January/February 2020 | Issue #1

TWM
TISSUE WORLD MAGAZINE

The independent news provider for the global tissue business

SCANDINAVIA REGIONAL REPORT:

LEADING LIGHTS IN THE SEARCH FOR INNOVATION

Plus ...

Project Survey
Global tissue machine projects coming on stream in 2020 and 2021

World News
Top 3Q results are in

Technical Theme: Paper Machines
Leading suppliers outline their business strategies

ConsumerSpeak
Peach founder Aaron Doades in New York City

informa markets

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In this issue...

▲ "We became circular before everyone else thought to do it."

TWM visits Essity's Lilla Edet mill in Sweden for our Scandinavian Regional Report. **Page 22**

Cover: The aurora lights meet innovation, representing Scandinavia as a leading light in terms of tissue innovation. By Contrast Creative, Manchester, UK.

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FI **FrontIssues**

SCANDINAVIA'S PRODUCTION IS OLD AND SLOW – BUT POISED TO REAP BENEFITS OF INNOVATION AND LOW CARBON EMISSIONS

Helen Morris
Senior Editor, Tissue World Magazine

Tissue in Scandinavia - Denmark, Sweden and Norway - is the classic story of where to find the growth. A combined population of about 21 million, they enjoy open modern market economies with a high standard of living combined with extensive government welfare measures. Per capita consumption is among the highest world levels, ten million Swedes for example at 5kg more than the western European average of 15kg. Only the US tops that. Machinery is generally getting on in years, and remains slow in comparison with other tissue leading nations, but even so that machinery is out-producing home demand with the result that exporting is on the rise. Euromonitor and Fisher International provide broad analyses, and our Regional Reports speak to tissue companies on the frontline. Growth will be a balancing act between technology upgrades and consumer preference for green tissue, which is historic.

Scandinavian's spiritual attachment to their great natural resource is strong. We outsiders get a glimpse of that when one contributor says: "One thing which distinguishes us as tissue consumers is the relationship we have with wood. It remains a very visible, historically-important material in our lives. It covers much of the landscape, forms many of our buildings and most of us know somebody whose living is wholly or partly dependent on wood or wood-based products.

"It is also plain to see that this resource is sustainable – the continuous cycle from sapling to harvesting is evident to anyone who ventures out of town."

A new age of planting trees may have dawned elsewhere. These nations have been smart for years. Scandinavian consumers are positive about products derived from wood. They are receptive to quality, and are willing to see tissue as more than a commodity. Brands and private label – gaining market share - are widely sold on added value qualities. So while unmet potential is not great, innovation, quality and impressive cost savings from green energy will be the drivers. Out-of-the-box innovation like this idea: leading brand Serla has teamed up with students at Aalto University in Finland to create designs for paper towels, consumers pick the winner; and Lambi brand has limited edition toilet paper and kitchen towels on which are printed love stories, plus consumers get to submit their own stories and then vote for their favourites. Creative involvement, brand loyalty, and a good read. Who would have thought it?

Informed and ready to tradeshow

TWM's mission is to prepare you for our trade shows across the globe. We like to arm readers with as much industry intelligence as it's possible to carry in one publication and view on one website as you arrive at our various conference and trade show halls across the world. As the management maxim has it: "If you can't measure it, you can't improve it." TWM gives you masses of measurements ... and then the location, the company, the conviviality and the shop window in which to deal.

This edition demonstrates the breadth of our coverage: the annual Project Survey is an extensive list of new tissue capacity being added, ordered or in final planning stages during 2019-2020, as well as noting any projects already planned for 2021; the World News pages cover developments from across all five continents; and MarketIssues summarises the main events from Tissue World São Paulo, the only dedicated tissue conference and tradeshow in South America, and now in its third edition. Trade visitors were 898 and the total number of participants was 967, while the show floor featured 44 international and local exhibitors at the Transamerica Expo Center.

Humberto Enriquez, Kimberly-Clark Brazil's quality, safety and environment manager, delivered the keynote address at the Senior Management Symposium where speakers shared a series of presentations under the theme - "Global Impacts, Local Challenges, Latin American Prospects - unlocking opportunities for sustainable success in the region's most dynamic tissue markets".

TWM wishes all our readers and dealers a happy and prosperous 2020.

WORLD TISSUE GROWTH - BIG DATA - AUTONOMOUS ROBOTS – INDUSTRY 4.0 – CHANGING BUYING HABITS - CYBER SECURITY - AUGMENTED REALITY: TISSUE WORLD SÃO PAULO OPENED ITS DOORS!

The only dedicated tissue conference and tradeshow in South America attracts record attendance from 46 countries!

Tissue World São Paulo, Brazil, has again raised the standard for the region's dynamic tissue industry.

Trade visitors to the event, now in its third edition, were 898. A total number of 967 participants attended during the three days from October 22-24, while the show floor featured 44 international and local exhibitors at the Transamerica Expo Center.

Humberto Enriquez, Kimberly-Clark Brazil's quality, safety and environment manager, delivered the keynote address as delegates attended the Senior Management Symposium (SMS) where the speakers shared a series of presentations under the theme – "Global Impacts, Local Challenges, Latin American Prospects – unlocking opportunities for sustainable success in the region's most dynamic tissue markets". The topics of the SMS session included:

Smart Manufacturing and other Game Changers. Is Tissue up for the Challenge? Moderator: Lairton Goulart Leonardi, managing director, Solvo Consulting, Brazil. Panellists: Luca Guidetti, general manager, Elettric80 Latin America, Brazil; Daniel Signori, technical director, Mili, Brazil; João Carlos Ronchel Soares, chief executive, IPEL – Indaial Papel, Brazil; Dineo Eduardo Silverio, president, Fabio Perini, Brazil; Emerson Armani, Automation Director, Valmet South America.

Capricious Consumers and the Retail Revolution. Moderator: Felipe Quintino, chief executive, Tissueonline, Brazil. Panellists: Tatiana Thomaz, director, Shopper Centric, Brazil; Manoel Müller, managing partner, Müller Camacho Design, Brazil; Rafael Pellegrini Oliveira, research analyst, Euromonitor International, Brazil.

A series of technical sessions and product presentations which featured various topics key to the industry. The free-to-attend technical solutions and product presentations were also held on day two and three. And again pushing the boundaries, for the first time two Happy Hours sessions were also held to facilitate networking and business discussion opportunities for all participants.

Below TWM summarises a few of the key talks.

Keynote Address - Environment Commitment: How Kimberly-Clark reduced its Water Consumption.

Humberto Enriquez, quality, safety & environment manager, Kimberly-Clark, Brazil

As it approaches its 150th year in the market, Kimberly-Clark's Humberto Enriquez used TW São Paulo to discuss how the company remains committed to improve the communities in which it operates, and how it has set ambitious goals in the areas of social impact, forests and fibre, energy and climate, waste and recycling, and the supply chain. One of the practices adopted to achieve these goals was the Water Footprint Neutralisation project, which included working to improve the water reuse in the manufacturing process. The goal was to propose a corporate policy for sustainable water management in Kimberly-Clark's Mogi das Cruzes unit in the state of São Paulo. In 2011, Kimberly-Clark partnered with The Nature Conservancy to implement the Direct Water Footprint tool to promote water use efficiency, and the water Footprint Compensation in priority conservation areas of the Alto Tietê watershed. This enabled K-C to calculate its "water footprint" and developed actions that led to two of its Brazilian factories to achieve the second and third best performance in water abstraction per tonne produced among all Kimberly-Clark units in the world.

Prospects for Sustainable Growth in the Latin American Tissue Business with Overview to Global Developments

Esko Uutela, principal, Fastmarkets RISI, Germany

World tissue consumption by region, 2018 – the market is dynamic

N. America 24.5%, China 22.4%, W. Europe 17.5%, L. America 11.1%, Asia Far East 6.2%, E. Europe 5.6%, Japan 5.1%, N&M East 4.1%, Africa 2.3%, Oceania 1.2%.

- China is larger than Western Europe in market size and approaching the size of North America.
- Latin America, Asia Far East and Eastern Europe are becoming increasingly important regions.
- China has been the largest producer country since 2015 and passed the US to become the largest consumer country in 2018.

Strong growth was seen in 2015-2017, but 2018 was weak as growth slowed in China and Western Europe. Global consumption: 38.7m tonnes (2018).

The main change in 2018 was that growth in China was only half of that recorded in 2017, Japan contracted and Western European growth slowed further. Meanwhile, Eastern Europe, Asia Far East and Africa showed more positive developments.

Volume growth of tissue consumption, 2008- 2018

- China accounted for 43% of growth, followed by North America (12%) and Latin America (11%).

Total global growth: 10.8m tonnes (1.08 million tonnes per year)

Latin American outlook

The five largest markets accounted for 77% of total consumption in 2018:

Brazil 31.2%, Mexico 27.5%, Argentina 8.2%, Chile 5.5%, Colombia 5.4%, Peru 4.7%, Venezuela 2.8%, Guatemala 2.0%, Ecuador 1.8%, Costa Rica 1.6%, all others 9.2%.

Total market size: 4.3m tonnes

Latin American tissue market shows varying annual growth, change to a more positive trend expected.

Economic turbulence and political instability caused problems and disappointing growth in 2014-2016, mainly due to the Brazilian recession.

- 2017 was more positive but weakness returned in 2018.

Average growth 4.4%/a.

Tissue production, imports, exports and consumption in Latin America, 2018

Foreign trade in tissue plays a minor role in Latin America, as a whole the market is rather self-sufficient.

- The only exceptions are Mexico with its trade with the USA, both imports and exports, and smaller Central American countries plus Caribbean Isles where most countries are net importers with the exception of El Salvador which is a major tissue exporter.

Latin American tissue consumption per capita, 2018

Economic turbulence and political instability caused problems and disappointing growth in 2014-2016, mainly due to the Brazilian recession.

Quality development in the Brazilian toilet paper segment, 2003-2018: The gradual move upward in tissue paper quality, replacement of single-ply tissue with products including multi-ply structures, has been a main feature in the Brazilian toilet paper business in recent years.

Today there are even four-ply products (Ness) in the market, and at least six three-ply brands.

- Today multi-ply products account for slightly less than half of the total toilet paper volume and will soon pass single-ply tissue. This move is a major driver for Brazilian toilet paper consumption.

Sustainable growth expected, provided no major regional economic crisis

Latin American tissue consumption is in a phase were the growth tends to accelerate when products other than toilet tissue make their inroads and broaden the product range. Towelling is in a key role in this development.

- A global economic slowdown but no deep recession is expected to start in the latter half of 2020, and this is likely to curb growth rates in tissue as well, typically with some delay, hitting 2021-2022.
- But as often in Latin America, political and economic turmoil is a threat that cannot be forecast.
- Brazil is expected to recover strongly and Mexico is also back on a growth track.
- Colombia, Argentina and Peru are expected to have good growth prospects as well

Capacity shares of the main Latin American tissue suppliers, fourth quarter 2019:

There are two main players, K-C and Softys (ex-CMPC), which are clearly larger than all other suppliers and together control about 37% of the regional capacity. The acquisition of SEPAC is included in the capacity of Softys.

- But as a whole, the supplier structure is very fragmented, particularly in Brazil. More consolidation can be expected, and reportedly some companies are for sale after margins badly suffered from high market pulp prices.

Total capacity: 6.0m tonnes

The North American tissue market has been strong recently. The AfH sector in particular benefitted from the strong economy, low gasoline prices and changing lifestyle of younger generations.

US tissue import growth, 2009-2018

Canada continues to be the main US import source for tissue, but China has taken second place ahead of Mexico and Indonesia.

- However, new imports tariffs will restrict imports from China; the cumulative year 2019 show decreases in the volume of Chinese tissue imported by the USA.

Trade wars will likely change supply patterns

The trade war between China and the USA escalated in September 2018 when the USA announced a 10% tariff on US$200bn worth of Chinese goods imported to the USA, including all the main categories of tissue with the exception of 48.18.90. This is a major issue as China is the second-largest import source of tissue after Canada. In 2018, tissue imports from China were about 336,000 tonnes, which corresponds to the capacity of five large tissue machines. The 10% tariff was partly offset by the weakening of the Chinese exchange rate.

However, recently the tariffs on China were raised to 25% and may remain at this level if no new agreement in the trade war can be reached. This would certainly cut tissue imports from China, and alternative sources cannot fully replace the whole quantity. Chinese tissue with a 25% tariff is not competitive in the US market.

Expected growth in US tissue consumption by business sector

- At-Home retailer labels will show the strongest growth, while At-Home branded volume growth will remain moderate.
- AfH growth will rise above average At-Home growth.

Growth rate of Western European tissue consumption, 2014-2027

- We expect relatively slow growth to continue for this and the next few years, based on the current economic outlook.

Net capacity change and tissue capacity utilisation in Western Europe until 2021.

- Capacity closures had helped the industry, but new projects thereafter broke the trend.
- Low demand growth lowered capacity utilisation in 2018, and continuing weak demand and new projects in 2019-2020 will keep the outlook moderate in the next couple of years.

Recent growth rates of Chinese tissue consumption

- The Chinese tissue market has been in a very robust growth phase, but in 2018 the growth was suddenly cut to half of the previous year.

Chinese investments exploding, but closures and project delays expected

- There is a real investment peak with too much capacity being built, but currently also a wave of capacity closures in the industry—as much as 1.3 million tonnes in 2017 and more than 700,000 tonnes in 2018.
- But currently more than 90% of Chinese tissue is made on modern machines, so closures will likely decline.

Net capacity change and capacity utilisation in the Asian tissue industry

- Overcapacity is obvious, although project delays may help.

Anticipated growth in the global tissue market

- Tissue consumption has been benefitting from improving global hygienic standards, but trade wars and other uncertainties about future economic growth shadows the outlook.

Announced tissue capacity expansion clearly exceeds organic market growth.

- In some years, such as 2019, the amount

of new capacity coming on stream is double the consumption growth.
- Closures have helped and will continue to do so in the future, but investment activity is overheated. The tissue sector is attracting too many investments.
- Major capacity closures could improve outlook, but only marginally.
- Global overcapacity is the name of the game!

AfH Tissue Snapshot & Trends and Opportunities in Retail Tissue - Brazil

Rafael Pellegrini, senior research analyst, Euromonitor International

Snapshot of AfH tissue:

$ 22.9bn - Global AfH Tissue (USD) -Total MSP. 5% of global growth in 2018. Asia Pacific is inevitably the region to push overall growth. $ 77.6bn - Global Retail Tissue in 2018 (USD)

1.8% of growth in Retail Tissue in 2018.

