NOESIS
ACTION SIMPLIFIED
THE OPERATIONS CLUB OF SIMS
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What's Inside

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The roots of education are bitter, but the fruit is sweet.
- Aristotle

Human behavior flows from four main sources: Desire, Passion, Emotion, and Knowledge.
- Plato

Dear Reader,

The Operations club of SIMS is pleased & proud to introduce the August edition of Lead Time. We are here to upgrade our student manager’s knowledge on latest technology of operations. Keeping your interests in mind, this time we have chosen the topics very carefully, so that you benefit from it. The articles rage showcase from topics on Toyota new global architecture, Distributed Manufacturing, IT operations to Scrum technology.

This month’s newsletter will elevate you to the latest technology of operations in industries. You will really feel interested in knowing the fact behind the technology & services implemented by few of the Multinational companies.

Operations management is the way we can improve the process around us. And these articles help us to widen our thinking, in term of technology involved in processes.

Keep Enhancing knowledge!!!
TOYOTA New Global Architecture (TNGA)

“Sudden and drastic changes in the business environment mean that conventional ways of thinking and doing business can no longer help us grow sustainably. We are at a crossroads where we must now build a new business model.”

- Toyota President Akio Toyoda

Toyota “A top automobile manufacturing firm” is known for its improvements in core vehicle performance and product appeal. Toyota has given the world such manufacturing concepts as “Just-in-time-inventory”, “3M”, “Continuous improvement.” And now with the potentially revolutionary “Toyota New Global Architecture (TNGA)”, Toyota looks to change the face of global automotive manufacturing once again. Through TNGA customers will be able to enjoy more stylish cars that are safer and more enjoyable to drive. At the same time, Toyota will substantially reduce the number and variety of different vehicle components, enabling smarter development and manufacturing that will increase efficiency and save time.

It marks a revolution in the way Toyota designs, engineers and manufactures vehicles, streamlining the process by standardising the size and position of key components within standard new vehicle platforms. In this way it is integral to Toyota’s mission to build ever-better cars efficiently.

Three Pillars of Monozukuri Structure Reform

1. One-by-one Production
2. Produce at the optimum speed for sale
3. Small-scale Production

Low-Cost, Small Volume Production

TNGA is an innovative, integrated development approach for powertrain components and vehicle platforms. Toyota takes the concept of platform sharing to a high level with TNGA by standardising components and their lay-out across different vehicle segments, and fully integrating both its manufacturing
operations and its suppliers in the new concept at a very early stage. Thus development of vehicles is being grouped to promote strategic sharing of parts and powertrain components with the goal of reducing resources required for development and by working even closer with suppliers, Toyota intends to further reduce costs and reinvest the resulting resources into developing advanced technologies and strengthening product appeal.

The overall goals of TNGA:

- 20% reduction in resources for new model development
- 25% improvement in fuel economy with 15% more power
- 40% reduction in cost of a new plant
- 50% reduction in launching a new model, with almost zero downtime
- Eventual target of 75% reduction in part numbers
- Improved quality, safety, energy efficiency, and flexibility

The use of highly flexible, modular platforms in the auto industry is a proven means of speeding up development and reducing costs, substantially. Toyota already uses modular platforms but is taking things a step further with the TNGA, particularly in the area of strategic sharing of parts and powertrain elements. The automaker aims to reduce the call on its resources by 20 percent or more with the TNGA platform.

But it’s not just about cost savings. There will be performance and efficiency gains, too. In designing the platform, engineers have repositioned and lowered the centre of gravity of powertrain components. The powertrains, too, will be completely new. They’ve also focused on reducing the weight of the size of certain components, while at the same time increasing overall body rigidity by as much as 30-65 percent thanks to higher strength materials and new laser welding techniques.

The automaker says it’s increased the overall fuel efficiency of its powertrains by about 25 percent and overall power output by more than 15 percent, gains achieved by improving the
thermal efficiency of its engines and reducing the parasitic losses of its transmissions. Its hybrid systems, meanwhile, are also being improved.

Thanks to a re-think of the drive unit layout and the design of smaller electric motors, inverters and batteries, Laser Screw Welding, Slush-moulded dashboards, One-at-a-time bumper production, Heat recovery system, Hybrid solar panels and Recycling batteries.

The long term benefits will be larger, more flexible factories with production lines that can quickly and easily be adapted to meet different manufacturing requirements.

**New-generation factories:** The new-generation factories designed as part of the TNGA (Toyota New Global Architecture) programme will be simple single-storey structures. They will be cheaper to build and power. The lack of overhead production equipment means that natural light will be allowed to flood into the production area.

**Re-invented production line:** Rather than a conventional conveyor belt that is mounted in a pit, Toyota’s new conveyor belt sits on the surface of the factory floor and is made in sections. This allows the belt to be made longer or shorter, simply by adding or removing sections of conveyor belt.

**New production equipment:** The new production equipment will be mounted on rollers, rather than being bolted to the floor. This means the equipment can be easily moved if the length of the production line changes. This functionality will be particularly valuable when it comes to introducing new features into cars.

