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Digitalization –  
Driving the  
Industry Ahead



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**D. A. Chandekar**  
Editor

*Dear Readers,*

Metals play a crucial role in the infrastructure development process. It calls for profound metallurgical knowledge and expertise. The production and processing of these metals pose steep challenges to metallurgists, technologists and process experts. As we all know metals form the foundation of any sustainable and growing civilization. All the ancient civilizations had a strong metallurgical understanding. Same is true in today's era too.

Emerging concepts like circular economy, Digitalization, and Green manufacturing are reshaping the industry, while developments like EV present potential challenges to its growth. In case of special alloys, though they offer significant advantages like precise properties, many companies follow the specification of their principal / collaborator adding to the confusion at the customer's end and also adding to inventory carrying cost. I strongly feel that there is a need to prepare a national specification for such special alloys. This will not only simplify the process, reduce the number of grades to be handled but also reduce the inventory and its carrying cost. Govt of India can take up this project with the help of industry experts.

Green manufacturing, in my opinion, is still at a very preliminary stage not only in India but worldwide. To

## Editorial Desk



categorize any metallurgical product as 'Green', one has to make the complete process chain 'Green', including the sources of power, all the equipment and components etc. This will naturally take a long time. Also, presently there are no proper parameters set for Green metallurgical products. A long way ahead !

The Indian economy has performed quite well in the past few years and is expected to continue its upward journey in the future too. The emphasis on infrastructure development is going to boost the metals demand in the country. The industry is going to benefit from the new scrapage policy. Also the defense is a new emerging customer sector. The present government's policy of 'Make in India' will surely give a forward push to the metals demand in the defense equipment sector but mind well, supplying to defense is not as easy as supplying to a private OEM. There are lot of hurdles. It requires that the supplier should satisfy many beurocratic procedures and compliances. I hope this long chain will gradually reduce with time and also the volumes would increase. On a long term basis, defense is of course a big consumer of metals sector.

'Metalworld' has been organizing various B2B trade shows for years, fostering a dialogue among industry stakeholders. The events attract an active participation from the industry, trade bodies and also the from the relevant govt departments. I sincerely hope the industry benefits from such healthy interaction !

*Write your comments :*

<https://metalworlddac.wordpress.com>

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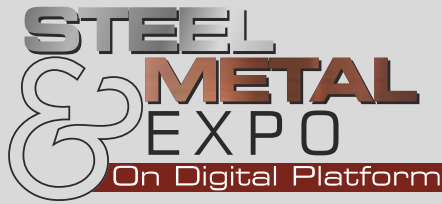


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# Digitalization – Driving the Industry Ahead

The Asian Metallurgy Show, originally a physical exhibition since 1997, transitioned to a digital platform in 2021 due to Covid. The virtual Steel n Metal Expo held from 18<sup>th</sup> to 31<sup>st</sup> December, 2023, featured online stands and webinars covering topics like digitalization, commodity trading, green steel production, role of zinc, sustainability. A notable webinar titled 'Digitalization – Driving the Industry Ahead'



The expert panel featured **Mike Hedderman**, Area Sales Manager, EMG Automation GmbH, **Abhimanyu Raja**, MD, Janyu Tech and **Dr. Narra Rajesh**, Director- Technical, Ulti-Met. This webinar was hosted by **D.A. Chandekar**, Editor, Metalworld & Steelworld.

**Abhimanyu Raja** - Implementing automation requires buy-in from middle management and convincing top management



of the need for investment despite safety not providing immediate returns. Retrofitting aged equipment, like hot metal handling systems in decades-old plants, is crucial. Collaboration with innovative companies, like in Dako, is key for joint product development. However, costs and integration challenges must be carefully assessed. Ultimately, successful implementation hinges on fostering an attitude of adoption, securing funding, and integrating changes seamlessly into existing operations.

**Dr. Rajesh** - Automation implementation requires a top-down approach, with visualization and approval starting from upper management. There may be lingering concerns about job security, but embracing technology is essential for progress. As costs rise and



industries evolve, integrating new technologies alongside traditional methods becomes increasingly necessary. Customers seeking justification for these changes are indeed justified, considering the broader context of industry advancements.



**Mike Hedderman**. Upper management must be convinced of the benefits of digitalization, primarily focusing on the potential for increased profits and cost savings. However, other

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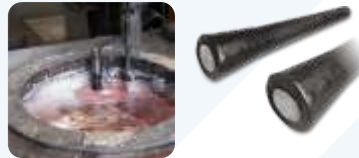
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## Face to Face

advantages such as improved communication, enhanced safety, and efficiency should also be highlighted. Recent advancements have enabled remote access to systems, allowing for better service and reduced downtime, especially crucial during the pandemic. Demonstrating these advantages will encourage further adoption of digitalization in industry.

### **Abhimanyu Raja** -

Shifting to digital processes typically takes 40 to 60 months due to several factors. Firstly, digitalization ensures future readiness and meets customer demands, even if not initially preferred. Secondly, not all benefits are immediately tangible, and some decision-makers still favor traditional methods. Educating and training employees on digital technologies further extends the implementation timeline. Despite ongoing developments, there remains a need for greater understanding and acceptance of digitalization at all levels of management.

**Dr. Rajesh** - Over the years, there has been a notable shift in mindset, especially evident from observations made since 2020. Trends show significant changes globally, with what was once considered a luxury becoming a necessity, particularly highlighted during the COVID-19 pandemic. Looking ahead to 2023, further advancements are expected in various

domains, indicating ongoing development. Notably, India's economy exemplifies rapid growth, with the time taken to reach each trillion-dollar milestone significantly decreasing.

**Mike** - To stay competitive, it's crucial to continuously adopt and implement the latest technologies available. Industries are now reaching out to implement systems on their own, indicating a growing demand for innovation. Customers are increasingly seeking detailed information about their purchases, particularly in sectors like automotive, necessitating digital storage and accessibility of production data to meet these demands.



**D.A.Chandekar** - In countries like India with large populations, there's concern that excessive digitalization could lead to increased unemployment. As digitalization professionals, how do we address this argument?

**Raja**- During the transition to computerization in banks, there was resistance from unions, mainly concerning fears of job loss and information security. However, these concerns were proven unfounded as technology adoption actually created more opportunities

and streamlined processes. Resistance to new technology is common, but embracing digitalization is essential for staying relevant in the future. Just as cell phones have become indispensable, digitalization is now a necessity for businesses to thrive.



**Dr. Rajesh**- From a global perspective, it's evident that technology adoption is essential for staying competitive. With advancements like drones and digital warfare, countries are increasingly focusing on technological superiority. To remain relevant and capture market share, businesses must embrace new technologies and evolve accordingly. Failure to do so could result in falling behind and losing out on opportunities.

