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LEAN OPERATIONS AND SYSTEMS

SCHOOL OF BUSINESS AND MANAGEMENT

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EDITORS' NOTE

Greetings Readers,

It is our pleasure to bring forth proudly the 67th Edition of the SIGMA Newsletter from Lean Operations and Systems Specialization.

This edition includes articles on topics like the Advanced Driver Assistance Systems, Lean six Sigma, Technologies which evolve the business models, Application of Supply Chain Analytics in Data Analysis and Business Intelligence, Benefits and Challenges of Data Analytics As A service, Cloud supply Chain, and Barriers of Implementing green supply chain in Pharmaceutical industry.

We, Team Oasys, express our sincere gratitude to our Dean, Dr. Jain Mathew and the entire leadership team, 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. We hope you have as much thrill and gain a good amount of knowledge as we had in bringing out this newsletter to you.

Stay safe, Stay Healthy.

Regards,

Team OASYS

Lean Operations and Systems Specialization
School of Business and Management

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THE BARRIERS FOR IMPLEMENTING GREEN SUPPLY CHAIN IN PHARMACEUTICAL INDUSTRY

RASHMI S - 2128146

The pharmaceutical industry plays a vital role in the manufacturing industry that supports health services. The growing impacts of technological innovation, modernisation, and industrialisation have pushed the pharma industry to develop concepts like environmentalism and green supply chain management practices in order to restore their competitiveness. A green supply chain reduces waste inside the industry and stops dangerous pollutants from spreading broadly into the environment in order to save energy.

The pharmaceutical businesses mainly compete on the basis of the calibre of their goods, prompt substance creation to meet consumer demand, and cost of goods. By utilising environmentally friendly products and production techniques, the industry can lessen its negative effects on the environment. The problem faced by the companies to use environmentally friendly substances is that it might lead to the deterioration of the quality.

The use of environmentally sound components would require adjustments to the formulation of existing products on the market and require a new authorisation process. Due to the high expense and lead time of the repeated R&D, and authorisation processes, the pharma companies do not prefer environmentally friendly components. Pharmaceutical businesses are not investing in environmentally friendly components since there is no market for them and consumers are hesitant to pay a higher price.

Additionally, it has been discovered that the pharmaceutical industry's biggest environmental problem involves disposing of unwanted or expired medications that are kept in households; nevertheless, a mere 1% of customers actually return these medications to pharmacies as directed.

The emissions of volatile organic compounds, generation of hazardous waste and medicine residues entering the ecosystem are the problems identified in the pharma companies that need to be taken care of for the successful implementation of GSCM. The industry also faces the environmental challenge of final packaging products, as due to quality requirements (dosage), there are limitations in using recycled materials.

The pharmaceutical logistics company encounters difficulties when delivering medicines at the correct temperature and humidity under controlled conditions. The medicine delivery is continuous, where the products are delivered 2-3 times a day, which has impacted the environment.

To have ecologically friendly products, the suppliers also need to be ISO 14001 certified. Although several providers assert that they are certified, it appears that they lack the necessary accreditation. They do not intend to obtain the certification because they feel it would be a big administrative burden.

It is found that the pressure from environmental regulations, suppliers, consumers, and community stakeholders has prompted the pharmaceutical industry to implement GSCM practices. It has been found that implementing GSCM practices improves environmental, operational, and financial performance. The pharmaceutical industry is continually striving to reduce costs in every sphere of the operation, and they do it cautiously as they would incur heavy capital and operating cost along with the training cost and cost of management of the facility.



TECHNOLOGIES THAT CAN CHANGE BUSINESS MODELS

ANIRUDH SEKAR - 2128304

Industry 4.0 And Digital Twinning

Digital twinning is revolutionary. Technology from Industry 4.0 is a significant advance for the industrial sector. Engineers will be able to build virtual prototypes of their products and maintain these digital representations of their items, making the required adjustments to improve their company success. Interactivity between the physical and digital world is expected to increase as industrial processes become more digital and smart linked technology become more prevalent thanks to the Internet of Things (IoT).