Retail tissue industry performance shaped by developing markets. Brazil represents one third of Latin American market - Brazil is a sizeable market but lags behind in value-added tissue

Retail market landscape: Third largest toilet paper market but only 38° in per capita – value terms. Low per household expenditure opens new opportunity roads.

Volume and value hand-in-hand potential in the Brazilian market. Surplus of BRL 9.5bn would represent almost 800,000 tonnes.

Brazil: understanding forecast drivers of growth

"Hard" and "soft" drivers together can provide a brighter forecast, but soft drivers to pave the way for the growth in retail tissue.

How to strengthen the brand amidst a hefty rational consumption environment?

Intertwined rationality of consumers - exit barrier, nature of purchase, cost benefit.

Mental Availability – guaranteed high brand awareness.

Physical Availability - to be present in the most important channels.

How can the industry reconsider its role with transformational retailers that will impact business?

Soft drivers - age, back to basics for status, conscious consumer, digitally together, everyone's an expert, I want a plastic free world, I want it now, loner living.

Conscious consumers: my values matter. Ethical and mindful consumption becoming more important.

Transparency in ingredients

- Alternative sources of fibre, forest friendly, no additives, all natural, unbleached

Social Responsibility

- "We before me" mindset
- "Purchase with a purpose"

Direct-to-Consumer & Subscription Model
- Rapidly expanding market
- Personalised offerings
- Convenience factor

Developed markets already witnessing environmentally responsible business models.

Loner Living: convenient, agile and closer

Households with one habitant is a new opportunity of market

Connectivity is evermore present especially for households with one dweller

Convenience is the core message
- Premiumisation: tissue and packaging
- New players tapping into Internet Retailing
- Optimise formats vs sizes
- Consumers' decision process

Reaching market potential can take time

ORGANIC GROWTH

Per capita lags behind developed markets. Consistent macroenomic recovery. Population growth still positive

BOOST GROWTH

Identify niches. Formats, communication, novelties. Retailing transformation

Investing in Industry 4.0 as a way to improve manufacturing productivity

Alberto Dantas, innovations director, Finep, Brazil

INDUSTRY 4.0: Connectivity, Big Data and IoT have paved the way to a new industry model. Industry 4.0 is a process of transformation of production systems into physical systems, in which physical and computational components are tightly interconnected. Equipment designed to schedule maintenance and predict failures - 70% of all machine failures may be predicted using analysis of data collected through sensors systems deployed in machinery.

Customer demand to transform the industry. Industry focused in customising production in order to meet specific individual demands. Industry 4.0 – enabling technologies. The main goal is to reduce production costs while at the same time increasing productivity. The 4.0 Concept encompasses the main disruptive technologies available in the world and tends to offer to buyers more customised/ personalised products and services.

Big data - autonomous robots - simulation - horizontally/vertically integrated systems - Industry loT - Cyber security - addictive manufacture - augmented reality.

MAIN BOTTLENECKS TO INDUSTRY 4.0 IMPLEMMENTATION IN BRAZIL

Lack of knowledge 71% of companies know very little or don't know at all the concept of Industry Internet and find it difficult to evaluate its benefits.

High implementation costs - to 42% of the companies planning to adopt digital technologies availability of financial resources is a limitating factor.

Technical factors: To 42% of the companies planning to adopt digital technologies factors such as technology expertise is a limitating factor.

21% of companies point out the difficulty in demonstrating returns as the mains obstacle to the implementation of digital technologies.

How to overcome these difficulties: Brazilian Chamber of Industry 4.0. Comprising the Ministry of Science, Technology, Innovation, and Communications (MSTIC) and the Ministry of the Economy, and integrated by members of private enterprises and academy, its purpose is to create and formulate a national policy focusing on the development of intelligent industries.

Loan Type: Decentralized Continuous Flow. Loan Taker: Manufacturing Companies. Provide financing for Innovation in micro, small, and midsized private businesses, by purchasing services of implementation of industry 4.0 enabling technology.

Doubled capacity: *Lila Group's TRY450m investment is in response to increased trade opportunities*

TURKEY

Lila Group doubles production capacity with TRY450m investment

Turkish hygienic tissue paper manufacturer Lila Group is to increase its production capacity by 50% after investing in an integrated tissue plant.

According to the company, the TRY450m investment will make it the second largest integrated tissue producer in Europe.

Exporting to 78 different countries across the globe, Lila Group decided to increase its production capacity following increasing trading volume and Turkey's potential to grow in the tissue industry.

The new plant will increase the group's staff count by 35% and will be based on a 50,000 square metre area on the company's existing production plant in Çorlu.

Chief executive Alp Öğücü said: "We have announced the largest integrated plant investment in one campus in the tissue industry.

"We decided to increase our production capacity due to increasing trade volume, Turkey's potential to develop in this industry and its ever-growing population.

EXPORTING TO 78 DIFFERENT COUNTRIES THROUGHOUT THE GLOBE, LILA GROUP DECIDED TO INCREASE ITS PRODUCTION CAPACITY FOLLOWING INCREASING TRADING VOLUME AND TURKEY'S POTENTIAL TO GROW IN THE TISSUE INDUSTRY.

"Once up and running our company, which carries on its activities under one roof in the largest integrated production plant in East Europe, Turkey, the Caucasus and the MENA region, will be the second largest integrated plant with the largest capacity in Europe within the same campus."

The new plant will be launched in the first quarter of 2020.

Öğücü added: "We will reach our roll paper producing capacity to 220,000tpy by increasing our existing production capacity by 50% and our branded product capacity from 100,000tpy to 120,000tpy.

"We are aiming to increase our market share by increasing the number of countries we export to."

He added that saved energy due to the investment will be equal to the amount of energy consumed by 4,000 households per year:

"Our new plant's machines are equipped with the latest technology. With the help of these updates, we will gain a 15% saving in energy consumption, which means US$1,500,000 worth of energy saving.

"As a group, we are at the top three in our industry. We finished 2018 with TRY900m turnover and 30% growth.

"The first nine-month long period was quite productive for us and compared to the same period last year we achieved approximately 30% growth."

Today the company exports 65% of its productions and also offers 35% of its production in the domestic market.

KIMBERLY-CLARK DE MÉXICO HAS REPORTED A YEAR-ON-YEAR NET SALES INCREASE OF 5.1% TO PS.$10.4BN IN ITS THIRD QUARTER RESULTS. CONSUMER PRODUCTS FOR THE PERIOD WERE UP 6% WHILST EBITDA INCREASED 28.4% TO PS. $2.6 BN.

ALGERIA

Africaine Paper Mills moves into tissue with Algiers TM

Africaine Paper Mills (APM) has moved into the tissue market after starting up production on its first tissue machine.

The 2.85m wide, Andritz-supplied TM started up in summer, with a design speed of 2,100 metres per min, producing up to 120tpd of toilet, towel and high-quality facial grades.

The machine is equipped with a state-of-the-art Shoe Press as well as Prime Dry Steel Yankee dryer that the company said enables energy-saving in order to reduce costs. The mill employs about 80 people and is located in the eastern suburb of Algiers. In addition to the local market - which the company said is increasingly demanding quality tissue grades – the company plans to export to neighbouring and foreign markets. APM is the third tissue machine to come on stream in Algeria, with Tonic Industries and Faderco already established.

MEXICO

K-C de México reports better cost environment in 3Q results

Kimberly-Clark de México has reported a year-on-year net sales increase of 5.1% to Ps.$10.4bn in its third quarter results.

Consumer products for the period were up 6% whilst EBITDA increased 28.4% to Ps. $2.6 bn. The company said the increases were due to "positive price comparisons, better cost environment and continued cost savings".

Revenues in consumer products increased 6%, AfH decreased 3% and exports declined 5% due to an increase in tissue sold domestically. Gross profit grew 18.7%.

Domestic fibre prices compared negatively, while virgin pulp, imported fibres, superabsorbent materials and resins compared favourably.

Energy prices were also lower and the company's cost reduction programme yielded approximately Ps.$400m in the quarter.

The company said it will "maintain our lean operation and continue to invest efficiently behind our brands and products".

Kimberly-Clark de México manufactures and commercialises branded consumer products including bath tissue, napkins, facial tissue, paper towels, wet wipes and soap.

Papel San Francisco improves energy efficiencies at Mexicali site

Papel San Francisco has invested in a complete stock preparation and deinking line for its new tissue production line at its Mexicali, Mexico facility.

Supplied by Kadant Black Clawson, the tissue mill said it needed a sustainable, highly-flexible solution with the ability to expand production while maintaining the high quality of the finished product.

Additionally, this system needed to process what is anticipated to be increased levels of furnish contamination from the market going forward.

Dario Palma, director of operations at Papel San Francisco, said: "The high efficiency solution from Kadant will support our growing production goals and enable us to get the very best in an increasingly challenging market environment."

The investment included Kadant Black Clawson's foundations fibre processing solution, which includes end-to-end recycling and de-inking fibre processing.

Papel San Francisco has provided the consumer and commercial markets with high quality personal care paper products for over 35 years.

The line is scheduled to be up and running in September 2020.

PAPEL SAN FRANCISCO HAS INVESTED IN A COMPLETE STOCK PREPARATION AND DEINKING LINE FOR ITS NEW TISSUE PRODUCTION LINE AT ITS MEXICALI, MEXICO FACILITY. SUPPLIED BY KADANT BLACK CLAWSON, THE TISSUE MILL SAID IT NEEDED A SUSTAINABLE, HIGHLY-FLEXIBLE SOLUTION WITH THE ABILITY TO EXPAND PRODUCTION WHILE MAINTAINING THE HIGH QUALITY OF THE FINISHED PRODUCT.

AMERICA

Irving Tissue expands in USA with plans to double Macon production

Irving Tissue has opened its $470m tissue production plant in Macon, Georgia, and announced plans for an additional $400m expansion project.

Located in the Sofkee Industrial Park, the site employs more than 200 people and produces ultra-premium quality household paper products including soft bath tissue and high-quality paper towel.

Robert K. Irving, president of Irving Tissue, said: "We're pleased to be expanding our business in the United States.

"We knew that this plant's strategic location would allow us to reach key markets and help to drive our growth."

The new second phase of the project represents an additional $400m investment, adding another 150 jobs and will be completed by January 2022.

He added: "We've already ordered an additional ThruAir Dry machine that will be a duplicate of what we already have in our Macon plant.

"This facility is part of an integrated value chain from sustainably managed forests to the store shelf.

"Most of the pulp for Macon products comes from our mill in Saint John, New Brunswick."

Construction of the plant doubled Irving Tissue's annual ThruAir Dry capacity, increasing it by 75,000 tonnes, the equivalent of 15 million cases.

Phase two will increase that to 30 million case capacity in Macon.

Irving Tissue produces premium household store brand paper products for many of North America's top retailers, in addition to some of the top-selling tissue brands in the marketplace.

It is part of Irving Consumer Products, one of North America's leading manufacturers of household paper and baby diaper products.

CASCADES IS TO PERMANENTLY CLOSE ITS TISSUE CONVERTING OPERATIONS AT ITS WATERFORD, NEW YORK AND KINGMAN AND ARIZONA PLANTS. EFFECTIVE 27 MARCH 2020, THE CLOSURES DO NOT INVOLVE THE WATERFORD CUSTOMER SERVICE OR DISTRIBUTION CENTRES, WHILE THE KINGMAN DISTRIBUTION CENTRE WILL CONTINUE TO OPERATE UNTIL THE LEASE ENDS IN OCTOBER 2020.

Cascades to close converting activities at Waterford and Kingman

Cascades is to permanently close its tissue converting operations at its Waterford, New York and Kingman and Arizona plants.

Effective 27 March 2020, the closures do not involve the Waterford customer service or distribution centres, while the Kingman distribution centre will continue to operate until the lease ends in October 2020.

The two sites produce a combined total of nine million cases of tissue products annually and employ 213 workers.

These volumes will be moved to other Cascades plants and filled with the ramp up of additional capacity.

Jean-David Tardif, president and chief operating officer of Cascades Tissue Group, said: "The difficult, but necessary decisions we are announcing today are part of our strategic efforts to improve the tissue group's profitability and position this business for long-term success.

"The losses recorded by these plants, existing market conditions, and our recently announced investments in acquiring and modernising other converting units in the US have prompted us to move production to our other sites to optimise operational efficiency and reduce logistic costs."

He added that over the coming weeks and months, Cascades will work to mitigate the impact of this announcement on its employees, including offering as many employees as possible the option to transfer to Cascades' other business units.

Employees who cannot, or do not wish to relocate to other plants, will receive support in their search for other employment.

SWEDEN

Metsä Tissue plans new TM as part of €230m investment

Metsä Tissue has applied for an environmental permit in Mariestad as part of its Future Mill programme.

In the first phase, the plan includes a new tissue paper machine, an automated warehouse and an office building in the Mariestad mill.

The possible investments in first phase are estimated to amount to approximately €230m.

The Future Mill programme was announced in April and aims to increase the long-term industrial efficiency and environmental performance of the tissue paper business.

Metsä Tissue is also aiming for totally fossil-free mills by 2030.

Improving the product quality and ensuring the availability of premium tissue paper are also part of the programme.

Esa Kaikkonen, chief executive of Metsä Tissue, said: "Metsä Tissue is the only tissue paper producer on the market with strong roots in sustainably managed northern forests.

"Premium tissue papers made from pure fresh fibre, grown close to our customers and consumers and the leading tissue paper brands in the Scandinavia, Katrin, Lambi and Serla, have always played an important role in our company.

"Now we're planning to continue to increase premium tissue paper production by investing, in the first phase, approximately €230m at the Mariestad mill.

"Our increasingly strong focus on fresh fibre in the future is also a result of the continuous decline of the availability and quality of recycled fibre.

"An investment in the production of premium fresh fibre tissue paper products with modern technology is the most sustainable solution for the future."

The environmental permit process and a pre-feasibility study aims to create preconditions to double the company's tissue paper production in two phases and to construct an automated warehouse and an office building in the Mariestad mill site.

The study is expected to be completed in the first half of 2021 and the final investment decision concerning the first phase could be made during the second half of 2021.

In the first phase, the planned investments would increase Mariestad's annual tissue paper production capacity by 50,000 tonnes fully as of 2024.

Kaikkonen added: "Scandinavia is our most important market area and we're committed to the development of our operations here.

"Tissue paper production is local, so we want to be close to our customers to be better able to meet growing demand.

"For us, Sweden and Mariestad represent a good operating environment and a possibility of developing the company with our professional and committed personnel."

METSÄ TISSUE HAS APPLIED FOR AN ENVIRONMENTAL PERMIT IN MARIESTAD AS PART OF ITS FUTURE MILL PROGRAMME. IN THE FIRST PHASE, THE PLAN INCLUDES A NEW TISSUE PAPER MACHINE, AN AUTOMATED WAREHOUSE AND AN OFFICE BUILDING IN THE MARIESTAD MILL.

