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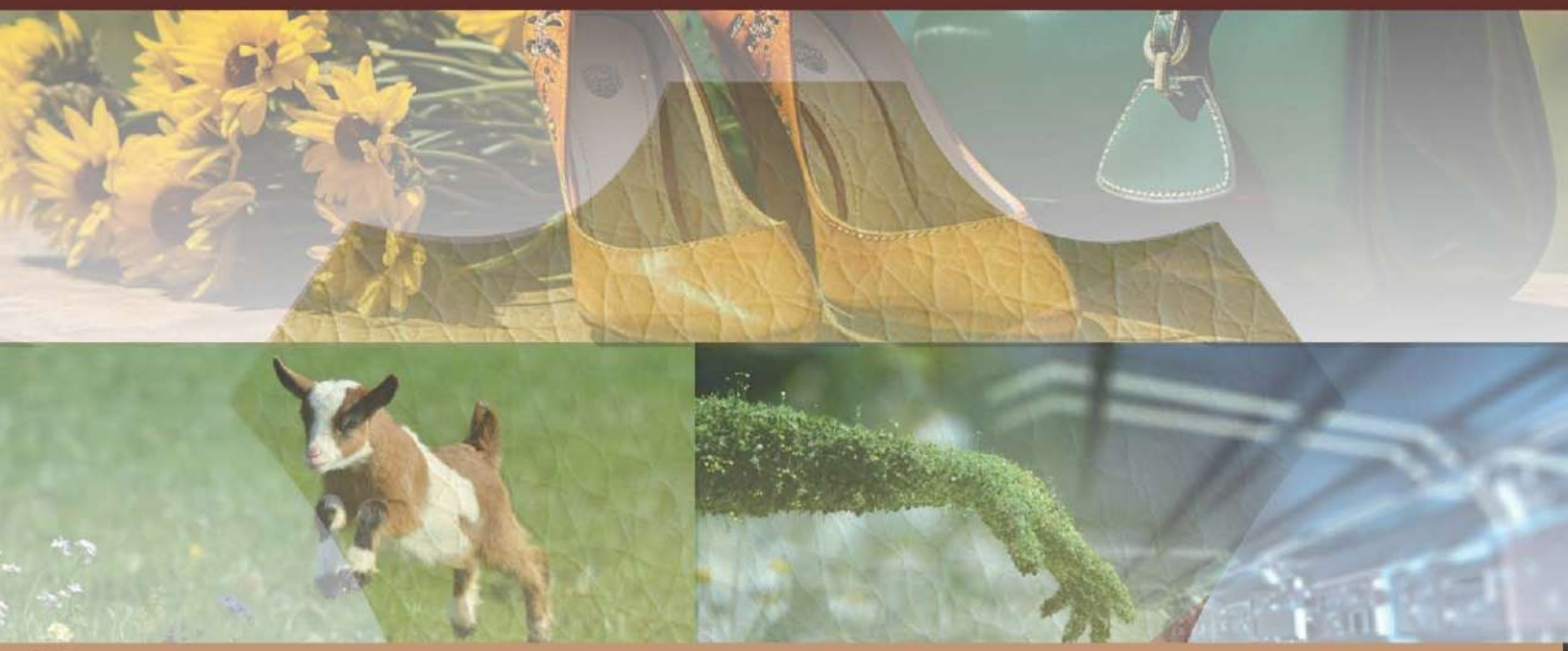

Special Issue, February, 2025

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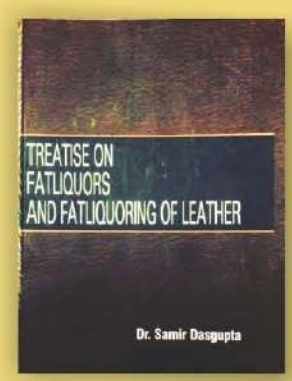

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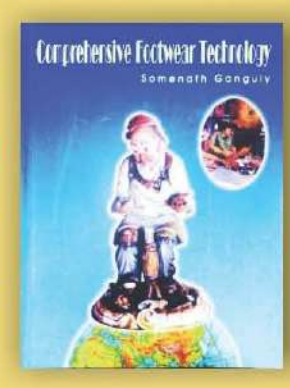

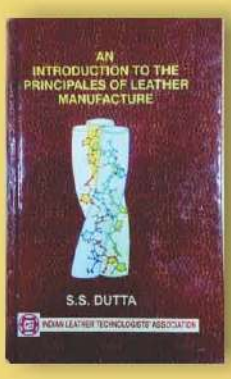

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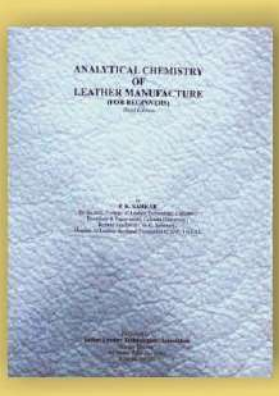

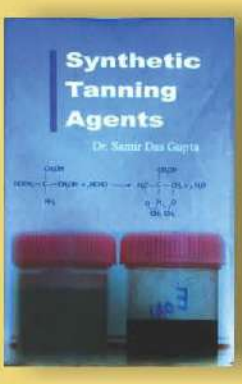

Title of the Book
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Author
Dr. Samir Dasgupta

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Author
Prof. B. M. Das

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Indian Leather Technologists' Association

[A Member Society of International Union of Leather Technologists' and Chemists Societies]

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JOURNAL OF INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION (JILTA)

Indian Leather Technologists' Association is a premier organisation of its kind in India was established in 1950 by Late Prof. B.M.Das. It is a Member Society of International Union of Leather Technologists & Chemists Societies (IULTCS).

The Journal of Indian Leather Technologists' Association (JILTA) is a monthly publication which encapsulates latest state of the art in processing technology of leather and its products, commerce and economics, research & development, news & views of the industry etc. It reaches to the Leather / Footwear Technologists and the decision makers all over the country and overseas.

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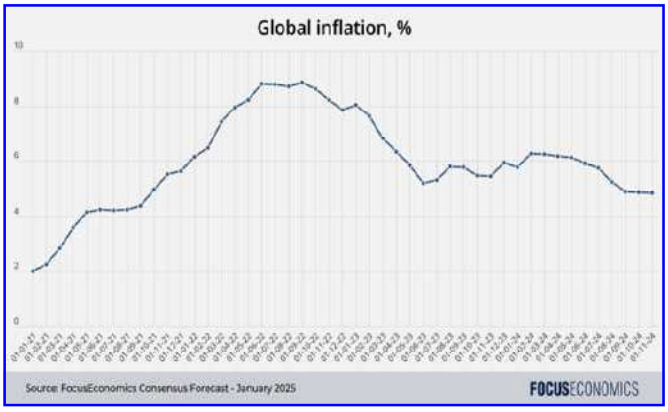
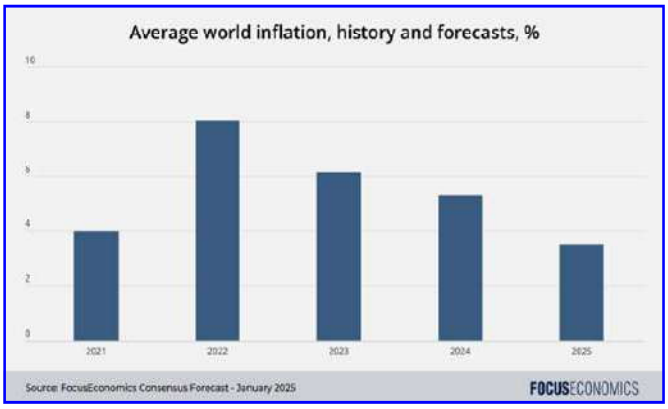
Probable Global Inflation Scenario in the Current Fiscal

Inflation peaked at close to 9% in late 2022 due to a combination of snarled supply chains and pent-up demand as economies reopened following the global pandemic. By late 2024, CPI (Consumer Price Index) inflation had roughly halved to below 5% as both supply chains and consumer demand normalized. That said that price pressures are running well above the levels that prevailed during the 2010s. This is due to a combination of factors: Greater trade protectionism, robust wage growth, low unemployment and less restrictive fiscal policy.

The following chart shows how global inflation has evolved in recent years :

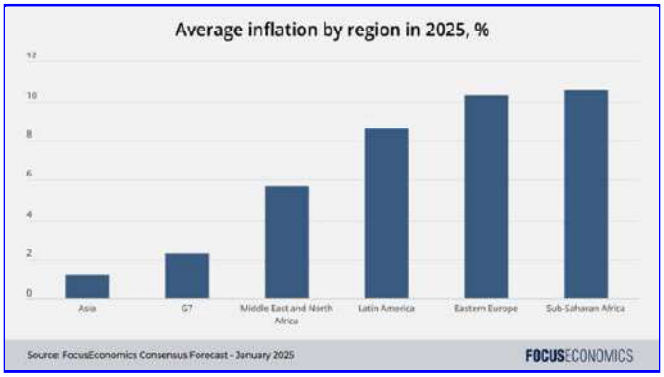


Economic panellists' CPI expectations are that 2025 inflation will average lower than the 2024 CPI inflation rate, though the slowdown will be softer than in 2024 vs 2023. Lower prices for food and energy will keep a lid on prices in 2025, though more global trade restrictions will prop up inflation.



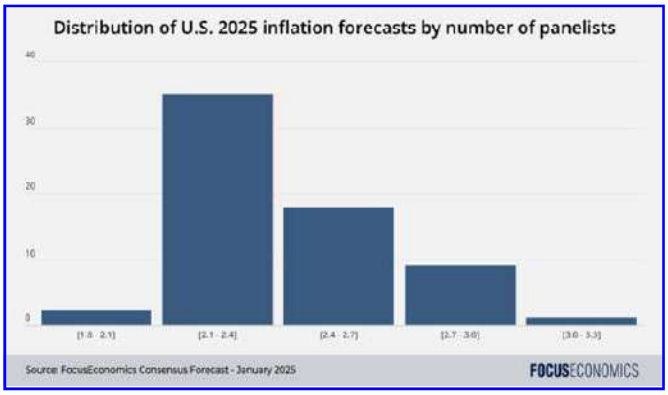
Looking at energy prices specifically, economic panellists expect prices for oil, coal and uranium to average lower in 2025 than over the past year. The green transition will likely cap prices for oil and coal, with oil prices additionally weighed on by rising non-OPEC output and eventual OPEC production hikes. Moreover, uranium prices will pull back following a bumper 2024. In contrast, U.S. and European gas prices are forecast to be higher, with U.S. prices boosted by stronger LNG exports.

Regarding regions, Asia is expected to see the lowest inflation rate in 2025. Price pressures in Asia will be depressed by the region's huge manufacturing capacity plus sluggish demand in China. The G7 economies will see the second-lowest inflation rate, which should be broadly in line with their central banks' 2.0% targets. Then will be the economies of the Middle East and North Africa, where price pressures will be contained by countries' currency pegs to the USD plus hefty price subsidies in the Gulf economies. The economies of Latin America and Eastern Europe will see moderately high inflation, as sizable interest rate cuts spur currency weakening. Finally, sub-Saharan Africa is projected to record the highest inflation rate among world regions in 2025. A lack of independent monetary policy in some countries, coupled with FX depreciation and economic mismanagement in some areas, will spur price pressures on the continent.



Since Donald Trump was re-elected as U.S. president in November, tariffs have been at the forefront of many economists' minds and are the top upside risk to global inflation in 2025. Before his election victory, Trump had threatened higher tariffs

on all U.S. imports of 10–20%, and tariffs as high as 60% on imports from China. Since the election, he has threatened to implement tariffs on Canada, Mexico and China as soon as he's sworn in January. There are two key unknowns here. The first is to the extent to which Trump will raise tariffs, as well as by when and on which nations. Some of the threats he has made—such as a blanket tariff on key partner Canada—could simply be negotiating tactics designed to extract concessions from other nations. The second unknown is how other countries will retaliate; if other nations respond to U.S. tariffs by aggressively tightening trade restrictions, this could result in a tariff spiral that notably raises world inflation. The threat of trade restrictions does not only stem from the U.S. Other large economies could continue to tighten their restrictions on imports of some Chinese goods—such as electric vehicles (EVs), batteries or solar panels—in order to protect domestic supply chains. 2024 already saw the EU and Canada impose tariffs on Chinese EVs for instance. That said, an illustration of the uncertainty provoked by the threat of tariffs is the wide spread among economic panellists' forecasts for average 2025 CPI inflation in the U.S. Panellists' forecasts range from just 1.8% to 3.1%, as the chart below illustrates :



All-out conflict between Israel and Iran is another upside risk to inflation, given the potential for disruptions to oil output from the Middle East—the region accounts for around a third of global crude supply. Likewise, a spread of the conflict in Ukraine to neighbouring countries or war between China and the U.S. over Taiwan would boost global price pressures due to supply chain disruptions. The Organization of Petroleum Exporting Countries (OPEC) meets regularly to set global oil output. Over 2024, the cartel repeatedly extended its voluntary output cuts—most recently until March 2025. Further extensions of these cuts pose an upside risk to price pressures in 2025.

The global unemployment rate is forecast to be broadly stable next year from this year at just below 5%, notably lower than the rate recorded during the 2010s. This should continue to exert some upward pressure on wages and prices. Lower-than-anticipated unemployment—perhaps due to unexpected fiscal loosening or tighter immigration restrictions—could cause inflation to come in higher than expected. Events such as pandemics, major cyber-attacks or natural disasters are impossible to predict but could substantially influence inflation were they to come to pass. They would likely also present central banks with the dilemma of needing to support economic activity while simultaneously reining in price pressures.

Focus Economic panellists' estimates are currently for the average central bank interest rate to fall by around 100 basis points next year, meaning monetary policy will still end the year tighter than it was before the pandemic. These rate cuts will occur in all world regions but should be particularly large in Eastern Europe—currently the region with the highest average policy rate. The evolution of U.S. tariffs is the key risk to the interest rate outlook. Large tariff hikes could cause the Federal Reserve to pause or slow monetary easing while simultaneously leading some other central banks to cut their own interest rates in order to support economic activity.

Experts are of the following opinions :

On the outlook for inflation, EIU analysts said :

"Consumer price rises are now at or close to target in many economies; however, we do not forecast a period of below-target inflation in the post-pandemic economy. This is due to a combination of demand and supply factors that should keep inflation at or slightly above target over the next five years. On the demand side, a tightening in labour markets, reflecting demographic changes and tighter immigration controls, will keep demand firm through higher wages. On the supply side, the reshaping of supply chains, the wider application of tariffs and the likelihood of unpredictable climate conditions will also put upward pressure on prices. We forecast that inflation in developed markets will average 2.1% over our five-year forecast period, up from 1.5% in the 2010s."

On inflation in advanced economies next year, Goldman Sachs analysts said :

"US core PCE inflation should slow to 2.4% by late 2025, higher than Goldman Sachs Research's prior forecast of 2.0% but still a benign level. The forecast would rise to around 3% if the US

imposes an across-the-board tariff of 10%. In the euro area, our economists expect core inflation to slow to 2% by late 2025. The risk of ultra-low inflation in Japan has abated."

On inflation in Asia, Nomura analysts said :

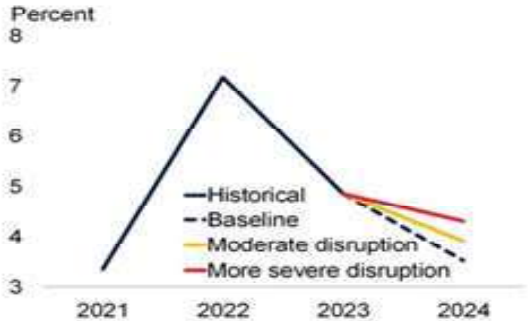
"Disinflation is likely to sustain into 2025. Subdued commodity prices and weaker demand are likely to contain goods price inflation, while labor market rebalancing should enable faster services disinflation. A redirection of Chinese exports to the region provides an additional disinflationary impulse."

On risks to the outlook, ING analysts said :

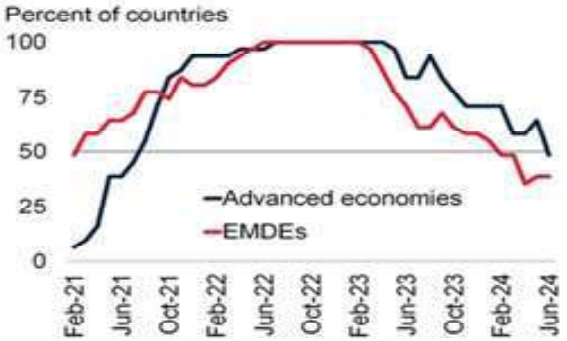
"Potential tariffs aren't the only factor that could reignite inflation throughout the year. Investment plans and initiatives could easily reintroduce supply-side constraints in many economies, creating new inflationary pressures. Initially, these investments might lead to higher inflation, with the hope that they will eventually boost productivity and reduce inflationary pressures. Consequently, 2025 could mark the beginning of a stop-and-go inflation pattern, with shorter but more frequent cycles, potentially necessitating more active monetary policy or a prolonged, steady approach from central bankers."

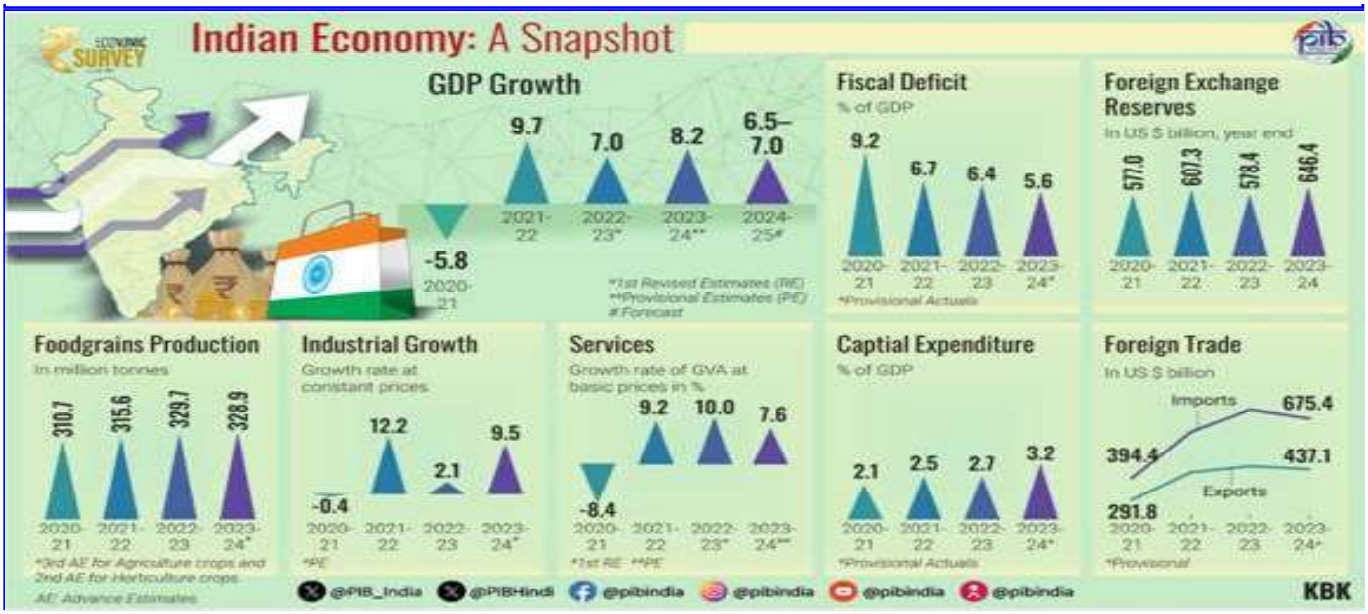
Dr. Goutam Mukherjee
Hony. Editor, JILTA

a. Inflation forecasts and oil supply disruptions



b. Countries with above-target inflation





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Stahl Leather solutions

Stahl is proud to launch the renewed Stahl Neo® range: a future-proof portfolio of low-impact solutions covering the entire wet-end and finishing stages of leather production.

With growing awareness of environmental and health and safety impacts, the Stahl Neo® portfolio has been extensively reviewed and tested to help customers meet today's fast-evolving certification and compliance landscape for leather chemicals. This includes the recently updated Zero Discharge of Hazardous Chemicals (ZDHC) Manufacturing Restricted Substance List (MRSL) 3.1.

Following a rigorous internal review and testing programme, all products in the Stahl Neo® portfolio are in compliance with the following three criteria:

1. ZDHC: All Stahl Neo® products are compliant with Version 3.1 of the ZDHC MRSL for leather manufacture.

2. EU CMR: Stahl Neo® products are certified free from carcinogenic, mutagenic or reprotoxic (CMR) substances as per EU criteria.

3. EU REACH SVHC: Stahl Neo® products meet EU REACH criteria for substances of very high concern (SVHC) (less than 0.1% concentration).

As a result, Stahl is now able to offer tanners the most comprehensive range of future-proof solutions on the market – providing peace of mind for stakeholders across the leather article value chain.

Scan the QR code to download the Stahl Neo® brochures and discover the specific benefits of each product in our portfolio.

www.stahl.com

Stahl is a world leader in speciality coatings and treatments for flexible materials. Around the world, nearly 2,000 Stahl colleagues are driven by a clear purpose:
Touching lives, for a better world.

Our diverse teams work on creative and innovative surface solutions that enable our customers to make fantastic products. Our coatings are found on everyday materials in the automotive, luxury goods, packaging, apparel and home furniture market, among others. When consumers touch everyday products, we touch their lives.

Being a world leader means we are dedicated to contributing to a better world together with our value chain partners. At Stahl, we aim to impact the market through innovation and sharing knowledge and by reducing our own operational footprint. Our approach is underpinned by our robust ESG strategy and our strong sense of social responsibility, a characteristic shared by leading global companies.

We promote:

- Teamwork
- Initiative
- Personal development
- Innovation
- Creativity

Working at Stahl, means being part of a versatile, ambitious team that is committed to working on innovative, high-quality coating solutions for our customers while making the world a better place. You will also be joining a diverse global community: headquartered in Waalwijk, the Netherlands, Stahl operates a network of 16 production sites and 37 application laboratories, supported by sales offices in 22 countries.

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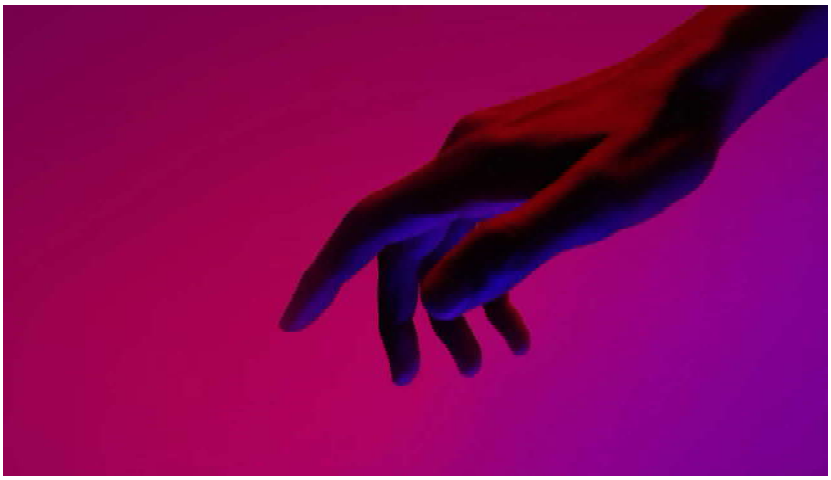
THROUGH THE LOOKING GLASS: THREE PACKAGING TRENDS SHAPING 2025



Packaging coatings are a vital element of the packaging industry. Beyond their functional role in protecting contents from external factors like moisture, light, and oxygen, coatings also play a key role in the visual and tactile appeal of packaging. From soft-touch finishes to striking metallic effects, these coatings can transform ordinary packaging into memorable brand statements.

The demand for sustainable and innovative packaging solutions is on the rise, fuelled by the growing food packaging sector and the rapid expansion of e-commerce. According to a report by Mordor Intelligence, the global packaging coatings market is set to grow at a CAGR of 5% between 2023 and 2028. Within this evolving landscape, we've identified three emerging trends set to shape the future of packaging.

1. The Internet of Packaging: IoT meets packaging innovation

The internet of things (IoT) has already revolutionized the way we interact with devices, and now it's extending to packaging. Known as the Internet of Packaging (IoP), this innovation leverages smart, machine-readable technologies like RFID, NFC, and QR codes to store and share detailed product information.

From enhancing supply chain traceability to combating fraud and improving customer engagement, IoP offers exciting opportunities. Industry leaders like beverage companies Diageo and Rémy Martin are already integrating NFC tags into their packaging to ensure consumer safety and provide deeper insights into their supply chains.

2. Driving sustainability with recyclable and biodegradable packaging

Sustainability continues to dominate the packaging conversation, with increasing pressure from consumers and regulators to reduce plastic waste. The European Union's forthcoming Packaging and Packaging Waste Regulation (PPWR), part of the Green Deal, introduces ambitious targets for recycling and sustainable design.

By 2030, plastic packaging must include a minimum percentage of recycled content, with stricter recycling targets set for 2040. At Stahl, we're investing heavily in barrier coatings that align with these goals, including biodegradable and biobased options. These coatings support the shift toward mono-material and paper-based packaging, enabling sustainable solutions without compromising product protection.

3. Creating memorable experiences with multi-sensory packaging

Packaging is often the first touchpoint between a brand and its customers, and it can significantly influence purchasing decisions. Multi-sensory packaging enhances this experience by appealing to sight, touch, and even smell.

Stahl's **Sensora®** range of coatings is designed to elevate packaging's tactile qualities. Whether you're looking for a silky, textured, or velvety feel, our solutions help brands craft a distinctive sensory profile that resonates with their identity and leaves a lasting impression.

(Stahl News – 13/01/2025)

WORLDWIDE PARTNERS MEETING 2024 : REUNITING FOR INNOVATION AND SUSTAINABILITY

Stahl and Weilburger Graphics by Stahl hosted the highly anticipated Worldwide Partners Meeting at the Gerhardshofen site.

The event was designed to discuss the company's future direction and to explore upcoming trends in the packaging industry. It was also a milestone: the first face-to-face meeting of global partners since 2017, welcoming 70 participants from 24 countries, including three distributors participating for the first time.
This year, the partners came from China, United Arab. Emirates, Romania, Czech Republic, Iran, Austria, Italy, Switzerland, Argentina, Greece, Hungary, Finland, Latvia, Slovenia, Turkey, Poland, Azerbaijan, Spain, Mexico, Peru, Ecuador, Lithuania, Estonia as well as Slovakia.

Reconnecting with Partners

For the first time since the acquisition of Weilburger Graphics by Stahl partners gathered to shape the future direction of the company. This meeting offered a chance to reflect on the evolution of the printing and packaging sectors and discuss the company's strategic direction moving forward. Key themes of the event included a strong commitment to sustainability, regulatory compliance, recyclability, and UV LED solutions.

"We are excited to meet face-to-face after such a long time," said Günter Korbacher, Managing Director of Weilburger Graphics by Stahl. "This event not only reinforces our valued partnerships but also sets a clear path for driving forward Weilburger Graphics by Stahl as part of Stahl Packaging Coatings. Together, we will continue to innovate and lead the way in sustainable packaging solutions."

Integration and expansion

Raymond Bakker, Vice President, Head of Packaging Coatings Division EMEA of Stahl Holdings B.V., presented a strategic overview of the acquisition and the vision for expanding the joint distributor network. "The integration of Weilburger Graphics into Stahl Packaging Coatings creates unparalleled opportunities for growth," said Bakker. "This partnership will bring us closer to a sustainable future while strengthening our market presence globally."

Throughout the day, various presentations showcased advancements in the field, including :

- A joint lecture by Sonia Morselli and Martin Drasnin (BASF) on the critical role of strong partnerships in sustainable packaging.
- Markus Klopf's insights into LED technology, highlighting energy efficiency, safety, and regulatory updates.

- Innovative approaches to reducing plastic usage in packaging by Bastian Pinsenschaum.
- And a lecture by Bernd Schech 'On safe paths'.

Closing the day on an inspiring note, Thomas Lurz, Germany's most successful open-water swimmer and Olympic gold medallist, delivered a motivational talk on resilience, a champion's mentality, and handling pressure in challenging situations.