**Mike** - Resistance to new technology, particularly from unions and the workforce, is prevalent across various industries, including steel and rail. However, with the inevitability of technological advancement, adaptation is not a choice but a necessity for future-proofing systems. Despite reluctance and battles with the workforce, the implementation of technologies like big data and robotics is increasing for efficiency and safety improvements. While some acceptance is reluctant, the





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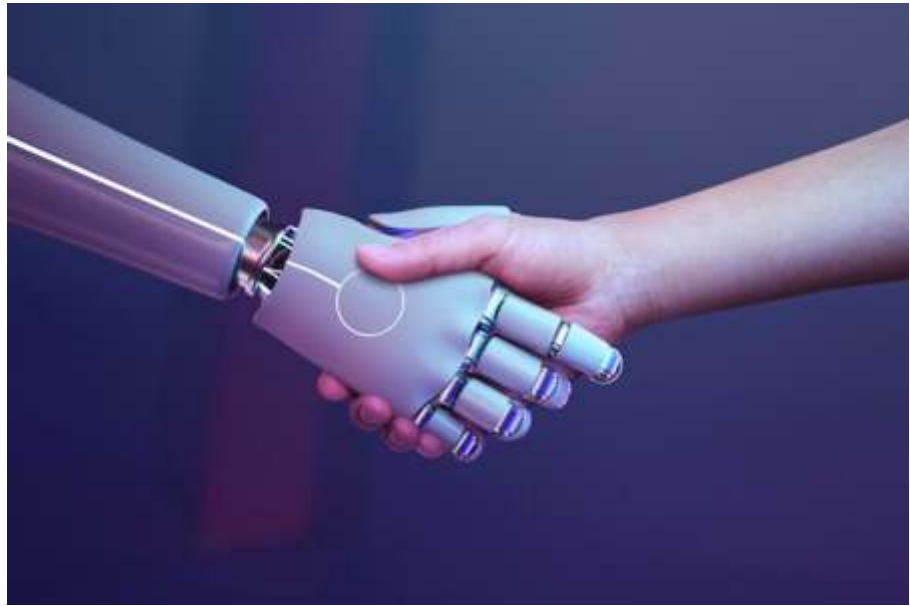
## Face to Face

trend towards digitalization is unmistakable and impacting everyday items as well as industrial processes.

**Dr. Rajesh-** In our industry, there's little resistance to digitalization, especially at the top management level. In India, technology adoption has been rapid, often outpacing Western counterparts. Systems like UPI have been highly successful, driving the need for new skill sets and facilitating data analytics for product servicing. Overall, there's a widespread acceptance and enthusiasm for embracing digital advancements.

**Rajesh-** Our experience with deploying a sledge cleaning robot underwater has been highly positive, eliminating the need for costly plant shutdowns and water pumping. Initially met with skepticism, concerns about expense have now vanished due to the robot's effectiveness and judicial interventions enforcing safety measures. With advancements like drones for inspections, the benefits of digitalization in hazardous environments are clear, prompting widespread adoption.

**D.A.Chandekar-** Okay, so I think let's close on this note that everybody is quite positive about the future of digitalization in India in general, and still in the same particular So the, the fact that our, our digital shows are also growing in also shows the interest and the seriousness of people in the process of digitalization. ■



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## Feature

# Status of Aluminium Industry in MENA region

**Introduction:** Today, Aluminium industry is a vibrant sector in the Gulf and a major contributor to the economies of the region. It is an important source of direct employment and a key contributor to a number of small and medium sized support industries. And even as the world has turned its attention to the Aluminium sector in the GCC, it is not merely a story of success, but also a story of healthy competition, synergy, and collaboration between the various participants and countries for the greater good of the sector, and region as a whole.

There are three main elements needed to build Aluminium smelters. The first element is energy, and

modern infrastructure and ports, and have excellent location to supply the world market in Europe, Asia, or United States.

Until 2008, there were two smelters, Alba and DUBAL with 1.92 million mt/y capacity which were cooperating in all fields. By 2010, Saudi Arabia, Oman, Qatar, and Abu Dhabi had built new smelters, not only increasing the overall production in the GCC region but also turning the region into a regional hub for the international Aluminium market. Today, there are six smelters in the region: Alba, DUBAL, EMAL, Sohar, Qatalum and Ma'aden, whose combined production capacity is approaching 5 MMt/y.



**Dhiraj K. Chauhan**  
(Director: METCON-  
Metallurgical  
Consultants)

output.

Production in Qatar and Saudi Arabia will experience slower growth compared to regional peers such as Iran which will witness a significant inflow of investment to accelerate domestic Aluminium capacity.

The Middle East has become a prominent Aluminium producer over the past decade, particularly the Arab states that form the Gulf Cooperation Council (GCC). In 2019, GCC accounted for 9.1% of global primary Aluminium production, rising from 1.6% in 2010. Despite an Aluminium price collapse earlier in 2020 amid the global Covid-19 pandemic, GCC primary Aluminium production in the year through August has increased 2.7% y-o-y to 3.8bnt. In the coming years it is expected to see steady growth in Middle Eastern Aluminium production, and United Arab Emirates (UAE), Bahrain, Iran, Qatar and Saudi Arabia are markets to watch.

### Production Growth scenario:

**(1)** UAE will maintain its position as the region's largest Aluminium producer, underpinned by Emirates Global Aluminium (EGA) USD1.4bn upstream integration. In 2019, the UAE accounted for 44.5% of Aluminium production within the GCC and contributed the most aluminium in the MENA region. Emirates Global Aluminium, is the largest producer of premium Aluminium, and was formed by

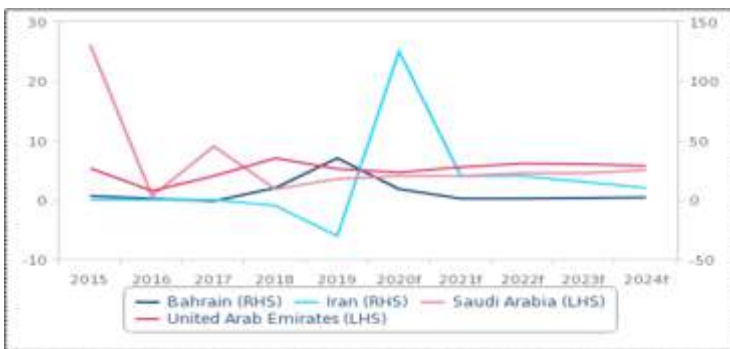


Fig.1: Select Countries - Aluminium Production Growth, % chg y-o-y.

the Gulf is rich in this regard. The second element is capital, which is also available locally and through international banks and financial institutions. The third element is market. The local industry for Aluminium is increasing in the Gulf and world demand for the metal is increasing at a rate of 5% annually. In addition, all the Gulf States have built

**Future outlook:** Middle East will experience modest production growth in its Aluminium sub-sector in the coming years, bolstered by expansion in regional production capacity amid a recovery in Aluminium consumption. UAE will maintain its role as the region's leading producer, although Bahrain will also experience an increase in



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## Feature

the merger between Dubai Aluminium (DUBAL) and Emirates Aluminium (EMAL) in 2013. The conglomerate benefits from its recent integration, having shipped over 6.1mn dry metric tonnes of bauxite since the August 2019 commencement of its subsidiary Guinea Alumina Corporation (GAC). Despite Covid-19, GAC is on schedule to achieve full production capacity of approximately 12mnt per annum by the end of 2020, solidifying EGA's value chain and supply for its Jebel Ali Aluminium smelter.



Fig.2: Saudi Aluminium mining

Aluminium production in the UAE will also benefit from its increased sustainability initiatives. For example, in September 2020, EGA reported its greenhouse-gas emissions intensity was 38.0% lower than the industry average. This will likely increase the firm's attractiveness to environmentally-conscious firms in Europe, such as automakers. In November 2019, EGA announced that its supply agreement with BMW would be increased and extended through 2022. Dubai has also announced several planned projects in the UAE such as a low-carbon Aluminium rolling facility, electrical vehicle battery storage plant and

cast aluminium wheel production facility. As such, we highlight upside to the country's role in the burgeoning electric vehicle market.