GLOBAL

Metsä Group reports "stable demand" for tissue in 3Q results

Metsä Group has reported sales of €4,183m compared to €4,290m in last year's third quarter.

The operating result for the group was €342m compared with €635m in 2018, whilst pre-tax results were €298m compared with €576m.

The company said that prices of long-fibre and short-fibre pulp in Europe declined by 13% compared to the previous quarter.

In China, the price of long-fibre pulp declined by 15% and the price of short-fibre pulp by 24%.

President and chief executive Ilkka Hämälä said: "Metsä Group's third quarter result weakened, as expected, compared to the previous quarter.

"The price level of pulp in Europe continued to decline as a result of China's lower price level.

"In China, the prices of softwood pulp

were stable during the third quarter and took a slightly upward turn at the end of September as softwood pulp inventories approached their average level, and as a number of producers announced production curtailments attributable to the market situation and technical reasons."

This year, Metsä Tissue announced its plan for a next-generation tissue paper mill in Mariestad, Sweden, and the start of a related environmental permit process.

It said demand for Metsä Tissue's products "remained stable" and the decline in pulp prices improved the company's result, along with the reorganisation of the business carried out during the first half of the year.

President and chief executive Linda K. Massman: *"Continued strong pulp and paperboard production."*

Clearwater reports "solid" 3Q results; 8% tissue sales increase

Clearwater Paper Corporation has reported a year-on-year net sales increase of 4.4% to $445.2m in its third quarter results.

This was due to higher net paperboard and tissue pricing from previously announced price changes and higher retail tissue shipments.

These items were partially offset by lower non-retail tissue shipments mainly as a result of the sale of the company's mill in Ladysmith, Wisconsin, in August 2018.

Linda Massman, president and chief executive, said: "Compared to our outlook, we performed well during the third quarter, with continued strong pulp and paperboard production and higher retail tissue shipments, which enabled us to achieve solid results."

The company has completed the maintenance outage at its Lewiston mill.

Its new Shelby, North Carolina-based plant is a facility producing ultra and premium grades at its targeted production volume.

"We are also happy to report that tissue sales have increased 8% year over year. Our long-term focus remains on improving our operational capabilities to ensure we are well-positioned to generate cash flow to de-lever our balance sheet."

Net loss for the quarter was $11.0m, compared to net earnings for the third quarter of 2018 of $34.4m.

The decrease in net earnings was a result of planned maintenance at the company's Lewiston, Idaho mill, as well as higher input costs for pulp and wood fibre.

EBITDA decreased to $28.1m compared to $71.0m for the third quarter of 2018 due to the planned maintenance at the company's Idaho mill in the third quarter of 2019.

In the consumer products segment, net sales were up 8% to $228.5m compared to the same quarter in 2018.

The company said this was due to higher retail tissue volumes sold, higher average prices for both retail and non-retail tissue products.

It reported an operating loss of $4.4m compared to operating income of $21.7m the same time a year earlier.

Total tissue volumes sold were 86,408 tonnes in the third quarter of 2019, a decrease of 2.8% compared to 88,860 tons in the third quarter of 2018.

Average tissue net selling prices increased 10.7% to $2,635 per tonne in the third quarter of 2019.

Clearwater Paper manufactures quality consumer tissue, AfH tissue, parent roll tissue, bleached paperboard and pulp.

The company is a premier supplier of private label tissue to major retailers and wholesale distributors.

Resolute results report impact of market pulp pricing

RESOLUTE FOREST PRODUCTS HAS SAID THE ONGOING WEAKNESS IN MARKET PULP PRICING HAS HAD "A SIGNIFICANT IMPACT" ON ITS THIRD QUARTER RESULTS. FOR THE PERIOD ENDING 30 SEPTEMBER 2019, THE COMPANY REPORTED A NET LOSS OF $43M COMPARED TO A NET INCOME OF $117M IN THE SAME PERIOD IN 2018. SALES WERE $705M IN THE QUARTER, A DECREASE OF $269M FROM A YEAR AGO.

Resolute Forest Products has said the ongoing weakness in market pulp pricing has had "a significant impact" on its third quarter performance.

For the period ending 30 September 2019, the company reported a net loss of $43m compared to a net income of $117m in the same period in 2018.

Sales were $705m in the quarter, a decrease of $269m from a year ago.

The third quarter of 2018 included sales from the Catawba (South Carolina) and Fairmont (West Virginia) facilities, which were sold in the fourth quarter of 2018.

Yves Laflamme, president and chief executive, said: "Ongoing weakness in market pulp pricing had a significant impact on our quarterly results.

"While paper has come under pressure this year and lumber markets continue their slow recovery, we are pleased with the progress in sales growth and productivity gains in the tissue business, as we continue to build our position in the segment with positive EBITDA.

"In October, we successfully used our strong financial situation to increase and extend our senior secured credit facility by $175m, providing us additional liquidity at very competitive terms to support our transformation initiatives.

"The proactive steps we have taken over the last few years to strengthen our balance sheet position us well to execute on our strategy despite the cyclical downturn currently affecting the industry."

The company's market pulp segment recorded an operating loss of $12m in the third quarter compared to operating income of $27m in the second quarter.

It said the drop in profitability was mainly due "to the 15% lower average transaction price, to $625 per metric tonne, as global market conditions further weakened".

The operating cost per unit rose by $34 per metric tonne, to $664, due to additional maintenance costs, mainly incurred during the scheduled outages at two mills.

Given steps taken to reduce finished goods inventory, shipments rose by 63,000 metric tons. Despite the volume increase, EBITDA fell to negative $5m in the third quarter.

The tissue segment incurred an operating loss of $3m in the quarter, an improvement of $1m compared to the second quarter, and building on the gains of the previous quarter.

Favourable product mix and continued pricing gains for AfH products led to a $46 per short tonne increase in average transaction price, to $1,741, offsetting the $32 per short tonne increase in delivered cost.

EBITDA improved slightly to $1m.

Laflamme added: "We expect challenging conditions in market pulp to persist at least through the end of the year, but we see encouraging signs and stronger industry operating rates for softwood pulp, which represents about two-thirds of our production capacity.

"For tissue, we will build on recent improvements around sales growth and productivity gains to deliver steady improvements over the next few quarters."

Yves Laflamme, president and chief executive: *"While paper has come under pressure this year and lumber markets continue their slow recovery, we are pleased with the progress in sales growth and productivity gains in the tissue business."*

Double E launches "tissue industry's lightest core plug"

Double E claims its new carbon fibre-based, ultra-light core plug weighs at least one third less than current models.

It aims to help the converting industry by enhancing productivity and safety, and builds upon Double E's industry status in applying carbon fibre technology to the converting products market.

Capitalising on carbon fibre's weight to strength ratio, the company engineered the plug's critical components using advanced composites that dramatically lower the weight of the core plug while assuring its performance integrity.

Double E has introduced what it said is the lowest weight core plug ever available to the tissue industry.

Steve Marsh, Double E's product manager for its Core Plug product line, said: "Multiple customers approached Double E seeking to further reduce the weight of our already lightweight core plugs.

"We started by applying our carbon fibre knowledge and developed a line of significantly lighter core plugs using a number of advanced materials, attaining our twin goals of significantly decreasing the weight while assuring delivering optimal structural integrity.

"These core plugs went through rigorous testing both in-house and live in the field, delivering our customers the strength and durability they need in their core plugs."

CAPITALISING ON CARBON FIBRE'S WEIGHT TO STRENGTH RATIO, DOUBLE E SAID IT ENGINEERED THE PLUG'S CRITICAL COMPONENTS USING ADVANCED COMPOSITES THAT DRAMATICALLY LOWER THE WEIGHT OF THE CORE PLUG WHILE ASSURING ITS PERFORMANCE INTEGRITY.

Ultralight: *the company applied its carbon fibre knowledge and developed a line of "significantly lighter core plugs" using a number of advanced materials*

Essity 3Q results; net sales up 9%

Essity has reported "strong development" in growth and profitability as all business areas reported higher margins in its third quarter interim report.

From 1 January 2019 – 30 September 2019, net sales increased 9% to SEK95,289m, up from SEK87,388m the same time a year earlier.

Organic net sales for the period increased 4.8%.

Emerging markets accounted for 36% of net sales and organic net sales increased 9.8%.

Operating profit before EBITA increased 28% to SEK 10,387m.

The company said the third quarter was characterised by "strong development

ESSITY HAS REPORTED "STRONG DEVELOPMENT" IN GROWTH AND PROFITABILITY AS ALL BUSINESS AREAS REPORTED HIGHER MARGINS IN ITS THIRD QUARTER INTERIM REPORT. FROM 1 JANUARY 2019 – 30 SEPTEMBER 2019, NET SALES INCREASED 9% TO SEK95,289M, UP FROM SEK87,388M THE SAME TIME A YEAR EARLIER. ORGANIC NET SALES FOR THE PERIOD INCREASED 4.8%.

IN THE CONSUMER TISSUE DIVISION, ESSITY'S NET SALES FOR THE PERIOD INCREASED 10.9% TO SEK36,635M. EXCLUDING LOWER SALES OF MOTHER REELS WHICH THE COMPANY SAID WAS RESULTING FROM PRODUCTION CLOSURES WITHIN THE TISSUE ROADMAP, ORGANIC NET SALES INCREASED 7.2%. ORGANIC NET SALES INCREASED 2.2% IN MATURE MARKETS.

in terms of growth and profitability" and that "all business areas reported higher margins".

It said all business areas "demonstrated healthy growth due to implemented price increases, a better mix and higher volumes".

Growth was strengthened by innovations and investments in sales and marketing activities. Its online sales continued to perform favourably and totalled SEK9bn for the first nine months of 2019, corresponding to about 10% of total group net sales.

Total cost savings amounted to SEK271m during the quarter, of which SEK179m was related to the group-wide cost-savings programme. In the consumer tissue division, net sales for the period increased 10.9% to SEK36,635m.

Excluding lower sales of mother reels which the company said was resulting from production closures within the Tissue Roadmap, organic net sales increased 7.2%.

Organic net sales increased 2.2% in mature markets.

Emerging markets accounted for 46% of net sales while acquisitions in Latin America increased net sales by 0.2%.

Adjusted operating profit before adjusted EBITA increased 43% (35% excluding currency translation effects and acquisitions) to SEK3,554m (2,491).

The increase was mainly due to higher prices, a better mix, higher volumes and cost savings.

Higher raw material and energy costs negatively impacted earnings by SEK-268m, corresponding to a negative impact on the adjusted EBITA margin of -0.7% points.

The company said the higher raw material costs were mainly the result of a negative currency transaction effect.

Next generation: *BTG's charge measurement with the Single Point Charge SPC-5500*

BTG launches the next generation of charge measurement

BTG has launched the next generation of charge measurement with the Single Point Charge SPC-5500.

The company said it is considerably smaller, easier to install and easier to handle than previous products.

It said the single point modular design "allows for greater flexibility".

It is suitable for wet-end applications in all papermaking processes such as in tissue, packaging and board or specialty paper.

It is used to control key process stages like anionic trash levels in incoming thick stockstreams, especially for closed loop control of fixatives.

K-C reports "excellent" third quarter results and strong profit margin improvements

Kimberly-Clark Corporation (K-C) has reported a third quarter year-on-year net sales increase of 1% to $4.6bn.

Organic sales increased 4% and the company is now targeting full-year 2019 organic sales growth of 3 – 4%.

The prior outlook was for organic sales growth of 3% and adjusted earnings per share of $6.65 to $6.80.

Chief executive Mike Hsu said: "We delivered excellent third quarter results and we are raising our full-year outlook.

"We achieved strong improvements in organic sales, profit margins and earnings per share in the quarter.

"In addition, we continued to launch innovations, pursue our growth priorities and increase investments in our brands."

The company generated $95m of cost savings and returned approximately $570m to shareholders through dividends and share repurchases.

"I'm encouraged by the progress we're making this year while we invest more for longer-term success," Hsu added.

"We continue to be optimistic about our opportunities to deliver balanced and sustainable growth through execution of K-C Strategy 2022."

Changes in foreign currency exchange rates reduced sales by 2% and business exits in conjunction with the 2018 Global Restructuring Programme reduced sales slightly.

In North America, organic sales increased 4% in consumer products and 5% in K-C Professional.

Outside North America, organic sales rose 5% in developing and emerging markets and 1% in developed markets.

"We delivered excellent third quarter results and we are raising our full-year outlook." K-C chief executive Michael Hsu

Third quarter operating profit was $915m in 2019 and $669m in 2018. Results in both periods include charges related to the 2018 Global Restructuring Programme.

In the Consumer Tissue segment, third quarter sales of $1.5bn increased 1%.

Net selling prices increased 5%., while volumes declined 2% and changes in currency rates reduced sales 2%.

Third quarter operating profit of $26m increased 25%.

Results benefited from higher net selling prices, cost savings and lower input costs.

The comparison was impacted by other manufacturing cost increases, lower volumes and increased selling, general and administrative costs.

Sales in North America increased 3% compared to a 5% decline in the year-ago period. Net selling prices rose 8%, while volumes fell 4 percent and product mix was off 1%.

Sales in developing and emerging markets increased 1%.In the K-C Professional (KCP) segment, third quarter sales of $0.8bn decreased 1%.

Maflex introduces Heracle quick change embosser

Maflex has launched the Heracle embosser and laminator, which it said is a brand new and original design.

According to the company, the machine is designed to ensure a quick and safe upper engraved roller change, offering "unprecedented versatility".

Due to the presence of two hydraulic and telescopic arms integrated into the machine, it is possible to alternate - in a completely automatic way - the different engraved rollers for embossing the upper ply.

While the machine is working with an embossing pattern, the operator can simply select from the control panel, one of the other two rollers in storage, and the machine performs the roll change operation in less than three minutes, without the need to break the paper web.

If an additional engraving design is needed (in addition to the two already stored), the operator, without stopping production, can replace one of the two rolls in storage with an overhead crane system.

Additionally, the line can run DERL and DESL, with Maflex said is synchronised completely automatically through the HMI.

The strategic position of the rolls waiting above the machine, combined with the automatic selection and change of Heracle, allows infinite embossing changes.

In addition, it is possible to clean the rollers in total safety, without stopping production, simply by bringing the roller to be treated away from the production line.

The machine is designed to contain two different engravings for the lower ply, installed on the machine.

Because of Maflex's modular design, the Heracle has its own electrical and control panels, making it easy to install on existing converting lines.