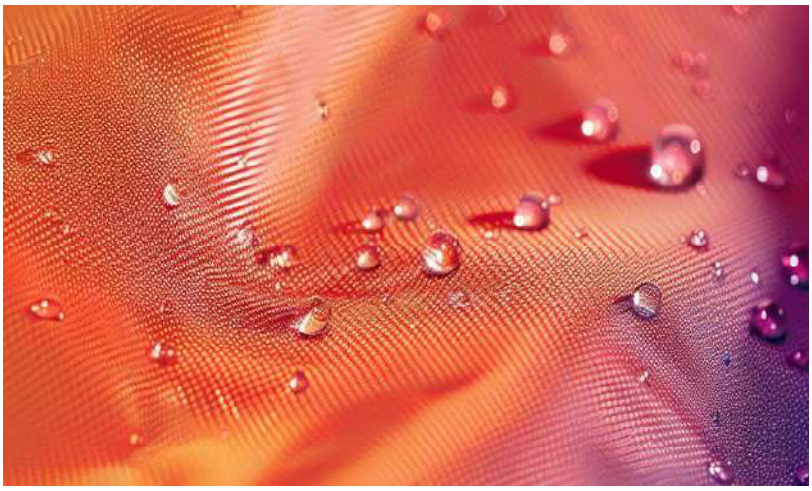
Shared ambition and goals

The event concluded with a networking dinner, offering participants the opportunity to forge deeper connections and discuss shared goals. "The enthusiasm and collaboration at this event are a testament to the strength of our partnerships," noted Arno Dürr, Sales Director of Weilburger Graphics by Stahl. "With the momentum we've built here, we're ready to shape the future of the packaging industry."

The Worldwide Partners Meeting 2024 underscored the collective strength and shared vision of Stahl Packaging Coatings and Weilburger Graphics by Stahl. With its focus on innovation and sustainability, the event set the stage for continued leadership in the packaging industry.

(Stahl News – 20/12/2024)

STAHL DIVESTS WET-END CHEMICALS BUSINESS AND COMPLETES ITS TRANSFORMATION INTO PURE PLAY SPECIALITY COATINGS COMPANY



Stahl, the global leader in speciality coatings for flexible materials, announces the divestment of its wet-end leather chemicals business to Syntagma Capital.

The proposed sale completes Stahl's transformation into a pure-play speciality coatings formulator for flexible materials. Following Stahl's recent acquisitions in packaging coatings in North America and Europe, Stahl is now better positioned to capture future growth in sustainable coating formulations. The announced divestment of the wet-end leather chemicals business will include 428 employees, the full wet-end portfolio and manufacturing facilities in Italy (headquarter) and India.

Strengthening focus and future growth

Founded in 1930 as the leather finishing company, Stahl has since successfully expanded its portfolio beyond leather, into coatings for a variety of flexible materials. The divestment of its wet-end leather activities allows Stahl to focus on its core know-how in speciality coatings for flexible materials. Leather finishing is Stahl's proud heritage and remains

core to Stahl's growth strategy. The Stahl Leather Finishing business will be led by Andrea Ceretta, appointed Stahl Group Director Leather Finishing, who has been working in the global leather industry for over 20 years.

Maarten Heijbroek, CEO of Stahl: "In recent years, Stahl has made a deliberate strategic shift towards premium coatings, establishing ourselves as the market leader in coatings for flexible materials. The divestment of our wet-end leather chemicals business completes this transformation. / Stahl is now a pure-play coatings formulator, which will allow us to accelerate innovation and sustainability to enhance consumer experiences and to live our purpose: 'Touching lives, for a better world'."

fl"At the same time, we are accelerating investments in growth, with a new manufacturing plant in Singapore, doubling our capacity in China and investments in new Centers of Excellence in Asia, the US and Europe. I'd like to thank all Stahl wet-end employees for their considerable contribution to Stahl over the years and wish them every success under their new ownership", Heijbroek concludes.

Xavier Rafols, CEO of the new company:/ "Our newly independent company combines over a century of expertise with the dynamism of a start-up. We're building our business on the core values of integrity, excellence, agility and courage. Through innovation, sustainability and expertise, we will deliver solutions that help our clients face today's challenges and tomorrow's opportunities. In this way, we are not simply a solutions provider but an end-to-end partner nurturing bonds that last. We look forward to continued collaboration with stakeholders across the value chain to drive progress in the leather industry."

The proposed transaction, which is subject to customary closing conditions, including the information and consultation of works councils and other regulatory approvals, is expected to be completed in the first half of 2025.

(Stahl News – 18/11/2024)

CREATE UNIQUE APPEARANCES WITH STAHL EDGE PAINT

Stahl's Edge Paint portfolio gives manufacturers the ability to customize and protect the edges of accessories, unlocking the creativity of designers and providing a final touch of class. Alongside its aesthetic appeal, our Edge Paint offers outstanding performance and low environmental impact while opening up efficiencies in the production process. For any producer of accessories, our Edge Paint delivers the quality and responsible chemistry that today's customers expect.

From the desk of General Secretary

23RD SANJOY SEN MEMORIAL LECTURE

The 23rd Sanjoy Sen Memorial Lecture was organized on Tuesday, the 14th January, 2025 at 03.00 PM at the Seminar Hall – 19A, Science City, Kolkata.

The program resumed with the introductory speech from Mr. Susanta Mallick, General Secretary, ILTA who greeted all and requested the following to pay tribute to late Sanjoy Sen.

- Mr. Arnab Jha, President, ILTA,
- Mr. Harsh Kumar Jha, former MD, Tata Metaliks Ltd. & former Chairman, Tata Metaliks Kubota Pipes Ltd. and Speaker of the day,
- Mr. Tapas Choudhury, Senior Life Member, ILTA,
- Mr. Prabir Kr. Dasgupta, Senior Life Member, ILTA,
- Mr. Prabir Choudhury, senior Life Member, ILTA
- Prof. (Dr.) Sanjoy Chakraborty, OIC, GCELT,
- Mr. Bibhas Chandra Jana, Joint Secretary, ILTA, on behalf of CLRI,
- Mr. Shirshendu Ghosh, Lecturer & TPO, CFTC, Budge Budge
- Mr. Rinsten Dorji, HOD – LGAD, FDDI, Kolkata
- Sk. Gholam Mohammad, from Industry
- Mr. Prakhar Shukla, Award Winner from HBTU, Kanpur,
- Mr. Abhijit Das, Secretary, Alumni Association, GCELT,
- Mr. Debjit Sen, Award Winner from GCELT, Kolkata,
- Miss Jui Kundu, Award Winner from GCELT, Kolkata,
- Mr. Arnab Bhunia, Award Winner from GCELT, Kolkata

Mr. Mallick then requested the Speaker along with President, ILTA to take their seats on the dais and requested Mr. Arnab Jha to honour Mr. Harsh Kumar Jha with a flower bouquet and shawl.

Mr. Mallick then invited Mr. Jha to deliver the Welcome Address to the gathering.

Mr. Jha welcomed all the dignitaries and participants from different sectors including Mr. Harsh Kumar Jha, hon'ble speaker of the day and other associations, organizations, academic institutions, industry etc. In his speech Mr. Jha elaborated the eventful life of Late Sanjoy Sen and his role as President of ILTA during 3 decades.

Mr. Jha also offered thanks to Mr. Harsh Kumar Jha for choosing a serious contemporary topic as the subject of his lecture.

Mr. Mallick then declared the name of the following students who secured the topper position in B. Tech, Leather Technology examination from different institutes and awarded with Sanjoy Sen Memorial Medal:-

a) **Mr. Diwakar Kumar** from Muzaffarpur Institute of Technology, Muzaffarpur, Bihar in 2024 who could not able to attend the program due to her pre-occupancy

b) **Mr. Prakhar Shukla** from Harcourt Butler Technical University, Kanpur, U.P. in 2024 presented by Mr. Arnab Jha & Mr. Harsh Kumar Jha

Prof. (Dr.) Sanjoy Chakraborty, OIC, GCELT, thereafter was requested to felicitate the students from GCELT and he then announced the name of **Mr. Debjit Sen** as the receiver of the Sanjoy Sen Memorial Gold Medal, presented by Mr. Susanta Mallick, G.S., ILTA, for topping B.Tech Leather Technology examination as Composite Topper of 4 years in 2023 from GCELT, Kolkata.

Prof. Chakraborty then declared the name of the students who were selected for receiving Dr. Prafulla Kumar Basu Memorial Scholarship and invited the following students to receive the same:

a) Miss Jui Kundu presented by Mr. Harsh Kumar Jha.

b) Mr. Arnab Bhunia presented by Mr. Susanta Mallick.

c) Mr. Anudhyan Datta (could not able to attend due to pre-occupancy. The award was presented to his father by Mr. Arnab Jha).

On conclusion of the award presenting session, Mr. Mallick requested Mr. Asit Baran Kanungo, Vice President, ILTA to introduce the Speaker Mr. Harsh Kumar Jha to the gathering.

Mr. Mallick then offered thanks to Mr. Kanungo and requested Mr. Harsh Kumar Jha to deliver the 23rd Sanjoy Sen Memorial Lecture titled "***Competitiveness – An Enigma***". The lecture which lasted for half an hour and was most informative and highly contemporary.

On conclusion of the lecture, Mr. Arnab Jha requested Mr. Susanta Mallick to present a Memento & Citation to the hon'ble speaker Mr. H. K. Jha.

Mr. Mallick thereafter offered Vote of Thanks to all the dignitaries, award winners, guests and members present and the Science City authority for extending their useful support. He extended a most cordial invitation to all to participate in the 6th Prof. S. S. Dutta Memorial Lecture at Chennai on 2nd February, 2025 during IILF-2025.

Mr. Mallick concluded with wishing all a happy, peaceful and prosperous New Year, 2025 and requesting them to help themselves to a high tea was being served at the outside of seminar hall.

More than 120 participants joined the program.

The whole program would be available on the YouTube Channel, Facebook Page and website of ILTA soon.

6TH S. S. DUTTA MEMORIAL LECTURE

Above is scheduled to be held at the Hall – 'A', 1st Floor, New Convention Center, Chennai Trade Center, Chennai during IILF – 2025 from 11.30 am onwards. This year the Memorial Lecture will be a part of LERIG Conclave.

Mr. P. R. Aqeel Ahmed, President, Indian Shoe Federation & Managing Director, Florence Shoe, has kindly consented to deliver the 6th Prof. S. S. Dutta Memorial Lecture titled ***"Indian Leather and Footwear Sections current scenario & way forward"***.

More details will be shared within a short while.

14TH PROF. MONI BANERJEE MEMORIAL LECTURE

This is scheduled to be held in mid of March, 2025. Details of the prograM will be intimated in due course.

14TH ASIA INTERNATIONAL CONFERENCE ON LEATHER SCIENCE & TECHNOLOGY (AICLST)

ILTA is going to organize the 14th Asia International Conference on Leather Science & Technology (AICLST) in the year 2026 at Kolkata, India.

ILTA will also organize Platinum Jubilee Celebration of ILTA in 2025.

Planning and details of both the programs will be shared in due course.

HEALTH CARE BENEFIT FOR ILTA MEMBERS

ILTA has taken an initiative to introduce Health Care Benefits for all the Members of the Association in collaboration with M/s Narayana Health, Kolkata. Initially the scheme is applicable for the members of Eastern Region only as the Pilot Project.

For benefits and other details about this project, you may kindly follow the HRD Corner.

DIGITALIZATION OF ILTA PUBLICATIONS

ILTA is going to launch a digital platform for availing all its publications including Text Books, JILTA and other publications online.

Work on this project is under process. The details of the same will be published very soon.

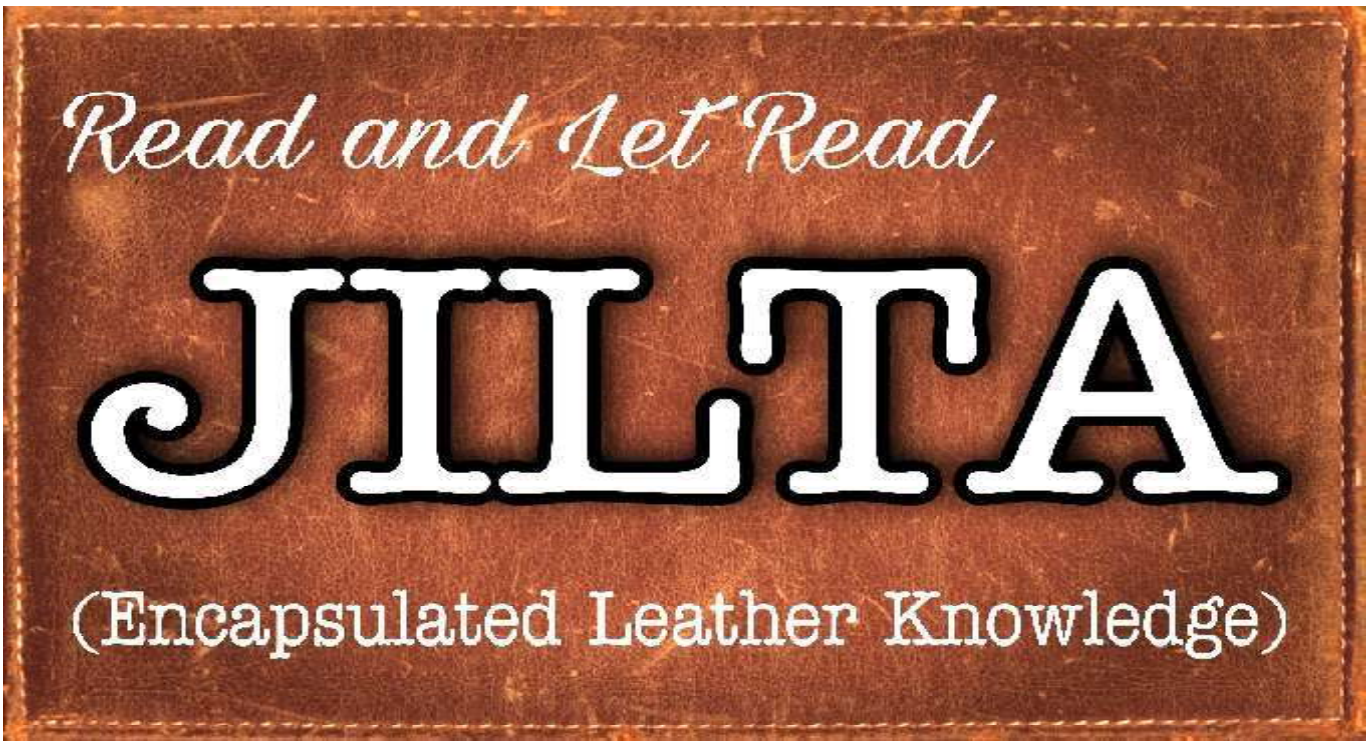
IDENTITY CARD FOR LIFE MEMBERS OF ILTA

The Executive Committee of ILTA has decided to issue a unique Plastic Identity Card to all the Life Member of ILTA against their Membership.

Hence, all the Life Members are advised to send the following information through official Email ID - **admin @iltaonleather .org** and/or WhatsApp No.- **9432553949** to ILTA office as soon as possible.

1) Name of the Member (In capital letter)
2) Full Residential Address of the Member
3) AADHAR No. of the Member
4) Blood Group of the Member
5) A HD quality Photo of the Member
6) Email ID of the Member
7) Mobile No. of the Member

(Susanta Mallick)
General Secretary



YOUTUBE CHANNEL & FACEBOOK PAGE OF ILTA

An official **YouTube Channel** namely **ILTA Online** and a **Face Book Page** namely **Indian Leather Technologists' Association** has been launched for sharing the activities of our Association since November' 2020 and July' 2021 respectively.

You may find all the Lives / Video recordings of different Seminar, Symposiums & Webinars on both of these social medias along with our website **www.iltaonleather.org** time to time.

You are requested to kindly do **Like** & **Subscribe** the YouTube Channel and **''Follow**' the FaceBook Page to get regular updates on the activities of our Association.

PUBLISH YOUR TECHNICAL ARTICLE

Faculties, Research Scholars and students of various Leather Institutes may wish to publish their Research / Project papers in an Article form in this monthly technical journal, JILTA.

Interested author may sent their paper (in MS Word format) along with a PP Photograph and Contact details like Email, Mobile etc. to our email IDs : admin@iltaonleather.org / jiltaeditor@gmail.com

Members are requested to :-

a) Kindly inform us your '**E-Mail ID**', '**Mobile No**', '**Land Line No**', through E-Mail ID: admin@iltaonleather.org or over Telephone Nos. : 24413429 / 3459. This will help us to communicate you directly without help of any outsiders like Postal Department / Courier etc.

b) Kindly mention your **Membership No.** (If any) against your each and every communication, so that we can locate you easily in our record.

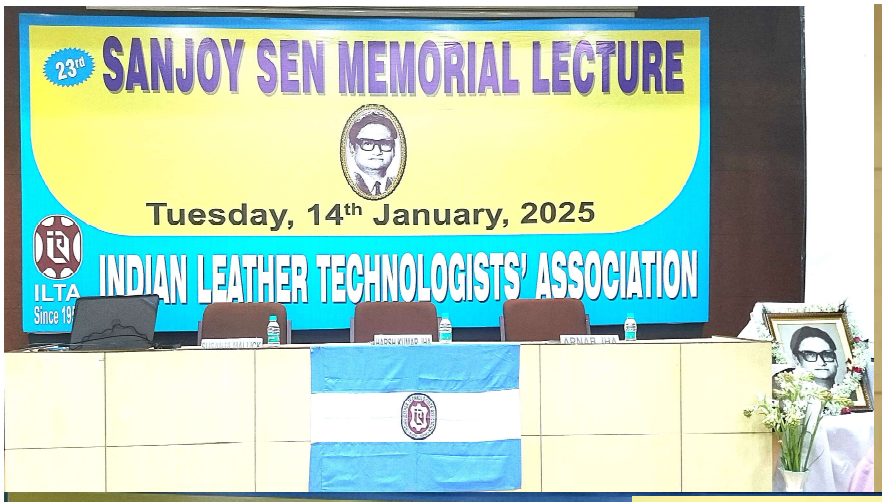
RECEIVING PRINTED COPY OF JILTA EVERY MONTH

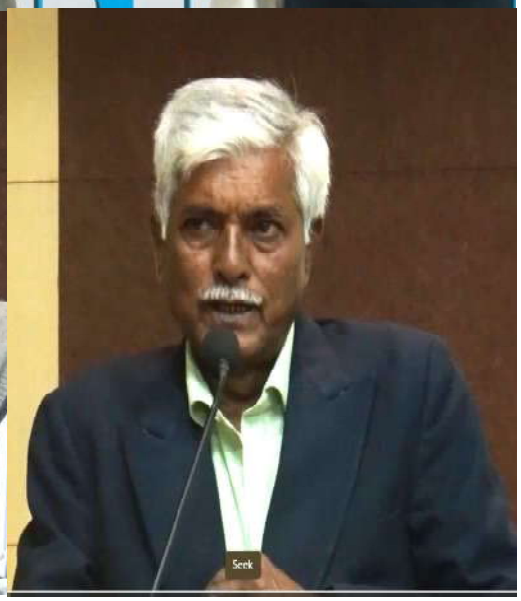
We have started to post Printed copy of JILTA from April' 2022 to members and all concerned as it was before Covid period. Simultaneously we have been sending the e-copy of JILTA through email also to all the concerned receivers.

If you are not receiving JILTA by Post or through email, may please verify your Postal Address and/or Email Id with our office at the earliest.

General Secretary and the Members of the Executive Committee are available to interact with members at 18.30 hrs, at our Registered Office on every Thursday

Snapshots of 23rd Sanjoy Sen Memorial Lecture





SNAPSHOTS

ILTA
Since 1950

INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION

(A Member Society of IULTCS)

In association with CSIR-CLRI organises the

6th Prof. S S Dutta Memorial Lecture

The Executive Committee requests the pleasure of your company at the 6th Prof. S. S. Dutta Memorial Lecture

Dr. N. Mohan, Director and CEO (Footwear Business), Kothari Industrial Corporation, has kindly consented to deliver the Prof. S. S. Dutta Memorial Lecture titled "*Indian leather and footwear Sectors current scenario and way forward*"

Date : *Sunday, the 2nd February, 2025 at 11.30 a.m.*

Venue : *Hall-A, First Floor,New Convention Centre, Chennai Trade Centre, Nandambakkam, Chennai*

Arnab Jha President	N. R. Jagannathan President (SR)	Susanta Mallick General Secretary

ILTA
Since 1950

INDIAN LEATHER TECHNOLOGISTS' ASSOCIATION

(A Member Society of IULTCS)

In association with CSIR-CLRI

Time		Programme
11.30 am	:	Registration
11.45 am	:	Introductory Speech by **Mr. Susanta Mallick**
11.50 am	:	Welcome Address by President, ILTA (SR) **Mr. N.R. Jagannathan**
12.00 pm	:	Address by Guest of Honour **Dr. T. Ramasami**
12.05 pm	:	Address by Chief Guest **Dr. KJ Sreeram**
12.10 pm	:	Award & Releasing of Journal of Indian Leather Technologists' Association (**JILTA**) • Award of 'Prof. S. S. Dutta Memorial Medal' • Award to the Best Exporters, 2024 • Releasing of JILTA Special Issue, February, 2025
12.25 pm	:	Prof. S. S. Dutta Memorial Lecture by **Dr. N. Mohan**
12.55 pm	:	Vote of Thanks by **Dr. R. Mohan**
01.00 pm	:	Lunch

Solidaridad

switchasia
Funded by the European Union

PROJECT PARTNERS

PISIE
CLC TANNERS ASSOCIATION (We Care for the Environment)
dugros
Stahl

Pradipta Konar, Sr. Programme Manager- Leather (Kolkata): pradipta.konar@solidaridadnetwork.org
Solidaridad Regional Expertise Centre
158/5, Prince Anwar Shah Road, Kolkata-700045 | Contact: 033-4060211, +91 98302798666

Solidaridad

switchasia GRANTS PROGRAMME

Solidaridad

switchasia GRANTS PROGRAMME

EFFECTIVE WASTE MANAGEMENT AND SUSTAINABLE DEVELOPMENT OF MSME TANNING COMPANIES IN KOLKATA LEATHER CLUSTER (BANTALA)

2022-2023

PROJECT PARTNERS IN ASIA

Pradipta Konar, Programme Manager-Leather(Kolkata): pradipta.konar@solidaridadnetwork.org

Solidaridad Regional Expertise Centre

158/5, Prince Anwar Shah Road, Kolkata-700045 | Contact: 033-40602211, +91-9830279866

WHEN MEDICAL CARE AND INDUSTRIAL WORK ALIGN, BOTH HEALTH & PRODUCTIVITY SOAR...!!!

When medical care and industrial work align, both health and productivity experience significant improvements. A workplace that prioritizes employee well-being through comprehensive healthcare programs—ranging from preventive care to mental health support—creates a healthier workforce. This, in turn, reduces absenteeism, lowers healthcare costs, and enhances overall job satisfaction. Workers who feel supported in maintaining their health are more engaged, motivated, and able to perform at their best. As a result, productivity soars, and organizations benefit from a more efficient, loyal, and energized team, creating a harmonious balance where both health and business success thrive.

Solidaridad consider that sustainable upliftment of the cluster can be done by introducing new green technologies and on the same hand creating improved working conditions for our workforce. Under the initiative of Occupation Health & Safety aspect of the implementing project with European Union & the Netherlands Embassy series of activities has been performed in Kolkata leather cluster.

Health Camps in Kolkata Tanneries Promote Wellness among Workers

Towards the end of October, Solidaridad conducted health camps and interactive sessions at various tanneries in the Kolkata leather cluster. The activities, organized under the project we are implementing in collaboration with the European Union, the Netherlands Embassy, and Dugros, aimed at educating employees regarding the best health and safety practices.

At the camps, the critical health parameters of over 650 employees were measured, and medicines prescribed in consultation with doctors. For those over 50, complete health check-ups were held. The doctors also initiated open discussions on health challenges faced by tannery workers and how to overcome them. More than 400 workers were given ergonomics session explaining how to reduce discomfort, prevent injuries and improve overall working productivity.

Additionally, eye check was also conducted for more than 150 patients having eye vision problem where medicines, spectacles were distributed.

This health camp benefited the workers by providing early detection to health issues, on time preventive care, onsite medical support and overall wellbeing.

In continuation to the initiative of providing better well-being of the workers, blood donation camp was organized for the industry with our project partner Dugros and BNI, on 15th October in the Bantala Leather Complex. This activity was an extension of our “Health and Safety Week” which was conducted in the last few days.

The day saw footfall of 512 donors ranging from industry owners, managers, supervi-sors, workers and our Solidaridad team donating blood.

Crafting Health & Safety – Medical Centre Inauguration in Bantala Leather Complex

Medical Centre under the FVO-RVO project which is co-funding project of EU Switch Asia was inaugurated on 7th December, 2024 by Mr. Rajendra Kumar Jalan (Chairman CLE) and Mr. Ramesh Kumar Juneja (Vice chairman CLE) in the presence of our Kolkata Leather dignitaries Mr. Imran Ahmed Khan (General Secretary CLCTA), Mr. Gopal Naredi, Mr. Zia Nafis (Joint Secretary CLCTA), Mr. Shahid Pervez (Joint Secretary CLCTA), Mr. Mohammed Azhar and other CLE and CLCTA officials.

This centre will assist Kolkata leather cluster in giving support through health, safety and wellness initiatives. Health & Safety support like Occupational Health & Safety trainings, workplace safety trainings, emergency care & first aid trainings will be provided to workers.

Medical centre will have a wide array of benefits, directly contributing to the well-being of employees and the success pf the industry as a whole. Through use of medical centre Bantala leather complex can improve workers health & safety, reduce absenteeism, have higher employee retention, reduce workplace injuries which will increase productivity and workers will have lower health care cost.

Providing a health center in the leather industry not only benefits the workers by improving their health and safety but also has long-term advantages for the company. It enhances productivity, reduces costs, promotes compliance with regulations, and boosts the company's reputation. By investing in worker health, the leather industry ensures a healthier, more sustainable, and more successful future.

SOLAR-POWERED TANNING, ECO-FRIENDLY CRAFTING...!!!

The use of renewable energy sources, particularly solar power, offers wide-ranging advantages for businesses, industries, and society as a whole. From reducing operational costs and environmental impacts to creating a positive public image and complying with regulations, solar energy is a key component of the transition toward more sustainable and resilient energy systems. By adopting solar power, industries can take proactive steps toward environmental responsibility while also realizing economic and operational benefits.

Walking on the “Sustainable Pathway” Solidaridad under the FVO project (Funds for Responsible Business) which is match-funding project of EU Switch Asia in cooperation with project partner Dugros has establish one of its kind first time in Kolkata Leather Complex – “SOLAR PANELS” for solar powered tanning. Green energy generated from this will enhance eco-friendly crafting.

The system has been established with a total installed capacity of 20.52 kWp, consisting of 38 solar modules. It will generate an annual energy production of 28,797 kWh. Over the course of 25 years, the investment yields a remarkable return of 255.9%. Additionally, the system comes with a 25-year warranty, ensuring long-term reliability. Moreover, it will contribute to a significant reduction in carbon emissions, preventing approximately 808.6 tons of CO2 equivalent from being released into the atmosphere over its 25-year lifespan.

Incorporating solar panels into the leather industry's operations supports efforts toward reducing environmental impact, cutting energy costs, and enhancing sustainability practices. It can also provide competitive advantages, boost the company's green credentials, and meet regulatory requirements, contributing to the industry's transformation into a more environmentally responsible sector.

By integrating solar power, the leather industry can contribute to global efforts against climate change, promote renewable energy usage, and enhance operational efficiency while maintaining product quality. This approach not only benefits the environment but also fosters economic growth and sustainable practices within the industry.

Solidaridad with the help of Dugros through the establishment of Solar Power creates an example which can be easily replicated in other tanneries and goods manufacturing units in Kolkata Leather Cluster. Units using this technology will not only be benefited from cost savings from energy bill but also will take a leap in the new future of Sustainability.

'SUSTAINABLE ASSOCIATES' ASSIST LEATHER TEAM GTO SET UP GREEN INTERVENTIONS FOR KOLKATA TANNERIES

Solidaridad recently concluded a year-long initiative in which 10 students from the Government College of Engineering and Leather Technology (GCELT) in Kolkata worked closely with the leather team as 'Sustainable Associates' to establish sustainable practices in tanneries.

The associates helped in project activities ranging from organizing and conducting Training of Trainers sessions on different green tanning technologies to overseeing capacity-building activities on different aspects of occupational health and safety. The students also regularly visited the tanneries to check the status of interventions implemented, and even scale them up at the cluster level.

By the end of their participation, the students, by compiling feedback from tanneries on the various activities, were able to help the project team implement a periodic, systemic approach to green initiatives in 126 tanneries in the Kolkata Leather Complex.

