

ISSN 2320-0758

PRICE ₹ 50/-

MATERIALS MANAGEMENT REVIEW



Volume 18 - Issue 10 date of Publication : 1-8-2022 No. of Pages 1-60 August 2022

Special Issue on **CIRCULAR ECONOMY**





भारतीय सामग्री प्रबंधन संस्थान Indian Institute of Materials Management

NHQ - Plot No. 102-104, Sec. 15, Institutional Area, CBD Belapur, Navi Mumbai-400614

**ADMISSION
OPEN AUGUST 2022
SESSION**

Explore a career in Management of Purchasing, Warehousing,
Supply Chain, Logistics & Materials Management

AICTE APPROVAL - F. No. Western/2022-23/1-11022203401

Post Graduate Diploma → **Materials Management**
→ **Logistics & SCM**

FRESH GRADUATES CAN ALSO APPLY

Entrance Test at IIMM Branches for Admission – August 7, 2022

S No.	Programmes	Approved	Eligibility	Duration
1	Post Graduate Diploma in Materials Management (PGDMM)	AICTE	Graduate in any discipline from any Recognized University	2 Years
2	Post Graduate Diploma in Logistics & SCM (PGDL&SCM)	AICTE	Graduate in any discipline from any Recognized University	2 Years

PROSPECTUS CAN BE OBTAINED FROM FOLLOWING IIMM BRANCHES

Prospectus Cost Rs.1000/- & By Post Rs.1100/-

NORTHERN REGION ALWAR -9731245655 / 787775655 CHANDIGARH 9815314430 / 0172-2556646 DEHRADUN 9410397734 GREATER NOIDA 9818464359 HARIDWAR 8126111611 JAIPUR 9001893395 KANPUR 0512-2401291 LUCKNOW 0522-2638264 LUDHIANA 0161-5212268 / 9815549987 NEW DELHI 011-41354969 / 9810830427 / 9818664267 RAE BARELI 9451077744 UDAIPUR 9829041733 / 8107283099

EASTERN REGION BOKARO 8986873175 / 8986873151 BURNPUR 9434777116 DHANBAD 9470595250 DURGAPUR 0343-2574303 JAMSHEDPUR 0657-2223539 / 9798171971 KOLKATA 9836123999 / 9830952363 NALCO 9437081126 RANCHI 0651-2360716 / 8987788599 ROURKELA 8260711943

WESTERN REGION AHMEDABAD 7383012684 / 9909996711 AURANGABAD 9423455983 BHARUCH 9998975891 GOA 9423007106 GANDHIDHAM 7046737857 JAMNAGAR 0288-2750171 MUMBAI 022-26855645 / 9820393639 MUNDRA 98687660068 NASHIK 0253-2314206 / 9850730029 PUNE 7276010854 SURAT 0261-2802682 VADODARA 7802053410 VAPI 9879569350 VU NAGAR 9825028050

SOUTHERN REGION BANGALORE 080-25327251 / 9900862486 CHENNAI 044-23742750 / 9444656264 COCHIN 0484-2203487 / 9400261874 HOSUR 9448018407 HUBLI 0836-2264699 / 9482779440 HYDERABAD 9398134227 K G F 9880994684 MANGALORE 0824-2882203 MYSORE 0821-4282124 / 9342112303 TRIVANDRUM 8086011015 VISAKHAPATNAM 7093802468 / 9010556099

CENTRAL REGION BHOPAL 8085856437 BHILAI 9407984081 BILASPUR 9425531806 INDORE 9826625417 NAGPUR 0712-2229446 / 9423074072

Application form can be downloaded from www.iimm.org and can be submitted to nearest IIMM Branch

Contact Us **NHQ- Mumbai**

Ph: 022-27571022
@ iimmedu@iimm.co.in

NHO- Delhi Office

Ph: 011-43615373
@ Education.nhqdelhi@iimm.org

From the Desk of Chief Editor & National President



Circular Economy is an economic system which targets zero waste & pollution by reusing and recycling the materials throughout its life cycle and finally return to environment in a natural regenerating manner thereby protecting the environment. Circular Economy can be defined as an economy which identifies, innovates and implements newer ways to reduce or eliminate industrial waste so as to mitigate the ecological and environmental impact of industries prior to happening rather than waiting to address the consequences of these issues.

United Nations has covered the concept of Circular Economy under Sustainable Development Goals (SDGs), target 8.4 which states that, there is a need to improve global resource efficiency in consumption and production, and decoupling economic growth from environmental degradation, the ultimate goal of a sustainable circular economy.

The transition from linear economy to circular economy envisages more cooperation from manufacturers by implementing new and innovative concepts of promoting resource optimization, recover waste by recycling or giving the product a second life as a new one, and reduce raw material consumption. It is further imperative for business entities to create supply chains that recover or recycle the resources used to create their products which not only shrink their environmental footprint, trim operational cost & waste, and use expensive and natural resources more efficiently & wisely.

Application of circular economy bears cascading impact in combating climate change, preventing waste and lowering the cost of production. For instance, production and use of steel, cement, aluminium and plastic as per circularity principles could lead to a reduction of upto 40 % Greenhouse gas emissions by 2050. Using recycled or reused building material (steel, sand, dust etc.) for building construction can result in savings of upto 25% of material cost. Similarly, using modular technology (breaking desired solution in to smaller solutions and integrating them with the help of software engineering), 3D printing, optimizing energy use, and reusing or recycling high-value materials at the end of their life cycle can result in prevention of one-third of projected global plastic waste generation by 2040.

It is estimated that adoption of a circular economy in India will result in yearly benefits of \$624 billion by 2050 and a 44% reduction in greenhouse gas emissions. The circular economy is a profoundly different model that can incentivize economic growth and generate millions of Jobs (As per NITI Aayog, around 1.4 million jobs will be generated by investing in the circular economy) without compromising on the environment front, thus representing the cornerstone for a resilient and low-carbon economy.

It is therefore, imperative for SCM professionals to focus on essentials of circular economy in all the facets of SCM and contribute towards better living conditions and well-being on mother earth.

H. K. SHARMA
mmr@iimm.org



*IIMM is a charter member of
International Federation of
Purchasing & Supply Management*

Chief Editor & Publisher

H.K.Sharma, National President

Core Committee :

Ashok Sharma,

President 5M India

T.G.Nand Kumar,

Former GM (Materials), TERI

National President :

H.K.Sharma, np@iimm.org

Editors :

Malay Mazumdar, IPP -

ipp@iimm.org

JS Prakash Rao Sr.VP -

srpv@iimm.org

Surendra Deodhar, NS&T -

nst@iimm.org

N.V. Raghu Babu, VP Central -

vpcentral@iimm.org

KR Nair, VP West -

vpwest@iimm.org

Ageet Kumar, VP North -

vpnorth@iimm.org

N Swayambhu, VP South -

vpsouth@iimm.org

Shambhu Shekhar, VP East -

vpeast@iimm.org

Prof.(Dr.) V.K.Gupta-IMT Ghaziabad

Prof.(Dr.) Goutam Sen Gupta,

Vice Chancellor- Techno India University

Correspondence :

MATERIALS MANAGEMENT REVIEW

**Indian Institute of Materials
Management**

4598/12 B, 1st Floor, Ansari Road,

Darya Ganj, New Delhi - 110 002.

Phones : 011-43615373

Fax: 91-11-43575373

E-mail: iimmdelhimmr@gmail.com &

mmr@iimm.org

Website : www.iimm.org

Printed at :

Power Printers,

4249/82, 2 Ansari Road, Daryaganj,

New Delhi - 110002



MATERIALS MANAGEMENT REVIEW

Volume 18 - Issue 10

(August 2022)

CONTENTS

PAGE NO.

■ CIRCULAR ECONOMY AS A TOOL FOR POST COVID RECOVERY	5
■ A STUDY ON THE CIRCULAR ECONOMY – BENEFITS AND BARRIERS FOR THE FUTURE	7
■ FUTURE OF BUSINESS: CIRCULAR ECONOMY: ROLE OF SUPPLY CHAIN	11
■ CIRCULAR SUPPLY CHAIN - A WAY TO SUSTAINABLE VALUE CREATION	15
■ CIRCULAR ECONOMY AND BUSINESS SCENARIO	20
■ DIGITAL SUPPLY CHAIN MANAGEMENT	22
■ WASTE MANAGEMENT	23
■ A DIGITAL SUPPLY CHAIN CAN BE A GAME CHANGER FOR THE SME SECTOR IN INDIA	21
■ DIGITAL SUPPLY CHAIN: DRIVING THE FUTURE OF INDIAN COMPANIES	23
■ FROM THE FOREST TO EVERY HOUSEHOLD	26
■ CIRCULAR-ECONOMY	27
■ HERE'S WHAT INDIA NEEDS FOR A SYSTEMATIC PLASTIC WASTE RECYCLING	28
■ CIRCULAR ECONOMY – FOR SUSTAINABLE DEVELOPMENT AND ECONOMIC GROWTH WITH A BETTER LIVING CONDITION AND A CLEAN ENVIRONMENT	30
■ DIGITIZATION OF SUPPLY CHAIN LOGISTICS	32
■ CIRCULAR ECONOMY QUIZ	34
■ CIRCULAR ECONOMY AND MATERIAL VALUE CHAINS	35
■ WHY INDIA NEEDS A CIRCULAR ECONOMY	36
■ HOW TO TACKLE POLLUTION FUELLED BY MANUFACTURING IN DEVELOPING COUNTRIES	37
■ CIRCULAR ECONOMY A \$45 BILLION OPPORTUNITY BY 2030 IN INDIA: REPORT	39
■ PULP AND PAPER ARE THE PIONEERS OF THE CIRCULAR ECONOMY	40
■ INTERPERSONAL SKILLFOR MATERIALS MANAGEMENT FUNCTION	41
■ CIRCULAR ECONOMY AND LOGISTICS	42
■ PUTTING INDIA ON AN ACCELERATED PATH TO BUILD A CIRCULAR ECONOMY	43
■ NOW THAT IT'S HIT BOTTOM IN GLOBAL ENVIRONMENT INDEX, INDIA MUST ADOPT CIRCULAR ECONOMY MODEL TO BE HABITABLE	45
■ GOVT DRIVING TRANSITION FROM LINEAR TO CIRCULAR ECONOMY	49
■ ISO20400:2017(E) SUSTAINABLE PROCUREMENT	50
■ BRANCH NEWS	52
■ EXECUTIVE HEALTH	56
NO. OF PAGES 1-60	

Edited, Printed & Published by :

INDIAN INSTITUTE OF MATERIALS MANAGEMENT

4598/12 B, 1st Floor, Ansari Road, Darya Ganj, New Delhi - 110 002.

Phones : 011-43615373 Fax: 91-11-43575373

E-mail: iimmdelhimmr@gmail.com & mmr@iimm.org

Website : www.iimm.org

(Published material has been compiled from several sources, IIMM disowns any responsibility for the use of any information from the Magazine if published anywhere by anyone.)

CIRCULAR ECONOMY AS A TOOL FOR POST COVID RECOVERY

AJAY SRIVASTAVA
INDIAN ECONOMIC SERVICE, CAG ADVISER
ajaysri@nic.in

The Covid-19 pandemic has exposed vulnerabilities in our current economic system. The lockdowns have caused severe impacts on the global economy, which included individuals, Small and Medium Enterprises (MSMEs), large manufacturers and businesses. It created huge uncertainties and short as well as long-term shifts in consumer preferences and production practices.

The pandemic not only exposed the poor health infrastructure in many countries, it also brought to the fore the importance of global value chains and the dependencies on trade in fuels and metals and revenues generated from tourism and remittances. As per the European Investment Banks Covid 19 Economic Vulnerability Index, the most vulnerable group to COVID-19 included countries who are dependent on oil exports or those with rely high on tourism. In India, high vulnerabilities have been noted in healthcare systems and to capital flows.

The circular economy, as an instrument to decouple economic growth from resource use and environmental impact, opens the way for a resilient post Covid recovery as circular economy models use a system-focused approach involving industrial processes and economic activities that are restorative or regenerative by design, enable resources used in such processes and activities to maintain their highest value for as long as possible, and aim for the elimination of waste through the superior design of materials, products, and systems. A circular economy entails markets that give incentives to reusing products, rather than scrapping them and then extracting new resources.

The Covid 19 saw a major supply disruptions across the supply chain in various sectors of the economy in general and Food and healthcare in particular. The following analysis of these two sectors amply demonstrate the role, which circular economy could play in the resilient post Covid 19 recovery.

Food sector: COVID-19 has created huge shifts in terms of food access, food security and food loss and waste (FLW). At the farm level, food waste is often the result of market factors like price volatility, high labour costs, or lack of labour availability. In India, for instance, Covid period saw labour migration on a large scale, which created severe labour shortages in States like Punjab, which are dependable on labour from other states to work in their fields. This not only impacted sowing of crops but also the harvesting and marketing of crops,

resulting in food loss as well as waste of unsold crop.

The wastage has been primarily due to the fact that the supply chain for food is complex and highly specialized and production is user driven. The crop plantation is done in anticipation of the demand and farmers do not have the flexibility to adjust production mid-season when demand disruptions such as during Covid 19 become apparent. For instance, producers of fruits and vegetables often grow their crops specifically for either the grocery retail or the food service sectors like hotels & restaurants. Any unexpected change in demand makes the suppliers (farmers) helpless as the crop has already been planted.

Covid 19 also witnessed the FLW due to excess accumulation of stock at retail and household levels. For instance, when major buyers of dairy across the country (restaurants, tea, and coffee shops etc.) were temporarily closed due to lockdowns, the dairy industry suddenly had a surplus of milk on its hands. Cows couldn't stop being milked, so farmers who couldn't find alternative buyers dumped huge quantities of their excess milk. Milk couldn't be quickly re-purposed into other products with longer shelf lives, like cheeses, because of the limited processing capacity and cold storage.

In addition to the above, Covid 19 witnessed substantial changes in the production and consumption habits which influenced the generation of FLW along the supply chain. As per a report of Spanish Ministry for Agriculture¹, Fisheries and Food (MAPA), in general terms, household consumption has increased significantly across all food categories. Spanish consumers stockpiled non-perishable food and other supplies and have been found eating more indulgent and comfort foods (i.e., food craving), drinking more wine, beer, and other spirits, as well as snacks throughout the day. This behavioural pattern holds true for most countries that experienced prolonged lockdown periods and imply not only changes in food supply chains and in the generation of FLW due to sudden change in demand patterns, but also repercussions in the dietary pattern, which may be detrimental to the health.

Circular economy could be an effective tool for addressing above issues by exploring the potential of large-scale investment in regenerative, and digitally enabled precision agriculture. Precision Agriculture uses technology in agriculture, horticulture, and

aquaculture and focuses on developing and enhancing the tools and processes to efficiently use resources in crop production and reduce input use (water, fertilizer, seeds, herbicides, and insecticides). Precision Agriculture technologies and equipment such as soil and yield mapping using a GPS, laser land levellers, GPS tractor guidance systems, and variable-rate input application allow farm operators to calibrate their operations and achieve new levels of efficiency.

Health care: Another major highlight of the Covid induced material waste has been the “medical waste”. With the rapid rise in the number of confirmed cases, the amount of COVID-19 related medical waste also increased significantly. The daily COVID-19 related medical waste, for instance, in China was about 470 tons². According to a WHO Report³, Tens of thousands of tonnes of extra medical waste from the response to the COVID-19 pandemic has put tremendous strain on health care waste management systems around the world, threatening human and environmental health and exposing a dire need to improve waste management practices. The WHO Global analysis of health care waste in the context of COVID-19: status, bases its estimates on the approximately 87,000 tonnes of personal protective equipment (PPE) that was procured between March 2020- November 2021 and shipped to support countries’ urgent COVID-19 response needs through a joint UN emergency initiative. Most of this equipment is expected to have ended up as waste. The report further points out that over 140 million test kits, with a potential to generate 2,600 tonnes of non-infectious waste (mainly plastic) and 731,000 litres of chemical waste (equivalent to one-third of an Olympic-size swimming pool) have been shipped, while over 8 billion doses of vaccine have been administered globally producing 144,000 tonnes of additional waste in the form of syringes, needles, and safety boxes.

The report lays out a set of recommendations for integrating better, safer, and more environmentally sustainable waste practices into the current COVID-19 response and future pandemic preparedness efforts and highlights stories from countries and organizations that have put into practice in the spirit of “building back better”.

Recommendations include various circular economy strategies like using eco-friendly packaging and shipping, safe and reusable PPE (e.g., gloves and medical masks), recyclable or biodegradable materials; investment in non-burn waste treatment technologies, such as autoclaves; reverse logistics to support centralized treatment and investments in the recycling sector to ensure materials, like plastics, can have a second life.

Besides efficient waste management, pandemic also opened doors for refurbished medical devices. The global refurbished medical devices market is expected to grow by over 10% a year between 2020 and 2025, which represents market opportunities as well as

increased asset utilisation rates (therefore less reliance on new raw materials). The importance of these strategies have notably been highlighted in the US, where several state treasurers have urged ventilator makers to make service manuals and repair-related resources available to help hospitals deal with the crisis. This has cost reduction implications which will appeal to cash-strapped public health authorities, but is also conducive to lowering the greenhouse gas footprint, since remanufacturing has been shown by the United Nations’ International Resource Panel⁴ to reduce emissions by over 80% in key sectors.

Conclusion: The above specific examples of food and health sector only constitute a small opening into the wider possibilities presented by the circular economy when it comes to post Covid recovery plans. Circular economy models hold good in many other sectors like construction, transport etc. Covid 19 period also saw new concepts like ‘work from home’. Given the shortage of office space, circular economy principles could be used to design modular offices coupled with ‘work from home’ to achieve reduction in materials and energy consumption.

A lot of thinking and brain storming is taking place as the understanding and knowledge of the dynamics of Covid 19 and its implications for the economy is developing. Several new theories and models are being advocated for faster and sustainable post Covid recovery. Circular economy augurs well for a resilient recovery not only in the present Covid induced crisis but also for any such natural or manmade crisis in future as the central focus of Circular economy models is based on efficient use of existing resources. The success of the Circular Economy, however, will depend on the involvement of all the stakeholders at each level of supply chain and creating appropriate institutional infrastructure and regulatory processes.

References:

- (1) Food waste management during the COVID-19 outbreak: a holistic climate, economic and nutritional approach-R. Aldaco, D Hoehn et al
- (2) Medical waste management practice during the 2019-2020 novel coronavirus pandemic: Experience in a general hospital -Jie Peng et al)
- (3) Tonnes of COVID-19 health care waste expose urgent need to improve waste management systems-WHO release 1.2.2022
- (4) Redefining value – The manufacturing revolution. Remanufacturing, refurbishment, repair and direct reuse in the circular economy-A report by the Working Group on Circular Economy of the International Resource Panel (IRP) of UN.

Disclaimer: The views expressed by the author are his personal and does not, in any way, be construed as those of the organisation or Department he belongs to or is currently working.



A STUDY ON THE CIRCULAR ECONOMY – BENEFITS AND BARRIERS FOR THE FUTURE

DR. SURESH KUMAR SHARMA (DEAN, GN GROUP OF INSTITUTION,
GREATER NOIDA, (U.P) INDIA) dean.mba@gngroup.org

DR. JWALA DEVI (ASSISTANT PROFESSOR, GN GROUP OF INSTITUTION,
GREATER NOIDA, (U.P) INDIA) jwaladevi18@gmail.com

ABSTRACT : Circular economy (CE) is a supportable development strategy that is being proposed to tackle urgent problems of environmental humiliation and resource shortage. There are 3R principles reduce, reuse and recycle materials of circular economy. For supported the healthy society and resources, renewables all materials and rebuild the active support. This study based on is a review of the briskly growing literature on Circular Economy and also cover all concept, practices& assessing its implementation. There are also discussing concept of circular economy compare with the current linear economy of taking materials, producing goods and disposing waste. The main focus of the paper identifies the underlying problems and challenges to CE in an entrepreneurial perspective. in the study also discuss use of circular economy in India as well as their benefits and barriers for the future generation.

Keywords: circular economy, environmental policy, entrepreneurial strategy.

INTRODUCTION TO CIRCULAR ECONOMY

Economics and Environment are closely related with each other. In this Circular economy (CE) with its 3R principles of reducing, reusing and recycling material clearly illustrates the strong linkages between the environment and economics. Pearce and Turner was first time introduced the concept of circular economy. In 1990 in his research Economics of Natural Resources and the Environment they explain the theories within and between economics of natural resources and their interconnection and implications for the concept of how economics works. According to the first law of thermodynamics, those resources used in production and consumption cannot be destroyed and are equal to waste that ends up in the system of environmental. Kenneth Boulding(1966), "The Economics of Coming Spaceship Earth contemplates the earth as a closed economic system in which the economy and the environment are characterized by a circular relationship where everything is input into everything else". Germany was the first runner in this as it started

implementing Circular Economy in 1996. This was accompanied by the enactment of the law 'Closed Substance Cycle and Waste Management Act'. Another example of an attempt to start implementing CE is in Japan. The Government of Japan has developed a comprehensive legal framework for the country's move towards a recycling-based society (METI, 2004; Morioka et al., 2005). 'The Basic Law for Establishing a Recycling-Based Society', which come into force in 2002 provides quantitative targets for recycling and long-term dematerialization of Japanese society (Van Berkel et al., 2009). China is the third country that is engaged in serious efforts to implement CE on a large scale. However, in contrast to the German and Japanese cases, the Chinese government for various reasons like retaining competitiveness, intends to initially introduce the CE framework on a smaller scale through a number of pilot studies so that it has a better basis for assessing its large scale and full coverage in the longer run. This policy is similar to economic liberalization which started with costal free economic zones. Several other countries like Sweden have for a long time successively introduced various incentive programs. They have also tried to facilitate optimal conditions for gradual and effective increase in the rate of recycling through public education. The policy has been successful and to the satisfaction of policymakers and environmentalists. Sweden, Germany and several other European countries have managed to incorporate green political parties in their political systems and processes of decision making which have both encouraged and eased a transfer towards a circular economy. Another significant effort by the European Commission (2012) is the European Resource Efficiency Platform (ERP) – Manifesto and Policy Recommendations.

Definitions of Circular Economy : Liner economy, "raw natural resources are taken, transformed into products and get disposed of". On the other side aims of circular economy is that close the gap between production and the natural ecosystems.

The World Economic Forum's Definition of Circular Economy : "A circular economy is an industrial system

that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems, and business models “.



The Principles of the Circular Economy:

Energy and Resources Are Gold

At its core, a circular economy model has the goal of designing out waste. In fact, waste things ideas based on a circular economy. In order to achieve this, products are designed to last (good quality materials are used) and used for a cycle of breakdown and reuse that will make it easier to handle and transform or renew them.

In the end, these tight product cycles transform the circular economy model apart from disposal and recycling, where large amounts of insert energy and labor are lost. The main goal is increase and grow the natural capital by controlling fixed stock and also balancing the renewable resources flows.

Nature's Cycles and Designs

Makes a difference between technical and biological cycles the circular economy model plays a very important role. In biological cycle happened only in consumption. Where biologically- based materials (such as food, linen or cork) are designed to feed back into the system through processes like anaerobic digestion and composting.

These cycles regenerate living systems, such as soil or the oceans, which provide renewable resources for the economy. By their turn, technical cycles recover and restore products (e.g. washing machines), components (e.g. motherboards), and materials (e.g. limestone) through strategies like reuse, repair, remanufacture or recycling.

At last main purpose of the circular economy is to boost the resource yields by circulating products, components, and the materials in use at the highest utility at all times in both technical and biological cycles.

Objective of study:-

1. Role of circular economy in INDIA.
2. Find the benefit of circular economy
3. Find the barrier faced by the circular economy.

“Paris or no Paris, it is our conviction that we have no right to snatch from our future generations, their right to have a clean and beautiful earth. It is part of our thinking and for that reason we do not believe in exploitation of the nature. We people do not have the right to take more than necessary from nature.”

— Honorable Prime Minister of India, Shri Narendra Modi St Petersburg International Economic Forum, 2017

Today, most developed countries of the world are intentionally making an effort to change from linear to circular economies; India is composed at the threshold of selecting and embarking on a growth path that is refreshing and regenerative by design.

According to a research it is estimated that a circular economy path adopted by India could bring in annual benefits of 40 lakh crores or approximately US\$ 624 billion in 2050. After this the greenhouse effect reduce 44% along with reduction in pollution. For the circular economy now government of India is formulating many policies and promoting project/scheme for the environment.

Circular Economy According to the UN Sustainable Development Goals in 2016, considering the rate that we are depleting natural resources on earth, an equivalence of 2 and 3 planets would be required to meet the needs of human population by 2030 and 2050, respectively. The “Take- Make-Dispose” philosophy followed by linear economic model is not being able to cope up with the demand and supply balance in consumption of natural resources. This imbalance is not only affecting the sustainability of the countries and enterprises but also affecting the global supply chain. This imbalance in demand and supply chain is resulting in socioeconomic and environmental risks and volatility. Keeping in mind the scarcity of natural resources in coming future, the current linear economy model is giving way to the circular economy model, which focuses on careful alignment and management of resource flow across the value chain by integrating reverse logistics, design innovation,

collaborative ecosystem, and business model innovation. (Goyal, Esposito, Kapoor, 2018) Green and ecological supply chain management practices have been developed in the last few decades, as an initiative to spread environment under lining concerns into organizations by cutting inadvertent negative consequences on the environment of production and consumption processes. Parallely, the circular economy discourse has been proliferated in the industrial ecology literature and practice. Circular economy forces the frontiers of environmental sustainability to move forward by the idea of transforming products in such a manner that there are workable relationships. Theoretical and Literature Review between ecological systems and economic growth. That is why, circular economy is not just limited to the use of the environment as a sink for junk but in fact with the creation of self-sustaining production systems where materials can be used time after time. There are studies that states, an incorporation of circular economy ideologies within maintainable supply chain management can give clear advantages from an ecological point of view.

