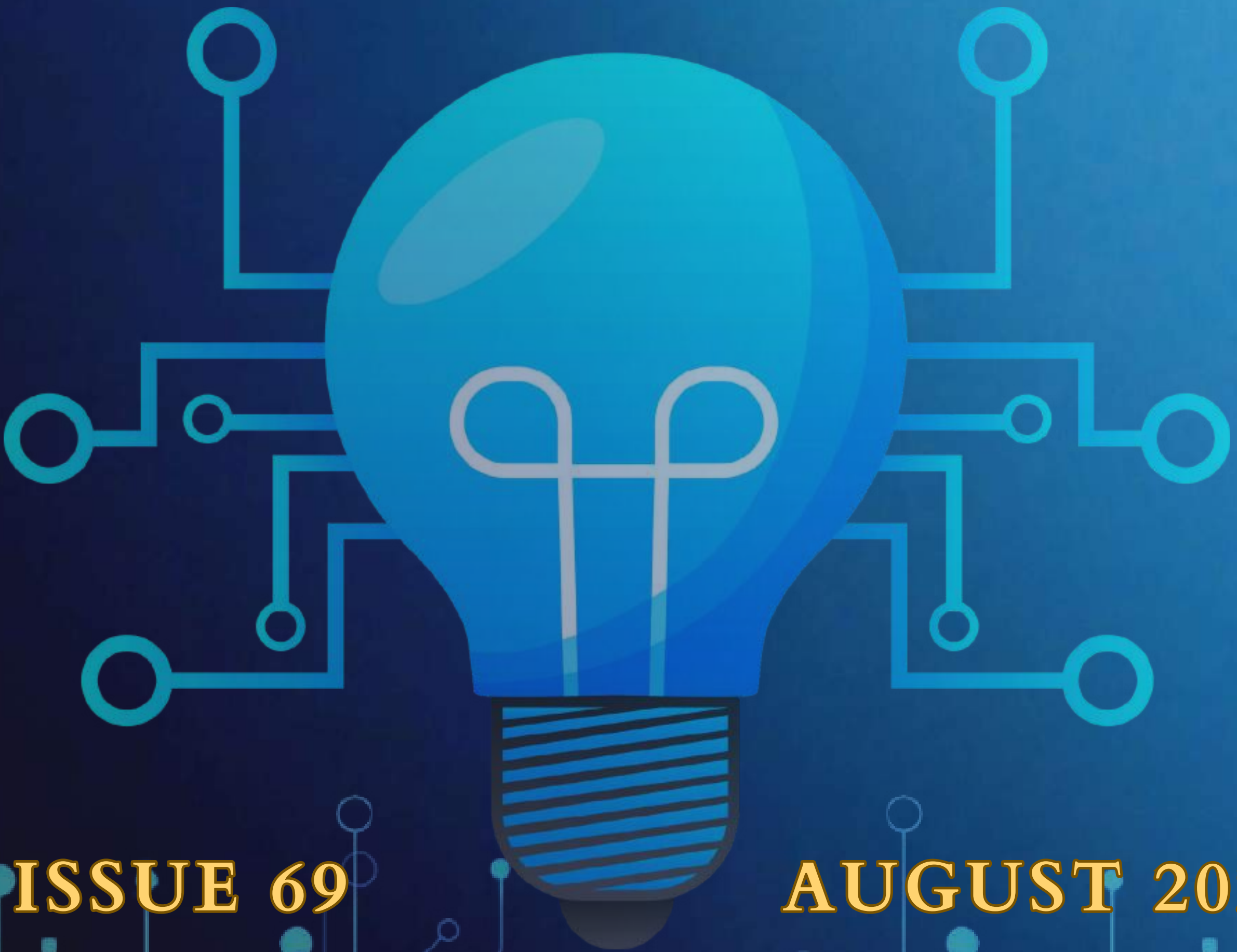CHRIST
(DEEMED TO BE UNIVERSITY)
BANGALORE · INDIA

SIGMA
NEWSLETTER

LEAN OPERATIONS AND SYSTEMS

ISSUE 69
AUGUST 2023

SCHOOL OF BUSINESS AND MANAGEMENT

EDITOR'S NOTE

Greetings Readers,

We take immense pride and joy in bringing forth the 69th Edition of the SIGMA Newsletter from Lean Operations and Systems Specialization.