UN environment

International Resource Panel

Green Technology Choices:

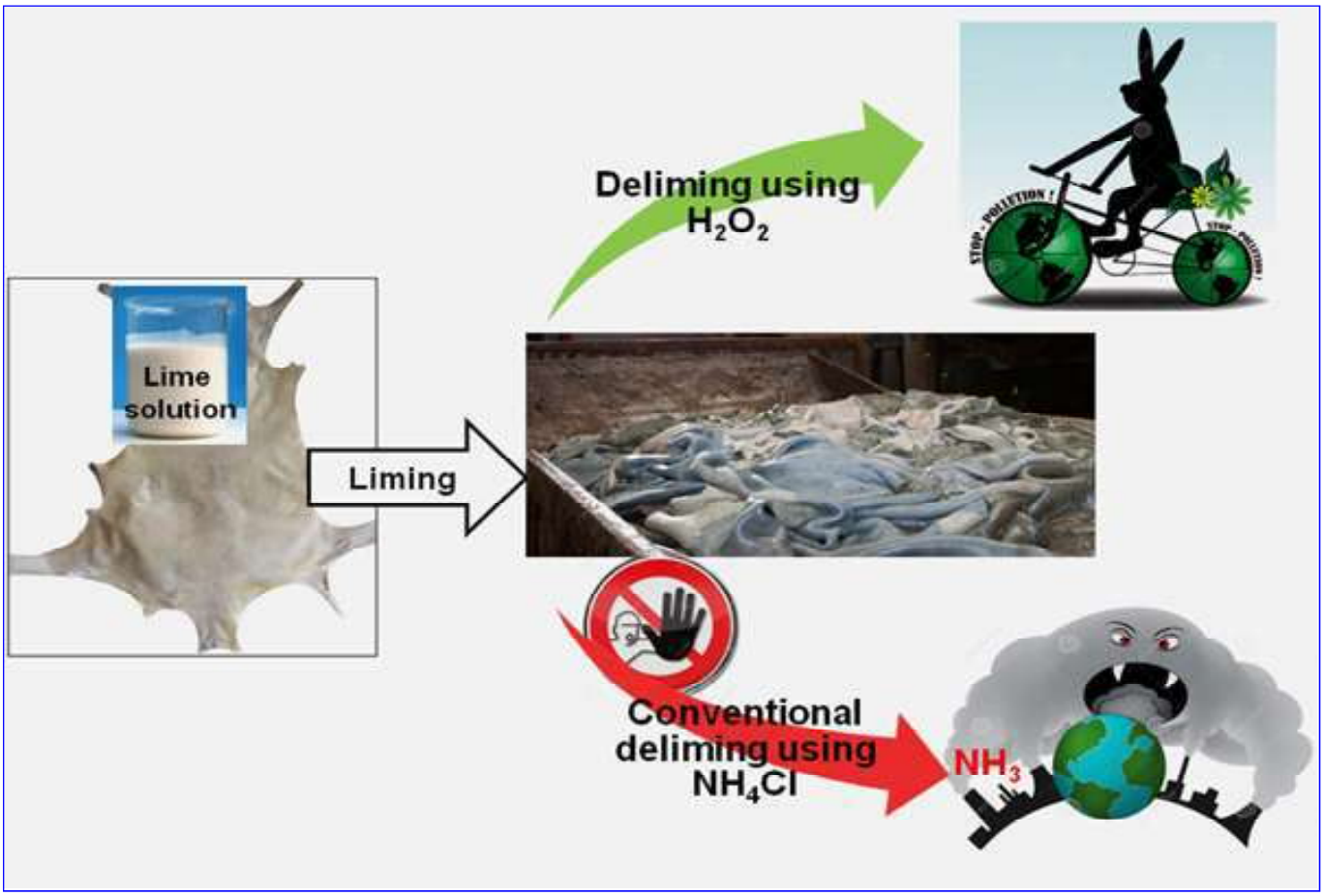
The Environmental and Resource Implications of Low-Carbon Technologies

INTERNATIONAL RESOURCE PANEL REPORT

Peroxide - Evasion to Pollution

Sandip Das, Ivy Kanungo, Anjan Biswas & Sanjoy Chakraborty

Dept. of Leather Technology, Govt. College of Engineering & Leather Technology, Kolkata



Abstract

Conventional leather processing is a chemically and energetically intensive multistage process. It engages various biological, inorganic, and organic materials, leading to environmental and economic constraints. Growing environ-mental policies dictate the prerequisite for alternative approaches in the conventional leather manufacturing process to overcome these constraints. Deliming, one of the unit pre-tanning operations among them, is accredited for generation and release of ammoniacal nitrogen gas, resulting negative impact on the environment. In this approach, usage of hydrogen peroxide has been explored for performing the above process in order to achieve cleaner leather processing. It has been found that the hydrogen peroxide treated limed pelt substantiate ammonia free leather manufacturing procedure. Leather prepared in unconventional method shows better aesthetic properties. Reduction of Biological Oxygen Demand, Chemical Oxygen Demand and Total Suspended Solid in the composite liquor associated with this newly developed recipe gives enormous potential in sustainable leather manufacturing process. Further, this newly developed green recipe seems to be economically viable.

Corresponding author E-mail : destinationsandip@gmail.com

Key Words : Leather Manufacturing, Ammoniacal Nitrogen, ecofriendly process

1. Introduction

Conventional pre-tanning operations in leather industry have become synonymous with serious ecological and environmental constraints. Beam house processing, especially liming-deliming are known to contribute major pollution load in leather processing (Saravanabhavan et al.2006). Liming satisfies the objectives of splitting up of collagen fibre bundles to the desired degree. The practice of liming removes the inter-fibrillary materials by specific reaction of several hazardous chemicals. This alkaline treatment increases the pH up to 12.5. Increase of pH induces osmotic swelling and plumping of the pelt required for leather processing, which in turn results a hydrostatic pressure inside the collagen matrix. The resultant hydrostatic pressure is very much crucial for diffusion of leather chemicals (Saravanabhavan et al.2008).

This operation is followed by deliming for removal of free or bound calcium ions and neutralization of residual alkali (Equation 1). Hence, deliming process contributes a buffering effect towards skin matrix, making it suitable for tanning operations.

$$Ca(OH)_2 + 2H^+ \leftrightarrow Ca^{2+} + 2H_2O \quad (1)$$

Conventional deliming, next unit operation of liming in leather manufacturing, is intended to neutralize for avoiding deposition of insoluble calcium salt on the matrix and loss of tanning materials. This process claims for the usage of ammonium salts, leading to the liberation of toxic ammonia gas (Equation 2) (Covington - Agency for Toxic Substances and Disease Registry).

$$Ca(OH)_2 + NH_4Cl \rightarrow CaCl_2 + NH_3 \uparrow + H_2O \quad (2)$$

In addition to that, systems generate significant quantities of ammonia and also contribute significantly to total Kjeldahl nitrogen (TKN) as reported by UNIDO (Ludivik 2000). Typical characteristics of wastewater from leather industries (Agency for Toxic Substances and Disease Registry – Dutta 1985) are being scrutinized globally to avoid resource depletion and threats to environments (Vogel et al.,1989 - American Thoracic Society. Respiratory health hazards in agriculture 1998 - Arbour et al. 2000). In the new millennium, several initiatives through eco-benign approaches especially alternative chemicals have been taken to overcome these ecological issues(Ludivik 2000 - Dutta 1985).

Hydrogen peroxide is a transparent pale blue syrupy liquid slightly viscous than water, soluble in water and ether and smells like Nitric acid. It is used as a bleaching agent, disinfectant or antiseptic and also as oxidizing agent, as it contains reactive oxygen species. Hydrogen peroxide decomposes slowly at room temperature with evolution of oxygen. It has a high dipole moment (2.01 D) and also a large Dielectric constant (89 at 0 C). It is a good ionizing solvent.

Chemical like hydrogen peroxide has received lesser attention, nevertheless important for ammoniacal nitrogen free pre-tanning operations. It is a polar solvent with high dipole moment (2.01 D) and large dielectric constant (89 at 0°C). In aqueous solution, hydrogen peroxide is more acidic than water. pK value of hydrogen peroxide is 10^{-12} whereas pK value of water is 10^{-14}. So, hydrogen peroxide is slightly acidic than water (Vogel et al., 1989).

It is a good ionizing solvent. Hydrogen peroxide can be apprehended both as an oxidizing as well as reducing agent in acidic (E^o = +1.77 V) and alkaline medium. It decomposes slowly at room temperature with evolution of oxygen (Equation 3).

$$2H_2O_2 \leftrightarrow 2H_2O + O_2 \quad (3)$$

Hydrogen peroxide is unstable in alkaline media as it decomposes to produce oxygen. That is the reason for which hydrogen peroxide solution is stabilized with weakly acidic condition.

$$H_2O_2 + 2OH^- \overset{Heat}{\longleftrightarrow} O_2 + 2H_2O + 2e \quad (4)$$

Oxidizing Property of hydrogen peroxide in acid solution and alkaline solution are summarized in Equation 5- Equation 7 and Equation 8-Equation 9, consecutively.

$$H_2O_2 + 2H^+ + 2e \leftrightarrow 2H_2O \qquad (E^0 = +1.77\,V) \quad (5)$$

$$2Fe^{++} + H_2O_2 + 2H^+ = 2Fe^{+++} + 2H_2O \quad (6)$$

$$2Fe(CN)_6^{4-} + H_2O_2 + 2H^+ = 2Fe(CN)_6^{3-} + 2H_2O \quad (7)$$

$$HO_2^- + H_2O + 2e = 3OH^- \qquad (E^0 = +0.87\,V) \quad (8)$$

$$Mn^{++} + H_2O_2 + 2OH^- = MnO_2 + 2H_2O \quad (9)$$

Hydrogen peroxide is reduced to water when it acts as an oxidizing agent.

Reducing Property of hydrogen peroxide in acid medium is briefed in Equation 10-Equation 11, whereas in alkaline solution, it is explained in Equation 12-equation 13

$$2H^+ + O_2 + 2e = H_2O_2 \qquad (E^0 = +0.68\,V) \qquad (10)$$

$$2MnO_4 + 5H_2O_2 + 6H^+ = 2Mn^{2+} + 8H_2O + 5O_2 \qquad (11)$$

$$2H^+ + O_2 + 2e = H_2O_2 \qquad (E^0 = +0.22\,V) \qquad (12)$$

$$2Fe(CN)_6^{3-} + H_2O_2 + OH^- = 2Fe(CN)_3^{4-} + 2H_2O + O_2 \qquad (13)$$

This study involves hydrogen peroxide mediated neutralization of lime liquor. Reactive oxygen species within peroxide molecule is responsible for its bleaching property. It might lead to a paradigm shift to ensure sustainable liming-deliming operation in leather processing.

2. Experimental Procedure

2.1 Materials

Calcium hydroxide [$Ca(OH)_2$] GR grade and hydrogen peroxide (H_2O_2) LR grade have been obtained from Merck.

2.2 Methods

Neutralization of lime liquor was performed using ammonium chloride and hydrogen peroxide. Ammonium chloride was used as standard (Table 1). 0.1 g of lime was mixed in 50 ml of water. Variable amount of hydrogen peroxide was added in each sample.

Table 1: Ammonium chloride mediated neutralization of lime liquor

Sl. No.	Lime in 50ml Water	Ammonium Chloride in g	pH
1		0	12.5
2		0.2	9.76
3		0.5	9.36
4	0.1g	1.0	9.3
5		1.5	9.08
6		2.0	9.02
7		2.5	9.0
8		3.0	8.99

In addition to this, variable amount of hydrogen peroxide was added into lime liquor, containing 0.05 gm lime mixed in 25 ml distilled water (Table 2). pH was checked through WTW pH meter for standard as well as test samples. Average pH value of triplet measurement at 30°C had been tabulated (Table 1 and Table 2).

Table 2. Hydrogen peroxide mediated neutralization of lime liquor

Sl. No.	Lime in 25ml Water	Hydrogen Peroxide (ml)	pH
1		0	12.5
2		0.5	10.5
3		1.0	9.85
4		1.5	9.5
5		2.0	9.1
6	0.5g	3.0	8.8
7		5.0	8.4
8		7.0	8.1
9		10.0	7.9
10		12.5	7.5
11		15.0	7.3

3. Result and Discussion

The medium pH has to be essential to many aspects of chemical reaction as well as ecological niche. Sensitivity or tolerance of medium pH *in vitro* / *in situ* varies accordingly to specific requirements of chemical reactions. pH of a medium signifies its acidic or alkaline nature. The regulation of medium pH is a fundamental physiological process of great significance for ecological balance. Alteration in H^+ and OH^- concentration within the solution constantly challenge the homeostatic mechanism of pH regulation. If the solution is too acidic or too alkaline it can cause "lock up" – a situation which restricts the chemical and biological processes.

Ammonium chloride and hydrogen peroxide mediated neutralization of lime liquor was performed in this study. It has been measured that pH of lime liquor is around 12.5. pH of each sample after neutralization was tabulated in table 1 and table 2. pH of lime liquor was found to decrease with increasing ammonium chloride and hydrogen peroxide concentration linearly (Fig. 1). Initially, there was a sharp decrease of pH with increaseing concentration of both ammonium chloride and

hydrogen peroxide. It attained almost a constant pH around pH 9 which was concordant with pH of deliming process.

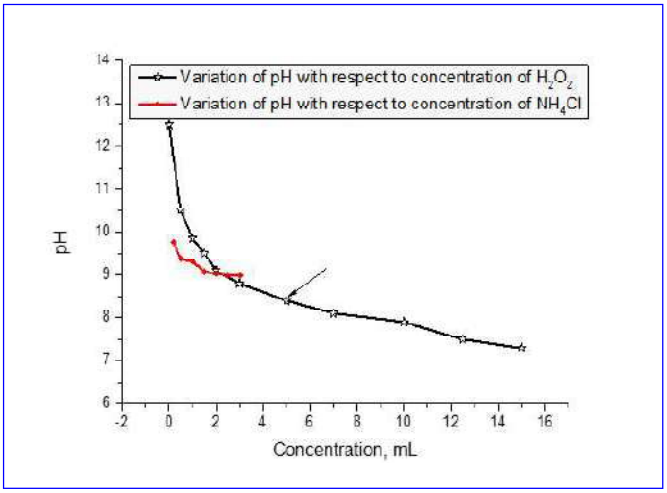


Fig. 1 Decrease of pH with increase in concentration of ammonium chloride and hydrogen peroxide

Calcium Hydroxide [$Ca(OH)_2$] is alkaline in nature, it gives pH around 12. Acidic nature of hydrogen peroxide helps to reduce OH. concentration of lime solution and bring down the pH around 8. Decrease of pH authenticates neutralization process. No ammonia gas was evolved during hydrogen peroxide mediated neutralization process.

Usage of hydrogen peroxide might be explored as a substituent of acidic ammonium chloride or ammonium sulphate in order to prevent the generation of ammoniacal nitrogen and ammonia gas. Newly developed neutralization formulation by hydrogen peroxide might be aimed to evaluate the impact of the developed process on the environment as against the existing leather manufacturing process.

4. Conclusion

This study has shown possible candidature of H_2O_2 as neutralizing agent of lime. The use of H_2O_2 could offer advantages in terms of waste minimization by applying alkali-mild alkali neutralization process. Use of H_2O_2 appears an innovative insertion in the ecofriendly approaches in leather manufacturing.

Hydrogen peroxide in different proportion has been found to produce some bleaching effect on the hides and skins. At the same time, it also has some neutralizing action on lime liquor where alkaline pH is converted to weak alkalinity (from pH 12 to 8). This is evident from the graph (fig no. 1).

This acid – base neutralization is further accentuated by the presence of sulphide ($S^=$). Sulphide gets promoted to sulphate ($SO_4^=$), removing the hazardous toxicity of hydrogen sulphide (H_2S) gas.

This also further ameliorates the colour of the limed pelt from greyish cast to complete white surface. Use of Hydrogen peroxide macerates the 3-dimensional texture of collagen protein. The pelt is found to be softer but plumper. Pelt contains no rubber like resiliency although the pH of the pelt is around 8 to 8.5. This pH is comparable with the conventional ammonium salt deliming process. The plumper texture of collagen matrix helps to produce Chrome tanned pelt with more and more chrome uptake with a soft feel.

Avoiding ammonium salt in the deliming process removes the toxicity of ammonia (NH_3) gas generation which is a long drown problem of this simple acid - base neutralization process and also prevents production of Nitrogen in the system.

Hydrogen peroxide in the chemical deliming process reduces also the pollutional load of the conventional deliming process, pollutional load like B.O.D., C.O.D. etc. Pollutional load, in its normal parlance is measured in terms of demand for oxygen to stabilize the waste water. The higher the demand for oxygen the higher is the pollutional load and vice versa.

Hydrogen peroxide on the other hand does not exerts the demand of oxygen like the conventional ammonium salt deliming process. As is evident from this following equations.

$$HO_2^- + H_2O + 2e = 3OH^- \quad (14)$$

$$H_2O_2 = 2H^+ + O_2 + 2e \quad (15)$$

This way Hydrogen peroxide helps to scavenge pollutional load of the pretanning process in the tanning industry.

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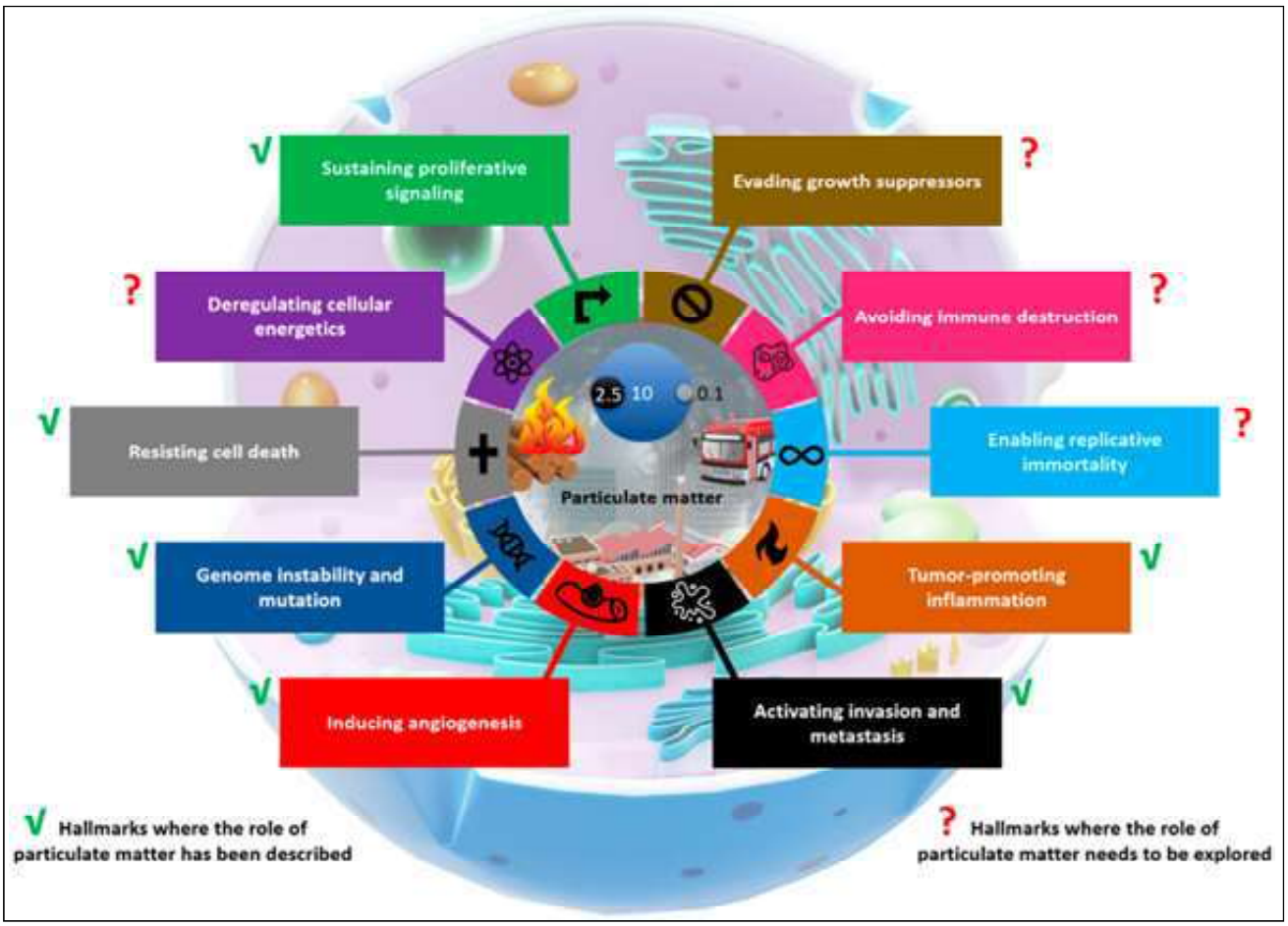
Figure legends :

Fig. 1 : Decrease of pH with increase concentration of ammonium chloride and hydrogen peroxide.

Table legends :

Table 1: Ammonium chloride mediated neutralization of lime liquor

Table 2: Hydrogen peroxide mediated neutralization of lime liquor



INTERNATIONAL UNION OF LEATHER TECHNOLOGISTS AND CHEMISTS SOCIETIES
(www.iultcs.org)

Newsleather

Stay curious, informed and connected

Edition 3, 2024

Welcome

This is the third edition of our scientific newsletter, dedicated to providing the latest updates on research, regulatory developments, technology, and standard methods in the leather industry.

In this issue, we are starting a series of publications about the use of patents in the leather industry. We will review two old patents that shaped the leather industry.

Patents are a complex subject, involving the interplay of technology, science, art, and legal expertise. The process of obtaining a patent is intricate and often requires the expertise of a patent attorney for the submission, interaction with the patent examiner, and defense of the patent. The patent process varies across different countries, resulting in situations where patents may be granted in some regions but not in others.

Thank you for joining us on this journey. We look forward to your feedback and contributions in future editions.

Please share your comments and suggestions to secretary@iultcs.org

Wishing you all a Happy New Year! Keep Tanning!

Kind regards,

Dr. Luis A. Zugno, editor

INTERNATIONAL UNION OF LEATHER TECHNOLOGISTS AND CHEMISTS SOCIETIES
(www.iultcs.org)

Traditionally, leather technology has been kept as a trade secret, with recipes and formulations guarded closely by the Master Tanner. Often, the chemicals were coded, and only handwritten formulations existed. Tanneries were tightly closed industries. However, with the advent of the industrial revolution, tanneries had to become more transparent, requiring the disclosure of chemicals and formulations. This shift created an opportunity to use patents to protect intellectual property. Today, both trade secrets and patents continue to play a crucial role in the leather industry.

A **patent** is a special legal protection for inventors. It gives them the exclusive right to use, make, and sell their invention for a set period, usually 20 years. This means no one else can use or copy their invention without permission.

Patents encourage inventors to create new things by ensuring they can benefit from their hard work. To get a patent, inventors must describe their invention in detail so others can understand how it works. This sharing of knowledge helps inspire more new ideas and inventions.

In simple terms, a **patent** is like a reward for inventors that also helps spread new knowledge and technology.

Patents play a crucial role in innovation by:

1. **Protection of Intellectual Property**: Patents safeguard inventors from unauthorized use of their inventions, ensuring they can control and monetize their innovations.
2. **Incentive for Innovation**: By granting exclusive rights to profit from inventions, patents provide a strong incentive for investing time and resources in research and development.

3. **Promotion of Knowledge Sharing**: The requirement for public disclosure of patented inventions fosters knowledge dissemination, which can inspire further innovation and development in related fields.
4. **Economic Growth**: Patents drive economic growth by encouraging the commercialization of new technologies, leading to the creation of new products, services, and industries.

While patents provide significant advantages, they also come with certain challenges:

1. **Cost**: The process of obtaining and maintaining a patent can be expensive, including application fees, legal fees, and maintenance fees. In the United States the total cost for the life of the patent is estimated in 100,000 dollars.
2. **Time-Consuming**: The patent examination process can be lengthy, often taking several years to complete. In most countries patents are valid for 20 years.
3. **Enforcement**: Enforcing patent rights can be complex and costly, particularly in cases of international infringement.

In this newsletter we will review 2 important and historical United States patents on the leather industry:

1. The two-batch system for chrome tanning patented in the United States by Schultz on January 8, 1884, next month completing 141 years. The two patents "Tawing Hides and Skins" describe the use of bichromate of potash (potassium bichromate) being reduced by sodium sulfite or sodium thiosulfate. Patents: US291784A and US291785.

   Schultz patents were challenged by Zahn citing prior art. The New Jersey court said that the process is not entirely new or original and that similar patents existed at the time of Schultz's patent. This video

has a great representation of the patent dispute: https://bit.ly/409Q5w7

2. Dr. Otto Rohm patented in 1908 the invention of a bating process using extract of the pancreas of animals and a mixture of salts of alkali and ammonia. This new bating method served as a replacement for the traditional use of dog dung in the bating process. The most known product of this patent (now expired) is called Oropon® and is still being used today. Patent US886,411. The German patent was issued on June 7, 1907: DE200519C https://patents.google.com/patent/DE200519C/en

The patent when issued became a public document and can be accessible easily. At the end of this newsletter, we have the complete text of these patents. The old patents are simple and very objective; today are more complex.

We will continue our discussion on patents and how to make searches in the future issues of Newsleathers.

UNITED STATES PATENT OFFICE.

AUGUSTUS SCHULTZ, OF NEW YORK, N. Y.

TAWING HIDES AND SKINS.

SPECIFICATION forming part of Letters Patent No. 291,784, dated January 8, 1884.

Application filed May 31, 1883. (No specimens.)

To all whom it may concern:

Be it known that I, AUGUSTUS SCHULTZ, a citizen of the United States, residing at New York, in the county and State of New York, have invented a new Improved Process of Tawing Hides and Skins, of which the following is a specification.

This invention relates to a new process for tawing hides or skins, said process consisting in subjecting said hides or skins to the action of compounds of metallic salts—such as bichromate of potash—and then treating the same with hyposulphite of soda, by which term is understood that salt which is more recently sometimes called "thiosulphate of soda," ($Na_2S_2O_3$.)

In carrying out my process, I unhair the rawhides and prepare them in the same manner in which they are made "ready" for tanning. If the hides have not been pickled, I subject them to the action of a solution of bichromate of potash in the presence of an acid—such as hydrochloric acid—or, if the hides have been pickled, they may be treated in a solution of bichromate of potash in water without the addition of an acid. In this solution the hides are left for a shorter or longer time, according to their thickness and to the strength of the solution employed. A skiver or the face of a sheep-skin can be done in a strong solution, as above described, in about fifteen minutes, while a full skin "roan" would require in the same solution about one hour. I call the solution "weak" if it contains five per cent. or less of the weight of skins of bichromate of potash, and I call the solution "strong" if it contains more than five per cent. of bichromate of potash. It is not material, however, how strong the solution is. The skins are completed if small pieces cut from the thickest parts of said skin show that the solution has entirely penetrated. The skins are then ready to be taken out, and after the adhering liquor has run off the skins are introduced into the second solution, which consists of hyposulphite of soda dissolved in water, and adding an acid, such as hydrochloric acid. The solution may be strong or weak of hyposulphite, and the quantity of acid used at first may be less than requisite to split up the entire quantity of hyposulphite, and more acid may be added if the skins show that more is required, which is indicated by the color of the skins. When they are done, they show a whitish, blueish, or greenish color, according to the time they are kept in the hyposulphite solution. A skiver which first has been exposed to the action of the bichromate for fifteen minutes will be ready by remaining in the hyposulphite solution about twenty minutes. For thicker skins a proportionately longer time is required. For some skins—such as calf or steers' skins—it is desirable that the same, after having been withdrawn from the second or hydrosulphite solution, shall be returned to the bichromate solution, which imparts to them a brownish color and leaves them in a favorable condition to be colored black. The coloring can be done after the skins leave the hyposulphite solution, and after they have been exposed for the second time to the bichromate solution. The leather coming from the hyposulphite solution is especially adapted for light or dark colors, and by proper dyeing methods better and brighter colors can be produced than on leather done by tanning. After the leather is treated in the manner above indicated, it may be colored, soaped, and greased in the usual way. Leather can also be made by reversing the operation and first soaking the hides in a solution of hyposulphite of soda and then exposing them to the action of the bichromate solution. By using the solutions indicated at a heat of about 80° Fahrenheit, the process will be done in a shorter time than if the solutions are used cold. By my process the gelatine contained in the hides is rendered insoluble by means not injurious to the leather. If leather made by tannin is put in a strong soda solution, the tannin is extracted and a dark-brown liquor is formed. If leather made by my process is put in a strong soda solution, the liquor obtained shows only a little milky color.