(Genovese, Acquaye, Figueroa & Koh, 2017) One more factor which focuses on embedding CE values in consumer Retail Reverse Logistics (RRL) operations is also one the many plus points in positive direction towards circular economy it supports the adoption of CE values within RRL operations. From one the research - it was found that embedding CE values within RRL necessitates the adoption of a multi-faceted approach. (Bernon, 2018) To facilitate and empower the circular economy a thorough understanding is needed not just for the environmental benefits but also on the economic. Benefits of it, Circular economy will need a society-level recovery system that takes all parts into account. A major component of how the circular economy functions is reverse logistics. How to manage recovery of waste that includes mobile phones, package waste, and inkjet cartridges from lakhs of homes and consumers and bring it back to the global material pool where the residual value of waste is captured Just some of the many needs of reverse logistics include asset tracking, materials recovery, dismantling, and toxic waste handling.

Benefits of the Circular Economy Model

After industrial revolution, linear model of production and consumption has been followed by the people. Raw materials have been converting into goods that are afterward sold, used and turned into waste that has been many times fortuitously discarded and managed.

On the opposite, the circular economy is an industrial model that is recreate by intention and plan and aims

to upgrade resources' performance and challenge the inconstancy that climate change might bring to businesses. It has benefits that are operational as well as strategic and brings together a huge potential for value creation within the economical, business, environmental and societal are.

Fewer Greenhouse Gas Emissions –

Main goals of circular economy have to helpful effect on the planet's ecosystems and to fight the imprudent desecration of natural resources. Decrease the greenhouse gas and raw materials use utilized agricultural productivity and decrease the negative externalities brought by the linear model. A circular economy can be helpful, after minimize the greenhouse gases effect a circular economy can be helpful. Because it is an energy that can be renewable and long running in less polluting.

- § There reusing and dematerializing, fewer materials and production processes are needed to provide good and functional products.

Employment Growth –

According to the 'world economy forum, " the development of a circular economy model, together with a new regulation (including taxation) and organization of the labor markets, can bring greater local employment in entry-level and semi-skilled jobs".

- § After Recycling and repairing practices an engineers or designers can be done easily disassembled product materials after transformation.
- § After spending the lower price we can increase consumption or increase new business by innovation process.

New Profit Opportunities –

Lower costs of inputs and in some cases create fully new profit run that can be achieved by businesses that move to the circular economy model. In this circular sphere, profit opportunities may come from playing in new markets, minimum cost off with waste and energy reductions and the promise of continuity of supply.

Now china has fellow a new policy that will ban plastic, it can be doing good for environment.

In the last if we want to make business more flexible we have to use circular economy. or in other words, make them more durable and prepared to deal with unexpected changes.

Top management play an important role in decision-makers, or as well, in a well-developed green by employees from all levels and departments.

The circular economy model seems to foster business models where products are rented or leased by customers during different periods of time, depending on the type of products.

Barriers to the Implementation of a Circular Economy Model

- § Social and environmental area is not examined in prices, advantage financial market signals instead of people and nature when economic decisions are made.
- § Prices of raw materials are fickle and at low prices alternative, good quality secondary resources are not competitive.
- § Circular economy business models are harder to develop, as most investors are still working under linear economy logic and sometimes upfront investments are required.
- § The demand for circular products and alternatives is still small.
- § There aren't still many qualified professionals with technical or 'information and communication technology' (ICT) knowledge.
- § New business models may be challenging to implement and develop because of laws and regulations that aren't prepared for this kind of innovations.
- § Plenty of businesses rely on old and/or strong alliances, making it harder to create new alliances and therefore to close loops.
- § Many companies still have goals and appraisal systems that focus on short-term value creation, whereas the circular economy model is a long-term value creation model.
- § The GDP index doesn't consider social and environmental externalities, discouraging the creation of value in both these areas.

The last barrier to a circular has a technological origin and it has to do with the need for changing and re-designing products and production/ take-back systems. These needs end up creating concerns about the ability to do this and still being competitive and having quality Products.

Conclusions

In last of research we are finding that the Circular Economy as a restoring system in which resource input and waste, emission, and energy leakage are minimized by slowing, closing, and narrowing material and energy

loops. This can be achieved through long-lasting design, maintenance, and repair, reuse, remanufacturing, refurbishing, and recycling. Second, we define sustainability as the balanced integration of economic performance, social inclusiveness, and environmental resilience, to the benefit of current and future generations.

References

- Acero, L. & Savaget, P., 2014. Plural Understandings of Sociotechnical Progress Within the OECD. 12th Globelics International Conference, 19-31 October 2014.
- Allwood, J.M., 2014. Squaring the Circular Economy: The Role of Recycling within a Hierarchy of Material Management Strategies, in: Worrell, E., Reuter, M. (eds.), *Handbook of Recycling: State-of-the-Art for Practitioners, Analysts, and Scientists*. 445–477.
- Allwood, J.M., Cullen, J.M., Carruth, M.A., 2012. *Sustainable materials: With both eyes open*. UIT Cambridge Ltd, Cambridge.
- Andersen, M.S., 2007. An introductory note on the environmental economics of the circular economy. *Sustain. Sci.* 2, 133–140.
- Banerjee, A. & Duflo, E., 2011. Poor economics: A radical rethinking of the way to fight global poverty.
- Bocken, N.M.P., de Pauw, I., Bakker, C., van der Grinten, B., 2016. Product design and business model strategies for a circular economy. *J. Ind. Prod. Eng.* 33, 308–320.
- Bocken, N.M.P., Rana, P., Short, S.W., 2015. Value mapping for sustainable business thinking. *J. Ind. Prod. Eng.* 32, 67–81.
- Ellen MacArthur Foundation (EMF), 2014. *Towards the Circular Economy vol.3*.
- Fetscherin, M., Heinrich, D., 2015. Consumer brand relationships research: A bibliometric citation meta-analysis. *J. Bus. Res.* 68, 380–390.
- The Circular Economy – A new sustainability paradigm? Geissdoerfer, Martin, Paulo Savaget, Nancy M.P. Bocken, and Erik Jan Hultink. 2017.
- <http://doi.org/10.1016/j.jclepro.2016.12.048>
- Circular economy in India: Rethinking growth for long-term prosperity- Ellen Macarthur Foundation
- <http://www.thehindubusinessline.com/companies/wastetoenergy-tech-provider-hitachi-zosenenters-india/article2365942.ece>





FUTURE OF BUSINESS: CIRCULAR ECONOMY: ROLE OF SUPPLY CHAIN

DR.C. SENGOTTUVELU, PH.D.,CPM(ISM-USA)

PROFESSOR, DEPT. OF PG MANAGEMENT STUDIES

ACHARYA BANGALORE B-SCHOOL, ANDHRAHALLI MAIN ROAD.

OFF MAGADI ROAD., BENGALURU-560 091. sengottuvelu138@gmail.com

Abstract : This paper highlights that the future of business, circular economy and the role supply chain. The paper is written on conceptual basis considering the secondary data. The subject experts' views and professionals' from industry opinions were considered. Manufacturing shifts such as. Economics of production, Consumer demand, Nature of products and Economics of value chain were discussed. Emerging areas of future business were also discussed. Further, circular economy and its relevance were discussed. The restorative or regenerative by intention and design principle also discussed. The value creation process in circular economy was highlighted with examples. Finally, the role of supply chain was discussed. The Berkeley Supply Chain Management in Bear Buy process and key activities involved were discussed. The paper also talks about the four Vs in supply chain management. Industry 4.0 technologies such as IoT, AI, machine learning, deep learning, data analytics, data security and safety, virtual stores etc were highlighted. The paper has been concluded by high lighting digital technology and its relevance to supply chain management.

Key words: digital technology, circular economy, manufacturing shifts, Industry 4.0 technologies.

Introduction : Business is not going to stay same in the future. Business firms are going to face challenges in terms of technology, practices in commerce and trade and emerging new areas of business. According to Sprint Business's Ivo Rook, Senior Vice President, Internet of Things and Tom Andriola, Chief Information Officer at the University of California System the most significant trends and technologies that will be impacting businesses over the next few years, are: Internet of Things, Security and privacy, Drones and autonomous vehicles, Artificial Intelligence and software bots, Self service automation, Mobile apps for communications, collaboration and reporting, Robotics in manufacturing and service. Technology is advancing in those areas. So, the companies are more concentrating to invest in those areas for better results.

In these times, when the digital revolution is no longer novel and technology has penetrated every aspect of our lives, it goes without saying that disruption is the name of the game. And that's in virtually every industry. Technology has changed everything from taxi cabs to gambling, even dramatically altering

the way we socialize with one another. As we fast approach the third decade of the 21st century, there are four schools of technology that hold the promise to not just disrupt, but transform the way we all approach day-to-day business. They are: i. Artificial Intelligence, ii. Internet of Things (IoT), iii. Data Science and Data Analytics and iv. Block chain.

Right now, the biggest issue is data breaches," Beck (CEO and founder of Opherium, a global research and development company) said. "All companies dealing with centralized data storage, any kind of data storage, they'll adopt blockchain tech first to get away from liability of storing data in one location." "Next few years more and more companies will start implementing blockchain in their phase one," Beck said. "It has already started and it will continue going [1].

Future of Business: Manufacturing : Manufacturing is no longer simply about making physical products. Changes in consumer demand, the nature of products, the economics of production, and the economics of the supply chain have led to a fundamental shift in the way companies do business. Customers demand personalization and customization as the line between consumer and creator continues to blur. Added sensors and connectivity turn "dumb" products into "smart" ones, while products increasingly become platforms—and even move into the realm of services.

As technology continues to advance exponentially, barriers to entry, commercialization, and learning are eroding. New market entrants with access to new tools can operate at much smaller scale, enabling them to create offerings once the sole province of major incumbents. While large-scale production will always dominate some segments of the value chain, innovative manufacturing models—distributed small-scale local manufacturing, loosely coupled manufacturing ecosystems, and agile manufacturing—are arising to take advantage of these new opportunities.

Meanwhile, the boundary separating product makers from product sellers is increasingly permeable. Manufacturers are feeling the pressure—and gaining the ability—to increase both speed to market and customer engagement. And numerous factors are leading manufacturers to build to order rather than building to stock. In this environment, intermediaries that create value by holding inventory are becoming

less and less necessary. Together, these shifts have made it more difficult to create value in traditional ways. At the same time, as products become less objects of value in their own right and more the means for accessing information and experiences, creating and capturing value has moved from delivering physical objects to enabling that access. Four important shifts in manufacturing are: i. Economics of production, ii. Consumer demand, iii. Nature of products and iv. Economics of value chain [2].

Figure 1. Four shifts in manufacturing



Source: Center for the Edge

Graphic: Deloitte University Press | DUpres.com

Figure 1 Four Shifts in Manufacturing

What are the trends during the future of business?

According to research findings: i. Collaboration will help to shape firms shared future – high level of collaboration is the key. ,ii.Who will do the work: Robots or Humans?. Companies are going to face many challenges in terms of people performance, purpose, potential and personalized plan. One size will not fit many people. lii. What will drive changes in production? Make vs Buy decisions, economics of scale, outsourcing vs insourcing etc. iv. How must be respond as consumption habits change? Data driven decision making is more prevalent than heuristic approach.

Circular Economy : The linear economy has to change. We must transform all the elements of the source-make-delivery- return /waste system: how we manage resources, how we make and use products, and what we do with the materials afterwards. Only then can we create a thriving economy that can benefit everyone within the limits of our planet.

Circular economy it's a new way to design, make, and use things within planetary boundaries. Shifting the system involves everyone and everything: businesses, governments, and individuals; our cities, our products, and our jobs. By designing out waste and pollution, keeping products and materials in use, and regenerating natural systems we can reinvent everything.

A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models.

Such an economy is based on a few simple principles, as shown in Figure 2. First, at its core, a circular economy aims to design out waste. Waste does not exist: products are designed and optimized for a cycle of disassembly and reuse. These tight component and product cycles define the circular economy and set it apart from disposal and even recycling, where large amounts of embedded energy and labour are lost. Second, circularity introduces a strict differentiation between consumable and durable components of a product. Unlike today, consumables in the circular economy are largely made of biological ingredients or 'nutrients' that are at least non-toxic and possibly even beneficial, and can safely be returned to the biosphere, either directly or in a cascade of consecutive uses. Durables such as engines or computers, on the other hand, are made of technical nutrients unsuitable for the biosphere, such as metals and most plastics. These are designed from the start for reuse, and products subject to rapid technological advance are designed for upgrade. Third, the energy required to fuel this cycle should be renewable by nature, again to decrease resource dependence and increase systems resilience (to oil shocks, for example).

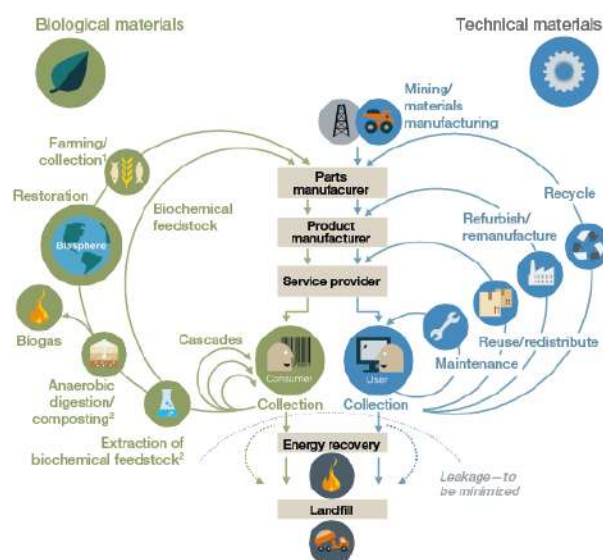


Figure 2: The circular economy—an industrial system that is restorative by design

These principles all drive four clear-cut sources of value creation that offer arbitrage opportunities, i.e. ways to take advantage of the price difference between used and virgin materials in Figure 3.

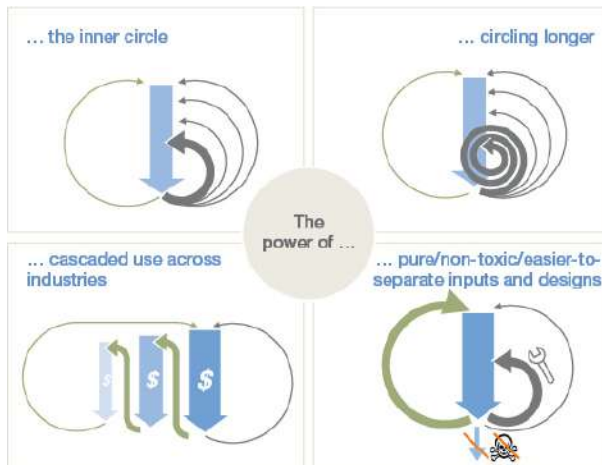


Figure 3: Sources of value creation for the circular economy

These four ways to increase material productivity are not merely one-off effects that will dent resource demand for a short period of time when these circular setups are introduced. Their lasting power lies in changing the run rate of required material intake. They can therefore add up to substantial cumulative advantages over a classical linear business-as-usual case.

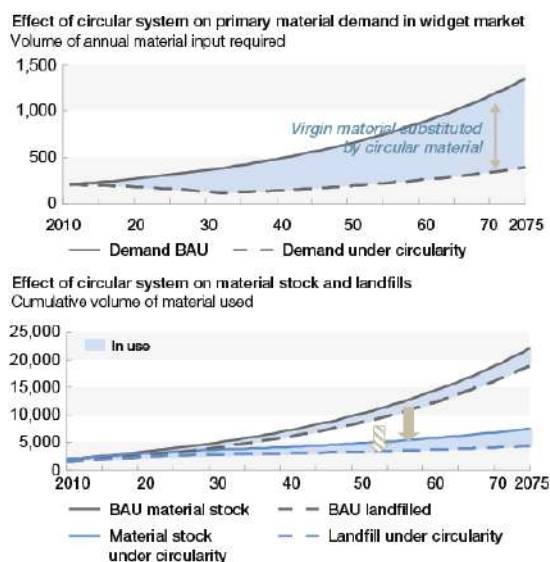


Figure 4: A circular economy would not just ‘buy time’ but also reduce the amount of material consumed to a lower set point

A number of businesses are already thriving on it. Innovative products and contracts designed for the circular economy are already available in a variety of forms—from innovative designs of daily materials and products (e.g. biodegradable food packaging and easy-to-disassemble office printers) to pay-per-use contracts (for tyres for instance) [3].

Role of Supply Chain : Manufacturers are facing intensifying challenges from both local and international competitors in the marketplace. In order to survive, manufacturers must be able to manage the dynamic market variables and satisfy their customers better than their competitors. Recent investigations have started to look in a more detailed manner at particular management techniques and practices to provide better advice on how these manufacturers should react to this challenge. One of the alternatives that seek to leverage manufacturers’ ability to compete is developing a high standards relationship starting with their customers and ending with their vendors, which defines the term supply chain management (SCM) [4].

According to SCOR model, the major process components of supply chain are: plan- source- make-deliver- return. The cost containment is possible by adopting the right strategy in sourcing. i.e., bulk buying, system contract, strategic partnership by signing long term business agreements (LTBAs) / Rate Contracts etc. By adopting lean distribution channel, further cost reduction is possible. Backward integration and Forward integration are more relevant strategies to adopt for cost reduction and uninterrupted supply of material.

Berkeley Supply Chain Management in Bear Buy process talks about various process components in it. The details are shown in Table 1 below. [5]

Table 1 Bear Buy Process Flow

Activity	Process Flow
Cart	Shopping
Requisition / Purchase Requisition	Requisition Creator, Authorization, Approval, Purchasing
Purchase Order	Supplier
Order Fulfilment	Receiving Goods / Services
Voucher Entry, Review & Approval	Invoice, 2way match (Voucher matching and PO matching, Voucher Approval
Payment Status	Payment

(Source: Berkeley Supply Chain Management, 2018)

In future, companies are not going to compete by offering products and services, but their supply chains are going to compete. Companies are going to concentrate both on upstream and downstream supply chains. Collaboration and adoption are important, companies are already in the process of implementation. Four Vs in a supply chain are: velocity, variability, variety and value. FMCG Companies are

more concentrating on distribution side, whereas engineering companies are more concerned about supply side (sourcing) to gain competitive advantage.

Conclusion : Business firms are going to face many challenges in the coming years in terms of technology, business practices and concentrating on new emerging areas of business. Industry 4.0 technologies are also going to bring more challenges and commitments to manufacturing sector in particular. Technology challenges such as IoT, AI, Machine Learning, Deep learning, Data driven decision making etc are the focus areas for the firms. It is also seen that there is a shift manufacturing such as I. Economics of production, ii. Consumer demand, iii. Nature of products and iv. Economics of value chain. Linear economics should change with circular economy. A circular economy is an industrial system that is restorative or regenerative by intention and design. This brings lot of alternate material usage in product development and material processing. Customer expectations are increasing day by day, low price, more varieties, low supply lead time and more customization further brings challenges to business firms. In this area, supply chain is going to play a vital in gaining competitive advantage and earn business excellence. Supply chain configuration, metrics driven supply chain performance and all the business entities should be seamlessly integrated. Technology and business should be properly embedded. Supply chain role is vital for future business and to improve the economic growth and development.

References

1. John Hagel, John Seely Brown and DuleeshaKulasooriya (2015). The future of manufacturing making things in a changing world. Retrieved from <https://www2.deloitte.com/us/en/pages> on Jan24, 2019.
2. What are the trends during the future of business?. Retrieved from <http://www.unilever.com/news> on March 12, 2019.
3. From linear to circular –Accelerating a proven concept (2018). World Economic Forum. Retrieved from <http://www.wrap.org/uk/circular economy> on March 12, 2019.
4. Khaled Al Falah, Mohamed Zarri& Abdel Moneim Ahmed (2003). The role of supply chain management in world class manufacturing: An Empirical Study in the context of Saudi. International Journal of Physical Distribution & Logistics Management, Vol: 33, Issue: 5, pp396-407.
5. Bear Buy Process- Berkeley Supply Chain Management. Retrieved from [http:// www. supplychain.berkeley.edu](http://www.supplychain.berkeley.edu). on March 12, 2019.

● ● ●

OBITUARY



With profound grief, it is to inform that IIMM Vadodara Branch has lost one of its Founder Members, Dr. Sushilaba Sarvaiya, on 06.07.2022. Dr. Sushilaba Sarvaiya alongwith her late husband Mr. R J Sarvaiya was life member of IIMM. Both of them were very active members of the constitution and have worked round the clock for the upliftment of Vadodara Branch. Dr. Sarvaiya had completed her PhD and used to work as a Professor in SNDT College. IIMM Vadodara has constituted an Award on behalf of Sarvaiya Family to 1st and 2nd Ranker of PDSM & PDIT Students every year.

IIMM Vadodara on behalf of its Members and Staff doesn't have **"words to describe how sorry we are at your loss but you have gone from our sight, but never from our hearts"**.

IIMM fraternity prays for the departed soul to rest in peace.



CIRCULAR SUPPLY CHAIN

- A WAY TO SUSTAINABLE VALUE CREATION

SN PANIGRAHI, PMP, ATP (PMI - USA), FIE, C.ENG
GST & INTERNATIONAL BUSINESS & PROJECTS CONSULTANT
CORPORATE TRAINER, MENTOR & AUTHOR
NATIONAL COUNCIL MEMBER, IIMM
snpanigrahi1963@gmail.com

Introduction to Circular Economy & Supply Chain
: The Traditional Approach of Linear Supply Chain simply describes a **straight path from “Mining – Taking – Making – Wasting & Dumping”**, resulting to their associated Negative Externalities such as Depletion of Natural Resources, Scarcity of Availability of Resources, Waste, Pollution, Health Hazards and Environmental Adversities. Therefore, there is a need to disrupt this linear trend and adopt **Circular Economic Models** which are **Restorative and Regenerative** by design, and pay equal attention to **People, Planet and Profits**.

It is imperative to imbibe circularity in our economic development, to balance the adverse effects of Rapid Urbanization, Industrialization, Growing Population, Climate Change and Depletion of Natural Resources.

It is a **change to the model in which resources are mined, made into products, and then become waste that is disposed**. Circular Economy involves Reduced Material Use, Redesign Materials to be less Resource Intensive, and Recaptures “waste” as a Resource to Manufacture New Materials and Products, use Renewable Energy Sources etc.

In a circular economy, manufacturers design products to be reusable. For example, **electrical devices are designed in such a way that they are easier to repair**. Products and raw materials are also reused as much as possible. For example, by recycling plastic into pellets for making new plastic products.

Circular economy **requires coherent practices by all actors across value chains, notably the Organization and their Suppliers, Consumers, and Financial and Government Institutions**.

In this Article let's Discuss on the Topic **“Circular Supply Chain- A Way to Sustainable Value Creation”**

Key Words : Circular Economy, Circular Supply Chain, Value Chain, 10R's of Circular Supply Chain®, Sustainability.

What is Circular Economy : A Circular Economy is an economic system of **Closed Loops** in which raw materials, components and products through production and consumption follows **Principles of Conservation, Restoration and Regeneration** (Doing More with the Less with Minimal Waste) as **Sustenance Practice** where the **Resources or Materials Lose their Value as Little as Possible or Use Existing Materials and Products as Long as Possible** and **Waste & Residues are put back into the System as a Resource**.



What is Circular Supply Chain : The Circular Economy associates the **Supply and Demand of Supply Chain to Improve Resource Efficiency**.

The Circular Supply Chain is a **Model that Encourages Suppliers, Manufacturers, Customers, End Users and all the Service Providers & Stakeholders in the entire Chain of Activities, Processes or Systems to take Concerted Measures to use Optimal Resources, Make Minimum Possible Waste, Remake of Returned Goods, Reuse of Discarded Materials and Recharge them for Resale**.

Optimizing material usage through better Product Design; Product Lifecycle Extension; Using Reusable or Recycled Material through Green Procurements; Reusing its ostensible Waste Materials; Return Policies, Buy-Back Mechanisms & Reverse Logistics where the Waste is put back into the system as a Resource; After Sale Service, Sharing Platforms etc giving a New Dimension to **Circular Supply Chain**.

It's aims is to **Maximize Materials Usage; Minimize Waste and better Manage Residuals & Returns and Convert them into New Products that they can feed as Input Resource to Create Salable Value once more.**

10R's of Circular Supply Chain©

Following are 10R's of Circular Supply Chain© developed by the Author.

- Ø **Restrain / Refuse** (keep **Under Control** of doing something or **Check within Limits; Say No - Do Not Accept**)
- Ø **Reduce** (**Minimum Use** of Raw Materials or **Less Consumption of Resources**)
- Ø **Repair** (**Make Good** Damaged Goods)
- Ø **Reuse** (**Multiple Times Use & Not Single Use** of Products and Components)
- Ø **Replace** (**Substitute** with Alternative (Better One))
- Ø **Recycle** (High Quality **Reprocessing** of Materials)
- Ø **Refurbish** (**Revamp, Renovate, Renew**)
- Ø **Recover** (**Regain / Reclaim** from Discarded)
- Ø **Rubbish / Rot** (Compost)
- Ø **Renewable Energy Sources** (**Alternative to Fossil Fuels** - Coal, Crude Oil and Natural Gas)



- Ø **Restrain / Refuse** (keep **Under Control** of doing something or **Check within Limits; Say No - Do Not Accept**)

Restrain Means to prevent from doing, exhibiting, or expressing something - to hold back from or control - keep under control of doing something or check within limits - "draw back tightly, confine,."

Government Policies / Regulations / Guidelines, that are Restraining or Preventing use of Certain Materials, Measures to Prevention, Reduction or Elimination of Waste at the Source or Promoting the use of Nontoxic or Less Toxic Substances, Implementing Conservation Measures, and Reusing Materials Rather than Putting them into the Waste Stream etc. are Major Initiatives towards Circular

Economy.

These initiatives take momentum when Social Activists, **NGOs enter the scene and actively involved to Create Awareness & Social Movement.**

The next is Individuals or Group Consumption Choices or Behaviors. **Awareness, Consciousness of Actions or No Actions, Reducing Consumption and forming a self-restrained society is the only way to live with nature harmoniously.** If you're given the option of taking an item that you don't need, the best option is to refuse it. **Say NO** to all things you don't need, especially single-use plastics, such as Water Bottles, Food Plates, Straws, Disposable Coffee Cups and Plastic Carry Bags. Once waste is created, all options to deal with it require energy and resources and generates waste in cyclic fashion. Some options are better than others, but it's better to just avoid creating waste in the First Place.