This issue features a wide range of insightful articles that explore the latest trends and best practices in topics such as Go first airline's turbulent journey: battling operational headwinds, Lean Industry 4.0: combining efficiency and technology in manufacturing, The convergence of lean and industry 4.0, SIP Experience: Bosch, Study on streamlining material movement in the shop floor, ZF rane automotive India Private ltd., Reducing material procurement delay at Cochin Shipyard Limited (CSL), Optimizing the loading point: A summer internship journey at Varun beverage ltd.

We, Team Oasys, express our profound gratitude to our Dean, Dr. Jain Mathew and the entire leadership team, the Head of Specialization, Dr. Ramakrishnan N, Faculty Coordinator Dr. Saibal Kumar Saha, faculty members of the specialization, and all those who have contributed in developing this edition of the newsletter. It's our pleasure to bring you informative and engaging content. We are eagerly looking ahead to continuing this journey with you!
Stay safe, Stay Healthy.

Regards,
Team OASYS
Lean Operations and Systems Specialization
School of Business and Management

TABLE OF CONTENTS

GOFIRST AIRLINES TURBULENT JOURNEY: BATTLING OPERATIONAL HEADWINDS

SAGARVA SRIVASTAVA

2228043

India's beleaguered low-cost carrier, GoFirst Airlines, faced severe operational headwinds from multiple fronts in early 2023. Nearly 50 percent of the fleet was AOG (Aircraft on Ground) by the start of the year 2023. The airline's fleet had been halted by engineering troubles and supply chain constraints, resulting in a perfect storm of maintenance delays, flight cancellations, and reduced capacity. A significant challenge had emerged from recurrent snags in the Pratt & Whitney (P&W) engines that powered GoFirst's Airbus A320 fleet.

Experts pointed out that P&W engines required intensive monitoring and maintenance, which GoFirst had struggled with. Around 14 GoFirst planes were grounded for oil leaks and other engine glitches from P&W power plants in January. Besides internal maintenance issues, global supply chain disruptions for P&W spare parts also impacted GoFirst. In 2022, shortages of castings and forgings had hampered P&W's ability to produce new GTF engines and service existing units. This disruption in P&W's capability harmed GoFirst's maintenance schedule and aircraft availability. Meanwhile, GoFirst's expansion plans had backfired due to inadequate engineering and maintenance staff. 2022 saw the addition of 16 planes which overstretched capabilities, leading to the Director General of Civil Aviation (DGCA) finding deficiencies in the maintenance workforce. Overworked engineers who struggled to turn flights quickly hampered the on-time performance of GoFirst.

With mounting passenger complaints, GoFirst stared at a long road to recovery. The airline had to optimize maintenance staffing, improve supply chain coordination with P&W, and rationalize its fleet expansion. Until they rectify operational issues at a systemic level, GoFirst's wings would remain clipped by a perfect storm of avoidable problems.

Revival Plan: According to reports, Go First intends to resume operations with a fleet of 26 aircraft, four of which are on standby. It intends to run about 160 daily flights on 78 routes, flying out of 22 locations. These flights will include both scheduled and charter flights. They recently carried out a routine sortie in Mumbai to inspect the aircraft.

LEAN INDUSTRY 4.0: COMBINING EFFICIENCY AND TECHNOLOGY IN MANUFACTURING

ANJANA RS

2228006

Lean Industry 4.0 is an approach that combines lean manufacturing principles with advanced technologies of Industry 4.0. It focuses on reducing waste, minimizing downtime, improving organization, and integrating technologies like big data analytics, advanced robotics, connected systems, cloud computing, and augmented and virtual reality.

Lean Manufacturing

Lean Manufacturing centers on the goal of minimizing waste while maximizing value for customers. It involves streamlining processes, eliminating non-value-added activities, and continuously improving operations. Key principles include:

- Identifying customer value.
- Optimizing flow and pull.
- Practicing just-in-time production.
- Empowering employees.

Lean manufacturing brings about several benefits, including heightened productivity, enhanced quality, lower costs, and improved customer satisfaction.

Industry 4.0 applies the integration of advanced technologies such as the Internet of Things (IoT), Artificial Intelligence (AI), robotics, big data analytics, cloud computing, and augmented reality/virtual reality (AR/VR) into production processes. It creates intelligent, connected systems that enhance productivity, automation, and data-driven decision-making. Industry 4.0 features include IoT connectivity, AI-powered automation, robotics, big data analytics, cloud computing, cyber-physical systems, AR/VR, and cybersecurity. It aims to transform manufacturing by enabling flexible, efficient, and customer-centric production processes.