(2) Production in Bahrain will benefit significantly from the inauguration of a new potline at its Alba smelter. In 2019, Bahrain produced 1.4mnt of aluminium, making it the second largest contributor after the UAE. Aluminium Bahrain's (Alba) smelter is the largest global aluminium smelter outside of China, and as of September 28, the firm remains committed to a production



Fig.3: Ma'aden Aluminium Refinery

target of 1.54mnt in 2020. The firm previously inaugurated Potline 6 in November 2019, which is expected to bolster annual output by 540kt. Potline 6 features DX+ Ultra technology, created by EGA in 2016, signifying the UAE's technical dominance in the regional aluminium market.

(3) Aluminium production growth in Saudi Arabia and Qatar will remain steady. In 2019, Saudi Arabia and Qatar



Fig.4: Select Countries - Aluminium Production, '000 tonnes

produced 965kt and 626kt of aluminium respectively, rounding out the top four MENA aluminium producers. Status of Secondary Aluminium Production: These applications are mainly in extrusion.

The MEA aluminum extrusion market size was valued at USD 1.6 billion in 2020 and is expected to grow at a compound annual growth rate (CAGR) of 4.0% from 2021 to 2028. The increasing use of aluminum products in vehicles is projected to drive market growth over the forecast period. Aluminum extrusions are used in the automobile industry for various applications, such as rear subframes, door instruction beams, seat cross members, stiffeners, front bumper beams, brake, suspension, and steering components. These different applications of aluminum can significantly reduce the weight of vehicles. Hence, the share of automotive applications in the aluminum

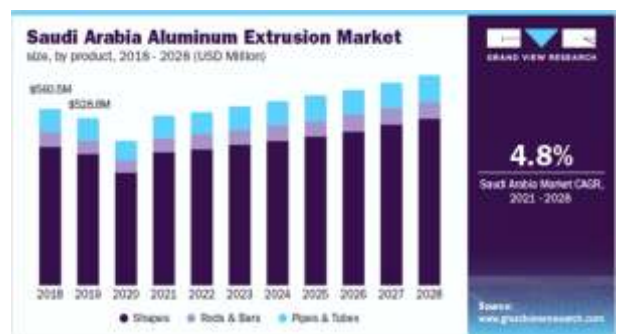


Fig.5: Saudi Arabia Aluminum Extrusion Market

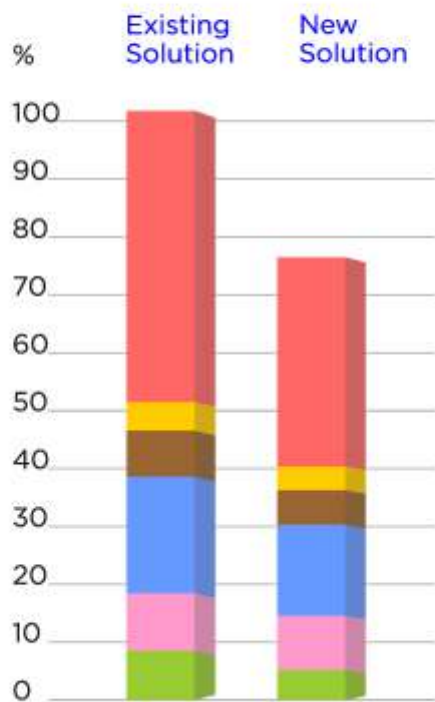
extrusion market is likely to witness strong growth over the forecast period. Saudi Arabia was the second-largest market in 2020, in terms of volume and revenue, and is likely to register the fastest CAGR over the forecast period. In the UAE, a large amount of

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## Feature

manufactured aluminum extrusion is domestically consumed while Gulf Extrusions LLC, the largest player in the region, exports 30% of its total products internationally. Its plant in Jebel Ali has an annual production capacity of 60,000 tons.

Some of the prominent players operating in the MEA aluminum extrusion market are:

Alupco, Gulf Extrusions Co. LLC, Taweelah Aluminum Extrusion Co. (TALEX) LLC, National Aluminum Products Company SAOG (NAPCO), Balexco (Bahrain Aluminium Extrusion Company) and Emirates Extrusion Factory LLC.

Status of Aluminium Industry in Africa: Africa is one of the largest producers of aluminium ore BAUXITE as a whole. African nation Guinea stands as the world's highest exporter of bauxite and ranks at number two in bauxite production. The other African countries producing bauxite are Ghana, Cameroon, Mozambique, Ivory Coast, etc. There are multiple numbers of aluminium smelters scattered all around the continent, but most of the



smelters failed to reach its actual production capacity and few also took steps to close down like Bayside Aluminium in South Africa and Alscion in Nigeria.

North African countries contribution is hardly worth mentioning.

Egypt Aluminum Company (Egyptalum) lies 100 kilometers north of the city of Luxor. Egyptalum is the largest aluminium producer in Egypt and one of the largest in Africa has a total annual production capacity of 320,000 tonnes. The company is supplied with the electric energy it needs from the Aswan High Dam. Egypt has 14% share in Aluminium production in Africa.

Libya Aluminum Exports was reported at 4,674.729 USD in Dec 2022 Countries like Libya, Algeria and Tunisia have more output of Oil, and Natural gas.



Fig.6: Aluminium Extrusion market share (Application wise)

MENA Region – Aluminium (Al) Production in ('000 mt) and y-o-y % change Region and Country wise figures are given in table 1.

Table 1

GEOGRAPHY	INDICATOR	2018E	2019E	2020F	2021F	2022F	2023F	2024F
MENA region	Al. prodn. '000,MT	5,902.2	6,421.5	7,071	7,427	7,695	7,958	8,239
MENA region	y-o-y % change	5.3	8.8	10.1	5.0	3.6	3.4	3.5
Bahrain	Al. prodn. '000,MT	1,056.0	1,425.6	1,554	1,569	1,585	1,609	1,642
Bahrain	y-o-y % change	10.0	35.0	9.0	1.0	1.0	1.5	2.0
Iran	Al. prodn. '000,MT	337.25	234.39	527.37	632.85	759.42	873.33	960.67
Iran	y-o-y % change	-5.0	-30.5	125.0	20.0	20.0	15.0	10.0
Saudi Arabia	Al. prodn. '000,MT	932.08	964.70	1,003	1,043	1,090	1,139	1,196
Saudi Arabia	y-o-y % change	1.8	3.5	4.0	4.0	4.5	4.5	5.0
United Arab Emirates	Al. prodn. '000,MT	2,781	2,926	3,059	3,228	3,425	3,629	3,835
United Arab Emirates	y-o-y % change	7.0	5.2	4.6	5.5	6.1	6.0	5.7



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#### Processing Equipment & Auxiliaries

- Primary aluminium processing equipment
- Recycled aluminium processing equipment
- Heat processing equipment
- Extrusion and rolling equipment
- Surface processing equipment
- Test and measurement equipment
- Deep processing equipment
- Environmental protection and energy efficient equipment
- Smart manufacturing equipment
- Refractory materials, foundry chemicals, master alloys, additives etc.
- Other auxiliary materials and equipment

### Concurrent Events

**Lightweight 2024** 亚洲汽车轻量化展览会  
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Vedanta Aluminium's BALCO plant in Korba, Chhattisgarh