Examples:

- ❖ A Ban on the use of Single-use Plastics that was notified by the Union Environment Ministry of India on August 2021 came into effect on 1st July'2022.
- ❖ EU agrees on single phone charger law. As of 2024, all smartphone and tablets sold in the bloc will have to be compatible with a USB Type-C.
- ❖ NGOs spreading awareness about the Use of Plastic & Environmental Effect.
- ❖ Boycott Products that Endanger Wildlife.
- ❖ Say 'no' to a plastic shopping bag if you are able to carry the items by hand or by bringing your own reusable bags.
- ❖ Refuse plastic utensils and sauce packets if you are taking food home and can use your reusable utensils.
- ❖ Avoid Use & Throw Goods - Instead choose to use Reusables.
- ❖ Use non-toxic or less-toxic substances.

- Ø **Reduce** (**Minimum Use of Raw Materials or Less Consumption of Resources**)

Reducing is simply **Using Less & Creating Less Waste.** Reducing Resources / Material use is the most important thing we can do. By reducing Material use, we avoid the unnecessary use of resources such as materials, energy and water. It means there is less waste to manage. This is one way you can reduce your carbon footprint. So if you can't or won't completely Refuse an item (First Option), Reducing is Next Best Option. **Don't create waste if you don't**

have to.

Examples :

- Ø Better Design to Reduce Material Consumption.
- Ø Use less Packaging in your Product
- Ø Buy in Bulk to Reduce Packaging.
- Ø Purchase Flexible Fuel Fleet Vehicles, or Low Emissions Vehicles.
- Ø Reduce landscape water use
- Ø Reduce the amount of water needed during production
- Ø Reduce Waste or Scrap by Upgrading & Improving Process Efficiency
- Ø Buy energy efficient items to Reduce Energy Consumption.
- Ø Use energy efficient light bulbs - Install automatic light shut off to Reduce Energy Consumption.
- Ø Encourage Carpooling or Riding a Cycle to Work.
- Ø Make Use of Natural Light (Transparent Roof Tops in Warehouse) to Reduce Electricity Consumption.
- Ø Only Buy just what you Need to Reduce Waste
- Ø Stop / Reduce Food Waste.
- Ø **Repair (Make Good Damaged Goods)**

Repair is Fixing or Restoring broken items to be used. Right to Repair is good for the environment instead of Buying New because it **Reduces Release or Emissions of Greenhouse Gases** that are generated during the manufacturing process. Repairing your possessions also cuts down on waste by extending a device's lifespan and reducing how often we buy new.

Examples :

- Ø Update your Computer Rather than throwing it out and getting a New Replacement. (Unfortunately iPads are Designed for Use & Throw – No Repair)
- Ø Industrial Machines Repair to Work again in Normal way
- Ø Repair, Painting and Decorating of Plumbing, Electrical Installation
- Ø Repair Broken Eyeglasses
- Ø Seal a Leaky Pipe
- Ø Repolish to make Scratches in Wood Furniture Disappear.
- Ø Chairs with Ripped Cushions Reupholstered with New Materials.
- Ø Repair a Broken Toy
- Ø **Reuse (Multiple Times Use & No Single Use of**

Products and Components):

Reuse refers to using items more than once or the action of using something again. Reusing is also **the act of taking old items that you might consider throwing away and finding a new use for them.**

Examples:

- Ø Energy-intensive industries capture and reuse waste heat.
- Ø Opportunities for Wastewater Reuse in other Processes.
- Ø Reuse Your Containers and Jars.
- Ø In information technology, design reuse is the inclusion of previously designed components (blocks of logic or data) in software and hardware.
- Ø Reuse of RO Reject Water or Ion Exchange Rinse Waters.
- Ø Use Reusable Plastic Containers for Freezing or Storing Food Items.
- Ø Save Gift Wrapping Paper and Boxes to use again.
- Ø Use Old Jars for Storage.
- Ø Give unwanted Toys and Books to Child Rehabilitation Centers or school Libraries to Use.
- Ø Make memo pads out of waste paper.
- Ø Re-use envelopes - purchase reuse labels.
- Ø **Replace (Substitute with Alternative (Better One)) :**

Replace means **the shift for a Better Alternative**. To replace is **to be or to furnish an equivalent or substitute, especially for one that has adverse impact on Environment**. Replace is an alternate product that is comparable and similar in functionality to the current item but is better from environmental point of view.

Example : Alternative to Plastics like Bamboo Toothbrushes, Stainless Steel / Glass Water Bottles, Eco-Friendly Coffee Tumblers, Cloth Pads or Menstrual Cups, Cloth Diapers, Reusable Shopping Bags, Compostable Garbage Bags, Eco-Friendly Cutlery etc.

Ø Recycle (Reprocessing of Materials)

The collection and conversion process of waste materials into usable and new materials is called Recycling. Recycling involves some form of reprocessing of waste materials to produce

another product. It is one of the **eco-friendly methods** of waste management for a sustainable conversion instead of letting it go to landfills. Current disposal methods threaten our environment and health, but with sustainable recycling, we conserve natural resources and decrease the harm we cause to the Environment. Recycling non-renewable materials reduce environmental pollution and protect natural ecosystems.

Recycling means turning an item into input which can be used again in the process, usually for Developing a completely New Product.

Examples :

- v Recycling of Metal Wastes, Glass Cullet, Plastic Wastes, Paper Recycle etc.
- v Recycle industrial wastewater by treating.
- v Processing of waste and extracting useful material from it.
- v Modify product packaging so that it can be easily recycled.
- v Energy Recycling - is the recovery of energy that would normally be wasted in industrial processes by flaring, exhausting to the atmosphere or operating low efficiency equipment, and converting it into electricity or thermal energy (steam or heated water).

Ø Refurbish (Revamp, Renovate, Renew)

Refurbish means Renovate, Renew, Revamp or Redecorate something, especially a Building. It is to rebuilding the original form and structure.

Example : Make a building look new again by doing work such as Painting, Repairing, and Cleaning to Improve its Looks and Possibly its Functionality.

Ø Recover (Regain / Reclaim from Discarded)

This is the recovery of waste without any pre-processing. Recover refers to the practice of **putting waste products to use**.

Examples: Waste oils that cannot be refined for reuse in vehicles can be burnt for energy recovery. Recovering the energy from waste oil reduces our dependence on coal and imported oil.

For example, decomposing garbage produces methane gas, which can be recovered and burnt to produce energy.

Ø Rubbish / Rot (Compost) :

This Residual Management. This is the last option when waste cannot be used in any other way. Usually, this means sending Rubbish to a landfill.

Composting is a great alternative to throwing things in the landfill. It provides the right environment for organic materials (like food and garden waste) to be able to properly decompose.

Examples:

- v Putting Veggie Scraps, Food Wastes or Garden Waste in the Compost Bin Instead of in the Trash.
- v Residual disposal of waste is normally into a sewer or septic tank.

It is very important to manage residual solid and liquid waste properly. Waste not disposed of correctly can cause damage to health and the environment.

Ø Renewable Energy Sources :

Just like other Resources, Energy also Lasts as Long as Possible in a Circular Economy. Renewable Energy Sources are most abundantly available and be Harnessed without Depleting. Use of Renewable Energy greatly Preserves other Natural Resources like **Fossil Fuels** - Coal, Crude Oil and Natural Gas.

Examples :

- v Solar Energy, Wind Energy, Geothermal Energy, Hydro-power, Ocean Energy, Bioenergy.

Value Insights into Supply Chain:

- v The term **Value Chain** refers to the process in which businesses receive raw materials, add value to them through production, manufacturing, and other processes to create a finished product, and then sell the finished product to consumers. The value chain describes **the full range of activities that firms and workers do to bring a product from its conception to its end use and beyond**. This includes activities such as design, production, marketing, distribution, support to the final consumers Return & Reverse Logistics and Converting the Waste into Wealth and Drive Value and Competitive Advantage in every Endeavour.
- v A linear supply chain simply describes **a straight path from raw materials to production, and finally, to disposal**. Needless to say, this is **not very Cost-Effective and Environmentally Friendly**. The products end up being discarded at some point by the consumer anyway. So, when a new product comes out, the old one is discarded in a landfill.
- v On the other hand, the **Circular Value Network** is **the set of interrelated activities performed by companies to maintain or increase the**

social, financial or environmental value of that activity and its parts.

- v The objective of Circular Supply Chain is to extract the Advantage of Materials, Energy and Wastes of a Process.
- v For better Realization of Value, Involvement of all the Stakeholders and their Collective Contribution, Collaboration and Alliances are instrumental to enable such circular business models. For example, the key to addressing India's solid waste management challenge lies in connecting all kinds of actors along the **value chain**, including producers / brand owners, municipalities, the informal sector, waste management companies, and recyclers.
- v Tie up arrangements with waste management agencies to realize their circularity objectives and supporting municipalities in plastic and other waste collection are very essential. Through Collection to Reuse, Repair, Recycle, Recover till Rubbish Maximum Value can be Extracting and Derived from Waste
- v The government can offset such pre-competitive collaboration across industries and value chains with partners as mutually invested coordinators of circularity. While this opens up additional avenues of green job creation, businesses have to be considerate about the already existing informal sector in demystifying the complexity of reverse logistics and the recycling landscape.

Benefits of Circular Supply Chain

- Ø Conserves Natural Resources such as Wood & Water; Mines & Minerals and other Resources.
- Ø Regenerates Natural Systems.
- Ø Reduces Depletion of Natural Resources.
- Ø Prevents Pollution - Combats Climate Change.
- Ø Support Sustainability.
- Ø Can Improve Access & Availability of Natural Resources for Future Generations.
- Ø Reduces the amount of waste sent to landfills and incinerators.
- Ø Reducing the Need to Collect New Raw Materials.
- Ø Saves Energy – Resource Consumption.
- Ø Saves Money and Creates Value.
- Ø Increases Economic Security by Tapping a Domestic Source of Materials.

Government Initiatives

According to Ellen MacArthur Foundation's estimates, **circular economy adoption in India will bring an annual benefit to a tune of Rs 40 lakh crore (\$624 billion) in 2050 and reduce GHG emissions by 44 per cent.**

The recent focus on circular economy in the Union Budget puts India in the right direction. So far, the government has been proactive in formulating policy frameworks for ten focus sectors for circular economy transition.

The Natural Resource Efficiency Policy, Plastic Waste Management Rules, Construction and Demolition Waste Management Rules, Metals Recycling Policy and Extended Producer Responsibility are a few such examples.

The E-waste Management Rules 2022 were **floated by the Ministry of Environment, Forests & Climate Change (MoEF&CC) on 19th May'2022**

Conclusion: All the stakeholders, **Governments, NGOs, Civil Society, the Private Sector, and others,** are **expected to Involve with Whatever best they can by Practice & Contribute** to the **10 R's of Circular Supply Chain** to **Realise the Benefits** of Circular Supply Chain and **help to put a break to the Exploitation of Natural Resources Extracted from the Nature and Ensures Availability of Natural Resources for our Future Generations Sustainably.**

Not only that, you also help to **Reduce the need for Extracting (mining, quarrying and logging), Reduce Requirements for Refining and Processing Raw Materials all of which create substantial Air and Water pollution.** As the **10 R's of Circular Supply Chain**, saves Energy & Resources, it also **Reduces Greenhouse Gas Emissions**, which helps to tackle Climate Change, Prevents Adverse Impacts on Environment and **Saves Mother Earth in a Truly Sustainable Manner.**

References:

The Circular Supply Chain : Basic Principles and Techniques- By Ifeyinwa Juliet Orji&Frank Ojadi

Circular Supply Chain – 17 Common Questions By Deborah Dull

The Circular Economy : A User's Guide – 1st Edition, by Walter R. Stahel

The Circular Economy: A Wealth of Flows - By Ken Webster

Designing for the Circular Economy – By Martin Charter

●●●

CIRCULAR ECONOMY AND BUSINESS SCENARIO

HENAL SHAH

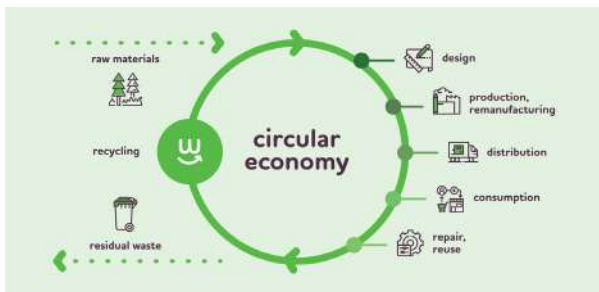
INSTRUMENTATION ENGINEER | SUPPLY CHAIN ENTHUSIAST

IIMM-AHMEDABAD BRANCH, henalshah31@gmail.com

The future of business is circular, and there's no room for waste in it. The new circular economy aims to bring circularity into heart of business leadership and practice.

But what is Circular Economy?

The circular economy is a model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended.



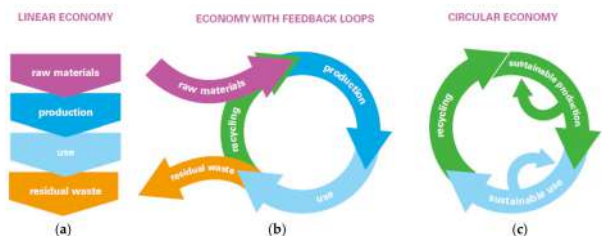
In practice, it implies reducing waste to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible. These can be productively used again and again, thereby creating further value.

Looking beyond the current take-make-waste extractive industrial model, a circular economy aims to redefine growth, focusing on positive society-wide benefits. It entails gradually decoupling economic activity from the consumption of finite resources, and designing waste out of the system. Underpinned by a transition to renewable energy sources, the circular model builds economic, natural, and social capital. It is based on three principles:

- Design out waste and pollution
- Keep products and materials in use
- Regenerate natural systems

Let's see the concept of a circular economy.

- In a circular economy, economic activity builds and rebuilds overall system health. The concept recognises the importance of the economy needing to work effectively at all scales – for large and small businesses, for organisations and individuals, globally and locally.
- Transitioning to a circular economy does not only amount to adjustments aimed at reducing the negative impacts of the linear economy. Rather, it represents a systemic shift that builds long-term resilience, generates business and economic opportunities, and provides environmental and societal benefits.



Technical and biological cycles

- The model distinguishes between technical and biological cycles.
- Consumption happens only in biological cycles, where food and biologically-based materials (such as cotton or wood) are designed to feed back into the system through processes like composting and anaerobic digestion. These cycles regenerate living systems, such as soil, which provide renewable resources for the economy.
- Technical cycles recover and restore products, components, and materials through strategies like reuse, repair, remanufacture or (in the last resort) recycling.

Origins of the circular economy concept

The notion of circularity has deep historical and

philosophical origins. The idea of feedback, of cycles in real-world systems, is ancient and has echoes in various schools of philosophy. It enjoyed a revival in industrialised countries after World War II when the advent of computer-based studies of non-linear systems unambiguously revealed the complex, interrelated, and therefore unpredictable nature of the world we live in – more akin to a metabolism than a machine.

Such an economy is based on a few simple principles.

1. At its core, a circular economy aims to design out waste. Waste does not exist: products are designed and optimized for a cycle of disassembly and reuse. These tight component and product cycles define the circular economy and set it apart from disposal and even recycling, where large amounts of embedded energy and labour are lost.
2. Circularity introduces a strict differentiation between consumable and durable components of a product.
 - i. Unlike today, consumables in the circular economy are largely made of biological ingredients or ‘nutrients’ that are at least non-toxic and possibly even beneficial, and can safely be returned to the biosphere, either directly or in a cascade of consecutive uses.
 - ii. Durables such as engines or computers, on the other hand, are made of technical nutrients unsuitable for the biosphere, such as metals and most plastics. These are designed from the start for reuse, and products subject to rapid technological advance are designed for upgrade.
3. The energy required to fuel this cycle should be renewable by nature, again to decrease resource dependence and increase systems resilience (to oil shocks, for example).

Let’s see, why do we need to switch to a circular economy?

The world’s population is growing and with it the demand for raw materials. However, the supply of crucial raw materials is limited.

We need to transform systems across the global economy to ensure that in 2050 more than nine billion people can live well within the limits of our planet. We must see raised ambition across

businesses and governments to scale up climate action towards a carbon neutral economy. The urgency is clear: business, government and civil society must go further, faster to avoid detrimental impacts to people and planet.

How to switch?

What was previously viewed as waste now has value. However, those ecosystems are complex and include many interdependencies and feedback loops. Digital technology has the potential to provide visibility and enable improved decision making when it comes to raw materials and services. Already, 35% of companies believe that digital technology will be a key enabler for their circular economy strategies, but very few are leveraging the technology for this purpose yet.”

2020 is the “super year” for climate and many more sustainability-related ambitions including food, nature and the SDGs in general. It will be a defining year if we want to save our planet.

Let’s see the benefits out of Circular Economy.

Moving towards a more circular economy could deliver benefits such as reducing pressure on the environment, improving the security of the supply of raw materials, increasing competitiveness, stimulating innovation, boosting economic growth, creating jobs.

Businesses will be capable to capture more value from their materials and resources and also build loyalty with their customer base.

Consumers will also be provided with more durable and innovative products that will increase the quality of life and save them money in the long term.

Circular business advantage offers a pathway for both large and small organisations to identify, capture and retain additional revenues or reduce costs while meeting customer demands in new ways. This can lead to relative decoupling of resource use and through lowered costs of access and ownership which benefits economic growth.

Using the tools of a circular economy offers all organisations a lasting advantage by combining more productive ways of doing things, while engaging in more system wide activity: ‘feeding the forest’ and not just ‘doing less harm’.



DIGITAL SUPPLY CHAIN MANAGEMENT

SUBEER OBEROI, GM NORTH & EAST REGION
YUSEN LOGISTICS (INDIA) PVT. LTD, HARYANA
subeer.oberoi@in.yusen-logistics.com

Supply Chain Management (SCM) is a series of interconnected activities related to the transformation and movement of raw material to the finished goods till it reaches to the end user. It is the outcome of the efforts of multiple organizations that helped in making this chain of activities successful.

Digital Supply Chain leverages technology to integrate various elements of SCM. Technology makes the supply chain not only efficient but also more responsive. One of the major impediments of digitalization has been data security. Now with advent of Blockchain Technology this issue has been resolved to a great extent.

There are 7 most prominently used technologies used in digital transformation of supply chains :-

- 1) Augmented Reality – Live direct or indirect view of a physical, real-world environment whose elements are “augmented” by computer-generated perceptual information.
- 2) Internet of Things (IOT) – Interconnection via internet of computing devices embedded in everyday objects enabling them to send and receive data.
- 3) Cloud Computing – Remote server network ensures better data security, processing and control in supply chains.
- 4) Big Data Analytics – Analysis of data received from various sources. The source of data can be structured such as demand forecasts / CRM, semi structured such as customer surveys or unstructured such as social media.
- 5) Artificial Intelligence – Development of computer systems capable of performing tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.
- 6) 3D Printing – Also known as additive manufacturing, refers to processes used to create a three-dimensional object in which material is joined or solidified under computer control to create an object, with material being added together (such as liquid molecules or powder grains being fused together).
- 7) Gamification – Application of game-design elements and game principles in non-game contexts to improve user engagement, organizational productivity, flow, learning, crowd sourcing, employee recruitment and evaluation, ease of use, usefulness of systems, physical exercise, traffic violations, voter apathy, and more.

Major advantages of these advanced technology elements are :-

- Ø Integrated Platform - Better coordination due to enhanced transparency enabled by digitisation.
- Ø Improved Efficiency - Better inventory management across value chain with better forecasting data.

Enhanced Responsiveness - Agile response to customers driven by better visibility which reduces lead times across value chain.

- Ø A game changer for E-commerce logistics - High volume of transactions are better managed through digitisation. A must have for managing Reverse logistics.

Listed below are the most commonly used smart digital tools :-

- Ø Radio frequency identification (RFID) - Visibility across value chain.
- Ø GPS Tracking - End to end tracking.
- Ø Bar Codes / Smart Labels - Elimination of human errors, better access to data and inventory management.
- Ø Cloud Technologies integrated with web services - Integrated and secured data across value chain.

Applications in cross border trade and contract logistics :-

- Ø Single Window Interface for Facilitating Trade (SWIFT) – Customs alignment with Participating Government Agencies (PGA'S) such as DGFT, APEDA, MPEDA, WPC, FSSAI, ADC etc.
- Ø Faceless & Paperless assessment by Customs – The Central Board of Indirect Taxes & Customs (CBIC) has launched eSanchit (e-Storage and Computerized Handling of Indirect Tax documents) for paperless processing, uploading of supporting documents and to facilitate the trading across Borders.
- Ø Digital Signature Certificate(DSC) for the purpose of electronic verification of documents.
- Ø Use of IoT for monitoring vital data such as temperature excursions, asset tracking & management, Inventory optimization etc.
- Ø Augmented Reality (AR) technology has opened up many benefits in warehousing such as Interactive 3D visualization, Fast object tracking without manual data gathering. Availability of AR applications on mobile devices makes its usages easier and economical.
- Ø Gamification techniques are also being used very extensively to streamline logistics and operational processes. The goal of gamification is typically to induce experiences that are common in gaming and to create and increase motivation or engagement via these experiences.
- Ø Artificial Intelligence (AI) and Big Data analytics have been highly effective for planning, demand forecasting and automation of logistics operations.

Evidently digitalization is the way forward in effective management of logistics operations and create an ideal supply chain solution.

●●●

WASTE MANAGEMENT

Waste Management : The Hazardous Substances Management Division (HSMD) is the nodal point within the Ministry for management of chemical emergencies and hazardous substances. The main objective of the Division is to promote safe management and use of hazardous substances including hazardous chemicals and hazardous wastes, in order to avoid damage to health and environment. The Division is also the nodal point for the following four International Conventions viz. Basel Convention on Control of transboundary movement of Hazardous waste and their disposal; Rotterdam Convention on Prior Informed Consent Procedure for certain Chemicals and Pesticides in International trade; Stockholm Convention on Persistent Organic Pollutants, the Minamata Convention on Mercury and Strategic Approach to International Chemicals Management.

The activities of the division are carried out in main thrust areas, viz., Chemical Safety; Management of Hazardous Wastes, e-waste, Municipal Solid Waste, Plastic Waste, Bio-medical Waste and Fly Ash Utilization. Major programmes/activities are as follows:

§ Chemical Safety : The Ministry of Environment, Forest and Climate Change notified the Manufacture, Storage and Import of Hazardous Chemicals (MSIHC) Rules, 1989 and the Chemical Accidents (Emergency Planning, Preparedness and Response) (CAEPPR) Rules, 1996 for ensuring chemical safety in the Country. These rules delineate the criteria for identification of Major Accident Hazard (MAH) unit. As per the rules, Central Crisis Group, State Crisis Groups, District Crisis Groups and Local Crisis Groups at Central, State, District and Local level are required to be set up for the management of accidents due to handling of hazardous chemicals listed in the rules. An off-site emergency plan for a district having MAH unit(s) is required to be in place so as to mitigate the impact of chemical accidents. As per the information received from various States and Union Territories, there are 1,861 MAH units in the Country, located in 303 districts. A sub-scheme titled "Industrial Pocket wise Hazard Analysis" has been in operation since the Eighth Five Year Plan. The Ministry provides financial assistance for preparation of off-site emergency plans, hazardous analysis and rapid safety audit reports to identified agencies for preparation of Off-Site Emergency Plans for 41 districts in the country having MAH units. Reports have been received and these off-site emergency plans including hazard analysis and rapid safety reports are under review.

§ Hazardous Waste Management

(i) National Inventory of Hazardous Wastes: As per information provided by the Central Pollution Control Board (CPCB), there are about 41,523 industries in the country generating about 7.90 million tonnes of hazardous waste annually, out of which landfillable waste is about 3.32 million tonnes (42.02%), incinerable waste is about 0.60 million tonnes (7.60%) and recyclable hazardous waste is about 3.98 million tonnes (50.38%). The Ministry has also initiated a project on GIS Based National Hazardous Waste Information System. It is a web based system, which has been developed to provide status of hazardous waste management in the Country. The database available on the web is required to be regularly updated by all State Pollution Control Boards to ensure updated status at all times. Through NHWIS till now survey of 33,000 hazardous waste industries and MIS data entry of about 27,500 hazardous waste industries has been completed.

(ii) Treatment, Storage and Disposal Facilities (TSDFs) for Hazardous Wastes: At present, 38 TSDFs include 17 Integrated TSDF, 13 Exclusive Common Secure Landfills and 8 Exclusive Common Incinerators are available in 10, 9 and 4 States/UT respectively. These States /UT contribute about 97.8% of total landfillable and 88.19% of total incinerable hazardous wastes generation in the country respectively. During 2013-14, financial assistance has been provided for setting up of two ongoing/new projects of TSDFs for hazardous wastes across the country.

(iii) E-Waste Management: The Ministry of Environment and Forest, has notified E-Waste Rules in May 2011, which has come into force with effect from 1st May 2012. The concept of Extended Producers Responsibility (EPR) has been enshrined in these rules. As per these Rules the producers are required to collect e-waste generated from the end of life of their products by setting up collections centers or take back systems either individually or collectively. E-waste recycling can be undertaken only in facilities authorized and registered with State Pollution Control Boards/ Pollution Control Committee (PCCs). Wastes generated are required to be sold to a registered or authorized recycler or re-processor having environmentally sound facilities. The rule has provision for setting up of Collection Centre individually or jointly; or by a registered society or a designated agency; or by an association to collect e-waste. These rules are the main instrument to ensure environmentally sound management of e-waste. Under these rules EPR

authorizations have been granted to 128 Producers which are spread in 11 states. 134 collection centres are set-up in 19 States.