Lean Industry 4.0

Lean Industry 4.0 combines lean manufacturing principles with the advantage of Industry 4.0 technologies. It integrates lean manufacturing practices, such as waste reduction and continuous improvement, with the digital capabilities of Industry 4.0.

In Lean Industry 4.0, reducing waste remains a core principle. This includes eliminating non-value-added activities, optimizing resource utilization, and minimizing downtime. Process efficiency is enhanced through the utilization of tools like value stream mapping and visual management techniques. At the same time, Lean Industry 4.0 integrates various advanced technologies. These include big data mining and analytics, which enable organizations to collect and analyze large volumes of data to gain valuable insights and identify improvement opportunities. Cloud computing facilitates data storage, accessibility, and collaboration across different departments and locations.

Additionally, Lean Industry 4.0 leverages augmented and virtual reality to improve training, maintenance, and problem-solving activities. Workers can perform tasks more efficiently and effectively with the help of these technologies, which provide interactive instructions and remote assistance.

Advanced robotics is another component of Lean Industry 4.0. Repetitive and physical tasks are automated using collaborative robots (cobots) and autonomous mobile robots (AMRs), improving productivity, reducing errors, and enhancing workplace safety.

By combining lean principles with Industry 4.0 technologies, Lean Industry 4.0 aims to create a more agile, efficient, and customer-centric manufacturing environment. It allows organizations to optimize processes, reduce waste, enhance productivity, and remain competitive in the new era.

THE CONVERGENCE OF LEAN AND INDUSTRY 4.0

ESHA KUMARI

2228019

Industry 4.0, the digital transformation of manufacturing driven by emerging technologies, is taking the lean principles of waste reduction and efficiency to new heights. The combination of lean methodology and Industry 4.0 creates a robust framework for optimizing production in the modern, smart factory. Big data analytics, the Internet of Things (IoT), cloud computing, and artificial intelligence (AI) are examples of technologies that already digitalize and analyze processes to find improvement opportunities that align with lean objectives.

IoT-enabled sensors provide real-time data for intelligent just-in-time production and predictive maintenance to minimize downtime. Machine learning algorithms can continuously fine-tune processes and detect defects early.

For example, agricultural equipment company John Deere uses AI-powered cameras on production lines to spot inconsistencies and alert workers, thereby maintaining quality standards in a lean way. Energy management firm Schneider Electric connects its machines to collect and analyze performance data, enhancing lean efforts like TPM and Six Sigma.

Increasingly, cobots and other smart automation assist human workers to reduce waste and free up time for higher-level tasks. At Morgan Advanced Materials, cobots not only automate repetitive manual work but capture process data for analysis by AI to boost lean continuous improvement practices. Augmented Reality can provide real-time guidance and instructions to workers on the factory floor, which helps to improve training and standardization of processes in line with lean goals. Workers can quickly access step-by-step visualization of procedures. For example, Boeing uses AR glasses to guide airplane technicians.

Additive Manufacturing or 3D printing on demand aligns with lean objectives like inventory reduction and lot size optimization. It enables just-in-time localized production of spare parts as needed. Companies like Omega Saverem have introduced 3D printing to decentralize and streamline their supply chains.

Vast volumes of data from sensors, equipment, ERP systems, etc., can feed machine learning algorithms to uncover inefficiencies in processes, quality issues, looming breakdowns, and more to drive data-based continuous improvement. ThyssenKrupp applies big data analytics to reduce machine downtime.

On the supply chain side, blockchain enables transparency, security, and traceability to optimize inventory levels and product flow. 3D printing facilitates just-in-time local production of spare parts and lower quantities tailored to demand.

By synthesizing lean and Industry 4.0, manufacturers can achieve new heights of safety, quality, flexibility, and efficiency. The future will see reinforced cross-pollination of these synergistic approaches as technology expands lean possibilities. Companies must tap into this convergence to maximize competitiveness.

SIP EXPERIENCE
BOSCH

AHILESH R N

2227502

It was a great opportunity for me to have completed my Summer Internship Project (SIP) at Bosch. As someone with two years of experience in logistics, I view my SIP experience as a stepping stone in my career path. Also, I am thankful to the University for giving me this excellent opportunity.

My SIP was about the digitalization of logistics operations. I worked with technical and key account managers. I learned about the pain points from the point of view of the logistics owner and their expectations for digitally operating trucks and warehouses.