## BALCO certified to Aluminium Stewardship Initiative Standard V3

Bharat Aluminium Company Limited, a unit of Vedanta Aluminium, has achieved the Aluminium Stewardship Initiative (ASI) Performance Standard V3 Certification for the manufacture and supply of a wide range of primary aluminium products at its facility in Korba, Chhattisgarh. This includes a smelter with two pot lines for producing molten aluminium (hot metal), three cast houses for shaping the aluminium, a rolled product plant and a power generation plant. Together, they contribute to an annual production capacity of 575,000 tonnes at BALCO. BALCO produces aluminium wire rods, ingots, primary foundry alloys and rolled

products, as well as India's first low carbon aluminium range Restora. They find applications in several sectors including automobiles, infrastructure, insulations, power projects, electrical and packaging. It has emerged as the first Indian company to achieve the ASI Performance Standard V3 Certification. Previously, Vedanta Aluminium has also achieved the ASI Performance Standard V2 Certification for its smelter and captive power plant located within the Special Economic Zone (SEZ) at Jharsuguda, Odisha, India. The ASI Certification program was developed through an extensive multi-

stakeholder consultation process and is the only comprehensive voluntary sustainability standard initiative for the global aluminium value chain. The ASI Performance Standard V3 (2022) was launched in May 2022 following a multi-year revision process. It defines 11 principles and 62 criteria under three sustainability pillars - Environment, Social, and Governance - with the aim to address sustainability areas in the aluminium value chain, such as biodiversity, indigenous peoples' rights, circularity, and greenhouse gas emissions. The independent, third-party audit of Bharat Aluminium Company Limited (BALCO) was carried out by CETIZION Verifica. ■

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# AI & Machine Learning - For Metals & Manufacturing Industry

Metal and process manufacturing industries deal with complex, multi-physics processes, where a lot of variables and correlations are not completely understood. Complex by nature, each of its processes generates an astonishing amount of data which provides useful insights if properly managed. Besides that, environmental conditions play an important role in the process and are keen to change over time. An effective digital & data-driven program leads all heavy industries in the improvement of sustainability and competitiveness on the market.

algorithms are being used to design complex metal components with greater optimization and efficiency. These tools can analyze vast amounts of data to identify the best materials, shapes, and manufacturing processes for a desired outcome.

- **Predictive maintenance:** Machine learning algorithms can analyze sensor data from machines to predict potential failures before they occur. This allows for proactive maintenance, minimizing downtime and production losses.



**Dr. Prashant Pansare**  
CEO – Rubiscape India

eliminates human error.

- **Robotic automation:** AI is playing a growing role in robotic automation, enabling robots to perform more complex tasks and adapt to changing environments. This allows for increased flexibility in production lines and the ability to handle a wider variety of parts.
- **Digital twins:** AI can be used to create digital twins of physical machines and processes. These virtual simulations allow manufacturers to test new designs, optimize production processes, and identify potential problems before they occur in the real world.



Artificial Intelligence (AI) and Machine Learning (ML) are rapidly transforming the metal and manufacturing industry, driving a new era of efficiency, precision, and innovation. Here are some examples.

- **AI-powered design:** AI

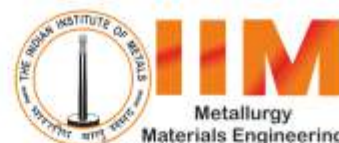
- **Automated quality control:** AI-powered vision systems can inspect manufactured parts for defects with high accuracy and speed. This reduces the need for manual inspections, improves overall quality, and

## The AI Takeover

Over the last couple of years, there has been an accelerated digital adoption across industries. More digital means more data, and that's precisely the reason Artificial Intelligence & Machine Learning has taken



# IBAAS-IIM 2024



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**September 25-27, 2024**

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- \* Develop a road map for Bauxite, Alumina and Aluminium industry in India.
- \* Provide a platform for primary and secondary aluminium producers to share knowledge and review latest developments in the entire value chain of Aluminium Industry.
- \* Application of Bauxite and Alumina in non-metallurgical industries.
- \* Digitisation Process and Digital Twins.
- \* Decarbonization and Green Aluminium.
- \* Aluminium recycling industry.

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### **Conference Highlights**

- \* A pre-conference workshop on 3D Printing will be organized by BITS and IIM Goa Chapter.
- \* Visionary leader outlines the future trajectory of the bauxite, alumina & aluminium industry.
- \* The latest developments & innovations in alumina refining, aluminium smelting & aluminium downstream/recycling technologies.
- \* A post conference visit to the HINDALCO Belagavi Alumina Refinery, Karnataka.

**BITS- Pilani  
K K Birla Goa Campus  
Goa, India**

**For participation and further details, please contact the IBAAS Office, India**

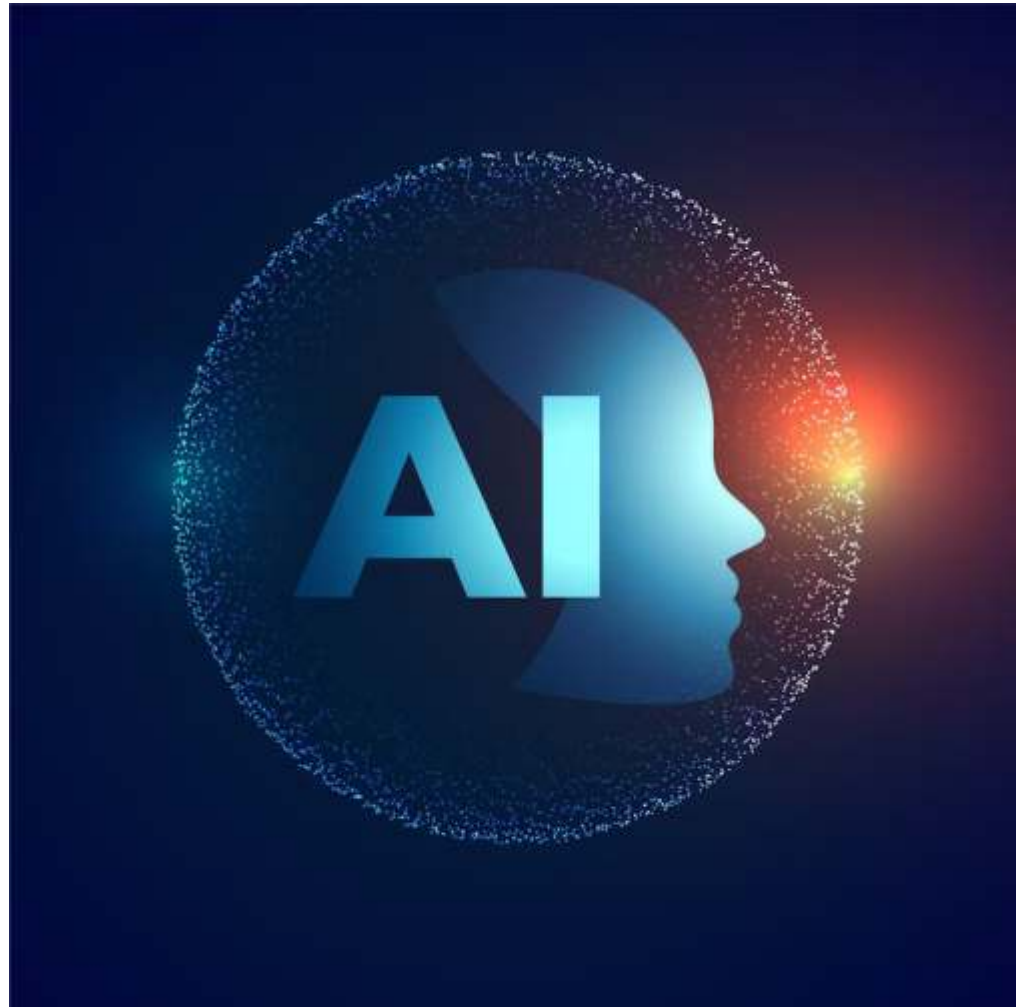


a centre stage. Here are some emerging trends in AI, ML, and data science to watch in 2024:

