



Paper Market in Transformation

ASEAN PULP AND PAPER SUMMIT PRESENTATION

AFRY MANAGEMENT CONSULTING | 13 NOVEMBER 2024 | PUTRAJAYA, MALAYSIA

ABOUT AFRY MANAGEMENT CONSULTING

AFRY provides engineering, design, digital and advisory services to accelerate the transition towards a sustainable society

| | | | | |
|------------|---------------|-----------|------------------------|-----------------|
| Presence | Revenue | Projects | Staff | Backed by |
| 5 | 1,608 million | > 100 | 800+ | 19,000 |
| continents | SEK in 2023 | countries | management consultants | experts at AFRY |

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In 2019 **ÅF** and **Pöyry** merged to form AFRY

We are **19,000** devoted employees

Net sales of **27 BSEK** (equivalent to 18 BRMB)

We work across **5** divisions – Process Industries, Infrastructure, Energy, Industrial & Digital Solutions, Management Consulting

Projects in **> 100** countries



AGENDA

Paper Market In Transformation

Global Paper Market Situation



Tissue Market Situation



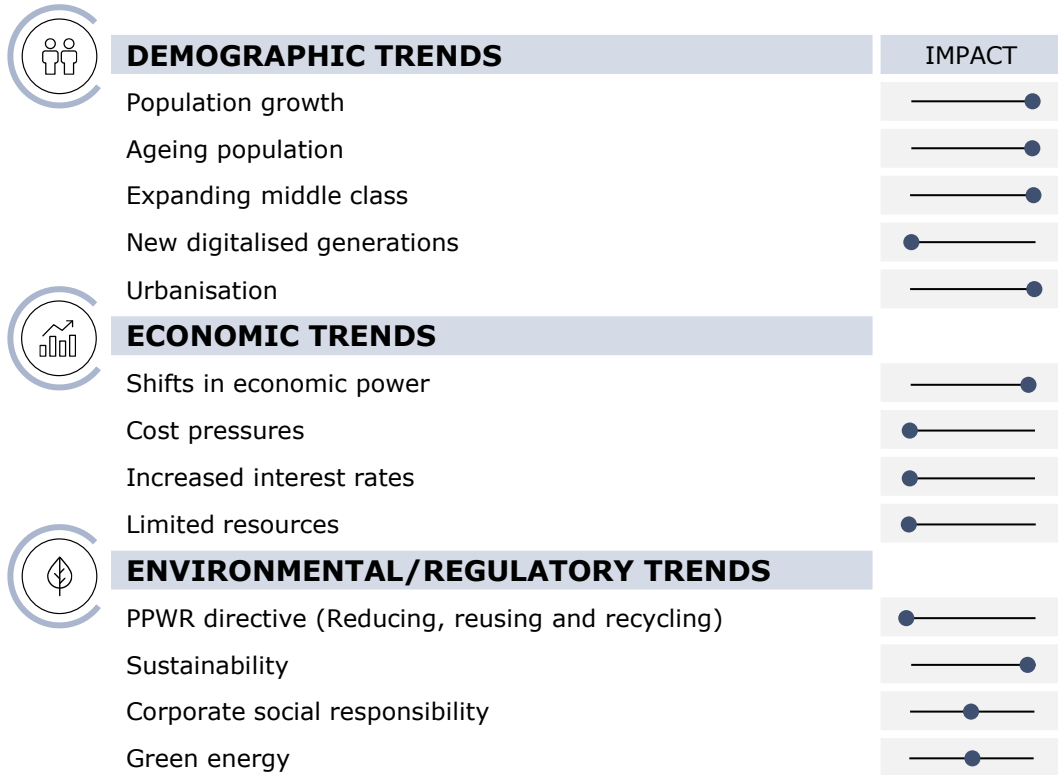
AGENDA

Paper Market In Transformation

Global Paper Market Situation



Environmental initiatives and consumer preferences support paper industry growth



TRENDS & DRIVERS | PRODUCT DEVELOPMENT TRENDS

Current technologies such as water-based dispersions and bio-based plastics are used to reduce and to replace plastic barrier in food service

WATER-BASED DISPERSIONS



Asia Pulp & Paper Foopak Bio Natura eliminates plastic by using a proprietary aqueous dispersion. It can be composted within 12-weeks in the industrial compostable facility, and 26-weeks in home composting.



One of **Mayr-Melnhof's** PM produces FBB and FSB with capability to produce dispersion barrier coatings directly on the machine. AEGLE and ISLA are products with water-based dispersion barrier.



storaenso

Stora Enso has installed dispersion barrier technology at its Forshaga site in Sweden in 2021. It results in products that are easier to handle in a recycling process, have a lower carbon footprint and can be composted in industrial facilities.



Metsä Eco-barrier Prime FBB is a dispersion coated barrier paperboard with a medium barrier against grease and moisture, can be composted industrially and at home. It is fluorochemicals and OBA-free.

BIO-BASED PLASTICS



WestRock TruServ Compostable Cupstock uses a bio-based polylactic acid (PLA) coating created from annually renewable resources. It is industrially compostable.



Graphic Packaging's ecotainer™ Cups are commercially compostable foodservice packaging, utilizes a PLA biopolymer coating, with ASTM and BPI certifications for compostability



PTT MCC (Thailand)'s **BioPBS** is derived from corn and transformed into biopolymer. It can be used for hot beverage cups, boxes and utensil for freshly cooked food. Paper packaging from **KMP (Thailand)** is also coated with BioPBS.



Huhtamaki's Bioware paper cups utilize plant-based PLA coating on the inside and are industrially compostable according to EN13432. **Pactiv's Earthchoice** is a BPI certified compostable, made from renewable PFAS free PLA coated paperboard

Producers are innovating to meet the downstream market demands

EUKALINER - KLABIN



- The Eukaliner® from Klabin shown positive signals of using 100% eucalyptus to produce kraftliner and white top kraftliner
- The combination of never-dried euca pulp and modern PM assets can make balanced moisture and thickness profile with good printability
- Basis weight: 90 - 200 g/m²
- Characteristics/Advantages: Potential of ~ 10% basis weight reduction; Lower steam consumption during the board corrugating process; a more homogeneous surface leads to better printing quality
- End use: packaging materials

GREEN SHIELD - HANKUK

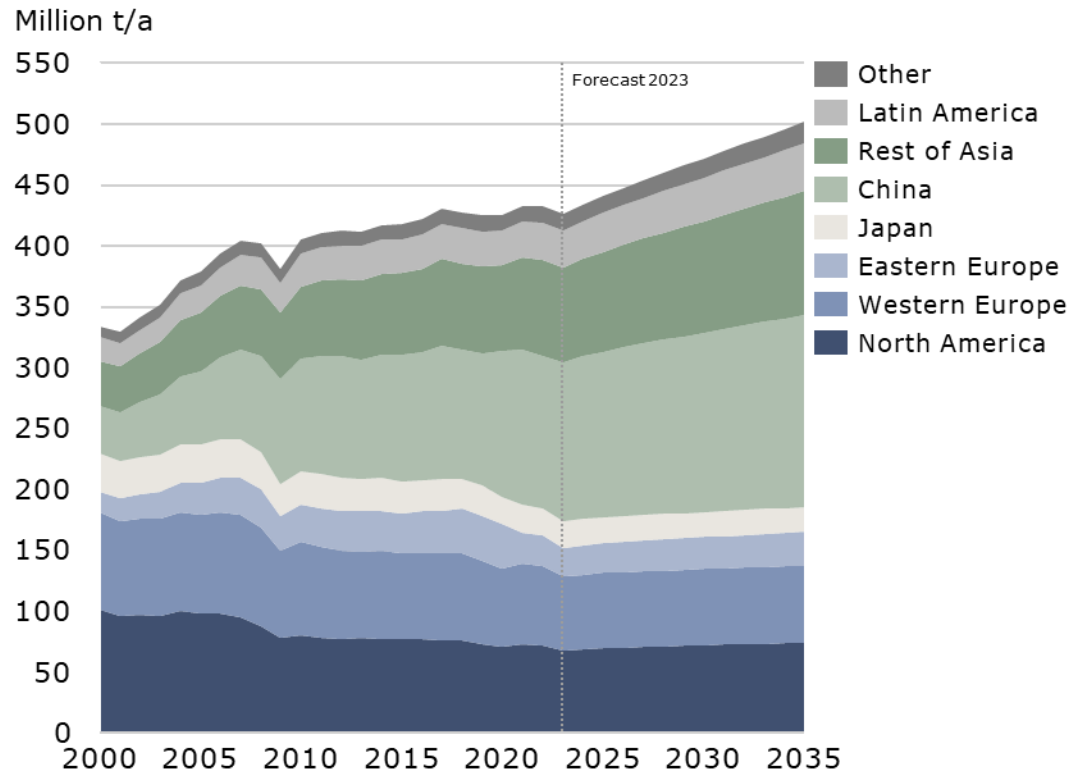


- Green Shield is a special Barrier coated paper (Polymer) developed by Hankuk Paper, Which has been manufactured by using a different method compared to other Barrier coating methods hence does not require PE coating and it can be reused in paper material
- Basis weight: 235 - 365g/m²
- Characteristics/Advantages: superb water resistance, grease resistance, and processing quality, suitable for food packaging
- End use: packaging materials for cups, food, cosmetics, etc.