Leather made by my process is very strong, soft, elastic, and my process is applicable to hides or skins of every description.

What I claim as new, and desire to secure by Letters Patent, is—

The within-described process for tawing hides and skins, said process consisting in subjecting the hides or skins to the action of compounds of metallic salts—such as a solution of bichromate of potash—and then treating the same with a compound containing hyposulphurous acid, (or as it is otherwise called "thiosulphuric" acid,) such as a solution of hyposulphite of soda or of potash in the presence of hydrochloric acid.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

AUGUSTUS SCHULTZ. [L. S.]

Witnesses:
W. HAUFF,
WILLIAM MILLER.

UNITED STATES PATENT OFFICE.

AUGUSTUS SCHULTZ, OF NEW YORK, N. Y.

TAWING HIDES AND SKINS.

SPECIFICATION forming part of Letters Patent No. 291,785, dated January 8, 1884.

Application filed July 16, 1883. (No specimens.)

To all whom it may concern:

Be it known that I, AUGUSTUS SCHULTZ, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Tawing Hides and Skins, of which the following is a specification.

This invention relates to a new process for treating hides or skins, said process consisting in subjecting said hides or skins to the action of a bath prepared from a metallic salt—such as bichromate of potash—and of then treating the same with a bath containing sulphurous acid.

In carrying out my process I unhair the raw hides and prepare them in the same manner in which they are made ready for tanning. If the hides have not been pickled, I subject them to the action of a bath of bichromate of potash in an acid, such as hydrochloric acid; or, if the hides have been pickled, they may be treated in a solution of bichromate of potash in water without the addition of an acid. In this solution the hides are left for a longer or shorter time, according to their thickness and to the strength of the solution employed. A skiver or the face of a sheep-skin can be done in a strong solution, as above described, in about fifteen minutes, while a full skin "roan" would require in the same solution about one hour. I call the solution weak if it contains five per cent. or less of the weight of the skins of bichromate of potash, and I call the solution strong if it contains more than five per cent. of bichromate of potash. The skins are done if small pieces cut from the thickest part thereof show that the solutions have entirely penetrated. The skins are then ready to be taken out of the solution, and, after the adhering liquor has run off, the skins are introduced into the second bath, which consists, by preference, of sulphite of soda dissolved in water, to which an acid—such as hydrochloric acid—should be added, in order to set free the sulphurous acid. The hydrochloric acid or its substitute may be added to the bath in a free state or through the medium of skins previously pickled, such skins being impregnated with the proper acid. The solution may be strong or weak of sulphite, and the quantity of acid used at first may be less than requisite to exhaust the bath of the sulphite, and more acid may be added if the skins show that more is required, which is indicated by the color of the skins. When the skins are done, they show a whitish, bluish, or greenish color, according to the time they are kept in the sulphite bath. A skiver which first has been exposed to the action of the bichromate bath for fifteen minutes will be ready by remaining in the sulphite bath about twenty minutes. For thicker skins a proportionately longer time is required.

For some skins—such as calf or steer skins—it is desirable that the same, after having been withdrawn from the second or sulphite bath, shall be returned to the bichromate bath, which imparts to them a brownish color and leaves them in a favorable condition to be colored black. The leather coming from the sulphite bath is especially adapted for light and also for dark colors, and by proper dyeing methods better and brighter colors can be produced than on leather done by tannin. After the leather is done in the manner above described, it may be colored, soaped, and greased in the usual way.

Leather can also be made by reversing the operation and first soaking the hides in a sulphite bath, and then exposing them to the action of the bichromate bath. By using the baths described at a heat of about 80° Fahrenheit the process will be done in a shorter time than if the baths are used cold. Tawed leather made by my process is very strong, soft, and elastic, and my process is applicable to hides or skins of every description.

Instead of using sulphite of soda, I can use other sulphites or bisulphites in presence of an acid or an aqueous solution of sulphurous acid.

What I claim as new, and desire to secure by Letters Patent, is—

The within-described process for tawing hides and skins, said process consisting in subjecting the hides or skins to the action of a bath prepared from a metallic salt—such as bichromate of potash—and then to the action of a bath capable of evolving sulphurous acid—such as a solution of sulphite of soda—in presence of another acid—such as hydrochloric acid—substantially as described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

AUGUSTUS SCHULTZ. [L. S.]

Witnesses:
W. HAUFF,
E. F. KASTENHUBER.

UNITED STATES PATENT OFFICE.

OTTO RÖHM, OF ESSLINGEN, GERMANY.

PREPARATION OF HIDES FOR THE MANUFACTURE OF LEATHER.

No. 886,411. Specification of Letters Patent. Patented May 5, 1908.

Application filed October 12, 1907. Serial No. 397,149.

To all whom it may concern:

Be it known that I, OTTO RÖHM, a subject of the German Emperor, residing at Esslingen, Germany, have invented a certain new and useful Improvement in the Preparation of Hides for the Manufacture of Leather, of which the following is a specification.

For bating hides, that is to say, for removing the lime and fatty matter from the hides after the liming process, dog manure has been used for a long time.

The present invention has for its object, to provide a simpler and more reliable method of removing the lime, together with the fatty matter and the remnant of the hairs. For this purpose I treat the hides with an aqueous extract from the pancreas of animals. The principal constituent of the said pancreatic extract is trypsin, the effect of which is materially assisted by the other enzyme of the pancreas, viz. steapsin, which has the property of splitting up fat and completing the saponification of the fat contained in the hides.

Aqueous pancreatic extracts alone have a very efficient bating action, but it is advantageous to add salts of ammonia or of alkalies or mixtures of such salts. The favorable effect of these salts on hides becomes apparent chiefly by the fact, that the hides shrink, become thinner and are less liable to become rough, on being placed in pure water after the bating process, which defect is liable to occur, when the hides have a strong alkaline reaction and the water contains a considerable quantity of calcium-bicarbonate.

The details of procedure will appear from the following example: A pancreas weighing about 250 grams is extracted with 1 liter of water, and 10 cubic centimeters of this extract are added to 990 cubic centimeters of a 0,1 per cent. aqueous solution of ammonium chlorid. The solution thus obtained is an excellent bate.

When the hides, which have been limed and have an alkaline reaction, are introduced into the bating liquid, the hides are liable to become rough, through the precipitation of calcium carbonate, in case the water employed contains much calcium-bicarbonate in solution. This defect may occur, whether the bating liquid contains trypsin alone, or together with salts of ammonia or alkali, and it may be avoided by subjecting the water intended for the preparation of the bate, to a preliminary treatment, which consists in precipitating the carbonic acid by means of a suitable quantity of lime water, or in adding to the bating liquid before the introduction of the hides starch-paste or other organic or inorganic materials adapted to envelop the calcium carbonate.

If desired, both remedies, viz. lime water and starch-paste, may be used at the same time.

What I claim is:—

1. The process for bating hides, which consists in treating the hides with an aqueous extract of the pancreas of animals, substantially as described.

2. The process for bating hides, which consists in treating the hides with an aqueous pancreatic extract containing an ammonia-salt, substantially as described.

3. The process for bating hides, which consists in treating the hides with an aqueous pancreatic extract containing a mixture of salts of alkali and ammonia, substantially as described.

In witness whereof I have set my hand hereunto in the presence of two subscribing witnesses.

OTTO RÖHM.

Witnesses:
H. STRÄHLE,
OTTO HAAS.

Classification of Footwear - Sports Shoes

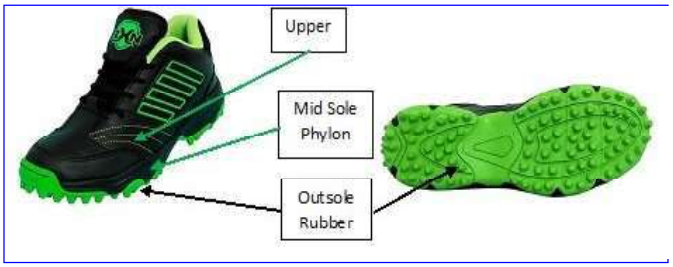
(Concluding Part)

Debabrata Chakrabarty

Footwear Technologist & Consultant, Hosur, Tamil Nadu

Hockey Shoes too like any field game are designed for shock absorption, stability and cushioning that the game demands based on the surface to be played on. The upper is made with thicker natural leather or pu leather with mesh lining that facilitates protection to foot as well as lower leg from injury. These shoes are water repellant with high breathability and needless to say that they support fast direction change.

The soles are Phylon mid sole with rubber outsole that are relatively harder with rubber cleats specifically designed for grass and turf. These cleats are non-metal and are shorter with more grip for turf than those for grass field which gives more grip on a wet and muddy grass field. They have asymmetrical lacing according to the foot shape ensuring secured and comfortable fit.



Hockey Shoe

Field Hockey Shoe and Sole

Turf Hockey Shoe and Sole

Cycling Shoes are more of an equipment for best performance, comfort and safety. They are specialized footwear that differ in design and functionality offering power transfer and compatibility with clipless pedals. The upper is obviously light weight and highly breathable made of leather, synthetic leather or mesh.

They have stiff soles to help transfer more power from the foot to the pedal with very light weight and snug fit reducing the slippage during intense riding. They have a version that is compatible with clipless pedals wherein the shoes are attached directly to the pedals for better stability and control. Breathability is a crucial feature to keep the foot cool and dry.

Cycling shoes vary in design depending on type of cycling with tailor made unique features for specific type of cycling as follows :

Road Cycling Shoes : They are designed to perform speed on hard paved surface and are typically light weight, highly breathable to reduce exhaustion during rides with stiff soles for maximum power transfer to the pedals with minimum energy loss.

Road Cycling Shoes

Commuter Cycling Shoes : These are more casual suitable for daily regular use for normal rides with comfortable fit and soles that are flexible enough to walk and stiff enough to ride.

Commuter Cycling Shoe

Corresponding author E-mail : sumiinternational36@gmail.com

Mountain cycling Shoes : These shoes are designed and constructed rugged to be able to sustain rough terrains with enhanced grip and protection as compared to road cycling. The sole has heavy cleats to allow comfortable walk too on uneven terrains. They are also called mountain biking shoes.

Mountain Cycling Shoes

Touring Cycling Shoes : These are designed for long distance rides prioritizing comfort and versatility. The soles are moderately stiff facilitating a balance between efficient riding as well as comfortable walking.

Touring Cycling Shoes

Triathlon Cycling Shoes : These shoes are designed for immediate change over between cycling and running and thus, has Velcro fasteners or a quick release system.

Triathlon Cycling Shoes

Motorcycle shoes/boots : also known as biking boots, are like armour to the bikers and are designed with extra reinforced toe sliders, armour plating on shin area and ankle bone area and of course with comfortability, ankle support and waterproof upper material. The best suited upper material is natural leather which can be full grain, printed grain or nubuck. Protection and safety to the rider is the most important requirement of this armour. It protects the foot from impacts and abrasions.

The soles are specifically designed for enhanced grip during on and off road on the footrest, pavements and pegs. These soles must have excellent abrasion resistance, rigidity and grip. They also must be anti-slip and heat resistance including the upper.

Motorcycling Shoes Motorcycling Shoe Sole

Motorcycling Boots

Mountaineering Shoes : Also, known as backpacking shoes/boots. These shoes/boots are specialized for protection against bruising and abrasion on rough wild terrain and provide high traction on rough, steep, wet, muddy and slippery terrain surfaces and are water resistant. And, of course comfort and protection to the foot with stability and durability. They need to be supportive, lightweight, and flexible enough with little stiffness for adaptability to the rough surface on the challenging terrain.

Mountaineering shoes/boots needs to be functional and adaptable to changing environments and surfaces. These are separately constructed for mountaineering with ventilation or breathability for summer hiking and separately constructed with insulation for winter or snow hiking with features quite different from each other pertaining to the sole specially.

Uppers made of water-resistant full grain leather with lining as required are the best while nylon mesh is more lightweight, more flexible, easy to clean but less durable.

The midsole is PU or EVA while mostly the outsole is rubber as the material is soft as well as durable. The sole generally has spikes for use on snow/ ice surfaces.

Mountaineering Boots

Mountaineering Boots with Crampons
(for ice / snow surfaces)

Mountaineering Shoe Sole (summer)

Mountaineering Shoe Sole (winter)

Readers, these are the majority of the types of specialized shoes in the athletic and performance segments. They are called performance footwear as these are equipment for the specific activities respectively and helps enhance the performance of the players.

There are other specialized shoes for many more events such as Hiking, Trekking, Skiing, Golf etc.

N.B. : *All illustrations are courtesy internet.*

ANNOUNCEMENT

ILTA LAUNCHED HEALTH CARE BENEFIT FOR ITS MEMBERS

Indian Leather Technologists' Association (ILTA), a member society of IULTCS and a pioneer organization in the field of leather industry, has now tied up itself with the hospital the Narayana group for Eastern India with a view to giving Indoor, Outdoor and Medical testing services to all of its registered (both life and ordinary) members at concessional rates.

Offer & Discount :

1. **OPD Service:** 10% discount on Doctor's Consultation, Prevailing Health Check-ups available at hospital, day care procedures, Investigations except outsourced tests.
2. **IPD:** 5% on total IPD billing as per prevailing hospital tariff excluding medicine / consumable / implant / outsource & blood bank services. (Not applicable on insurance cases/ Govt scheme / ESIC and any other schemes & promotional package or offers & discounts).
3. **Ambulance:** As per Availability & as per Narayana Health ambulance policy & charges.
4. **Payment Terms:** Payment should be only in Cash Mode, Debit Card, Credit Card, NEFT/RTGS/ IMPS. No cheques shall be accepted.

These facilities will be extended to its existing members (both Life & Ordinary) only. Six family members including spouse, two children (below 25 years) and dependent parents will be entitled to avail these facilities. The persons concerned may contact Mr. Bibhas Chandra Paul, OSD, ILTA (Mob. No. 9432553949) and / or Mr. Subha Paul, Assistant Manager - Payor Relation, Narayana Health (Mob. No. 8334847000) for further details.

ILTA will issue a Health Card in favour of each Member. Thus, Members are requested to collect the prescribed application format to avail this facility either from ILTA Office or through email.

ILTA IS NOW ON DIGITAL PLATFORM

Indian Leather Technologists' Association is now set for digitalization of its all publications. The members and non-members alike are eligible for this facility. The association has been publishing number of books on leather & footwear technology since inception. Also, the Association has a great collection of number of articles from renowned personalities & scientists of leather fraternity worldwide which has been publishing in our only technical journal namely "Journal of Indian Leather Technologists' Association (JILTA)".

All the above facilities will be available to all the interested peoples on digital platform through the official website of the Association very soon.

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Revolutionizing the Footwear Industry through AI : Innovations in Customization, Sustainability & Efficiency

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Abstract

Integrating Artificial Intelligence (AI) transforms the footwear industry, enabling custom, sustainable shoe design and production while enhancing efficiency and personalization. AI-driven innovations reshape supply chains, optimise material use, and improve customer engagement through data-driven insights and customization capabilities.

Key applications include AI-enhanced design processes, material selection, and real-time quality control, which help meet sustainability goals and reduce waste. Furthermore, AI enables personalized footwear through technologies such as 3D scanning and virtual try-ons, offering tailored products for individual consumers. As AI adoption advances, it promises to revolutionize the footwear sector, driving further sustainability and product customization innovation.

Keywords : Artificial intelligence, footwear, customization, sustainability, manufacturing.

Introduction

AI is reshaping the footwear industry, enabling the creation of custom, sustainable shoes with improved design and production. It enhances efficiency, personalisation, and sustainability, streamlining supply chains and more effectively meeting consumer demands, marking a new era in footwear innovation (Kotelskaia, 2023). Prospects for innovation and advancement seem endless.

Integrating AI into the footwear sector represents a significant change in designing, producing, and delivering personalised shoes to customers. Not only is this integration changing conventional methods, but it is also raising the bar for sustainability, efficiency, and personalisation in custom shoes. In recent years, AI has become a powerful tool for companies looking for a competitive edge. AI is transforming the footwear industry, from supply chain management to product design (Liu et al., 2024).

With the growth of e-commerce, the footwear sector has seen a tremendous transformation in recent years. With online sales expected to make up 45 per cent of all footwear sales by 2025, businesses are looking to AI to obtain a competitive advantage in this quickly changing sector.

Accenture research shows that over 60 percent of businesses are experimenting with AI. Still, only 12 percent are utilising it at a level of maturity that gives them a significant competitive edge and allows them to grow their income 50 percent faster than their competitors (Derksen and Myslymi, 2022).

Adoption of AI in the Footwear Industry: Current Trends and Challenges

AI integration within the footwear industries has been relatively gradual despite the strong focus on creativity and personal expression in these sectors. This slower adoption may stem from the industry's reliance on traditional, human-driven design processes. However, recent developments indicate that AI technologies are being increasingly explored, particularly for enhancing design innovation. AI tools like DALL-E2, for example, are being used to augment the design process, allowing for the creation of futuristic and high-performing footwear designs (Figure 1). DALL-E^2 is the successor of the original DALL-E model, a generative AI model that combines the powers of NLP and computer vision to create images from textual descriptions (Marcus et al., 2022). DALL-E is an acronym for "Decoder-Only Autoregressive Language and Image Synthesis." In simpler terms, DALL-E^2 is an AI model that synthesizes images based on textual input, such as captions or short phrases.

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Figure 1. Generative results of soccer shoes with Chelsea style (left) and women sporty sneakers with futuristic style (right).

These AI-driven design platforms enable designers to experiment with new ideas but rely heavily on the creator's vision and guidance. A designer's ability to convey a unique narrative through their work remains vital, and years of experience in craftsmanship and problem-solving continue to distinguish top-tier designers in the industry.

While AI in design is still in the early stages of adoption, some key players in the footwear industry are making significant advancements in AI-powered customer engagement and operational efficiency. For instance, a leading footwear manufacturer recently launched an AI-driven e-commerce platform in partnership with a major technology company to provide a more personalized and efficient shopping experience. The platform, which serves millions of customers across multiple countries, leverages AI to offer targeted services and enhance customer satisfaction. This strategic shift toward AI-first operations reflects the increasing recognition of AI's potential to improve global competitiveness and operational productivity.

The example demonstrates the substantial opportunities for the footwear industry to leverage AI technologies to meet evolving customer expectations and streamline production processes. Integrating AI with data-driven tools and Customer Relationship Management systems allows companies to enhance performance and consumer engagement. However, a cultural shift toward accepting AI-driven creativity and operational efficiencies will be necessary for AI to be more widely embraced across the industry. This gradual adoption underscores the need for ongoing exploration of AI's potential to revolutionize design and broader aspects of the footwear industry.

AI in Footwear Manufacturing: Applications and Impact

AI has transformed the footwear manufacturing industry by enhancing design processes, improving material efficiency, and offering customized solutions. AI-driven shoe design can produce more environmentally friendly, useful, and aesthetically beautiful goods that satisfy various consumer demands and preferences. Additionally, it helps businesses keep ahead of the highly competitive footwear industry by allowing them to react quickly to shifting market conditions (Cheng, S. H. (2023). Below is a structured analysis of how AI contributes to the footwear sector.

(i) Design Process Applications

- Algorithmic Creativity : Based on input parameters, AI algorithms can be trained to think creatively and explore many design ideas. As a result, distinctive and creative shoe designs are produced.

- Design Optimisation : AI can optimise designs for utilitarian and aesthetically pleasing elements. It can guarantee that the design of the shoe optimises performance, comfort, and other elements like weight and durability.
- Rapid Prototyping : AI-generated designs that can be rapidly prototyped using 3D printing or other modern manufacturing processes allow for faster iteration and design validation.

(ii) Material Selection

- Material Analysis : AI can analyse the strength, flexibility, weight, and environmental impact of different materials. This research helps choose the best materials for a certain shoe design.
- Cost Efficiency : AI can assess a material's cost-effectiveness while accounting for manufacturing expenses and market variables. This aids in striking a balance between price and quality when making shoes.
- Sustainability : AI plays a crucial role in selecting sustainable materials that minimise the environmental impact of the footwear manufacturing process.

(iii) Consumer Insights

- Market Research : AI can sort through enormous volumes of data to find new customer preferences and market trends. This data includes social media mentions, reviews, and sales trends.
- Demand Forecasting : AI can accurately anticipate the types of shoes in demand by assessing past data and patterns.
- Customisation : Custom shoe designs can be created based on customer feedback and preferences, guaranteeing that the items accurately reflect market demands.

(iv) Supply Chain Management

- Demand Forecasting : AI makes precise demand predictions using market trends, historical data, and other variables. This allows businesses to keep their inventory at an ideal level, lowering excess and stockouts.
- Inventory Management : AI systems may automate and optimise inventory management, guaranteeing that components and raw materials will be available when needed. By doing this, manufacturers can reduce delays and the expense of extra inventory.
- Supplier Selection : AI can evaluate supplier performance and find dependable, affordable vendors, making the supply chain more effective.

(v) Quality Control

- Real-time Inspection : During production, AI-powered computer vision systems can examine each shoe in real-time, finding flaws or inconsistencies that human inspectors might overlook.
- Consistency : AI guarantees a consistent quality of each shoe, minimising waste and decreasing the possibility of making substandard items.
- Data Analytics : AI-generated quality control data can be evaluated to find ways to improve the production process and raise overall quality.

(vi) Manufacturing

- Robotic Automation : Artificial intelligence-enabled robots are capable of fast and highly accurate component assembly, stitching, and cutting.
- Process Optimisation : AI-powered equipment can optimise production procedures, adjusting in real-time to maximise productivity, reduce energy use, and minimise errors.
- Labour Cost Reduction : Automation lowers labour expenses but frees up human labour for more complicated and creative jobs like design and problem-solving.

(vii) Customisation in Footwear

AI is transforming how customers engage with and buy shoes. In addition to increasing consumer happiness, AI-powered customisation also lessens the requirement for mass-producing standardised shoe sizes and styles, which results in less waste and a more environmentally friendly method of making shoes. Consumers gain from having distinctive, cozy shoes that suit their preferences

and requirements. Here's a closer look at how AI is influencing the industry's use of personalised customisation :

- 3D Scanning : Accurate measurements of the customer's foot are obtained using AI-powered 3D scanning technology. These images provide data on the distinct size, arch, and form of the foot.
- Machine Learning Algorithms : After processing the 3D scan data, machine learning algorithms identify the best design and size for each shoe, guaranteeing a custom fit for the wearer.
- Tailored Insoles and Lasts : 3D printing allows for creating bespoke insoles and shoe lasts that fit each person's unique foot form, offering the best possible comfort and support.
- AI-Driven Design Platforms : Consumers can co-create their footwear using AI-powered design tools. These platforms frequently offer an easy-to-use interface for customising the shoe's materials, colours, patterns, and design elements, among other features.
- Virtual Try-On : Customers can see how the customised shoes will fit and appear. AI-driven virtual try-on technology helps them make educated judgements.
- Instant Pricing : AI can determine prices in real-time based on the customisations clients choose while making design decisions, guaranteeing affordability and transparency.

(viii) Material Efficiency Measures

In the footwear industry, material efficiency pertains to the capacity to employ materials to minimise waste, lower resource usage, and be consistent with sustainability objectives. AI is essential to improve material efficiency by maximising resource utilisation. Here's a more thorough breakdown of every fact :

- Material Usage : AI algorithms assess and maximise material usage in footwear design and production. This entails making data-driven choices about the general design of footwear items and selecting, distributing, and cutting materials. AI can evaluate aspects, including material qualities, financial implications, and environmental effects. For example, it can figure out the best arrangement for cutting patterns to save material waste.
- Waste Reduction : AI-driven optimisation guarantees the prudent use of material resources, minimising surplus and waste during production. As a result, there will be financial savings and a smaller environmental effect when the same number of shoes are produced using fewer raw resources. Reducing waste helps manufacturers create a more sustainable and clean production process.
- Meeting Sustainability Targets : Numerous shoe manufacturers have established sustainability goals, many of which involve lowering the shoes' environmental impact. AI reduces waste and chooses more environmentally friendly materials, which helps meet these goals. Sustainability goals often include using recycled materials, choosing products with smaller carbon footprints, and following ethical and environmentally responsible supply chain procedures.
- Material Tracking : Using AI-driven sorting algorithms, recycling and upcycling is more effective when different materials are separated. AI-powered devices, for instance, can classify old shoe components such as leather, rubber, fabrics, or plastics. Precise sorting is essential for efficient recycling and reuse procedures because it guarantees that materials are sent to processing and remanufacturing correctly.
- Recycling Initiatives : AI can analyze data to find material recycling and repurposing opportunities. For example, recycled materials from old shoes can be used to make new shoe parts or even new goods. Recycling programmes are essential for lowering waste and the demand for fresh raw resources.
- Upcycling Strategies : AI systems can offer innovative ways to upcycle materials into higher-value products. For example, used shoe soles could be recycled into rubberised surfaces or sporting tracks. Upcycling encourages creative methods to prolong the useful life of materials and goods, which lowers waste and advances the circular economy.

Conclusion

The integration of AI is driving significant transformation within the footwear industry, fundamentally altering manufacturing processes, sustainability practices, and product customization. A key aspect of this change is

AI's role in advancing sustainable practices and supporting a circular economy. AI has the potential to revolutionize the bespoke footwear sector by enhancing customer experiences, optimizing manufacturing efficiency, promoting sustainability, and enabling highly personalized design processes.

AI-driven innovations in the footwear industry are paving the way for products that are more accessible and tailored to a wider audience. The ability to design and produce shoes that cater to individual preferences, values, and specific foot characteristics is becoming a reality.

As AI continues to evolve, the prospects for further innovation and advancement in the footwear industry appear limitless, ushering in an era of enhanced personalization and sustainability in footwear manufacturing. This shift addresses practical consumer needs and aligns with broader environmental responsibility and resource efficiency goals.

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ANNEXURE - I

ANALYSIS – EXPORT PERFORMANCE OF LEATHER, LEATHER PRODUCTS & FOOTWEAR DURING APRIL-OCTOBER 2024-25 VIS-À-VIS APRIL-OCTOBER 2023-24

As per officially notified DGCI&S monthly export data, the export of Leather, Leather products & Footwear for the period April – October 2024-25 touched US $ 2867.78 Million as against the performance of US $ 2810.99 Million in April-October 2023-24, recording a decline of 2.02%. In rupee terms, the export touched Rs. 239941.21 Million in April-October 2024-25 as against Rs. 231993.01 Million in April-October 2023-24, recording a decline of 3.43%.