- **Democratization with AutoML** : Automated Machine Learning (AutoML) tools are simplifying AI and ML for non-experts. AutoML automates tasks like model selection, hyper parameter tuning, and deployment, making it easier to leverage these technologies for a wider range of applications.
- **Rise of Generative AI** : Generative AI models can create entirely new data, like realistic images, text, or even code. This has applications in areas like synthetic data generation, and creative content development.
- **Edge Intelligence:** Processing data closer to where it's generated, on "edge" devices, is becoming increasingly important. This reduces reliance on centralized cloud computing and enables faster, real-time decision-making for applications like autonomous vehicles and industrial automation.
- **Quantum Computing and AI** : While still in its early stages, quantum computing has the potential to revolutionize AI by solving complex problems that are

intractable for classical computers. This could lead to breakthroughs in areas like materials science and financial modeling.

- **Continuous Rise of NLP & LLM** : Natural



Language Processing (NLP) and Large Language Models (LLM) enables computers to understand and process human language. Advancements in NLP & LLM are leading to more sophisticated chatbots, machine translation tools, and sentiment analysis applications.

The metal industry can undergo a significant transformation by embracing a data-driven approach. Here's how:

### Data Collection and Infrastructure

- **Embrace IoT and Sensors** : Implement sensors throughout the manufacturing process to collect real-time data on everything from machine performance and temperature to material properties [1].

- **Standardize Data Collection** : Establish consistent data collection practices across departments to ensure data quality and facilitate smooth integration for analysis.

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## Technology

- **Invest in Data Storage Solutions :** Invest in robust data storage solutions like cloud platforms to handle the massive amount of data generated in metal manufacturing. Data Analysis and Utilization
- **Leverage Big Data Analytics :** Utilize big data analytics tools to extract valuable insights from the collected data. This can reveal patterns, trends, and areas for improvement.
- **Predictive Maintenance :** Implement AI-powered algorithms to analyze sensor data and predict equipment failures before they happen. This allows for proactive maintenance, minimizing downtime and maintenance costs.
- **Process Optimization :** Use data analytics to identify bottlenecks and inefficiencies in the production process. Data can guide decisions to optimize resource utilization, production schedules, and overall efficiency.
- **Data-Driven Decision Making :** Empower decision-makers at all levels with data-driven insights. This allows for more informed choices regarding production planning, pricing

- strategies, and resource allocation.
- Cultural Shift and Workforce Training
- **Data Literacy :** Invest in training programs to improve data literacy among the workforce. This equips employees to understand, interpret, and utilize data effectively in their daily tasks.
  - **Culture of Continuous Improvement :** Foster a culture of continuous improvement where data is used to identify areas for improvement and implement data-driven solutions.
  - **Collaboration between Teams :** Encourage collaboration between data scientists, engineers, and production floor personnel to ensure data insights are translated into actionable solutions on the shop floor.
- Benefits of a Data-Driven Metal Industry
- **Increased Efficiency :** Reduced downtime, optimized processes, and improved resource allocation lead to significant efficiency gains.
  - **Enhanced Quality Control :** Data-driven insights can improve quality control processes and minimize defects.

- **Improved Sustainability :** By optimizing resource usage and minimizing waste, data-driven practices contribute to more sustainable metal manufacturing.
- **Cost Reduction :** Predictive maintenance, optimized processes, and reduced waste lead to significant cost savings.
- **Competitive Advantage :** Increased efficiency, better quality control, and faster response times make metal manufacturers more competitive in the global market.

**In conclusion** -The road to a data-driven metal industry requires investment, cultural change, and workforce training. However, the potential benefits in terms of efficiency, cost reduction, and sustainability make this transition a worthwhile endeavour for metal manufacturers of all sizes. ■







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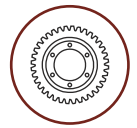
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# Zawar Mines: A Sustainable Evolution



Nestled within the heart of Rajasthan's arid landscapes lies Hindustan Zinc's Zawar Group of Mines, a captivating testament to centuries of mining history and innovation. Situated in #ZincCity, these mines occupy the southern reaches of the sprawling Aravalli Range, boasting a remarkable array of flora and fauna, with over 200-220 bird species highlighting its biodiversity. Zawar Mines have not only survived but thrived, evolving from primitive beginnings to the high-tech operations managed by Hindustan Zinc, a Vedanta group company, which has played a crucial role in reshaping the narrative of Zawar.

Hindustan Zinc's dedication to responsible mining is evident through investments in advanced technologies, effective waste management systems, and initiatives for environmental preservation. Their commitment is showcased by best-in-class exploration machines and sustainable initiatives like the CII National Award-recognized Dry Tailing Plant. Dominating the landscape, the Zawarmata temple represents historical

grandeur with archaeological evidence supporting its ancient origin.

Dating back to the 6th century BC, Zawar Mines boast one of the world's oldest zinc smelting sites. Old workings at various places such as Mochia, Bhalariya, Baroi, and Zawarmala Mines contain numerous old mining



equipment, including bamboo baskets, wooden ladders, earthen lamps, and wooden supports. Carbon dating of these artifacts suggests the age of these



workings to be between 2500 to 2800 ( $\pm 100$ ) years. Carbon dating has been invaluable in unravelling the history of the Zawar mines, revealing mining and smelting activities from the 8th century BCE to the mid-19th century CE, marking centuries of mining legacy.

Zawar mines hold vast reserves of zinc, lead, and silver ores, playing a pivotal role in bolstering the Indian economy and finding application in diverse industrial processes, from battery manufacturing to construction material production. Beyond economic significance, Zawar Mines have positively impacted surrounding communities through various upliftment initiatives. These range from encouraging the adoption of innovative farming techniques to the empowerment of local women, contributing to holistic development in the region.

The story of Zawar Mines is one of evolution, progress, and sustainability. As the sun sets over the Aravalli Range, Zawar Mines continue to shine as a beacon of hope and possibility for the mining industry, serving as a continuous source of livelihood for the tribal people in this region. ■





## Carbon tax impact will have limited impacts on Indian primary aluminium industry: ICRA

The European Union's carbon tax is anticipated to have a limited impact on Indian primary aluminium producers, as per ICRA's findings. Initially, the Carbon Border Adjustment Mechanism (CBAM) will cover only direct process-related emissions, starting January 1, 2026. This is expected to moderately affect aluminium prices, with a projected 2-6% impact. However, if indirect emissions, mainly stemming from coal-fired power plants, are included in the future, the impact could be severe, potentially reaching 27-30% of current prices. Despite India's efforts to reduce carbon footprint, the reliance on coal-fired electricity poses a challenge.

