FutureBridge

CAPABILITY SHOWCASE

Pulp & Paper

Industrial Business Deck

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01 Market Overview

Pulp & Paper Landscape: A 360° View of Ecosystem

PULP MAKING

Fibre Preparation

Wood Preparation
Debarkers · Chippers · Chip screens

Recycled Fibre Preparation
Pulpers · Cleaners & coarse screens · Deinking flotation cells

Alternative Fibre Preparation
Depithers · Cutters and shredders · Wet cleaning & washing systems · Separators

Pulping and Refining

Chemical Cooking
Digesters (continuous/batch) · Chip feeding systems · Impregnation vessel

Mechanical Refining
High-consistency refiners · Chip impregnator · Steam separation system

Non-wood & Specialty Cooking
Horizontal tube · Continuous digester · Auto-hydrolysis , Pre-hydrolysis reactor

Cleaning and Bleaching

Washing
Wash press (twin-roll) · Drum displacement washer

Screening & Cleaning
Pressure screen (knotter & fine) · Hydro-cyclone cleaner

Bleaching
Oxygen delignification reactor · Bleaching tower & chemical mixer

Chemical Recovery & Pulp Drying

Liquor recovery
Multi-effect evaporator · Recovery boiler

Chemical regeneration
Causticizing plant · Rotary lime kiln

Pulp drying & baling
Drying machine · Cutter & baling line

PAPER MAKING

Stock Preparation

Refining
Low-consistency refiner · Refiner fillings / plates · Deflaker

Cleaning & screening
Hydro-cyclone cleaner · Machine screen · Fractionation screen

Approach flow & additives
Approach flow system · Chemical dosing system · Disc filter / fibre recovery

Forming, Pressing & Drying

Sheet Forming
Headbox · Dilution Control System · Edge control module

Pressing
Shoe press · Press roll & roll covers · Press felt

Drying
Steam-heated dryer cylinder · Impingement / air dryer · Yankee dryer

Surface Finishing & Winding

Sizing & coating
Film size press · Hard nip sizer · Blade coater · Curtain coater

Calendering
Soft & hard nip calender · Metal belt calender

Reeling & winding
Reel · Two-drum winder · Belt-supported winder

Functionalizing

Barrier & Repellency
Water & grease barrier treatment · PFAS-free barrier systems · Bio-based barrier chemistry

Multilayer & Structured Papers
Layered fibre structures · Micro-fibrillated cellulose integration

Specialty Surface Functions
Heat-sealable paper · Conductive or sensing coatings

PRODUCTS

Market Pulp

Packaging Paper & Board

Tissue

Graphics Paper

Specialty & Technical Paper

Functional Paper

FINISHING & CONVERTING

Surface Finishing & Mechanical Treatment

Functional Coating & Treatment

Laminating & Multi-layer Structures

Web & Sheet Conversion

Printing & Decoration

Packaging Conversion

Pivotal Shifts Reshaping Pulp & Paper

Pulp & Paper is moving from conventional, asset-centric production toward more resource-efficient equipment, flexible assets and higher-value paper products.

Rebuilds are replacing greenfield expansion in mature markets

- Existing machines are being converted and rebuilt to create new capacity and grades.
- Paper-machine OEMs are shifting from new-machine sales toward conversion, rebuild and lifecycle opportunities.

Coating is becoming a product-differentiation layer

- Higher-value paper products increasingly rely on surface treatments to deliver barrier and functional properties.
- Coating and sizing equipment are becoming critical to moving from commodity grades toward differentiated products.

Plastic and chemical bans are creating demand for entirely new machine classes

- PFAS and single-use plastic rules are pushing brand owners toward fibre-based alternatives.
- Moulded fibre and barrier coating are scaling from pilot to commercial machine classes.

Heat recovery and drying are being reengineered for lower-carbon production

- Vapour recovery is reducing steam demand, while hydrogen, biomass and electric heating are emerging for drying.
- Heat systems are becoming a mill-wide lever for energy cost and decarbonization.

Functional and specialty papers are opening new product spaces

- Producers are adding barrier functionalities and other technical performance to fibre-based substrates.
- Paper machines and coating lines are increasingly being designed around end-use requirements such as food-contact barriers, release liners, filtration media, and electrical insulation.

Ecosystem Dynamics

Value creation is shifting beyond the mill as technology partners, downstream players and new fiber ecosystems reshape how paper is produced, engineered and commercialized.