Blockchain In The Supply Chain

The demand for utmost transparency and security throughout the supply chain is on the rise as a result of the growing trend toward digitally networked supplier ecosystems. The capacity to enable tamper-proof transactions and services is becoming increasingly crucial as businesses face increased scrutiny and customer confidence is a major issue.

By bringing the transparency, scalability, and improved security that make it simpler and safer for firms to collaborate online, the use of blockchain technology can revolutionize the supply chain.

The Emergence Of New Human-Machine Interfaces

Human-machine interfaces are becoming more complex as the Internet of Things expands. By enabling workers of all skill levels to successfully accomplish complicated tasks with no formal training, technologies like speech recognition and augmented reality glasses hold the possibility of altering production throughput and quality.

These technologies will definitely change the business model of the companies which will bring a lot of job opportunities. Implementing these technologies will help the company as well as the employees grow in terms of knowledge and exposure.



DATA ANALYTICS AS A SERVICE - CHALLENGES

DESHMUKH JANHAVI RAVINDRA
- 2127938

Data analytics as a service is projected to have a \$4.98 billion market in 2019. It is anticipated to increase to 25.9% between 2020 and 2027. That's a lot. The competition is fiercer than ever before as more and more small, medium, big, and even Fortune 500 firms choose to use data analytics as a service each year.

DATA ANALYTICS AS A SERVICE

Data analytics as a service (DAaaS), as the name suggests, is a platform created to analyze and handle enormous amounts of data. With a cloud-based delivery approach, DAaaS is offered with cutting-edge data analytics tools that customers may customize to meet their own demands, goals, and specifications.

Organizations often transfer their company data onto the platform while they search for the ideal DAaaS. They may then arrange this enormous volume of information and obtain insightful analytical information produced by analytical apps. Analytical Apps organize analytic data workflows that are created by utilizing a wide range of resources. They are all mostly reliant on machine learning.

CHALLENGES OF DATA ANALYTICS IN CLOUD

Even while the DAaaS chosen has great capabilities, there may be issues that make it difficult for businesses of all sizes to use it, especially if it's offered through a specific cloud environment.

Security

According to technical leaders, practitioners, and managers, security is one of the top obstacles to embracing the cloud, according to a 2020 Statista poll.

Security is still a key problem that more than 83% of respondents say they struggle to handle. It is understandable why some businesses are cautious and terrified to migrate their data to the cloud. But the DAaaS provider is still a factor. Make sure to select a business with a solid reputation for providing high-caliber services and a wealth of knowledge.

In order to give further data protection, focus your attention on choices that adhere to the toughest security procedures. While it may be tempting to choose those that are inexpensive, there is nothing that can compare to services that are of great value.

Complexity

Data analytics may be essential to a company's success. Data analysis, however, is a complicated process that calls for a professional's skills and understanding. Although outsourcing is popular, having expertise within firms is rewarding.

On the other side, initiatives that fail are often caused by a company's lack of competent data scientists.

In business, you simply want what's best for your enterprise. Internal training for analytics tools is something you cannot afford to ignore if you intend to go to DAaaS. Having qualified data scientists can open up numerous prospects in the future, even if it comes at a cost.

Employee development will increase return on investment while simultaneously lowering costs.

Management

Particularly, the analytical procedure might be taxing. It entails a number of significant processes that call for the appropriate personnel, including data collecting, data modeling, data mining, and visualization.

While it may be beneficial to outsource any of these duties, you should not undervalue the benefits of retraining your current staff. Again, you will lose a lot of money on this venture. However, ongoing staff training will help your organization succeed in the long run.