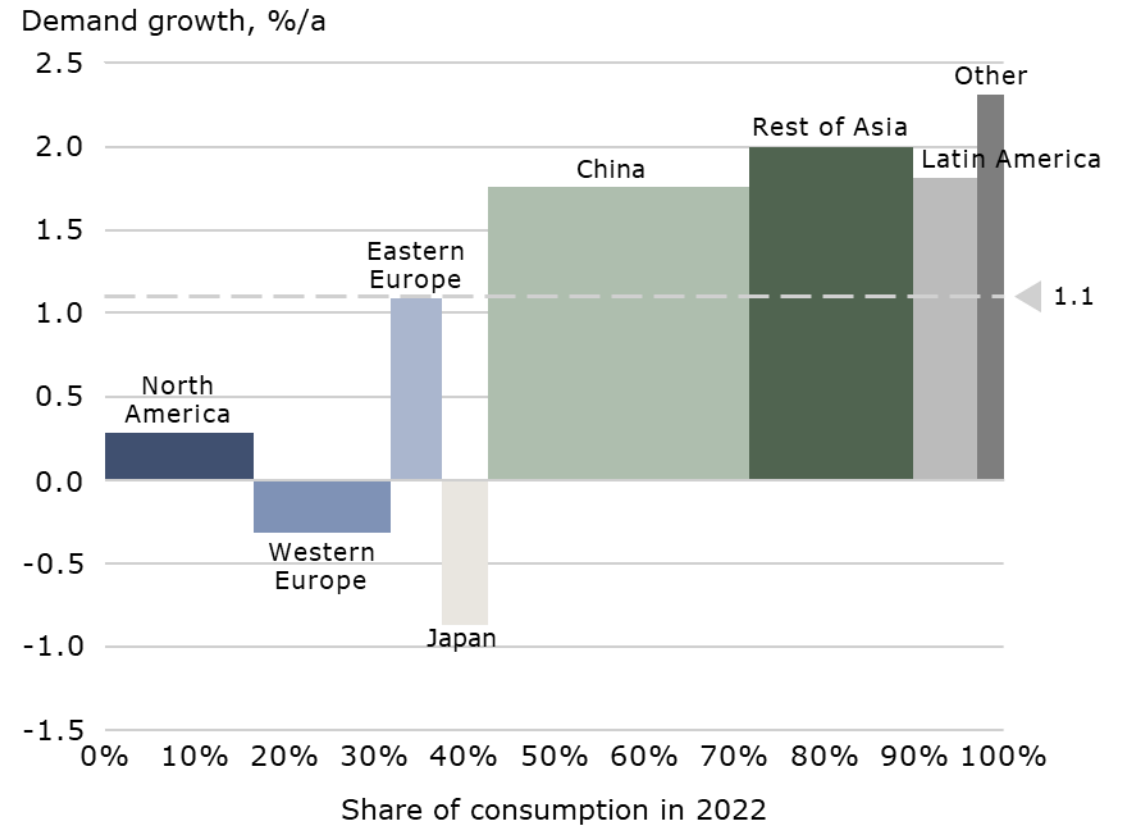
GLOBAL DEMAND AND SUPPLY | PAPER DEMAND BY REGION

Emerging economies are driving the additional paper consumption; mature economies are still heavily exposed to the secular graphics paper decline

DEMAND BY REGION 2000-2035



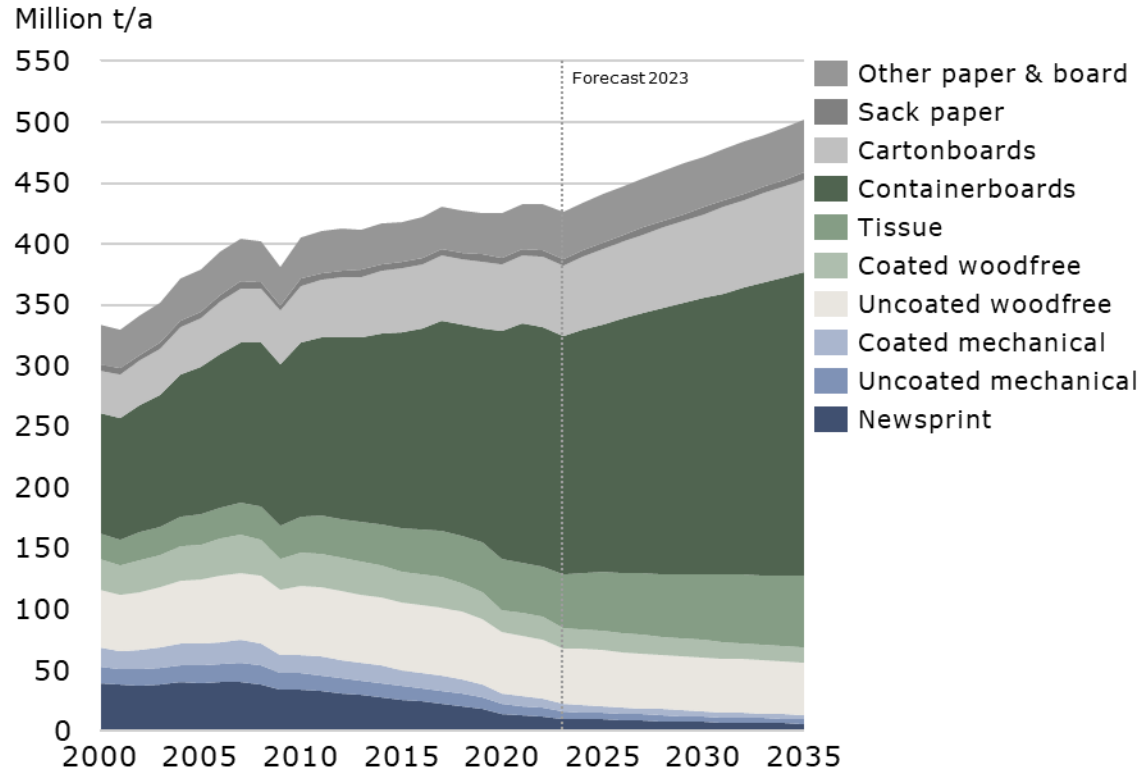
LONG-TERM DEMAND GROWTH 2022-2035



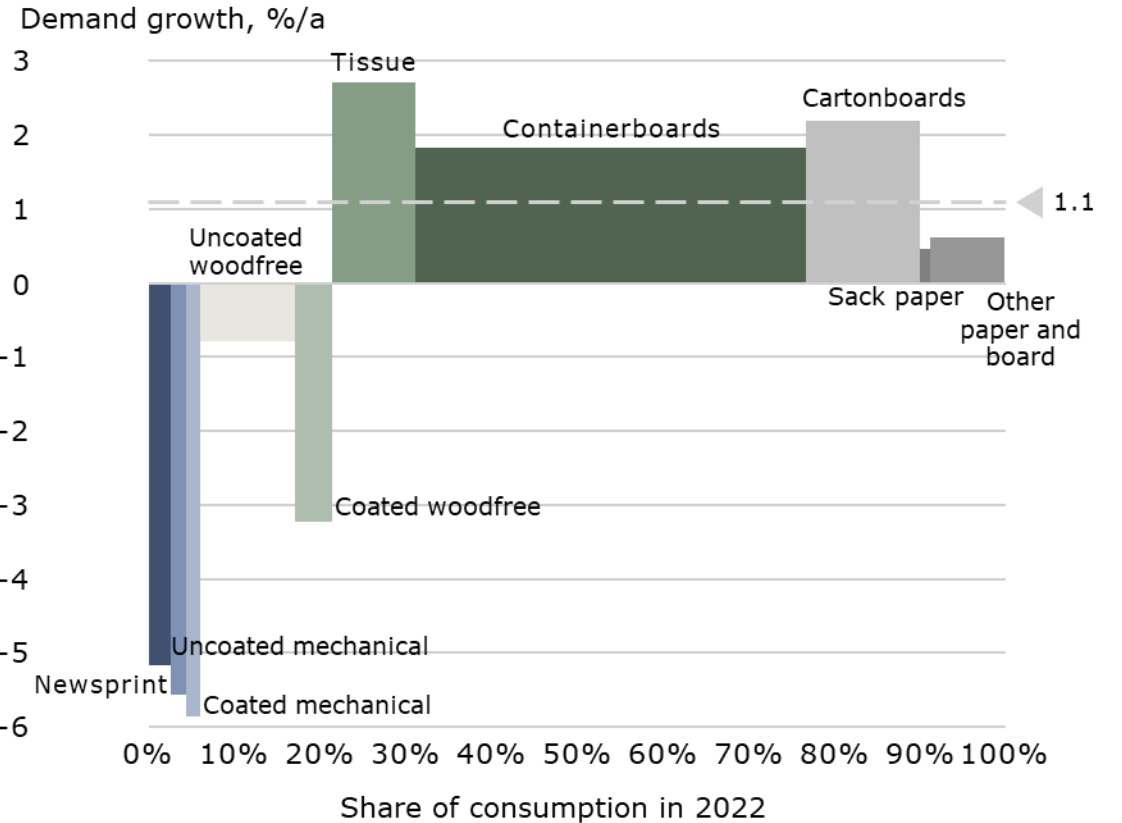
GLOBAL DEMAND AND SUPPLY | BY PAPER GRADE

Tissue and packaging papers are driving the future demand increases, while especially publication papers face steep decline