On analyzing data from over 20 visits to LSP (Local Service Providers), we have identified a pain point where the existing time can be significantly reduced, possibly by at least 50%. This finding highlighted an essential area for improvement and optimization. As I was working with key account managers, I also worked on marketing strategies. I suggested marketing approaches that can be done in the future to inform the owners about the platform.

My mentor suggested checking the Wardley map to see if the platform works. I completed the Value Chain, Ecosystem scan for this Wardley map, which showed the stakeholders involved. All these activities were iterative, taking insights from the LSP visit.

I was also assigned to attend virtual meetings with fellow digital vendors to gain insights into digitalization procedures and identify potential challenges. As a collaborative team, we engaged in extensive discussions to explore possible modifications and improvements that could be implemented on the platform. And through my insights and the discussions, the team is currently working on whether the digital platform satisfies all the pain points suggested by the logistics players. I am satisfied with this project, which will help Bosch in the revenue and logistics industry by decreasing downtime and avoiding fraudulent activities.

SIP EXPERIENCE STUDY ON STREAMLINING MATERIAL MOVEMENT IN THE SHOP FLOOR

PAVAN R

2228240

I completed my Summer Internship Project (SIP) at CIE Automotive India Ltd. (previously Mahindra CIE) Plant 2 in Bengaluru. They are the manufacturers of auto components by forging method. Plant 2 has a facility to carry out hot forging, cold forging, and warm forging of auto components. I was privileged to work in Bay 5 which was responsible for machining Steering parts like CV joint and tripot.

I worked on streamlining material movement on the shopfloor of Bay 5 based on lean methodology and lean principles, along with various lean tools. My SIP also entailed identifying and addressing different wastes that could be present in the process. The internship provided me with a new perspective on practical applications regarding various theory topics, which helped me to provide feasible recommendations for improving the process or solving the problems identified. It was a small window into the corporate world that we will be venturing into very soon.

Along with applying the knowledge accumulated during the past year, I was allowed to learn a new flow transformation tool called VMAP (Visual Map of Material and Information Flow) which Mr. Furuhashi Takeyuki, a renowned flow transformation specialist from Japan, developed. This tool is widely used in the industry to analyze the flow of material and information in the process and streamline it. It is a lesser-known tool to most people, yet very effective in its purpose. The immense guidance from my corporate and academic mentors helped me successfully complete the internship. Along with the learning, I tried to utilize my fullest potential to add value to the organization through my engineering and design engineering skills for assisting in the day-to-day activities allotted to me.

I displayed dedication, discipline, and analytical skills to solve problems with a semi-decent chance of solving the issues assigned to me without giving up.

SIP EXPERIENCE
ZF RANE AUTOMOTIVE INDIA
PRIVATE LTD,

S SRI BHAVAANI

2228249

I did my Summer Internship Project (SIP) at ZF Rane Automotive India Private Ltd, Chennai. The company is a manufacturer of Hydraulic power steering and electric steering. The company manufactures auto components for both commercial vehicle steering and passenger car steering industries. The project was carried out in the material management department. The SIP was titled "Improvement of Supplier lead time in the procurement process of direct materials".

The procurement process of raw materials was observed in the supply chain department. Issues related to procurement were identified by collecting data through SAP software, conversations with the department team members, and observation during the procurement process. The team faced extended supplier lead time in direct materials procurement. The project's main objective was to enhance supplier lead time by implementing an Advanced Shipping Notice (ASN) system through the supplier portal. This initiative targeted at least five critical direct material suppliers, aiming to streamline and improve the efficiency of the supply chain process.

By using a portal for advance shipping notices, both the supplier and recipient can streamline their communication, reduce manual errors, and improve the efficiency of the supply chain. The portal acts as a centralized platform for data exchange, facilitating real-time information sharing and enhancing collaboration between the parties involved.

The five lean principles were used in this project to eliminate waste and add value to the procurement process. The identification process revealed three types of waste: inventory, motion, and waiting. These are the key areas where improvements and optimizations can be made to enhance overall efficiency. They are eliminated by implementing advance shipping notices through the supplier portal and real-time information and data sharing between the suppliers and the company.

From this project, I learned the process of supply chain management and procurement of raw materials from suppliers. I learned the primary applications of SAP software for the procurement process and the usage and importance of ASN for the supplier portal. Overall, I had a great opportunity and experience working in such a great company.