CLOUD SUPPLY CHAIN

APARNA S PILLAI - 2128234

Industry 4.0 and digital technologies have significantly impacted supply chain and operations management. The size and extent of new creative business models may vary but they all have similar characteristics, including cloud-based organization, digital platforms, service-oriented value generation, and dynamic process composition.

In order to construct and operate a supply chain network, a new business model known as "cloud supply chain" is built on integrating and networking some physical and digital assets from third parties in the cloud. The "supply chain as a service" paradigm, which moves beyond providing local, isolated services in manufacturing and logistics (e.g., utilizing EDI or RFID), incorporates concepts and technology from Industry 4.0 and digital operations emerging from the "supply chain as a service" paradigm.

The transitions occurring in this field is based upon the cutting-edge, network-oriented technologies such as Blockchain and Internet-of-Things. It can also be viewed as an outcome of evolution in different research and practice developments such as virtual enterprises, cloud manufacturing, and software-as-a-service.

Cloud supply chain is more than logistics outsourcing, evolving along with engineering, digital technology, and supply chain management principles. The integration of all operational processes (such as logistics, warehousing, manufacturing, procurement, sales, and returns), all supply chain flows (such as material, informational, and financial), and all supply chain actors is referred to as "cloud based supply chain" in digital platforms and ecosystems (such as suppliers, manufacturers, distributors, and customers).

The integration of cutting-edge supply chain management principles and digital technologies based on the dynamic, situational composition of physical services into networks is known as a cloud supply chain. The digital manufacturing and logistics fulfillment processes spanning material, financial, and information flows are linked in the cloud-based collaboration platform to enable customer-focused dynamic service composition.

This combination allows for the active redesign and management of a physical supply chain network as a customer-focused amalgamation of production, procurement, distribution, warehousing, and after-sales operations. A technological framework for implementing the cloud supply chain is created by digital communication, collaboration, identification, and with the help of modeling technologies such as Blockchain, Internet of Things, Industry 4.0, cloud computing, 5G, and edge computing. The cloud based supply chain business model has gained a lot of traction in real-world applications and requires in-depth investigation and analysis.



ADAS - ADVANCED DRIVER ASSISTANCE SYSTEMS

VIDHI JUNEJA - 2128057

The main function of Advanced Driver Assistance Systems (ADAS) is to reduce the frequency of automobile accidents and the severity of those that cannot be prevented in order to prevent fatalities and injuries. Essential safety-critical ADAS applications include pedestrian detection/avoidance, lane departure warning/correction, traffic sign recognition, automatic emergency braking, and blind spot detection.

The functioning of ADAS-Automobiles is the cornerstone of the next generation of mobile-connected gadgets, with autonomous cars making significant progress. Autonomous application solutions are divided into multiple chips, referred to as Systems on a Chip (SoCs). These chips use interfaces and high-performance Electronic Controller Units (ECUs) to connect sensors and actuators. Self-driving cars use a variety of apps and technologies to get a 360-degree view, both up close (in the car's immediate surroundings) and far away. In order to meet ever-rising performance criteria while simultaneously reducing power and footprint requirements, hardware designers are using more complex manufacturing nodes.

Following are a few ADAS applications:

- **Adaptive Cruise Control:** On highways, where drivers may find it challenging to continuously check their own speed as well as the speed of the cars surrounding them, adaptive cruise control is especially helpful. Advanced cruise control can automatically speed up, slow down, or even stop the car depending on what other objects are doing or moving in the area.

- Glare-Free High Beam and Pixel Light are sensors designed to adjust to the darkness and surroundings of the vehicle without disturbing approaching motorists. This innovative headlight programme detects other cars' lights and redirects the vehicle's lights away from other road users, preventing them from being briefly blinded.
- Adaptive Light Control adjusts the vehicle's headlights to changing lighting situations further, this adjusts the brightness, direction, and rotation of the headlights based on the vehicle's surroundings and the level of darkness.
- Automatic parking warns drivers to conceal areas, allowing them to know when to turn the steering wheel and come to a complete stop. Compared to regular side mirrors, rear-view cameras provide a more complete picture of the surroundings. By fusing data from numerous sensors, some systems may even be able to park the vehicle without the driver's assistance.