DEMAND BY PAPER GRADES 2000-2035



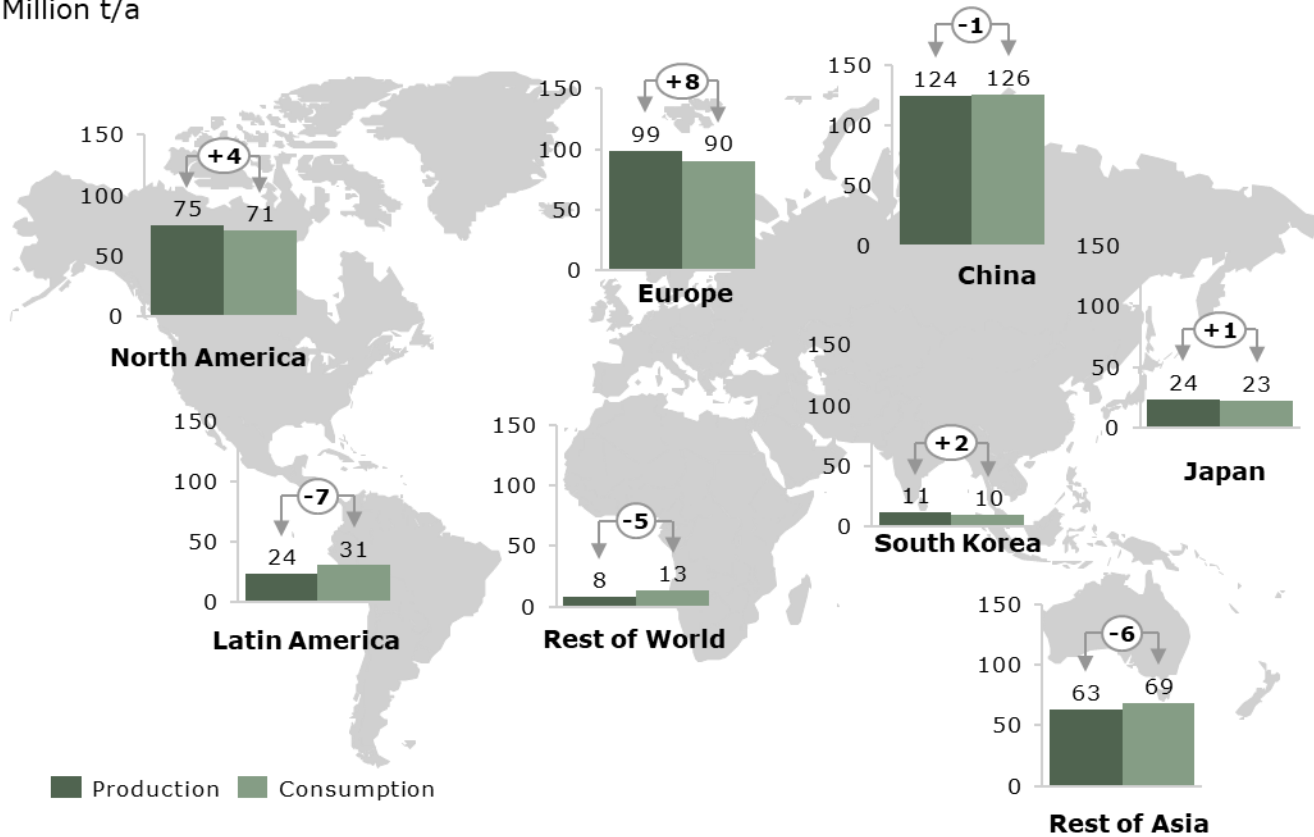
LONG-TERM DEMAND GROWTH 2022-2035



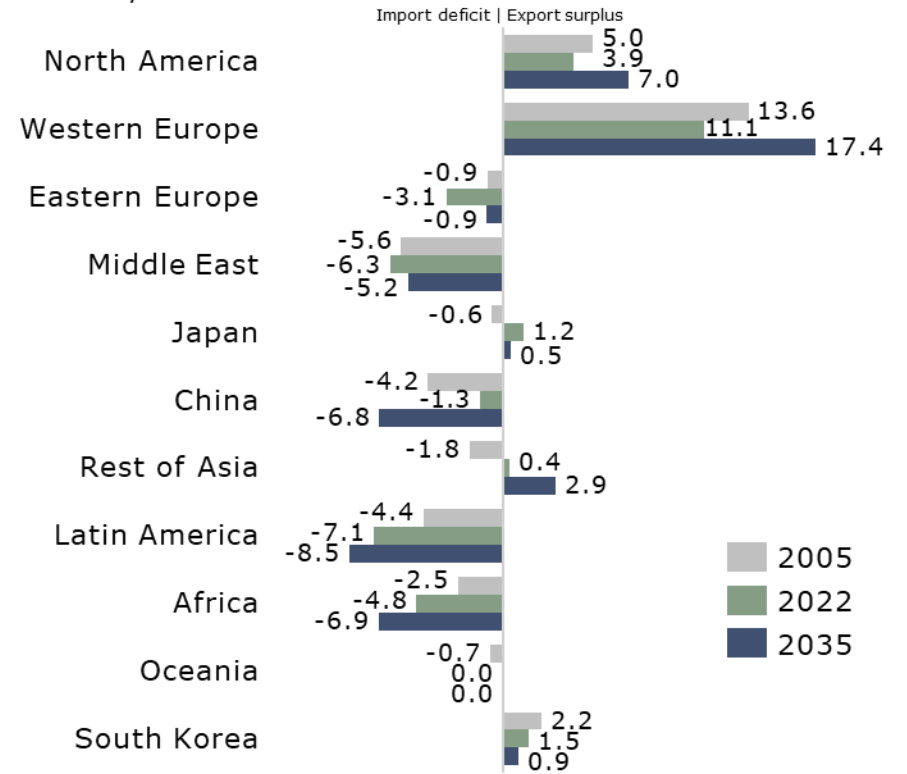
GLOBAL DEMAND AND SUPPLY | NET TRADE BALANCE

International trade in paper and board totalled 112 million tons in 2022 corresponding to one quarter of the global production

SUPPLY DEMAND BALANCE 2022 – TOTAL PAPER AND BOARD
Million t/a

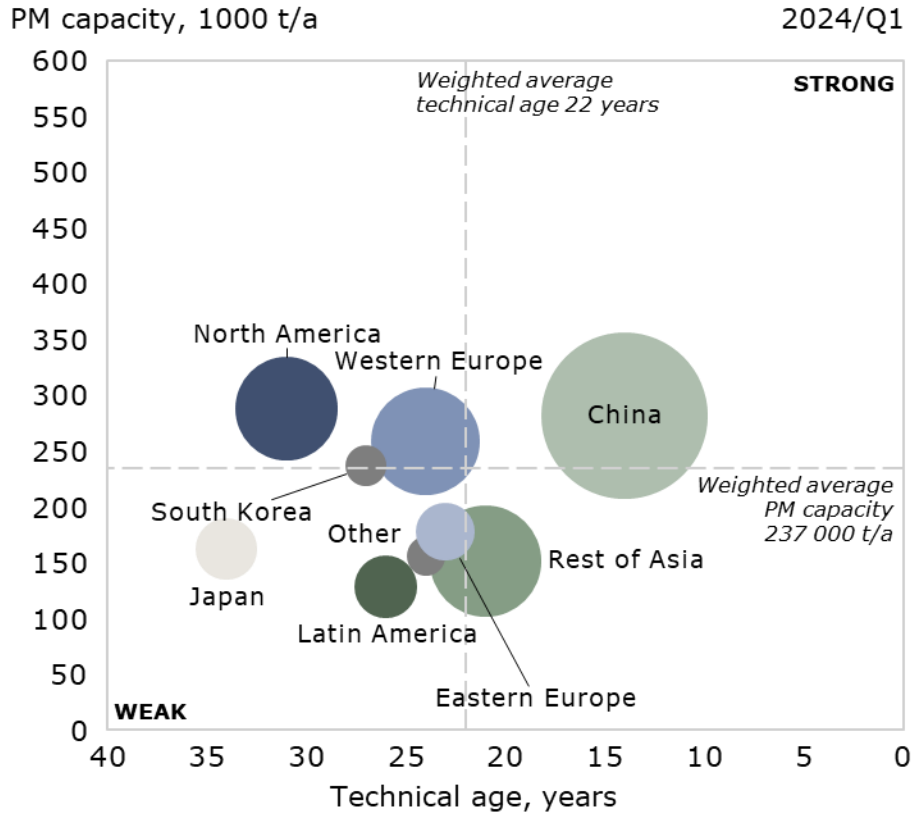


NET TRADE BALANCE
Million t/a



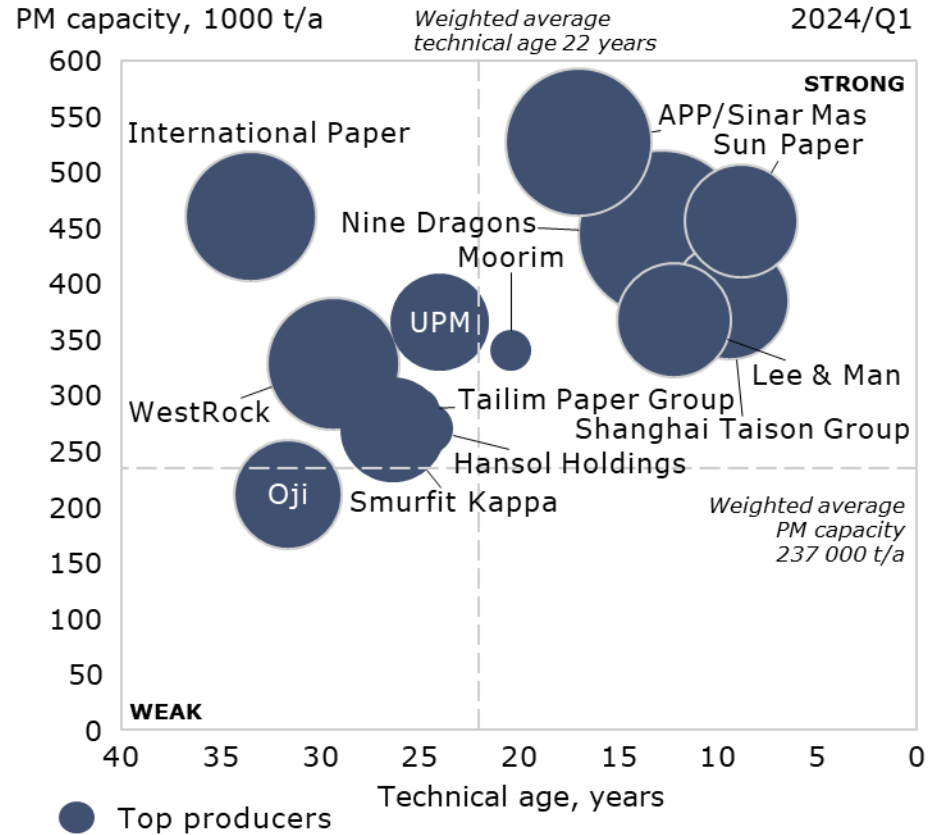
China stands out as the largest and most modern paper producing region