- Submitted By: Abhishek Prasad
  MBA 2016-18 (E-03)
Distributed Manufacturing

Distributed manufacturing turns on its head the way we make and distribute products. In traditional manufacturing, raw materials are brought together, assembled and fabricated in large centralized factories into identical finished products that are then distributed to the customer. In distributed manufacturing, the raw materials and methods of fabrication are decentralized, and the final product is manufactured very close to the final customer.

In essence, the idea of distributed manufacturing is to replace as much of the material supply chain as possible with digital information. To manufacture a chair, for example, rather than sourcing wood and fabricating it into chairs in a central factory, digital plans for cutting the parts of a chair can be distributed to local manufacturing hubs using computerized cutting tools known as CNC routers. Parts can then be assembled by the consumer or by local fabrication workshops that can turn them into finished products. One company already using this model is the US furniture company at FAB.

Current uses of distributed manufacturing rely heavily on the DIY “maker movement”, in which enthusiasts use their own local 3D printers and make products out of local materials. There are elements of open-source thinking here, in that consumers can customize products to their own needs and preferences. Instead of being centrally driven, the creative design
element can be more crowd sourced; products may take on an evolutionary character as more people get involved in visualizing and producing them.

Distributed manufacturing is expected to enable a more efficient use of resources, with less wasted capacity in centralized factories. It also lowers the barriers to market entry by reducing the amount of capital required to build the first prototypes and products. Importantly, it should reduce the overall environmental impact of manufacturing: digital information is shipped over the web rather than physical products over roads or rails, or on ships; and raw materials are sourced locally, further reducing the amount of energy required for transportation.

If it becomes more widespread, distributed manufacturing will disrupt traditional labour markets and the economics of traditional manufacturing. It does pose risks: it may be more difficult to regulate and control remotely manufactured medical devices, for example, while products such as weapons may be illegal or dangerous. Not everything can be made via distributed manufacturing, and traditional manufacturing and supply chains will still have to be maintained for many of the most important and complex consumer goods.

Distributed manufacturing may encourage broader diversity in objects that are today standardized, such as smartphones and automobiles. Scale is no object: one UK company, Facit Homes, uses personalized designs and 3D printing to create customized houses to suit the consumer. Product features will evolve to serve different markets and geographies, and there will be a rapid proliferation of goods and services to regions of the world not currently well served by traditional manufacturing.

Submitted By: Maneesh Sachan
MBA 2016-18 (C-23)
Each production house comes up with many innovative processes so as to increase their overall efficiency. One of such innovative methods of production was introduced recently by Honda for their automobile production and is known as **ARC line process**.

- This method was introduced at Prachinburi Plant in Thailand which is involved in the production of Civic model.
- This method was developed by incorporating Flowing cell production style production.
- As the name suggests, in this method the production workers get on board, the ARC unit and assemble one vehicle body with complete set of parts while moving along the production line with the vehicle.
- The surface is covered with wood and its wide area enables operators to access parts and components that are positioned within close proximity of the vehicle.
- The operators install different components such as interior and exterior parts using battery-powered fastening tools and they are also equipped with a tablet type of device, which contains paperless instructions and error-proofing software.
- This configuration is very much flexible such that the number of platforms can be increased or decreased dynamically to adjust assembly line’s length. Honda claims that the cost to implement ARC was cheaper than traditional automotive assembly lines.
- According to sources, Honda claims that their overall efficiency increased by 10%.
- This is achieved because the operators are loaded with full boxes of parts at the start of the assembly line and empty boxes are retrieved at the end which is also the same spot and the number of spots at which the parts are to be brought are also less which reduces the workload which increases the efficiency of the production line.
**Key Technological changes employed:**

**PLUTO System (Proficiency Learning and Ushering Target for Operator)**
- The operators are provided with Tablet type devices which gives them paperless instructions (as well as Audio and Video).
- Inspection of each vehicle is done immediately at the QGATE for assembly errors.
- Ensures high quality maintenance during the assembly process.

**DISC System (Distribution Set pack Control)**
- Works in connection with production planning.
- Helps in supplying appropriate parts to each production associate.
- Indicator that is placed on the parts shelves indicate the location of necessary parts by illuminating the light.

- Submitted By: Rathish J  
  MBA 2016-18 (A-41)
Lean IT is the extension of lean manufacturing and lean services towards the development and management of information. Its central concern, applied in the context of IT, is the elimination of waste, where waste is work that adds no value to a product or service in technology (IT) products and services.

**Lean IT Principles**

- **Value Streams**
  
  These are the services provided by the IT function to the parent organization for use by customers, suppliers, employees, investors, regulators, the media, and any other stakeholders.

- **Value-Stream Mapping**
  
  It involves a methodology of value-stream mapping diagramming and analysing services (value streams) into their component process steps and eliminating any steps (or even entire value streams) that don’t deliver value.

- **Flow**
  
  Flow is one of the main concepts of Lean similar to “mura”. It is an approach to reduce the waste in the system.