Implementation of ADAS by TATA motors in India

Collision Mitigation System (CMS) and Lane Departure Warning System (LDWS) are included in Tata Motors' Advanced Driver Assistance Systems (ADAS) for PRIMA and SIGMA cars. Tata Motors will use WABCO's cutting-edge technology that has been customized for India's operating conditions in collaboration with WABCO India. Tata Motors' Commercial Vehicle Business Unit is making progress with the creation of medium- and heavy-duty commercial vehicles' advanced driver aid systems. It is designed to lower the number of traffic accidents while simultaneously improving vehicle and occupant safety in a range of low-visibility scenarios.



LEAN SIX SIGMA: YESTERDAY, TODAY, TOMORROW

S NITHIN - 2127825

Introduction

Continuous improvement (CI) has become an important business strategy for many organizations today across the globe. This includes manufacturers, financial service organizations, healthcare services, and public sector organizations. The creation of a successful CI strategy is essential to the long-term success of contemporary organisations. Lean Six Sigma (LSS) has grown to be one of the most well-known and effective business process improvement approaches that organisations have ever experienced.

History of Lean Six Sigma (LSS)

LSS, like the majority of significant inventions, was built upon earlier ideas and techniques to enhance quality and business outcomes. It was founded on theories from Total Quality Management (TQM), the Deming Philosophy, and statistical process controls, to name a few.

Lean Six Sigma (LSS) today – The current state

LSS for manufacturing, LSS for services, particularly financial services, the connection between LSS and innovation, LSS and its role in SMEs, standards for LSS certification, and the current hot topics surrounding the certification process are some of the current Lean Six Sigma implementation aspects.

The Future of Lean Six Sigma (LSS)

Going well for the next generation Large and small businesses alike used the original Six Sigma methodology before switching to LSS to achieve success: quality was raised, turnaround times were cut, waste was reduced, and customer satisfaction increased.

Emerging trends

- Globalization and its associated competitive pressures.
- Customers have become more assertive and demanding improved quality, for example, by utilizing social media to give immediate public feedback on poor performance.
- The capability and use of information technology are expanding exponentially.
- The Big Data trend is emerging as an important by-product of growing IT capabilities and availability.

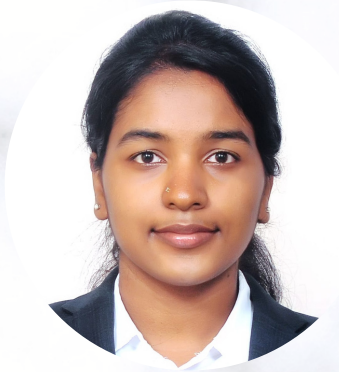
Sustainability - Lean Six Sigma (LSS)

Improvements that must be made and maintained over time will become apparent when we assess sustainability in these areas. The LSS framework is a useful tool for locating and implementing these improvements. Due to the DMAIC Control Phase, LSS is specially positioned to aid in ensuring project sustainability.

Conclusion

I have reviewed the past and present use of LSS in process and organizational improvement to provide context on what may be the future of LSS. We have learned that critical ingredients are commitment of leadership through management, involvement of top talent, supporting infrastructure, and a good approach to improvement including areas of application and technology used.

Alumni View



THE HICCUPS AI HAS TO OVERCOME/ PROBLEMS AND FUTURE OF ARTIFICIAL INTELLIGENCE

SHUBA LAKSHMI K

AI is one of the tech buzzwords of recent years. With advances in machine learning and deep learning, AI systems can now perform tasks that required tedious human efforts, such as image recognition, natural language processing, and decision-making. There is a lot of excitement around AI because it has great potential. The best example of the successful application of AI in recent times is ChatGPT.