(iv) Batteries Management: The Batteries (Management & Handling) Rules, 2001 was notified in May, 2001 to regulated the collection, characterization and recycling as well as import of used lead acid batteries in the country. These rules inter-alia make it mandatory for consumers to return used batteries. All manufacture/assemblers/reconditioners/importers of lead acid batteries are responsible for collecting used batteries against new ones sold as per a schedule defined in the rules. Such used lead acid batteries can be auctioned /sold only to recyclers registered with the Ministry on the basis of their possessing environmentally sound facilities for recycling/recovery.

1. Solid Waste Management:

(i)Municipal solid waste management including plastic waste management: As per information, municipal areas in the country generate 1, 33,760 metric tonnes per day of municipal solid waste (MSW), of which only 91,152 TPD waste is collected and 25,884 TPD treated. The Ministry has notified the Municipal Solid Wastes (Management and Handling) Rules, 2000 for management of the municipal solid waste. These Rules, inter-alia, provide for mechanisms to be set up by the Municipal Authority for management of the waste within their jurisdiction. However, the Municipal Authorities are facing difficulties in implementation of these Rules. The matter was discussed with stakeholders and it has been decided to amend the existing rules on the Municipal Solid Waste. The Ministry published the draft (Municipal Solid Waste (Management and Handling) Rules, 2013 inviting comments/ suggestion from the public. The Comments/ suggestions received were analyzed for the finalization of the new rules on the municipal solid waste. The emphasis is on management of the waste through a sustainable business model which includes segregation of municipal solid waste at source, door to door collection by involving waste collectors, processing of segregated waste in to useful products such as methane, compost, etc.

As per information available, municipal areas in the country generate 1,33,760 tonnes per day (TPD) of plastic waste, of which only 9,250TPD waste is collected and recycled. The Plastic Waste (Management and Handling) Rules, 2011 have been notified for the management of plastic waste in the country. The Rules, inter-alia provides for waste management systems to be established by the municipal authorities. The municipal authorities have been made responsible for setting up, operationalisation and coordination of the waste management system and for ensuring safe collection, storage, segregation, transportation, processing and disposal of plastic waste.

The Ministry regularly provides financial assistance to

create awareness on the various provisions of these Rules.

(ii) Bio-Medical waste management: As per the information received from SPCBs and PCCs of Union Territories, about 4.16tons of biomedical waste is generated per day. There are 190 Common Bio-Medical Waste Treatment and Disposal Facilities (CBMWTFs) in operation and 29 CBMWTFs are under construction. The waste is required to be managed as per the Biomedical Waste (Management and Handling) Rules, 1998, as amended by the Ministry.

The Ministry initiated the process of amending existing Rules in 2011 and notified the draft Bio-Medical Waste (Management & Handling) Rules, 2011 for public comments. The comments/suggestions received in the Ministry were compiled and analyzed in consultation with various stakeholders such as Union Ministry of Health and Family Welfare, SPCBs/PCCs of Union Territories, representatives of health care establishments, operators of common biomedical waste treatment and storage facilitates and civil societies. The activities related to finalization of these Rules particularly redefining the categories of biomedical waste, standards for technologies for biomedical waste treatment including incineration were undertaken during the year 2014-15. The discussions with Central Pollution Control Board and other stakeholders were held on these issues. The Rules are being finalized and may be notified in supersession of the existing Rules on Bio-Medical Waste Management.

(iii) Fly ash utilization: Electricity generation in the country is and would remain predominantly coal based in the near future. The Indian coal is has high ash content of the order of 30 -45%, generating large quantity of fly ash at coal/lignite based thermal power stations in the country. The management of fly ash has thus been a matter of concern in view of requirement of large area of land for its disposal because of its potential of causing pollution of air and water. To address environmental problem of fly ash disposal, the Ministry of Environment & Forest and Climate Change (MoEF) issued Notification on fly ash utilization in 1999 prescribing therein the targets for fly ash utilization for Coal/Lignite power based Thermal Power Stations with an aim to achieve 100% utilization in a phased manner. The targets of 1999 were further revised in 2003 and 2009.

The objectives of the notification are to protect environment, conserve the top soil, and prevent dumping of fly ash from Thermal Power Stations on land and to promote utilization of ash in the manufacture of building materials and construction activity. The implementation of this Notification has resulted in steady increase in the utilization of fly ash. The fly ash utilization in the country has been increased from 13.51% to 57.63% in the year 2013-14. However, the utilization has not reached to 100%.

To review the status of implementation of the fly ash notification in the country a meeting of Monitoring Committee, constituted in pursuance of the provisions contained Fly ash Utilization Notification was held in June 2014. During the meeting stakeholder such as Ministry of urban Development, State Urban Development Department, Central Public Works Department, National Highways Authority of Indian, etc. were asked to ensure utilization of fly ash / fly ash products in construction projects. The Central Pollution Control Board has been asked to undertake a study to assess the environmental impacts of utilization of fly ash in abandoned mines.

2. International Conventions/Protocols

(i) Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal: The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal was adopted on 22 March 1989 by the Conference of Plenipotentiaries in Basel, Switzerland. The Convention entered into force on 5 May 1992. The overarching objective of the Basel Convention is to protect human health and the environment against the adverse effects of hazardous wastes. Its scope of application covers a wide range of wastes defined as “hazardous wastes” based on their origin and/or composition and their characteristics (article 1 and annexes I, III, VIII and IX), as well as two types of wastes defined as “other wastes” (household waste and incinerator ash; article 1 and annex II). India deposited its instrument of ratification on June 1992. As on date there are 180 Parties to the Convention.

(ii) Rotterdam Convention on the prior informed consent procedure for certain Hazardous Chemicals and Pesticides in International Trade: The Rotterdam Convention on the prior informed consent procedure for certain Hazardous Chemicals and Pesticides in International Trade entered into force on 24th February 2004. India acceded to the convention on 24th May 2005 and it became operative on 23rd August 2005. During the interim period, over 170 countries identified 265 departments/institutes as Designated National Authorities (DNAs) to act on their behalf in the performance of the administrative functions required by the Convention. The Designated National Authorities (DNAs) for India are in Ministry of Chemicals and Fertilizers, Ministry of Agriculture and Cooperation. The Official Contact Points (OCPs) are designated in Ministry of Environment, Forests and Climate Change. There are 47 chemicals listed in Annex III to this Convention, which include 33 pesticides and 14 industrial chemicals that have been banned or severely restricted for health or environmental reasons by two or more Parties and which the Conference of the Parties (COPs) has decided to subject to the Prior Informed consent (PIC) procedure.

(iii) Stockholm Convention on Persistent Organic Pollutants: The Stockholm Convention on Persistent

Organic Pollutants (POPs) is a global treaty to protect human health and the environment from POPs. The Convention sought initially 12 chemicals, for restriction or elimination of the production and release. Now, the Convention covers 23 chemicals. The Convention was adopted in May, 2001 and came into force on 17th May, 2004. India ratified the Convention on 13th January, 2006 which came in to force on 12th April, 2006. As per Article 7 of the Convention, Parties to the Convention were required to develop a National Implementation Plan (NIP) to demonstrate how their obligations to the Convention would be implemented and NIP has been developed through Global Environment Facility (GEF) funding. Ministry of Environment, Forests and Climate Change serves as the focal point for GEF and Stockholm Convention in the country. Designated national authorities are in Ministry of Agriculture and Cooperation and Ministry of Chemicals and Petrochemicals. India has ratified 12 initially listed chemicals.

(iv) Minamata Convention on Mercury: In February 2009, the Governing Council of UNEP adopted Decision 25/5 on the development of a global legally binding instrument on mercury. At the Conference of Plenipotentiaries held from 9th-11th October 2013 in Minamata and Kumamoto, Japan, the “Minamata Convention on Mercury”, a global treaty to protect human health and the environment from the adverse effects of mercury, was formally adopted and opened for signature by States and regional economic integration organizations. The Convention has till now received nine ratification and 128 signatures. India has signed the Convention on 30th September 2014.

(v) Strategic Approach to International Chemicals Management: In February 2006, over 190 countries including India acceded to the Strategic Approach to International Chemicals Management (SAICM), an international policy framework to foster sound management of chemicals. Initial activities under SAICM included development or updating of national chemicals profiles, strengthening of institutions, and mainstreaming sound management of chemicals in national strategies. Towards this end, India initiated the preparation of the National Chemicals Management Profile to assess India’s infrastructure and capacity for management of chemicals. Other actions taken by the Ministry were: (i) initiated studies of inventories of lead, cadmium, mercury and arsenic in paints, distemper and pigments in the country, (ii) initiated discussions with leading national laboratories, (iii) notified the E-Waste (Management and Handling) Rules, 2012 for the management of electronic waste, and (iv) finalized the draft Dangerous Goods (Classification, Packaging and Labelling) Rules, 2013 in the line of Globally Harmonized System.

Source: moef.gov.in

● ● ●

FROM THE FOREST TO EVERY HOUSEHOLD

From the forest to every household

Do you know how the raw material of countless everyday products is made? Read our Q&A explaining the basics of modern pulp production at UPM.

What is pulp?

Wood consists of fibres embedded in lignin. Pulp is made on the Fibre line of a pulp mill, where fibres are extracted from wood, and the lignin is removed.

Pulp – a clean, renewable and biodegradable raw material – is a big part of our everyday lives, used, for example, in tissue and hygiene products, food wrapping and packaging, carton board, labels and stickers, printed products, and as binding agents in foodstuffs and pharmaceuticals.

How is the wood raw material handled?

At UPM, all wood used for pulp production comes from sustainably managed forests and plantations. When harvested, the tree logs are first weighed, measured, and inspected. From the wood yard logs are fed into a debarking drum and chipper, and the chipper cuts logs into small chips for more efficient pulping.

In addition to wood chips, we use sawdust from sawmills and plywood mills for making pulp.

How are wood fibres processed?

Wood chips are mixed in the pulp mill's digester with an alkaline solution, white liquor, and cooked in a high temperature, which dissolves the lignin and separates fibres. During the cooking process approximately half of the wood dissolves. The pulp is then washed, screened for quality and bleached.

The spent cooking chemicals and dissolved wood material is called black liquor. This substance is recovered and burned in a recovery boiler to produce energy that keeps the process running.

Washed and bleached pulp is taken next to the drying machine, which produces thick and heavy sheets. Dry pulp bales are easy to transport and use by different industries. Sheets are packed in bales, taken to storages, and then transported to markets all over the world.

How are chemicals used and recycled in pulp production?

Chemical recovery is a crucial component of the chemical pulping process. It recovers process chemicals from the spent cooking liquor for reuse.

For example, in softwood production, soap is separated from the black liquor and converted to crude tall oil, which is a renewable source for biodiesel and bionafta production.

Evaporated black liquor is burned in the recovery boiler to recover the inorganic chemicals for reuse in the pulping process.

How is water used in the production of pulp?

Water is an essential element in pulp production. There are, for example, several washing stages in between the different process steps.

High washing efficiency with a low amount of added fresh water is essential during production.

Only a small portion of the water used in UPM's production leaves the process as effluent and has to be replaced with fresh water. Enhancing water management has been one of our top priorities. Now our mills use 35% less water per tonne of pulp than 10 years ago.

How are emissions treated?

As a procedure, effluent treatment is at least as important as pure water intake and availability. All wastewater is treated in mechanical and biological effluent treatment plants before being released back into watercourses.

Emission levels in wastewaters are regularly monitored and reviewed, both internally and by relevant authorities.

Also airborne emissions are monitored continuously. Most of UPM's airborne emissions result from energy generation. UPM aims to continuously reduce these emissions, and improvements are especially visible in sulphur dioxide and nitrogen dioxide emission reduction.

How does a pulp mill produce renewable energy?

UPM is the second largest generator of biomass-based electricity in Europe. Our pulp mills are modern, extremely energy-efficient facilities that produce plenty of surplus clean energy, mainly generated by burning black liquor.

Burning black liquor generates high-pressure steam to generators for electricity production, resulting also in low pressure steam used in different processes in a pulp mill.

Source: www.upmpulp.com



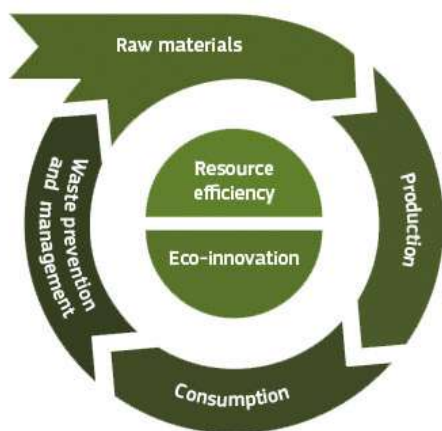
CIRCULAR-ECONOMY

Towards a Circular Economy: Why should India follow the circle to sustainability



A lot has been said about consumerism and its aftermath in the last couple of decades. But despite the discourse, most developed societies have given in to the trap of the consumerist lifestyle. Whether it is for the allure of class, or the joy of possession, contemporary society is constantly fuelled by materialistic tendencies and thrives on it.

From the time-tested systems of reuse and recycle, we moved to the age of use and throw, and while the world was busy looking for the next cool product, we have generated an unprecedented amount of waste. The great Pacific garbage patch is getting bigger every day while nations make feeble attempts to ban single-use plastics.



In such a scenario, the concepts of circular economy can turn things around. Circular economy proposes a circular instead linear life cycle of products, where

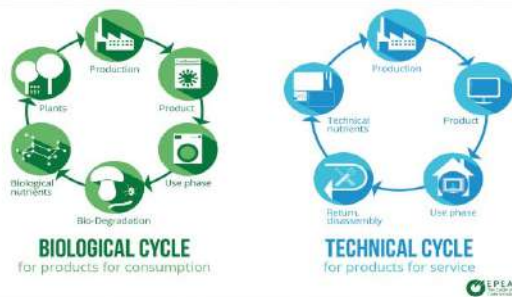
instead of disposing expired goods, their basic components are reused or repurposed. It also looks to minimise waste in production processes by finding utility in by-products and redesigning manufacturing processes to weed out waste. It is similar to the concepts of Biomimicry and Bio-convergence in essence. The core idea is to function like natural processes, where every part has a specific function and every effort leads to a logical outcome. In other words, nothing goes to waste in Nature and it is high time that we started thinking on the same lines. Historically, the reuse of objects and resources was very common, especially in Indian households. Repairing broken devices, repurposing objects and handing down clothes were common across generations. This has changed in the last decade. With globalisation and the influx of foreign brands, the Indian market is now one of the biggest consumer markets in the world. Moving to a circular economy model would take recycling and reuse beyond the average household, to the industrial sector.

The NITI Aayog very recently collaborated with Tomasz Kozlowski, Ambassador, European Union Delegation to India, for a study on the scope of circular economy (CE) and resource efficiency (RE). According to the study, India being a resource-rich country, has great potential to become a circular economy. It spells out 30 recommendations for an easy transformation, including the following:

1. Formulation of a National Policy on RE/CE,
 2. Establishment of a Bureau of Resource Efficiency (BRE),
 3. R&D for scalable technologies for RE & CE.
- Four papers on resource efficiency in the following sectors have also been released.
- 1 Steel
 - 2 Aluminium
 - 3 Construction and demolition waste
 - 4 Secondary Materials Management in electrical and electronics

Kozlowski confirmed that the EU is committed to adopt a more sustainable approach to the economy and assured India of support through the transition towards RE and CE. Kozlowski further noted that the RE and CE policies, if implemented efficiently, would also help with climate change and enable India to meet its commitments to the Paris Agreement. Ratan P. Watal, Principal adviser of the NITI Aayog, also

confirmed India's intentions to move towards a more sustainable approach to counter climate change.



Climate change is closely related to overuse of resources. The more we use up natural resources to manufacture goods, the more we emit greenhouse gases. When these goods are disposed of, and end up in landfills, they become toxic for other living creatures, and degrade the environment. "A circular economy is a regenerative system in which resource input and waste, emissions, and energy leakage are minimized by slowing, closing, and narrowing energy and material loops. This can be achieved through long-lasting design, maintenance, repair, reuse, remanufacturing, refurbishing and recycling." It is thus, a long-term, holistic solution to climate change. According to the Ellen MacArthur Foundation's 2016 report, three key focus areas for the transition to circular models in India are—

1. cities and construction
2. food and agriculture
3. mobility and vehicle manufacturing

A successful move to circular economy in these areas alone can potentially bring in annual benefits of \$624 billion by 2050.

So what does India need to make the leap? The biggest challenge on the path to circular economy is forging an industry-wide collaboration. A circular economy needs a system approach, where any changes made to any part or component of the system must consider its consequence on the bigger picture. This can only be achieved through a large-scale collaboration, similar to the CE100 network. There are a lot of innovative start-ups across the world discovering ways of assimilating CE and RE principles. These can be scaled and integrated into the mainstream industry. The industry must make a concerted effort to encourage and nurture such small-scale innovations. But as a first step, we need a deeper understanding of the concepts of CE and a macro-level plan for optimal implementation, and the sooner we start, the better. To put it in the words of Circle Economy's CEO, Harald Friedl, "A 15 degree world can only be a circular world."

Source: www.ids-pl.com



HERE'S WHAT INDIA NEEDS FOR A SYSTEMATIC PLASTIC WASTE RECYCLING

Plastics are everywhere- it is one of the biggest threats looming over the world's environmental well-being. Global plastic waste generation has more than doubled from 2000 to 2019 to 359 million tonnes. India has been a consistent contributor to adding plastic waste to these numbers. According to Union Cabinet Minister for Environment, Forest & Climate Change Bhupender Yadav, India generates 3.5 million tonnes of plastic waste annually. The prolonged pandemic and the burst of retail spaces such as FMCG markets, e-commerce, and food delivery services have seen an upward growth in plastic consumption.

Recycling – the need of the hour : In 2021, Union Environment Minister Prakash Javadekar tweeted – 'Plastic per se is not a problem; it is uncollected plastic waste that is.' The tweet highlights an important issue, that plastic which can't be recycled goes unmanaged. According to the Central Pollution Control Board report 2019-2020, India recycles around 60% of plastic waste. The remaining 40% ends up in landfills, on the streets, clogging water bodies, etc. Unmanaged

plastic also makes its way into the bellies of grazing animals, making it a concerning nuisance. This undisposed plastic is leading to a major plastic crisis.

We as a country also struggle to do proper documentation of plastic recycling. India's significant waste segregation and recycling system operates through an informal process, wherein the ragpickers sort out the waste and sell it to dealers at measly daily wages. These dealers then sell the plastic to the plants. Central Pollution Control Board stated in its annual report of 2018-19 that the country has around 1080 unregistered recycling units. The report indicated that none of the states reported the installed capacity of these plastic recycling units, which raises serious questions about the country's plastic waste management abilities.

India's policy is on the right track but needs momentum : With a goal to reduce plastic production, bring down littering and advocate proper segregation of plastic waste, the Ministry of Environment, Forest

and Climate Change introduced the Plastic Waste Management Rules in 2016. The rules allotted responsibilities to local bodies, gram panchayats, waste generators, retailers and street vendors to check plastic waste. The 2016 rules have been amended recently, with a new concept called Extended Producer Responsibility added in 2021.

This new rule has specific guidelines imposed on the producer, importer, and brand owner to follow environment-friendly ways to dispose off plastic waste at pre-consumer and post-consumer plastic packing levels.

“The enforceable prescription of a minimum level of recycling of plastic packaging waste collected under EPR (Extended Producer Responsibility) by producers, importers and brand owners will strengthen the circular economy of plastic packaging waste. The guidelines also mandate use of recycled plastic in plastic packaging by the industry. This step will generate demand for recycled plastic material’, says Ministry of Environment, Forests & Climate Change Secretary, Leena Nandan.

To curb the country’s plastic pollution, the Central Government also announced a ban on single-use plastic across the country. Single-use plastics include items such as grocery bags, bottles, food cutlery, straws etc. However, the ban isn’t sufficient to tackle plastic waste. There must be guidelines issued for alternatives to plastics, which at the moment are missing from the government rules.

Along with the ban, the manufacturers must also be asked to mark the type of plastic used in a product, so it can be recycled accordingly, believe experts. There should also be a new regulatory body that enforces these rules, as the ban is not taken seriously in many parts of the country, defeating the purpose of introducing a ban to curb plastic usage.

“One of the key challenges towards achieving environmental sustainability through the circular economy is to keep plastic waste collection and recycling lucrative. India generates enough waste to meet the demands of local industries which use recycled plastic waste as raw material for their products. Through a network of waste pickers, ‘kabadiwalas’, recyclers our country is the leader in the collection and recycling of many plastic resins,” says Vinod Shukla, president, Pandit Deendayal Upadhyay Smriti Manch.

What more can be done?

Many start-ups are focusing on building businesses in the waste management space. Their main goal is to recycle non-degradable waste into valuable resources. This is a good start, considering such innovative ideas can save the environment from catastrophic climate

change consequences. For instance, a Pune-based start-up is developing sustainable materials to replace plastic. This start-up is developing paper cups that can hold hot liquids but can get decomposed in the natural environment within six months. Another start-up is making shoes from waste, sourced from a waste removal company that hires rag pickers. A lot of clothing brands are opting for sustainable fashion as opposed to fast fashion, which has a negative environmental impact.

In 2018, The Coca-Cola Company unveiled ‘World Without Waste’ - a bold, ambitious sustainable packaging initiative that is creating systemic change by driving a circular economy for bottles and cans across the globe. The initiative lays emphasis on Coca-Cola’s innovations in technologies to reduce, recycle, and repurpose plastic waste to build a Circular Economy for Plastics - from how bottles and cans are designed and produced, to how they’re recycled and repurposed through three fundamental goals i.e., design, collect and partner.

In line with the global initiative, there are various projects being undertaken by Coca-Cola in India, aimed at waste segregation, improving the standard of living of waste recyclers, and creating awareness at the grassroots level around recycling and reusing of PET containers and plastic waste. Through these efforts, Coca-Cola India has been able to recover 62,825 MT of post-consumer packaging material in 2020 and helped recover 36% of cans and bottles which were introduced in the Indian marketplace.

Coca-Cola India is also a founding member of India Plastics Pact (IPP), Asia’s first such pact to promote a circular economy for plastics by a public-private collaboration that enables innovative ways to eliminate, reuse, or recycle the plastic packaging across the plastics value chain. To know more about Coca-Cola’s efforts in the space of plastic circularity,

There should also be a collective effort made by universities, research organizations, plastic manufacturers, and, most importantly, policymakers. They should collaborate and come up with ideas for renewable energy integration and process optimisation. Another way is to build local communities that will collaborate on conducting waste picking drives that will motivate others to participate in the same. After all, the fight against plastic should have each citizen ready to combat its vicious effects.

Disclaimer: This article has been produced on behalf of Coca-Cola by Times Internet’s Spotlight team.

Source: timesofindia.indiatimes.com

● ● ●

CIRCULAR ECONOMY – FOR SUSTAINABLE DEVELOPMENT AND ECONOMIC GROWTH WITH A BETTER LIVING CONDITION AND A CLEAN ENVIRONMENT

DR P RAMAN, DIRECTOR, ENERGY EFFICIENCY AND
ENVIRONMENT LTD., NEW DELHI

Circular economy is a utility model of resources with highly efficient utilization of resources with minimum wastage. It includes innovative production technologies and efficient process of consumption/utilization. Circular economy involves management of different factors like proprietary, efficient usage of materials and products and innovative manufacturing technologies and alternative clean/green energy technologies. Circular economy is basically focused on efficient use of resources (of energy and materials) to have a clean environment with sustainable development and economic growth. While the natural resources like minerals and oil remain limited the population on earth keeps increasing. Exploitation of forest and fossil fuel leads to climate change which results into different forms of natural disasters (like extreme weather conditions, forest fire, cloud burst, flood and also irregular/inadequate monsoon. Hence there is a need to have circular economy in place for sustainable development and economic growth with a better living condition and clean environment.

Proprietary: A combination of owning, sharing, leasing of any appliance/equipment to maximize its capacity utility factor (CUF). For example, an industry or residential cluster needs about 100 KW power. Here the timing and load demand of these two sectors has to be looked in detail and instead of having two generators a single generator can be procured to increase its CUF. The same case may be extended to multiple users. Scale of economy and utilization efficiency is a critical influencing factor in circular economy. Hence, sharing, leasing, etc. to be considered to the category of proprietary of any equipment.

Efficient usage: Any product/equipment has to be utilized to the best possible utility factor. Repairing, reusing and refurbishing are the key factors to support circular economy. Every product has an efficiency factor which is governed by multiple components. For example, take the transport sector using petrol/gas engines. The efficiency of the engine is close to 30%. Then the performance efficiency of the clutch system and transmission gears reduces the overall efficiency further and the final overall efficiency of a car/truck/bus could be around 20%. This shows only one fifth of

the petrol/diesel/ gas is used for transport and 80 % of the fuel is just burnt and the energy goes into the atmosphere in the form of heat from the exhaust and radiator. A lot to be done on this century old technology of this sector. In case of electric power generators, the efficiency is less than 10%, when operating it at lower capacity and the generator efficiency is around 25 % when it is operated at above 80% of its design load. Nowadays, emphasis is on to use battery car. Efficiency plays a crucial factor in case of battery car. The overall efficiency of the battery car is influenced by power generation efficiency, factor of power transmission loss, battery charging efficiency, battery's discharging efficiency, the prime mover (electric motor) and transmitter efficiency. Efficiency loss at each node is indirectly adds consumption of more material, energy and cost. The efficiency factor and carbon emission factors are inversely proportional. Efficient use of any product is a crucial factor in circular economy.

Production: Production of any equipment/component should use more of the recycled materials and less of new materials. For example, reuse and recycling of metallic materials (Iron /brass/ copper etc.) will need less energy and minimum investment in comparison to new materials. Innovative production methods should be evolved/focused for cost reduction and extended life cycle, in comparison to conventional production methods. For example, carbon foot print of steel production from iron ore will be about 1.85 tonne per ton of steel produced. The contribution of steel production is 8% of the total global CO₂ emission. Effective management of collection and reuse of steel will reduce the CO₂ emission significantly. Similarly, there will be a significant reduction in the production cost of a component from Ore to Iron and reuse/recycle of Iron. Reusing and recycling component is explained by taking the iron which is applicable to the production of most of the material. If we take transport sector the Light Motor vehicle or Heavy motor vehicle can reuse and refurbish the metallic parts like chassis and body and also the engine components like engine body, gears, pistons, crank shaft, etc. The control module of the vehicles can be reused with appropriate servicing. When there is too much change in the module, the individual components of used modules (like chips, capacitors, resistors) can be used effectively.