The company said it is the only product on the market that combines all the above features.

Gambini delivers TouchMax.Air to Byness Company

Gambini has announced the installation of the new embosser-laminator TouchMax. Air at Italian-based company Byness, after it wanted to improve and differentiate its production.

According to the converting machine supplier, the new embosser is an "advanced, innovative, flexible and versatile technology", integrating the TouchMax.Twin embosser with a part of AirMill technology.

Byness has installed Gambini's FLEX 600 converting line: a 600m/min consumer line that is equipped with the new TouchMax.Air embosser-laminator.

Carlo Berti, sales director at Gambini, told TWM: "The new line creates bulky tissue rolls with high-quality values in terms of softness, absorbency and tensile strength, while making the products more stable during the production phase, thus optimising the efficiency."

It works at a production speed up to 600m/min and is characterised by extreme flexibility, being able to laminate in five different configurations: Synchronised, Random, LNG (Laminated-Non-Embossed), Point-to-Point and Point-to-Flat.

Due to the machinery, Byness will be able to increase its range of products by satisfying the most diversified requests of buyers, reducing production times and costs.

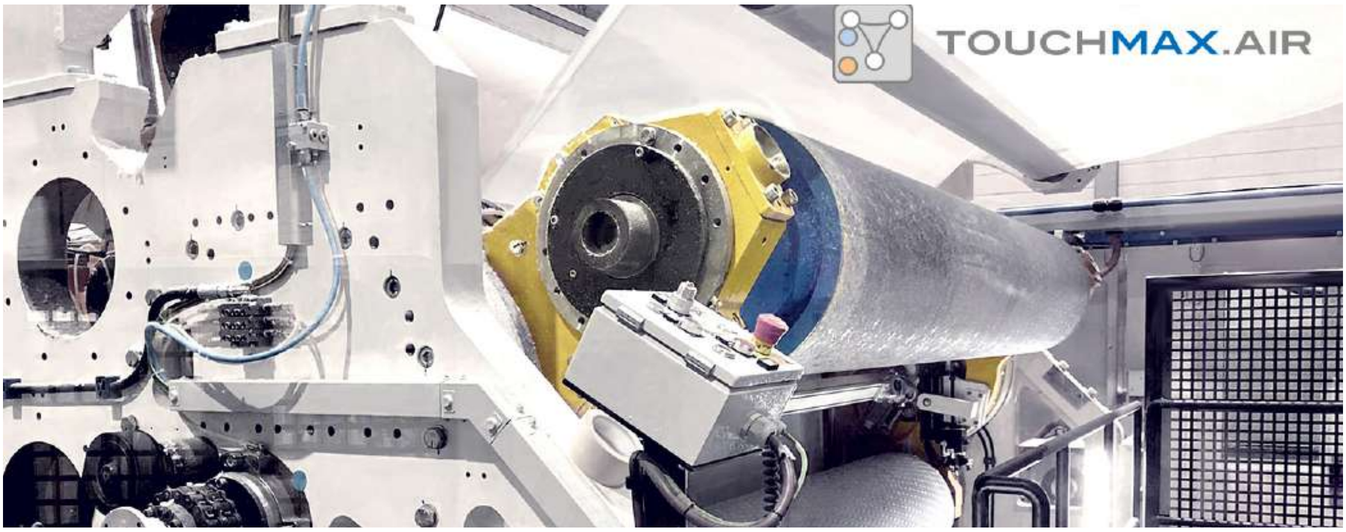
Berti added that the customer will be able to use less raw material and resources by using conventional papers (DCT/LCT), while obtaining, however, a product very similar to textured paper.

Byness is a Pistoia-based tissue converting company that has been present on the tissue market for over 50 years.

It produces toilet paper with pure and ecological cellulose, as well as industrial rolls, hand towels, tissues, napkins, disposable examination sheets.

Its brands include Ninfea, EcoLine, Morbida and Naturel.

Unprecedented versatility: *Maflex launches the Heracle quick change embosser*



Gambini's TouchMax.Air embosser-laminator: *the new line creates bulky tissue rolls*

DOMINICAN REPUBLIC

César Iglesias enters tissue market with TT SYD start-up

César Iglesias Group has moved into the tissue market after starting up a Toscotec-supplied TT SYD. The second-generation machine was successfully started-up at its paper mill in Santo Domingo in the Caribbean, producing and converting toilet tissue, paper towels and napkins.

Following start-up, the company said it has observed a marked increase of production capacity and energy savings in the drying section.

It added that the height, width and pitch of the internal ribs as well as the shell thickness "achieved an optimal geometry, which guarantees a highly efficient heat transfer. The supply also includes the steam and condensate system, the Yankee coating spray boom, a new forming roll, as well as the complete overhaul service of press rolls.

In response to the customer's request for the fastest possible delivery, Toscotec said it further refined the production time and was able to deliver the Steel Yankee Dryer in record time.

Jesús Feris Ferrús, César Iglesias technical director, said: "When we selected the supplier for this investment we thought that the TT SYD's superior performance and short delivery time made it the most competitive choice in the market.

"The energy efficiency of the TT SYD will allow us to reduce the manufacturing cost of our tissue line and give us a competitive advantage in the market."

César Iglesias is a Dominican company with more than 100 years of experience.

Dedicated to the manufacture and marketing of mass consumption products in the areas of cleaning, home care and personal care and food, it has over 2,000 employees, 21 factories, and a portfolio of 27 brands.

POLAND

Metsä Tissue to curtail tissue production at Krapkowice

Metsä Tissue is to curtail its tissue production at its Krapkowice mill by stopping the PM6 until the end of December 2019.

It will then decide by the end of the year whether PM6 will be restarted.

The annual production capacity of the PM6 has been approximately 20,000 tonnes.

The company said the curtailment is necessary "because of the currently unsatisfactory prices of tissue papers in the market".

It added that it will also aim in future to balance its mills to meet market demand.

Metsä Tissue is part of the Metsä Group which focuses on wood supply and forest services, wood products, pulp, fresh fibre paperboards and tissue and greaseproof papers.

CÉSAR IGLESIAS GROUP HAS MOVED INTO THE TISSUE MARKET AFTER STARTING UP A TOSCOTEC-SUPPLIED TT SYD. THE SECOND-GENERATION MACHINE WAS SUCCESSFULLY STARTED-UP AT ITS PAPER MILL IN SANTO DOMINGO IN THE CARIBBEAN, PRODUCING AND CONVERTING TOILET TISSUE, PAPER TOWELS AND NAPKINS.

Increase of production capacity: *César Iglesias Group starts up its Toscotec-supplied TT SYD*

OLD AND SLOW PRODUCTION – BUT POISED TO REAP BENEFIT OF LOW CARBON EMISSIONS

WITH PER CAPITA CONSUMPTION RANKED AMONG THE HIGHEST WORLD LEVELS, ANY SCANDINAVIA GROWTH WILL BE A BALANCING ACT BETWEEN TECHNOLOGY UPGRADES AND CONSUMER PREFERENCE FOR GREEN TISSUE.

Scandinavia consists of three countries—Denmark, Sweden, Norway—that have a great deal of history and culture in common. (Iceland and the Faroe Islands are also part of Scandinavia in a strict geographical sense, but they are not included in this analysis. And although Finland is a Nordic county, it is generally not considered to be part of Scandinavia). Scandinavian countries also have similar economic policies and demographics today. They enjoy open modern market economies with a high standard of living combined with extensive government welfare measures. Scandinavia has a combined population of about 21 million, a high standard of living, and growing economies. These factors should combine to create a high level of tissue consumption, however, tissue production is not a significant paper grade in this region. Norway has one tissue mill, Sweden has seven, and Denmark has no tissue mills.

It makes sense to look at the tissue business in this region as a unit, but first, it is essential to note some subtle differences between these three countries. Sweden dominated the region through the 18th century, and both Norway and Denmark suffered heavy losses under occupation in World War II — events that contributed to the long-term political and economic developments in the region.

Norway is a member of The North Atlantic Treaty Organisation (NATO) but has rejected joining the European Union (EU). However, Norway is a member of the European economic area, and partially participates in the European Union's single market and contributes significantly to the EU budget. Norway maintains its own national currency called the Kronerand and, while the country is a significant producer of oil and gas, it saves state revenue from this sector in the world's largest sovereign wealth fund in anticipation of eventual declines in production. Norway's population is 5,372,191 as of 2018 and growing at about 0.94%. Unemployment is about 4.2%, and GDP is growing at about 1.9%. Tissue consumption per person has averaged about 18kg over the past ten years.

Bruce Janda
Senior consultant, Fisher International

Sweden has not participated in any

IT MAKES SENSE TO LOOK AT THE TISSUE BUSINESS IN THIS REGION AS A UNIT, BUT FIRST, IT IS ESSENTIAL TO NOTE SOME SUBTLE DIFFERENCES BETWEEN THESE THREE COUNTRIES. SWEDEN DOMINATED THE REGION THROUGH THE 18TH CENTURY, AND BOTH NORWAY AND DENMARK SUFFERED HEAVY LOSSES UNDER OCCUPATION IN WORLD WAR II — EVENTS THAT CONTRIBUTED TO THE LONG-TERM POLITICAL AND ECONOMIC DEVELOPMENTS IN THE REGION.

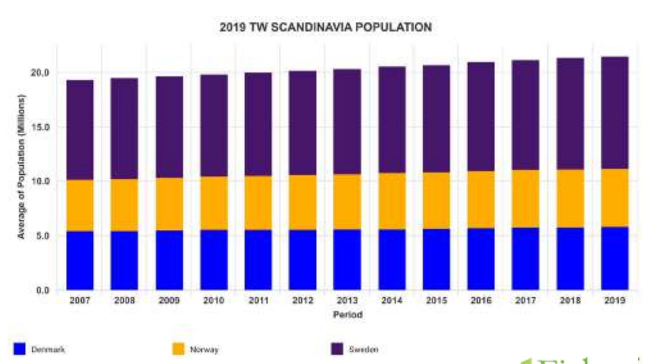


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Figure 1

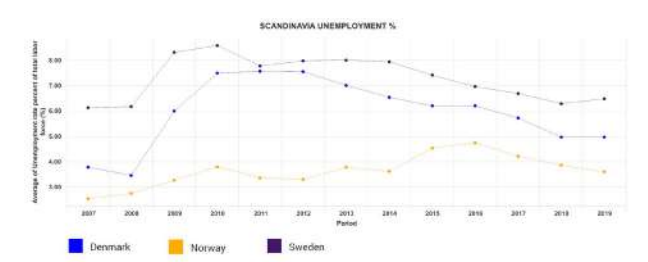

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Figure 2

THE MARKET TRENDS MODULE IN THE NEW FISHERSOLVE NEXT PLATFORM SUPPORTS A QUICK ANALYSIS OF TRENDS THAT MIGHT INFLUENCE FUTURE TISSUE DEMAND IN THE REGION. THE EVOLUTION OF POPULATION, UNEMPLOYMENT, GDP PER CAPITA, INFLATION AND TISSUE TRADE STATISTICS CAN QUICKLY BE SOURCED AND PLOTTED.

war for over two centuries and remained neutral in both world wars during the 20th century. Although Sweden is not a member of NATO, it has started cooperating more closely with its neighbours on defence issues. Sweden joined the EU in 1995, but the public rejected the introduction of the euro currency in a later referendum. Like Norway, the Swedish national currency is also called the Kronor. Sweden's population is nearly twice that of Norway or Denmark at 10,040,995 as of 2018, growing at about 0.8%. The unemployment rate is about 6.7%, and GDP is growing at about 2.1%. Sweden's tissue consumption per person has averaged about 19kg over the past ten years. Sweden is also the home of Essity, the world's largest tissue producer (when combined with Vinda).

Denmark is a member of both the EU and NATO, yet it has opted out of the European monetary union and continues to use the Danish Kroner as its currency. Denmark is experiencing a modest economic expansion of about 2.3% and unemployment is about 5.7%. The population is approximately 5,809,502 as of 2018 and growing at about 0.59%. Denmark's tissue consumption per person has averaged about 18kg over the past ten years.

The Market Trends module in the new FisherSolve Next platform supports a quick analysis of trends that might influence future tissue demand in the region. The evolution of population, unemployment, GDP per capita, inflation and tissue trade statistics can quickly be sourced and plotted, as shown in the following charts. This helps predict future tissue demand based on population and purchasing power.

Figure 1 shows the total Scandinavia population and its growth over the past 12 years. Each country has maintained its relative percentage of the total. The population is growing slowly in all three countries, moderating tissue demand growth potential.

Figure 2 shows unemployment in each of the Scandinavian countries. All three experienced a spike in 2009 during the global economic downturn but have continued to trend slightly down more recently. While Norway remains an energy producer, which has supported a healthy job market, Sweden has seen slower job growth.

Figure 3 shows that inflation spiked during the 2008 economic disruption but has returned to normal ranges, and Figure 4 shows that the Scandinavian region has enjoyed steady economic growth per capita since 2009. GDP per capita compound annual growth rates (CAGR 2007 to 2019) of each country range from 1.8% for Norway, 2.0% for Denmark, and 2.3% for Sweden.