SIP EXPERIENCE
REDUCING MATERIAL PROCUREMENT DELAY AT COCHIN SHIPYARD LIMITED (CSL)

RITTY K CHERIAN

2228042

Name: Cochin Shipyard Limited (CSL)

Established: 1972

Location: Kochi, Kerala, India

Industry: Shipbuilding and Ship Repair

Website: www.cochinshipyard.com

Cochin Shipyard Limited (CSL) is India's leading shipbuilding and ship repair facility. CSL has played a significant role in developing the maritime industry in India. CSL specializes in constructing various vessels, including bulk carriers, offshore support vessels, tankers, passenger ships, and naval ships. The company has a reputation for making and repairing some of the largest ships in India. CSL has recently built and delivered the prestigious indigenous aircraft carrier, INS Vikrant, the most significant warship built in our country for the Indian Navy.

Increased material procurement lead time was the problem identified. Through analysis, I found that the company needs help manufacturing ships due to increased lead time for material procurement. A deviation from the standard/expected time for each step up to purchase order creation has been determined.

The root causes analyzed for the problem include:

- Lack of communication between the departments.
- Lack of transparency or visibility of the existing system.
- Following a mix of manual and computerized methods.

Also, there needs to be more integration between the current system and SAP, which can eliminate multiple data entries.

Recommendations:

Considering the possible flaws of the existing system and the root causes, the aim was to design an e-procurement system for CSL, where a vendor database was created for the smooth functioning of the process rather than going for open tendering and reducing the manual work. Adding an SAP e-sourcing module to the existing SAP will help reduce the redundant data entry work and link the current systems, which supports the material procurement process flow.

SIP EXPERIENCE
OPTIMIZING THE LOADING POINT:
A SUMMER INTERNSHIP JOURNEY
AT VARUN BEVERAGES LTD.

SREEKANTH V

2228052

I did my Summer Internship at Varun Beverages Ltd., Chennai. The company is the second-largest bottler for Pepsico outside the US and received the Best Bottler Award from Pepsico for the year 2022. They produce and deliver carbonated soft drinks, non-carbonated beverages, mineral water, and preforms required to make PET bottles. I worked with the company's shipping department and did a project on optimizing the loading point. My main objective was to improve the productivity of loaders and have a better workflow at the loading point. This could help the company take up more orders and dispatch them on time without backlogs.

During this internship, I also got a chance to visit other departments of the firm, which helped me get a basic idea about how the production of such products happens the role of quality, and its prime importance in the food and beverage industry. I also learned how teamwork plays a significant role in an organization and how challenging and vital workforce management is. Additionally, I witnessed the use of many material handling equipment and automated machines. There were ample learning opportunities as I could talk with many company employees, including people in managerial positions. I observed the real-time functioning of concepts like the FIFO inventory management method, which was a theoretical concept taught to me. Moreover, I understood the impact of having 5S implementation and improved my observation skills while working on my project. I learned many new things related to supply chain management, and I received hands-on training in the order punching process, which was done in SAP software.

I tried to identify if any of the seven types of waste per the lean ideology were present at the loading point. I attempted to find reasons for those identified wastes through direct observation and with the help of a fishbone diagram. I discussed my observations with the shipping manager and also suggested simple changes that can be done to improve and optimize the current workflow at the loading point. This SIP was a great learning opportunity and helped me understand my strengths and weaknesses. I got a clear idea about which areas to work more on to fit into the highly competitive corporate world.

POEM RX100 - MY POCKET ROCKET

J LAKSHYA

2228226

At the very first sight,
He caught my soul.
Not every ride can handle this beast.
It's not a machine controlled by MEN;
Man if you try, he will tame you down.

Once your heart syncs with it,
The two-stroke madness you know it all.
At the touch of the throttles,
He knows the therapy I need.
A ride with the beast,
Smokes my pain away.

Near or far his arrival is always known
The world pauses for a moment to see him pass by
He is a dream to many and owned by few.
In him, I found my soul.

POEM: YOU

Mesmerized by your eyes and enchanted by
you my love.
My eyes were glorifying you.
And forgot the presence of the glowing
beauty.
Which comes in the magical dusky night.

It stood by my window,
But my eyes denied to see its beauty.
As my soul was hypnotized by yours.

It light dimmed'
The shine turns to scarlet.
As it seemed like it was seething.
And it asked whose charisma,
Made a halo around your heart.
Which denied my eyes from admiring it?

And I spoke of you my love,
Seconds, minutes and hours passed by.
And now every dawn, it stood by the window.
Just to listen about you.

One mysterious night I didn't see it stand by
the window.
As my soul was chanting your name.
It started to thunder and storm.