REGIONAL ASSET QUALITY

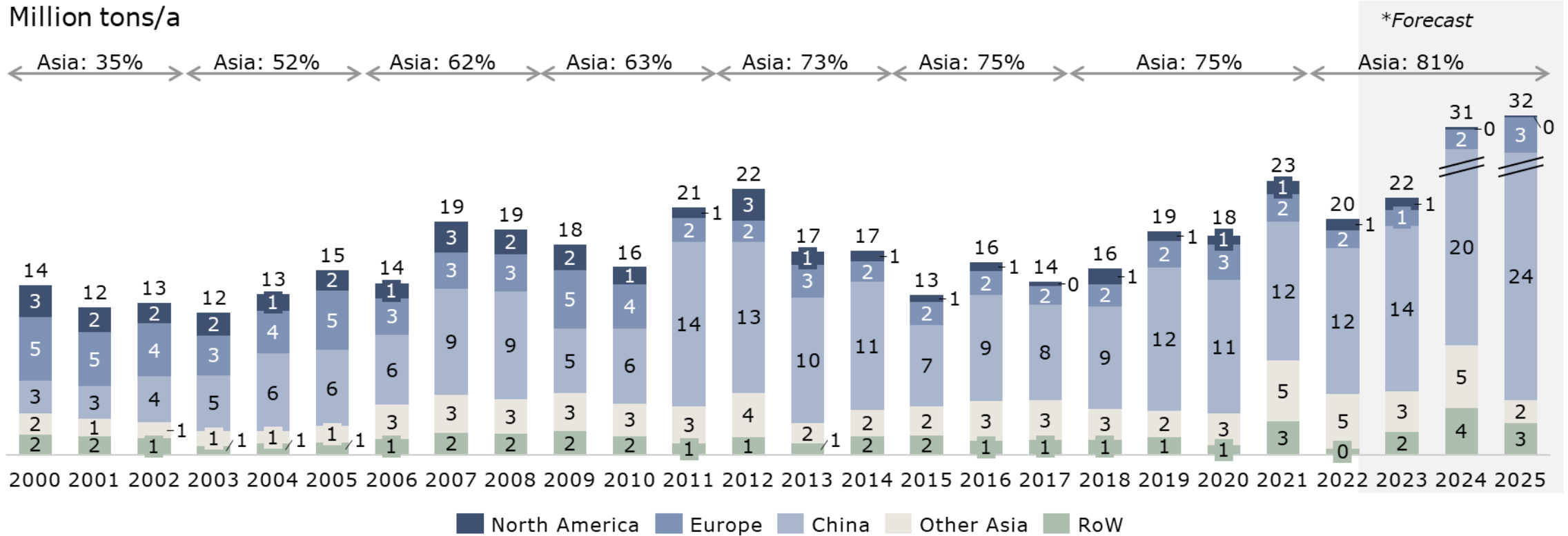


Bubble size reflects the allocated grade capacity

TOP PRODUCER ASSET QUALITY



Paper industry investment activity has permanently shifted to Asia, especially China



– The share of Asia has grown from 35% in the early 2000s to 60-65% in the early 2010s and 70-80% in the past few years and is expected to maintain at similar level driven by another round of capacity expansion in China and other Asian regions.

¹⁾ New PMS, 2nd hand machines, rebuilds and capacity expansion by start-up year Note: 2022-2025 investment includes decided and planned projects

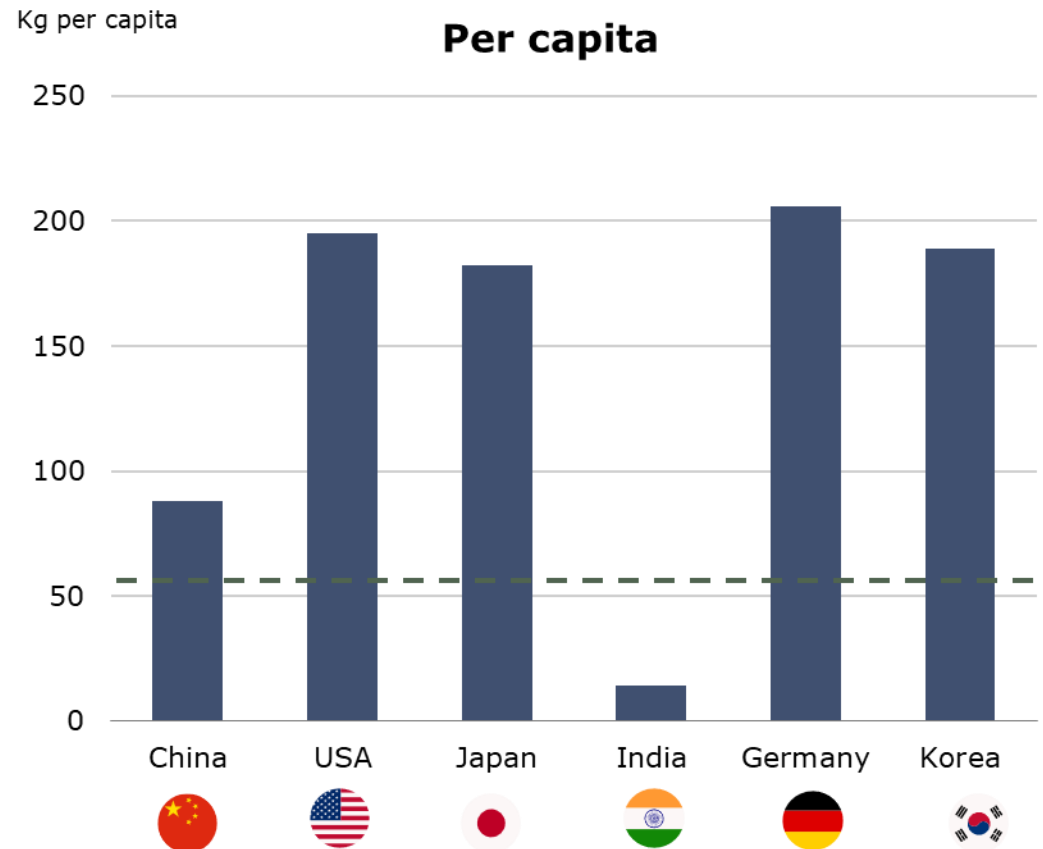
South Korea is a top-10 paper and board consumer globally, with per capita demand being comparable with other mature economies

PAPER AND BOARD DEMAND / TOP 10 COUNTRIES

| | | | Demand in MT/a 2022 |
|----|---|-------------|------------------------|
| 1 |  | China | 126 |
| 2 |  | USA | 66 |
| 3 |  | Japan | 22 |
| 4 |  | India | 19 |
| 5 |  | Germany | 17 |
| 6 |  | Italy | 11 |
| 7 |  | Mexico | 10 |
| 8 |  | South Korea | 10 |
| 9 |  | Brazil | 9 |
| 10 |  | France | 8 |

Source: AFRY

PER CAPITA CONSUMPTION OF TOP-5 COUNTRIES



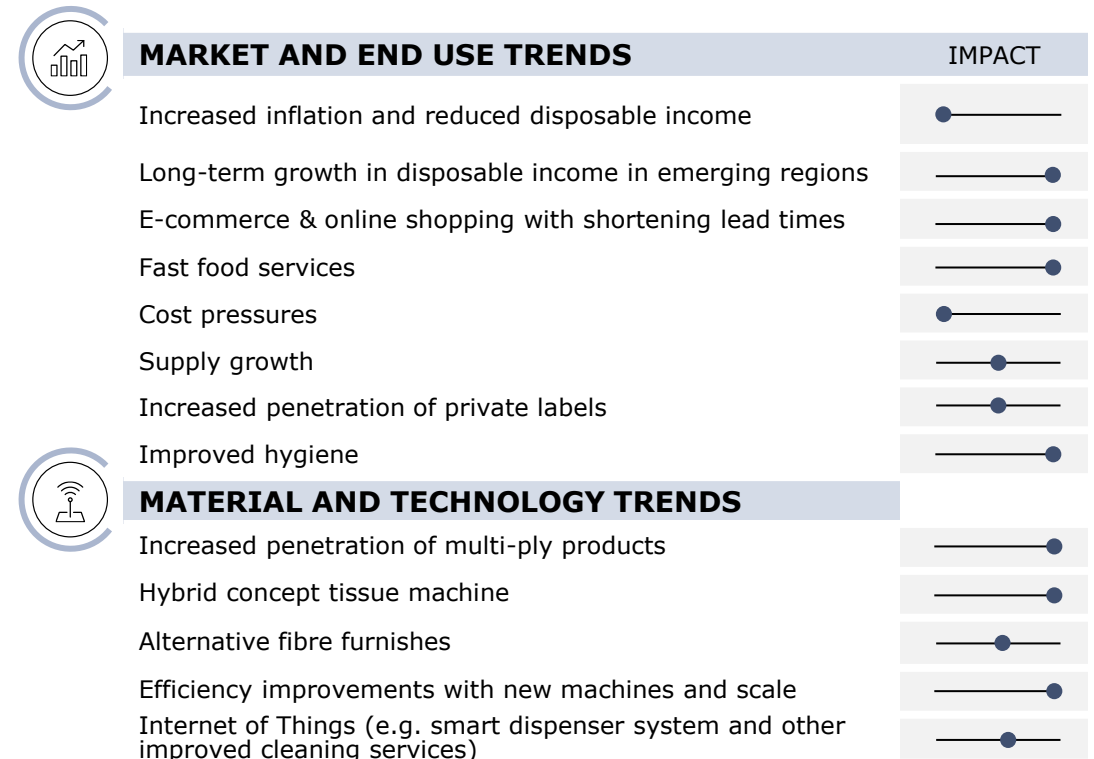
AGENDA

Paper Market In Transformation

Tissue Market Situation



Demographics, economic welfare and improved hygiene standards are supportive for tissue paper consumption

