

IPRO
306

FINAL REPORT

IMPROVING GLOBAL SUPPLY CHAIN MANAGEMENT

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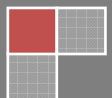


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Description of the IPRO Program

The Interprofessional Projects (IPRO®) Program at Illinois Institute of Technology

An emphasis on multidisciplinary education and cross-functional teams has become pervasive in education and the workplace. IIT offers an innovative and comprehensive approach to providing students with a real-world project-based experience—the integration of interprofessional perspectives in a student team environment. Developed at IIT in 1995, the IPRO Program consists of student teams from the sophomore through graduate levels, representing the breadth of the university's disciplines and professional programs. Projects crystallize over a one- or multi-semester period through collaborations with sponsoring corporations, nonprofit groups, government agencies, and entrepreneurs. IPRO team projects reflect a panorama of workplace challenges, encompassing research, design and process improvement, service learning, the international realm, and entrepreneurship. (Refer to <http://ipro.iit.edu> for information.)

The *IPRO 306: Technology and Business Innovations to Improve Operations* team project represents one of more than 30 IPRO team projects for the Spring 2011 semester.

Acknowledgements

The IPRO 306 project team would like to acknowledge the tremendous support and enthusiasm displayed by the Sloan Valve team. Without their help, we would not have been successful in our objectives, nor would we have been able to experience such a tremendous learning experience.

Sloan Valve Team

Franklin Echevarria

Steve Bankemper

Steven Rodgers

Brian Capo

Michael Skrypek

Greg Spoor

Steve Mader

Jim Gabelhausen

Monique Divarco

I. Executive Summary

The IPRO 306 team was tasked with assisting a major plumbing manufacturer, Sloan Valve, in optimizing the global supply chain. Due to the scope of the project and the desire of the team to produce the greatest impact on Sloan Valve, IPRO 306 was involved with 3 projects during the fall of 2010.

Sloan Valve is a 104 year old privately held manufacturer and global distributor of commercial valves and plumbing fixtures. The company was built on the invention of the Flushometer, a type of high efficiency, low maintenance valve that was a far departure from the valves that flooded the marketplace. However, through the perseverance of the inventor and founder, William E. Sloan, the flushometer eventually became the standard in commercial construction. Over the years, Sloan has kept the innovative and determined spirit of its founder and has realized continuous growth through strategic acquisition and new product development.

Currently, the Sloan Valve network contains 8 different facilities: 4 manufacturing, 3 in the US and 1 in China, 1 foundry that supplies all of the castings for manufacturing, and 3 distribution centers (DC). The Franklin Park location serves as the corporate headquarters, as well as, a primary manufacturer and replenisher of the distribution centers. Sloan currently employs over 500 people and as a privately held company keeps its financials confidential.

The Green Team initially started off with the limited scope of finalizing the green survey and deploying the survey to the various suppliers. Eventually it was decided by the Sloan stakeholders to extend the scope of our project to include the start of a Supplier Certification Program. Using the various metrics Sloan keeps track of in its Enterprise Resource Planner software, SAP, our team was able to develop a system that automatically scores a supplier based on the data available for them in the software. This is the first step in a Supplier Certification Program as an efficient and reliable way to score suppliers is essential to certifying them.

The second project worked with Sloan Valve on their Overall Equipment Effectiveness (OEE) program. The team's focus was determining what Sloan Valve in

terms of their OEE program. Their current program was explored and analyzed. The team then went on to develop a new method for collecting data that is necessary to calculate the OEE of the machinery used by Sloan Valve. The team developed a new methodology on how the data should be collected that will be beneficial for Sloan Valve in determining the OEE of the equipment used at Sloan. This process was build upon previous semesters work.

The Cost Decision Matrix project is to develop a tool that compares the various cost elements that Sloan incurs while procuring products Overseas as well as Domestic. As it happens often in procurement practices that the least is not always the best, this tool will help Sloan decide which the most cost effective vendor is. This will become basis for short listing various suppliers before making a thorough analysis.