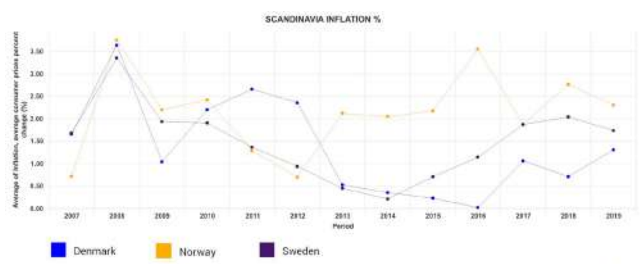

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Figure 3

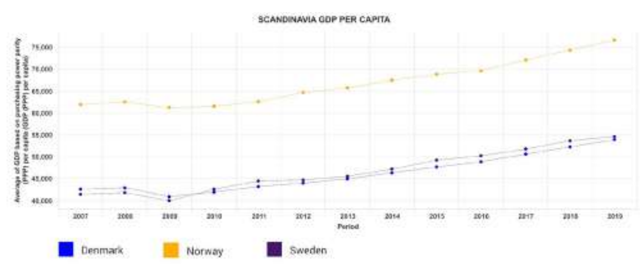

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Figure 4

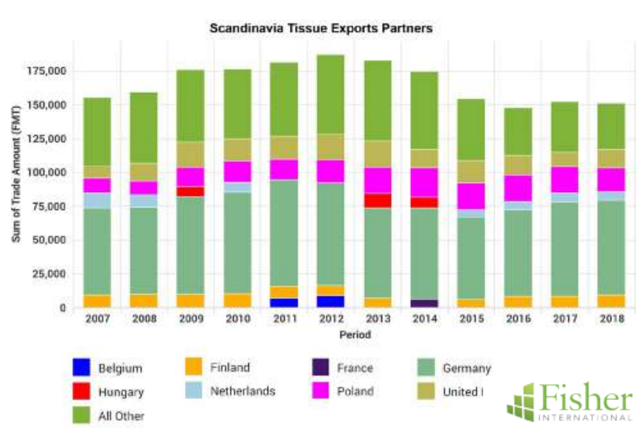

Figure 5

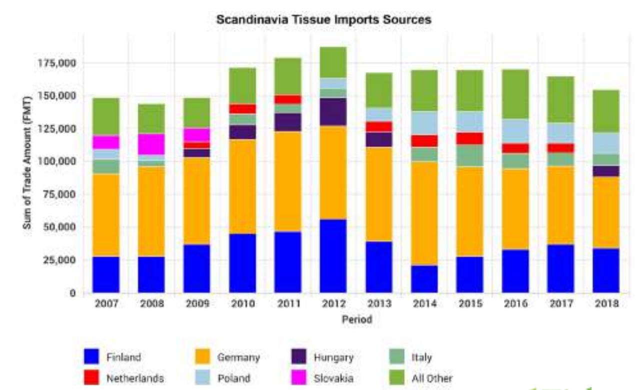

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Figure 6

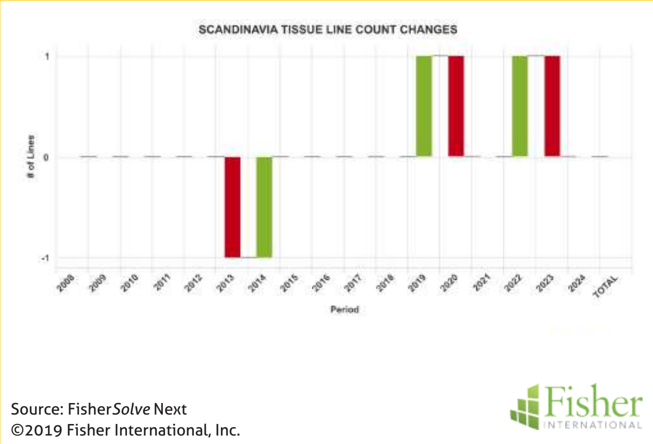

Figure 7

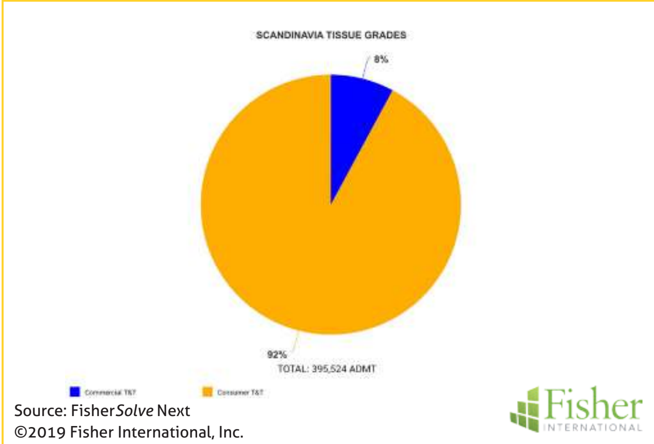

Figure 8

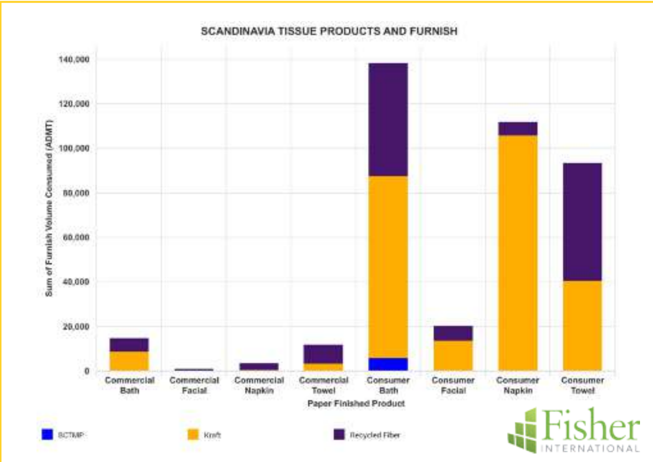

Figure 9

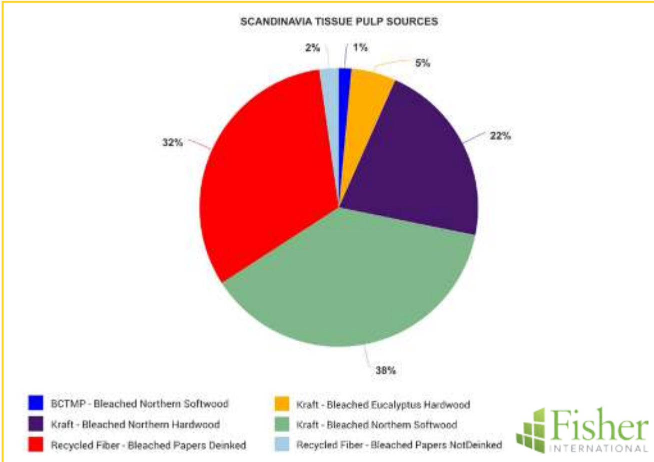

Figure 10

This is slow growth, but better than many global regions.

These four charts show an overall economic picture that should support healthy tissue consumption, but slow consumption growth rates.

Tissue Trade volume analysis is required to evaluate the region's consumption and production. Figure 5 shows the trend of tissue exports from Scandinavia to the top seven importers. Germany is the top destination for Scandinavian tissue exports followed by Poland, Finland and the United Kingdom. The total volume of tissue exports has decreased somewhat over this period, while domestic demand has likely grown.

Figure 6 shows the trend of Scandinavian tissue imports for the same period, which have tended to be steady to slightly down over the past five years. Tissue imports tend to run about 25,000 finished metric tonnes ahead of the tissue exports shown in Figure 5. (Denmark's tissue consumption is all imported, but Norway and Sweden's exports to Denmark are part of the Scandinavian system.) The top tissue supplier for Scandinavia is Germany, followed by Finland, Poland and Hungary; only Germany and Poland have advanced technology machines. The trade partners identified provide a basis for comparing Scandinavian tissue machine quality versus relevant competition.

While Figure 6 shows relatively stable to declining volumes, Figure 7 shows the changes in Scandinavian production in terms of line changes (green bars indicate machine additions and red indicate machine closures). One tissue machine was removed and replaced in 2013-2014. The number of tissue machines remained constant, but the domestic capacity increased through this replacement and improvements to existing machines. Another tissue machine replacement is now underway, and another is planned for 2022-2023. These changes should further reduce tissue imports versus exports.

Scandinavia enjoys a high tissue consumption per capita rate versus the averages of Western Europe. However, the consumption of tissue in their AfH or commercial grades is somewhat below average for the other high consumption countries. The chart in Figure 8 shows that only 8% of tissue production is AfH. For example, North American tissue consumption is almost 33% of commercial tissue grades.

Further analysis of Scandinavian tissue production is shown in Figure 9, which shows individual tissue finished product volumes and tissue furnish types. Consumer bath is the most significant grade and is about 30% deinked pulp with a small amount of BCTMP, and consumer napkin and kitchen roll towels are also significant grades. Interestingly, the towelling is about 60% recycled fibre.

SCANDINAVIA ENJOYS A HIGH TISSUE CONSUMPTION PER CAPITA RATE VERSUS THE AVERAGES OF WESTERN EUROPE. HOWEVER, THE CONSUMPTION OF TISSUE IN THEIR AFH OR COMMERCIAL GRADES IS SOMEWHAT BELOW AVERAGE FOR THE OTHER HIGH CONSUMPTION COUNTRIES.

SCANDINAVIA'S AVERAGE TISSUE MACHINE QUALITY IS RELATIVELY LOW COMPARED TO ITS TRADE PARTNERS. MACHINES IN NORWAY AND SWEDEN TEND TO BE OLDER AND NARROWER THAN THOSE IN GERMANY (LARGER MACHINES), OR HUNGARY/LITHUANIA (NEWER MACHINES).

Figure 10 shows a further breakdown in the fibre sources for Scandinavian tissue production. Northern fibre that is native to the region makes up the most substantial portion of fibre, and recycled papers represent over a third of the total. Some eucalyptus fibre is also imported.

Scandinavia's average tissue machine quality is relatively low compared to its trade partners. Machines in Norway and Sweden tend to be older and narrower than those in Germany (larger machines), or Hungary/Lithuania (newer machines). This is to be expected for a system that has been in balance with relatively slow growth for some time.

Figure 12 shows that Sweden's tissue production costs are moderate, and similar to those in Germany. Norway is an outlier, however, with very high tissue production costs.

Scandinavia has relatively lower carbon emissions per tonne, as coal is not a significant energy source, and Figure 13 charts this data. This is a substantial advantage for Scandinavia's tissue business compared to Germany, the Netherlands and Poland. Norway, Sweden and Finland all share lower carbon emissions in external power generation (biomass fuelled energy is shown in blue).

Scandinavia's tissue production system is relatively old and slow. Replacement of tissue machines is at a deliberate pace, limiting capacity growth and technology upgrades. There has been no application of advanced structuring tissue techniques such as the locally produced Valmet NTT or TAD process machines, and Essity does operate advanced structured tissue production machines in many other countries. Relative cost positions are average but at risk. However, Scandinavia tissue production excels at low carbon emission paper production (along with neighbouring Finland). This is expected to play a more significant role in consumer appeal and full production costs in the future.

Scandinavia's tissue consumption of about 20kg per capita ranks it at the top level in the world. Advanced tissue technology could reduce total use based on weight. Population and economic growth are low but positive. However, the low reduced relative commercial tissue grades consumption is surprising and bears further investigation for such advanced economies. This analysis doesn't show the details of the trade tonnes product formats, but trade volume flows are about 20-25% of total tissue consumption.

Is it possible for Scandinavian tissue consumption to continue to grow toward the 25kg per capita number seen in North America? Will imports of advanced tissue technology products generate a stronger consumer interest? This article presents a static picture summary of Scandinavia's tissue industry today. Fibre prices, exchange rates and environmental regulations will change, providing some participants with advantages and others with new challenges. Scandinavian tissue mills will continue to change hands and perhaps consolidate; neighbouring countries may invest in tissue-making capacity, thus affecting Scandinavia's imports and exports.

Source: Fisher*Solve* Next
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Figure 11

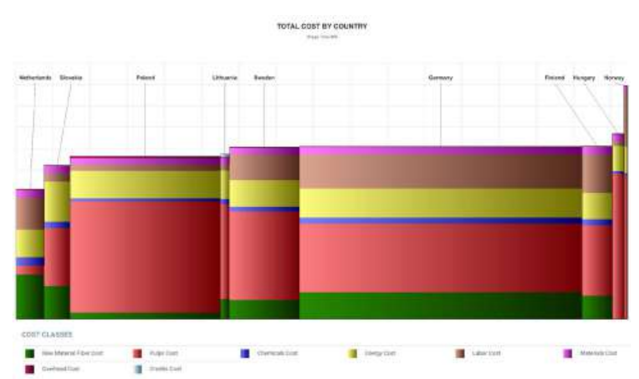

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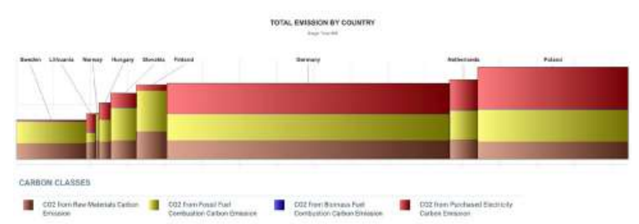
Figure 12



Source: Fisher*Solve* Next
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Figure 13

About Fisher International, Inc.

Fisher International, by virtue of its deep expertise in the pulp and paper industry, provides insights, intelligence, benchmarking, and modeling across myriad scenarios. By arming companies with the knowledge that will help them gain a better understanding of their strengths and help identify weaknesses, Fisher is helping businesses stave off challenges and better position themselves for long-term growth. For more information, visit www.fisheri.com, email info@fisheri.com or call +1 203.854.5390 (USA)

CONSUMER TISSUE IN SCANDINAVIA: MEETING CHALLENGES TO GROWTH AND BRAND DIFFERENTIATION IN MATURE MARKETS

Per Brandberg
Research analyst,
Euromonitor International

Market saturation is a common factor in retail tissue markets in Scandinavia. Looking at volume per capita in retail tissue over the past five years across the region, demand and consumption have not fluctuated to any significant degree, and no substantial growth is expected in the coming five years, through 2023. As mature markets with high levels of per capita consumption, Scandinavian markets will be mainly driven by fundamentals like GDP and population. Sweden's population is expected to grow the most until 2023, with a growth around 1% per year. Norway's growth is slightly lower at around 0.7% per year, and then Denmark and Finland are expected to grow the least, with around 0.4% and 0.2% per year respectively.

As mature markets, Scandinavian countries show limited unmet potential in consumer tissue. Denmark and Sweden are the two markets with the most unmet potential in the region, estimated at 13,400 tonnes and 11,600 tonnes, respectively. The challenge for market players is to find solutions to capture this potential and encourage more purchases. However, in addition to consumers already fairly set in their consumption patterns, there are a number of disruptors that can cause further problems for the tissue industry in the long term. For example, bidets are becoming more popular in countries like Denmark, which can become a challenge when it comes to driving toilet paper demand. Bidets are promoted as being more hygienic and do not require toilet paper. Additionally, while still small in per capita terms, moist toilet wipes have gained traction in both Denmark and Finland. While these wipes are usually used as complementary to dry toilet paper, some consumers turn to them as a full substitute to dry paper for convenience and as a cleansing option when access to water and indoor facilities is limited, thereby potentially undermining the demand for toilet paper in the long term. While flushable wipes have been facing criticism over their environmental impact, industry research and innovation into materials used to produce flushable wipes is resulting in the development of wipes that can meet tightening regulations and meet sustainability agenda.