Meanwhile, Europe's potential ban on Russian aluminium could ignite competition between European and U.S. buyers for Middle Eastern aluminium, leading to price hikes. This competition may evoke memories of 2018, when sanctions were imposed on Rusal. Middle Eastern countries like the UAE and Bahrain could become key suppliers, particularly as aluminium gains importance in electric vehicle manufacturing. The loss of Russian metal could leave Europe with a shortfall of approximately 500,000 tons, necessitating a search for alternative suppliers and potentially the restart of idled capacity in the region.

## Hyundai Motor ends Indonesia aluminium deal after climate campaign by K-pop fans

South Korea's Hyundai Motor Co and PT Adaro Minerals Indonesia Tbk have ended an aluminium supply agreement after calls by a climate campaigner backed by K-pop fans not to procure supplies of the metal produced using coal power.

Millions of young K-pop fans have thrown their considerable weight at times behind various global campaigns and social causes, often using social media. Hyundai Motor said in a statement on Tuesday that it had ended its non-binding memorandum of understanding (MoU) with Adaro, a unit of Indonesia's second-largest coal miner Adaro Energy Indonesia, at the end of 2023, adding that the companies had decided to explore other opportunities independently.

Wito Krishnadi, director of PT Adaro Minerals Indonesia, also confirmed the companies had decided not to renew the agreement following its expiry.

The South Korean automaker signed the MoU with Adaro Minerals in 2022 to secure the right to purchase aluminium produced by Adaro's subsidiary PT Kalimantan

Aluminium Industry.

At the time of the signing, Hyundai said it expected to procure aluminium from Adaro that meets the automaker's carbon neutralization policy amid growing demand for aluminium among global automakers.

## Global Aluminium Sheet Prices Inclines in March 2024, regions face different challenges

In March 2024, the global aluminium market witnessed dynamic shifts affecting supply and demand dynamics across key regions. In the USA, Aluminium Sheet remained readily available to meet demands, benefiting from market dynamics. Germany experienced inventory drops, while Alumina production in the Americas decreased, impacting supply chains. China faced delays from suppliers, leading to raw material shortages. Aluminium Sheet prices inclined due to supply-demand disparities, particularly favored by pricing dynamics.

In the US, a surge in demand for Aluminium Sheet was observed, fueled by competitive dynamics, with positive demand trends persisting. Germany's low inventory levels posed industry challenges, potentially leading to price hikes. Similarly, China's domestic Aluminium Sheet industry experienced heightened demand, notably from the automotive sector, reflected in increased supplier delivery times and a rebounding manufacturing industry.

Overall, the market dynamics were influenced by decreased inventory levels, post-Lunar New Year recovery, and adverse weather conditions, with Aluminium Sheet prices showing fluctuations. The strong demand for Aluminium Sheet in the US and Europe, coupled with China's energized domestic industry, indicates continued market momentum in the coming months.

## Global copper smelters less active after China's planned output cuts

More global copper smelters were not operating in March than in the first two months, data from satellite surveillance of metal processing plants showed, after Chinese smelters proposed to cut output and operations elsewhere undertook planned maintenance.

Earth-i, which specialises in observational data, tracks smelters representing up to 90% of global production for its SAVANT service and sells data to fund managers, traders and miners.

The company said that an average of 17.7% of global copper smelter capacity monitored was inactive in March compared with 11.5% during January and February combined.



## News Update

Average inactive capacity in China rose to 9% in March from 8.3% in the first two months, it added in a statement on Thursday.

China's top copper smelters proposed in late March to cut production by 5% to 10%, sources told *Reuters*, after the world's top producer of refined copper battled short supply of raw material and losses at some operations.

"As market watchers seek confirmation of pledged curtailments in China ... inactivity in the country jumped sharply in the final days of March, ending the month at a substantially higher 12.8%," Earth-i said.

Outside China, the Isabel plant in the Philippines has shown "flickers" of inactivity, along with Codelco's Chuquicamata smelter in Chile, it added.

"We are now entering a period of several scheduled maintenance closures."

Trafigura: AI boom could spark a copper shortage

### AI and data centers' rapid growth is creating a significant demand for copper

- The copper market is already facing a 4-5 million ton deficit by 2030.
- China, a major copper producer, is considering production cuts due to raw material supply issues.

The chief economist at commodity trading giant Trafigura has warned the copper market could tighten further as a result of artificial intelligence.

Speaking at the Financial Times Commodities Summit in Switzerland, Trafigura's chief economist Saad Rahim said that growth has "suddenly exploded" as a result of the proliferation of global data centres.

2030, this could amount to an additional 1m tons of need, Rahim said and that the figure is "on top of a 4-5m ton deficit gap by 2030 anyway".

He added: "That's not something that anyone has actually factored into a lot of these supply and demand balances."

China Heavily Subsidized BYD to Expand Its EV Market Share

Rahim's concerns surrounding AI and its dredging of resources has been echoed by others. Recent research from the University of Washington shows that the hundreds of millions of queries logged on Open AI's platform require the equivalent energy of 33,000 US households — around one gigawatt-hour a day.

Copper, meanwhile, rallied to its highest price point in over a year last week, hitting nearly \$9,400 (£7,444), despite lingering concerns about the state of the global economy.

The energy transition has been fuelling the drive for copper as a key component of electric vehicles and renewable energy technologies.

Additionally, the prospect of lower interest rates spurring on global manufacturing, for which copper is a key material, as well as a long-awaited wake-up in China's property industry, have also been signalling a growing need for the red metal.

But China, which is also the third-largest producer of copper from mines, has been threatening to cut production as it struggles to maintain regular raw material supplies. This problem is also felt across projects in other countries.

Kieron Hodgson, an analyst with Panmure Gordon, said in a note circulated this week that Chinese cuts would "change the narrative for all" and "significantly tighten" the global copper market, driving prices upward.

### India initiates anti-dumping probe into import of aluminium foil from China

#### Hydro Årdal opens new recycling unit with capacity to process 25,000 tonnes of post-consumer aluminium scrap annually

As part of its efforts to meet the demand for low-carbon aluminium in European markets, aluminium and renewable energy company, Hydro, has invested NOK 100 million in recycling technology in the casthouse at the Årdal primary aluminium plant in Norway.

*Image above: Årdal Recycling opened on April 10 by Mayor of Årdal Christian Sønstlien, Minister of Trade and Industry Jan Christian Vestre and Plant Manager Anveig Bjordal Halkjelsvik. (Photo: Jens Christian Boysen/Hydro)*

"The demand for low-carbon aluminium is increasing, particularly in the automotive industry. Thanks to the cutting edge technology and know how utilized by our team in Årdal, customers can reduce the carbon footprint in their value chain and get closer to achieving their climate targets," says Eivind Kallevik, Executive Vice President of Hydro Aluminium Metal.

The upgraded casting line in Årdal will mix primary aluminium made with renewable hydropower with up to 30 percent post-consumer aluminium scrap. This is resulting in a record low-carbon footprint that helps some of the most advanced customers in Europe cut the embedded greenhouse gas emissions of their products.

The recycling unit in Årdal had its official opening on April 10. Hydro Årdal is now able to deliver REDUXA 3.0 aluminium with a carbon footprint of below 3.0 kg CO<sub>2</sub>e/kg aluminium. This is approximately 80 percent lower than the world average.

"Low-carbon aluminium from Årdal is already an important part of Hydro's strategic partnership with leading customers in our joint efforts to decarbonize. With this upgrade and other long-term investments at the



plant, Hydro Årdal is set to deliver low-carbon aluminium to the European market for decades to come," says Kallevik.