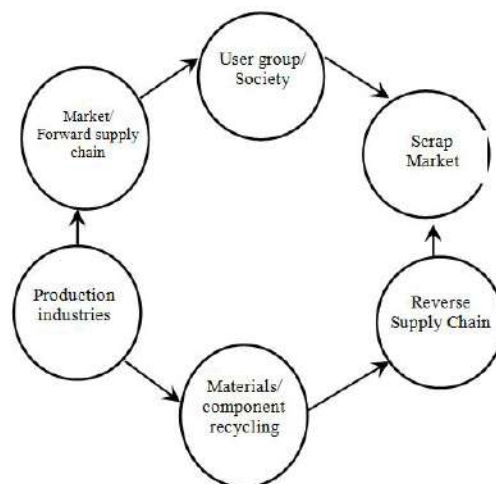
Innovative and efficient technologies: The production, management, process of usage should be upgraded toward minimizing, material, time and energy in production and usage. Efficiency is not only referred to the performance of an equipment efficiency factor as well as the carbon footprint is associated with every stage in the production process, transport and usage, reuse and recycling. For example, if we take the automobile manufacturing industries, there is a ratio in the amount of steel procured, used and wasted. The cutting profile and sheet specification has to be optimized. Innovative technologies and simulation software should be extensively used to minimize the wastage and also to minimize the time, energy consumption in the manufacturing process. Most of the steel plant face severe heat loss (energy loss) in the production process, which can be minimized by innovative and advanced technology in furnace design.

Alternative energy technologies: Circular economy can be enhanced by appropriate use of alternative and renewable energy technologies. The conventional fossil fuel-based energy sources are more expensive and they are the potential sources for GHG emissions. To have a sustainable and clean environment renewable energy sources like biomass, solar and wind should be used to the maximum possible. Any technology gap or barriers in utilization of renewable energy sources should be identified and resolved for a successful circular economy.

The increasing price of petrol/diesel/gas can affect the production process and economic/industrial growth rate. Also, the conventional fossil fuels contribute for carbon emission and climate change. The present era is a great example of beginning of climate change implications like cloud bust, forest fire, extreme summer, and extreme winters. The climate change is a strong influencing factor of the circular economy. Hence renewable energy sources should be used extensively by adoption of innovative renewable energy products like solar power and biomass energy for power generation and thermal applications. Green hydrogen is preferred as one of the future clean energy sources. The green hydrogen production cost needs to be comparable with the conventional energy cost (Rs/MJ). At present the green hydrogen is produced using the electricity produced from photo voltaic plant or wind mills. One of the upcoming alternative energy technologies is green hydrogen through biomass steam gasification. Alternative energy technologies will have a great role in circular economy and for a sustainable growth.

Circular economy can be established only when there is adoption of all the influencing factors at all the sectors, which includes production industries, different nodes of supply chains, marketing, user group/society and reverse supply chain system. In summary an efficient process/method of circular economy should be in place and in practice.

The major energy intensive sectors need to be identified. Mostly the industry and transport sectors are highly energy intensive and have the maximum fraction of the GDP. Green hydrogen is a sustainable clean energy source aimed to replace the conventional fossil fuel usage in industrial sectors. Electric vehicle is aimed at an alternative to the petrol/diesel vehicle. Here electricity production is through renewable energy sources.



The above figure represents a process flow diagram depicting the concept of circular economy and involvement of different players.

The user group is at top of the circular economy. Acceptance of any product using it efficiently and proper disposal of the product after its life, so that it is recycled and reused appropriately. The production industries have to adopt innovative and efficient technologies. Production industries should have a clear understanding about material usage (new/recycled/ quantity and wastage factor). The market and forward supply chain can be considered as one interlinked node, coordination between the market, supply chain and production industries have to perform in view of establishing a circular economy by adopting new and efficient technologies and managerial process.

The scrap market should have a well-coordinated process in practice to collect the used goods without damaging the materials/components. Scrap market can have a monitoring and collection process coordinated with sellers, users and service providers. A suitable reverse supply chain should be in place to collect the materials from the scrap market and to transport it to the materials/components recycling industries. Coordination between recycling and production industries are very much important to minimize use of new components/materials.

● ● ●

DIGITIZATION OF SUPPLY CHAIN LOGISTICS

V.RAJU, BUSINESS HEAD AND SR VICE PRESIDENT – ALL CARGO LOGISTICS,
CHEMICAL, FOOD AND PHARMA VERTICAL, 3 PL CONTRACT LOGISTICS.

v.raju@avvashyacci.com

With the aggressive pace of economic growth, India is on a fast track to development, powered by innovation and disruption across key sectors, encouraging government policies, and robust and aggressive growth in IT. Globally, as in India, the logistics sector is undergoing an unprecedented transformation, fuelled by innovations in IT and digitization. Despite this, the Indian logistics sector, regarded as the backbone of a healthy economy, is highly fragmented and unorganised.

As a result, the logistics spend in India currently amounts to 14-15 percent of GDP compared to the 5-6 percent of the GDP spend in developed economies. However, with focused initiatives on manufacturing, like the Make in India campaign, and thrust on digitisation with the Digital India campaign, the Indian logistics sector has slowly begun its disruptive transformation.

Done right, global supply chain digitization enables three critical business functions:

§ **Collaboration** - ensure every member of your supply chain, beginning with the raw materials supplier, is on the same page

§ **Automation** - scale up, reduce errors, and calculate landed cost immediately

§ **Analytics** - take a structured look at your data to create an audit trail and generate game-changing reports

According to a study, the logistics market in India is expected to grow at a CAGR of 16 percent on an average. Some key areas where digitisation will play a major role in transforming logistics into a robust, IT-enabled, intelligent service, include:

Machine Learning and Data Analytics Access to authentic and reliable data has been the biggest boon of digitisation. For the logistics sector as well, the intelligent analysis of data has helped create a massive transformation in not just managing client expectations but also to increase efficiency, cut costs, and drive growth. Some key areas where data analytics is helping shape logistics include: Improved operational efficiency due to data-enabled intelligence that enables effective decision making. Efficient management and tracking of inventory due to real-time data updates, created through a data bank on routes and progression

reports Improved customer experience due to optimised, timely, and effective execution and forecasting of logistics needs of clients.

IoT Internet of things (IoT) can be explained as the ability for multiple physical objects to connect to the internet and share data, without human intervention. This has effectively transformed several businesses, including logistics. Many logistics experts are already using these new resources to improve systems and supply networks, reduce costs, and look for opportunities to generate more revenue too. Listed below are some practical applications of IoT in logistics: Safety in supply chain management by reducing human interactions and risk of accidents Implementation of sustainable processes through optimisation of resources, including energy consumption.

Blockchain Blockchain, a distributed database that maintains an ever-growing list of records called 'blocks', transfers information with a timestamp that is locked and cannot be altered. Modern logistics networks today cater to the expanding global markets, resulting in supply chains that span over hundreds of stages over months and multiple geographical (international) locations, including tonnes of shipping and customs paperwork and multi-level payments involving numerous stakeholders. Hence, logistics is an ideal sector where blockchain can be applied to: Improve supply chain security and reduce fraud since all data is maintained on a public ledger Facilitate seamless processes by reducing bottlenecks as there is no longer a requirement for certification by third parties

Artificial Intelligence (AI) AI has been a buzzword in the supply chain world for a while. Worldwide, logistics and supply chains are undergoing a transformation as more "artificial intelligence" is being employed to manage both domestic and international movement of goods. Some key applications of AI include: Reduction in human intervention and workforce and increased efficiency in delivery and warehousing (including sorting and distribution centres) The efficient and intelligent harnessing of big data to drive cost-effective supply chain management Intelligent 'predictive analysis' that is based on an intelligent analysis of vast amounts of data collected, over a period of time, helps avert crisis/mismanagement. While the industry is suddenly flooded with data unlike ever before, digitisation of processes continues to remain a challenge.

Let's talk on " How we at ALL CARGO got the digitization of the Supply Chain functions " , this more specifically to its overseas freight forwarding arm called ECU Lines "to ensure that Supply chain Logistics is a success .

ECU360 – technology driven logistics solution

Made in China, Thailand, Vietnam and so on – these tags grace the garments worn by millions across the world, who do not even bat an eye at the arduous journey it has made across the seven seas. This is the power of the globalised world. Enabling this seamless movement of goods in this global village called earth is ECU Worldwide's digital logistics platform, ECU360. The world's number one LCL consolidator makes smart use of cutting-edge technology, to facilitate seamless cargo movement across the globe, enabling businesses to expand and giving customers greater choice.

Take the example of a shirt bought in New York City. It was probably designed by a California based brand, the cotton came from India, the fabric was made in Bangladesh using German machines, and the shirt was ultimately stitched in a garment factory in Vietnam. The lifeline connecting all these entities and enabling a global supply chain are logistics providers orchestrating and facilitating the timely and secure movement of goods.

Using technology to power the journey : ECU Worldwide, a global leader in the freight forwarding industry, is part of the lifeline enabling, supporting, and driving global supply chains. The ECU360 product stack uses technologies like automation, cloud computing, OCR and machine learning to make the international supply chain journey seamless.

The journey of the shirt in New York goes through at least 25 different touchpoints: factories, customs, terminals, shipping lines, forwarders, and authorities and more. Making this journey efficient requires seamless information flow across all these touchpoints. This is a herculean task especially considering some of these touchpoints are traditional and barely digital. However, ECU World wide's team of engineers, product managers, designers and logistics experts focus on building digital products to make this happen.

Consequently, on ECU360, customers can get instant quotes – a USP of the platform, as well as accomplish other critical workflows like booking, and tracking. They can get instant door-to-door quotes for over 50 markets, while they quote and book in less than 30 seconds. It is due to these nifty features that over 7500 freight forwarders trust ECU360 for their global cargo movements.

Moreover, these services can be complemented with carefully curated value-added offerings provided by ECU Worldwide, such as insurance and domestic trucking for the US markets, among others.

Digital Transformation : The freight forwarding industry is going through a transformation with digital adoption and ECU Worldwide is leading this from the front. Small freight forwarders who would otherwise not have access to digital logistics solutions, are able to not only use it themselves, but also offer it to their customers. In this sense, ECU Worldwide is democratizing technology in the logistics sector, making it accessible to all.

Conclusion : The world today is a global village, where goods make a complex journey across the world to their final destinations. ECU Worldwide is making this journey seamless by leveraging cutting-edge digital technology to unleash immense value for businesses. Big data and data analytics can help identify patterns for future predictions. For instance, marketing and sales forces could deploy advanced analytics to understand prescribing behaviour and potential patient profiles, enabling more precise targeting of providers and increasing the number of prescriptions filed.

Cloud and mobile technology, sensors, and next-generation business intelligence will bring about a new wave of automation in business processes—that is, real time responsiveness though streamlined, automated workflows with few handovers and end-to-end, real-time transparency on progress, costs, and business value. Thus, cloud-based platform could be a viable solution for efficiencies in supply chain logistics. Technology is still at its nascent stage in the industry, especially in India. There is a dire need for high technology enabled and process managed cargo storage and handling facilities to operate efficiently in India, which calls for high investments.

A long-term investment strategy is needed for augmenting the country's warehousing, ground handling, storage, IT infrastructure and transportation capabilities. These technology solutions will have to be supplemented with human intervention, at least in the near term to ensure efficiency. Productivity in the warehouse functioning , by way of pick and retrieval time, loading and unloading time storage stacking and retrieval time etc. are of immense importance and in the times to come, each of these metrics will have to be monitored closely and worked upon with the help of AI and robotics , to ensure higher efficiency in the operations, as demanded by the customers . In India , it is still some time away before these digitization techniques will take off and be implemented, but the heartening news is that these techniques are being worked upon and though being at the nascent stage , it will for sure radicalize the supply chain logistics and bring about a total revolution in the way SCM is conducted , sooner than later. These techniques of digitization are here to stay for sure.

● ● ●

CIRCULAR ECONOMY QUIZ

1. Which of the following is the 4Rs in the 4R framework of the circular economy?
 - a) Refuse, Reduce, Recycle, Rework
 - b) Reduce, Reuse, Recycle, Recover
 - c) Refrain, Reject, Refuse, Reserve
 - d) Rethink, Refrain, Refuse, Recycle
2. A concept that is not a driver of circular economy is
 - a) Focus on aggressive industrial development
 - b) Environmental and human health
 - c) Economic growth
 - d) Social welfare
3. All are core ideas of circular economy except
 - a) Resource efficient business models
 - b) Respect for social and economic development
 - c) Conservation of natural environment
 - d) Reduction of waste during production
4. Which of the following is not a central theme of circular economy?
 - a) Valuation of materials within a closed loop system
 - b) Extensive use of natural resources
 - c) Reducing pollution
 - d) Sustaining economic growth
5. A principle that is not a part of circular economy is
 - a) In a true circular economy, there is zero waste
 - b) The two types of industrial ingredients in a CE are recoverable and recyclable
 - c) The industrial cycle should be entirely on renewable
 - d) Customers are users rather than consumers
6. Circular economy aims at the sustainable development that implies all of the following except
 - a) Enhancing environmental quality
 - b) Maintaining economic status quo
 - c) Providing social equity
 - d) Benefiting current and future generations
7. All are characteristics of circular economy except
 - a) A restorative industrial system
 - b) Shift towards renewable energy
 - c) Eliminating the usage of toxic chemicals
 - d) Focus on waste recovery
8. A term not associated with circular economy
 - a) Cradle to cradle
 - b) Material efficiency
 - c) Eco industrial parks
 - d) Subordination to constraint resources
9. To classify the human impact on the ecosystem, Rockstrom et al. introduced the concept of
 - a) Sustainable environment
 - b) Circularity gap
 - c) Planetary boundaries
 - d) Recyclability
10. The circular economy treats an end-of-life product as a
 - a) Waste
 - b) Resource
 - c) Constraint
 - d) Scrap

Digital supply chain quiz answers

1. d
2. b
3. a
4. d
5. c
6. a
7. c
8. d
9. a
10. d

CIRCULAR ECONOMY AND MATERIAL VALUE CHAINS

This project is part of the World Economic Forum's **Centre for Nature and Climate** Platform
The Circular Economy Challenge

Business, governments and citizens around the world increasingly recognize the challenges caused by our “take-make-dispose” approach to production and consumption. In 2019, over 92 billion tonnes of materials were extracted and processed, contributing to about half of global CO₂ emissions. The resulting waste – including plastics, textiles, food, electronics and more – is taking its toll on the environment and human health.

The circular economy, which promotes the elimination of waste and the continual safe use of natural resources, offers an alternative that can yield up to \$4.5 trillion in economic benefits to 2030.

Achieving this transition requires unprecedented collaboration given that today, only 8.6% of the world is circular. We have a long way to go. To this end, the World Economic Forum's Circular Economy Initiative brings together private, public, civil society and expert stakeholders to accelerate the circular economy transition by advancing three key pillars or work:

Advancing leadership commitment : The Platform for Accelerating the Circular Economy (PACE) was launched in 2017 by the Forum as a platform for public and private sector leaders to take commitments and accelerate collective action towards the Circular Economy.

The PACE community consists of 80 public, private, international and civil society executive leaders and over 200 members championing 18 projects across the globe. Since early 2019, the PACE Secretariat has been hosted by the World Resources Institute in The Hague with continued leadership and collaboration of the Forum.

Transforming Material Value Chains : The Forum hosts a series of major value chain action partnerships that work with partners along global material value chains to advance circular models – from plastics, electronics, batteries, cars, to fashion/ textiles:

- **Global Plastic Action Partnership** : GPAP is a public-private collaboration platform launched in 2018 to help translate commitment to move to a circular economy for plastics into tangible strategies and investible action plans.

- **Circular Electronics Action Partnership** : The partnership operates across the value chain – from

manufacturing, reverse logistics, material recovery, to e-waste management, to unlock the circular economy potential for electronics.

- **Global Battery Alliance** : A public-private collaboration platform with ~60 members seeking to establish a sustainable battery value chain

- **Trade & Circular Economy** : A collaboration between the trade and Circular Economy initiative to assess the role and function of trade in facilitating a positive circular economy transition.

Scaling Innovation and the 4IR : Scale360° is an emerging initiative which aims to mobilize action among innovators, governments, civil society, and private sector stakeholders to grow the ecosystem for circular 4IR technology innovation— with a focus on plastics, electronics, food and fashion/textiles. This work builds on the related report launched in 2019 to explore the potential of the 4IR to fast-track the circular economy.

The Circular Economy for Net-Zero Industry Transition : The initiative is designed to raise the decarbonization ambition for harder-to-abate materials (steel, cement, chemicals, and aluminum) and help those industries realize a 1.5° pathway by catalyzing scalable circular economy solutions. To find out more go to <https://www.weforum.org/circular-economy-for-net-zero>

The initiative convenes key stakeholders from the material supply side and key demand-side industries around dedicated Action Tracks, with the aim to facilitate industry collaborations along value chains on concrete circular economy solutions. These efforts will be guided by three main pillars:

- **Research and analysis**: Building on existing macro evidence, undertake analysis to identify transformative circular economy partnerships

- **Mobilizing partnerships and industry champions**: Mobilize champion companies around a common vision and drive coalitions for impact, including signing up to an industry pledge

- **Building political momentum**: In close collaboration with government partners, convene political and business leaders to put climate and circular economy on the agenda at COP and beyond

For more information, contact Antonia Gawel, Head, Circular Economy Initiative (antonia.gawel@weforum.org).

Source: World Economic Forum



WHY INDIA NEEDS A CIRCULAR ECONOMY

ANAND SRINIVASAN

The COVID-19 pandemic has pushed India to rethink the linear model to move towards a more sustainable circular one, where resources are more carefully utilised.

For over 18 months since the COVID-19 pandemic began, the world has been continuously fighting the outbreak and its consequences. Almost 50 lakh people have lost their lives and many more have lost their livelihoods. Moreover, the economies of several nations, more particularly the developing and emerging countries like India, have been badly hit.

Even as last year's lockdowns and the aftermath of the pandemic saw the economy slide downwards, the government of India not only started planning for its (economy's) revival, but also the transformation from the linear 'take, make and dispose' model to a more circular one.

According to figures released by the government for 2020-2021, India's GDP (Gross Domestic Product) contracted by 7.3 percent. The impact can be gauged by the fact that between the early 1990s till the pandemic struck the country, we grew at an average of about 7 percent every year.

While it is critical to revive the economy, the transition to a circular economy is the need of the hour.

A restorative or regenerative economy that pays equal attention to and cares equally for people, planet and profits also implies the necessity of opting for renewable resources, and simultaneously working towards the elimination of waste via a more pragmatic way of making materials, products, systems and business models.

Although the government is working towards implementing its plans, we the people also need to think and act consciously towards this larger good.

For starters, we have to find new ways of not only making good use of the world's limited resources, but also find newer ways to reuse them. So, besides making products that last long and recovering everything from them to recycle along the value chain, we also need to explore alternative sources of sustainable raw materials like biomass and CO₂ (Carbon Dioxide) itself.

Moreover, we also need renewable energy to power a true resource-efficient country. These moves will help reduce the greenhouse emission by 44 percent, besides significantly decreasing congestion and pollution.

That's where collaboration plays a significant role in this transformation of linear economy into circular.

Building a resilient and low carbon economic recovery can't be possible without the joint efforts of government, industries and people working in close association with each other.

At the same time, it needs to be ensured that growth is distributed evenly across all industries, from manufacturing, agriculture and health to telecommunications and information technology. While a sizable population of India relies on agriculture, we also need to maintain equilibrium by focussing as much on education, healthcare, digital and new-age technologies.

Given the pivotal role technology in the battle against the pandemic, its part in building a circular economy is as crucial. Not to forget, technology plays a huge part in bridging the divide between urban and rural India.

Government initiatives like direct benefits and money transfers to citizens through digitisation of banks under the Jan Dhan scheme post the launch of Digital India is an apt example of how technology ensured those in rural areas don't miss out on the benefits due to them.

New-age technology like 5G, Artificial Intelligence (AI), robotics, blockchain, cloud, machine learning among others can be applied to services across sectors.

So, even as we take technology to everyone across age groups, strata in rural and urban areas, industries and businesses also need to nurture a growth mindset keeping in mind sustainable goals like climate change, renewable energy solutions and widespread use of digital platforms.

According to estimates, adopting a circular economy will bring India annual benefits to a tune of Rs 40 lakh crores by 2050.

Another key pillar in building the circular economy is by being vocal for local. One example that comes to mind about the Atmanirbhar Bharat initiative of the Indian government is the mass production of PPE (personal protection equipment) kits and masks, within a few weeks of the nationwide lockdown last year.

From being a country that didn't have adequate PPE kits etc for its frontline workers, India not only became a big manufacturer, but was also able to supply other countries in need of them. Moreover, the indigenous making of PPE kits and masks also provided employment to a huge number of people across the country.

Considering that plastic contributes to a considerable amount of waste to the environment, industries are working towards alternative raw materials, recycling products and reducing wastage.

For this purpose, the government has not only been

formulating policies and projects to drive the country towards a circular economy, but also notified various rules like Plastic Waste Management Rules, Construction and Demolition Waste Management Rules, Metals Recycling Policy among several others.

Interestingly, circular economy is not a new-age idea. In our childhood, we're taught to be cautious about using our resources, spending wisely and saving for the future. So, transitioning from a linear economy to a circular one is like coming full circle for us.

Edited by Affirunisa Kankudti

(Disclaimer: The views and opinions expressed in this article are those of the author and do not necessarily reflect the views of YourStory.)

Source: YourStory



HOW TO TACKLE POLLUTION FUELLED BY MANUFACTURING IN DEVELOPING COUNTRIES

HENRIQUE PACINI AND KWEKU ATTAFAH-WADEE,
UNCTAD ECONOMISTS

Improving productive capacities is essential to economic diversification, value-addition, and by consequence, social progress. This is especially relevant in the context of regional integration, where production scales grow beyond national markets.

At the same time, industrialization raises the issue of pollution, a multidimensional problem.

Much of the pollution problem relates to exports. For example, large textile clusters in countries like Bangladesh, Kenya, Pakistan and Tanzania exported \$79 billion worth of goods in 2019.

To produce those exports, the environmental footprint up to the factory gate involved intense water consumption (44%), land use (19%) and degradation of freshwater quality.

At the manufacturing stage, the largest share of pollution (44%) occurs in the form of soil toxicity, which is hard and expensive to remediate. As a result, gains from manufacturing and trade could be offset by the costs of associated pollution and its toll on human health.

This has ignited concerns over the consequences of trade on the environment, beyond climate change impacts. The manufacturing-pollution-export nexus has received little examination.

Insights from sub-Saharan Africa and South Asia

Balancing green industrial policies with deepening trade integration requires the adoption of clean production technologies. Positive incentives, such as facilitated transfer of environmentally friendly technologies and technical skills, would be ideal for laying strong foundations across sub-Saharan Africa and South Asia to mitigate manufacturing pollution.

Such technological transfers can make local production processes more efficient by, for example, reducing energy and water use, and avoiding leakages of environmentally harmful substances.

Harnessing life cycle assessments

Furthermore, policymakers in the South should consider harnessing the potential of life cycle assessments (LCAs), as explored by a recent UNCTAD report.

As an example, an analysis by UNCTAD and Instituto 17 shows that for every tonne of palm oil processed for exports in Kenya, 1.8 tonnes of pollutants equivalent to dichlorobenzene are left in the environment, straining local soils.

Insights from LCAs show the manufacturing stage of value addition (gate-to-gate) as contributing to ozone formation and various types of ecotoxicities.

Expanding LCA boundaries to consider upstream factors such as agricultural inputs reveals that export-oriented manufacturing has a significant impact on water consumption and quality, as well as on land-use change.

LCA methods allow a better understanding of the environmental burdens linked to exports. They also help identify the value chain components that are most sensitive in terms of environmental and health impacts.

This information helps local governments better define target sectors for implementing pollution prevention strategies.

Lessons from LCA analyses remind us that industries based on renewable inputs, such as textiles or food and beverages, can have pollution impacts beyond CO₂, with equally harmful social consequences.

Unlocking opportunities in manufacturing pollution

Trends in the investment community are helping reduce pollution in manufacturing. These include greening of investment portfolios, usually driven by shareholders, and impact investing related to environmental concerns.

Regulations also influence investors' actions, such as the European Union Taxonomy on Sustainable Finance, which creates disclosure obligations for companies and financial entities, as well as a common language for investors in projects with substantial impact on the environment.

Through this policy, every fund that flows into an investment, directly or indirectly, from a financial institution based in the European Union will need to comply with the taxonomy.

This European Union initiative promotes a life cycle perspective for investments across the entire value chain (including those based in the south) and champions the best available technologies.

It's also being used as a best practice in other

markets, receiving technical contributions from the United Nations Principles for Responsible Investment.

Recommendations on reducing pollution

Reducing pollution and realizing the full development gains linked to exports would benefit all. Here are some recommendations on doing so:

1. The creation of comprehensive trade databases and country-specific LCA inventories for developing countries. This follows recommendations from a recent report coordinated by UNCTAD as part of the Sustainable Manufacturing and Environmental Pollution (SMEP) programme, to better support national governments in decision-making.
2. Identification of public and private initiatives to address the manufacturing-pollution-export nexus in the global South. Many environmental governance initiatives from private, public and international actors are gaining traction in Africa and South Asia, such as green manufacturing guidelines, eco-industrial parks, industrial symbiosis, Environmental Management System (EMS) certification, cleaner production, and circular economy practices. They are also proposed by specialized agencies such as UNIDO.
3. Better enforcement of environmental legislation designed for manufacturing sectors, where business non-compliance is widespread. This occurs due to various factors, such as high implementation costs, limited access to monitoring systems and weak institutions.