Paper is co-engineered downstream

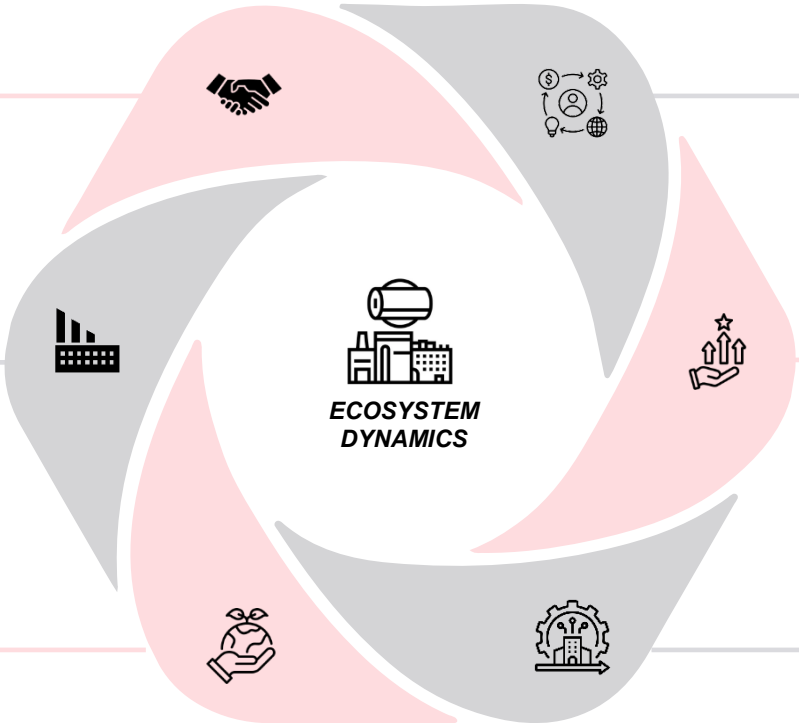
Mills increasingly collaborate with converters and material specialists on barriers, lightweighting and molded fiber.

Legacy assets become conversion platforms

Closures and rebuilds are creating demand for flexible machines that can shift from declining graphic grades to packaging, tissue and specialty grades.

Circularity becomes a shared system

Fibre recovery, lignin valorization and improved recycling require closer coordination across mills, technology suppliers, material producers and downstream users.



New feedstocks create new ecosystems

Recovered fiber and agricultural residues connect mills to new suppliers and bio-based markets.

Bioeconomy is attracting new players

Textile, chemical and biotechnology companies are entering the pulp value chain to develop fibre, biomaterials, chemicals and other products from wood and alternative feedstocks.

OEMs become transformation partners

Equipment suppliers increasingly support conversion, automation, digitalization and lifecycle optimization.

02 Challenges and Opportunities

Challenges and Opportunities

Industry pressures are reshaping the mill investment agenda from capacity-led expansion toward selective conversion, modernization, automation and resource optimization.

KEY CHALLENGES	KEY OPPORTUNITIES
Legacy assets misaligned with changing demand Graphic-paper decline and uneven growth are forcing difficult decisions on closures, conversions and modernization.	**Convert & rebuild legacy paper machines** Repurpose legacy machines toward packaging and specialty grades through targeted machine-section upgrades.
Fiber supply is becoming harder to secure and control Virgin-fiber availability, recovered-fiber competition and alternative-feedstock variability are making consistent, cost-effective furnish harder to secure.	**Advanced fiber preparation and treatment** Improve pulping, screening, refining and fibre treatment to handle variable feedstocks while improving yield and pulp quality.
Recycled fiber quality is becoming more difficult to manage Higher recycled content increases exposure to contaminants, fiber degradation, stickies and repulpability challenges.	**Next-generation recycled-fiber processing** Upgrade screening and cleaning to increase recycled content while reducing contamination and fiber losses.
Rising technical complexity of paper-based packaging New barriers, coatings and functional materials require capabilities beyond traditional commodity-paper production..	**Engineered paper & barrier capabilities** Develop functional coatings and barrier technologies to deliver packaging performance beyond conventional paper grades.
Pulp mills remain heavily dependent on fibre-based revenue Lignin, tall oil, bark and other biogenic streams are largely consumed internally or sold into lower-value applications.	**Lignin and side-stream valorization** Convert lignin, tall oil and other mill side streams into higher-value chemicals, materials and bio-based products.