It seemed like the silver dust didn't give way
for the white beauty to come.
And they melted down to mist as they wanted
to listen about my love for you.
And the winds carried the message to every
conner in this world.
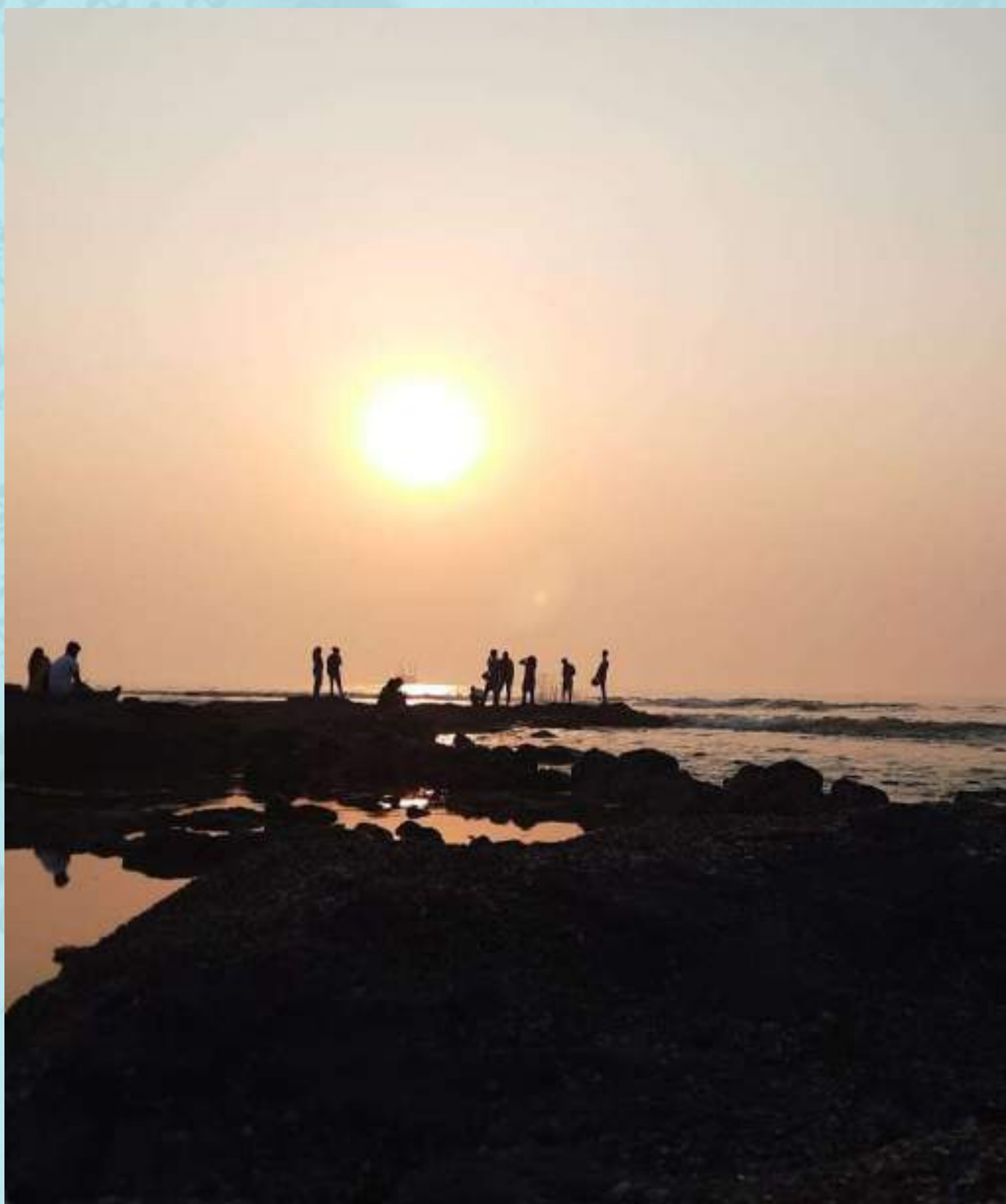It feels like the whole universe knows about my
love for you.
But does your heart know?