II. Purpose and Objectives

Team Purpose

Green Team

- To finalize and implement Green Survey and Metrics from previous semester.
- To create an automatic system to rate Sloan's suppliers against a set criteria.
- To reduce time lost due to inspection of parts received from supplier.
- To create a system that allows suppliers to easily view their scores.

Lean Team - OEE

- To develop a methodology and a system which would provide live data on OEE for all machines which are being used to enter data for.
- Create a process for collection of OEE data that is both functional and operator friendly.
- Create a potential system design and breakdown process on OEE processed data.

Cost Matrix Team

- Reduce the complexity of procurement process.
- Standardized comparison among the different locations Sloan has
- Understand the various factors involved in procurement (taxes, inventory, lead times, etc) and how it affects the total cost.
- Meet or exceed the expectations of Sloan Valve and Mr. Caltagirone
- Increase the organizations awareness of total cost.
- Identify potential global markets for sourcing

Team Objectives

- Meet or exceed the expectations of Sloan Valve and Mr. Caltagirone
- Create and design a tool to perform Cost Matrix
- Design and implement a green initiative that is both cost effective and appealing to consumers
- Implement an efficient method to track machine downtime
- Create a system which eliminated the amount of downtime and increases the OEE percentage throughout Sloan's manufacturing plants
- Work effectively as a team, with passion and honesty, to achieve our outlined goals

III. Organization and Approach

Green Team

The Green Team worked closely with Sloan Valve's Brian Capo, Global Supplier Quality Assurance Manager Franklin Echevarria, and Commodity Manager Steve Bankemper. The Green Team and Sloan advisors agreed to meet once per week at 2:00 pm on Tuesdays. Emails were frequently exchanged throughout the week.

Members of the Green Team were first tasked with combining last semester's green survey with Sloan's existing supplier survey. Once this was done, the revised survey was sent to the initial 12 suppliers our team had chosen and the results were combined on an excel spreadsheet. The team then got to work on coming up with the data required to accurately gauge supplier performance. Data was compiled based on values described in the Sloan Supplier Manual and what data was being routinely kept. At this point we had to turn to one of Sloan's computer engineers who worked with us to change the required settings and create the necessary entries and forms to enable the scoring feature. Once the new system was tested, we rolled it out to the initial suppliers we had selected. We had also planned to create a site where suppliers could see their scores, but it was revealed to us that the site was not ready yet to be used.

Lean Team - OEE

The Lean Team's scope and team objectives were changed in middle of the semester, and a risk management contingency and mitigation was in effect which involved on creating a new purpose of the team which would be feasible to complete in 8 weeks. The team met with Lean experts as well as IT personnel to identify areas of weakness. The team determined that no one is entering the data on the system and it is cumbersome. A proposal was put on the table to have scanners throughout the plant which would do text and handwriting recognition and input into database. After team researched the product, it was concluded that it had a lot of problems since it is not a perfected system as it lacks ability to make smart decision and make distinctions between lines and characters and letters. The team met with the Sloan Lean team and proposed a new system which would involve the workers to enter in data themselves into systems through a touch screen computer which would feed live data into a back end database. In addition, the database would calculate OEE numbers live per request. The team researched touch screen computers and scanners, and developed a back end database Schema which images the current OEE sheet that is being used. A written process was developed on the flow of how the workers would interact with the new system.

Continuous communication with Sloan and our team made the project run smoother as the team was able to get feedback and move the project forward. The team worked closely with Greg Spoor who gave the team constructive feedback on developing the new system.

Cost Matrix Team

The Cost Decision Matrix team was lead by Michael Skrypek, Director Global Sourcing, who was also in charge of the strategic planning and execution of the project. Defining the scope of the project was the most difficult part since it was very broad. Once that was done the team worked on the tool with Mr Skrypek supervising every step. Sourcing decisions are very tactical and strategic; hence at the weekly meetings at Sloan we did a lot of brainstorming to understand the business and its nuances. Following the Sloan weekly meetings was a team meeting to implement the necessary changes to the tool. Constant feedback with the instructor about the status of the project and ways to approach the different challenges took place by e-mail, phone and scheduled meetings.

