

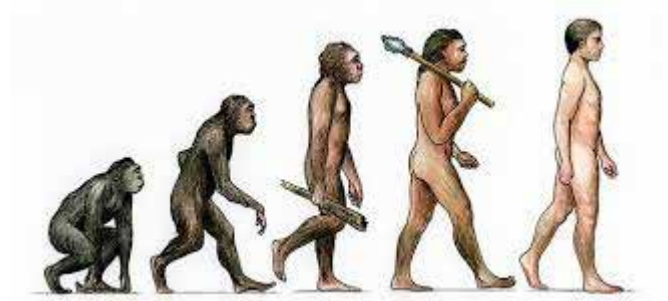
Technology Revolution for Industry Growth

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Evolution of Mankind

Science discovered the evolution of human brain since last 6 million years from a mere emotional Limbic brain of an animal to a thinking gadget with the growth of Cortex and Neo cortex. Ever since human species got the rational & imagination faculties, they have never stopped challenging the status quo to move away from stone age to iron age to digital age now. Constantly human brain is seeking to discover the secrets of mother's nature, convert science to technology and then engineer new products for human comfort and happiness. Those of us living in the current era are the luckiest in terms of scientific inventions that made our life most comfortable. Although human beings are the weakest creation physically, learned to fly without wings, sail in the ocean and even reach the farthest planets through innovation. This quest for knowing & conquering nature will continue till the imagination exist as faculty of human beings.



Industrial Revolution

In the last 3 centuries mankind witnessed many inventions that revolutionised the way civilisation moved forward. To cite a few the first one is Gutenberg's invention of printing press in 1468, which provided the breakthrough of recording and dissemination of knowledge. The second one was locomotive by George Stephenson in 1825 which reduced the human slavery. The invention of IC engines by Nikolaus Otto in 1876 revolutionised transportation. The birth of digital age commenced by the invention of electronic computers in 1943 by Max Newman which revolutionised the way human beings

Mr. NC Narayanan

Founder Chairman of SSA Group

NC Narayanan, fondly known as 'NC', is the Founder Chairman of SSA Group. His personal mission when he founded SSA back in 1999 was to help industries achieve "Prosperity through Quality" – a goal that he has pursued with passion throughout his career spanning almost five decades.

As a CEO coach and mentor for leadership teams across geographies, NC has made significant contribution to hundreds of organisations and thousands of people across multiple countries spanning South Asia, Middle East and Africa where he has earned the reputation of a 'Transformation catalyst'. He specialises in Envisioning, Strategy Formulation and Change Management with an emphasis on leadership and people development. NC is also very passionate about developing young leaders by mentoring and coaching them. He is an avid blogger and writes on myriad topics such as "Parenting", "How to make marriage work?", "Psychic equity" and many other self-development topics.

NC has authored many books on the topics of Lean and Statistical Problem Solving. Some of his popular books are "Enigma of Lean", "Lean Six sigma in a Nutshell" and "Statistical Guide for six sigma". McGraw Hill Education has published his latest book "Pragmatic Leadership" in which he deals with a systematic approach to mastering leadership through personal leadership, team leadership and organisational leadership. He has been conferred with several awards in recognitions of his contributions to the field of Quality & Business Excellence. NC is a revered speaker and regularly chairs international conferences on Lean Management, Six Sigma and Operational Excellence. NC is a Gold Medallist in Mechanical Engineering from Anna University, and holds an MS in Computer Aided Design from the prestigious Indian Institute of Technology, Madras.



live today. The digital age pervaded into every aspects of our life today with the advent of smartfones which has become an indispensable gadget of our daily life. This will continue to unearth all unknown territories of nature.

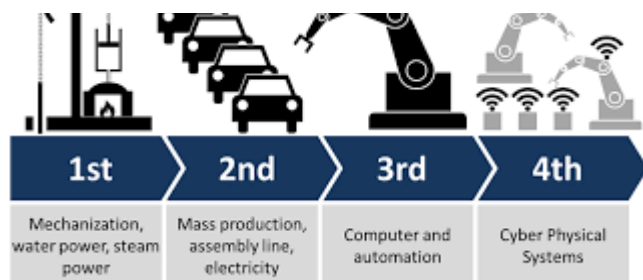


Change vs Transformation

There are many emerging concepts and technology that improves efficiency and effectiveness of the enterprises which are small incremental changes and some of them are breakthrough transformations. There is a subtle difference between ‘Change’ and ‘Transformation’.

- The change is incremental but transformation is significant
- Change needs acceptance but transformation needs a paradigm shift
- Change gives a marginal improvement in results by transformation leads to huge benefits
- Change is reversible but transformation is irreversible.

Technology revolution in manufacturing



The **Industry 4.0** is the buzz word for leaders who are looking for the next step to lead transformation in their industry. Let us look at what is this buzz word really mean. There are 4 major steps in which the manufacturing technology transformed in the last 3 centuries. The first one is the invention of steam power which is called **Industry 1.0** that gave birth to usage of energy for many industrial work.