SIGMA NEWSLETTER

PHOTOGRAPHY

S SRI BHAVAANI

2228249

J LAKSHYA

2228226

ISHA VIVEK MHASHETE

2228225

SIGMA NEWSLETTER

CROSSWORD

GAUWDAMI P

**2228321**

Down:

1. Finding, interpreting, and communicating relevant patterns in data.
2. A method of organising distinct levels of a dimension based on granularity.
3. A collection of data that contains information about other data.
4. A category that can be used to organise data by facts and measures for the purposes of data dicing (grouping) and slicing (filtering).
6. Iterative information derivation and extraction from stakeholders or other sources.
8. A stakeholder from outside the company who is in charge of standard definition and enforcement.
9. Common remedies to common problems that are unsuccessful and may have undesired repercussions.
12. Synthetic biographies of imagined future product users.

Across:

7. The process of comparing performance to that of other leading firms in order to improve performance.
A lengthy user narrative.

11. A software development method in which the entire team works on the same project at the same time, in the same location, and on the same computer.

13. A framework for managing product development and other knowledge work.
14. A predetermined length of time during which a person or a group works consistently toward the completion of a task.
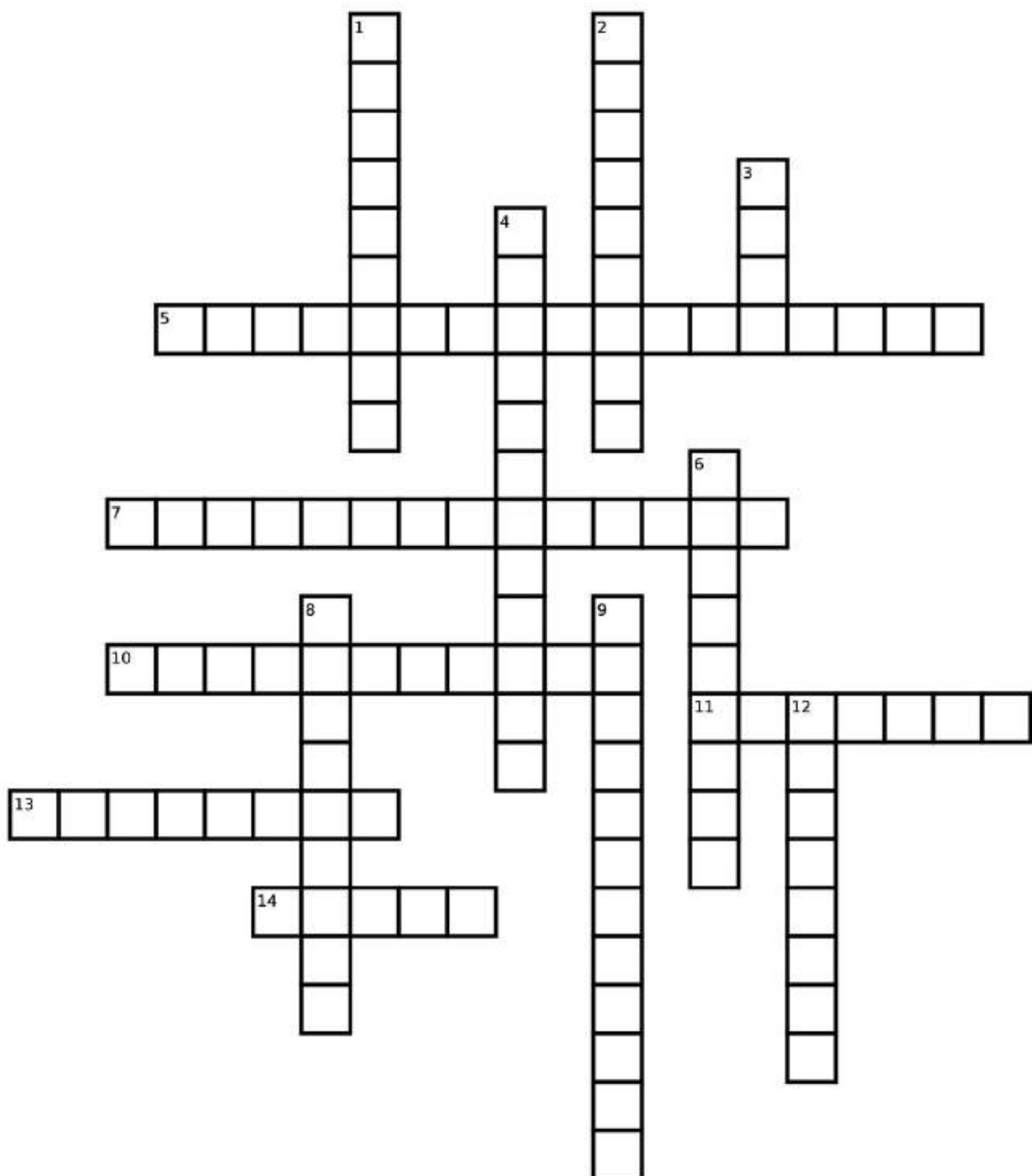
CLUB ACTIVITY
(SIMULATION GAME)