Other practical recommendations include incorporating environmental provisions in regional and bilateral trade agreements, strengthening institutional capacities in terms of training and creating private sector awareness regarding green manufacturing guidelines and their associated opportunities.

This commentary is based on a roundtable discussion held on 7 December 2021 on the role of exports in manufacturing pollution in developing countries. The views expressed are those of the authors.

Source: UNCTAD



CIRCULAR ECONOMY A \$45 BILLION OPPORTUNITY BY 2030 IN INDIA: REPORT

A circular economy ecosystem refers to a closed-loop production model where resources are reused and kept in the production loop, allowing for more value generation

India's circular economy could touch \$45 billion by 2030, an opportunity startups can potentially tap into, according to a report by venture capital fund Kalaari Capital.

Adopting circular economy practices can help generate savings of over \$624 billion by 2050 across sectors such as food, agriculture, construction, and mobility in India, the report said. Sectors such as fashion, construction, agriculture and food, mobility, and rare earth materials are expected to provide the biggest opportunities for circular economy startups.

A circular economy ecosystem refers to a closed-loop production model where resources are reused and kept in the production loop, allowing for more value generation. The objective is to retain as much value as possible from resources, products, and materials to create an ecosystem that sustainably promotes longevity, reuse, refurbishment, and recycling, the report highlighted.

Advocacy and adoption of circular economy is key in a market like India that already faces a huge strain on the supply of resources owing to the country's large population.

Adoption of circular economy will have a direct financial impact in India. The cost of providing services to individuals following a circular path will be lower than the traditional take-make-waste model. Greater savings can help drive widespread adoption, especially among India's cost-conscious consumers, it added.

"India is expected to become the world's third largest economy by 2030, accounting for about 8.5% of global GDP. If the global circular economy touches \$4.5 trillion by 2030, then we're looking at a \$45 billion opportunity provided India captures just 1% of this market. If India's share of the circular economy matches its contribution to global GDP at 8.5%, we'll have a over \$380 billion circular economy here," according to the report.

This could also positively impact the environment in the form of lowered levels of congestion and pollution.

However, over the past five years companies in the circular economy ecosystem have attracted investments totaling only \$1.8 billion across various sectors in India. That's a sliver of the total funding drawn by startups in the same period.

Over 60% of the deal volume within circular economy and approximately 80% of the value of deals comprise of mitigation-oriented innovations in energy and transportation, the fund said in its report.

"This mirrors the prominence of energy and mobility start-ups globally. Over the last decade, significant techno-commercial progress, a favourable policy environment, and the evolution of standardised frameworks for impact measurement have fuelled increased adoption. On the other hand, sectors like smart-agriculture, waste, environment, and natural resources are still ramping up in India," the report added.

The report pointed to several models companies could adopt in the circular economy including circular supply chain, recovery and recycling, product life extension, sharing as a service and product as a service.

It also emphasised sectors such as fashion, agriculture and construction that are ripe for such innovation.

For instance, the food value chain in India is prone to high wastage. Food wastage and asset under-utilisation are some of the areas circular economy startups can tap into, thus creating annual benefits of \$ 61 billion by 2050.

"As such, startups can solve different problems across the value chain. For instance, startups offering Product-as-a-Service can help improve asset utilisation at the farming stages, while product recovery and recycling models can be effectively leveraged at the post-consumer stage," the report added.

It also pointed to the more recent popularity of environment-friendly brands selling footwear, clothes, handbags, daily essentials etc., made from recycled materials.

Source: Livemint

● ● ●

PULP AND PAPER ARE THE PIONEERS OF THE CIRCULAR ECONOMY

As the world grapples with the challenge of finite natural resources, industries are building circular economies to sustain themselves. See why the paper and pulp industry is one of the trailblazers in adopting this approach. The world will have 2 billion new middle-class consumers by 2030, which inevitably means consumption levels will increase. As a result, the world is seized by the problem of balancing rising demand for raw materials, with a finite supply. So what could be the solution? Circular economies might hold the answer.

A circular economy is a system aimed at maximising the use of resources and reducing waste by making the best possible use of a product. Unlike the traditional 'take and make', a circular economy thrives on a 'Reuse and Recycle' model. For the pulp and paper industry, this model hits close to home.

"Paper has always been recycled," says Jori Ringman, Deputy Director General at the Confederation of European Paper Industries (CEPI), a non-profit-making organisation, based in Brussels. "The first paper in medieval times came from recycled textiles," he explains. When the demand for paper grew in the 19th century, and there wasn't enough recycled textile available, cellulose fibre was introduced.

Reuse and recycle : The circular economy approach continues to serve the industry well even in modern times.

"Recycling graphic paper, like newspapers and magazines, on a large, organised scale started in the 60s," says Thomas Krauthauf, Vice President RCP & CEWS at UPM Communication Papers. Paper companies started to buy their paper back from the local authorities, ensuring that recyclable material is always available. In fact, recycling in the industry has increased by 49% since 1998 to reach 19.5 million tonnes. In 2017, 72.3% of all paper consumed in Europe was recycled, according to the European Paper Recycling Council. The signatories of the new European Declaration on Paper Recycling have committed to reaching a 74% paper recycling rate by 2020. But there are some barriers to reaching that goal.

"Unfortunately, in some regions, especially in Eastern Europe, the level of collection is low," says Krauthauf. Both UPM and CEPI are advocating measures to reverse this. "However, if someone puts a newspaper in the general waste bin, we can't get it back." Tissue-based products such as toilet paper, diapers and paper tissues usually cannot be recycled.

"Everybody has a responsibility to recycle," says Krauthauf, who is also Chairman of the International Association of the Deinking Industry (INGEDE). "We work closely together with the suppliers of ink, glue and machines to make sure we can reuse the paper."

Pushing past the limits : Some of the final products cannot be recycled currently on a large scale, says Krauthauf. However, producers like the label material supplier UPM Raflatac, for example, recently developed a new type of glue for labels that can now easily be separated from the paper during the recycling process.

Paper can't be recycled forever though. After 20 to 25 times, wood fibres are worn out. "When you wear your favourite t-shirt for years, it will also get holes," explains Ringman. "Natural fibres used for paper have the same characteristics." In practice, paper can only be recycled five to seven times, because, besides the fact that not all paper is returned to the paper producers, part of the fibres get lost during the recovery, collection and sorting process. "This means you cannot collect enough from yesterday's consumption for tomorrow's growing needs," says Ringman. "This is true for all materials in the circular economy, not only paper."

To substitute for losses, he calls for renewable materials like cellulose pulp to be used to link the circular economy to sustainable natural cycles. "This is an opportunity for the innovative pulp industry in areas ranging from textiles to health care."

"When one tree is harvested, generally three or four trees are planted and when harvested, all parts of the tree are used carefully," he adds.

Pioneering circular economies : So what happens to raw materials and products at the end of their useful lifecycle? UPM has been selling part of the paper production side streams to the brick production industry since the 1980s, which uses it to, naturally enough, make bricks.

"This consists of 30 percent fibres, fillers and ink from paper. The brick sector now relies on our material," explains Krauthauf.

The rest of the waste is used in UPM's power plants for heat and energy production. The ashes left over are used as by-products to bleach paper or for soil stabilisation during road construction.

The pulp and paper industry has the advantage of being pioneers in promoting the concept of a circular economy. "Even before people knew what the circular economy was, we were being guided by its principles," says Ringman, "but there are still more possibilities to explore."

Besides, he says: "Europe has no choice. There's a huge competition for limited resources worldwide. So, we should make the smartest use of the material. We can't succeed unless we make the circular economy a success."

Source: www.upmpulp.com

● ● ●

INTERPERSONAL SKILLFOR MATERIALS MANAGEMENT FUNCTION

BANI PRASAD CHAKRABORTY, A V P-PROCUREMENT
TUAMAN ENGINEERING LTD.

An organization either commercial or non-commercial can not operate effectively without team effort and spirit of people. But at the same time we find that no two people are having similar nature, test, liking or disliking in each other. If we imagine a football ground and if each player are having their own separate football to play what would be the result? In the mindset of diversity, it requires unity to win the game or to maintain the effectiveness of the organization. Here lies the need of interpersonal relationship.

There are mainly four skill areas which is required to develop the activity of each individual specially in Materials Management profession.

1. **Conceptual Skill:** The mental ability to coordinate all of the organisation's interest and activity.
2. **Technical Skill:** The ability to use the tools , procedures and techniques of Specialized field.
3. **Learning Skill:** The ability to enhance the knowledge as a power base and establish the right connections.
4. **Interpersonal Skill:** The ability to work with, understand and motivate other people both individually and in groups.

All other skills have a very strong requirement on job in office but the relationship skill is what affects one's performance not only on his job but in his total life. Relationship is developed wherever we go – in the office, in the factory, at home, in small group. Everywhere relationship shall become essential.

Our Approach: Generally we find fault in others which does not improve our relationship skill.

Alternate Route: If we look at our own self fault and when we search within self, we will find that myself is the worst one. If we have this approach then there is a good chance, there could be an improvement in the relationship.

Establishing relationship:

Communication : Relationships are established through communication. When two people meet each other,they communicate. The communication may be verbal or non verbal. In understanding relationship,we have to look at both the verbal and non verbal communication. When two people communicate, they can either have a cross transaction or a parallel transaction. If the transaction is cross, it creates tension. If it is parallel, it creates satisfaction. Parallel transaction results smile and cross transaction results hostility.

There are three ways that we communicate with people. Each piece of communication is known as transaction.

Adaptive communication by which one is willing to compromise, see other person's view points, is polite and socially acceptable, is predictable and reliable. Follows procedure and protocol.

Free communication by which one becomes enthusiastic ,energetic, finds creative solutions to problems, has a competitive attitude.

Rebellious communication: Impulsive, Quarrelsome and non cooperative.

Whenever we get into some disfunctional communication with somebody, we should sit back, analyse what really went wrong.

Look back and think about the alternative scenario which can improve relationship.

We should think foresight while meeting and ask ourself how we can approach the person so that communication become functional.

Two routes are available in case of conflicts:

I am right, you are wrong. I am good you are bad.Then quarrel are inevitable.

I think this way,you think that way.Let us understand each other. Results will be favourable.

The best example of this is the mother-child relationship. It is possible when we understand each other and then only we can come to a compromise.

Constructive Work attitude:

Work well and let people be satisfied with our work.

Side by side acquire qualification.

Whenever an opportunity comes, stake your claim.

First Important contribution to the problem or relationship is attitude and this can be moulded through our positive thinking and understanding process.

2nd contribution should be to move gradually towards I am ok, you are ok and creating good feeling on either side.

3rd contribution is to carefully look to the extent which is helping us to move from success to success utilizing our talents.

Lastly the best time to make friends and co operatebefore we need them and continue with respect, fairness and honesty.

● ● ●

CIRCULAR ECONOMY AND LOGISTICS

Nowadays, the product life cycle becomes shorter and shorter due to the development of technologies and faster distribution cycles.

The term “circular economy” appeared as an opposite to the linear “take, make, dispose” economic model. Now, product life cycles are becoming shorter and shorter due to the development of technologies and faster distribution cycles.

Fast fashion and electronics serve as a good example. We as customers are encouraged to consume more, since our purchased products quickly become obsolete. This makes us face an important environmental problem of product waste.

What is the main principle of a circular economy?

The European Commission defines it as follows: “Waste and resource use are minimized, and when a product reaches the end of its life, it is used again to create further value¹”.

Mobile phones are another example. Usually, after 1 or 2 years of use, people want to get a new model. However, the phone that is of no use to them anymore may be of interest to someone else. So it will be refurbished and resold; and once it does stop functioning, its components will be reused for manufacturing.

Figure 1 depicts a product life cycle represented by two circles: “make-consume-enrich” for biological materials and “make-use-return” for technical materials² (source: Ellen MacArthur Foundation).

The circular economy therefore helps to keep products in circulation for as long as possible and then to recover their parts and materials at the end of product life.

An increasing number of companies are now adapting the circular economy approach due to a growing variety of environmental challenges (waste, pollution, shortage of resources) and regulatory constraints. In many countries, for example, manufacturers of electronic products are obliged to take care of them at the end of life. In Europe, this is regulated by the Waste Electrical and Electronic Equipment (WEEE) directive (2012/19/EU), which obliges manufacturers to collect, recycle, and recover all types of electrical goods.

Organizing the reverse logistics of goods has become an obligation for consumer electronics manufacturers. At the same time, it enables them to generate extra

revenue and create a positive brand image in terms of CSR.

The switch towards a circular economy therefore creates new business opportunities for reverse logistics companies. GEODIS has implemented an asset recovery center in Germany that gives a second life to high tech equipment.

The GEODIS Asset Recovery Centre in Nieder-Olm, Germany

GEODIS has numerous reverse logistics centers all over the world, including a key site in Nieder-Olm, Germany. In a facility of more than 23,000 sqm (2017 figures), electronic devices are being reworked to give them a new life.

GEODIS fulfills all kinds of activities to prepare unwanted, damaged or end-of-lease goods to be used again, getting the maximum value out of them and their components.

Sometimes, mid-life products just need to be inspected, cleaned and refurbished for resale. While treating IT equipment, GEODIS conducts asset verification testing using special operability and configuration software. This guarantees the wipe-out of the previous user’s personal data.

We also fulfill repair operations, reducing the number of products with minor problems that need to go through the recycling/disposal stage, thereby extending product life.

Once an item is recovered, repaired and the software is installed, we conduct remarketing activities. We define an appropriate price for the product based on data analysis, and then put it on sale in the channel of greatest value – whether that be e-commerce, broker sales or other channels.

What can be an end-of-life treatment?

We may not realize the value hidden in consumer electronics waste. Even if the item is non-repairable, it can contain considerable value in its spare parts and materials.

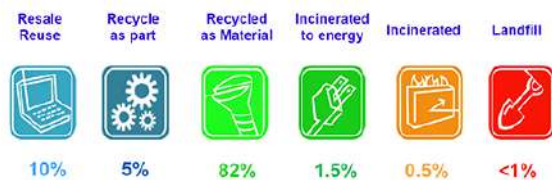
In GEODIS reverse logistics centers, end-of-life products are dismantled to pieces so that their spare parts can be reused in a manufacturing process or repair services. Some materials (such as gold, aluminum, copper, etc.) can be sold to specialized markets. This process is called

urban mining – getting elements from waste, used products and buildings.

We make sure to fulfill our recycling operations and proper disposal activities in accordance with The Waste Electrical and Electronic Equipment Directive, with a special focus on safety while treating dangerous goods.

GEODIS therefore plays a real environmental role here, as products are recycled through appropriate channels and landfill waste is kept to minimum (less than 1%).

GEODIS results in 99% of materials being recycled
Less than 1% is going to Landfill



Circular economy principles can be implemented in logistics, as evidenced by electronic devices.

At the same time, reverse activities are quite developed for high tech and automotive items, and can also be applied to other types of products, such as fast-moving consumer goods (clothes, food, beverages, etc.).

The collection and processing of mid-life and end-of-life products all require specialized expertise. Entrusting these operations to a 3PL provider can provide both environmental and financial benefits.

Sources:

¹ https://ec.europa.eu/growth/industry/sustainability/circular-economy_en

² Ellen MacArthur Foundation – Introduction to the circular economy – Circular economy booklet <https://www.ellenmacarthurfoundation.org/>

Source: GEODIS



PUTTING INDIA ON AN ACCELERATED PATH TO BUILD A CIRCULAR ECONOMY

SHIVANSHU CHAUHAN / SANGEETHA RAGHURAM / ISHITA ARYAN

The pragmatic policy environment, presence of an already thriving informal sector and the waste economy gives India an inherent advantage for the paradigm shift.

Circularity is not a new-age idea to the Indian ecosystem. The country has been known for its frugal innovation around ‘doing more with the less’.

Today, India stands at an inflection point in its journey towards economic growth. To balance the adverse effects of rapid urbanisation, industrialisation, growing population, and climate change, it is imperative to imbibe circularity in our economic development.

There is a need to disrupt the linear ‘take-make-waste’ model and adopt circular economic models which are restorative and regenerative by design, and pay equal attention to people, planet and profits. This would integrate the design-thinking approach for optimising resource efficiency across product lifecycles, enabling businesses to overcome the risk of raw material shortages.

As a multiplier effect, it would also reduce negative

externalities such as waste, pollution and health hazards, while opening up newer business opportunities. According to Ellen MacArthur Foundation’s estimates, circular economy adoption in India will bring an annual benefit to a tune of Rs 40 lakh crore (\$624 billion) in 2050 and reduce GHG emissions by 44 per cent.

The recent focus on circular economy in the Union Budget puts India in the right direction. So far, the government has been proactive in formulating policy frameworks for ten focus sectors for circular economy transition.

The Natural Resource Efficiency Policy, Plastic Waste Management Rules, Construction and Demolition Waste Management Rules, Metals Recycling Policy and Extended Producer Responsibility are a few such examples.

Going forward, the policies need to evolve into coherent and systematic action plans to enable circular business models. Here are a few pragmatic perspectives that can enable the actors of change to achieve this.

As the next step, there is a need to innovate and contextualise realistic circular business models to harness the multipronged benefits of a circular economy. It should go beyond feel-good corporate social responsibility and cut across sectors, industries and value chains to drive sustainability on a mass scale by refashioning linear streams of inputs and outputs while keeping businesses financially viable.

Today, one-third of India's 1.2 billion people live in urban areas, generating approximately 62 million tonnes of municipal solid waste (MSW) annually. As per NITI Aayog, this number is expected to grow rapidly to 125 million tonnes per year by 2031.

Optimising material usage through better product design, product lifecycle extension, product as service, sharing platforms and using recycled material through green procurements can disrupt the not-so-sustainable consumption pattern and consumerism.

Brands have already started to design incentivised return policies and buy-back mechanisms. This helps in constructing effective reverse logistics where the waste is put back into the system as a resource, thus giving a new dimension to waste economy.

Multi-stakeholder collaboration and alliances are instrumental to enable such circular business models. For example, the key to addressing India's solid waste management challenge lies in connecting all kinds of actors along the value chain, including producers/brand owners, municipalities, the informal sector, waste management companies, and recyclers.

Brand owners have tied up with waste management agencies to realise their circularity objectives and are supporting municipalities in plastic waste collection. While low-value plastic waste collected from cities is co-processed as fuel in cement kilns, high-value plastic waste is being recycled.

The government can offset such pre-competitive collaboration across industries and value chains with partners as mutually invested coordinators of circularity. While this opens up additional avenues of green job creation, businesses have to be considerate about the already existing informal sector in demystifying the complexity of reverse logistics and the recycling landscape.

As per an SBI report, India's informal economy contributes to more than 20% of the country's GDP, placing the country in an advantageous position to swiftly move towards a circular economy.

Leveraging digital technology for reverse logistics could further reinforce innovation and value creation for circular business models. Technology and digital intelligence can transform the traceability of material flow across value chains and build confidence amongst industry players and users of recycled products. Initiatives such as Startup India, Make in India and Digital India have well-positioned the country to create such indigenous solutions.

Simultaneously, a circular economy can attract and accelerate sustainability financing. Its closely knitted equations with SDGs and the global ESG agenda give a fresh window to cities and businesses to realign themselves and rebuild their brand value to appeal to a growing class of sustainability-minded stakeholders.

Global investments are backing sustainable businesses, infrastructure, and development. According to Bloomberg intelligence, ESG assets are on track to exceed USD 53 trillion by 2025.

The circular economy is being used as a lens to weigh the short-term returns vis-a-vis the longer-term social and environmental value. Despite being in its infancy, the circular economy is giving businesses and cities that commit to it a chance to gain a first-mover advantage to attract such funds and investments.

The government has already identified a few focus areas and related sectors that need to recognise and revolutionise the material flow and carbon footprint across product life cycles.

There is a need to closely assess the economic interactions to identify interdependencies in between the value chains of businesses and systems that can be leveraged to induce circularity.

India's rapidly evolving market and high development potential can be a competitive advantage over mature economies. This ambitious long-term vision of a circular economy, built on the current strengths of the Indian market and congregation of diverse stakeholders could pave the way for a fast-tracked sustainable and resilient prosperity.

(Views are personal. Chauhan is Partner, Raghuram is Director, and Aryan is Senior Associate in ESG - Circular Economy, PwC India.)

Source: bussinesstoday.in



NOW THAT IT'S HIT BOTTOM IN GLOBAL ENVIRONMENT INDEX, INDIA MUST ADOPT CIRCULAR ECONOMY MODEL TO BE HABITABLE

RAJDEEP PATHAK

Circular economy is an alternative to linear economy, which is based on take-make-dispose model. It starts with development and production of product, its consumption or its use as a secondary material

I was glued to an old documentary on Sundarlal Bahuguna (9th January, 1927 – 21 May, 2021)– well-known environmentalist and leader of Chipko Movement, a person who fought for the preservation of the forests of the Himalayas in the 70s and later spearheaded the anti-Tehri Dam movement from the 1980s to early 2004 – when my daughter's painting on preservation and protection of Mother Earth caught my attention.

She was still busy giving her work the finishing touches. What I saw was that she drew two types of hands – one brown and one green. While the brown represented us (humans) attempting to protect the soil, the green symbolised nature nurturing our efforts by spreading her abundance around. This, she said, was a school project as part of the World Environment Day that fell on June 5.

Her creative idea of protecting planet Earth with two hands seemed perfect as far as her imagination took her flight, but it is undeniable that we adults are to be blamed for the present condition of environmental degradation.

Let me point out here that as I am writing this sitting in my room, the outside temperature in the Capital city of Delhi is 48 degrees Celsius.

I was equally reminded of a promotional video where children and adults are invited by teachers in separate sessions to draw their thoughts on environment. While the parents drew plants and lush green trees and blue sky and rainbows, when the papers given to the children were placed on the table before their parents, they were startled to see what their children painted. It was dark, black and grey with no rain and rainbows.

This clearly stated how and in what condition they are living or are bound to live for the next few decades because of what we adults have done to this planet earth, which we neither inherited nor owned.

An honest confession: I couldn't locate this video on YouTube. However, another 3.27 minute hard-hitting short documentary on 'pollution in India' depicting how humans will live in 2030 with O2 kit for their survival is enough to open our eyes to the grave threat

that is looming large upon us.

What we have done to our environment

Led by the United Nations Environment Programme (UNEP) and commemorated annually on June 5 since 1973, World Environment Day is the largest global platform for environmental public outreach and is celebrated by millions of people across the world.

This year it was hosted by Sweden. #OnlyOneEarth was the campaign for World Environment Day 2022. It called for collective, transformative action on a global scale to celebrate, protect and restore our planet.

The United Nations has declared a not-to-be-forgotten threat with a triple planetary emergency that the Earth faces:

- The climate is heating up too quickly for people and nature to adapt;
- Habitat loss and other pressures mean an estimated 1 million species are threatened with extinction;
- Pollution continues to poison our air, land and water.

It further highlights that time is running out, and nature is in emergency mode. To keep global warming below 1.5°C this century, the global community must come together to work to halve annual greenhouse gas emissions by 2030. Without action, exposure to air pollution beyond safe guidelines will increase by 50 per cent within this decade and plastic waste flowing into aquatic ecosystems will nearly triple by 2040.

There is a need for urgent action to address these pressing issues, making "Only One Earth" and its focus on living sustainably in harmony with nature, as pertinent as ever.

While it is nothing new that our production and consumption lead to large quantities of waste, an important element in work on eco-cycles is, therefore, sustainable waste management.

We are in an era when we are driven by rapid urbanization, economic development and changing consumption and production patterns. Over the years, the amount of single-use packaging is rapidly increasing worldwide.

At the same time, globally waste management systems still lack effectiveness. As a result, annually 75-199 million tons of plastic find their way into the oceans, based on estimates by United Nations Environment Program (UNEP). About 60 to 90% of marine litter (waste) consists of plastics, of which much comes from single-use plastic products and packaging.

The environmental data that is being received are signalling alarm bells for us. According to an estimate, 13 lakh hectares of forest are being destroyed every year in India alone. About 8 lakh hectares of land of the country is getting rugged every year.

According to another estimate, about one lakh tonnes of insecticidal chemicals are being used in India every year, due to which 96000 tonnes of agricultural produce is lost.

One can hardly forget the tragedy that struck Kedarnath temple in Uttarakhand in 2013. The initial reason that was attributed to it was heavy rains.

However, in the assessment by environmentalists and scientists, it was pointed that one of the reasons for this tragedy was about 70 hydroelectric projects running in the region. These projects affected the flow of rivers and caused landslides and floods.

Moreover, this danger is not over yet and experts believe that if tampering with nature is not stopped, then more devastating and tragic incidents will reoccur.

To protect the environment, we need to properly manage waste. It is necessary to collect the garbage dump and recycle it into reusable waste, such as water bottles, etc. Emphasis should also be given on making manure from leaves, and so on.

Another challenge before us is that of e-waste. Due to the increasing dependence on technology, the country is turning into a heap of e-waste. It is startling to see that four percent of the world's e-waste is in India.

E-waste contains many types of chemical substances, which are a serious threat to the environment. Proper management of e-waste has become very essential.

The aim of waste management is to reduce the potentially dangerous effects of waste on the environment and human health. There is also a need to work towards waste prevention, reduction and recycling.

The aim as far as possible is to make use of the resources contained in waste. At the same time, it is important to reduce adverse effects in the form of emissions of methane gas from landfills and carbon dioxide from combustion, as well as emissions of heavy metals and organic environmental pollutants.

This primarily means that we have to try to produce as little and as non-hazardous waste as possible. An all embracing perspective on the area of waste is required to attain sustainable waste management.

Towards circular economy – the way forward

Governments, businesses, academia and civil society increasingly recognize that a switch towards a circular economy approach to plastic waste and waste in general is necessary to tackle many challenges faced by environment.

The transformation from a linear to a circular economy requires a much stronger commitment to sustainable management of waste and resources.

The goal of circular economy is:

- (1) To increase the life cycle of different types of materials and waste and
- (2) To facilitate their reuse by treating them as manageable resources.

Circular economy is not limited to waste management only, but starts with development and production of the product, its consumption or its use as a secondary material. A circular economy is an alternative to a linear economy, which is based on a take-make-dispose model.