The first step was the analysis of the initial state, focusing on the problems already identified by Sloan Valve in their procurement process: difficulties to identify lowest total cost, complexity communicating with the different Sloan procurement locations. At the end of every meeting, a recap of the objectives accomplished during the day was done, highlighting the positive and negatives aspects of the day at Sloan Valve. A detailed project plan was formed in the very beginning and every week team ensured that everything was going according to plan and tasks were accomplished within the designated time frame thus keeping project always in motion. This approach of constant communication and feedback and a close interaction between the Cost Decision Matrix team and Sloan help the project move constantly forward and kept a steady momentum. Even though challenges arose at certain points, both parties worked together to move pass them and finally fulfill the expectations defined on the expected results at the project plan.

IV. Analysis and Findings

Green Team

- Surveyed initial suppliers with Sloan's Supplier Survey with our Green survey attached.
 - Most suppliers had very good ratings for both surveys.
- Implemented a scoring system to automatically rate suppliers.
 - Initial selection of suppliers had their scores calculated.
 - System can automatically compile scores or they can be instantiated manually.
 - Before and after scores are shown.
 - Scores are broken down into Quality and Delivery and then further broken down into those categories.
- Interviewed employees that will be affected by new system for their input.

Lean Team - OEE

- The current system in place not practical as administration enters in data into excel sheet.
 - Data entry is only performed upon availability of staff.
 - No real time data and status of machines. No OEE numbers
- Proposed system - scanners with text and handwriting recognition as a possible OEE solution to input data
 - Researched proposed system finding many problems with the system as scanners are not up to date to distinguish differences in handwriting and formatting, making it difficult with large margins of error to input data.
- Researched a new system including a touch screen system with a backend database.
 - The system would have direct contact with the operators and workers on the shop. They would have to input all data in.
 - The data would be inputted in and forwarded to a database.

- The worker would also scan paper and be saved as an image for future reference.
- Researched possible touch screen computers as well as scanners.
- A new process and method of inputting information into OEE program was established with a detailed breakdown of the process.

Cost Matrix Team

- There is no “tool” to cost compare supply chains. Price and cost were not defined clearly
 - Broke down the different elements of cost so it is visible and easier to evaluate the pros and cons.
 - Collected data from Sloan
 - Thru intelligent probing we created a tool that is easily adaptable
 - Manage to eliminate subjectivity associated with currency, language, global regions.
- Many people have different perceptions of cost associated with supply chain
 - Standard and integrated approach optimizing the process by implementing input form
- Management wants a data driven decision process
 - Tool will help Sloan make a strategic decision

V. Conclusions and Recommendations

Green Team

The Green Team had a very limited project at the start of the semester and was thankful when Sloan decided to increase the scope of the project. While it created extra work for us to gave us a chance to create something meaningful for Sloan and to create a lasting impression. We combined the Green Survey that the IPRO team last semester had created with Sloan’s existing Supplier Survey. The team sent these out to the same

12 suppliers we had decided to trial the scorecards on. Combined with these self surveys and the automatic scorecards that can be created for any supplier, Sloan now has a much greater ability to monitor and rate its supplier base. As Sloan wants to use these scorecards to create a Supplier Certification Program, we wanted to implement a website which would allow Suppliers to check their scores, but due to time and other constraints we were unable to. Our recommendation to the future IPRO is to finish this reporting system and to expand the criteria taken into account during the score creation.

Lean Team - OEE

In Spring of 2011, the Lean team – OEE – developed a system in which OEE data collection can be digitalized and become more readily available for the management to analyze as well as be operator friendly. Because no one was available to continuously input data in, a new system and a long term solution was necessary. The new system developed would make OEE data analysis much easier as it will provide live and dynamic data to management to make better decision and improve the global supply chain. The new system involves the operators which means having available data for the management each shift enabling the management to have the ability to make better strategic decisions. Having this system would make better lean process as well as improve the overall global supply chain by having more efficient machine working.