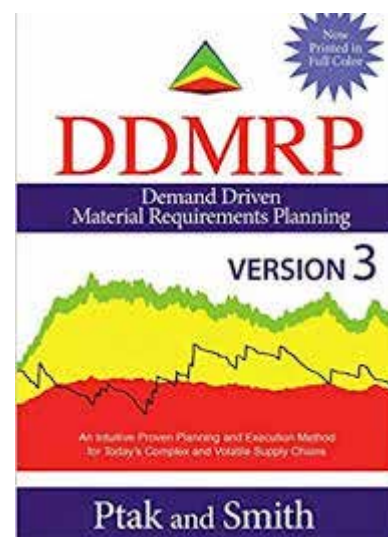
In 1906 Henry Ford established the mass production based on the concept interchangeability proposed Eli Whitney in 1798 which is the major step forward

in manufacturing complex gadget like automobile in large quantities. Mass production technology applying electrical energy is referred to as **Industry 2.0**. So, the current manufacturing systems adopted by vast majority of the manufacturing companies are based on Ford manufacturing systems.

During 1950s, Taichi Ohno from Toyota car manufacturing introduced the concept of Lean manufacturing challenging the ford manufacturing system by eliminating the waste from a manufacturing system which are referred as 7 Muda (Japanese word for Waste). The invention of computers and application of digital systems in manufacturing technology through CNC machines significantly improved the accuracy and change over times leading to flexible manufacturing systems called FMS. This step forward is called **Industry 3.0**.

The next major transformation happened when **Tim Berners Lee** invented the Internet by networking of computers and developing a common language through which the computers worldwide can talk to each other. No one knew that Internet will lead to cloud and all digital information age. IOT (Internet of things) pervaded into manufacturing creating all machines as intelligent machines leading to ‘Cyber physical systems’ combining human beings and robots together which is called **Industry 4.0**

MRP to DDMRP (Material Requirement Planning to Demand Driven MRP)





One of the major concerns of a manufacturing and trading companies is increasing inventory consuming working capital which eats away the profit. The companies borrow funds from banks for augmenting the demand in working capital leading to incapability to service the debts. One fine morning a heavy cash crunch happens and the industry declares insolvency. The CEOs have nightmares to manage working capital and hence scared of facing the stakeholders in the board rooms.

More the complex the organisation becomes, greater is the inventory management issues. There are many external factors changed over the last few decades. Many decades ago the product variety was low and customer waiting time was high. As we move into 21st century the customer expectations have gone up with increased obsolescence of products demanding more frequent new products. As the product life cycle comes down the non-moving stock piles up. The regulatory norms are increasing day by day with new & stringent norms for safety and performance of the products to meet environmental norms. In addition to the above industries face stiff competition constantly differentiating to have customer stickiness. The digital technologies and IOT changed the way commerce works. The e-commerce and mall culture changed the way outbound logistics works. Hence what concepts and paradigms worked decades ago are falling apart to meet the changing environments discussed above.

The concept of material requirements planning (MRP) introduced in early 1960s has given leverage for planning and execution through computerised planning system. MRP is based on the forecasting which has its own inaccuracies. The recent research shows that the highest forecasting accuracy is 61% which means the planning, procurement and manufacturing of goods are based on 40% inaccurate information. More over the variation in product design, supplies, quality issues etc

introduces many variability that affects inventory. This is one of the reasons for the piling up of inventory. The MRP is called “PUSH system” as it assumes a sale and pushes material across the value stream.

In order to solve this problem Ptak and Smith introduced a new concept called “DDMRP” based on a scientific demand driven planning system as a natural extension of Lean manufacturing (Refer the book DDMRP for more details). DDMRP works on Customer pull instead of pure forecasting. The engine that drives DDMRP is called de-coupling through strategic buffers and strategic locations which reduces inventory substantially and increases sales with right materials available at the right place. DDMRP is supported by computerised applications that work seamlessly with the ERP systems. The results achieved through DDMRP is 30% reduction in inventory with over 99% on time delivery.

Change Management

The human beings always have a resistance to change to adopt to the new environment. The main reason for resistance to change is due to the fear of obsolescence, Lack of knowledge and the need for learning the new skills. So, the resistance starts from the leadership level and percolates up to lower most level of the organization. The major challenge for adopting the new technologies needs an open-minded approach considering the benefits and also recognizing the possible obsolescence that threatens the very existence of the organization. The paradox is:

- Prosperity is the result of improvement
- Improvement is the result of change / transformation
- Human beings want prosperity but resist change!!

Conclusion:

The industries of the world acknowledge the fact that adopting the available technology is a must, however, their major challenge comes in adopting the right technology that would suit their business. Adopting technology is not enough but adopting the right technology is the key to utilise the benefits that the technology has to offer for an organization to grow.