EXPORT OF LEATHER, LEATHER PRODUCTS & FOOTWEAR FROM INDIA
During April-October 2024-25 VIS-À-VIS April-October 2023-24

(Value in Million Rs)

PRODUCT	APR-OCT 2023-24	APR-OCT 2024-25	% VARIATION	% SHARE 2023-24	% SHARE 2024-25
FINISHED LEATHER	21701.89	22527.82	3.81%	9.35%	9.39%
LEATHER FOOTWEAR	97922.11	99465.94	1.58%	42.21%	41.45%
FOOTWEAR COMPONENTS	13186.33	12155.46	-7.82%	5.68%	5.07%
LEATHER GARMENTS	18712.13	18319.19	-2.10%	8.07%	7.63%
LEATHER GOODS	60453.64	65753.8	8.77%	26.06%	27.40%
SADDLERY AND HARNESS	8995.08	10330.8	14.85%	3.88%	4.31%
NON-LEATHER FOOTWEAR	11021.83	11388.2	3.32%	4.75%	4.75%
TOTAL	**231993.01**	**239941.21**	**3.43%**	100.00%	100.00%

Source : DGCI &S

(Value in Million US$)

PRODUCT	APR-OCT 2023-24	APR-OCT 2024-25	% VARIATION	% SHARE 2023-24	% SHARE 2024-25
FINISHED LEATHER	262.93	269.29	2.42%	9.35%	9.39%
LEATHER FOOTWEAR	1186.72	1188.93	0.19%	42.22%	41.46%
FOOTWEAR COMPONENTS	159.83	145.3	-9.09%	5.69%	5.07%
LEATHER GARMENTS	226.69	218.91	-3.43%	8.06%	7.63%
LEATHER GOODS	732.27	785.82	7.31%	26.05%	27.40%
SADDLERY AND HARNESS	108.97	123.45	13.29%	3.88%	4.30%
NON-LEATHER FOOTWEAR	133.58	136.08	1.87%	4.75%	4.75%
TOTAL	**2810.99**	**2867.78**	**2.02%**	100.00%	100.00%

Source : DGCI &S

- **Footwear** (Leather Footwear, Footwear Components & Non-Leather Footwear) holds the major share of **51.26 %** in the total export of leather and leather products with an export value of **US$ 1470.31 Mn.**

MONTH WISE EXPORT OF LEATHER, LEATHER PRODUCTS & FOOTWEAR FROM INDIA DURING APRIL-OCTOBER 2024-25

(Value in Million US$)

PRODUCT	APRIL 2024	MAY 2024	JUNE 2024	JULY 2024	AUGUST 2024	SEPT 2024	OCT 2024	TOTAL APR-OCT 24
FINISHED LEATHER	39.69	44.8	35.92	33.25	36.89	37.29	41.45	269.29
LEATHER FOOTWEAR	134.13	159.97	189.16	208.04	187.65	152.12	157.86	1188.93
FOOTWEAR COMPONENTS	17.44	21.84	22.58	22.76	20.97	19.1	20.61	145.3
LEATHER GARMENTS	17.52	26.35	35	38.66	35.91	30.99	34.48	218.91
LEATHER GOODS	94.53	108.47	106.19	111.09	126.74	120.18	118.62	785.82
SADDLERY AND HARNESS	13.09	15.05	17.08	20.31	19.02	18.59	20.31	123.45
NON-LEATHER FOOTWEAR	18.06	17.05	18.35	17.47	19.3	20.39	25.46	136.08
TOTAL	**334.46**	**393.53**	**424.28**	**451.58**	**446.48**	**398.66**	**418.79**	**2867.78**

Source : DGCI &S

ANNEXURE - II

ANALYSIS – COUNTRY WISE EXPORT PERFORMANCE OF LEATHER, LEATHER PRODUCTS & FOOTWEAR FROM INDIA DURING APRIL-OCTOBER 2024 VIS-A-VIS APRIL-OCTOBER 2023

(Value in Million US$)

COUNTRY	TOTAL			SHARE IN TOTAL EXPORT APR-OCT 2023	SHARE IN TOTAL EXPORT APR-OCT 2024
	APR-OCT 2023	APR-OCT 2024	% CHANGE 2024		
U.S.A.	539.15	634.26	17.64%	19.18%	22.12%
GERMANY	322.83	325.33	0.77%	11.48%	11.34%
U.K.	241.04	269.25	11.70%	8.57%	9.39%
ITALY	194.85	179.99	-7.63%	6.93%	6.28%
FRANCE	140.17	131.22	-6.39%	4.99%	4.58%
SPAIN	143.24	141.51	-1.21%	5.10%	4.93%
U.A.E.	64.54	69.78	8.12%	2.30%	2.43%

COUNTRY	TOTAL			SHARE IN TOTAL EXPORT APR-OCT 2023	SHARE IN TOTAL EXPORT APR-OCT 2024
	APR-OCT 2023	APR-OCT 2024	% CHANGE 2024		
NETHERLANDS	111.48	133.63	19.87%	3.97%	4.66%
HONG KONG	41.33	34.39	-16.79%	1.47%	1.20%
CHINA	80.67	73.92	-8.37%	2.87%	2.58%
POLAND	66.67	59.28	-11.08%	2.37%	2.07%
BELGIUM	104.41	73.63	-29.48%	3.71%	2.57%
SOMALIA	17.35	16.50	-4.90%	0.62%	0.58%
VIETNAM	46.69	52.72	12.91%	1.66%	1.84%
AUSTRALIA	46.59	41.62	-10.67%	1.66%	1.45%
PORTUGAL	33.76	29.86	-11.55%	1.20%	1.04%
DENMARK	31.56	32.76	3.80%	1.12%	1.14%
KOREA REP.	24.2	24.90	2.89%	0.86%	0.87%
JAPAN	45.77	39.83	-12.98%	1.63%	1.39%
RUSSIA	39.21	31.33	-20.10%	1.39%	1.09%
S. AFRICA	20.56	17.07	-16.97%	0.73%	0.60%
CHILE	19.31	21.17	9.63%	0.69%	0.74%
MALAYSIA	22.71	21.09	-7.13%	0.81%	0.74%
AUSTRIA	26.38	23.60	-10.54%	0.94%	0.82%
CANADA	33.01	33.49	1.45%	1.17%	1.17%
SWEDEN	13.94	17.73	27.19%	0.50%	0.62%
NIGERIA	7.04	5.22	-25.85%	0.25%	0.18%
INDONESIA	15.06	20.28	34.66%	0.54%	0.71%
MEXICO	24.06	23.93	-0.54%	0.86%	0.83%
SAUDI ARABIA	26.63	25.22	-5.29%	0.95%	0.88%
KENYA	5.76	4.93	-14.41%	0.20%	0.17%
SWITZERLAND	9.22	10.84	17.57%	0.33%	0.38%
SLOVAK REP	5.83	3.87	-33.62%	0.21%	0.13%
HUNGARY	5.73	11.93	108.20%	0.20%	0.42%

COUNTRY	TOTAL			SHARE IN TOTAL EXPORT APR-OCT 2023	SHARE IN TOTAL EXPORT APR-OCT 2024
	APR-OCT 2023	APR-OCT 2024	% CHANGE 2024		
THAILAND	11.5	10.81	-6.00%	0.41%	0.38%
BANGLADESH	10.4	12.48	20.00%	0.37%	0.44%
FINLAND	8.18	5.75	-29.71%	0.29%	0.20%
TURKEY	13.58	15.30	12.67%	0.48%	0.53%
ISRAEL	9.94	9.34	-6.04%	0.35%	0.33%
CAMBODIA	6.6	7.73	17.12%	0.23%	0.27%
CZECH REPUBL	6.77	9.48	40.03%	0.24%	0.33%
GREECE	7.19	5.69	-20.86%	0.26%	0.20%
NEW ZEALAND	4.26	3.74	-12.21%	0.15%	0.13%
OMAN	4.8	3.79	-21.04%	0.17%	0.13%
SRI LANKA DES	5.34	6.43	20.41%	0.19%	0.22%
SINGAPORE	7.07	10.08	42.57%	0.25%	0.35%
SUDAN	0.53	0.09	-83.02%	0.02%	0.00%
TAIWAN	3.78	3.42	-9.52%	0.13%	0.12%
NORWAY	4.46	8.34	87.00%	0.16%	0.29%
DJIBOUTI	1.51	1.65	9.27%	0.05%	0.06%
OTHERS	134.33	117.58	-12.47%	4.78%	4.10%
TOTAL	**2810.99**	**2867.78**	**2.02%**	**100.00%**	**100.00%**

Source : DGCI &S

The **Top 15 countries** together account about 78.82% of India's total leather & leather products export during April-October 2024-25 with export value of US $ 2260.36 Mn.

ANNEXURE - V

ANALYSIS – INDIA'S IMPORT OF LEATHER, LEATHER PRODUCTS AND FOOTWEAR DURING APRIL-OCTOBER 2024-25 VIS-À-VIS APRIL-OCTOBER 2023-24

As per officially notified DGCI&S monthly India's Import Data, the Import of Raw Hides & Skins, Leather and Leather products for the period April-October 2024-25 touched US$ 751.74 Million as against the performance of US$ 745.29 Million in April-October 2023-24, recording a growth of **0.87%**.

INDIA'S IMPORT OF LEATHER, LEATHER PRODUCTS & FOOTWEAR DURING April-Oct 2024-25 VIS-À-VIS April-Oct 2023-24

(Value in Mn US$)

PRODUCT	APR-OCT 2023-24	APR-OCT 2024-25	% VARIATION	% SHARE 2023-24	% SHARE 2024-25
RAW HIDES AND SKINS	13.4	19.21	43.36%	1.80%	2.56%
FINISHED LEATHER	235.28	230.66	-1.96%	31.57%	30.68%
LEATHER FOOTWEAR	267.2	322.86	20.83%	35.85%	42.95%
FOOTWEAR COMPONENTS	12.17	21.28	74.86%	1.63%	2.83%
LEATHER GARMENTS	1.08	1.01	-6.48%	0.14%	0.13%
LEATHER GOODS	39.8	38.22	-3.97%	5.34%	5.08%
SADDLERY AND HARNESS	1.6	1.62	1.25%	0.21%	0.22%
NON-LEATHER FOOTWEAR	174.76	116.88	-33.12%	23.45%	15.55%
TOTAL	**745.29**	**751.74**	**0.87%**	**100.00%**	**100.00%**

Source : DGCI &S

India's Import of different categories of Footwear holds a major share of about 61.32% in India's total leather & leather product including Non-Leather Footwear with an Import value of US$ 461.02 Mn. This is followed by Finished Leather with a share of 30.68%, Raw Hides & Skins 2.56%, Leather Goods & Accessories 5.08%, Saddlery & Harness 0.22% and Leather Garments 0.13%.

MONTH WISE INDIA'S IMPORT OF LEATHER, LEATHER PRODUCTS & FOOTWEAR DURING APRIL-OCTOBER 2024-25

(Value in Million US$)

PRODUCT	APRIL 2024	MAY 2024	JUNE 2024	JULY 2024	AUGUST 2024	SEPT 2024	OCT 2024	TOTAL APR-OCT 24
RAW HIDES & SKINS	1.74	2.81	2.55	3.07	3.97	2.62	2.45	19.21
FINISHED LEATHER	29.54	34.74	31.13	32.23	37.77	31.3	33.95	230.66
LEATHER FOOTWEAR	25.64	32.6	42.16	105.61	71.53	23.03	22.29	322.86
FOOTWEAR COMPONENTS	1.84	2.67	4.13	3.62	3.65	3.02	2.35	21.28
LEATHER GARMENTS	0.12	0.1	0.12	0.17	0.13	0.22	0.15	1.01
LEATHER GOODS	4.95	5.87	5.18	5.71	5.12	5.02	6.37	38.22
SADDLERY AND HARNESS	0.17	0.17	0.21	0.21	0.28	0.28	0.3	1.62
NON-LEATHER FOOTWEAR	6.01	11.87	19.11	49.98	19.93	4.67	5.31	116.88
TOTAL	**70.01**	**90.83**	**104.59**	**200.6**	**142.38**	**70.16**	**73.17**	**751.74**

Source : DGCI &S

Council For Leather Exports (CLE)
चर्म निर्यात परिषद
(Sponsored by Ministry of Commerce & Industry, Government of India)

CLE National Export Excellence Award Winners 2023-24

OVERALL - EXPORTS OF LEATHER, LEATHER PRODUCTS AND FOOTWEAR

1st Place : APACHE FOOTWEAR INDIA PVT LTD., TIRUPATI
2nd Place : MIRZA INTERNATIONAL LIMITED, KANPUR
3rd Place : SUPERHOUSE GROUP, KANPUR

Above Rs.300 Crores:

LEATHER FOOTWEAR

1st Place : FENG TAY INDIA, TIRUVANNAMALAI
2nd Place : APACHE FOOTWEAR INDIA PVT LTD, TIRUPATI

LEATHER GARMENTS

1st Place : BHARTIYA INTERNATIONAL LIMITED, GURGAON

LEATHER GOODS

2nd Place : A. V. THOMAS LEATHER & ALLIED PRODUCTS PVT. LTD., CHENNAI

Above Rs.200 Crores & Upto Rs.300 Crores:

LEATHER FOOTWEAR

1st Place : TATA INTERNATIONAL GROUP, RANIPET
2nd Place : LEINER SHOES PVT. LTD., AGRA

FINISHED LEATHER

1st Place : PRARA LEATHERS GROUP, CHENNAI

LEATHER GOODS

1st Place : KHEMCHAND HANDICRAFTS, JODHPUR
2nd Place : ALPINE APPARELS PVT. LTD., FARIDABAD

NON-LEATHER FOOTWEAR

1st Place : APACHE FOOTWEAR INDIA PVT LTD., TIRUPATI

Above Rs.100 Crores & Upto Rs.200 Crores:

LEATHER FOOTWEAR

1st Place : RAHMAN INDUSTRIES GROUP, KANPUR
2nd Place : ROGER INDUSTRIES GROUP, AGRA

FINISHED LEATHER

1st Place : MODEL TANNERS, KANPUR

LEATHER GARMENTS

1st Place : S.M. LULLA INDUSTRIES WORLD WIDE, CHENNAI
2nd Place : GEMINI ENTERPRISES, CHENNAI

LEATHER GOODS

1st Place : JAK GROUP PVT. LTD., GURUGRAM
2nd Place : STICHWELL EXPORTS PRIVATE LIMITED, KOLKATA

NON-LEATHER FOOTWEAR

1st Place : RELAXO FOOTWEARS LTD., DELHI

FOOTWEAR COMPONENTS (SHOE UPPER)

1st Place : HABEEB TANNING COMPANY, CHENNAI
2nd Place : LEGERO UNITED SHOES INDIA (P) LTD., VELLORE

INDUSTRIAL LEATHER GLOVES

1st Place : RAMA OVERSEAS LIMITED, KOLKATA

Upto Rs.100 Crores

LEATHER FOOTWEAR

1st Place : FUZAIL SHOES PRIVATE LIMITED, CHENNAI
2nd Place : SUPER TANNERY LIMITED, KANPUR

LEATHER GARMENTS

2nd Place : APOLLO FASHION INTERNATIONAL LIMITED, NOIDA

LEATHER GOODS

1st Place : KARENN INTERNATIONAL PVT. LTD., KANPUR
2nd Place : ASG KOMPANERO LIMITED, KOLKATA

FINISHED LEATHER

2nd Place : MODEL EXIMS (INDIA) PVT. LTD. KANPUR

FOOTWEAR COMPONENTS (SHOE UPPER)

1st Place : B B K SHOES, RANIPET
2nd Place : COMPETENCE EXPORTS PVT. LTD., KANPUR

NON-LEATHER FOOTWEAR

1st Place : NEXGEN FOOTWEARS PVT. LTD., DELHI
2nd Place : WALKAROO INTERNATIONAL PVT. LTD., COIMBATORE

HARNESS & SADDLERY (LEATHER)

1st Place : MIREEN INDUSTRIES PRIVATE LIMITED, GURUGRAM

HARNESS & SADDLERY (NON LEATHER)

1st Place : SUPERHOUSE GROUP, KANPUR
2nd Place : TEXT HORSE, KANPUR

INDUSTRIAL LEATHER GLOVES

1st Place : ACKNIT INDUSTRIES LIMITED., KOLKATA
2nd Place : VINIT GLOVES MANUFACTURING PVT. LTD., KOLKATA

FASHION /SPORTS LEATHER GLOVES

2nd Place : HIJAZ KURODA GLOVES COMPANY PRIVATE LIMITED, CHENNAI

FOOTWEAR COMPONENTS (OTHER THAN SHOE UPPER)
OTHER COMPONENTS

1st Place : SPERENE COMPOUNDING PRIVATE LIMITED, GREATER NOIDA
2nd Place : WILHELM TEXTILES INDIA PRIVATE LIMITED, GURGAON

FOOTWEAR COMPONENTS (OTHER THAN SHOE UPPER)
SOLES

1st Place : SUOLIFICIO LINEA ITALIA (INDIA) PVT. LTD., PONDICHERRY
2nd Place : VERSATILE OPERATIONS, AGRA

BEST WOMEN ENTREPRENEUR AWARD 2023-24

1. Ms. **Seema Bhatia, Director** of M/s. **Prits Leather Art (P) Ltd., Noida** for Leather Garments
2. Ms. **Saniya Misbah, Proprietor** of M/s. **Zenith Impex**, **Kolkata** for Leather Goods.
3. Ms. **Meenakshi Kalsi, Partner** of M/s. **Metro & Metro**, **Agra** for Leather Footwear
4. Ms. **Deepa Suresh, Partner** of M/s. **Bab Leather Products International**, **Chennai** for Finished Leather
5. Ms. **Jasmeet Kaur, Partner** of M/s. **Panache Exports**, Kanpur for Harness & Saddlery (Non Leather)

BRAND CREATION AWARD 2023-24

1. Brand Creation Award for "**LEMAITRE, PERF, SAFETIX**" to **M/s. Rahman Industries Group, Kanpur** for **Leather Footwear**.

2. Brand Creation Award for "**Welcome Pure**" to M/s. **Welcome Footwears, Bahadurgarh** for **Non Leather Footwear**

3. Brand Creation Award for "**Art n Vintage**" to M/s. **Vintage Lineage, Noida** for **Leather Goods**

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LEATHER GOODS MARKET INVESTMENT INSIGHTS AND FUTURE PROJECTIONS 2025 – 2032

Global Leather Goods Market Size 2025 that provides crucial details on company opportunities, growth plans, trends, innovations, competitive landscape in 2025, and the geographic outlook. Based on relevant market and regional segmentation, a thorough assessment of this worldwide market includes the historical analysis of this market (from 2025 to 2032) and develops reliable and approximate timeline estimations up to 2032. It provides the industry overview with growth analysis and historical & futuristic cost, revenue, demand and supply data. The research analysts provide an elaborate description of the value chain, future roadmaps and its distributor analysis. The forecast market information, SWOT analysis, Leather Goods market scenario, and feasibility study are the vital aspects analysed in this report. The report also presents forecasts for Leather Goods investments from 2025 to 2032.

Leather Goods Market size was valued at USD 440.64 Billion in 2023 and is poised to grow from USD 470.16 Billion in 2024 to USD 788.1 Billion by 2032, growing at a CAGR of 6.7% during the forecast period (2025-2032).

The Leather Goods market is fiercely competitive, with an emphasis on innovation, efficiency, and quality. Global trends that affect the supply chain include the rising need for environmentally friendly and energy-efficient equipment, increased usage of digital technology, and the importance of circular economy principles. The major and emerging players of the Leather Goods Market are closely studied considering their market share, production, sales, revenue growth, gross margin, product portfolio, and other important factors. This will help players familiarize themselves with the movements of their toughest competitors in the Leather Goods market. The report is just the right tool that players need to strengthen their position in the Leather Goods Market. It helps throughout several stages of company development and releasing novel products into the market. It assures a successful product release to the novice players.

Profitable players of the Leather Goods market are :

- ✓ Hermès International S.A.
- ✓ LVMH Moët Hennessy Louis Vuitton SE
- ✓ Kering SA
- ✓ Prada S.p.A.
- ✓ Coach, Inc.
- ✓ Capri Holdings Limited
- ✓ Richemont SA
- ✓ Tapestry, Inc.
- ✓ Salvatore Ferragamo S.p.A.
- ✓ Samsonite International S.A.
- ✓ Christian Dior SE
- ✓ Chanel S.A.
- ✓ Michael Kors Holdings Limited
- ✓ Tumi Holdings, Inc.
- ✓ Furla S.p.A.
- ✓ Valentino S.p.A.
- ✓ Tod's S.p.A.
- ✓ Kate Spade & Company
- ✓ The Rockport Group
- ✓ Wolverine World Wide, Inc

Essential regions of the Leather Goods market are :

- ➢ Leather Goods North America Market includes (Canada, Mexico, USA)
- ➢ Leather Goods Europe Market includes (Germany, France, Great Britain, Italy, Spain, Russia)
- ➢ Leather Goods Asia-Pacific Market includes (China, Japan, India, South Korea, Australia)
- ➢ Middle East and Africa (Saudi Arabia, United Arab Emirates, South Africa)

- Leather Goods South America Market includes (Brazil, Argentina)

Key takeaways from the Leather Goods market report :

- Detailed consideration of Leather Goods market-particular drivers, Trends, constraints, Restraints,
- Opportunities, and major micro markets.
- Comprehensive valuation of all prospects and threats in the
- In-depth study of industry strategies for growth of the market-leading players.
- Leather Goods market latest innovations and major procedures.
- Favourable dip inside Dynamic high-tech and market latest trends remarkable the Market.
- Conclusive study about the growth conspiracy of Leather Goods market for forthcoming years.

Take Action Now: Secure Your Leather Goods Market Today –

https://www.skyquestt.com/buy-now/leather-goods-market

As mentioned by the group of researchers and industry analysts, the report on the global market delivers some measurable insights related to Leather Goods market. Furthermore, with the support of several business-driven strategies, the market report elaborates the shifting industrial scenarios. Crucial segments are ranked and segregated based on their industry shares in the global market. Moreover, the global Leather Goods market research study briefly summarizes various key competition variables that are critical for the industry to determine possible market conditions at the global and regional level. The market report has been widely exhibited in order to deliver specialized industry assessment into the company profiles of the topmost players as well as highly established companies. Therefore, the world Leather Goods market has been evaluated as one of the helpful and extraordinary documents for the new entrants and industry players.

Above all, what criteria distinguish success from failure? We identified key parameters based on global market, which include pricing, value, availability, features, financing, upgrades or return policies, and customer service. Most importantly, this market study can assist you in identifying market blind spots.

(newstrail.com - 11/01/2024)

CLOSING LEATHER MUSEUM AN AFFRONT, SAYS CAMPAIGNER

Campaigners trying to stop the closure of Walsall's leather museum have described the proposals - including plans to digitise parts of the collection - as an "affront" to the town, given the industry "is so deeply written into our heritage".

Proposals due to be considered by Walsall Council next month also include some physical samples going on display elsewhere. Campaigner Lauren Broxton said the industry was "about where we come from". A petition opposing the closure has more than 2,000 signatures. It added that a town centre location would also make it more accessible.

Gary Flint, the councillor responsible for Health and Wellbeing, said the aim was to create "a new, inclusive, and progressive museum that can better serve the diverse needs of our community". He also said there was a wider aim of including the museum in a "dynamic cultural hub".

The local authority's cabinet is due to discuss budget proposals on 12 February and a decision to close could then follow by the end of the month. Ms Broxton said her connection to the museum - on Littleton Street West - came through working as a fashion designer specialising in leather work for 30 years.

She said the town had a long association with the trade and "everybody knows someone who works in leather, or whose family has worked in leather". The museum, in a Victorian building which was once a leather-making factory, explains the leather-working process and tells visitors about Walsall's links to the industry, using artefacts from local people and telling personal stories.

Walsall Council said more visitors were needed to ensure the "long-term sustainability of the museum". Proposals to move

some of the artefacts to another location in the town and digitise others have not impressed campaigners.

Claire Taylor, who set up the online petition, said: "The museum represents more than just a building; it is a meeting place, an educational resource, and a symbol of our unique leather-working heritage." Ms Broxton, who described the building as a "relic or shrine", said it would be impossible to recreate the smells, sounds and feel of leather work in digital form.

She said many people would have happy memories of going as a child to the museum, which opened in 1988.

She added she was hoping people would "make as much noise" as possible before the council meeting. Mr Flint said feedback from a consultation was currently being considered, and added that if the museum was relocated, the council would "ensure our heritage is celebrated in a space that reflects its importance to our community".

(BBC – 13/01/2025)

IFF BRINGS ELITE FUR & LEATHER SHOWCASE TO SOUTH KOREAN CAPITAL

The International Fur Federation (IFF) has announced the return of its prestigious International Fur and Leather Expo, taking place at the Grand Intercontinental Seoul Parnas from March 5 to 7, 2025. This exclusive event brings together industry leaders, fashion experts, and luxury fur and leather artisans from around the globe to showcase the finest collections in the heart of South Korea.

A Showcase of Global Craftsmanship

The 2025 Expo will feature a wide range of artisanal fur and leather products, including garments, trims, and accessories. Visitors can expect to see exquisite creations crafted from Sable, Mink, Chinchilla, and Fox fur, alongside leather accessories and shearling jackets. Exhibitors will represent key international markets, providing a unique opportunity to explore diverse styles and trends.

Why Seoul?

Seoul's thriving luxury fashion scene and its position as a pivotal hub for international business make it an ideal location for the Expo. As South Korea continues to establish itself as a trendsetter in the Asian luxury market, the IFF fur and leather fair offers exhibitors a platform to connect with influential buyers, designers, boutique owners, department stores, and media representatives.

Opportunities for Networking and Growth

The Expo will be more than a showcase of luxury products. It serves as a vital networking platform for buyers and exhibitors to forge partnerships, explore market trends, and secure business opportunities. Attendees will include government representatives, industry influencers, and key players in the fur and leather fashion sectors.

Highlights of the Event

- Exclusive Collections: Featuring premium fur and leather items that blend luxury with contemporary design.
- International Representation: Participants from over 10 countries, showcasing a variety of styles and materials.
- Networking Events: Opportunities to meet fashion industry experts and form long-lasting business connections.
- Seamless Organisation: Hosted at the iconic Grand Intercontinental Seoul Parnas, offering the perfect backdrop for this boutique luxury event.

Sustainability and Craftsmanship

In addition to luxury, the IFF remains committed to showcasing sustainable and ethically sourced fur and leather products. The event will highlight innovations and practices that reflect the evolving needs of today's discerning consumers.

Join Us in Seoul

The IFF's International Fur and Leather Expo 2025 promises to be an unmissable event for those passionate about luxury

fashion. The IFF invites exhibitors, buyers, and industry professionals to participate in this unique event.

(fibre2fashion.com – 13/01/2025)

LONDON FASHION WEEK'S DECISION TO BAN REPTILE SKIN IS NOT "SUSTAINABILITY"

Who needs animals in fashion? That's what many people probably think. It was evidently what London Fashion Week thought before their recent announcement to ban reptile leathers from their catwalk.

London Fashion Week's CEO, David Leigh-Pemberton, cited that the decision was motivated in part because many British Designers "are working towards more sustainable practices". The sentiment is laudable, but is it informed? The answer is no.

There are many reasons why the decision by London Fashion Week to ban exotic skins is wrong. The first is the idea that the reptile skin industry is exploitative and therefore detrimental to the species and the planet. In fact, a significant and growing body of scientific research proves the opposite is true – that reptile skins, provided they are responsibly sourced, are a nature-based raw material with exemplary sustainability credentials.

Ironically, if young designers are genuinely interested in the impacts of their raw material choice on the planet, a 2019 life-cycle analysis provides clear evidence of which materials they should be using. It is not cotton. It is not synthetic or any other leather. It is reptile leather (specifically, python).

How is this possible? At a fundamental level, reptiles are the evolutionary response to an energy-deficient and unpredictable planet. They are nature's version of 'green' technology; basking in the sun to fuel metabolic energy requirements and employing specialised energy-saving physiologies to cope with extreme environments. This is why some species are 90% more energy efficient compared to warm-blooded livestock, and why they are a dominant life form in hostile landscapes such as the Australian outback.

These natural attributes are now helping to build resilience and adaptability in many parts of the tropics – a fact that is no longer lost on many local communities and luxury fashion brands.

Reptile skins are derived from two basic sources: wild harvests similar to oceanic fisheries, and captive production similar to poultry farms. The vast majority of supply chains are tropical in origin, meaning the industry is biased towards climate vulnerable geographies in the Global South.

Reptile farms require less food and water compared with conventional livestock systems. They produce less polluting waste and greenhouse gas emissions, and reptile meat is a culinary norm for millions of people, many of whom already struggle with protein deficient diets.

Wild reptile harvests, at least those connected to the luxury fashion industry, are now underpinned by science-based management programs. They include animal welfare, social, and environmental standards, population monitoring, and adaptive management interventions. Poor governance can doubtless have impacts on the effectiveness of these programs, but the same is true for all raw material supply chains utilised by the fashion industry.

Many wild reptile harvests provide a sustainable source of food and income for indigenous people living in biodiverse landscapes. Without the opportunities afforded by the fashion industry, these people would be forced to turn to less sustainable livelihoods, such as slash-and-burn agriculture, or the illegal trade in genuinely threatened species such as pangolins and tigers.

Has London Fashion Week considered these nuanced impacts? Probably not. But would we rather listen to climate change deniers or climate scientists? In the same way, it's about time the fashion industry stops listening to misinformation spread by animal rights groups and properly informs itself about the science behind exotic skins.

If you work in the fashion industry and, after properly informing yourself, you still wish to stop working with reptile leathers, then that is fine. Just don't claim that you're doing so "for the animals", in the name of "sustainability". Because you'll be wrong.

(internationalleathermaker.com – 19/12/2024)

INDIA FORECASTS 2024/25 ECONOMIC GROWTH OF 6.4%, SLOWEST IN FOUR YEARS

India forecast annual growth of 6.4% in the year ending in March, the slowest in four years and below the lower end of government's initial projection, dragged by a weaker manufacturing sector and slower corporate investments.

India's had initially projected a growth rate of 6.5%-7%.