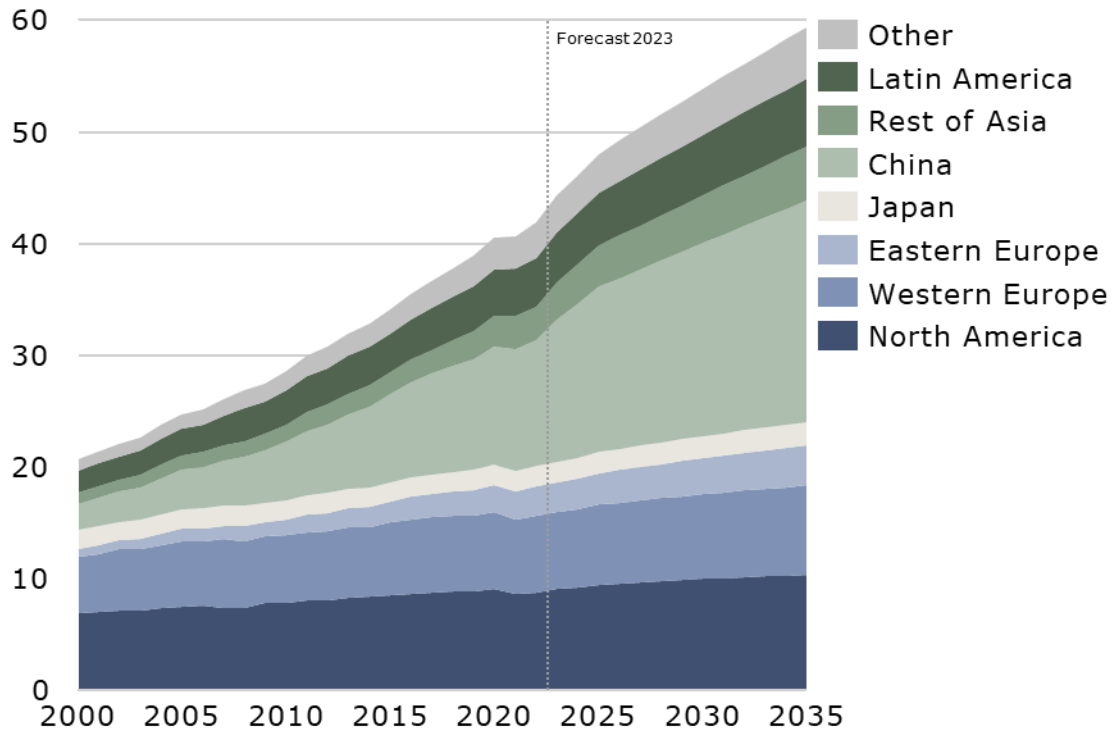


TISSUE PAPER | DEMAND BY REGION

Increasing disposable income is the main factor underlying the robust growth of tissue consumption in emerging economies

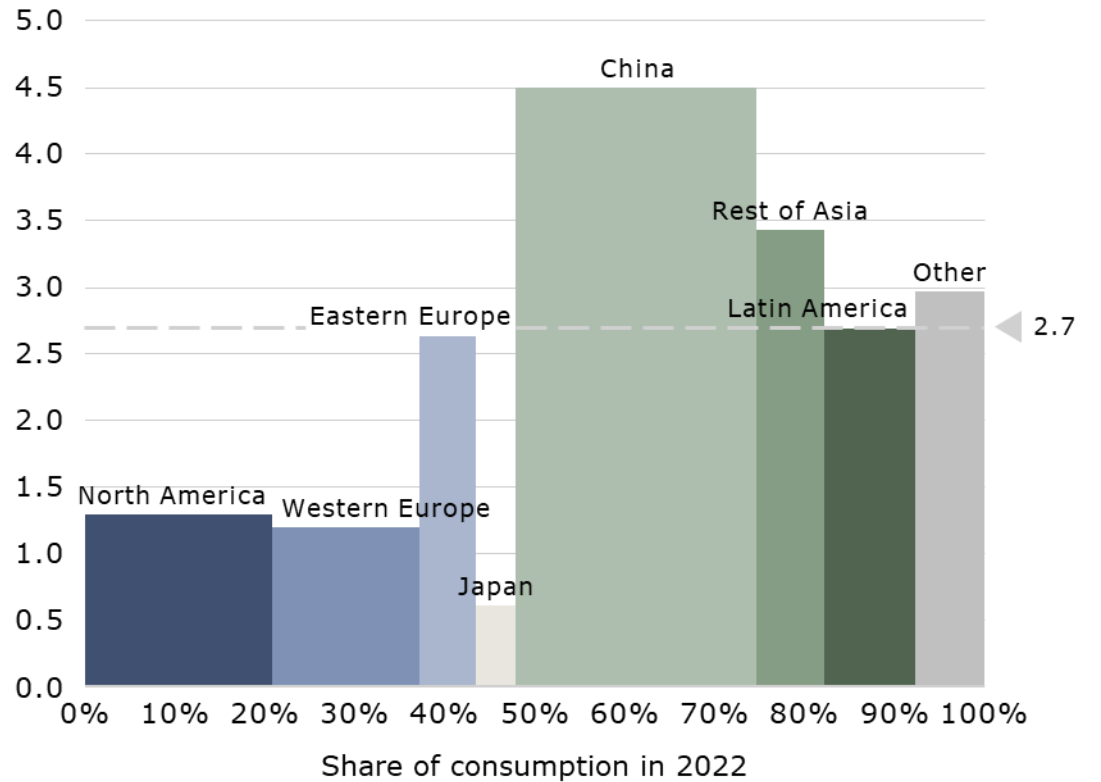
DEMAND BY REGION 2000-2035

Million t/a



LONG-TERM DEMAND GROWTH 2022-2035

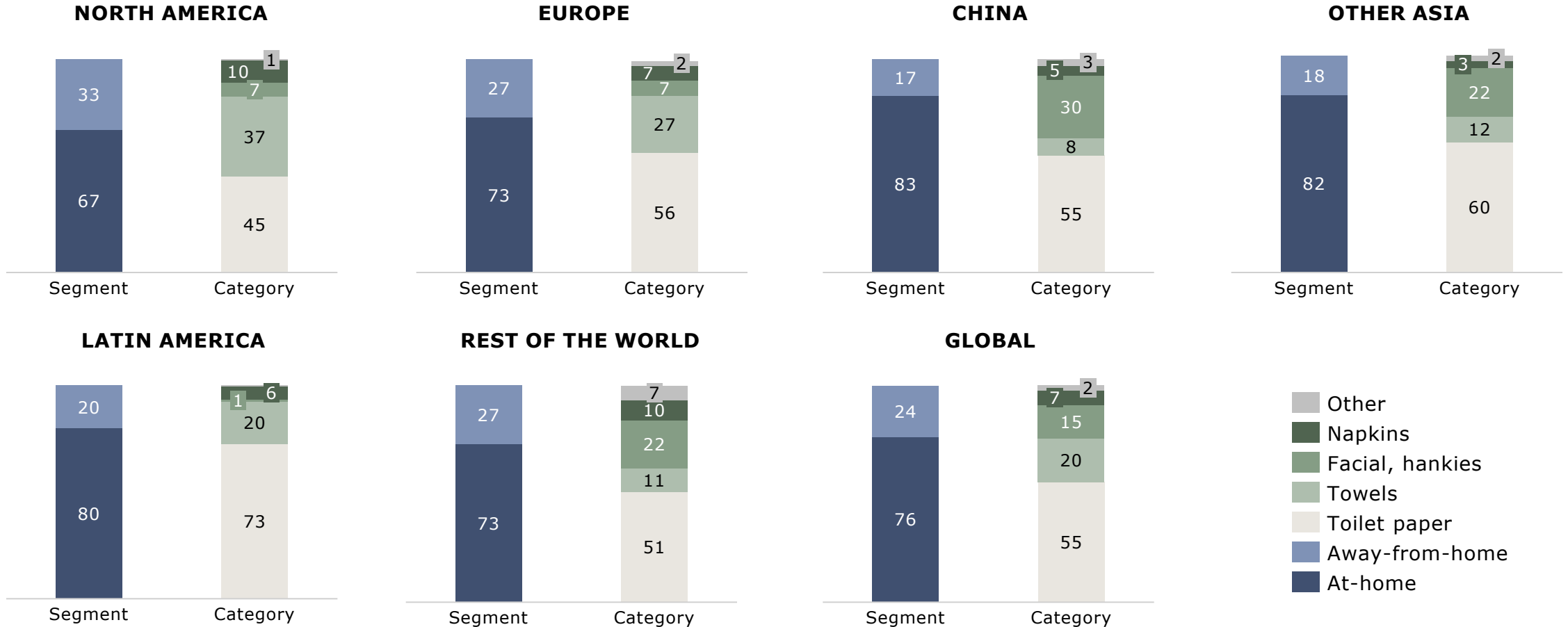
Demand growth, %/a



Note: This chapter relates to tissue paper for converting

TISSUE PAPER | DEMAND BY SUB-SEGMENT

At-home tissue accounts for about 75% of global tissue consumption; over half of global tissue consumption is toilet paper

