koppa (Director, Genuine Motor Accessories—and an Erdman Center alumnus) at the Harley-Davidson Museum in downtown Milwaukee. The idea behind the trip, masterfully arranged by Pat Koppa, was to experience different areas of the company’s operations and how they interacted. At the Pilgrim Road facility we experienced lots of material learned in class. For example, Harley-Davidson is employing cellular manufacturing, real-time feedback on process bottlenecks, and limited inventory through Just-in-Time/Lean manufacturing. The discussion with Rod Copes focused on Harley-Davidson’s expansion into India, the challenges the company faces and its strategy for moving forward. Jim Haney talked about the challenges facing H-D’s IT department, especially with respect to cyber security, consolidating infrastructure, and using real-time information to make production decisions. Lastly, Pat Koppa briefed us on Harley’s retail partnerships. One interesting tidbit was that Harley has worked with Garmin to develop a GPS specifically for motorcycles. It was interesting to learn from all the speakers how powerful the Harley-Davidson brand is and the passion it inspires in its employees and customers.

Afterwards we tailgated at Miller Park and attended a Brewers-Astros game. OTMatters is happy to report that the Brewers won 3-2.
Second-year MBA Students – Class of 2010

**Joel Anacker**
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Internship: Anacker Consulting LLC, Madison WI

**Aniruddha Das**
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IT Project Manager for GE Healthcare
Bachelor of Engineering (Electronics)
Nagpur University, Maharashtra, India
Internship: W.W.Grainger, Lake Forest, IL

**Brandon McGirr**
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Software Developer
Bachelor of Science, Computer Science
University of Notre Dame, Notre Dame, IN
Internship: Los Alamos National Laboratory, Los Alamos, NM

**Ankit Puri**
Ericsson, New Delhi
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Internship: TDS Telecom, Madison, WI

**Sreejith Satheez**
Tata Consultancy Services Ltd, Mumbai India
IT Analyst, Bachelor of Technology, Information Technology
Cochin University of Science and Technology, Cochin, India
Internship: Celerant Consulting (client site in Memphis, TN)
First-year MBA Students – Class of 2011

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The newsletter is produced by the MBA students in the Operations and Technology Management Program under the supervision of Center Executive Director Urban Wemmerlöv. The objective is to inform professionals, faculty, and students of the Erdman Center of activities and events in the field of operations and technology management.

Reporters: Adam Plunkett and Urban Wemmerlöv
Special Thanks to Eric Baum and Brian Huckins

Erdman Center for Operations and Technology Management

Executive Director ............................................... Professor Urban Wemmerlöv
Director ............................................................... Andrew Jakubczak
Center Assistant ..................................................... Kathy McCord

Operations and Technology Management (OTM) is a cross-functional area of study that is concerned with the development, implementation, and improvement of processes, technologies, and management systems for the purpose of designing, making, and delivering goods and services in an efficient and effective manner that brings value to the customer. This MBA program leverages the students’ technical backgrounds in generating new skills in business process improvements, IT implementation, the strategic use of technology, economic analysis, and management of change.

OTM graduates’ career goals include leadership positions in operations, supply chain, information technology management, business development, and consulting. They have been placed in a variety of large and small organizations, including Abbott Labs, Accenture, Capital One, Celerant, Cisco, DaimlerChrysler, Deere & Co, Deloitte Consulting, Delphi, Eaton, EPIC Systems, General Motors, Goodyear, Grainger, Guidant, Harley-Davidson, HP, i2, Intel, Johnson Controls, Johnson Diversey, Kimberly-Clark, Novartis, Philips Broadband Networks, Promega, Samsung, Schlumberger, Sonoco, Sorrento Lactalis, Spectrum, TRW, ZS Associates, and others.

The OTM program is administered by the Erdman Center and guided by an Academic Advisory Board comprising faculty from the Wisconsin School of Business and the College of Engineering. Also linked to the program is an Executive Advisory Board with members drawn from 15+ organizations.

For more information on the OTM program at the Wisconsin School of Business at the University of Wisconsin-Madison, please go to bus.wisc.edu/erdman.