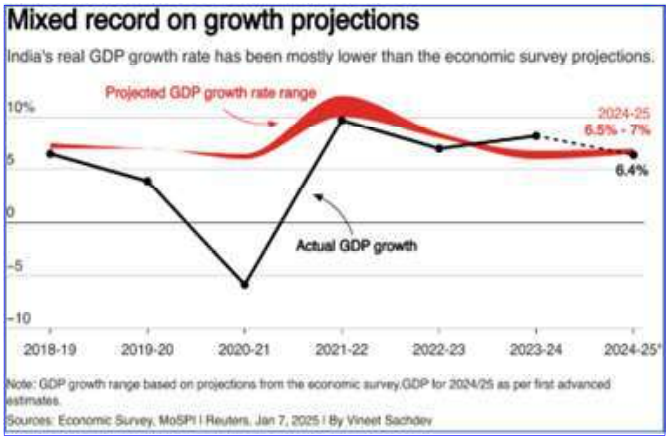
The forecast by the National Statistics Office (NSO) follows several disappointing economic indicators in the second half of 2024 - including low growth, high inflation, anaemic capital flows and a record trade gap - that cast doubt on the robustness of the country's growth.

Last month, the Reserve Bank of India lowered its growth forecast for the year ending March 2025 to 6.6%, from its earlier forecast of 7.2%, after India reported lower-than-expected growth of 5.4% in July-September, its slowest pace in seven quarters.

The full year projection suggests growth will revive somewhat in the second half of the year to 6.7%, said Aditi Nayar, chief economist at rating agency ICRA.

In nominal terms, which include inflation, the economy is expected to grow 9.7%, compared with the 10.5% estimate in the annual federal budget announced in February 2024.

Nayar added that given the slowdown in government spending earlier this year, India might trail its budget gap estimate of 4.9% for the current financial year.



The chart shows the difference between projections in the economic survey and the actual GDP growth rate.

Private consumption, which accounts for nearly 58% of GDP, was seen expanding by 7.3% year-on-year compared to 4% in the previous fiscal year.

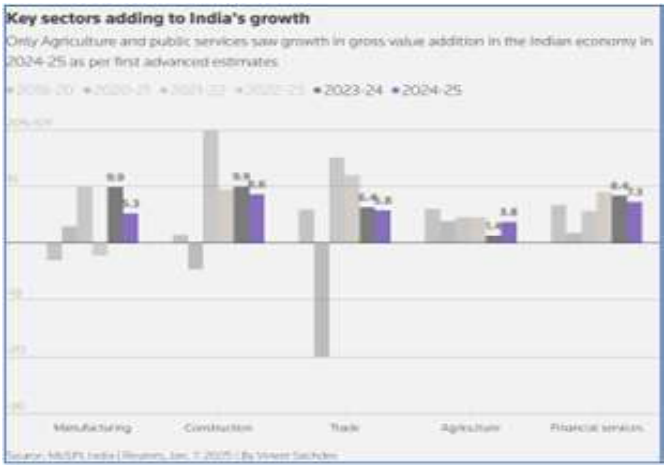
But private investment is seen rising by 6.4%, lower than 9% growth in the previous year. Government spending is estimated to rise by 4.1% year-on-year in 2024/25, up from a 2.5% increase in the previous fiscal year.

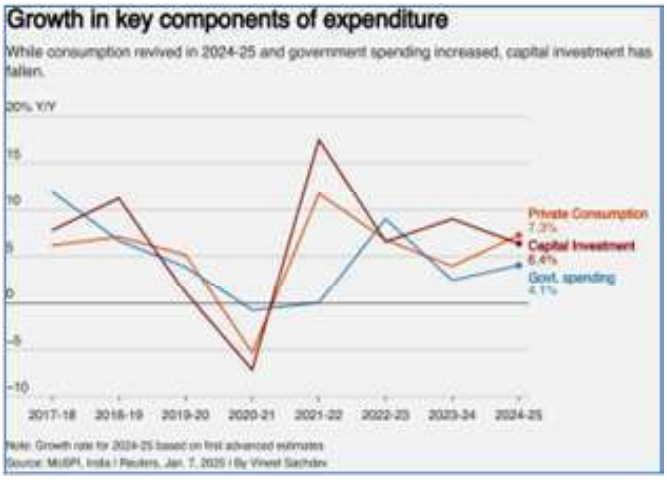
Sectorally, growth is seen supported by a pick-up in farm output, which contributes about 15% of GDP and employs more than 40% of the workforce. Farm output growth is seen picking up to 3.8% in the current fiscal year, from 1.4% a year ago, following an abundant monsoon.

Manufacturing, which accounts for about 17% of GDP, is projected to expand at 5.3% year-on-year in 2024/25, compared with 9.9% a year ago, while construction output was seen growing by 8.6%, down from 9.9% in the previous year, data showed.

The advance estimates will see further revisions and Madhavi Arora, economist at Emkay Global, said the figure might be optimistic.

The economy might face "downward pressure, implying a downside risk to the 6.4% estimate," amid weaker investments by companies, she said.





The chart shows the yearly growth of the key expenditure components of India's GDP - capital investment, private consumption and Govt. spending.

GROWTH DEBATE

India's central bank said last month the underlying reason for the slowdown in growth was inflation, which has eroded purchasing power of urban consumers.

But in a rare comment, the government's latest monthly economic report said the central bank's monetary policy stance and regulatory measures may have caused a demand slowdown.

The report added the growth outlook for October to December appeared bright, with rural demand remaining resilient and urban demand picking up.

Indicators from corporate earnings have remained mixed.

Among the first major corporates to report third quarter earnings, India's Dabur (DABU.NS), opens new tab, which makes products ranging from honey to toothpaste, estimated its revenue rose in the low single-digit percentage range in the third quarter due to subdued demand for healthcare and beverage products. But jewellery and watch company Titan reported robust demand.

Growth in the year beginning April 1, 2025 will be influenced by global and domestic uncertainties, said ICRA's Nayar, projecting GDP growth of 6.5% in the next financial year.

(theprint.in - 07/01/2025)

Valorisation of Invasive Species - For Leather, Fur, Bristle, Meat and By-Products *(Part - 25)*

Subrata Das, M.Tech (Leather Technology)
Freelance Leather Technologist & Consultant, Chennai

American Bullfrog

Native to North America, east of the Rocky Mountains, the American Bullfrog is acknowledged as one among the 100 most harrowing invasive alien species globally, due to its supremely competitive, predatory and adaptable nature. The voracious ranids are powerful "gape limited", ambush predators, implying that their assorted choice of diet is constrained to those which can fit into their mouth whole. The amphibians, equally adept in reconnaissance, surprise and lethal attack from a concealed position, cannot, therefore, capture prey above a certain size, which is regulated and limited by the size of their mouth. This limitation notwithstanding, the catalogue of their dietary preference is both impressive and authoritative.

Usually submerged in the water, with its eyes above the surface, this scourge of native avifauna and both macro - and micro-invertebrates, waits for the opportune moment for prey to come within striking distance. Often synchronized with a momentum attaining leap, the bullfrog's uncoiled tongue is propelled forward with uncanny precision, to snare the victim - feet and jaws employed for secondary restraint and subdual of larger prey - smaller ones being devoured without ado.

A 2013 paper, "Stomach contents from invasive American bullfrogs Rana catesbeiana (= Lithobates catesbeianus) on southern Vancouver Island, British Columbia, Canada" by Kevin Jancowski and Stan A. Orchard, determined as many as fifteen classes of organisms in the partially digested stomach contents of 5075 American bullfrogs, collected from 60 locations.

These included –

Ants of various kinds, odonates (dragonflies and damselflies), hymenopterans (bees, predatory and social wasps), aphids, brachyceran flies, lacewings, weevils, hoverflies, butterflies and moths, caddisflies, mosquitoes, cockroaches, fireflies, crickets, beetles (ground beetles, click beetles, ladybirds, giant water bugs and predaceous diving beetles), lizards (alligator lizards, skinks) and scorpions,

Other varieties eaten by American bullfrog include, fish (salmonid fingerlings, such as coho salmon, trout up to 15 cm in length, pumpkinseed sunfish, sculpins and sticklebacks), frogs (Pacific tree frog, red-legged frog, northern leopard frog,

Corresponding author E-mail : katasraj@rediffmail.com

Columbia spotted frog, the boreal chorus frog), salamanders (western red-backed salamanders and Oregon ensatina salamanders, North American brook salamanders and north western salamanders), turtles(endangered western painted turtles, spiny soft shelled turtles, common snapping turtles and musk turtles) and mammals (Townsend's voles, American and Pacific water shrew, Preble's meadow jumping mouse, cotton rat, moles, American mink cubs and muskrat pups).

In addition to the above, the vermin have been found to devour songbirds that come down to the water's edge to drink (red winged blackbirds, house finch, grackles, sparrows, swallows, mallards, wood ducks, warblers and waxwings), bats, snakes (common garter snakes, western terrestrial garter snakes, common kingsnakes, and in some instances rattlesnakes), rough skinned newts, spiders, tarantulas, snails, isopods, crayfish, amphipods, slugs, earthworms, millipedes, centipedes, leeches, clams and mites. In some instances, they have been known to catch and devour ducklings.

In June 2018 a captured and eviscerated bullfrog revealed two bobwhite quail chicks in its stomach.

In the absence of alternate food sources, the non-native behemoths are known to occasionally cannibalize juveniles and tadpoles. Such formidable and unspecialized predaceous behaviour of American bullfrogs has strengthened the anxiety and concern of scientists and conservationists on their dauntingly large and complex three - dimensional ecological footprint - subaquatic, supra-aquatic and non-aquatic (terrestrial). In addition, their ability to ambush and assimilate lotic, lentic, aerial and terrestrial victims under diurnal, crepuscular and nocturnal conditions, make them large, powerful, intimidating and intense predators.

In their native range the competitive and rapacious anurans are geographically dispersed in Hawaii, the lower 48 United States, and the Canadian provinces of Manitoba, Saskatchewan, Alberta and British Columbia. Although native to eastern North America, the American bullfrog was abetted by humans, focused on enriching their work and wallet, to cross the 100th meridian (W) and traverse over the Rocky Mountains into British Columbia.

In order to gain access to and benefit from the lucrative market for frog legs, the hefty ranids were introduced to Western United States in the 1910s and to British Columbia in the 1930s. Bullfrogs were also liberated irresponsibly by pet traders and hobbyists into wetlands, after having been imported, bought, sold and traded as bio-control agents, for ornamental fish and turtle ponds or pisciculture establishments. Many anuran meta-populations are assumed to trace their origins to these released stocks.

Commonly occurring on Vancouver Island, in the South Okanagan, Central Kootenay border region and the Lower Mainland of Canada, bullfrog colonies have been reported from Creston, dispersing northward. The Columbia-Shuswap region does not yet have free-ranging numbers. The slimy vertebrates are present at elevations of 0-1900m, with predominant numbers inhabiting lower altitudes. The highest site from which a bullfrog has been reported, remains Hot Springs Creek, Colorado (2745m).

The smooth skinned, goggle eyed, resonant voiced, variously coloured, non-warty bullfrogs, imported or purchased by besotted amateurs as pets, when tadpoles of 4-6 inch length, grows to adulthood (8 inches long, weighing 0.5 kg in 1-2 years time) to become both unappeasable and unmanageable. With the sole available benign option being their release into the wild, to wreak havoc on natural ecosystems for the next 6-10 years, till end of life, their owners unburdened their responsibility by setting free their charges. Since the size of American bullfrogs is directly proportional to the time required by tadpoles to metamorphose into imposing leviathans with matching abnormally large appetites, the longer it takes for the tadpole to become an adult, the larger is the size of the adult.

Bullfrogs were introduced elsewhere, from their native North American habitat, mainly for use as food, pond ornamentation and pest control. The warm adapted species, today has dispersed across 20% of the world (40 countries spanning 4 continents, except Africa and Antarctica).

The introduced range of the "Godzilla among amphibians", includes many countries in Central (Hawaii, western and southern Mexico and the Caribbean) and South America (Venezuela, Ecuador, Colombia, Chile, Brazil, Guyana, Peru, Paraguay, Uruguay and Argentina.), Europe (UK, Germany, Belgium, France, Italy, Spain, Greece, the Netherlands), Oceania and Asia (Thailand, Korea, Taiwan, China, Japan, Indonesia, Philippines, Malaysia, Russia and Israel.)

Deliberate and accidental introductions, secondary translocations, escapes from compromised amphibious aquaculture establishments, interaction between meta-populations,

emigration from their natal water bodies to escape cannibalism by and competition from conspecific adults as well as for foraging and establishing new colonies, have resulted in mushrooming numbers of the fecund and resilient species.

The spread of the interlopers has been ministered to by human intervention in the following ways - inadvertent release of bullfrog tadpoles or juveniles during stocking or tank cleaning, amphibians jumping over or escaping enclosures, release into wetlands, as a part of school projects, after study of growth and development at various life stages, liberation of pets or pet trade specimens, when too large to care for or unsuitable for home aquariums, overflow of large volume of water into holding pens during rains, let-offs by unscrupulous traders to create free-ranging natural inventory without any overhead and emancipa-tion and mercy-release by the religious minded for spiritual merit.

A brief outline of the introduction of the American Bullfrog into various countries is as follows :

Hawaiian Islands - in 1867 - to provide a food source and for controlling aquatic invertebrates.

Japan – in 1917 - brought from USA for commercial farming

Taiwan – in 1924 - Unsuccessfully introduced. Reintroduced in 1951 for frog culture and distributed to frog farms.

Canada- in the 1930s – as a delicacy for consumption

Italy – 1932-37 – several releases in drainage ditches, presumably for pest control.

Argentina and the Dominican Republic - 1955 - for commercial exploitation

Germany - in the 1960s - Tadpoles and larvae of bullfrogs imported by pet shops. Established free ranging numbers in the Southwest of Germany.

China – in 1962 - American bullfrogs from Cuba to be farmed for food in Xinjiang and Hunan

France – in 1968 - A dozen specimens imported from USA were released into a private pond in Gironde Department, in South west Bordeaux.

Indonesia – in 1970 - Liberated in Bogor.

Korea - in the 1970s - imported for food

Panama – in 1981 - For frog farming

The Netherlands - in 1986 - Five tadpoles, again imported from the USA were liberated into a large garden pond in Breda.

Uruguay – in 1987- for amphibious aquaculture

Venezuela – in the 1990s - for scientific research. Feral numbers were reported in 2001 from Andean ponds near Sierra Nevada, but apparently eradicated after effective control in 2009

UK – in 1999 - bred successfully for the first time, although introduced much earlier through pet shops.

Singapore – in 2000 – Mercy releases for religious merit – called “fang sheng “ (life release) in Chinese and “jiwitte dana” (gift of life) among Theravada Buddhists – of bullfrogs into wetlands such as Pasir Ris park and Jurong Lake has created invasive populations of the amphibian in the island state.

Austria, Denmark, Croatia, Israel, Russia, Malaysia, Singapore and Tajikistan - Introductions effected but present status unknown Bullfrog habitats and breeding sites are mostly deep pools with still perennial water. The anurans do not flourish in or are missing from steeply sloping streams, flowing water lacking in physical depth, or areas vulnerable to excessive flooding. Breeding in higher elevations commences in the warm months (May - July). In the plains and lower altitudes, multiplication of numbers is observed from March - April, and continues through the summer.

Females deposit agglomerations of 10,000-20,000 quoit shaped eggs, which hatch in 2-5 days, in placid water as slender lamellas extending about a square metre on the water surface, with multiple clutches oviposited in a season. With hibernation precluded in habitats with warmer climes, such as in Brazil, Paraguay and Hawaii, the egg count can triple to 60,000.

The amphibians are a highly aquatic species and are associated with wetlands with rich availability of invertebrates. The highly resilient “croakers” can survive in a miscellany of habitats over the course of a season from marshes and lakes to small backyard beautifying ponds, along creeks and streams, beaver ponds, reservoirs, seasonal bayous and puddles of still water, basin swamps, isolated and abandoned cattle tanks, roadside

drains and ditches, prairie potholes, and occasionally in wells and caves, forested habitat and floodplains. Bullfrogs do not prefer hyacinth covered ponds and rivers. This adaptability to "source and sink" is considered to be the fulcrum of their success in spreading far and wide.

Resistant to moderately high temperatures of 30-33 degrees Celsius, the ranids maintain their body temperature to the desired degree by alternating between land and water and also by varying their posture at regular intervals. Mucous secretion offsets loss of water with rising temperatures. The circulatory system of the amphibian concomitantly aids skin hydration. Lower ambient temperature is counterbalanced by basking in sunlight.

American bullfrogs exhibit a marked tendency to migrate between and within the same season, with individuals recorded traversing an average of 1.22 km in 19 days. While most stay in close proximity to their natal water body, appreciable overland locomotion is not uncommon.

Bullfrogs commonly bear the chytrid fungus, inimical to most amphibians. They also perform the function of vectors by carrying the fungus without being affected by it. Other afflictions spread by the American Bullfrog are through cytoplasmic virus, iridovirus and ranavirus, lung flukes and numerous metazoan parasites, adversely impacting other sympatric amphibians.

Bullfrogs, by virtue of their wide global distribution, have contributed to scientific breakthroughs and crucial discoveries in disciplines of environmental science, nociception and tissue injury studies, biomedicine, toxicology, endocrinology, physiology, biochemistry, pharmacology, genetic and sensorineural research, zoology, evolution, biotechnology and ecology.

They are extensively used in dissections, education programmes and research models, thus providing viable options to traditional mammalian specimens such as guinea pigs, mice, rats and rabbits, which not only require greater living space but also demand specialized handling and nourishment. The amphibians are also considered by scientists as an archetypal species for constructing typical ranid genomic resources, because they are enduringly diploid.

The bullfrog's thin, delicate and permeable skin is penta-functional – It absorbs water, performs respiration, assists thermos-regulation, effects mucous secretion to ensure water conservation, minimizes dehydration, facilitates amplexus and accomplishes camouflage from predators by changing colour, with the help of pigment cells called chromatophores to blend indistinguishably with its surroundings - an invaluable defence mechanism to ensure its survival.

A bullfrog's skin, like that of other frogs, is hygroscopic and assists cutaneous respiration by homeostatic action, whereby blood circulation is facilitated through the skin contrariwise to the flow course of the absorbing oxygen or encompassing water, enabling the amphibian to exchange carbon dioxide with the ambient atmosphere. This vital attribute is the sole mechanism available to it, during aestivation and hibernation.

A dense and compact weave of capillaries, immediately beneath the skin, particularly in and around the pelvic area, stimulates gas exchange between the circulatory system and the external environment. The head, shoulder and back contains granular glands, which secrete viscous mucous to maintain the dampness and fustiness of the skin, protecting the bullfrog against bacterial and fungal detriment and imparting an oleaginous safeguard from predaceous herons, raccoons and foxes.

The anuran periodically sheds its skin to avoid annealing, to ensure cell renewal, to sustain critical protective barriers and to lower pathogen load, thereby optimizing functional merits of the integument. The sloughed skin is promptly devoured, to replenish expended nutrients such as proteins and calcium. Bottom –up from the flesh and muscular tissue, frog skin is constituted of a dermal layer, underlying the epidermis, which is again a tri-layer of stratum germinativum, stratum spinosum and stratum corneum – all of which are squamous epithelial cells.

Commercial raising and breeding of frogs, which are ectothermic ecaudates, were, in the initial stages, conventionally limited to tropical and sub-tropical regions. However, with scientific and efficient advancements in amphibious aquaculture, European countries such as Poland, Spain, Germany, the Netherlands, France, Austria, Hungary and Belgium have successfully become major players in the market for frozen frog meat. The runaway leader of the group is New Zealand with total export of USD 203.9 million, with the following nine European nations in positions 2-10 earning a combined USD251.9 million, in 2022 -23.

South and Central America

Canadian batrachian and ranaculture specialist, Tom Cyril Harrison, is credited with the maiden introduction of bullfrogs in **Brazil,** to supply meat for human consumption, in 1935. He is said to have procured 300 ranids for a Brazilian government frog farm in Rio de Janeiro, which distributed hundreds of newly hatched tadpoles to "amphi-farms" country - wide under the aegis of federal and state government supported agricultural programmes.

In the 1970s, an additional 20 imported pairs of adult bullfrogs were sourced from University of Michigan, by Luiz Dino Vizotto, and housed in São José do Rio Preto in São Paulo state. This was followed by periodic small-scale introductions by individual bullfrog breeders, from USA and Mexico, which continued into the early 2000s.

Following the failure and subsequent closure of frog farms, including escapes from compromised enclosures, non-captive colonies of the feral anurans successfully established dominance mainly in South and Southeast of the country and are today found in 9 out of 26 states in Brazil as an exogenous species.

Currently, around 400 tons of frog meat, valued at USD 1.9 million is produced by 150 registered amphibious aquaculture facilities in Brazil.

Eduardo Filgueiras, belonging to a family which farmed frogs for meat in Rio de Janeiro, established Nova Kaeru tannery in the Tres Rios municipality area of the city in 1977. Besotted with the texture and complexity of frog skin, being discarded from the family farm, he commenced tanning frog skins in a fiberglass enclosed, pre-owned concrete mixer and a modified washing machine, to transform the unique raw material into leather.

In 2002,following six years of exhaustive research and development, the tannery commenced successful commercial production of frogskin leather, from frogs weighing up to 300grams. Daily production of 15,000 lightweight, waterproof, soft and flexible leather, from frogskins, by both vegetable and mineral tanning methods, brought Nova Kaeru international acclaim. The attractive, mottle patterned leather, with muted sepia margins contrasted with the delicate, soft-hued middle, had two major limitations. Firstly, the maximum achievable thickness was 0.8mm, restricting the range to accessories requiring moderate strength and durability. An even greater challenge was the diminutive size (maximum 100 cm x 70 cm), whereby 500 bullfrogs were required for a coat and nearly 280 for jacket.

A significant stage of product development and improvement was reached when Nova Kaeru perfected a technique of adhesive -bonding rectangular bullfrog leather panels, butted together without interlocking or overlapping, to generate a plane surface to the fullest extent possible. The functionality of these sheets was further enhanced with light fabric backing, making them amenable for making a wide range of articles such as clothing, footwear, accessories and leather goods.

Nova Kaeru positioned their frogskin range, finished in a wide range of hues and optics, as exotica to cater to niche markets demanding uniqueness and willing to reward quality and perceived value. In 2002, a 6.5 sqft sheet of Nova Kaeru frogskin leather, haptic, physical, durable and flexible enough to withstand the vagaries of extreme fashion demand, was priced at US$320.

Today, 26 years later, Nova Kaeru tannery specializes in exotic leather, expanding to leather salmon, arapaima, be Leaf caiman and ostrich skin. The frog skin line has been discontinued but Filgueiras remains the pioneer of frog skin tanning in Brazil.

Commercial frog farms also operate in **Argentina, Ecuador, Panama, El Salvador, Guatemala, Colombia, Cuba and Mexico**. However, there is no data on the capacity, production, escape or deliberate release of the anurans and their feral meta populations or feral distribution and frog skin tanning activity in the respective countries.

Africa

Democratic Republic of Congo, Namibia, Côte Ivoire, Burkina Faso, Benin, Nigeria, Burundi and Ghana have traditionally consumed frog meat. However, there is no invasive population of the American bullfrog in Africa and despite the business potential there are neither notable amphibious aquaculture establishments in Africa nor any tanning facilities for frog skin. Chad, Niger and Mauritania, which have predominant Muslim populations and for whom frog meat consumption is prohibited by religion, are the main suppliers of frogs to the west African countries.

Asia

Export of frog Legs of the Indian Bullfrog was banned by **India** (1978) **and Bangladesh** (1988) - both leading

exporters of the delicacy to Europe in the 1970s and 80s respectively - when faced with critical decline in ranid populations in their respective countries.

It was the Cuban leader Fidel Castro, who, in 1962 arranged the first ever consignment of four hundred American Bullfrogs to **China**. He also transferred scientific and technical the know-how of bullfrog husbandry to China. The amphibians were translocated to the other side of the world, from Havana to Peking, with eleven casualties during the five-day transconti-nental trip, the reminder was dispatched to fisheries in Shanghai, Nanjing and Guangzhou for raising. In return, China's then leader, Mao Zedong gifted Peking duck to Cuba and taught the country how to grow paddy rice.

Thenceforth, the fleshy delicacy became a staple of the Chinese white linen dining elite. Today frog meat dishes include - frog in hotpot, on rice and noodles, pan-fried, deep-fried, in soup and grilled, spicy braised frog, frog in soup cooked in Sichuan and Hunan styles, frog dry pot with green pepper and perilla, frog boiling stone pot and frog with pork stomach, frog dry pot garlic and Sichuan pepper, frog soup, frog stew with potato and noodles, barbecued frog, Fuzhou-style deep-fried frog's legs, copper pot frog, fried frog, with tofu and vegetables and Yunnan style beer frog hotpot, to mention a few.

In China, there is negligible attempt to tan American Bullfrog skins because in most instances the anuran is consumed nose to rump - the flesh is eaten, the skin is either consumed or used along with internal organs by apothecaries for preparation of various traditional medicines – fermenting, distilling and extracting ingredients from them, to compound into materia medica and elixirs to cure almost any ailment including stress, osteoporosis, low libido, asthma and bronchitis.

In 2017, the business of frog breeding and consumption in China, according to the Chinese Academy of Engineering, was worth 50 billion yuan (US$7.6 billion) and China's export volume of frog legs was 6.38 metric tons, in 2021, commanding a value of USD 33.30M.

Singapore's first and only frog farm – Jurong frog farm , in the Kranji countryside – was opened in 1981 by Wan Bock Thiaw. The farm raised 10-15,000 American Bullfrogs every month from spawn to market sized adult amphibians – providing employment for 13 staff. Four products comprised the USP of the frog farm – antibiotic, hormone and steroid-free Bullfrog meat, boneless frog flesh, frog skin chips seasoned with spices as snacks and "hashima" - bottled "Premium Hashima with American Ginseng – an elixir resembling ice tea made from female American bullfrog fallopian tubes, oviducts and the adipose tissue surrounding them. Upon the expiry of its lease from Singapore Land Authority, the farm was permanently closed from 1 February, 2023, although its online outlet remains functional.

Bo Talo Village in central Thailand is a renowned frog raising village, comprising a hundred families. Fifteen villagers, working in a small manufacturing unit, ***using conventional and low technology,*** ensure a daily production of 100 units of canned frog meat, ready-for-the-plate, marketed under the brand - Big Frog, from small-scale, backyard tank raised ranids. The meat is popular either with rice or as a snack with beer. A number of profitable frog farms can be found in Myanmar, Cambodia, Vietnam, Indonesia and the Philippines.

American Bullfrog skins have also been used for making skin parchments for book binding. In 2021, researchers in Nanyang Technological University bio-engineered a porous composite of bull frog skin and discarded fish scales for bone repair. Bullfrog collagen buttresses the "biomaterial scaffold", providing support to cells attaching to it, while phosphate and calcium, which stimulate bone formatt-ing cells, are made available by the hydroxyapatite, obtained from fish scales, by calcinations and air drying.

The bio material is now being evaluated to assess if it could be used to hasten the regeneration of bone tissue lost to disease or injury, such as jaw defects from trauma or cancer surgery and assist bone growth around surgical implants such as dental implants. Scientists believe it is a promising alternative in tissue repair for the human body.

A molecule isolated from the skin of East Asian bullfrogs has been found to boost insulin production in mice, as well as to improve glucose tolerance, opening new frontiers for diabetes medication.

Scientists of the Biological Materials Department of Central Leather Research Institute, Chennai have done pioneering work on use of frog skin collagen as a novel substrate in cell culture. Although the biomaterial was from Rana tigrina, there could be possibilities of using the same from the Invasive American bullfrog for treating burn wounds.

Europe and North America

Presently the tanning of bullfrog skin in Europe, is not significant. Two tanneries in France, situated in Millau, obtain and tan bullfrog skins from Brazil. Other than in France, insignificantly few are tanned. Occasionally, US tanners procure, prepare and sell frog skins against special orders but no regular market exists for them.

Noted for its beauty and durability, frog leather is very thin and pliable. It possesses a delicate and smooth grain, and is used principally, as exotic leather for tourist souvenirs, card cases, watch straps, wallets, purses and gun holsters.

Prior to the Russo-Ukrainian war, MJ Art studio in Odessa, Ukraine was renowned for its customized range of accessories from a host of exotic leathers, among them frog skin. The following personal leather articles of outstanding beauty and quality, made from frog leather, were offered by the company : USB flash drives, luxury bags, cases and sleeves for all models of phones, tablets, joysticks, laptops, keyboards, key chains, and other electronic gadgets, bracelets, computer mouse, money clips, leather straps for watches, clutch bags, spectacle cases, shoes, belts and the piece – de-resistance – exclusive frog leather hats topped with the predators head fixed in a threatening rictus.