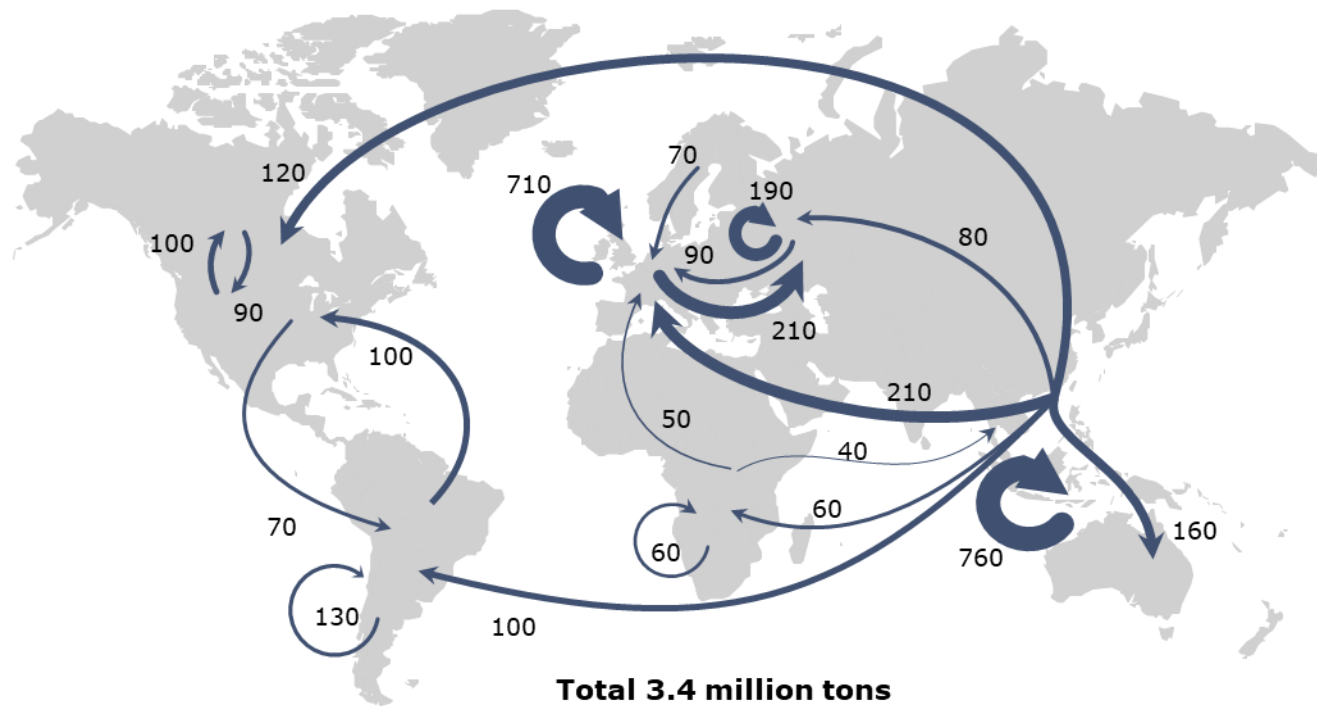


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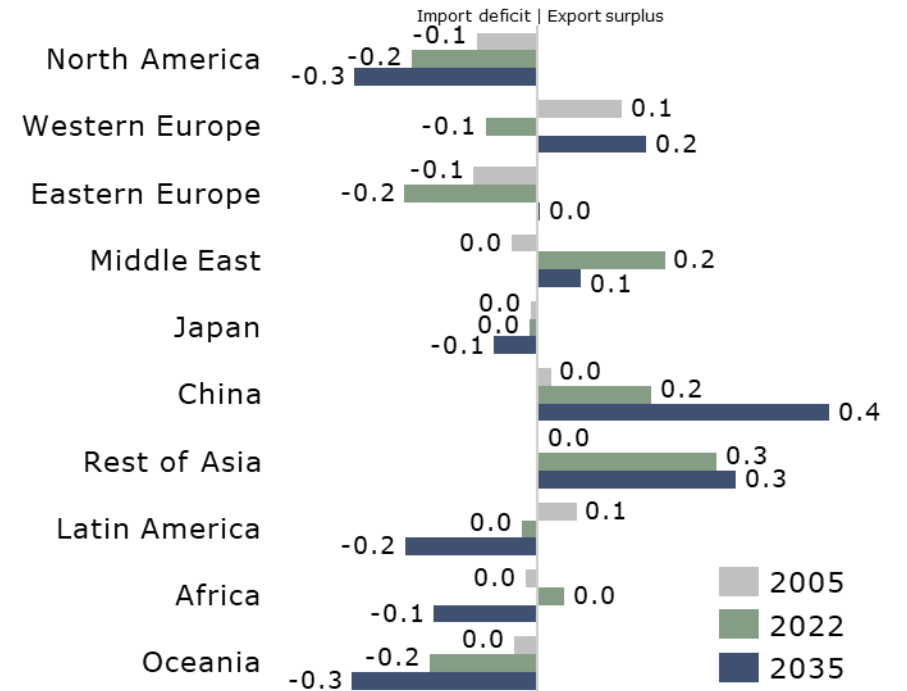
TISSUE PAPER | TRADE FLOWS

Fundamental changes in trade structure are not expected; tissue largely remains a regional product, with a few exceptions