“Change is inevitable, and the disruption it causes often brings both inconvenience and opportunity.”- Robert Scoble

AI is just similar to other disruptive technologies- they have both benefits and negatives. Benefits are quite famous- automation, saves time, reduces human error, etc.

Also, there have been several examples of harm caused by AI in recent years such as Imagenet, and Narxcare- The drug overdose software solution. Other problems the AI needs to overcome are:

1. Biased algorithms: AI systems have been found to exhibit biases in decision-making, due to the biased data they are trained on. For example, facial recognition systems have been shown to perform less accurately on people with dark skin tones, leading to concerns about racial bias.

2. Privacy violations: AI systems can process and store vast amounts of personal data, which raises concerns about privacy violations. For example, there have been instances where facial recognition technology has been used for surveillance purposes, leading to concerns about government overreach.

3. Job displacement: As AI systems become more capable, there is a risk that they will automate certain jobs, potentially leading to unemployment and a loss of livelihoods for workers.

4. Misuse of AI systems: AI systems can be used for malicious purposes, such as creating fake news.

5. Ethical dilemmas: AI systems can sometimes make decisions that raise ethical dilemmas, such as when they are used in autonomous weapons systems.

Well, a few critics say, such disadvantages are seen due to a lack of inclusion, and data quality in training for AI. AI development is opaque, complex and has other barriers which make it difficult for third parties to verify the claims made by developers.

Unfortunately, it remains very difficult for regulators to evaluate AI application algorithms and test them to understand potential risks. It is difficult to assess whether deployed AI systems illegally discriminate against protected categories.

For example, can we analyze how well a computer vision system performs when confronted with pictures of people from different demographic backgrounds? Can we grade the output of a natural language processing system asked to produce content on different ethnicity?

AI is gradually entering all our everyday gadgets; it is important AI is governed and has proper regulations to follow. Auditing AI products helps to provide assurance to the public to some extent.

But auditing AI products is not an easy task. AI products are complex in nature. Also, context matters greatly and what is acceptable in one application might not necessarily be in another – for example, an algorithm used in a medical or social welfare application will require far more scrutiny & regulations than an algorithm used for a music application.

But even the core technical parts, such as the algorithm, the compute and the training sets, remain very difficult to properly scrutinize. Even the datasets used in machine learning and AI training are sometimes incomplete and include biases. There is always a risk of harmful algorithmic systems; It is important to have more toolkits that will empower policymakers, activists and white hat hackers of the future.

AI technologies will evolve, grow, and affect the way people work in the future. Currently, the AI growth phase offers a great opportunity for the IT community to step up and establish sound governance around auditing AI. Frameworks like COBIT, a powerful and time-tested methodology, can be leveraged to pave the way. Such frameworks and regulations could help AI benefits outweigh the harm caused by it.