Sustainability has been playing a part in consumer purchasing decisions. Euromonitor International lifestyle surveys on "green" attitudes released in 2019 indicate that over 50% of the respondents in Sweden and Denmark are worried about climate change and try to have a positive impact on the environment through everyday actions. The manufacturers respond to sustainability through the use of recyclable materials in tissue and packaging, further supporting and reinforcing sustainability agenda through eco labels. Most of the products on the markets in Scandinavia are labelled with Svanen (Swan, official eco label of the Nordics) and other certification labels, which also makes it hard

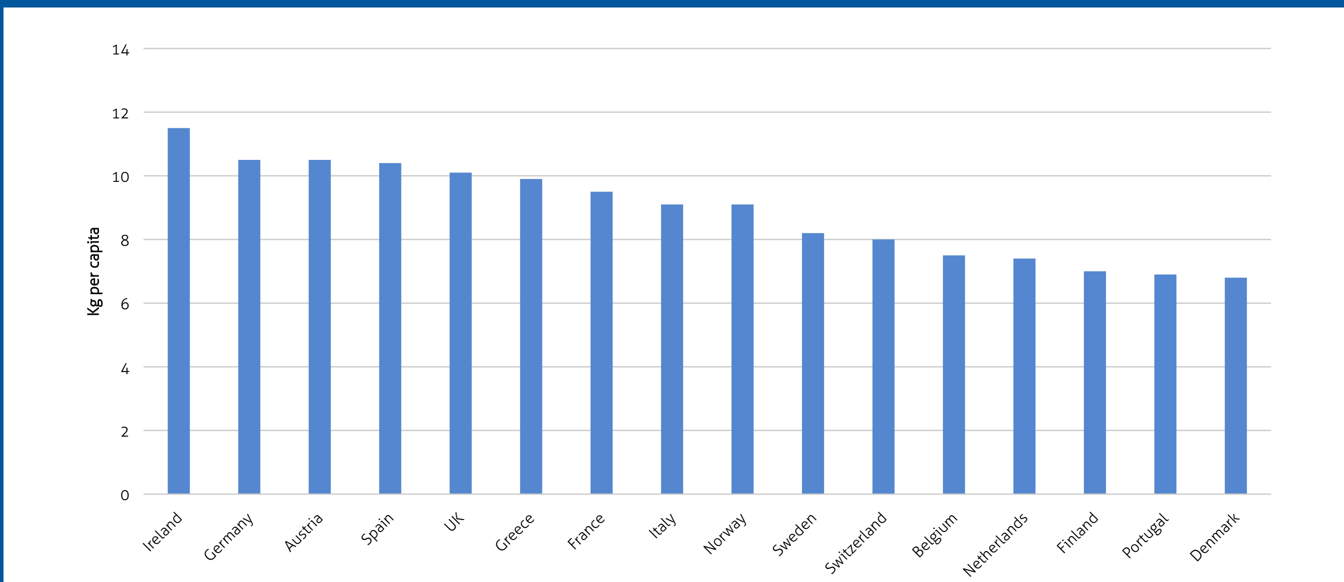


Table 1: Retail tissue, volume, kg per capita, 2018, select Wester European markets *Source: Euromonitor International*

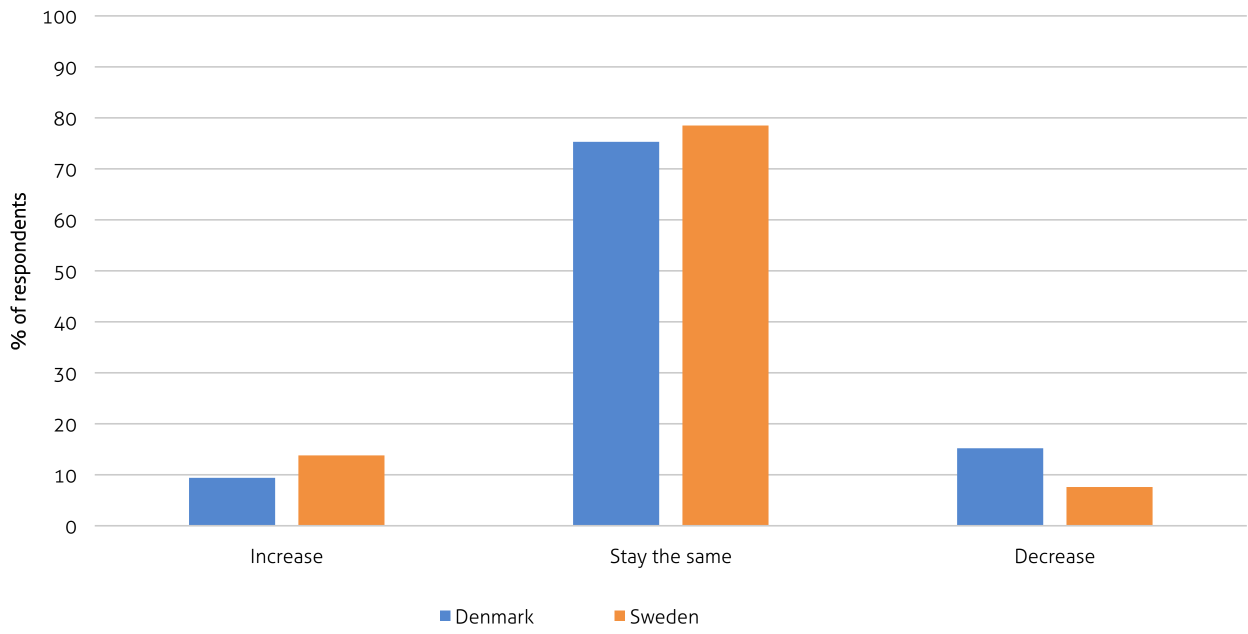


Table 2: Consumer intention to change spending habits on private label, Sweden and Denmark, 2019, Source: Euromonitor International Global Lifestyle Surveys, 2019

for brands to use sustainability messaging as a unique selling point.

Subsequently, consumer tissue brands continue to encourage value-added features, such as convenience and aesthetics, to influence the demand. Disposable paper products remain a convenient option for consumers and can apply to a variety of tasks. To reconcile the desire for both sustainability and convenience, many consumers across Scandinavian countries turn to tissue products made from recycled materials. However, not all consumers gravitate towards recycled tissue, due to generally lower quality. Many consumers are still drawn towards white, aesthetically pleasing paper products, which is reflected well in the toilet paper market where the volume sales of non-recycled toilet paper stand for between 47% (Norway) and 26% (Finland) of the market.

Additionally, many brands turn towards other solutions to add value to their products. For instance, Duni AB – one of the key players in paper napkins – continues to focus on designs and quality. In 2017 the company collaborated with the design duo Bernadotte & Kylberg to create the Amazonica collection, which consists of an assortment of tableware products including premium napkins. This in itself might not be enough to catch consumers attention, but the fact that 'Bernadotte' in Bernadotte & Kylberg is the royal Swedish prince Carl Philip is definitely something that makes Duni differentiate itself from the competition.

Unique designs are popular as a method to attract consumers across Scandinavia, and some branded product manufacturers take it a step further by involving consumers in design development. In Finland for example, one of the leading brands - Serla – has been teaming up with Aalto university since 2015 to create designer paper towels. The students come up with five options to consider, and Finnish consumers get to pick a winner. Additionally, every spring and summer Lambi brand introduces limited edition toilet paper and kitchen towels featuring love stories printed on them under Lambi Rakkaustarina, or Lambi love story. Lambi has been printing its love stories editions since 2013, which became very popular among consumers. Moreover, consumers get to submit their own love stories and then vote for their favourites among the thousands of options. Direct consumer engagement helps to create more affinity with the brands and designs featured on them, adding not only value but also emotional connection to the brands.

While quality value-added products in consumer tissue, including limited editions and unique designs, help support brand value, sales growth remains under pressure from private label. Private label tissue is very popular across Scandinavia, accounting for 60% share of consumer tissue value sales in Denmark, 47% in Sweden, 32% in Norway, and 24% in Finland in 2018. Furthermore, Euromonitor International lifestyle surveys released in 2019 revealed that the vast majority of consumers in Sweden and Denmark are not planning on changing their private label purchases. Additionally, a significant portion of consumers (9% of respondents in Denmark and 14% in Sweden) are planning on increasing their spending on private label. Consumers simply do not experience a great enough difference in quality between private label tissue products and brand name tissue products to choose the latter more frequently, especially considering a great deal of investment that has been going into private label product innovation. Private label products are also carried by discounters who offer tissue products at low cost and in bulk, which makes it even more attractive for consumers.

Thus, the Scandinavian retail tissue markets are quite mature and offer limited unmet potential for organic growth. Additionally, significant presence of private label is putting pressure on branded products, especially in view of the industry efforts to raise retail prices to compensate for high material costs. In a difficult operating environment, manufacturers of consumer tissue will continue to seek unique venues to offer product quality and brand differentiation, such as a variety of formats and unique designs as well as direct consumer engagement to build brand affinity. Sustainability will remain in focus as well, from both a manufacturing costs perspective and legislative pressures as well as consumer efforts to improve their footprint on the environment. However, in view of industry engagement across the board in sustainability efforts, long-term brand differentiation alongside the sustainability efforts alone will be problematic, requiring a more innovative approach t

"WE BECAME CIRCULAR BEFORE EVERYONE ELSE THOUGHT TO DO SO."

Even within green leader Essity, the Lilla Edet mill north of Gothenburg is a pioneer in driving growth while still prioritising sustainability … through waste usage, low cost steam, biofuel electricity, 86% recycled fibre, and post-consumer recycled plastic. Report by Senior Editor Helen Morris

WITHIN SCANDINAVIA, ESSITY OPERATES TWO OF THE SEVEN TISSUE MILLS IN SWEDEN (NEIGHBOURING DENMARK HAS NO TISSUE MILLS AND NORWAY JUST THE ONE). GLOBALLY, THE COMPANY CONTINUES TO BE A LEADER, IN THE EUROPEAN TISSUE AND HYGIENE PRODUCTION MARKETS IN PARTICULAR.

As Essity's six colleagues take TWM on a thorough tour around their impressive historic tissue mill, there is talk of circular economy, carbon neutrality, benchmarking, driving fossil-free packaging growth … impressively modern topics set to the backdrop of a plant that dates back to 1881.

Located an hour north of Gothenburg, Sweden, a city that is undergoing an extensive re-construction of its roads, buildings and bridges, TWM first visited the Lilla Edet mill in 2011. Even then, it was a blueprint for the tissue giant's global tissue production (currently 56 tissue sites) and famed for its environmental efforts.

Essity – formerly SCA – has owned Lilla Edet since 1986 and production has remained at 94,000tpy; 60,000 for the Professional Hygiene market and 40,000 tonnes for the consumer market. The plant has continued to modernise by investing in de-inking technology and stringent environmental standards.

Within Scandinavia, Essity has two tissue mills, one in Sweden and one in Nokia, Finland (neighbouring Denmark has no tissue mills and Norway just the one). Globally, the company continues to be a leader, in the European tissue and hygiene production markets in particular. The 'Swedish influence' on the world market

Lilla Edet: *Located an hours drive north of Gothenburg, Essity has owned the historic site since 1986.*

High-quality: *Scandinavians on the whole look for quality when it comes to their tissue purchases.*

continues to grow year-on-year.

In 2011, what was perhaps the most striking was how a mill – in a region of the world that has taken the green lead in terms of tissue and in its society generally – had maintained growth in what is a very developed and mature 'old market'. As we meet again towards the start of 2020, can the site continue to reflect the future for Essity's global fleet of 56 tissue plants, and the future for tissue?

TWM is warmly greeted by operations manager Martin Drobena, operations manager Jonas Pihlström, plant initiative manager Christian Carlsson, safety manager Joakim Molin, quality and environment manager Gunnar Johansson and media relations manager Karl Stoltz. Drobena is acting mill manager as the site is in the process of recruiting, and explains that while it's "a little bit untraditional to have so many people here... everyone here is an expert in their sector. So you have here the full circular economy!"

The site is one of three mills in Sweden that has a very long history, and has "been here since the beginning," Drobena adds. "When Mölnlycke bought this mill we just had five mills globally. Mölnlycke became a part of SCA in 1986, that has recently become Essity for the health and hygiene part of the business."

It was first established as a sawmill in 1881 and then in the 1950's the first tissue machine was installed. In the past two decades, every angle of the mill has been looked at by Essity to see how it can improve on its strategy and focus to that of a circular economy. Pihlström says: "One of the key developments was the power plant, which was installed 17 years ago to deal more efficiently with reject and sludge. It has been a great advantage to us. Even within Essity, it has meant that we are up there in terms of low level of costs and steam because of the biogenic energy. It means we don't have to ship around for biomass and electricity and we have a very low cost of steam production as well as being environmentally-friendly. All companies need to do this."

During our tour of the 400-staffed site, he explains further that the power plant, with the turbine and 33 megawatt boiler, is vital: "We don't have any rejects that we are dealing with as waste. We try and consume everything that we are producing here so that it is beneficial for us environmentally and for energy. We are able to burn our own waste from the process to reuse it again as steam or electricity. It is low cost steam production, biofuel and green electricity. I'm very pleased and proud of this. It really is giving us a lot of benefits."

Those benefits are also wider-ranging: "It's a lot of good things. So instead of sending the sludge away at big cost, we use it as energy to produce our own steam at a very low cost. We also supply the district's heating and we are using the energy for that also."

On a global level, Essity has a strong energy savings programme: "For us we were already on a very good level," Drobena says. "Sustainability has been very important and received high levels of attention for many years here in Sweden. Even within the company we are now well known for our energy awareness. We became circular before everyone else thought to do so."

The company is also part of the United Nations' Paris Agreement and he says it has a "tough goal" to achieve within the company for its electricity and fossil fuel use. "We want to be fossil-fuel free company by 2030," Drobena adds. "We want to be even more at the fore of Essity, and we already have a very good starting

ON A GLOBAL LEVEL, ESSITY HAS A STRONG ENERGY SAVINGS PROGRAMME: "FOR US WE WERE ALREADY ON A VERY GOOD LEVEL," DROBENA SAYS. "SUSTAINABILITY HAS BEEN VERY IMPORTANT AND RECEIVED HIGH LEVELS OF ATTENTION FOR MANY YEARS HERE IN SWEDEN. EVEN WITHIN THE COMPANY WE ARE NOW WELL KNOWN FOR OUR ENERGY AWARENESS. ."

"WE ARE LOOKING AT ALTERNATIVE RECYCLED FIBRES AND WE HAVE VERY INTERESTING PROJECTS RUNNING. WE HAVE A LOT OF ACCESS TO R&D HERE AND WE WANT TO KEEP THE CONNECTION SO WE CAN CONTINUE TO BRING INNOVATIONS AND USE OUR UNIQUE POSITION AND HISTORY."

point. We are looking outside of the box and how we can achieve this ambition."

PM5 is one of the company's oldest machines having been installed in 1959. "It is now 100% fossil-free," Carlsson adds. "It is one of the oldest machines we have. We can claim it is 100% fossil-free production as it has something very unique, an electrical fire hood. It is one of the most energy efficient machines in Essity. So even though it is not the most modern technology it is very well optimised and very efficient."