MAIN TRADE FLOWS 2022 – TISSUE
1000 t/a



NET TRADE BALANCE
Million tons

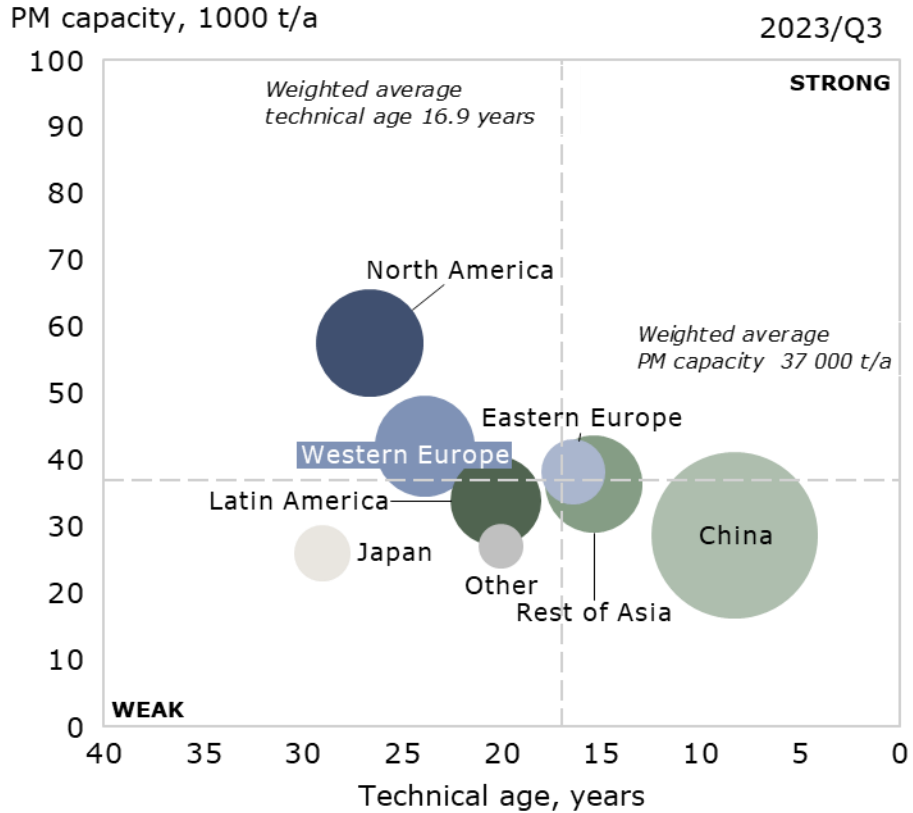


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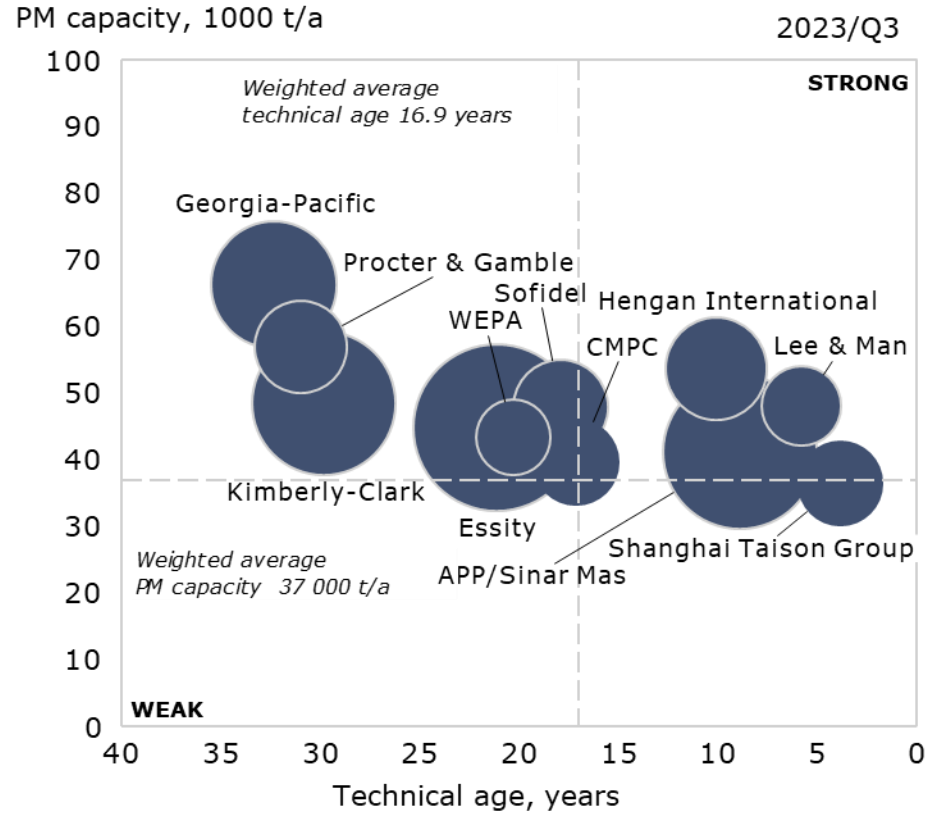
TISSUE PAPER | ASSET QUALITY

Tissue machines are much smaller than those of other commodity paper grades; new machines are constantly added, especially in Asia

REGIONAL ASSET QUALITY



TOP PRODUCER ASSET QUALITY



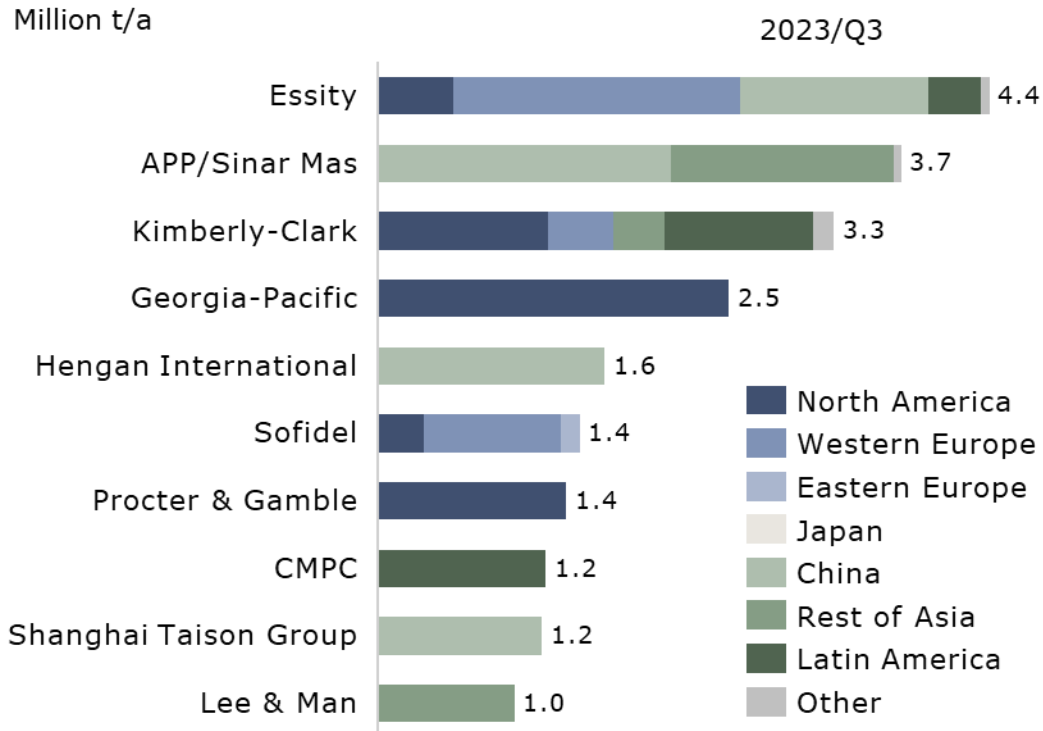
Bubble size reflects the allocated grade capacity

Note: This chapter relates to tissue paper for converting

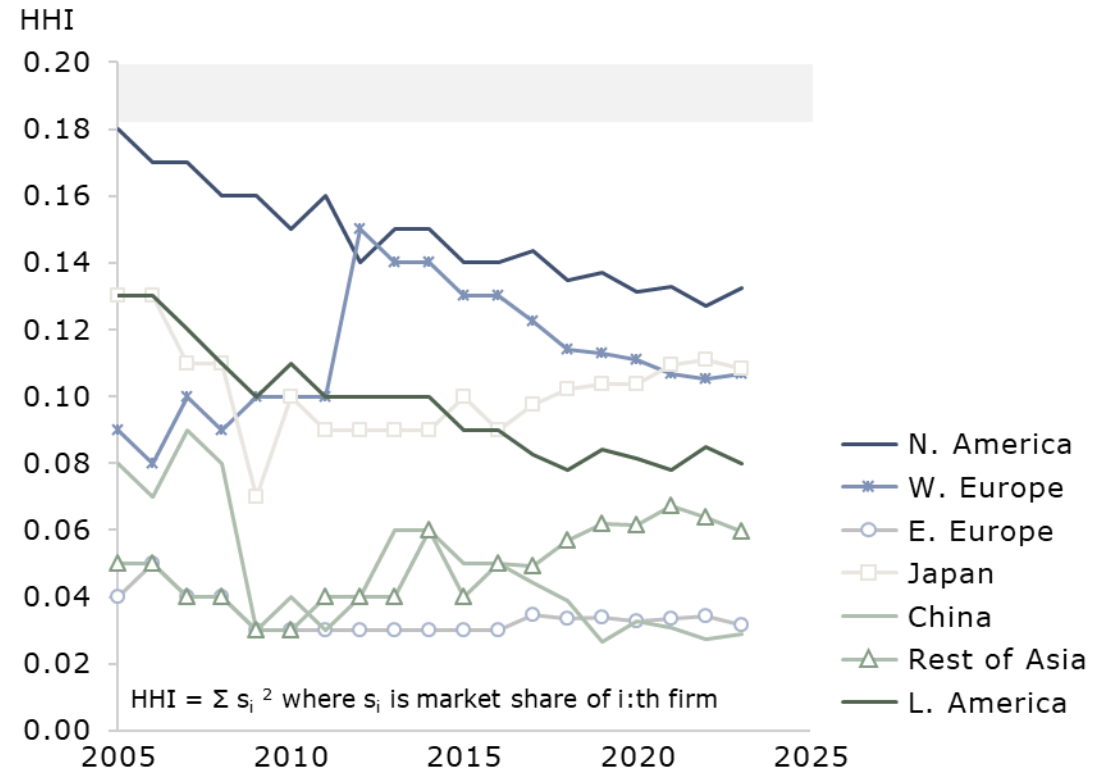
TISSUE PAPER | TOP PRODUCERS AND INDUSTRY CONCENTRATION

The tissue market has a fragmented structure, characterized by less capital-intensive investments and lower entry barriers compared to other grades