Hydro aims to become a net-zero producer of aluminium by 2050, and is on track to achieve a 30 percent reduction in emissions by 2030 compared to 2018 levels. Aluminium recycling is one of the main pathways of Hydro's decarbonisation strategy.

In addition to recycling of post-consumer scrap, Hydro is working towards full decarbonization by introducing new technologies such as carbon capture and storage, as well as developing HalZero, a completely new electrolysis process with the potential to eliminate CO2 emissions from primary aluminium production altogether.

## Manufacto India Reshaping the Aluminium Formwork Industry with High-Tech Production

Manufacto India's commitment to innovation, quality, and client-centric solutions positions the company as a strong contender in the aluminium formwork industry



Manufacto India Reshaping the

Aluminium Formwork Industry with High-Tech Production Manufacto India Pvt. Ltd., founded in December 2023 by industry veteran Sanjiv Chhabra, is revolutionizing the aluminium formwork sector with its customer-centric approach, innovation, and unwavering commitment to quality.

Drawing from Chhabra's 14 years of experience in aluminium manufacturing and real estate development insights, Manufacto India addresses the persistent challenges faced by builders and developers. Backed by a team of seasoned experts with over 15 years of experience in aluminium formwork manufacturing, the company aims to deliver premium-quality solutions tailored to each project's unique requirements.

Equipped with state-of-the-art machinery and boasting a production capacity of 15,000 square meters per month, Manufacto India ensures timely delivery of custom-designed formwork systems. These systems offer accelerated construction timelines without compromising on quality, undergo rigorous testing processes, and boast a high load-bearing capacity, providing exceptional durability and reliability.

Furthermore, Manufacto India's buyback guarantee at 40% of the original sale price underscores its confidence in the product's longevity, while the company's commitment to sourcing reliable raw materials ensures

consistent quality and performance.

With its focus on innovation, quality control, and client satisfaction, Manufacto India emerges as a formidable player in the aluminium formwork industry, poised to provide efficient and dependable construction solutions for builders and developers alike.

## Vedanta Aluminium's Healthcare Initiatives Benefit around 4 Lakh People in Odisha & Chhattisgarh

On World Health Day, Vedanta Aluminium, a leading aluminium producer in India, revealed its significant impact on the healthcare landscape in Odisha and Chhattisgarh, benefiting approximately 4 lakh individuals in FY24. Embracing the theme "My health, my right," Vedanta Aluminium has been dedicated to providing top-tier healthcare services and promoting preventive measures, aligning with the fundamental right to quality healthcare for all.



Across its operations in Jharsuguda, Lanjigarh, Korba, and Vizag General Cargo Berth (VGCB), Vedanta Aluminium spearheaded

various initiatives. In Jharsuguda, mobile healthcare units traversed nearly 30 villages, disseminating health awareness materials and conducting a pilot breast cancer screening camp at the Jharsuguda Diagnostic Centre. Lanjigarh witnessed a multi-specialty health camp, benefiting over 500 individuals, alongside extensive health and hygiene awareness programs across 20 villages. In Korba, assistive devices were distributed to elderly and specially-abled persons, while multi-specialty health camps served around 500 community members in Bhadracharya and Belakachar.

At VGCB, a two-day eye check-up camp catered to around 400 people, with free spectacles provided to address vision impairments. Additionally, essential support was extended to marginalized communities, including battery-operated wheelchairs and tricycles, enhancing mobility and independence.

Vedanta Aluminium's initiatives encompass a wide range of basic and specialized healthcare services, reaching underserved communities within and around its operational sites. Through these concerted efforts, the company continues to champion accessible and quality healthcare, embodying its commitment to social responsibility and community welfare.



## Domestic passenger vehicle sales rise by 11% in February – SIAM

As per the recent month data published by Society of Indian Automobile Manufacturers (SIAM) reported sharp increase in Passenger vehicle sales by 11 percent year-on-year jump in dispatches to dealers in February, as sports utility vehicles (SUVs) continued to drive demand. It was the highest-ever February dispatch by car manufacturers. Total dispatches of passenger vehicles (PVs) to dealerships stood at 370,786 units in February, 10.8 per cent higher than 334,790 units sent in February last year, data from the Society of Indian Automobile Manufacturers (SIAM) revealed.

Three-wheeler sales in February were at 54,584 units, up 8.3 percent. Two-wheelers continued their growth path selling 15,20,761 units in February, which was a sharp 34.6 percent jump. But the sales of commercial vehicles (CVs) remained muted. It saw a 0.7% decline in the wholesale volumes in February.

Vinod Aggarwal, President, SIAM said, "Passenger vehicles, two-wheelers, and three-wheelers have posted growth in February 2024 compared to the previous year,

while commercial vehicles have witnessed a slight de-growth. Overall robust GDP growth of the country in Q3 of 2023-24 has helped the auto sector.

The Bharat Mobility Global Expo 2024 held in February 2024, graced by the Hon'ble Prime Minister, has also created a strong positive sentiment for the consumers and therefore the industry expects the growth momentum to continue."

SUVs, meanwhile, remained the major growth driver. Mahindra and Mahindra said on Monday that its SUV sales in the domestic market jumped 40 percent in February. PV exports have grown by 20.5 percent, while two-wheeler exports have grown by 39.5 percent.

Honda Motorcycle & Scooter India's (HMSI) scooter exports have more than doubled from 13,365 units in February 2023 to 28,008 units in February 2024. Hero MotoCorp's motorcycle exports have also nearly doubled to 22052 units this February from 11689 units last February.

### Domestic Sales: Monthly

Category Segment/Subsegment	Domestic Sales (In Nos.)	
	February	
	2023	2024
<b>Total Passenger Vehicles<sup>3</sup></b>	<b>3,34,790</b>	<b>3,70,786</b>
<b>Three Wheelers</b>		
Passenger Carrier	38,777	42,582
Goods Carrier	8,711	10,013
E-Rickshaw	2,615	1,509
E-Cart	279	480
<b>Total Three Wheelers</b>	<b>50,382</b>	<b>54,584</b>
<b>Two Wheelers</b>		
Scooter/ Scooterettee	3,91,054	5,15,340
Motorcycle/Step-Throughs	7,03,261	9,64,362
Mopeds	35,346	41,059
<b>Total Two Wheelers</b>	<b>11,29,661</b>	<b>15,20,761</b>
<b>Quadricycle</b>	<b>107</b>	<b>36</b>

<sup>3</sup> BMW, Mercedes, JLR & Volvo Auto data are not available. Tata Motors Domestic Sales data included only in "Total PV", detailed break-up is not available. However, without Tata Motors, "Total PV" would be 2,91,928 for February 2023 and 3,19,519 for February 2024