Regional Industry Dynamics

The market is shifting from “where is paper growing?” to “what type of investment is each region making?” - greenfield in South America, expansion in APAC, and asset transformation in mature markets like North America and Europe.

NORTH AMERICA

- Mature, rationalizing market where packaging remains resilient, but capacity closures are increasing
- OEM demand is shifting toward conversions, rebuilds, debottlenecking and productivity upgrades.

EUROPE

- Graphic-paper decline is shifting investment toward packaging, specialty grades, asset conversion and lower-resource production.
- OEM demand is moving toward brownfield conversion, energy reduction, fibre traceability and regulatory readiness.

CHINA

- Overcapacity is pushing leading players toward pulp integration, cost control and higher-value grades.
- Demand is shifting toward integrated pulp-paper projects, specialty machines and productivity upgrades.

SOUTH AMERICA

- Competitive fibre economics continue to support large integrated pulp projects.
- Greenfield pulp projects are creating demand across pulp, recovery, utilities and mill infrastructure.

APAC

- Packaging and tissue demand is supporting new capacity, particularly in India and Southeast Asia.
- New-machine demand is strongest in packaging, tissue and specialty grades, with automation and resource productivity built in.

Future Industry Direction

Pulp & paper is evolving from a volume-driven manufacturing industry into a differentiated, flexible and increasingly integrated fiber-based industry

Regional advantage drives investment

South America favors integrated low-cost pulp; APAC continues to build; mature markets increasingly prioritize capacity rationalization and productivity.

Targeted rebuilds redirect legacy capacity

Conversions, rebuilds and retrofits will increasingly redirect legacy machines towards packaging, tissue and specialty grades.

Strategic fiber sourcing takes priority

Tighter virgin supply and variable recovered fiber increases the value of screening, refining, furnish optimization and fiber recovery.

Advanced engineering expands paper capabilities

Lightweighting, coatings, barriers, molded fiber and advanced cellulose will expand paper into higher-value applications such as high-performance food service, e-commerce and more.

Fiber diversity becomes a process challenge

Recovered and alternative fibers will expand, but variability, contamination and fiber degradation will make furnish preparation increasingly sophisticated.

03

How FutureBridge can Help?

How FutureBridge can help?

Support pulp & paper players in navigating the industry's next growth cycle through technology scouting, opportunity identification, customer insight, competitive intelligence and growth strategy.

Innovation / Solution / Technology Scouting

Identify emerging technologies across fiber processing, pulping, bleaching, paper machines, digitalization and decarbonization, assess technology maturity, suppliers and application potential.

Future Roadmaps & Future of X

Develop technology and market roadmaps highlighting evolution, adoption timelines, inflection points and emerging whitespace opportunities across pulp, paper and packaging.

Customer Analysis & VoC

Identify customer requirements, technical specifications, pain points and adoption barriers across pulp, paper, converting, packaging and end-use segments.

Market and Competitive Analysis

Assess market attractiveness, growth pockets, competitive positioning and white spaces across packaging, tissue, specialty papers, biomaterials and pulp applications

Strategy (Positioning, GTM)

Define priority opportunities, value propositions, target customers and entry strategies to capture growth across grades, technologies, applications and value chains.

M&A & Partner Identification

Identify technology providers, startups, OEMs, material innovators and strategic partners to close capability gaps and accelerate market entry.

Leadership Team

Arvind Sawarkar

Practice Head
Industrial Business

More than two decades of experience across mobility and industrial technology, helping global leaders decode market disruption, identify emerging opportunities, fast-track innovation, and build strategies for next-generation growth.

Pete Dulcamara

Partner
Chemicals & Materials

As a FutureBridge Partner and former Kimberly-Clark Chief Scientist, Pete brings a rare client-to-advisor perspective, helping industrials, packaging, chemicals and consumer products companies accelerate innovation with confidence.

Tanay Choure

Director
Industrial Business

Nearly two decades of mobility and industrial consulting experience, helping global leaders navigate industry disruption, identify emerging technologies and market opportunities, accelerate innovation, and unlock the next wave of growth.

FutureBridge is a techno-commercial consulting and advisory company. We track and advise on the future of industries from a 1-to-25-year perspective.

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