  For example, a software development team may produce code in a language familiar to its members and which is optimal for the team (zero muda i.e. no waste). But if that language lacks an API standard by which business partners may access the code, a focus on mura will expose this otherwise hidden source of waste.

- **Pull/Demand System**
  
  A pull is a service request. It is the initial request and could be from the customer or consumer of the product or service.

  For example, a customer initiates an online purchase. That initial request in turn triggers a subsequent request (for example, a query to a database to confirm product availability), which in turn triggers additional requests (input of the customer’s credit card information, credit verification, processing of the order by the accounts department, issuance of a shipping request, replenishment through the supply-chain management system, and so on).
Trends towards Lean IT

➢ Recessionary Pressure to Reduce Costs

The onset of economic recession in December 2007 was marked by a decrease in individuals’ willingness to pay for goods and services, especially in face of uncertainty about their own economic futures. Meanwhile, tighter business and consumer credit, a steep decline in the housing market, higher taxes, massive layoffs, and diminished returns in the money and bond markets have further limited demand for goods and services.

When an economy is strong, most business leaders focus on revenue growth. During periods of weakness, when demand for goods and services is curbed, the focus shifts to cost-cutting. In-keeping with this tendency, recessions initially provoke aggressive (and sometimes panic-ridden) actions such as deep discounting, fire sales of excess inventory, wage freezes, short-time working, and abandonment of former supplier relationships in favor of less costly supplies. Although such actions may be necessary and prudent, their impact may be short-lived. Lean IT can expect to garner support during economic downturns as business leaders seek initiatives that deliver more enduring value than is achievable through reactive and generalized cost-cutting.

➢ Proliferation of Online Transactions

IT has traditionally been a mere support function of business, in common with other support functions such as shipping and accounting. More recently, however, companies have moved many mission-critical business functions to the Web. This migration is likely to accelerate still further as companies seek to leverage investments in service-oriented architectures, decrease costs, improve efficiency, and increase access to customers, partners, and employees.

The prevalence of web-based transactions is driving a convergence of IT and business. In other words, IT services are increasingly central to the mission of providing value to customers. Lean IT initiatives are accordingly becoming less of a peripheral interest and more of an interest that is intrinsic to the core business.
Green IT

Though not born of the same motivations, Lean IT initiatives are congruent with a broad movement towards conservation and waste reduction, often characterized as green policies and practices. Green IT is one part of this broad movement. Waste reduction directly correlates with reduced energy consumption and carbon generation. Indeed, IBM asserts that IT and energy costs can account for up to 60% of an organization's capital expenditures and 75% of operational expenditures. In this way, identification and streamlining of IT value streams supports the measurement and improvement of carbon footprints and other green metrics. For instance, implementation of Lean IT initiatives is likely to save energy through adoption of virtualization technology and data center consolidation.

- Submitted By: Hitesh Kumar
  MBA 2016-18 (E-25)
The Scrum

The Scrum approach to agile software development marks a dramatic departure from waterfall management. Scrum and other agile methods were inspired by its shortcomings. Scrum emphasizes collaboration, functioning software, team self-management, and the flexibility to adapt to emerging business realities.

Scrum is part of the Agile movement. Agile is a response to the failure of the dominant software development project management paradigms (including waterfall) and borrows many principles from lean manufacturing. In 2001, 17 pioneers of similar methods met at the Snowbird Ski Resort in Utah and wrote the Agile Manifesto, a declaration of four values and twelve principles. These values and principles stand in stark contrast to the traditional Project Manager’s Body Of Knowledge (PMBOK). The Agile Manifesto placed a new emphasis on communication and collaboration, functioning software, team self-organization, and the flexibility to adapt to emerging business realities.

In the agile Scrum world, instead of providing complete, detailed descriptions of how everything is to be done on a project, much of it is left up to the Scrum software development team. This is because the team will know best how to solve the problem they are presented.

This is why in Scrum development, for example, a sprint planning meeting is described in

**SCRUM FRAMEWORK**
terms of the desired outcome (a commitment to a set of features to be developed in the next sprint) instead of a set of Entry criteria, Task definitions, Validation criteria, Exit criteria (ETVX) and so on, as would be provided in most methodologies.

Scrum relies on a self-organizing, cross-functional team. The scrum team is self-organizing in that there is no overall team leader who decides which person will do which task or how a problem will be solved. Those are issues that are decided by the team as a whole. And in Scrum, a team is cross functional, meaning everyone is needed to take a feature from idea to implementation.

Within agile development, Scrum teams are supported by two specific roles. The first is a ScrumMaster, who can be thought of as a coach for the team, helping team members use the Scrum process to perform at the highest level.

The product owner (PO) is the other role, and in Scrum software development, represents the business, customers or users, and guides the team toward building the right product.

While optimal Agility requires fundamental changes to organizational design, it’s tempting to use one of the hybrid approaches that combine a watered-down version of Scrum with traditional hierarchical management. Large organizations that are more committed to the values and principles of the Agile Manifesto are advised to learn about Large Scale Scrum (LeSS).

- Submitted By: Maneesh Sachan
  MBA 2016-18 (C-23)
Thank You