SIAM						
Segment wise Comparative Production, Domestic Sales & Exports data for the month of February 2024						
(Number of Vehicles)						
Category Segment/Subsegment	Production		Domestic Sales		Exports	
	February		February		February	
	2023	2024	2023	2024	2023	2024
<b>Passenger Vehicles (PVs)*</b>						
Passenger Cars	1,69,826	1,51,538	1,42,201	1,15,937	25,207	31,440
Utility Vehicles (UVs)	1,58,602	2,21,965	1,38,238	1,91,435	19,512	21,819
Vans	11,550	13,248	11,489	12,147	140	784
<b>Total Passenger Vehicles (PVs)</b>	<b>3,37,978</b>	<b>3,86,741</b>	<b>2,91,928</b>	<b>3,19,519</b>	<b>44,859</b>	<b>54,043</b>
<b>Three Wheelers</b>						
Passenger Carrier	56,978	65,687	38,777	42,582	19,386	25,203
Goods Carrier	8,191	10,797	8,711	10,013	254	638
E-Rickshaw	2,516	754	2,615	1,509	-	-
E-Cart	407	567	279	480	-	-
<b>Total Three Wheelers</b>	<b>68,092</b>	<b>77,805</b>	<b>50,382</b>	<b>54,584</b>	<b>19,640</b>	<b>25,841</b>
<b>Two Wheelers</b>						
Scooter/ Scooterette	4,40,901	5,67,463	3,91,054	5,15,340	33,378	47,364
Motorcycle/Step-Throughs	8,72,062	12,19,447	7,03,261	9,64,362	2,01,097	2,80,142
Mopeds	35,706	42,624	35,346	41,059	612	576
<b>Total Two Wheelers</b>	<b>13,48,669</b>	<b>18,29,534</b>	<b>11,29,661</b>	<b>15,20,761</b>	<b>2,35,087</b>	<b>3,28,082</b>
<b>Quadricycle</b>	<b>452</b>	<b>331</b>	<b>107</b>	<b>36</b>	<b>348</b>	<b>458</b>
<b>Grand Total</b>	<b>17,56,191</b>	<b>22,94,411</b>	<b>14,72,078</b>	<b>18,94,900</b>	<b>2,99,934</b>	<b>4,08,422</b>

\* BMW, Mercedes, JLR, Tata Motors and Volvo Auto data is not available  
Society of Indian Automobile Manufacturers (12/03/2024)

SIAM						
Summary Report: Cumulative Production, Domestic Sales & Exports data for the period of April-February 2024						
Report I (Number of Vehicles)						
Category Segment/Subsegment	Production		Domestic Sales		Exports	
	April-February		April-February		April-February	
	2022-23	2023-24	2022-23	2023-24	2022-23	2023-24
<b>Passenger Vehicles (PVs)*</b>						
Passenger Cars	19,72,794	17,88,659	15,79,029	13,98,836	3,72,497	3,91,631
Utility Vehicles (UVs)	19,82,297	24,42,849	17,57,158	22,11,831	2,18,478	2,10,638
Vans	1,28,805	1,32,929	1,25,593	1,33,538	457	7,236
<b>Total Passenger Vehicles (PVs)</b>	<b>40,81,696</b>	<b>43,64,437</b>	<b>34,61,780</b>	<b>37,42,205</b>	<b>5,91,432</b>	<b>6,09,505</b>
<b>Three Wheelers</b>						
Passenger Carrier	6,61,579	7,74,583	3,20,963	5,02,125	3,41,819	2,72,257
Goods Carrier	89,553	1,04,148	86,679	99,864	4,396	3,439
E-Rickshaw	24,641	28,737	23,936	29,595	-	-
E-Cart	3,055	3,407	2,830	3,442	-	-
<b>Total Three Wheelers</b>	<b>7,78,828</b>	<b>9,10,875</b>	<b>4,34,408</b>	<b>6,35,026</b>	<b>3,46,215</b>	<b>2,75,696</b>
<b>Two Wheelers</b>						
Scooter/ Scooterette	51,13,161	58,42,185	47,53,085	53,72,713	3,74,014	4,68,460
Motorcycle/Step-Throughs	1,23,79,726	1,33,19,166	94,14,380	1,06,73,137	30,29,006	26,60,607
Mopeds	3,99,946	4,44,480	4,04,753	4,40,936	3,528	2,232
<b>Total Two Wheelers</b>	<b>1,78,92,833</b>	<b>1,96,05,831</b>	<b>1,45,72,218</b>	<b>1,64,86,786</b>	<b>34,06,548</b>	<b>31,31,299</b>
<b>Quadricycle</b>	<b>2,356</b>	<b>4,196</b>	<b>620</b>	<b>694</b>	<b>1,854</b>	<b>3,536</b>
<b>Grand Total</b>	<b>2,27,56,713</b>	<b>2,48,85,339</b>	<b>1,84,69,026</b>	<b>2,08,64,711</b>	<b>43,46,049</b>	<b>40,20,036</b>

\* BMW, Mercedes, JLR, Volvo Auto data is not available and Tata Motors data is available for April-December only  
Society of Indian Automobile Manufacturers (12/03/2024)



Statistics

SIAM
Category & Company wise Summary Report for the month of February 2024 and Cumulative for April-February 2024
Report II
(Number of Vehicles)
Table with 13 columns: Segment/Subsegment, Manufacturer, Production (Feb 2023, Feb 2024, April-February 2022-23, April-February 2023-24), Domestic Sales (Feb 2023, Feb 2024, April-February 2022-23, April-February 2023-24), Exports (Feb 2023, Feb 2024, April-February 2022-23, April-February 2023-24). Includes sub-totals for Passenger Vehicles (PVs) and Total Passenger Vehicles (PVs).

SIAM
Category & Company wise Summary Report for the month of February 2024 and Cumulative for April-February 2024
Report II
(Number of Vehicles)
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SIAM
Segment & Company wise Production, Domestic Sales & Exports Report for the month of February 2024 and Cumulative for April-February 2024
Report III
(Number of Vehicles)
Table with 13 columns: Segment/Subsegment, Manufacturer, Production (Feb 2023, Feb 2024, April-February 2022-23, April-February 2023-24), Domestic Sales (Feb 2023, Feb 2024, April-February 2022-23, April-February 2023-24), Exports (Feb 2023, Feb 2024, April-February 2022-23, April-February 2023-24). Includes sub-totals for Passenger Carrier, Goods Carrier, and E-Cart.







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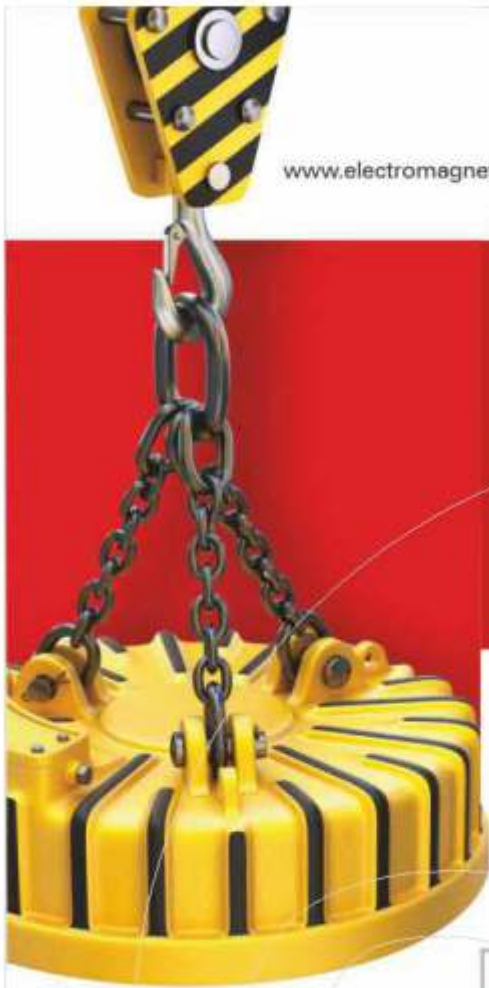
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