PM7 produces high-quality paper and was rebuilt in 2007, and the dry-end is now Valmet. It produces 33,000tpy of high-quality premium products on 100% virgin fibre, but most importantly from recycled paper in the same quality as virgin.

In total, 86% of the plant's production is recycled and 14% virgin fibre products. "We are pushing to use recycled as much as possible, but a lot of customers are requesting virgin fibre," Carlsson adds. "We prefer just to use recycled and with the quality of the de-inking pulp, it's on the same level of brightness as the virgin fibre. All the Professional Hygiene products here are coming from recycled fibres. We produce a lot of retail brands on the consumer side, but on the Professional Hygiene side which is business-to-business, we have our brand Tork."

He adds that availability of recycled paper is "definitely going down" and the site has had to import from outside of Sweden, mostly in the Nordic countries (Denmark, Finland, Iceland, Norway, Sweden) but also sometimes from Poland and the UK. "We are looking at alternative recycled fibres and we have a very interesting project that we will have news of in the next few months. It will be the next step into the recycled future. We have a lot of access to R&D here and we want to keep the connection so we can continue to bring innovations and use our unique position and history."

Essity is increasing capacity in Lilla Edet with handwiping, which Johansson says is very positive for the mill, but adds that "it also decreases the environmental footprint with products being produced closer to the markets where it is sold and used. A new folding line for hand towels will be installed in 2020. He added: "The folding hand towel market has always been here and it is actually the biggest market for these types of products, but we're seeing it coming back to Sweden more and more. There is more demand for it and so we want to start more production. There's not many companies in Scandinavia that do these types of product and so for us, we consider it a new area for our mill."

He adds that the project "fits the footprint for sustainability, as transportation is getting an issue in Europe. By investing in this new line we are decreasing the use of transportation. He says the site was one of the first to produce hand towels, but it was in Germany as there wasn't much demand for it in the Nordics.

L-r: *Safety manager Joakim Molin, operations manager Martin Drobena, plant initiative manager Christian Carlsson, operations manager Jonas Pihlström and quality and environment manager Gunnar Johansson.*

Product diversity: *local tissue purchasing trends have underpinned the strength of brands such as Essity's Tork.*

This is now changing and the Nordics are seeing more demand for this sector: "We look at it from a long-term perspective on how we can adjust our own footprint and do more local production. The market is also getting this type of question: where are the products produced? Consumers want to buy locally-made products, it's important for them, especially with food and tissue. They don't want paper shipped all over the world."

The plant has also been working on recycled plastics for more than two years and over the past year has launched these products into the market. "We are advanced in this," Carlsson says. "We have a global project focussing on this by Essity, but no other site has this high content of post-consumer recycled (PCR) plastic. We have plastics in our packaging that contain 60% of PCR, 20% of green plastics from sugar cane. So we are really ahead of the rest of the market with this and our plan is to grow this further. We are using plastic that you heat up and shrink, so it's very smooth. That will make up 67% of our packaging. And once we do this, we can say we are carbon neutral."

The site was the first Essity mill with this high content of PCR: "No other mill has 60%, but then we have been working on it for a very long time. Our colleague Gert-Inge Norrström has to take the credit for this, he has been the driver of it."

Carlsson adds the plan is to make this a habit in the market: "The suppliers, they're not really ready yet but they're getting there. We are talking about the availability of the PCR products. The key is having a supplier that also has all the correct certificates. It's very strict. There are a lot of demands, it needs to be food-contact proof, etc. From a process capability, we need a supplier who has the ability to produce it for the same function and same appearance, for the customers and also for the process. That is something we as a company are doing to work with the suppliers. More and more customers are getting there so we are ready. We want to drive it."

"When it comes to packaging, we want two things in place; to reduce the material consumption of what you have, so the thickness and the material of the plastics," Carlsson says. "We are also benchmarking in the company with these types of initiatives. We are trying to do the best out of what we have, because once you do that, then you can talk about investments. Even with our wrapping machines for the jumbo rolls, we are stretching the wrap around as much as possible so that we lower consumption." He says the plant wants "certain levels of excellence", and then it will increase those levels even further: "The next step must be investment. We are getting there, next year we will invest in new wrappers that will improve the operation even further. It's all about innovations; like what we're doing on the paper machines and the PCR in particular. Once you have the know-how and the capability, then you have something new. You can be confident that you'll succeed."

From the site's warehouse, it sells around one million tonnes per day of goods to 25 different markets. There is also a completely new automation system. Drobena says: "We started to implement Industry 4.0 in 1993, so we have always been ahead of the game with this. The company has always invested heavily in automation in form of automatic AGVs and automated solutions for storing semi-finished and finished goods. The

THE PLANT HAS ALSO BEEN WORKING ON RECYCLED PLASTICS FOR MORE THAN TWO YEARS AND OVER THE PAST YEAR HAS LAUNCHED THESE PRODUCTS INTO THE MARKET. "WE ARE ADVANCED IN THIS," CARLSSON SAYS. "WE HAVE A GLOBAL PROJECT FOCUSSING ON THIS BY ESSITY, BUT NO OTHER SITE HAS THIS HIGH CONTENT OF POST-CONSUMER RECYCLED (PCR) PLASTIC."

only manual part of Professional Hygiene production now is involved in the lifting of the mother reels onto the unwind stands of our converting machines. Everything else is touchless."

As for the region's tissue market, Scandinavians on the whole look for quality when it comes to tissue purchases, and this has underpinned the strength of the Tork brand in the region. Whilst private label has risen to take high percentages in other European countries, in Sweden in 2011 it was under 30%, and in 2019 it is 25%. The branded products strike a chord with Scandinavian consumers and design and the environment continue to play an important role.

For Lilla Edet, the brands/private label split in Scandinavia is variable: "We're definitely not seeing more private label in Professional Hygiene" Drobena says. "In consumer, yes private label is growing here, particularly in Sweden. But within the Nordics, the private label business in Denmark and Finland is really low."

He adds that for the plant, there is no especial move towards the private label market: "The latest investment for hand towel line is for Professional Hygiene. Tork is also an exceptionally strong brand. We have steady growth in volume year over year, which is a good sign the market is healthy."

He says the swings and shift in volume for Consumer Goods are "more significant" when it comes to private label and branded products. "The trend here in Sweden is definitely in favour of private label. We can see the opposite in Denmark."

Automation: *the site started to implement Industry 4.0 in 1993, and has always invested heavily in automation in the form of automatic AGVs and automated solutions*

The site also exports its Professional Hygiene products out of the region. "45% of Jumbo toilet paper and 30% of coreless products is for export all over the world," Drobena says. "We have a very significant volume going out to the rest of Europe, and we also have volumes undertaking the trip to the rest of the world, everywhere accept from the North America. We started to export goods into Brazil last year ... so we sell all over the world from Lilla Edet."

The site has also set up the unique circular service called Tork PaperCircle, which is the world's first paper towel recycling service. It is a service for customers, where the company offers a collection service for used hand towel waste from toilets back to the mill. "This is something we are rolling out in Sweden right now," Carlsson adds. "One big problem for companies is the used hand towel waste from toilets. We are now offering them this collection service. It has already started in the Netherlands, Germany and is in rollout in the UK also. Together with a facility company we build up a system to facilitate this. We use the tissue from the waste paper bins, we pick it up and bring it to the site and recycle it again. So, we are closing the loop."

He adds that even with the site's export potential, working on local initiatives like this is also something that Essity is looking to do more and more: "We are continually looking at how to optimise and produce closer to the market. The question is that the technology you need for some of the products isn't there yet, so the question is whether you invest, how do you do it? Step by step we are trying to move production even closer to the market."

THE SITE ALSO EXPORTS ITS PROFESSIONAL HYGIENE PRODUCTS OUT OF THE REGION. "FOR JUMBO REELS, 50% IS FOR EXPORT ALL OVER THE WORLD," DROBENA SAYS. "40% OF EXPORTS ARE CORELESS. WE HAVE A VERY BIG VOLUME GOING OUT TO THE REST OF EUROPE, AND WE ALSO HAVE A BIG VOLUME GOING TO THE REST OF THE WORLD, EVERYWHERE ACCEPT FROM THE AMERICAS."

KLIPPANS BRUK STARTS TO SELL INTO THE USA AND ASIA AS DEMAND FOR DEEP-COLOURED TISSUE INCREASES WORLDWIDE

Operating since 1573, Klippans Bruk has just invested in a new Recard-supplied PM which will quadruple production and means "the globe is now our market." Here, TWM met chief executive Per Skoglund and sales and marketing director Susanne Hägerstrand to get the latest.

History and tradition: *Klippans Bruk is located in Skåne County, Sweden, just over an hour north of Malmö*

"WE HAVE CONTINUOUSLY INVESTED IN PERSONAL AND MACHINERY TO BE AT THE FOREFRONT OF DEVELOPMENT. DURING 2019 WE INVESTED IN A NEW TISSUE MACHINE, PM 11. THIS INVESTMENT MEANS WE WILL QUADRUPLE OUR PRODUCTION AS WELL AS CREATING NEW POSSIBILITIES FOR DEVELOPMENT. THE NEW MACHINE WILL ALSO ALLOW US SHORTER LEAD TIMES TOGETHER WITH IMPROVED FLEXIBILITY AND SERVICE."

TWM/1: Describe the history of the plant and its current set-up?

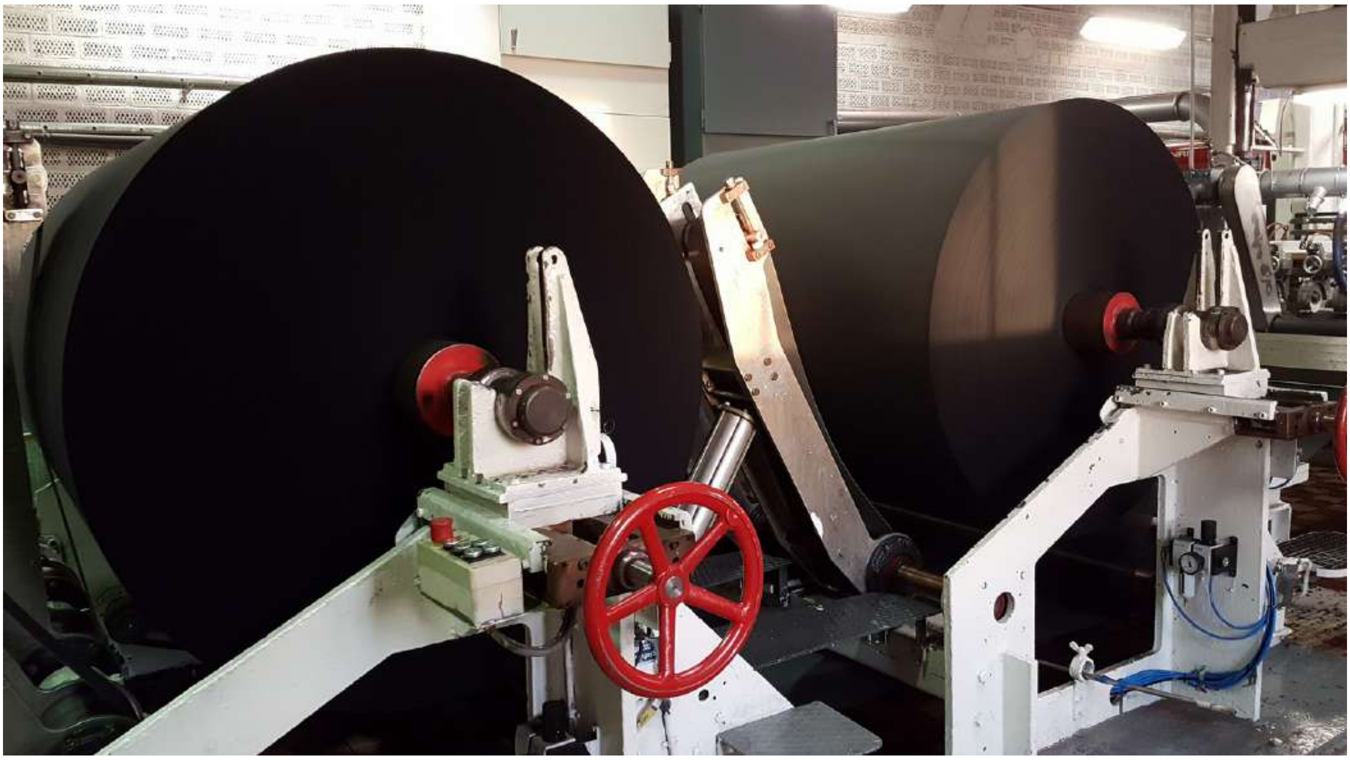
Per Skoglund: "Klippans Bruk began papermaking in 1573 when the famed astronomer Tycho Brahe's uncle started producing paper near the monastery at Herrevads kloster. It was actually Denmark's first mill, because this part of Sweden belonged to Denmark until 1658. Since it was established, it's had a total of 11 paper machines and the production of tissue paper for napkins started in 1962.

"It has never been standard paper, it was always cigarette paper, tissue paper, etc. A huge variety of different products.

"Klippan was a stock-listed company in the nineties and the group acquired a mill in Gothenburg and also one in Scotland. Then in 2005, the then group went bankrupt and three private local men bought the site. There is still one of the owners left and a new private investor joined 2017. They started to really specialise in deep-coloured tissue, which is where we are now. We specialise in deep colours only and have gained substantial expertise in this sector. No converting is planned.

"We have always sourced high quality raw materials and all our tissue is manufactured by Swedish virgin pulp. We also offer small batches in the customer specified colour required where the minimum quantity is as low as eight tonnes.

"We have continuously invested in personal and machinery to be at the forefront of development. During 2019 we invested in a new tissue machine, PM 11. This investment means we will quadruple our production as well as creating new possibilities for development. The new



Increasing export potential: *black jumbo rolls make up 20% of the site's production*

machine will allow us shorter lead times together with improved flexibility and service."

"With the increased capacity we also focus on white and pastel coloured tissue. Our white tissue is used for printed napkins and has a high content of softwood in order to fulfil the plybonding."

"OUR STRATEGY IS VERY CLEAR – OUR CORE BUSINESS IS HIGH COLOURED TISSUE FOR NAPKINS, AND WE WANT TO EXPAND THIS PRODUCT OUR GLOBALLY FOLLOWING THE INVESTMENT OF PM11. WE WILL NOT BECOME A CONVERTOR, WE WANT TO SPECIFICALLY FOCUS ON MANUFACTURING HIGH COLOURED TISSUE JUMBO ROLLS."