Other accessories made of frog leather from sundry manufacturers include belt loops and spanners, card holders, cross body purses, derby shoes, caps, protective cases for airpods, airpads and headphone covers.

In spite of the wide range of personal accessories, made of frog skin leather, the market for frog skin leather still remains small, because like other exotic invasive species such as cane toads, tree snakes, tegu lizards and green iguanas, they are small in area, limiting their use to pocket sized articles and accessories and specialized custom-made products for clientele in a niche market.

In most instances, multiple skins need to be stitched together, which not only is inconvenient but also at times, detracts from its aesthetic, performance and functional merit. Although miscellaneous small personal leather items made of frog skin look very luxe and classy and instantly elevate an otherwise simple design, to a timeless, fashion forward and eye catching object, difficulty of attaching embellishments such as Swarovski crystals on the small raised areas of the grain, which sit on an inflamed base, or amenability of the skin to satisfactorily imbibe big, bold, bright, metallic, fluorescent and neon hues is a shortcoming, tanners and designers have been unable to adequately address, wherefore frog skins are not considered at par with other exotic skins in terms of luxury, quality, longevity or investment quotient.

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PHYSICAL PROPERTIES OF SHOE UPPER MATERIALS AND THEIR EFFECT ON FOOTWEAR COMFORT*

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ABSTRACT

A comparative study of full chrome retanned and semichrome leathers with synthetics is made. Various physical properties such as water absorption, water penetration, water vapour permeability, effect of wetting and drying, rate of drying, resistance to perspiration, tensile strength, elongation, percent set, flexibility, apparent density and resistance to heat and cold of the upper materials are measured. The results obtained are discussed from the points of view of comfort.

The properties of footwear materials which contribute the wearer's comfort is a subject of universal interest. But very little work has been done on this very important subject of foot comfort. Obviously foot comfort depends on the absence of painful pressures anywhere on the foot, and on keeping it warm in cold weather and cool in hot weather. Comfort in footwear concerns with the physiology of the foot, environmental conditions and the physical properties of the materials used. This study mainly concerns with the physical properties of upper materials. The importtant properties of uppers which will influence the comfort of the footwear are : (1) water vapour permeability, (2) Moisture absorption and desorption, (3) Area stability, (4) Effect of wetting and drying, (5) rate of drying, (6) water absorption, (7) water penetration, (8) water vapour absorption (9) perspiration resistance, (10) lightness, (11) Flexibility (12) Plasticity of leathers, (13) Tensile strength, (14) Elongation, (15) Stitch tear strength, (16) Resistance to cold and (17) Resistance to heat. Hence these properties of the various upper materials were measured and the results obtained are discussed from the points of view of comfort.

Experimental Procedure

All samples were conditioned for a week at 65%±2% relative humidity and 80°±4°F temperature and then tested.

Full chrome, chrome retanned and semi-chrome leathers and synthetics were used. All the leather samples were obtained from the butt portion.

For finding out the water absorption, Kubelka's apparatus[1] was used. The method suggested by Mitton[2] and approved by the physical Testing Commission of International Union of Leather Chemists[3] was used for determining the water

*Paper presented at the ILTA Symposium, Agra, 1968.

vapour permeability. Apparent density was determined using an Edwards' densimeter[4] taking the necessary precautions. Bally penetrometer (I.U.P/10)[5] was used for testing the water absorption and water penetration. A Tinius Olsen Stiffness Tester[6] was used to determine the flexibility. Plasticity by linear strain[7] was determined using a Scott Tensile strength tester. The "percent set" after a specified time was calculated as suggested by Bultin[8]. The tensile strength, stitch tear strength and elongation were determined following the methods 2011[9], 2151[10] and 2021[11] described in Federal Specification KKL-311a. Details regarding the measurement of other properties are given below :

Moisture Absorption and Desorption

Moisture absorption was studied at 0.65 and 100% r.h. The size of the leather samples used was 10 cm × 6 cm. The amount of moisture absorbed and the percent increase in area was also found out at 65 and 100% r.lh.

Area Stability

The samples were conditioned at 0% r.h. at room temperature of about 30°C. After measuring the area, the samples were transferred to 100% r.h. After conditioning at 100% r.h. the area of the various samples was measured. The change in the area of the samples is expressed as a percentage of the area at 0% r.h.

Effect of Wetting and Drying

The effect of the wetting and drying was studied taking samples of size 15 cm × 10 cm. The samples were dipped in 400 ml. of water for 24 hours and then taken out. After removing the excess of water, the area of the samples was measured. This was repeated four times. The other properties tested were (1) percent elongation, (2) percent set, (3) compressibility, (4) resiliency, (5) stiffness and (6) shrinkage temperature.

Rate of Drying

Leather specimens (5.7 cm dia) from the butt portion were immersed completely in a beaker containing 200 ml. of water and removed when they had absorbed about the same amount of water. The samples were weighed, hung and allowed to dry naturally at room temperature. Periodic weighings were made and the percentage of absorbed water that evaporated or was lost at various time intervals was determined.

Water Vapour Absorption

The samples were conditioned at 0% r.h. until equilibrium was reached and weighed at room temperature of about 30°C. Then they were transferred to a conditioned atmosphere of 100% r.h. and kept for 24 hours. Then they were weighed.

The percentage water vapour absorption after 24 hours $= \frac{\text{Weight at } 100\% \text{ r.h.} - \text{weight at } 0\% \text{ r.h.}}{\text{weight at } 0\% \text{ r.h.} \times 100}$

Perspiration Resistance

The samples were subjected to treatment with artificial perspiration and the cracking observed after bending the material through 180 degrees (KKL-311a method 3211)[12]

Lightness

Samples of the same size were cut from the same location on the side and weighed.

Resistance to Cold

This method is of use in determining the resistance of leather to cracking on being bent at low temperatures. The specimen (a rectangle of leather 2 inch in length and 1 inch in width) was placed in a cold chamber (-20°C) for 2 hours. While remaining in the cold chamber at the specified temperature, the specimen was folded cross-wise sharply on itself with the grain side of the leather out. The folded specimen was examined for any crack in the area around the bend.

Resistance to Heat

This method is of use in determining the effect of elevated temperatures on leather under normal atmospheric pressure and controlled humidity. The leather (test specimen) was heated for 45 minutes in an oven maintained at 150 $\pm$ 3°C. The leather was heated dry. Immediately after removal from the oven the samples were tested for cracking.

Results and Discussion

Water vapour permeability

As a general purpose upper material should have high water vapour permeability. This property was measured for various upper materials. The results are given in Table 1. It is seen that for the synthetic substitute uppers the value is low. Full chrome uppers exhibit the highest value. The enormous surface area of the fibres in leather enables it to take up water vapour rapidly and to convey it to the outside air . The transmission of water vapour is favoured because it is transmitted by and through the substance of the leather fibres themselves. The greatest water vapour permeability of chrome leather is due to its greatest surface area. Previous studies[13,14] proved that impermeable uppers lead to increased sweat retention in the boots and socks. Kennedy *et al*[13] observed that the sweat or water vapour absorption capacition of the boots with the Melovin uppers were exceeded on many test days, giving

rise to the appearance of saturation by moisture in the lining leather. Hence for a comfortable footwear, the upper material should have high water vapour permeability.

Moisture Absorption and Desorption

Moisture absorption and moisture permeability are factors which may well be of importance to the health of the feet. Hence various upper materials were tested for this property and the results are given in Table 1. From the results it is seen that the moisture absorption of chrome leather is the greatest and that of the synthetics is the lowest. The chrome tanned upper leathers shows more moisture absorption than the semichrome and chrome retanned leathers. It may be due to greater percentage of hide substance in chrome tanned leather. The chrome retanned leather absorbs less moisture, probably because the vegetable tannins prevent swelling. Moisture absorption will influence the area stability of the upper materials. Hence it will affect the comfort properties of footwear.

Area Stability

From the results given in Table 1, it is seen that the area is increased to greater extent at 100% r.h. in the case of chrome tanned leathers (11%) whereas the increase is nil in the case of chrome retanned leathers. At 0% r.h., the percent decrease in the area is more in the case of chrome tanned leather (12%). In the case of chrome retanned leathers, the percent decrease in area at 0% r.h. is 8%. If the dimensional changes are too pronounced, the shoe begins to lose its shape. The loss of shape will be more in synthetics as compared to leather.

Effect of Wetting and Drying

In field use, upper materials in contact with water and mud will sometimes crack and stiffen, water containing large amounts of salts and other materials has an adverse effect on uppers. During the processes of wetting and drying, poor leathers lose more water solubles, become flabby, and wear out quickly. Hence a study of the physical properties of the uppers before and after wetting is, made and the results are given in Table 1. From Table 1, it is seen that the area of the chrome leather is increased by 11.5% which will affect the comfort properties of footwear. The increase in area is more in case of chrome tanned leathers. The moisture absorption capacity of the leathers is increased due to repeated wetting and drying. It may be due to the removal of the water solubles and tanning materials. This may be one of the reasons for the comfort of the used shoes.

Rate of Drying

The ability of leathers to dry rapidly is a desirable quality. Hence the rate of drying was determined and the results are given in Table 1. From the results it is seen that the rate of evaporation is more in the case of chrome tanned leathers than

semi-chrome and chrome retanned leathers. This may be due to the difference in the nature of the tanning, thickness and porosity of the samples. The rate of drying of synthetics is very poor. The reservoir capacity of the samples is in the reverse order. The rate of evaporation decreases with time and would thus seem to depend on the quantity of water contained in the samples. As the shoes are likely to become wet especially in winter season or in the cold countries, the rate of drying of upper materials assumes great importance.

Water Absorption, Water Penetration and Water Vapour Absorption

Functional footwear is expected to keep the feet dry by resisting the moisture from the outside, and by absorbing moisture from perspiration from the inside and allowing the same to evaporate. Shoes that cannot brush off external water obviously rot and deteriorate quicker than the water resistant ones. Hence the upper materials were tested for these properties and the results are given in Table 1. The results show from the point of view of the properties of water absorption, water penetration and water vapour absorption, which properties may be expected to influence comfort from a physiological stand-point, for normal conditions, full chrome appears to be better as it allows a greater amount of water vapour to pass through and at the same time absorbs water vapour to a fair extent. However, if the ambient conditions are very wet, the increased water absorption of full chrome compared to semi-chrome might make semi-chrome better. Even though the synthetic uppers have the maximum water resistance, their water vapour permeability and water vapour absorption characteristics are very poor.

Perspiration Sesistance

Chrome retan has poor resistance to perspiration whereas the semi-chrome and the synthetics have the maximum resistance to perspiration. The perspiration resistance of chrome upper is poor. So semi-chrome upper leathers can be used for a comfortable footwear.

Lightness

Although we are provided with many strong muscles, the muscles which lift the foot and lower leg in walking are relatively weak and any extra weight wh'ch is placed on the feet becomes a burden. It has been estimated that one pound extra weight on the feet is equivalent to ten pounds extra on the back. Hence the weight per unit area of various materials were measured and the results are given in Table 1. Comparing full chrome, semi-chrome and chrome retanned leathers, chrome retanned leather is heavier than the other. The synthetics are having the lowest weight. The values for the apparent density also confirms this.

Flexibility

Flexibility of uppers is very important to shoe comfort. Hence this property was measured and the results are given in Table 1. The results showed that the syn-

TABLE 1

Physical properties of upper materials

Properties	*Full chrome*	*Semi-chrome*	*Chrome retan*	*Synthetics*
1 Water vapour permeability mg/cm²/hr	8.1	6.9	4.3	1.2-2.9
2 Moisture absorption at 100% r.h.	44	42	39	16-23
3 Area stability				
(a) percent increase in area at 100% r.h.	11	5.6	Nil	3.6-8.5
(b) percent decrease in area at 0% r.h.	12	6	8	14-18
4 Effect of wetting % increase in area due to wetting	11.5	9.8	7.9	10-22
5 Rate of drying % water evaporated after 24 hour	25.4	23.8	22.4	12-18
-do- 1 hour	7.6	7.1	6.2	1.2-4.3
6 Water absorption (static)				
cc/100 gm leather after ½ hour	12.9	9.6	18.3	7.9-12.4
" 2 hours	33.1	28.1	56.2	21.7-27.3
" 24 hours	87.6	89.8	89.6	58.3-69-7
7 Water absorption (dynamic)				
cc/100 gm leather after 2 hours	38.6	34.5	60.4	26.3-31.4
8 Water penetration (Time in minutes)	104	191	68	180-260
9 Water vapour absorption (per cent)	27	21	32	1.9-3.8
10 Perspiration resistance	Fair	Good	Poor	Good
11 Lightness				
(a) weight in gm (10×10 cm)	10.3	10.8	13.2	6-10.4
(b) A.D. gm/cc	0.78	0.78	0.86	0.50-0.73
12 Flexibility				
(a) Load required to bend the leather 0.25" in length and of unit cross section through an angle of 30°	9.2	10.6	16.4	6.8-12.8
(b) Flex endurance	Good	Good	Fair	Fair
13 Percent set(after 24 hours)	24	18	16	4.6-9.3
14 Tensile strength lbs/sq. in.	4030	3060	3580	1080-3100
15 Elongation (%)	70	36	52	58-86
16 Stitch tear (lbs/inch thickness)	1320	1260	1463	830-940
17 Resistance to cold	Good	Good	Good	Poor
18 Resistance to heat	Good	Good	Fair	Poor

thetic uppers and chrome uppers are more flexible than the others. Flexing endurance is good for chrome and semi-chrome uppers. For a comfortable footwear, the upper should not be too soft or too stiff.

Plasticity

An upper leather must meet the stringent mechanical requirements of the "lasting" process. Lasting is, perhaps the key process in shoe-making, since it is at this stage that the shape of the shoe is imposed on the materials from which it is made. Ideally, a material for shoe upper should be capable of being made to conform to the last in a few seconds, of retaining this shape on removal of the last—even after being worn and yet still making minor adaptations of shape to fit the foot of the individual wearer while standing or walking. The plasticity of the full chrome is more than that of semi-chrome and chrome retan and synthetics have low percent set.

Tensile Strength, Elongation and Stitch Tear

These properties were measured and the results are given in Table 1. The results given in the table show that the synthetics upper have lower strength. The stretchiness in synthetic materials is generally higher than in the leather samples. Among leathers chrome leather is having higher strength and higher elongation.

Resistance to Cold and Heat

If the upper material is having poor resistance to cold, it may become hard and thus will affect the comfort. Similarly, if the uppers are having a poor resistance to heat, it may become soft and affect the comfort. Hence this was studied and the results are given in Table 1. Chrome and semi-chrome leathers are having a good resistance to heat and cold. The synthetics become stiff at cold temperature and more flexible at hot temperatures.

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Hands on Leather Finishing - Glaze and Immitation Glaze

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Glaze-kid Leather

One of the highest - quality and most elegant leathers, used mainly for ladies' footwear.

Glaze finish is one of the oldest finishing in the world and a lot of secret and different opinions are stills existing concerning this types of ARTICLE.

Performed by means of a glazing machine and no-thermoplastic binders. Used for high quality leather because it accentuates the natural grain.

The Glazed-kid, is a highly glazed fancy leather manufactured from special quality goat skin and is used for the manufacture of fancy ladies and gents shoes and now adays also fancy leather goods.

The gloss of Glaze-kid has some specialty and differs from the gloss of other types of upper leather calf , corrected grain chrome retanned upper leather and kattai leathers. This leather when glazed after finishing, reflect light in the same way as it done in by a big piece **of mirror**.

Here we like to quote from **Prof S S Dutta**'s book '**Principles of Leather Manufacture**' on Glaze-Kid leather – "If we look to the surface of glazed-kid through a microscope against reflected light it will appear the night-sky of a winter a cloudless sky with millions of shining stars in it.

This indicates that the glazed-kid surface consists of hundreds and thousands of tiny-mirror-like plain surfaces and a class one glazed-kid these plains are separated from each other by a centre distance almost equal to the average resolving power (0.3mm)of a normal human eyes as an experimentally shown by Prof S S Dutta and Dr K T Sarkar of College of Leather Technology, Kolkata.

Therefore ,a hide and seek game between our eyes and glazed - kid surface .Sometimes the glazed-kid looks like a continuous mirror showcasing a single image of single light surface and sometimes it is the combination of a several tiny mirrors showing several images of a single light surface.

This is beauty of best quality glazed-kid leather."

Raw material :

Out of all substrate, no other skins have such grains suitable for glazed-kid. Goat skins are the only raw materials for glazed-kid as the natural grain patterns of these skins are such that they can be shaped to tiny mirror-like planes by strict controls on tannery operations.

The portions between the rows of hair follicles in raw goat skins are slightly bulged and called grains ,which made smooth and highly polished during tannery operations so that they can act as tiny mirror-like planes for reflection of light .On an average, there should be 900 to 1000 such planes per square centimetre area of skins surface so that the centre distance between such adjacent planes is near about 0.3 mm.

Accommodation of these numbers of grains in such a small area is possible only if the grains are very small and more or less uniformly distributed. Moreover, the heights of these grains should not be too much, otherwise severe liming, bating, and mechanical actions will be necessary to make them flat, smooth and polished and these severe actions may reduce the hide substances and strength of the leather. Fine smooth grained goat skins should therefore be selected for glazed-kid.

During liming and bating, large amount of interfibrillar materials of skins are lost, hence appreciable amount of filling materials are introduced during tanning and finishing operations, in contrast finished leather becomes tiny and papery, unless the

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collagen content of the raw skins is high. For this reason, collagen content i.e., good substance is selected for glaze-kid leather.

Goat skins are available in various part of the world. The principal sources of supply are India, China, Africa, South America and Arabia. Some European countries like Switzerland, Spain, Germany, Ireland and Great Britain also produces a certain quantity. The nature of skins with different sources of supply.

On the basis of quality of the final leather, goat skins are varying may be classified into following groups :

- Indian
- Chinese
- North African
- Arabian

Requirements of production :

Indian skins are considered best ,on the basis of fineness of grain skins may be arrange in following order : Kustia, Dacca, Dinajpur (Bangladesh), Calcutta, Muzaffarpur (India). Other regions like Kashmir, Punjab, U.P either poor in collagen content or their grain patterns are not suitable for glaze-kid manufacture. Hence best Glaze-kid selected from regions only.

The age and size of the goat is very important between the skins of too young or too old goats do not possess that type of grains which are demanded by Glaze-kid. Locality and the size 24" to 36" with high collagen content per unit volume and free from all defects, especially grain sides, are generally selected.

The selections of quality of Glaze-kid decides the quality of finished leathers.

Under each of these classifications of origin there are again sub classifications according to size and substances, e.g., heavies, medium, lights, etc.

Skins measuring –

36" and up are Heavies.
32" to 36" are Mediums
28" to 32" are Lights,
23" to 28" are Smalls ,
Under 23" is kids
Manufactured in thickness of 0.6mm to 0.9mm

In these kind of leather, the preparation of the crust is very important :

- It should behave non-stretchy, no elasticity in flanks and sides
- Should have degree of roundness with resiliency, must not be papery
- Sufficient strengths-tensile, bursting, tear etc.
- Good feel and resistance to grain crankiness.
- Looseness is serious defect in glazed-kid crust, must be avoided.
- The setting out must be done very carefully.
- The trimming should be proper.
- The leather should be flat as possible

Semi-chrome is the tanning – re-tanning system with which we receive the best results. The mechanical operations of the crust should be done very carefully. The leather should lie flat and should not be elastic. Tanners should particularly take care of the elasticity of exila's and bellies. The grain must be flat and soft.

The re-tanning and fat liquoring should specially be adjusted for glazing. That means that the leather should be glossy but should not become darker after glazing. A slight grain snuffing on the grain side with paper 800 or 1000 can be very advantageous for the final result like shine and appearance of the grain surface.

Finishing of these articles involved the following basic step :

- **Preparation of crust** - This involves the proper staking preferably mollissa, buffing of flesh side, good toggling, trimming & then proper grain corrected preferably with fine emery paper like 800 or 900 or 1000 paper.
- **Pre-bottom or polish coat** - This is mainly to even out the absorption, to seal the grain to avoid excessive swelling during further coating and of course to get desired brilliancy from the bottom.
- **Bottom coat** - This is to give the leather the proper colour, covering, shine and the required final look.
- **Top coat** - This to give the required fastness and also the shine and feel.

Glaze finish was the classical finish for shoe upper leather. It has high gloss, shows the natural grain, has polishing properties, it is easily repairable by the shoes maker and does not reduce the breathing properties of the leather.

Glazed finish demand good quality grain as finishing recipe/ products has poor covering power of grain i.e., non-coating finish are demanded.

Non-thermoplastic binders or products used in pure glaze finish :

Films of this types of article are less elastics and stretchy. On no cases should they be applied in thick coats as this results in brittleness and peeling of the films. High gloss achieved by exposure to heat, in particular by the frictional pressure during glazing. When added to thermoplastic finishing agents they improve fastness to solvents.

Casein or Protein Binder :

Is obtained from skimmed milk by precipitation with hydrochloric acid and must not have ahigh fat content. Correctly dried casein should have a light, whitish yellow colour. Casein dried at excessive temperatures has brownish colour and can only be redissolved with difficulty. Water solubility of casein is achieved by dissociation of by ammonia, borax or sodium bicarbonate. The great no. of commercially available products have different viscosities depending on their application and composition. The basic requirement is that of soft casein products be used in first coat and harder a formulations for top coats.

The addition of plasticiser improves only the bending endurance, but not the elasticity. In order to achieve satisfactory water resistance of casein finishes they should treat with fixing agents.

The water stain cannot be avoided in casein finishes completely, that can be avoided by repolishing off with dry cloth.

Modified Casein :

The commercially available products have been modified by means of polyamide. This improves flexibility and fastness to moisture. Furthermore, fixing agents can be added directly to such solutions without causing precipitation. The benefit of this is that additional intermediate fixation is not necessary.

Albumen :

Blood and egg albumen are extensively used in earlier time, now casein mixed with certain qty albumen are available in branded product.

Egg albumen is obtained from white of hen eggs and available in dried powder form, suitable for pale glaze finishes to give them a clear, transparent high gloss.

Blood albumen are extracted from OX Blood, when added to black glaze finishes it improves depth of colour and brilliance.

Shellac :

Derived from lac, the secretion of the Indian lac insects. Improves the gloss effect and handle of casein top coats. due to its poor fixing capacity, it should be added in smaller amounts.

Gelatine :

Additive for glaze finishes. Gives the films a glossy, translucent high gloss effect. Prescribed for glaze finishing of snake, crocodile and lizard skins. Due to its poor fastness property advised to use less quantity in finish formulation.

Formerly, large amounts of blood albumin and egg albumin were used. The chief product today is casein , gelatine and glue added in appropriate quantities.

The Process : The Recipe :

First we apply spray dyeing. This application is very important on corrected grain crust to achieve on equal grain colour. It is very important to use Alcohol in the spray dyeing in order to avoid too deep penetration, problem during glazing & polishing as well as migration of fats.

The polishing after polish ground decides about the sealing that means if your polish after the polish grounds, the base coats is only for levelling because you have already sealed the grain.

Blacks are invariably formulated with minimum content of true pigment to avoid greying effect, some chemical brands advocating pigment with casein binder and strong transparent dye solution.

The casein binder used are modified more plasticised in bottom coat and less in subsequent coats where a harder casein binder used to give brighter glaze.

Some glazeable and polishable grounds and oils used along with strong dye solution in pre-bottom coat to improve the repolish ability filling also the brilliancy of final finish.

The fixing done with low/free formaldehyde fixing agents to give fastness .

Product Recommendation : Casein Binder : Soft, thin film of medium gloss :

Modified casein binder which gives soft, thin film of medium gloss. Gives a very good repolish ability .

Casein Binder : Medium soft, high gloss :

High solid, synthetic modified protein binder containing polyamide. Forms a transparent, medium soft, high gloss film, should have better physical properties specially wet rubs.

Casein binder : Medium hard, high gloss :

Modified protein binder, Medium hard with very high clear gloss. Very well glazeable & polishable.

Polyurethane Binder : Very Soft, glazeable and polishable :

Modified PU Binder, Very Soft, polishable and glazeable. Gives good adhesion to the base coat. Good swelling resistance.

Fixing Agent : Low or free of Formaldehyde :

Fixing agent for protein with very low or free formaldehyde.

Oil : Medium strong and glossy, light surface darkening, absorption levelling :

Oil medium strong and glossy pull up effect ,light surface darkening can also use as absorption levelling preground which does not disturb the final gloss in glaze and polish finish.

Grounds : Strong Filling, soft preground :

Strongly filling soft preground containing casein, waxes & oils. Very well polishable.

Pigment : Maximum levelling, high fastness dispersed pigments :

Finally dispersed pigments are suitable for glazing finishes with high fastness properties.

Glazing Machine : Carried out on oscillating glazing machines by means of glass or agate roller which is pushed with frictional pressure over the leather in narrow widths and rapid sequence.

Common Error in Formulation and processing of Glaze Finish :

Brittleness and breaking of the film - Very hard or thick pigment and top coats of glaze finishes.

Greyness - caused by uneven refraction of light in leather with coarse hair pores, especially in the dark-coloured glaze finishes or in leather with very thin finish coats.

Deposition of dust and dirt - buffing dust on leather, particles of dust and dirt in the finishing room or dried residues of finishing float in feed lines, spray guns, spray booth and drying sections are deposited in the finish coat and result in rough surfaces, causing streaks in glazing too.

Glaze Imitation :

Upper leather of smaller skins, manufactured in tanning and finishing procedure similar to that of Glaze-kid leather.

Raw material requirement :

Goat skin of good substance from ,must not exhibit veiny appearance, ribbons or double skin

Requirements of production :

Manufactured in thickness 0.6-1.0 mm, to fill the loose structure heavy retannage, hence, lower strength properties.

GLAZE IMITATION finishing becomes more fashionable. The trend is to produce these glossy aniline leathers completely water based without any solvent top coat.

These leathers are made from goat skins and are always snuffed with 800/1000 grit emery papers, before finishing is started. The major challenge with the finish is to maintain the gloss without any sugary break of finish (minimum loading) as well as no opening of bellys and flanks in order to get better cutting value. Some customers want 100% wet rub fastness as some is not so strict about the physicals.

The Process : The recipe :

There are many approaches to make immitation glaze, fixation is done with low or free formaldehyde fixing agent , another approach is with Polyurethane Top coat used with casein binder as a top fixing.

Equal qty of resin and casein binder used in base coat, which helps to be more elastic and glossier without much loading. A controlled quantity of polyurethane with high solid used to makes films more tougher and resistance to heat as well. Main glossy wax can be polyethene wax used for plate release, retention of gloss. The polyurethane top coat selected should have unique property of sustaining the temperature 120^{0}C and above and also it prevents the discolouration and migration of pigment /dyes towards surface on ironing.

A polishable, glazeable polyurethane advised to use fat to overcome loading and to imparts fine break of finish.

Uses of Iso-Propyle - Alcohol plays major role, to sink the finish into the grain layer, avoiding opening.

Now a days instead casein formaldehyde fixation avoided with PU Top and Casein in topcoat with cross linker to have better Kulchi Heat fastness test) on shoe making and better flex behaviour.

Product Recommendation : Polyamide Casein :

Soft and Supple Film :

Polyamide Casein with internal plasticised structure gives very good supple and soft film, cross linkable with scale formation.

Casein binder : With waxes and oils :

Modified protein binder with waxes and oils, medium hard gives filling, polishability and covering.

Casein Binder : Soft, thin film of medium gloss :

Modified casein binder which gives soft, thin film of medium gloss. Gives a very good repolishability.

Casein Binder : Medium soft, high gloss :

high solid, synthetic modified protein binder containing polyamide. Forms a transparent, medium soft, high gloss film, should have better physical properties specially wet rubs.

Casein binder : Medium hard, high gloss :

Modified protein binder, Medium hard with very high clear gloss. Very well glazeable & polishable.

Acrylic Binder 1 : Fine particle size :

Fine particles size acrylic binder lower solid with no grain overloading, gives good water drop resistance with filling properties to avoids opening problem.

Acrylic Resin binder 2 : Very Soft, stretchy and elastic :

Very soft, very stretchy, strong tacky elastic binder of higher solid.

PU Binder 1 :

Low solid ,polishable, glazeable, glossy with good adhesion, fine film

PU Binder 2 :

A universal PU binder with high solid, tough and covering, glossy with higher physicals

Polyurethane Top Coat : Plateable at High Temperature :

PU top coat, plateable at high temperature, high gloss and natural feel having good inter adhesion, cross linkable.

Feel Agent : Casein like Feel :

Feel agent, aqueous, fatty slippery casein like feel, no greying effect.