While there is no universally-agreed definition of a circular economy, the 2019 United Nations Environment Assembly, the UN's flagship environment conference, described it as a model in which the value of products and materials is maintained for as long as possible and waste and resource use are minimized. It underlines the general principle of an economy that decouples economic activities from finite primary resource consumption.

In this field the concept of the 3R (Reduce, Reuse, Recycle) plays an important role.

A 'circular economy' model, which employs not only waste management, but reuse, recycling and responsible manufacture, could support the development of new industries and jobs, reducing emissions and increasing efficient use of natural resources (including energy, water and materials).

A 'circular economy' has been identified as a major (up to \$4.5 trillion: World Business Council for Sustainable Development) commercial opportunity and could support the development of new industries and jobs, reducing greenhouse gas emissions and increasing efficient use of natural resources (including energy, water and materials).

By maximising resource utility and incorporating the concept of circularity during production and consumption (i.e., not just focused on waste management), the circular economy boosts entire economies.

The Pangean in an article titled "Circular Economy in India", October 12, 2021 by Rajsi Sah, while quoting The Ellen MacArthur Foundation, defines circular economy as an "Industrial system that is restorative or regenerative by intention and design".

It replaces the linear economy concept with restoration; shifts to the use of renewable energy; eliminates the use of toxic chemicals that impair reuse and return to the biosphere; and strives for waste elimination through superior design of materials, products, systems and business models.

It further writes, “In other words, a circular economy model seeks to bridge the gap between production and the natural ecosystems’ cycles, on which humans ultimately rely”.

The circular economy concept entails two sets of activities: first, waste elimination through biodegradable waste composting and reusing, remanufacturing, and recycling of transformed and non-biodegradable waste, and second, switching to renewable energy instead of chemical substances.

In a circular economy, no product goes to waste; everything is designed to maximise the value of the materials contained inside it while preserving their high utility at all times. The transition to a circular model is expected to benefit economies in a variety of ways.

The article further points to a report titled ‘Towards the Circular Economy’ (2013), of the Ellen MacArthur Foundation where it forecasts significant net material savings, price volatility and supply risk reduction, enhanced rates of innovation employment and capital productivity, decreased externalities, and long-term economic resilience.

The approach, it points, would thus shift the economic balance away from energy-intensive materials and primary extraction to create a new sector dedicated to reverse cycle activities.

Furthermore, since many emerging market economies are more material intensive than the developed economies, circular business models could result in even greater relative savings.

Increasing circularity means moving away from a linear (take-make-dispose) economy, to one where products and materials are reused, repurposed and recycled. This reduction in consumption of raw or virgin material not only reduces waste, but can also reduce the need to extract and process additional raw materials.

Whether one is operating from a pragmatic and environmentally-conscious standpoint, adapting some principles from the circular economic model just makes sense—especially when looking at the long-term.

For the circular economic model to work, there is a need to find ways to minimize our overall material consumption. We must look at our current waste patterns and find ways to fill the gaps. And, rather than relying on raw materials, we have to find ways to use recycled resources in our manufacturing processes and to handle our waste more responsibly.

Not only this, research suggests that there is strong

case for the development of innovative technologies that overcome identified challenges and support continued growth. A circular economy is not only beneficial for the environment, but it has proven economic benefits as well. In fact, research suggests that moving to a circular economy could offer \$4.5 trillion in economic opportunity.

The Indian perspective

By embarking on a circular economy transformation, India could create direct economic benefits for businesses and citizens while reducing negative externalities. With its young population and emerging manufacturing sector, the country can make systemic choices that would put it on a trajectory towards positive, regenerative, and value creating development.

The core ideas of the Circular Economy are the elimination of waste by respect for the social, economic, and natural environment, design, and resource-conscious business conduct.

Built on the backbone of these principles, the Circular Economy has demonstrated to deliver tangible benefits and viability to address the economic, environmental, and social challenges of our days. Sustainability and circular economy (CE) are growing interest for governments, investors, companies, and civil society. Sustainability envisions a balanced integration of economic performance, social inclusiveness, and environmental resilience to benefit current and future generations.

Rajsi Sah in her article in The Pangean also records that “Circular economy ideals (reuse, re-purpose, and recycling) have been prevalent and practiced in Indian society for a long time, passed down as lessons from generation to generation, making a strong case for India to transition to a circular economy. Doing so will not only reduce resource dependency but also increase competitiveness”.

Rashi quotes the Ellen MacArthur Foundation which says that a circular economic development path in India could generate a yearly value of \$218 billion in 2030 and \$624 billion in 2050, as compared to the existing development scenario.

Reports suggests that the Indian economy has shown strong signs of being resilient during the pandemic. Efforts to make a circular transition can be seen across sectors. A lot of work in the different Ministries and Departments has been happening for quite some time.

A report titled “Circular Economy in India: Rethinking Growth for Long-Term Prosperity” by Ellen Macarthur Foundation, presents seven key insights that make the case for the application of circular economy principles in India:

1. A circular economy development path in India could create annual value of ¹ 14 lakh crore (US\$ 218 billion) in 2030 and ¹ 40 lakh crore (US\$ 624

billion) in 2050 compared with the current development scenario.

2. By adopting circular economy approaches, businesses could achieve material cost savings and increase their profits. The key drivers of value creation include better product design, innovative business models, and reverse logistics.
3. A circular economy development path could significantly mitigate negative environmental externalities. For example, greenhouse gas (GHG) emissions could be 23% lower in 2030 and 44% lower in 2050 compared with the current development scenario, helping India deliver on its targets promised in the recently ratified Paris agreement.
4. A circular economy could deliver benefits for the Indian population, such as cheaper products and services and reduced congestion and pollution. In all three focus areas studied, the analysis showed that the cost of providing the expected services for each citizen would be considerably lower on the circular development path than on the current path.
5. Leveraging digital technology to enable the circular economy could reinforce India's position as a hub for technology and innovation. The interplay between circular economy and digital technology creates fertile ground for value creation and given its renowned IT sector, India is particularly well positioned to leverage these opportunities.
6. By actively leveraging and reinforcing circular economy opportunities now, India could move directly to a more effective system and avoid getting locked into linear models and infrastructure. As the systems that provide housing, food, and mobility require development in a growing economy like India's, the country could realise significant value by developing them in a circular, rather than a linear, way.
7. High-growth markets like India can achieve competitive advantage over mature economies by moving to a circular economy.

In conclusion, a circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the end-of-life concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse and return to the biosphere, and aims for the elimination of waste through the superior design of materials, products, systems and business models.

Source: www.nationalheraldindia.com

• • •

OBITUARY



SHRI V. HARIHARAN

(PASSED AWAY ON 22ND JULY 2022)

**First National President
and Founder Member of IIMM**

IIMM fraternity is saddened by the sudden demise of Shri V. Hariharan, founder member and first National President of Indian Association of Materials Management (later renamed as Indian Institute of Materials Management): Shri V. Hariharan was kind hearted man who always thought for the welfare of the IIMM and its fraternity. In the formative years of IAMM and later as IIMM, he passionately worked for increasing the importance of discipline of Supply Chain/Logistics Management. He was also an active member of Probus Club of Chennai and was nominated member of IRDAI (Insurance Regulatory and Development Authority of India) for several years. He was Fellow of the Institution of Engineers. He was a top management professional who worked with and guided the business fortunes of the most well known corporate of Telco, IBM and TVS. His book on "Water Management for Sustainable Diving" found its way to World Bank, He was Advisor to the Union Public Service Commission. He was President of Rotary Consumer Guidance Cell and Chairman Citizen Advice Bureau. He was closely associated on healthcare for weaker section and numerous socially useful activities. He received the Award for Excellence as "Distinguished Social Activist" during the International Day of the Elderly.

It was in recognition of his enormous contribution in the field of Supply Chain Management, IIMM conferred "Lifetime Achievement Award" on him in 2021.

IIMM fraternity prays for Sadgati and Moksha for the departed soul and prays the Almighty to give strength to his family and IIMM to bear the great irreparable loss.

Om Shanti Shanti

GOVT DRIVING TRANSITION FROM LINEAR TO CIRCULAR ECONOMY

The key to an *aatmanirbhar* Bharat is sustainable growth. The need of the hour is a development model that leads to the optimum utilization of resources. With a growing population, rapid urbanization, climate change and environmental pollution, India must move towards a circular economy.

An economic approach aimed at eliminating waste and the continual use of resources, circular economy offers a new paradigm that emphasizes on the need to take a comprehensive view of products and processes. Our production systems must adopt practices around the principles of circular economy so that they not only reduce resource dependency but also gain competitiveness.

A circular economy path adopted by India could bring in substantial annual benefits, along with significant reduction in congestion and pollution, which would consequently have a snowball effect on the economy. Our ability to maximize our resource efficiency, minimize the consumption of finite resources as well as the impetus to the emergence of new business models and entrepreneurial ventures will spur our transition towards self-reliance.

The Government has been actively formulating policies and promoting projects to drive the country towards a circular economy. It has already notified various rules, such as the Plastic Waste Management Rules, e-Waste Management Rules, Construction and Demolition Waste Management Rules, Metals Recycling Policy, etc., in this regard.

Since its constitution, NITI Aayog too has undertaken several initiatives to ensure sustainable economic growth. Direct initiatives were taken to address the challenges in the utilization of waste as resource and to evolve a perspective on the recycling industry in India. Progress was made in promoting the usage of fly ash and slag produced in the steel industry in other sectors. NITI also organized an international conference on 'Sustainable Growth through

National Recycling'; prepared a strategy paper, along with the EU delegation to India, on 'Resource Efficiency', and four more on resource efficiency in the sectors of steel (with the Ministry of Steel), aluminium (with the Ministry of Mines), construction and demolition (with the Ministry of Housing and Urban Affairs) and e-waste (with the Ministry of Electronics and Information Technology).

To expedite the transition of the country from a linear to a circular economy, 11 committees have been formed—to be led by the concerned line ministries and comprising officials from MoEFCC and NITI Aayog, domain experts, academics and industry representatives—for 11 focus areas (Annexure 1). The committees will prepare comprehensive action plans for transitioning from a linear to a circular economy in their respective focus areas. They will also carry out the necessary modalities to ensure the effective implementation of their findings and recommendations.

The focus areas include 11 end-of-life products/recyclable materials/wastes that either continue to pose considerable challenges or are emerging as new challenge areas that must be addressed in a holistic manner.

While increased manufacturing and changing consumption patterns will generate more employment and increase per capita income, the effects of such higher production on the environment must also be efficiently managed and mitigated. With only 2% of the world's landmass and 4% of freshwater resources, a linear economy model of 'Take-Make-Dispose' would constrain India's manufacturing sector and, consequently, the overall economy. Therefore, it is essential to recognize and revolutionize the material flow in the manufacturing process and shift towards a circular economy, which provides multipronged economic and ecological benefits.

Annexure 1

S. No.	Focus Area	Concerned Line Ministry
1	Municipal Solid Waste and Liquid Waste	Ministry of Housing and Urban Affairs
2	Scrap Metal (Ferrous and Non-Ferrous)	Ministry of Steel
3	Electronic Waste	Ministry of Electronics and Information Technology
4	Lithium Ion (Li-ion) Batteries	NITI Aayog
5	Solar Panels	MNRE
6	Gypsum	Department for Promotion of Industry and Internal Trade
7	Toxic and Hazardous Industrial Waste	Department of Chemicals and Petrochemicals
8	Used Oil Waste	Ministry of Petroleum and Natural Gas
9	Agriculture Waste	Ministry of Agriculture and Farmers' Welfare
10	Tyre and Rubber Recycling	Department for Promotion of Industry and Internal Trade
11	End-of-life Vehicles (ELVs)	Ministry of Road Transport and Highways

Source: PIB



SUSTAINABLE PROCUREMENT

INTEGRATING SUSTAINABILITY INTO THE ORGANIZATION'S PROCUREMENT POLICY AND STRATEGY

ISO 20400:2017(E) - Sustainable Procurement : Integrating Sustainability Into The Organization's Procurement Policy And Strategy is in continuation to ISO 20400:2017(E)- "Sustainable Procurement- Understanding the Fundamentals" published in July 2022 on page no. 55.

SUSTAINABLE PROCUREMENT : INTEGRATING SUSTAINABILITY INTO THE ORGANIZATION'S PROCUREMENT POLICY AND STRATEGY

5.1 Committing to sustainable procurement

The commitment of the top management of the organization is critical to successful sustainable procurement, and it is important that top management understands how procurement can support the organizational goals and improve performance.

Without this formal commitment, individuals involved in procurement have no official mandate to integrate sustainability into their procurement strategies or processes. Sustainable procurement therefore remains an ad hoc activity without resources and recognition at an organizational level.

Sustainability considerations should be integrated at the highest and most strategic level of the procurement function in order to clearly set intentions, directions and priorities for the whole organization in terms of sustainable procurement.

When they exist, two key procurement documents are typically impacted and should be linked with the overall organizational policies and strategies, including those covering sustainability:

- a document, often called a "policy", which expresses the procurement intentions, objectives and values of the organization, as formally expressed by its top management: such a document usually describes elements such as the organization's vision, values, commitments and rules;
- a written plan, often called a "strategy", which outlines how an organization's procurement

intentions and directions will be delivered: this should outline the key objectives and targets and include a basic work plan. Some organizations might not create separate documents. The ultimate goal should be to embed sustainability into existing procurement documents.

5.2 Clarifying accountability

Clear accountabilities for sustainable procurement should be established. An example can be seen in Figure 2. The accountability at the top management level usually resides with the head of procurement.

This arrangement plus integrating sustainability into the teams' objectives and job descriptions might be sufficient.

In an SMO, the owner or manager plays a more important role, particularly in the absence of a distinct procurement department and/or manager.

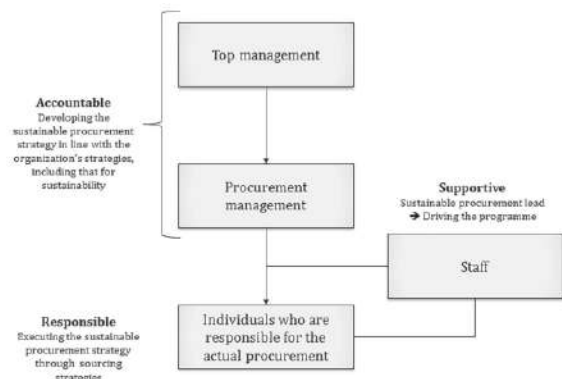


Figure 2 — Example of roles and levels of accountability for sustainable procurement

5.3 Aligning procurement with organizational objectives and goals

When setting sustainable procurement priorities management should adapt the organizational goals and values into clear sustainability objectives for the procurement policy and strategy. This should take into account the organization's strategic choices such as externalization, increased subcontracting abroad, and increased partnerships, mergers and

acquisitions, which might have a significant impact on the way the organization could operate in the future. This exercise should result in the establishment of specific, measurable, achievable, realistic and timely objectives for the key issues identified for sustainable procurement that are fully supportive of and aligned with organizational goals.

Procurement should set clear targets and measure performance against high-level sustainability goals.

A sustainable procurement policy should:

- reflect the organization's values, principles, objectives and goals;
- reflect the organization's commitment to sustainability;
- align clearly and precisely with the organization's policies;
- take into account the three pillars of sustainability: environmental, social and economic considerations;
- address the principles of sustainable procurement.

If an organizational policy or strategy does not exist, then top management should be engaged to understand the need to embrace sustainability, to formally determine the strategic intentions and objectives, and to clarify how these align with the organization's priorities.

5.4 Understanding procurement practices and supply chains

The procurement function should interpret the organizational sustainability policy and strategic goals and align the objectives with the procurement goals, applying risk management.

In order to set priorities for sustainable procurement an organization should have an overview of:

- its procurement practices;
- its supply chains.

It is important to recognize that the organization's practices which influence procurement can, in themselves, give rise to sustainability adverse impacts. EXAMPLE Late payment, unrealistic delivery requirements, overly aggressive price negotiation, disregard or abusive litigation of third parties' intellectual property, unfair competitive practices, penalties, and failure to respect international norms of behaviour. This, in turn, can damage the reputation of the organization with potential impacts on stakeholder confidence, investor confidence, employee satisfaction and retention, customer

satisfaction and continuity of supply. Effective management of these issues can give rise to improved supplier performance and stakeholder satisfaction. An overview of the supply chain could be achieved by considering the following:

- core processes;
- complexity and number of tiers;
- transparency within the supply chains;
- important actors and partners;
- external influences;
- sustainability impacts.

5.5 Managing implementation

When implementing the sustainability objectives of the procurement policy the organization should:

- validate strategic objectives through appropriate decision-making;
- establish Specific, Measurable, Achievable, Realistic, Time-bound (SMART) goals for each objective;
- get endorsement and sponsorship from top management;
- effectively communicate to all relevant stakeholders, both internal and external to the organization
- deploy the policy and strategy throughout the organization and procurement process, ensuring that clear roles and responsibilities are established and the resources needed to achieve the objectives are available;
- assess and monitor implementation;
- share commitments, progress and results with all relevant stakeholders and learn from stakeholders' sustainability expertise and experience;
- review the implementation and strive for continual improvement.

Top management should articulate their vision of long-term sustainability outcomes and should challenge and empower individuals who are responsible for the actual procurement to seek innovative and sustainable solutions. Leaders should be capable of and willing to provide guidance, mentoring and advice. Note that leadership can exist at all levels of organization.

●●●

BRANCH NEWS

CHANDIGARH BRANCH

Indian Institute of Materials Management Chandigarh branch celebrated M. M. Day by organizing a professional talk on Importance of Vision and Mission statement on 23 April 2022 at IIMM office at Tri Plaza, Peer Muchhalla. Dr Ashish Saihjpal Assistant Professor, Punjab University and Hon General Secretary IIMM Chandigarh branch. It is pertinent to mention here that Ashish is son of Late Dr A. K. Saihjpal a great educationist and veteran of IIMM. Dr Ashish defined Vision and mission statement and highlighted it's importance in deciding its goal for the next few years and why it is essential for any organization. Before that Mr Rajesh Gupta Branch Chairman welcome the members and shared the history of M. M. DAY. Mr Mr O. P. Longia Former National President IIMM administered the oath of code of conduct of IIMM to members. Mr S. K. Sharma Former National President IIMM emphasized to improve the visibility of IIMM in Industry. Mr T. K. Magazine Distinguished member and one of Founder of Vizag and Chandigarh branches motivated the members to contribute some time for achieving the mission of IIMM. Mr Dalip Kumar Hon Treasurer proposed the vote of thanks. After the ceremony, members were served with Lunch.

Factory Visit : In order to improve visibility of IIMM, our team of Mr S K Sharma Former National Institute of Materials Management and Mr O. P. Longia Former National President IIMM visited Bharat Electronics limited Panchkula to have interaction with Mr Himanshu Verma Head M. M. and his senior team. Meeting was presided over by Mr Salil Dey Head Manufacturing, Sr Dy G. M. Both team deliberated various points having mutual interest. IIMM team shared about training of various aspects of Materials Management including inventory management, Strategic Sourcing, Lean management, Public Procurement etc. Also shared about our two Post Graduate diploma in Materials Management and Supply Chain Management and Logistics. BEL team has also highlighted various problems in Procurement including shortcomings in Purchasing through GEM. Following inputs were shared by them:-
“1) Search engine is very poor in GeM.”
“2) Sanction orders are stopped for Direct Orders, hence Management sanction is becoming difficult to get.”
“3) Sometimes, product category (i.e. OEM Cartridge) is stopped by GeM for more time and orders are not possible.”
“4) There is no relevant answer is given by GeM helpdesk. Helpline nos are not accessible.”
“5) During Bid submission, datasheet/ brochure shall be uploaded alongwith contact details.”
“6) How to take action on fraud

sellers?”
“7) Rejection in GeM is not addressed.”
“8) Sometimes Price quoted is very high than market pricing.”
“9) Even while using, logout in GeM is frequent.”
“10) GeM ID used during procurement may be preserved in GeM contract for further use, if available.



Team IIMM assured that these shortcomings will be shared with appropriate authorities through our National President. Mr S. K.Sharma suggested that all materials professionals should become members of IIMM. Mr O. P. Longia thanked for their cooperation and hospitality. Mr Salil Dey assured for full cooperation and he will find out the opportunities where both can work together. It was second visit of IIMM Team, earlier they visited SML ISUZU.



KOLKATA BRANCH

Subject : Condolence Meeting : A Condolence Meeting condoling the sad demise of Mr. D K Acharyya, Past Chairman of IIMM Kolkata Branch, held on Wednesday, the 18th May, 2022 at 6.30 through hybrid mode. Members attended the Condolence Meeting at IIMM Kolkata Branch Office or online, as convenient. Google Link for the Condolence Meeting was communicated. Profile of Late D K Acharyya to the cause of IIMM and Supply Chain Fraternity is appended below. Approx. 70 members joined the meeting shared their memory in the meeting.

Ashok Das Gupta	Past National President
D.N. Chakravorty	Past Chairman
V.K. Jain	Past National President
G.K. Singh	Past National President
S.K. Mukherjee	Past Chairman
Archan Ray	Faculty
D. Mallick	Course coordinator
R.K. Mitra	Faculty
Kallol Ghosh	Vice Chairman
Maushik Mukherjee	Secretary
Koushik Roy	Chairman

UDAIPUR BRANCH

Annual General Meeting of IIMM Udaipur Branch : The annual general meeting 2022 of the Indian Institute of Materials Management Udaipur branch was organised at Hotel Blu Feather.



On this occasion, amongst the august gathering of more than 50 members and representatives of various industries, many new strategies were discussed at length and resolutions were passed to organize them and work cohesively for the upliftment of the branch and institute as whole keeping in mind the goals and objectives of the institute. The Action Plan for the coming year 2022-23 was rolled out.

Branch Chairman Shri D.C. Jhanwar delivered the welcome address and expressed his gratitude to all Executive Committee Members for their cooperation during the year. Last AGM (2020 – 2021) MOM were passed by the general house.

While presenting the annual report of the branch, Honorary Secretary apprised the achievements of the last year 2021-22 and said that the year is an example of good operational management and sustainability. She mentioned about the appreciation from NEC for the work and constant new initiatives taken. Talking about the key highlights of the activities undertaken during the year 2021-22 were apprised by Ms. Haseena Chakkiwala.

Mentioning the IIMM's initiative towards women empowerment at the national level, she appraised about the election of Ms. Priya Mogra for the post of the chairperson of the newly formed organ 'Shakti'. National Head Quarters have also shouldered IIMM Udaipur with a responsibility of a new committee called 'Cement Committee' for expending horizon of IIMM in this vertical.

IIMM Udaipur Branch have already inducted three institutional members and two more companies are in pipeline. As we are heading in the digital world, IIMM Udaipur have started Facebook page where we are regularly sharing our session's details and admission related news, updates on our branch activities.

New members - M/s Wonder Cement, M/s Mangalam Cement and M/s J.K. Lakshmi Cement were felicitated on this occasion. Ms. Neera Tapariya and Mr. Devvrat Katiyar were also felicitated for their cooperation in the activities of IIMM. National Councillor Smt. Priya Mogra presented a proposal regarding the action plan to honor the individuals as well as organizations doing excellent work in the field of material management by awarding the IIMM Excellence Award, which was unanimously approved by the House. A complete roadmap for this event was discussed.



Honorary Treasurer presented the final Annual Accounts 2021- 2022 which are also sent to NHQ for audit process. Vice Chairman Shri Rajesh Jain appraised about the various short- term and long-term educational courses being conducted by IIMM. He also appraised about the digitization of the whole process. The students can now enrol themselves online thru portal and similar way all the courses can be carried out.

Permanent Advisor Shri P.S. Talesara appealed to adopt modern techniques of supply chain management in the changing industrial and business scenario. He apprised about software-based programs for disposal of dead inventory stock in companies, publication of journals for dissemination of information about new techniques of Materials Management, starting of new courses on Materials Sciences and Supply Chain Management, procurement of material on reasonable cost. He also proposed to develop a materials library.



Councillor Smt. Manisha Agarwal, Joint Secretary Mr. Anil Parikh and Shri Saxena of J.K. Lakshmi Cement also shared their views about the various activities related to material management. At the end of the meeting, Executive Member Shri Anil Mishra proposed vote of thanks to all and invited the members and for dinner.

VADODARA BRANCH

MM DAY CELEBRATION : On 23rd APRIL 2022 at Hotel Grand Mercure, Surya Palace, Vadodara

- The theme for this year's Materials Management Day was "Management of Risk and Resilience Management in post pandemic Supply chain". In line with this theme, IIMM Vadodara branch also celebrated the Materials Management Day on 23rd April 2022. The Celebration started with Quiz Competition wherein the participants were invited from various Multinational Companies from in and around Vadodara. Around Eight teams participated in MAT QUIZ 22. Special Quiz for Audience was also integrated as part of the Quiz Competition which made the atmosphere lively. Winning Participants were awarded with Winner and Runners Up Trophy.
- MAT QUIZ 22 was followed with felicitation ceremonies. IIMM, Vadodara Branch Felicitated its faculty Mr. L L Notani for his long term association with IIMM Vadodara Branch and for his Valuable contribution in enhancing the growth of the Institution. Mr. L L Notani had launched a book on

Materials Management on 20th April '22, with an objective to share his 40 years of hard-earned experience with upcoming professionals in Supply chain Management functional area. With a view that this book reaches to many professionals Mr Notani decided to provide copies on "**Free Complimentary Basis**". He has provided copies to our institute for sharing with all Companies / Students connected with the institute either through various courses or training programs.

- IIMM Vadodara Branch also Felicitated Mrs. Sushila Ben Sarvaiya for valuable contribution to IIMM Vadodara Branch.
- On this very important occasion, it was our privilege to have with us Mr. Kishor Jhalaria – CEO Deepak Phenolics Limited who addressed the gathering as **The Chief Guest**. His experience at Reliance Industries Ltd / Deepak Group gave new inputs to the members.
- Other Dignitaries who put in their valuable thoughts and insights included Mr. Lalbhai Patel, Mr. Malay Mazumdar along with Mr. Prasanta Gupta of Aarti Industries and our Branch Chairperson Dr. Bharti Trivedi.