TOP PRODUCERS



INDUSTRY CONCENTRATION



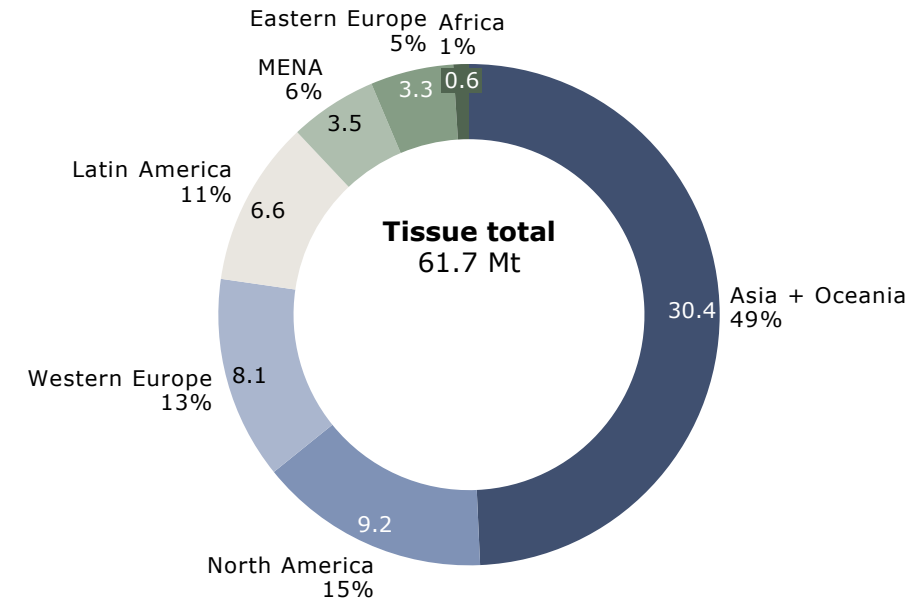
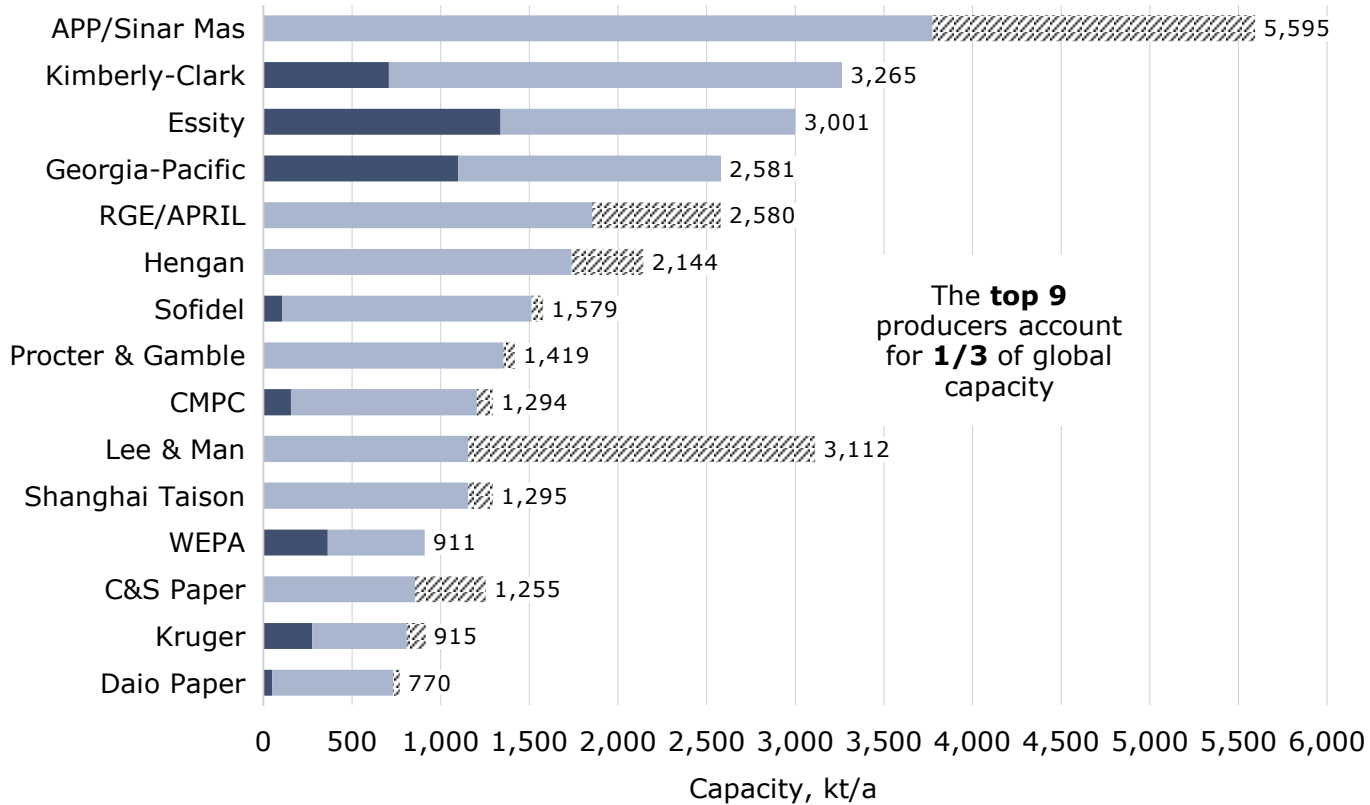
Note: Decreases in the Herfindahl-Hirschman index (HHI) generally indicate a loss of market power and increase in competition, while increases imply the opposite; An industry is considered to have market power if seller concentration exceeds the level of 0.18-0.20 | This chapter relates to tissue paper for converting

TISSUE PAPER | TOP PRODUCERS AND FIBER USAGE

Globally K-C, Essity and G-P are the leading producers in the focus markets; tissue producers are predominantly local/regional

GLOBAL LEADING TISSUE PRODUCERS: INDICATIVE RECYCLED-SHARE

1,000 tonnes

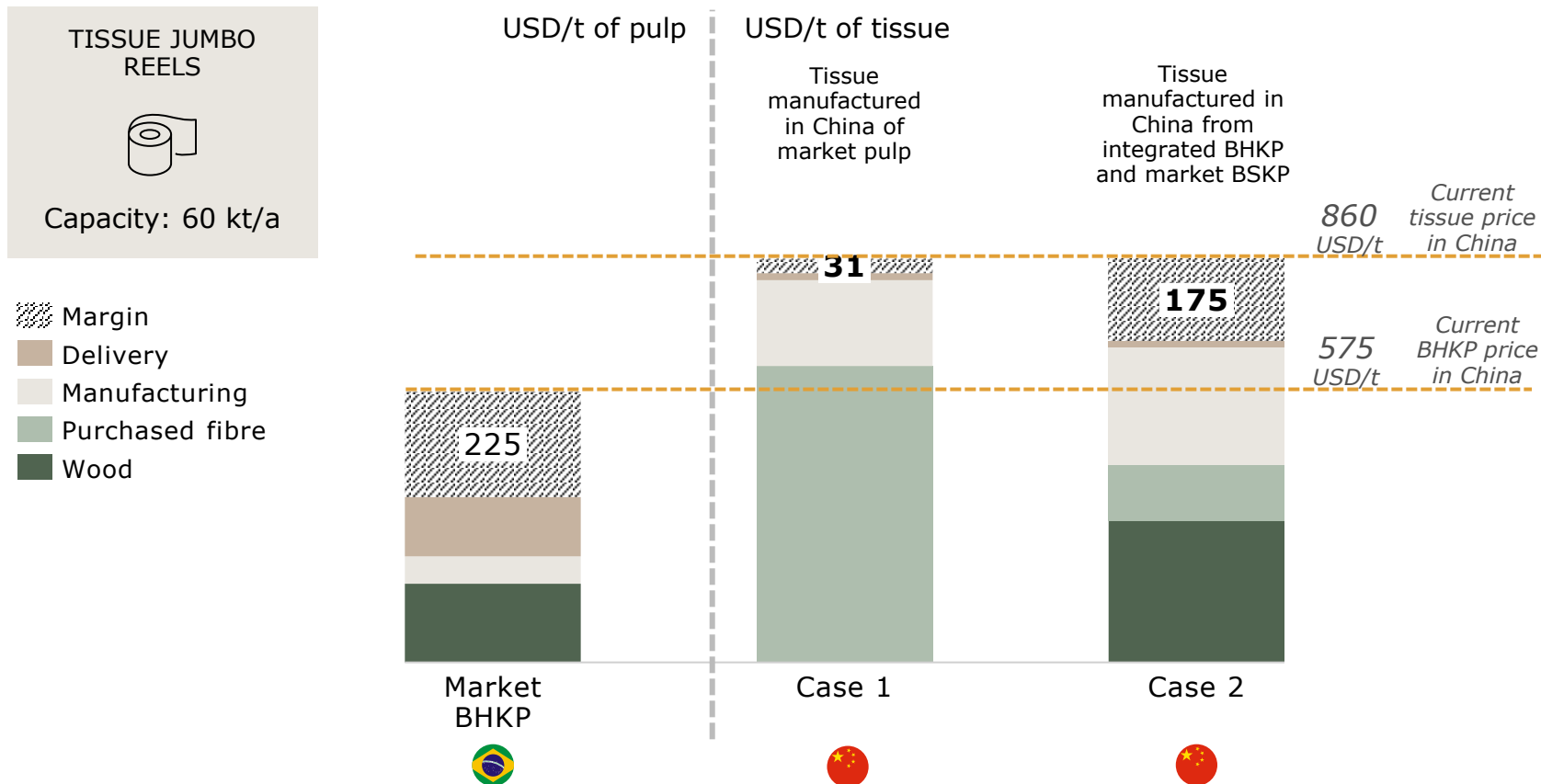


NOTE | DIP Capacity refers to the DIP capacity integrated to a tissue mill | "Projects" includes decided and planned projects

TISSUE PAPER | EFFICIENCIES | COMPETITVNESS EXAMPLE

With integrated operations, Asian players achieve higher margins compared to relying solely on market pulp

EXAMPLE: POTENTIAL OPERATING MARGIN IN TISSUE



Note: Tissue furnish: BSKP 0.16 ADt/t of tissue, BHKP 0.89 ADt/t of tissue.

Multi-faceted approach focusing on both internal production and consumer is needed...

PRODUCER / CONVERTER



SUPPLY CHAIN EFFICIENCY

- Fiber integration
- Speed, flexibility, high output, high OEE
- Less waste & manual labor



FLEXIBILITY

- Variety of formats and pack sizes
- Greater differentiation



SUSTAINABILITY

- Operations, energy consumption
- Materials and recycling

CONSUMER / MARKET



HYGIENE AWARENESS

- Promoting benefits
- Integrating with other hygiene and health care products as seamless solution



PRODUCT ASSESSIBILITY

- Assessable in different channels, format, sizes and pricing
- Presence in e-comm/ futuristic distribution channels



BRANDING

- Demographic focused packaging
- Hygiene and health care products co-branding

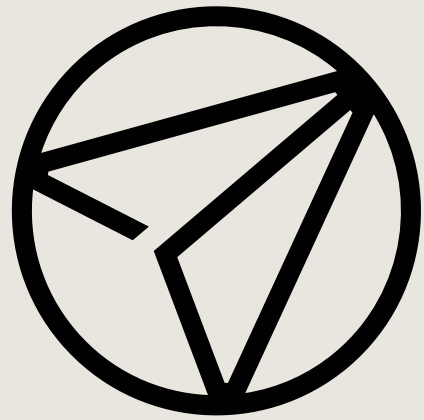
THANK YOU!



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