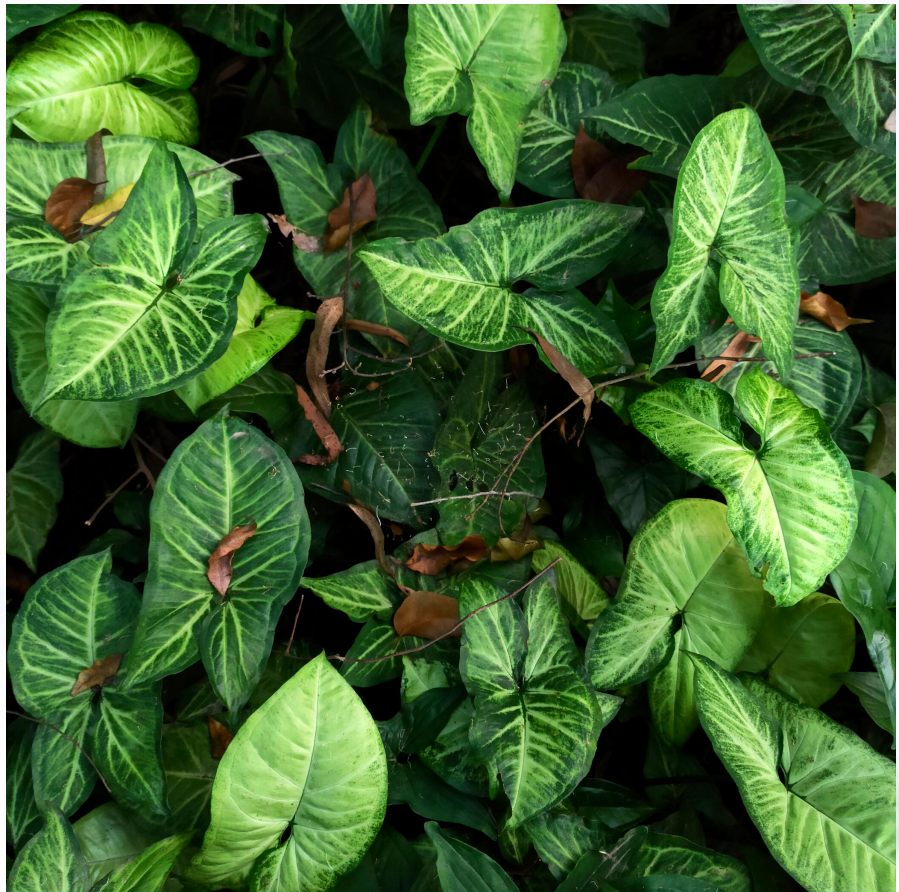
Impressions of Nature



Submitted by:
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Submitted by:
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Club Activities

The speaker for the Corporate Interface was Sumit Bhosale, Head ,Operations, Elliots Group. Head of Specialization, Prof. N Ramakrishnan, faculties and Students of Lean Operations and Systems participated in the session. The discussion started off with the speaker speaking about the importance of a system , and what could be the major causes and effect of a system being not followed in the industry. The speaker made sure to engage the audience with him lively way of delivery and giving relevant scenarios from industry, he focused more on innovating things that has already been invented and how it could help the future generations evolve with time. It moved forward with the speaker's understanding of the subject . A thorough explanation of the topic was done. It was an interactive session that ended with a Question and Answer session (Q&A). The speaker was awarded with a token of appreciation at the end of the session for sharing his knowledge



The club activity aimed at enhancing the skills one should have during the ongoing Placements. The attendees were divided into several and were given the topics for the discussion to be carried, along with several minutes for preparation. The topics given for Group Discussion included Tech Layoffs, 5G Tech Services in India-Benefits and Impact, Is Metaverse a Revolutionary Technology or just hype, Impact of Chat GPT AI, for the current tech industry, Musk-Twitter Deal: Boost to Freedom of speech or Caging a Golden Bird. The students tried to give constructive arguments as much as they could and the performance of each student was validated by their peers were given feedback as to where the individual lacks and ways how to overcome it. The students found it useful, which would also further help them for placements coming further.



Club Activity - Panel Discussi

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The speaker for the Corporate Interface was Dr Debopam Chakrabarti, Associate Director, Deloitte. Head of Specialization, Prof. N Ramakrishnan, faculties and students of Lean Operations and Systems participated in the session. The discussion started off with the speaker taking the audience the evolution of Supply Chain and giving insights on how supply chain used to be a few years ago and how the supply chain has evolved to the way it is today. Furthermore, the guest focused on the Technologies prevalent in the Supply Chain and also Future trends that could help evolve the supply chain. It moved forward with the speaker's understanding of the subject . A thorough explanation of the topic was done and it gathered curious minds to raise their doubts about the discussion. It was an interactive session that ended with a Question and Answer session (Q&A). The speaker was awarded with a token of appreciation at the end of the session for sharing his knowledge.



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