We recommend the next team to work on Lean Implementation in IPRO 306 to continue on the development of this system as well as work on its integration with SAP system which is already in place throughout Sloan. Possibly have an Information Technology or Computer Science oriented IPRO to design and implement the application.

Cost Matrix Team

The cost matrix team was able to develop a functional tool and tested on real world example. Feedback by the Global Sourcing team said that our tool was convenient and user friendly which were our objectives. It was also said that the tool helped standardized cost analysis across the different locations Sloan Valve has in the world. The tool will increase the organizations awareness of total cost. We recommend

future IPRO teams to take this one step further by segmenting each one of the cost buckets and dive down deeper into the analysis.

APPENDIX A: Team Information

Team Member	Major	E-mail
Burim Bakalli	Information Technology Management – Database Management	bbakalli@iit.edu
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Leonardo Lopez	Computer Information Systems	lopeleo@iit.edu
Tuesday Njoagwuali	Aerospace/Mechanical Engineering	tnjoagwu@iit.edu
Oluwabanji Oduola	Industrial Technology and Management - Logistics	ooduola@iit.edu
Luis Pulido	Architecture	lpulido1@iit.edu
Arya Ramesh	Industrial Technology and Management	aramesh@iit.edu
Suzanne Razmi Heshat Abad	Industrial Technology and Management of Operation	srazmihe@iit.edu
Angad Singh	Mechanical Engineer	asingh63@iit.edu

APPENDIX B: Team Interests

Team Member	Sub Project	Strength	Weakness	Expectations
Burim Bakalli	OEE	Databases, critical thinking, process elimination, information technology related topics	Inventory management, process, and procedures	Better understanding of how lean works, as well as the best way to implement it in the business world
Dhaval Doshi	Cost Matrix	Process Optimization, logical reasoning, purchasing experience	Communication skills, programming	Complete our coursework with real-world experience and get a basic understanding of some costing tools
Erhan Edlinger	Green Supply Chain	Computer Related topics, data analysis	Time management, lack of experience	I am excited at the opportunity to work hand in hand with the people at Sloan and I hope to gain valuable experience that I can apply to jobs I acquire in the future.
Margaux Jeanne Froment	OEE	My dynamism and ability to communicate efficiently	I overreact, also too impulsive	Learn more from real operations in this company and learn from coming up with solutions

Leonardo Lopez	Cost Matrix	Experience in supply management group for 10 years. Basic programming experience.	Time available during the week.	Complement my work and knowledge with the group and obtain some leadership experience.
Tuesday Njoagwuali	Cost Matrix	Great Communication skill, multi-tasking	None	Learn new exciting things.
Oluwabanji Oduola	Green Supply Chain	Currently doing a lot of research in green supply chain.	Reading and writing.	To learn what green supply chain is and be able to apply this knowledge in Manufacturing industries.
Luis Pulido	OEE	Good leadership and problem solving skills.	Not good being behind a desk	Help complete this project while acquiring skills and helping my team through this process.
Arya Ramesh	Green Supply Chain	Good communication skills, can work well in groups. A lot of determination.	Lack of experience	Learn more about global supply chain. In addition, direct implementation of eco-friendly and going green aspects.
Suzanne Razmi Heshat Abad	Cost Matrix	Organized, Committed, communicative	The amount of time during the week, lack of experience	To gain knowledge about supply chain.

Angad Singh	Cost Matrix	I have proven analytical and problem solving skills that I gained from my previous job experiences. I have ability to multi task and work effectively in fast paced environment. Have Hands on Experience with the underfill, surface mounting, assembly and testing procedures.	I can get impatient when other people do not work as hard as I do.	To have an experience working with a real company. Also, to discuss with teammates how to improve the condition which we want to make better
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APPENDIX C: IPRO 306 “Organizational” Chart