Felicitation of Mr. L L Notani with Shawl & Citation.



Release of Book by Mr. L L Notani.

As part of the first Evening Talk Session after Covid, IIMM Vadodara started its mission of Knowledge Sharing through its Evening talk on 16.07.2022 by way of Organizing a Lecture on theme "Art Therapy for Stress Management" by Mr. Surendra Dhumal at IIMM Hall at 6.30pm.

Mr. Dhumal stressed upon the need of art as one of the techniques in bringing out your Stress. Art can be in form of Singing, Dancing, Reading, Writing, Painting etc. He also talked about how during one of his session at Baroda Central Jail helped him draw his attention to the behavioral pattern of the prisoners by way of painting. He also stressed upon how Art can bring about Stress not only in a normal person but in persons who are differently abled through their minds.



Felicitation of Mrs. Sushila Ben Sarvaiya.

Our Chairperson, Dr. Bharti Trivedi welcomed the members and wished all of them to be part of our programmes which will be scheduled every month from now onwards. She informed all the members present about the sad demise of one of our founder members Mrs. Sushilaba Sarvaiya on 5th of July 2022.

Mr. Lalbhai Patel addressed the gathering and informed how Mr. and Mrs. Sarvaiya were the backbone of IIMM Vadodara and how much pain they have taken to bring the Institute to this level by way of Memberships and other Value-added activities. **As a tribute to them, this lecture was taken as a "Memorial Lecture"**



Mr. Surendra Dhumal displayed his paintings which he exhibited through different exhibitions in each and every corner of India and with very famous personalities.

OBITUARY



D. K. Acharyya (1941- 2022)

IIMM Family is shocked, disturbed and saddened about the sad demise of Mr. D K Acharyya, Past Chairman and Past Course Co-ordinator of IIMM Kolkata on 5th May, 2022. Late Acharyya was an accomplished professional in materials management profession, an acclaimed faculty member who imparted professional management courses for more than forty years focusing need of budding professionals. His student-centric approach made him an admired faculty among students. He represented IIMM on several occasions to renowned public and private sector enterprises for imparting management training. Late Acharyya left no stone unturned to scale up to the pinnacle of IIMM Kolkata as its Branch Chairman in his forties in 1987-88.

He also served as Member of the Board of Studies and National Council Member in 1990 and further in 1998-99. He was conferred with Distinguished Membership. After super annuation from his regular service, he devoted quality times in furtherance of IIMM through its professional management courses. He chaired the position of Course Co-ordinator of IIMM Kolkata for 2005-09 & 2011-21 and contributed immensely.

During his tenure, IIMM Kolkata clinched the Best Metro Branch Award for Education in six consecutive years. Late Acharyya was a man of principle, a proficient professional and above all at each erinits true sense setting an example to nurture promising professionals. He was such a wonderful person and had always been a great asset to IIMM and Materials Management Fraternity. His absence will create a void in IIMM family but he will be forever in our heart.

Late D K Acharyya will remain in IIMM's thought and prayers. In this moment of loss, words are useless. May His soul rest in eternal peace! May the Almighty give enough strength to bear the irreparable loss to the bereaved family!

Forever in fond remembrance: IIMM (Kolkata) Family.

EXECUTIVE HEALTH

EVOLUTION IN HEALTHCARE WITH DISRUPTIVE SCREENING TECHNOLOGIES

MANISH SINGHAL

Using novel testing methods involving blood, breath, saliva, eye and dental images, it might be possible to envision a future with non-invasive, affordable tests that can detect these diseases early, all while being patient-friendly.

It's 2030, you feel unwell, your body hasn't felt like itself for a few weeks now. You're worried it could be something concerning. You head to the nearest hospital and they wish to run a few tests. A decade ago, perhaps, you would be worried about whether your insurance covers the series of tests and machines you're about to be put through. Instead, all that the doctors require are some basic samples and the next thing you know, the display in front of you has text and graphics running across the screen, showing all possible areas of concern.

Healthcare screening today is riddled with problems far beyond just high cost and inconvenience. Most diseases - serious illnesses and chronic ailments alike, lack preventative screening options and require specialists for diagnosis. Some require tests which are invasive and prohibitively expensive. Many of these diseases can be controlled if they're detected early, improving the patient's quality of life.

Using novel testing methods involving blood, breath, saliva, eye and dental images, it might be possible to envision a future with non-invasive, affordable tests that can detect these diseases early, all while being patient-friendly. There are some new modalities that have the potential to become mainstream in the near future.

Traditional biopsies and other testing methods are invasive, charged with potential complications, sometimes unrepeatable and cannot be performed when clinical conditions have worsened or when a tumor is inaccessible. Combining liquid biopsy with DNA-sequencing has shown promising results for the early detection of cancer.

During the past decade, liquid biopsy — the analysis of tumours using biomarkers circulating in fluids such as the blood — has received tremendous attention. The ability to detect and characterize tumours in such a minimally invasive and repeatable way could have considerable clinical implications, and huge progress has been made in the development of methods that can do just that.

Recently, circulating tumor DNA (ctDNA) and cell-free DNA (cfDNA) in blood plasma have emerged as promising cancer biomarkers. They have been demonstrated to have utility for non-invasive detection of cancer, personalized treatment of late stage cancer, and residual monitoring of cancer during and after treatment.

Identifying and enriching these biomarkers and combining them with a genetic profile of the patient have resulted in encouraging developments towards a multitude of early disease detection tests via blood.

There are certain Breath-based tests being introduced as well. New research suggests that the measurement of the volatile organic compounds (VOCs) produced by the body's metabolic activity is a powerful approach for health monitoring and disease detection. Volatile organic compounds (VOCs) are gaseous molecules that can be sampled quickly and non-invasively from breath. They can originate either from within

the body (endogenous VOCs) or from external sources such as diet, prescription drugs and environmental exposure (exogenous VOCs). Research is ongoing to establish clearer connections between specific VOCs and the biological processes involved in their production. This can be used in cancer detection and inflammatory diseases such as IBD, Crohn's disease and fatty liver can be controlled with early diagnosis.

Additionally, there are saliva based tests. Saliva is being looked at more closely than ever for its diagnostic possibilities. In recent times, because of the improved efficiency of genomic and proteomic technologies, the use of salivary diagnostics in a clinical setting is becoming a reality, a trend somewhat driven by discoveries in testing for COVID-19. The wide spectrum of biomarkers present in saliva provides valuable information for clinical diagnostic applications and can be used to detect a wide range of conditions, ranging from oral cancer to autoimmune diseases.

Dental imaging is also being taken under consideration. This involves taking a number of photographs of the teeth and jaw region. Apart from identifying dental abnormalities such as cavities and malalignment of teeth, new research suggests dental images can also be used to detect a few other health conditions early. Based on the density of the lower jaw bone, it might be possible to detect bone loss, indicative of early signs of osteoporosis.

Fundus imaging is another such modality. It refers to the process of taking many photographs of the interior of the eye through the pupil. This can be used to detect conditions such as glaucoma, diabetic retinopathy and retinoblastoma (tumour in the eye) among others, allowing early and accurate diagnosis, especially changes in the eye of patients with diabetes and blood pressure. As a window to the brain, the retina provides a unique opportunity to study many ophthalmic and neurodegenerative diseases

Future of healthcare screening

Early detection of neurodegenerative diseases, cancer, metabolic disorders and other conditions can be life-altering for patients. In most cases, detecting a condition early enables a demonstrable treatment plan, leading to higher survival rates and quality of life. Improving patient outcomes can also help in reducing the burden on stressed healthcare systems across the world that are teetering on the brink of collapse. This vision is bolstered by research work that is underway on breath and saliva based tests and recent FDA approvals of multi-cancer liquid biopsies. Correlations are also being established between dental and fundus imaging and various other diseases that are hard to detect today. A future of non-invasive, quick tests to diagnose ailments early may prove to be a reality, paving the way towards a more proactive approach to healthcare.

Manish Singhal, Founding Partner, pi Ventures

(DISCLAIMER: The views expressed are solely of the author and ETHealthworld.com does not necessarily subscribe to it. ETHealthworld.com shall not be responsible for any damage caused to any person/organisation directly or indirectly).

Source: ETHealthworld.com

●●●



MATERIALS MANAGEMENT REVIEW (MMR)
Annual Subscription (for 12 Issues) Rs. 1000.00
Order Form / Renewal Form

Subs. No.: P.N. _____

Name of the Subscriber / Organization _____

Address of the Organization _____

Phone _____ Fax _____ E-mail _____

Subscription Period

From (month year) _____ to (Month, Year) _____

Payment enclosed

Cheque / Draft (Favouring IIMM, Payable at Mumbai) No. _____ Dated _____

for Rs. _____ Drawn on Bank _____

Branch _____

Please bill us

Signature of the Subscriber _____ Subscription No. _____

Please return the form to :

Indian Institute of Materials Management (IIMM)

4598/12 B, 1st Floor, Ansari Road, Darya Ganj, New Delhi - 110 002.

Phones : 011-43615373 Fax: 91-11-43575373

E-mail: iimm2delhi@gmail.com & iimmdelhimmr@gmail.com

Website : www.iimm.org

ADVERTISEMENT TARIFFS

Position	Monthly Rate (Rs.)	Annually Rate (Rs.)
Back Cover (4 Colors)	30,000.00	2,50,000.00
II/III Cover (4 Colors)	25,000.00	2,00,000.00
Full Page (4 Colors)	20,000.00	1,75,000.00
Full Page (B/W)	15,000.00	1,25,000.00
Half Page (B/W)	10,000.00	1,00,000.00
Quarter Page (B/W)	8,000.00	75,000.00
Strip	5,000.00	50,000.00
Tender Notice (F/P B/W)	20,000.00	
Placement News (H/P B/W)	10,000.00	

Advertisement material alongwith Cheque / Demand Draft should be drawn in favour of IIMM Mumbai and despatched at the following address

INDIAN INSTITUTE OF MATERIALS MANAGEMENT

4598/12 B, 1st Floor, Ansari Road, Darya Ganj, New Delhi - 110 002.

Phones : 011-43615373 Fax: 91-11-43575373

E-mail: iimm2delhi@gmail.com & iimmdelhimmr@gmail.com Website : www.iimm.org

Add Rs. 20/- Extra for Outstation Cheques.





भारतीय सामग्री प्रबंधन संस्थान Indian Institute of Materials Management

NHQ: Plot No. 102 & 104, Sector-15, Institutional Area, CBD Belapur, Navi Mumbai-400614
Ph: 022-27561754, 27565831, Fax: 022-27565741, email: iimmnhq55@gmail.com/ members@iimm.co.in

MEMBERSHIP CATEGORY

★ Life Member ☐ Full Member ☐ Associate Member ☐

★ (Send 1 additional photo for I-Card)

SERVICING BRANCH

No. _____

FOR OFFICE USE NHQ ONLY

Name _____ Sex: ☐ Male ☐ Female

Designation _____

Name of Organization _____

Office Address _____

Tel. & Mob: _____ email _____

Home Address _____

Tel. & Mob: _____ email _____

Educational Qualification _____

Work Experience (Start with present position)
(Please attach separate sheet where necessary)

Year	Year to	Position	Company / Organization

INDIVIDUAL FEES

Category	Entrance Fee	Annual Subscription
Life Member	Rs.500/-	Rs.12000/- (One Time)
Member	Rs.500/-	Rs.1000/- ★
★ Also can avail 5 years membership by paying Rs.4000/-		
Associate	Rs.500/-	Rs.500/-

Membership of any other Professional organization _____

Your Blood Group _____ Your Date of Birth _____

Where will you like to receive the IIMM mail: ☐ OFFICE ☐ HOME

UNDERTAKING

I wish apply for membership of the institute with appropriate status.

I certify that all information supplied in the application is true and correct.

I undertake to abide by all rules & regulations of IIMM as on date and to be revised in future.

Eligibility: Associate: _____

Others: _____

Applicant's Signature _____

Date: _____

REFERENCE

(From IIMM Member / your immediate senior organization where worked / working who have a personal knowledge of IIMM.)

Signature 1st Referee _____

Name: _____

Designation & Company _____

Mobile: _____

Email: _____

Dated: _____

Signature 2nd Referee _____

Name: _____

Designation & Company _____

Mobile: _____

Email: _____

Dated: _____

BRANCH CHAIRMAN

IIMM HEADQUARTERS AND BRANCHES

IIMM NHQ : Plot No. 102 & 104, Sector-15, Instl. Area, CBD Belapur, Navi Mumbai-400614. Tel.: 27561754 / 2756 5831, Fax : 022-27571022
E-mail NHQ : iimnhq55@gmail.com, members@iimm.co.in E-mail Edu. Wing : iimmedu@iimm.co.in, Website : www.iimm.org

AURANGABAD BRANCH

Indian Institute of Materials Management
Third Floor, T-01, Khivansara,
August High Street, Ulka Nagar,
Aurangabad - 431005
Mob-09423455983/9765402066
iimmau@rediffmail.com

AHMEDABAD BRANCH

Indian Institute of Materials Management
C/o Sa Raa Group Of Companies 406,
Kalasagar Shopping HubOpp, Saibaba
Temple, Nr Sun N Step Club
Sattadhar Cross Road Ghatlodia,
Ahmedabad-380061 (Gujarat)
Mob-09909996711/7383012684/
9374012684
iimmahmedabad@gmail.com

ALWAR BRANCH

Indian Institute of Materials Management
15, Shopping Centre, Shanti Kunjalwar -
301001 (Rajasthan)
MOB-09731245655/0787745655
Email-id-iimmaiw@gmail.com,

BANGALORE BRANCH

Indian Institute of Materials Management
304, A-Wing, III Floor, Mittal Tower # 6
M G Road, Bangalore - 560001
TEL-080-25327251/52
iimmbg@airtelmail.in

BHARUCH BRANCH

Indian Institute of Materials Management303,
Vinay Complex,
Near Dudhdhara DairyOld NH Highway
8, Bhaurch Mob-09998975891
iimmbharuch@gmail.com

BHILAI BRANCH

Indian Institute of Materials
ManagementRoom No. 326, 3rd Floor
Ispat Bhawan, Bhilai Steel Plant
Bhilai - 490001
Tel-0788-2892948 krparker@sail.in

BHOPAL BRANCH

Indian Institute of Materials Management
4/9-B, Saket NagarBhopal - 462024(MP)
Mob-08085856437/09479747246
sameersharma3@rediffmail.com

BILASPUR BRANCH

Indian Institute of Materials Management
C/o. Gen. Manager (MM) HOD3rd Floor, MM
Department
South Eastern Coalfields Ltd., Seepat Road,
Bilaspur - 495006 (CG)
Mob-09827185719 iimmbps@gmail.com

BOKARO BRANCH

Indian Institute of Materials
ManagementPurchase Dept. Ispat
BhawanBokaro Steel City -
827001JharkhandMob-08986873175/
8986874786iimbokarobranch@gmail.com

BURNPUR BRANCH

Indian Institute of Materials Management
New Materials Building, Ground Floor, Near
Crs Store sail- lisco Steel Plant lisco Steel
Plant, Burnpur-713325.
ASANSOL (West Bengal)
iimmburnpurbranch@gmail.com
0943776532/09434777365

CHANDIGARH BRANCH

Indian Institute of Materials
ManagementSCO 19-B, Swatik Vihar
Mansa Devi Complex, Sector - 5Panchkula
- 134109 (Haryana)
TEL-0172-2556646/4730170
iimmchandigarh2@gmail.com,

CHENNAI BRANCH

Indian Institute of Materials Management
4th Floor, Chateau D'Ampa110 (New# 37),
Nelson Manickam Road Aminjikarai,
Chennai - 600029
TEL-044-23742195/23742750/9444656264
admin@iimmchennai.org

COCHIN BRANCH

Indian Institute of Materials Management
GCDA Shopping Complex, Gandhi Nagar
Kadavanthra PO Kochi - 682020 (Kerala)
TEL-0484-2203487/9400261874
iimmcocin@gmail.com

DEHRADUN BRANCH

Indian Institute of Materials Management
C/o. 30, Kalindi Enclave Balliwalla Chowk,
Lane No.2 Dehradun-248001 (UK)
Mob-09410397734
raj_rajender@ongc.co.in,

DHANBAD BRANCH

Indian Institute of Materials Management
C/O. Office Of GM (MM) Department,
B.C.C.L. Koyla Bhawan, Koyla Nagar,
Dhanbad-826005 (JHARKHAND)
TEL-0326-2230181
iimmdhanbad@gmail.com

DURGAPUR BRANCH

Indian Institute of Materials Management
Ispat Bhawan Durgapur Steel Plant Steel
Authority Of India Ltd Durgapur - 713203
(WEST BENGAL)Tel-0343-2740980
durgapurimm@gmail.com

GANDHIDHAM BRANCH

Indian Institute of Materials Management
Management1,2,3, Plot # 356, Ward-12B
Tagore Road, Gandhidham -370201 (Kutch)
Gujarat
Mob-09925066322/7046737857
iimm_gim@rediffmail.com

GOA BRANCH

Indian Institute of Materials Management124/
8, Umashripad Behind NSDNear Vishal
Mega mart Anand Estate Dabolim, GOA-
403801 Vasco-da-Gama Mob-09923425037
sateesh.vernekar1238@gmail.com

GREATER NOIDA BRANCH

Indian Institute of Materials Management
B-193, Swarn Nagri Opp: JP Golf Course
Greater Noida - 201308
Mob-09350261642
ageetkumar@yahoo.co.in

HARIDWAR BRANCH

Indian Institute of Materials Management
97.b Vignan Kunj, Indian Institute of
Technology Roorkee Haridwar - 247667
Tel-01332-284886
iimmaridwar@gmail.com

HOSUR BRANCH

Indian Institute of Materials Management

HYDERABAD BRANCH

Indian Institute of Materials Management
Building No.6-3-347/9/4/C, First Floor,
Union Bank Building, Behind Model House,
Dwarakapuri Colony, Punjagutta,
Punjagutta, Hyderabad-500082(t.s)
Mr.P.Somayajulu Mob-09949872010
iimm.hyd1719@gmail.com,

INDORE BRANCH

Indian Institute of Materials Management
03, Rajmahal Colony, Ext Manik Bag
Road, Indore - 452007 (M.P)
Mob-09826625417
dr.stmgmt@gmail.com

JAIPUR BRANCH

Indian Institute of Materials Management
C/o. Mr. Purushottam Khandelwal
48, Mohan Nagar, Gopalpur Bypass,
Jaipur - 302018
Mob-09799299157/09001893395
iimmjaipur1@gmail.com

JAMSHEDPUR BRANCH

Indian Institute of Materials Management
Room # 6, Russi Modi Centre for
Excellence, Jubilee Road,
Jamshedpur - 831001
Mob-09798171971
iimm_jsr@yahoo.co.in

HUBLI BRANCH

Indian Institute of Materials Management
Karnataka Chamber of Commerce &
Industry Bldg., 1st Floor, Jayachamaraj
Nagar, Near Nehru Ground, Hubli-580020
Tel-0836-2264699/09972703336

JAMNAGAR BRANCH

Indian Institute of Materials Management
C/o. Mr. Jayesh Joshi, Riddhi Engineering
Works, 111, Madhav Complex, Opp: DKV
Collage, Jamnagar - 361008
Tel-0288-2750171/9824263869
ridhieng@yahoo.com

K G F BRANCH

Indian Institute of Materials Management
C/o. Santosh Kumar, Manager-Materials
EM Division, BEML Ltd., K.G.F-563115
Mom.-09743977684 emvh@beml.co.in

KANPUR BRANCH

Indian Institute of Materials Management
C/o. Kailash Nath, 58, New Defence Colony
Opp. Krishna Nagar Telephone Exchange
G.T. Road, Kanpur-208007 (UP)
Mob-07897000150/09935032495
kailashnath119@gmail.com

KOLKATA BRANCH

Indian Institute of Materials Management
8/B, Short Street, Kolkata - 700017
Mob: 09830952363/9836123999
iimmcal17@gmail.com

LUCKNOW BRANCH

Indian Institute of Materials Management
C/o P.K. Bajpai 86/106, Kurmi Tola,
Maqbool Ganj, Lal Kuan, Lucknow (UP) -
226018, Mob-09415752999/6307080159
iimm_lko@rediffmail.com

LUDHIANA BRANCH

Indian Institute of Materials Management
C/o. Guru Nanak Industrial Corporation
Adj. Hero Cycle Ltd., G T Road,
Ludhiana - 141010 (Punjab)
Mob-09814027317 iimmlidhbr@gmail.com,

MUMBAI BRANCH

Indian Institute of Materials Management
2-A, Arihant Bldg, Above Bhandari Co-op
Bank Ltd, Goregaon (East), Mumbai- 400063
TEL-022-26863376/4528/09820393639
iimmbom@gmail.com

MUNDRA BRANCH

Indian Institute of Materials Management
C/o. Durlubh Singh, No. B/04/03, Samudra
Township, Old Port Road, Nr. Adani Hospital
Dist-Kutch, Mundra - 370421 (KUTCH)
Mob-07574807369/09687660462
durlubhsingh.khalsa@adani.com,

MYSORE BRANCH

Indian Institute of Materials Management
Anubhav Udyog, K-64, Hootagalli Ind. Area
Mysore - 570018 (Karnataka)
TEL-0821-4282124
mysoreiimm@gmail.com,

MANAGALORE BRANCH

Indian Institute of Materials Management
C/o. Exclusive Shipping & Exports
IV Floor, Via: Ashirwad building G H S Road
Mangalore-575001 D.K.
TEL-0824-2245513/08884345513/
9845080613, philipcc13@hotmail.com

NAGPUR BRANCH

Indian Institute of Materials Management
404, Suryakiran Complex-1
Bajaj Nagar, Nr. VNIT Gate
Nagpur - 440010 TEL-0712-2229446
iimmnagpur@gmail.com

NASIK BRANCH

Indian Institute of Materials Management
1, Parag Bldg, Patel Lane # 4
College Road, Nasik - 422005
TEL-0253-2314206
iimmnasik@gmail.com

NEW DELHI BRANCH

Indian Institute of Materials Management
U-135, Vikas Marg, Shakrapur, Near Laxmi
Nagar Metro Station, Delhi - 110092
Tel-011-41354969
admin@iimmdelhi.org

NALCONAGAR BRANCH

Indian Institute of Materials Management
C/o. Mr. S.N. Baghar House, No. A-04,
Shree Ganesh Villa Bikash Nagar, P.O.-
Turanga, Dist-Angul-759123 (Orissa)
Mob-08437081126 snbaghar@gmail.com

PUNE BRANCH

Indian Institute of Materials Management
Pratibha Towers, Plot # 22 Old Pune
Mumbai Road, CTS # 15/2, Above TVS
Showroom, Wakdewadi, Pune - 411003
Mob-07276010854 iimmpune1@gmail.com,

RANCHI BRANCH

Indian Institute of Materials Management
Gen Manager (MM) Office Central
Coalfields Ltd., Darbhanga House, Ranchi -
834001 Mob-08987784115/7257995864
abinashkthakur@gmail.com

RAE BARELI BRANCH

Indian Institute of Materials Management
497, Acharya Dwivedi Nagar, Near CMO
Office, Jail Road, Rae Bareilly-229001
Mob-09451077744/9454146676
iimmrbl@yahoo.com

ROURKELA BRANCH

Indian Institute of Materials Management
TH-01(West) Sector-4, Near Mahila Thana
Dist: Sundergarh, Rourkela-769002
(Odisha) MOB-08260711943/8895501056
iimm.rourkela@gmail.com

SURAT BRANCH

Indian Institute of Materials Management
C/o. General Manager (Corrmil)
Krishak Bharati Co Ltd, PO: Kribhaco
Nagar, Surat -394515, TEL-0261-2802032
pravendrasingh@kribhaco.net

TRIVANDRUM BRANCH

Indian Institute of Materials Management
TC-9/1447, 2nd Floor, Future House
Temple Road, Sasthamangalam
Thiruvananthapuram - 695010
Mob-07994512438/Tel-0471-2724952
iimmtvpm@gmail.com

UDAIPUR BRANCH

Indian Institute of Materials Management
2nd Floor, Above Manohar Furniture
13, Ashwini Marg, Udaipur - 313001 (Raj)
TEL-0294-2411969/8107283099
iimmudpr@gmail.com

VADODARA BRANCH

Indian Institute of Materials Management
Vishal Chambers, 2nd Floor
34, Vishwas Colony, Alkapuri, Vadodara -
390007, Mob-07802053410/7043959060
iimmvadodara@gmail.com,

VAPI BRANCH

Indian Institute of Materials Management
Chip & Bytes, Fortune Mall, Above Jade
Blue Via Road, GIDC, Vapi - 396195
Mob-09724214353
iimmvapi@gmail.com

V U NAGAR BRANCH

Indian Institute of Materials Management
Champs Engineering, 1-57, GIDC Estate
Vithal Udyog Nagar - 388121
Dist-Anand, (GUJARAT) Mob-09825028050
harshad.champs@gmail.com,

VISAKHAPATNAM BRANCH

Indian Institute of Materials Management
C/o. CMA Bhavan, Akkayyapalem Jn.
Akkayyapalem Highway,
Visakhapatnam - 530016
Mob-09885310934/7093802468
iimmvizag@gmail.com

NHQ/EDUCATION WING

IIMM, Plot Nos. 102 & 104, Sector-15
Institutional Area, CBD Belapur
Navi Mumbai - 400614
TEL-27565592/27571022
Admin@iimm.org/ Education@iimm.org

SAP Ariba 

THE BEST RUN 

Reimagine your Procurement from Source-to-Pay

Your company's Procurement function can drive innovation and business value. Connect virtually through every step and piece of data together across the entire source-to-pay process, with SAP Intelligent Spend and Business Networks.



Consolidate and
control all spending
from source to pay



Find new sources
of savings



Build a healthy,
agile supply chain



Leverage business
networks for better
collaboration

See what's possible for your organization. Request a demo to learn how SAP can transform your procurement end-to-end, control spending, and build a sustainable supply chain.

Scan the QR
code to schedule
a personalised
demo today!