Cross linker : Uses of crosslinker specially Iso-cyanite is preferred for all colours, its help to give better adhesion and flex behaviour together with PU Top Coat.

Fixing Agents : Low or free formaldehyde fixing agents also used in production when PU Top partially replace with addition of Casein for better casein like gloss.

Machine used for Immitation glaze :

Hydraulic Plating Machine - Leather are pressed towards the plating contact surface in stationary pressing process.

Roto press - Cylinder plating machines used for continuous through feed operation by means of conveyor belts.

On all machine the desired plating effect and film formation are influenced by the temperature and the time of contact with plating surface as well as by the pressure.

Common Error in Formulation and processing of Immitation Glaze Finish :

Brittleness and breaking of the film - Very hard or thick pigment and top coats of immitation glaze finishes.

Greyness - caused by uneven refraction of light in leather with coarse hair pores, especially in the dark-coloured glaze finishes or in leather with very thin finish coats .

Deposition of dust and dirt - buffing dust on leather, particles of dust and dirt in the finishing room or dried residues of finishing float in feed lines, spray guns, spray booth and drying sections are deposited in the finish coat and result in rough surfaces.

Sticking and air marking in smooth plating - Moisture trapped in finish coat, excessive moisture remains in leather, formulations too thermoplastics ,excess heat and pressure on plating - in immitation glaze 120^{0}C on roto press and intermediate embossing 80^{0}C is often preferred in production.

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INDIAN ECONOMY LIKELY TO BE 'A LITTLE WEAKER' IN 2025 : IMF MD

The Indian economy is expected to be "a little weaker" in 2025 despite steady global growth, IMF managing director Kristalina Georgieva has said. Georgieva also said she expects quite a lot of uncertainty in the world this year mainly around the trade policy of the US.

In her annual media roundtable with a group of reporters on Friday, she said global growth is expected to be steady in 2025, but with regional divergence. Georgieva said she expects the Indian economy to be a little weaker in 2025.

However, she did not explain it any further. The World Economy Outlook update week will have more details about it. "The US is doing quite a bit better than we expected before, the EU is somewhat stalling, (and) India a little weaker," she said.

Brazil was facing somewhat higher inflation, she said. In China, the world's second-largest economy, the International Monetary Fund (IMF) was seeing deflationary pressure and ongoing challenges with domestic demand, she said.

"Low-income countries, despite all the efforts they are making, are in a position when any new shock can affect them quite negatively," Georgieva said. "What we expect in 2025 is to have quite a lot of uncertainty, especially in terms of economic policies.

"Not surprisingly, given the size and role of the US economy, there is keen interest globally in the policy directions of the incoming administration, in particular on tariffs, taxes, deregulation and government efficiency," Georgieva said. "This uncertainty is particularly high around the path for trade policy going forward, adding to the headwinds facing the global economy, especially for countries and regions that are more integrated in global supply chains, medium-sized economies, (and) Asia as a region," she said.

That uncertainty is actually expressed globally through higher long-term interest rates, even though short-term interest rates have gone down, the IMF managing director said. Donald Trump will be sworn in as the 47th President of the United States on January 20, replacing Joe Biden at the White House.

Trump, 78, has announced plans to impose additional tariffs on countries like China, Canada and Mexico. He has publicly announced the use of tariffs as a key policy tool. On inflation, the IMF expects global disinflation to continue, Georgieva said."As we all recognise, the higher interest rates that were necessary to fight inflation did not push the world economy into recession.

"They have delivered the desired results. Headline inflation is converging back to target sooner in advanced economies than in emerging markets," she said.

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GDP GROWTH IN FY25 MAY HIT 4-YEAR LOW. IS INDIAN ECONOMY LOSING STEAM?

While a slowdown in the ongoing financial year was anticipated, the steep downward revision in GDP growth for FY25 has taken many by surprise.

India's economic growth is expected to slow sharply to 6.4% in FY25, according to the first advance estimates released by the government. The projection marks a considerable drop from the 8.2% growth achieved in FY24 and represents the slowest pace of expansion in four years.

The estimate is also lower than the Reserve Bank of India's (RBI) revised annual growth forecast of 6.6%, raising concerns across sectors. While a slowdown in the ongoing financial year was anticipated, the steep downward revision has taken many by surprise. So, what factors are driving this deceleration in GDP growth?

SECTORAL GROWTH MODERATION

Dr. Manoranjan Sharma, Chief Economist at Infomerics Ratings, explained, "India's GDP is expected to grow by 6.4% in FY25 over 7.2% in FY24. This slowest growth rate since the pandemic manifests moderation across key sectors and constitutes a significant drop from the 8.2% growth in FY24."

While agriculture is poised for a noticeable improvement with a growth projection of 3.8% compared to 1.4% last year, other key sectors are forecast to slow. Manufacturing growth is projected to fall to 5.3% from 9.9%, while mining is expected to grow at 2.9% compared to 7.1%.

Similarly, the construction sector is set to grow at 8.6%, down from 9.9%, and electricity growth is estimated at 6.8%, lower than the previous year's 7.5%.

The top contributors to GDP, such as manufacturing, trade and hotels, and financial services and real estate, are all expected to witness slower growth in FY25. Urban consumption has also been hit hard, with inflation eroding the purchasing power of the urban poor.

"Decelerating GDP growth, together with persistent inflation, would make the RBI's task of managing the growth-inflation trade-off odious," added Dr. Sharma.

CHANGING CONSUMER PREFERENCES

Dr. VP Singh, a Director-PGPM at Great Lakes Institute of Management, highlighted the impact of evolving consumer behaviour on economic growth. "Premiumisation is the flavour of the day. The industry will have to quickly adapt to changing tastes," he noted.

Singh pointed out that subdued sales in the FMCG and auto sectors are not merely a result of low incomes. "The entry of brands like MG Hector and KIA in 2018 and the surge in Parle-G sales during COVID indicate that poor sales stem more from shifting preferences than income constraints," he said.

These shifts in consumer behaviour underline a broader transition in India's consumption landscape, which may weigh on GDP growth in the short term but could offer opportunities for industries willing to adapt quickly. "The country is undergoing a change in preferences, and the industry will soon incorporate these changes, leading to more robust GDP growth," Singh added.

IMPACT ON STOCK MARKETS AND BROADER ECONOMY

Ajit Mishra, SVP, Research, Religare Broking Ltd, highlighted the potential market impact of the revised GDP forecast. "India's GDP growth projection of 6.4% for FY25 could temper investor sentiment, as lower growth expectations might lead to reduced corporate earnings forecasts, prompting portfolio adjustments," he said.

Sectors closely tied to economic growth, particularly manufacturing, may see notable declines. However, Mishra suggested that "effective government fiscal measures or potential interest rate cuts by the RBI could offer some relief."

A sustained slowdown in GDP growth could also affect foreign institutional investor (FII) sentiment. Mishra noted, "Slower economic growth often raises concerns about corporate profitability and market stability. If FIIs identify more favourable opportunities elsewhere, they may reduce their exposure to Indian equities."

That said, India's long-term appeal remains intact due to its demographic advantage, strong consumption trends, and resilient financial markets. External factors such as global economic conditions and geopolitical tensions will also play a role in shaping FII behaviour.

Nominal GDP is expected to grow by 9.7% in FY25, slightly higher than the 9.6% seen in FY24. However, the broader economic outlook will rely heavily on the government's fiscal policies and the RBI's approach to managing inflation and growth.

(indiatoday.in – 09/01/2024)

INDIA'S ECONOMIC OUTLOOK FOR 2025 : NAVIGATING SLOWDOWN, STRUCTURAL CHALLENGES AND GLOBAL UNCERTAINTY

The Reserve Bank of India (RBI) faces its own set of challenges. With inflationary pressures and a fragile rupee, there is little room for significant interest rate cuts.

The RBI is caught in a delicate balancing act, where every policy decision is magnified, and the risks are immense. In the heart of India, economic corridors buzz with the energy of a nation striding toward its future. Yet, beneath the optimism lies a question that echoes in boardrooms and policymaker offices across the country: Is India's economic slowdown in 2025 merely a temporary glitch, or does it signal deeper structural issues?

In a conversation with Rahul Kanwal, News Director - Aajtak & India Today, Neelkanth Mishra, Chief Economist at Axis Bank and chairperson of the UIDAI, Rathin Roy, former director of National Institute of Public Finance and policy and Soumya Kanti Ghosh, group chief economic adviser at SBI, discussed the possibility of India's economic slowdown in 2025, impact from Trump's tariff bombs, investment scenario, RBI stance on interest rates and global uncertainty.

Here are the salient points :

The Slowdown: A Sign of Things to Come?

The GDP growth has dipped to 5.4%, the lowest in seven quarters. For some, this is just a brief respite in an otherwise vibrant growth story. Yet, for others, this marks the beginning of a more ominous trend. As economists like Neelkanth Mishra and Rathin Roy delve into projections, they are divided.

"Q2 GDP growth slowest in 7 quarters," said Neelkanth Mishra.

While one believes this is the result of global turmoil, lingering pandemic scars, and the geopolitical uncertainty that looms over India. The other is of the opinion that India's structural weaknesses — such as insufficient capacity expansion and a sluggish manufacturing sector — are playing a more significant role.

Investment Trends: Hope or Hype?

In the aftermath of the pandemic, optimism lingers around the recovery of investments. The private sector is inching back with capacity expansions, signaling a hopeful sign. But not everyone shares the same enthusiasm. While some experts argue that investment recovery is slow but steady, others point to the hesitancy in large-scale capital expenditure, particularly among state governments. The real estate sector, once a driver of growth, remains dormant, adding to concerns about India's economic future.

Amid this uncertainty, there's a push toward emerging sectors like renewables, healthcare, and fintech. Yet, even these promising areas face delays. For them to meaningfully contribute to the economy, time is needed — a luxury that India's leaders can ill afford.

Interest Rates and RBI Policies: A Tightrope Walk

The Reserve Bank of India (RBI) faces its own set of challenges. With inflationary pressures and a fragile rupee, there is little room for significant interest rate cuts. While some experts argue that a lower interest rate could stimulate growth, others warn that such moves could destabilize the currency and worsen fiscal deficits. The RBI is caught in a delicate balancing act, where every policy decision is magnified, and the risks are immense.

The Trump Tariff Gambit: A Blessing in Disguise?

As the political stage in the US heats up with the prospect of Donald Trump's return, India's business leaders wonder how the fallout from higher tariffs, especially those aimed at China, will affect them. Trump's "America First" policies could push manufacturing out of China, creating an opening for India to emerge as a viable alternative under the "China plus one" strategy. The potential is there, but the shift won't happen overnight. The nation's manufacturing infrastructure still lags behind China's, and India's share in global exports remains marginal.

The Uneven Growth Story: A Tale of Two Indias

As the country navigates through its economic maze, one stark reality emerges: the uneven growth across regions. While states like Maharashtra, Tamil Nadu and Gujarat are thriving, Uttar Pradesh and Bihar struggle. As the rural-urban divide and

regional economic disparities widen, it leads to a future where growth may be lopsided, creating socio-economic tensions.

External Factors and Global Uncertainty: The Ripple Effect

The global economic landscape casts a long shadow on India's future. With the US grappling with fiscal deficits and rising interest rates, emerging markets, including India, face an uphill battle. "There has been significant geopolitical uncertainty," said Soumya Kanti Ghosh.

Trade policies under the Trump administration add to the uncertainty, and India finds itself at the crossroads of global competition.

Yet, within this turmoil, there is potential. India is poised to tap into foreign direct investment, especially in sectors like manufacturing and technology. The global economic shift could play into India's hands, but only if the nation can stabilize its internal growth trajectory.

Moderate Growth Expectations: Stability or Stagnation?

As 2025 looms, experts predict a moderate growth trajectory. While India's prospects remain positive, there's a realiSation that the nation's growth is reliant on factors beyond its control — global economic stability, US policies, and the ever-volatile geopolitical landscape. "We'll perform moderately well, but I am not sure we get to 7%," said Rathin Roy.

The challenge lies in addressing the structural issues: job creation, investment in education and health, and stimulating the real estate sector.

The Road Ahead: Navigating Uncertainty

India's economy in 2025 is a paradox. The country's demographic advantage and untapped potential in sectors like renewables and technology position it to become a global powerhouse. However, if it doesn't address its internal structural weaknesses and external vulnerabilities, the nation may find itself caught between the promises of its growth story and the realities of its economic limitations.

As the journey continues, India's policymakers and business leaders must walk a fine line, balancing internal priorities with the shifting dynamics of the global economy. The story of India's economic future is still being written, with chapters of hope, challenge, and opportunity, but the outcome depends on how well the nation adapts to the ever-changing world around it.

(businesstoday.in – 02/01/2025)

INDIA'S ECONOMIC PARADOX: BALANCING STARTUP GROWTH WITH RISING UNEMPLOYMENT

India is a land of contrasts. On the one hand, there's 'Shining India'. The market capitalisation of listed companies ranks India fourth globally. According to IMF, India's real GDP growth rate is expected to outperform other emerging-market economies by about 67% in FY25. Robust capital markets, an indigenous PE-VC ecosystem, and regulatory and policy pushes have ensured the reverse-flipping of India's 'Startup Kohinoors'.

On the other hand, India has a rising unemployment rate (9.2% in June 2024 vs 7% in May 2024), 50% of graduates are unfit to be hired, and the cost of quality education is increasing, while the monetary reward from the job market upon graduating is plummeting to multi-year lows. Hiring from key IITs and IIMs is a case in point.

Then there is the much-touted 'demographic dividend', a term used to underscore the India advantage. But it's a short-lived asset that works only in a window of opportunity. India is expected to undergo a demographic transition over the next 16-36 years. Hence, India's tryst with becoming a developed economy is time-bound.

That, beyond the rhetoric, this is India's century, is visible not only in the capital markets exuberance - 63 mainboard IPOs in India till Sept 2024 and 165 SME IPOs till Aug 2024 - which is bringing back Indian startups formerly domiciled outside India,

such as PhonePe, Groww and Pepperfry, but also in the way Indian food is climbing up the culinary ladder globally, and the adoption of India's culture globally via Bollywood, yoga, etc - that is, via its rise through soft power.

Furthermore, GoI's support (amendments in the Companies Act in 2017), policy push (regulations by RBI in 2018) and an investor-friendly environment (in P/E terms, Nifty50 is trading at about 89% premium to MSCI EM index) give investors the confidence for a successful exit in today's time.

As Isaac Newton once said, 'If I have seen further, it is by standing on the shoulders of giants.' This holds true for where India is today, and where it's headed. We must acknowledge the efforts of multiple stakeholders - private and public - in this journey. The Indian dream exists in 'India' and 'Bharat' alike, and is democratised by internet penetration across the country.

While we can pat ourselves for where we have reached, one mustn't get complacent. As India Inc relies on 'Operation Startup', over-reliance on startups to extrapolate the notional growth of state and central governments may not be the best measure, as valuations are not truly reflective of the revenues of the firm.

India has also been able to develop a robust domestic investor network. An efficient benchmarking tool to assess these AIFs would be using distributions to paid-in capital (DPI) over multiple on invested capital (MOIC). Such a strategy will ensure the quality of fund managers in the ecosystem improves and, thereby, has a multiplier effect on the quality of founders and innovations that India is backing.

Startups will lead India's journey from developing to a developed economy. For it to achieve this target, it needs :

Broad-based growth that generates more employment. An education system that caters to the jobs of tomorrow and helps with the development of human capital. Rather than focusing on rote learning, India needs educational institutions that include 'startup projects' as part of their curriculum to foster innovation and enhance the manufacturing sector (by improving the ease of doing business and simplifying labour laws).

Increased ease of compliance for startups. Standardising laws in GIFT IFSC. Rewiring of the tax system via joint parliamentary committees to retain business, talent and profits in India.

Addressing these will help India to increase its real per-capita income by about 7.3x (from today's $2,730) to achieve its target of a developed economy.

Whether India can address these concerns by 2047 is debatable as achieving growth comparable to Singapore's miraculous rates would require behavioural changes that today's polity might not be amenable to. However, the Indian markets have a unique DNA, and they should be able to crack this race with its demographic dividend.

(economictimes.indiatimes.com – 11/01/2025)

WHY IS INDIA NOT IN THE INNOVATION RACE?

India has its share of both large tech companies and large national laboratories, but why is it that these don't seem to be at the forefront of any innovation news headlines? asks Ajit Balakrishnan.

Flip through any academic journal, wade through an opinion piece on an online news site or its print cousin, or glance at a news headline and you see businesses claiming their innovative new product/service launch or governments proclaiming innovation-related investment or legislation.

And you start wondering what all this frenzy about innovation is about. When I query my business friends, they promptly reply that innovation is essential to help them differentiate their products or services from those of their competitors. When I query my friends involved in state or national-level policy making, their prompt reply is that innovation is central to creating industries that drive economic growth and thus create jobs and grow gross domestic product (GDP).

And come to think of it, the term 'GDP', which in my college days was perceived by all of us as something that only academics chant about, in today's world appears to be as important even to the non-professional as India winning the world one-day cricket championship, or having an Indian girl being crowned as Miss World.

Then we read about United States-based companies like Google and Microsoft dominating the current hot topic of innovation, artificial intelligence (AI), and then you hear that these great innovator tech giants are led by Indians: Google by Sundar Pichai, Microsoft by Satya Nadella, IBM by Arvind Krishna, and, hold your breath, the White House Science and Technology Policy Committee by Arati Prabhakar ... the list goes on and on.

India also has its share of both large tech companies and large national laboratories, but why is it that these don't seem to be at the forefront of any innovation news headlines?

Even more bewildering is that all these Indian tech leaders in the United States and leaders heading Indian tech companies and labs, are all part of something we are all proud of: India's merit-based education system, which ensures that in all fields, be it science, engineering, management or social sciences (to name a few fields), entry to the best colleges and institutes is based on an entrance exam system and is not based on family contacts and inheritance and paying hefty amounts.

Co-existing with all of the above is the oft-reported news that we, because of this extreme merit-based system, seem to be creating a generation of students/entrants who have mastered a system of besting entrance tests using rote learning (through training schools such as those in Kota) and thus are not good at the kind of original thinking that innovation requires?

Maybe we can learn from other countries, particularly ones that overwhelmingly lead in innovation, and for this there is no better place to start than the United States of America. As we all know, in our times, outfits from this country dominate the innovators of the business world (Google, Microsoft, etc) as well as the innovators of the educational world (Stanford University, Massachusetts Institute of Technology, etc). What makes the US such a dominant player in the innovations of our time?

The answer to this is (hold your breath) a public institution called DARPA, the full form of which is Defense Advanced Research Projects Administration. DARPA is the institution that defined the technical challenge and funded, for example, the innovation behind Google's original search algorithm. DARPA's funding also laid the foundation for the creation and dominance of Intel, Nvidia, Qualcomm, Cisco as well as Raytheon, Boeing, and more.

A recent eye-catching one was the $600 million funding by DARPA of Amazon's cloud-computing project. Incidentally, there are several of my left-leaning American friends who recount all this and say that this is why America needs to be at war all the time so that such funding will continue. But that is another story.

What makes me worry and perhaps you too, dear reader, is this: India also has its share of such large institutions like the Defence Research and Development Organisation (DRDO), which alone had an annual Budget allocation last year of $2.8 billion (Rs 23,000 crore/Rs 230 billion) and a network of 52-plus laboratories spread all over India and employs more than 7,000 scientists.

Why, then, does India not have world-leading technology companies like Google, Microsoft, and Amazon? When I wandered through my friends and acquaintances with this same question, why is India not in the forefront of innovation, the wisest reply that I got, and unsurprisingly, from a friend who is a member one of India's "business communities" was this: "It does not pay to innovate in India."

I immediately jumped on him: "Why is that so?" His answer: Indian companies, private or government-owned, think it is too risky to adopt a new innovative product or service. In India, another friend says, a significant portion of research funding is government-led, particularly in sectors like defence, space, and energy. This can lead to bureaucratic inefficiencies and a slower adoption of cutting-edge technologies in the private sector.

And, crucially, large Indian companies often prefer low-risk, service-oriented models over high-risk, high-reward innovation. And, finally, India produces many highly skilled engineers and technical graduates, but many of them migrate to countries like the United States, where opportunities for tech innovation are greater, or they end up in the services sector domestically.
The education system in India also tends to emphasise rote learning over creative problem-solving.

(rediff.com – 16/01/2025)

GROWTH IN INDIA SLOWED MORE THAN EXPECTED: IMF

"Growth in India slowed more than expected, led by a sharper-than-expected deceleration in industrial activity," the IMF said in its latest update of the World Economic Outlook, according to which the global economy is holding steady. In 2023, India's growth rate was 8.2 per cent, which dropped to 6.5 per cent in 2024. The global growth is projected at 3.3 per cent in 2025 and 2026, below the historical (2000–19) average of 3.7 per cent. he forecast for 2025 is broadly unchanged from that in the October 2024 WEO, primarily on account of an upward revision in the US offsetting downward revisions in other major economies. Global headline inflation is expected to decline to 4.2 per cent in 2025 and to 3.5 per cent in 2026, converging back to target earlier in advanced economies than in emerging markets and developing economies, it added.

According to IMF WEO, global growth is expected to remain stable, albeit lacklustre. In the US, underlying demand remains robust, reflecting strong wealth effects, a less restrictive monetary policy stance, and supportive financial conditions. The growth is projected to be at 2.7 per cent in 2025, the report said. "In India, the growth is projected to be solid at 6.5 per cent in 2025 and 2026, as projected in October and in line with potential," the IMF said. In 2023, India's growth rate was 8.2 per cent, which dropped to 6.5 per cent in 2024. It is expected to remain the same in 2025 and 2026, it said.

IMF's Chief Economist Pierre-Olivier Gourinchas said the decline in inflation to 4.2 per cent this year and 3.5 per cent next year will help draw to a close the global disruptions of recent years, including the pandemic and Russia's invasion of Ukraine, which precipitated the largest inflation surge in four decades.

(PTI/Rediff.com – 17/01/2025)

INDIA'S FOREX RESERVES DROP BY $8.71 BN TO $625.87 BN

India's forex reserves dropped by $8.71 billion to $625.87 billion in the week ended January 10, the RBI said on Friday. Earlier, the overall kitty dropped by $5.693 billion to $634.58 billion in the week ended January 3, the Reserve Bank of India said. The reserves have been on a declining trend for the last few weeks, and the drop has been attributed to revaluation along with forex market interventions by RBI to help reduce volatilities in the rupee.The forex reserves had increased to an all-time high of $704.88 billion in end-September.

For the week ended January 10, foreign currency assets, a major component of the reserves, decreased by $9.47 billion to $536.01 billion, the data released on Friday showed.

Expressed in dollar terms, the foreign currency assets include the effect of appreciation or depreciation of non-US units like the euro, pound and yen held in the foreign exchange reserves. Gold reserves increased by $792 million to $67.88 billion during the week, the RBI said. The Special Drawing Rights (SDRs) were down by $33 million to $17.78 billion, the apex bank said. India's reserve position with the IMF was down by $4 million at $4.19 billion in the reporting week, the apex bank data showed.

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-: JILTA : -

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History and Activities of Indian Leather Technologists' Association #1

The Indian Leather Technologists' Association (ILTA) was founded by Late Prof. B. M. Das, the originator of Das-Stiasny theory and father of Indian Leather Science on 14th August' 1950. ILTA is the Member Society of IULTCS (International Union of Leather Technologists & Chemists Societies) representing India.

The primary objectives of the oldest Leather Technologists' Association which celebrated its Diamond Jubilee year in 2010, are :

- To bring all concerned with the broad spectrum of the leather industry under one umbrella.
- To organize seminar, symposium, workshop in order to create information, knowledge and latest development for the benefit of all concerned. To offer a common platform for all to interact with each other in order to understand each other's problems and prospects.
- To publish monthly journal as a supplement to those above objectives. The monthly journal of ILTA is known as journal of Indian Leather Technologists' Association and is the most widely circulated technical journal concerning leather technology.
- To publish text books for the benefit of students at various levels of study, for the researchers and industry.
- To have interface between urban and rural sector.
- To assist various Government Institutions, Ministry and autonomous bodies to formulate appropriate policies acceptable and adoptable to the industry.
- To organize practical training and to provide skilled manpower and to motivate good students for study.
- To conduct activities related to the growth of the export of leather and leather goods from India.

ILTA also organizes Prof. B. M. Das Memorial Lecture every year during the Foundation Day Celebrations on 14th August, Sanjoy Sen Memorial Lecture on 14th January, the birthday of our late President for several decades, Prof. Moni Banerjee Memorial Lecture on 15th March, the birthday of our late Founder-General Secretary of our Association and Prof. S. S. Dutta Memorial Lecture on 2nd February every year during IILF at Chennai. Many reputed scientists, industrialists and educationists have delivered these prestigious lectures. Foreign dignitaries during their visits to India have addressed the members of ILTA at various times.

ILTA have published the following books :

1. An Introduction to the Principles of Physical Testing of Leather by Prof. S.S. Dutta
2. Practical Aspects of Manufacture of Upper Leathers by J. M. Dey
3. An Introduction to the Principles of Leather Manufacture by Prof. S .S .Dutta
4. Analytical Chemistry of Leather Manufacture by P. K. Sarkar
5. Comprehensive Footwear Technology by Mr. Somnath Ganguly
6. Treatise on Fatliquors and Fatliquoring of Leather by Dr. Samir Dasgupta
7. Synthetic Tanning Agents by Dr. Samir Dasgupta
8. Hand Book of Tanning by Prof. B. M. Das

ILTA presents awards in the name of Prof. B. M. Das Memorial, Sanjoy Sen Memorial, Prof. J. M. Dey Memorial, Prof. Moni Banerjee Memorial and Prof. S. S. Dutta Memorial Medals to the top rankers at the University Graduate and post graduate levels. Prof. J. Sinha Roy Memorial Award for the author of the best contribution for the entire year published in the monthly Journal of the Indian Leather Technologists' Association (JILTA). From the year 2023, ILTA has started to present a Scholarship namely Prof. Moni Banerjee Memorial Scholarship to a student of B.Tech / M.Tech in Leather Technology who is meritorious but financially crippled.

contd.

History and Activities of Indian Leather Technologists' Association #2

Registration No. KOL RMS/074/2025-27

The International Congress of IULTCS used to held in different locations of the world once in two years. In its 125 years long history, for the first time the Congress was held in January 1999 outside the developed countries and that too in India at CLRI, Chennai. Indian Leather Technologists' Association organized the Congress under the able leadership and guidance of Late Sanjoy Sen, the then President of ILTA and IULTCS and Dr. T. Ramasami, the then Vice-President of ILTA and Director, CLRI, Chennai. In 2017 IULTCS Congress was successfully held again at Chennai, India for the second time.

In order to promote and provide marketing facilities, to keep pace with the latest design and technology, to have better interaction with the domestic buyers, ILTA has been organizing LEXPO fairs at Kolkata from 1977, Siliguri from 1992 and Durgapur from 2010. To help the tiny, cottage and small-scale sectors industries in marketing, LEXPO fairs give the exposure for their products. Apart from Kolkata, Siliguri and Durgapur, ILTA have organized LEXPO at Bhubaneswar, Gangtok, Guwahati, Jamshedpur and Ranchi. It commensurate with the time, demand and new perspective of the modern-day leather users. ILTA has started to organize LEXPO at Kolkata from 2022 in a new shape with the Manufacturers and Exporters of Leather Goods from all over India.

ILTA celebrated its Golden Jubilee with a year long programme from 14th August' 2000 to 13th August' 2011 along with the first conference of South East Asian Countries at Netaji Indoor Stadium, Kolkata.

The Association's present (as on 31.03.2024) strength of members is around 550 from all over India and abroad. Primarily the members are leather technologists passed out from Govt. College of Engineering & Leather Technology, Kolkata, Anna University, Chennai, Scientists from Central Leather Research Institute (CLRI), Harcourt Butler Technical University, Kanpur, Govt. Institute of Leather Technology, Jalandhar, Central Footwear Training Institute, Agra, Central Footwear Training Centre, Budge Budge, Footwear Design & Development Institute, Kolkata, National Institute of Fashion Technology, Kolkata etc.

In order to strengthen its activities, ILTA have constructed its own six storied building at 44, Shanti Pally, Kasba, Kolkata – 700107 and have named it "Sanjoy Bhavan".

This Association is managed by an Executive Committee duly elected by the members of the Association. It is absolutely a voluntary organization working for the betterment of the Leather Industry. None of the Executive Committee members gets any remuneration for the services rendered but they get the satisfaction of being a part of this esteemed organization.