The second day of the Antaragni League consisted of riddles and a simulation game. The riddles revolved around lean operations and all the teams of the league participated. It was a buzzer round and teams were seen to be enthusiastic in contributing to their team score. Following this, a simulation game called "Sodapop" was played by the teams. The goal was to maintain a soda factory and not face stockouts or excessive inventory by maintaining optimum inventory levels throughout the game. Once a year's time was completed in the game, the metrics were jotted down by the club activity team for evaluation and the team scores were updated for the league Antaragni. The simulation game has set an example for the students to show that learning can be game based.

SIGMA NEWSLETTER

CORPORATE INTERFACE
"ACADEMIC CROSSROADS TO OPERATIONAL REALITIES"

The Corporate Interface session with Mr. Karthik Sridharan was an inspiring and insightful event for the students. The young entrepreneur shared his journey from being an Analyst at J.P. Morgan to starting his own business. Here are the key highlights of the activity: Mr. Sridharan shared his transformational journey, starting with his engineering background at BITS Pilani to his corporate experience at J.P. Morgan in London. He emphasized how the pursuit of a balanced and fulfilling life led him to opt out of high-paying placements at IIM Ahmedabad and instead venture into entrepreneurship. The speaker candidly discussed the challenges he faced while starting his own business and offered valuable insights on what to do and what to avoid in the entrepreneurial journey. Participants had a hands-on experience with the Buildd App, one of Mr. Sridharan's startups, engaging in a fun game and gaining access to a one-stop platform for learning about startups and business. Students had the opportunity to engage in one-on-one chats with the app's co-founder and team, providing valuable networking and learning experiences.

CORPORATE CONFLUENCE
"MERCEDES-BENZ RESEARCH & DEVELOPMENT (MBRDI)
TEAM AND SAP UNIVERSITY ALLIANCE TEAM"

The corporate confluence session aimed to disseminate information about the various opportunities available at MBRDI, especially with respect to SAP. The session included a brief talk about the journey of Mercedes-Benz and how MBRDI is an integral part of Mercedes-Benz cars worldwide. The guest speakers also talked about the highly beneficial online courses offered by SAP for students. Fifty free vouchers were given to students of LOS for free courses from the online learning portal of SAP.

CLUB ACTIVITY
"BEST SUMMER INTERNSHIP PROJECT SELECTION"

The best Summer Internship Project (SIP) from each mentoring group of Lean Operations and Specialization (Central and Kengeri Campus) was selected, and those students were asked to present their SIPs to a viva panel constituting two talented alumni- Mr. Subhrajit Dey (Commonwealth Bank) and Mr. R. Nandhakumar (oracle) and professors N. Ramakrishnan. Saibal Kumar Saha, Shreekant Deshpande, and Sivakumar Pujari. The Kengeri students presented their SIPs online as the event was held at the central campus. Members of the viva panel gave valuable feedback for all of the SIPs presented. After careful evaluation, the best SIP awards were given to Ms Shivanya SM (BKC) and Ms Suman A (BCC)

SM SHIVANYA   WINNER   **SUMAN A**

LEAN OPERATIONS

ZF INDIA PVT. LTD
Process and Manpower optimization in assembly lines using automation and deployment of skilled labours.

TOYOTA KIRLOSKAR MOTORS
Enhancement of Quality in Weld Shop – Elimination of bends in CMPV roof panel establishing a Poka-Yoke System

SIGMA NEWSLETTER

CROSSWORD ANSWERS

ANSWERS

Analytics
Hierarchy
Metadata
Dimension
Benchmarking
Elicitation
Solution life cycle
Regulator
Antipatterns
Epic
Mob programming
Personas
Scrum
Timebox

SIGMA NEWSLETTER

TEAM

NANDHINI M
2228337

THINAKARAN S B
2228058

S SRI BHAVAANI
2228249

BHAVISHYA GOYAL

GAUWDAMI P
2228321

ESHA KUMARI
2228019

RITTY K CHERIAN
2228042

CHRISTY MARIA BENNY
2227716

Head of Specialization

Dr. N Ramakrishnan

Faculty Co-ordinator

Dr. Saibal Kumar Saha