TWM/2: How long have you worked at Klippans Bruk?

Skoglund: "I joined Klippans Bruk on 1 July 2019. I had previously worked in the graphical paper industry for the past 20 years, most recently at graphic paper manufacture Arctic Paper. This gave me the expertise in the printing paper market, but it's a declining sector, and I was keen to work in a market that was seeing growth.

"I joined Klippans Bruk because I was challenged to be a part of the growth with a new PM and the needed market growth. To come into a market that was growing was a challenge for me and what attracted me to it."

Susanne Hägerstrand: "I started August 2018. At that time the mill had already been overbooked for a year or two, so I was keen to be involved in its capacity growth. In 2017, increased demand and a lot of new customers wanted our products. The lead times were awful! We were having to say no to orders and new customers, we have been overbooked for more than a year. Even for deep-coloured tissue, so were turning away work."

TWM/3: What investments have you made?

Skoglund: "We decided to invest in a second tissue machine with the idea to increase capacity. So in 2018, we were experiencing many more companies asking for these types of products and we simply couldn't produce enough ... we had to invest in more machinery in order to keep up with the demand. Now we are trimming up the machine.

"In 2019, we installed the paper machine, a Recard-supplied PM11, which was fascinating to see come on-stream. The new machine has quadrupled capacity at the site, adding 30,000pty of coloured and white, high-quality tissue to the market, and we aim to increase this to 40,000-45,000tpy.

"Recard's supply is based in a turn key project and included a tissue machinery Crescent Former with a maximum operating speed of 1.700mpm, trim at a real by 3.2m and with a gross production capacity of 110tpd. The new machine has now come on stream."

Hägerstrand: "And it's not just the PM ... It's the boiler, rewinder, wrapping station, the conveyor belts need to be built, internal logistics, etc. It's a challenge when you go from 12,000tpy to 45,000tpy. We have a lot of hard work to get the right volumes up."

TWM/4: What is your growth strategy for the following years?

Skoglund: "Our core business is very simple – high coloured tissue, for napkin and end-use. We will not be a converter. We should be an independent tissue supplier. We also need to go more towards white tissue, but probably mainly for napkins. We see a possibility to widen the grammage range and also start with glued qualities. Some converters really want pre-glued tissue, which is why we've made this investment.

"We want to expand this product globally following the investment of PM11. We want to specifically focus on manufacturing high coloured tissue jumbo rolls.

"The PM investment has meant that the

"I joined Klippans Bruk specifically because I wanted to build a new PM and work with growth. To come into a market that was growing was a challenge for me and what attracted me to it."
Chief executive Per Skoglund

"WE ARE DEFINITELY SEEING AN INCREASED DEMAND FOR DEEP-COLOURED TISSUE ALL OVER THE WORLD, AND THE WORLD'S ECONOMIES ARE DRIVING DEMAND IN THIS SECTOR."

globe is now our market. We can now target the USA, Asia, Middle East and Africa with deep coloured tissue as well as Northern Europe for white tissue."

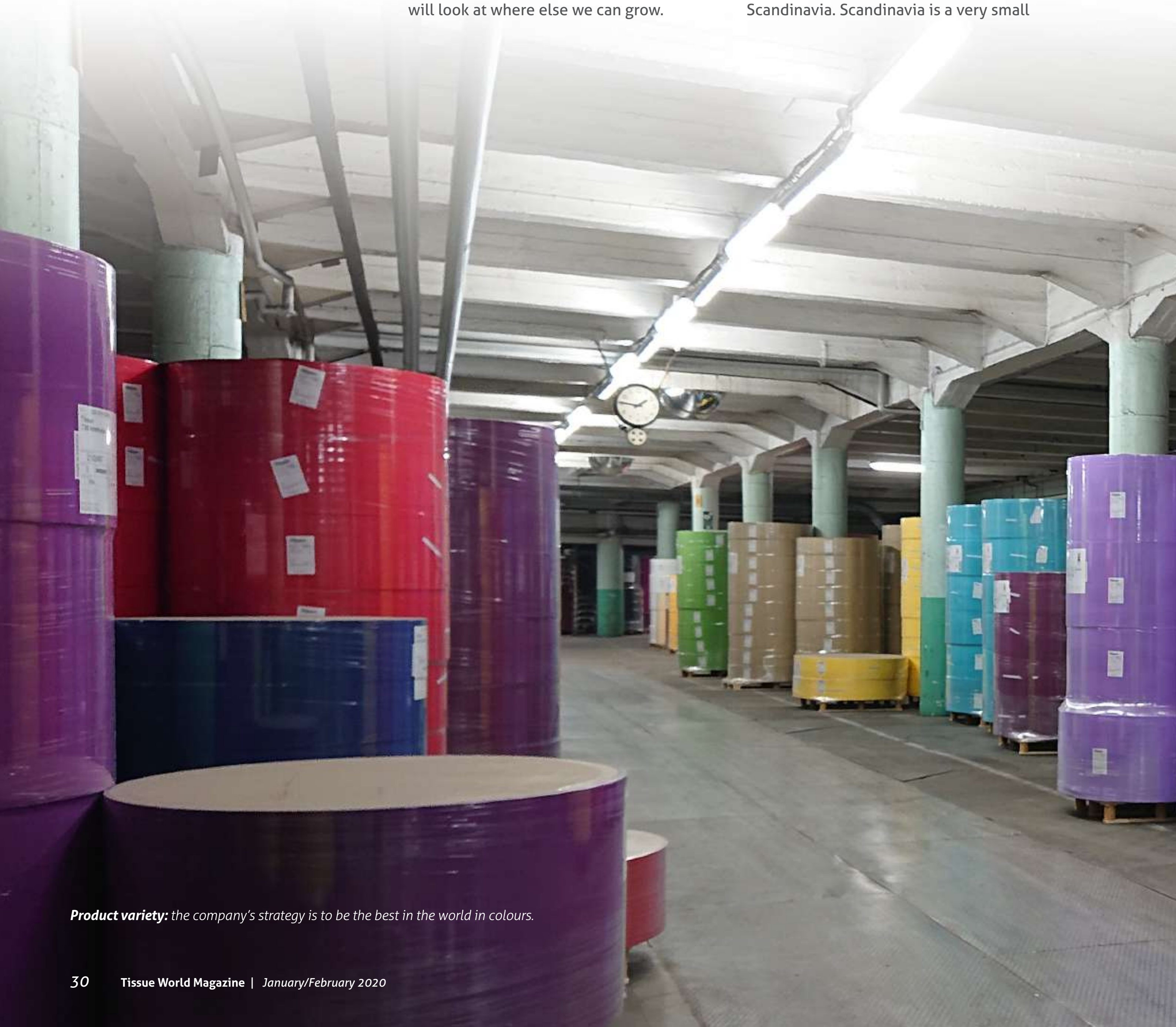
TWM/5: Do you want to diversify your current product offering?

Hägerstrand: "We're looking into this next year. Hopefully we'll get a good market with this new strategy. We're already on 24,000pty and we will see this next stage of growth next year. We will go out next year with a sales capacity of 35,000tpy ... so we will look at where else we can grow.

"When we look globally –in America, Asia, South America, Africa - black or deep colours are requested. When it comes to white, it's mainly in the northern European market. We will then continue to evaluate this strategy and look into medical applications, wet strength applications, etc. that's not decided yet."

TWM/6: How much exporting do you plan?

Hägerstrand: "We currently exporting 98% of our production outside of Scandinavia. Scandinavia is a very small



Product variety: *the company's strategy is to be the best in the world in colours.*

market, there's only a few converters in each country here. Also in the UK and France, it's a very consolidated market.

"We have to be all over the place in order to sell our products. There's also a lot of opportunity for us to sell into the central eastern region. The demand here in Western Europe is very constant, and we're looking to grow so we are looking at the bigger mature markets as well as all the largely-untapped potential in eastern and central Europe. We're seeing a lot of growth there, people there have more and more money to spend, and the more they go out, the more they consumer tissue. The economic growth in Eastern Europe is driving the tissue demand growth.

"Asia – big increase in demand for these products. We haven't been able to supply and grow before, we haven't had the capacity. So we are in a big investigating phase now. We supply Asia with some black tissue and we hope we can increase this. The deep colours market has a lot of possibility for us.

"And in the US, almost everything is pre-glued, and now we are able to do that that's a big opportunity for us. We were thinking white pre-glued. Normally we use the embossing in Europe, but they don't do that in America, they use glue. It's such different behaviour. We need to treat the US the same way we treat Asia, it will be deep-coloured products. That's the biggest opportunity in the next few years. We've also had a lot of interest from the Middle East. And it's very much the deep colours, a lot of people are interested in black. Almost 20% of our production is black. Our strategy is that we should be the best in the world in colours. We have more than 100 colours that we can produce. In our production schedule you can see all colours being produced every month. We want to take care of the strength we have."

TWM/7: What's driving the demand for these products globally?

Skoglund: "If people are going more and more to restaurants and bars, they're consuming tissue more and more. As economies all over the world are growing, we're seeing more people going out, and they need napkins. So we need to be global. We haven't been able to fully supply these regions previously, we simply haven't had the production capacity. This is the first time we've been able to grow."

TWM/8: What buying preferences trends are you seeing globally?

Skoglund: "The AfH market here in Scandinavia is stable. In regions such as Malaysia and China, we supply them with a lot of black tissue.

"In the USA, this is a completely new market for us because they want napkin

Caption:

Growth target: *by 2024, the aim is to increase the site's machinery's productivity and increase their presence in the market generally.*

products with glue. We didn't have glue prior to this investment, so something as simple as that has opened up a whole new and vast market."

TWM/9: What new opportunities are there for you in terms of the environment?

Hägerstrand: "Compostability is becoming a very important thing. Our white tissue is compostable and all our products are biodegradable. Apart from the selling and finding new markets, sustainability and the environment will continue to be key for us. Tissue - at least napkins - started a lot later in terms of environmental sustainability.

"We have the EU Eco-Label. Fibre is also renewable in many ways. Overall, it's a very positive trend for our industry. We are keen to make a range of fully compostable napkin products."

TWM/10: What are your main opportunities for the next five years?

Skoglund: "Our aim is to be the best in the world in coloured napkins. We're not looking at coloured toilet tissue, mainly because of the logistical issue with toilet tissue. Our trim width isn't right for toilet paper.

"The medical segment is also one of the sectors that has potential and where we will focus the coming year.

"By 2024, the growth target is to increase our machine's productivity and increase our presence in the market generally. We are looking at other products such as white napkins and white printed napkins as well as increased grammars. With colour, we want to be the driver, not the co-driver. We want to introduce more mild and natural colours. We want to drive the trend.

"We will continue to target the high-quality market. We're also seeing a lot of demand for 1ply, although 2 & 3 ply will continue to be the main volume that the market demands."

TWM/11: And the main challenges?

Hägerstrand: "Pulp prices have been a challenge that last two years, we hope for better stability in the coming year.

"White as a category is a big range in itself for us, and one we will look into more. Before the investment, we were very overbooked and we couldn't do much in the white market. Currently we only produce 5% of white products. But I wouldn't be surprised if next year, 20% of the product is white. White is such a bigger product.

Above: *Susanne Hägerstrand, Klippans Bruk sales and marketing director*

"Buying a new PM has also been a fascinating challenge. It's also involved bringing in a new boiler, it's re-building an old building to house it all. The site's internal logistics have had to change because we have gone from 12,000tpy to 45,000tpy. Our staff numbers have also gone from 40 to 80. There have been a lot of changes that we all have had to adapt. It's a challenge.

"We will have a lot of hard work to do to get the right volumes up. We're quite a new team, all of us, and we are excited about the challenges ahead. When you come from outside the industry, you have a different viewpoint.

"But we are looking to grow more. 2020 will be the target to grow the machine production and also the market."

‘I DON'T WANT TO FEEL GUILTY WHEN I'M USING A PRODUCT SO ENVIRONMENTAL RESPONSIBILITY IS A PREREQUISITE FOR ANY BRAND THAT I'M LOYAL TO.’

Aaron Doades is founder and chief executive of Peach – a digital-first, sustainable luxury bath tissue brand based in New York City. Here, he chats about his preferences at home.

“Hello Aaron, so as CEO of Peach let’s have a guess as to which tissue you use at home.”
“Hello TWM, good guess. I really only use bath tissue and paper towels at home. I'm definitely a product of my generation in that millennials tend to not use facial tissues or napkins because I already buy products that can take care of that. I use Peach for all the normal uses plus as facial tissue, and I use paper towels for everything you'd expect plus as napkins and to dry off my dog after a walk if it's raining out. Even when I have company over, I use paper towels as napkins. It's important to me that the tissue products that I buy are environmentally responsible because of how prevalent tissue products are in my daily life.

“I think the trend overall of consumers using less facial tissue and napkins means it's more important than ever to deliver high-quality experiences from brands that really resonate with consumers.”

“And judging by your business strategy, quality is important.”
“Yes, I want the best possible, most comfortable experience with every product I use, not just when it comes to bath tissue and paper towels. However, I don't want to feel guilty when I'm using a product so environmental responsibility is a prerequisite for any brand that I'm loyal to. Once I know a brand is taking steps to take care of the environment, I want the best possible product in the category, from a brand who shares my values.”

“Is that brands or private label?”
“I prefer branded products because I'm loyal to brands that fit my lifestyle and world view.”

“We’re guessing you’re not big on pushing a heavy trolley round the store?”
“I almost exclusively buy online, either directly from brands' websites or Amazon. I obviously use Peach in my own home but even if I weren't the chief executive of a digital-first bath tissue brand, I can't imagine a world where I'd prefer lugging around gigantic packages of bath tissue and paper towels as opposed to having them delivered directly to my doorstep whenever I need them.

“I find it telling that most of the brands that I'm loyal to have actually found me as opposed to the other way around. Whether it's while I'm scrolling through Instagram or learning about a new product through a brand partnership, it seems that digital-first brands have perfected the science of getting their products in front of consumers who are likely to enjoy them. I'm definitely a proof point from the consumer side, and I believe that Peach is proof on the brand side.”

“Obviously, the environment is important to you?”
“Extremely, but that's not the only value I look for when choosing products. The brand that's selling the product needs to be environmentally-responsible but ideally, it'll also do something more to help the world, like giving a portion of their profits to charity. I think the days are over when a brand can get away with just having a fun-looking mascot and not stand for anything.”

“How did it all start at Peach?”
“When I realised that I personally didn't care about what type of toilet paper I was buying. I had strong brand preferences for almost every other type of product I used, but all toilet paper was the same to me: middling quality, wrapped in plastic, from an outdated brand with no mission, and sold only via retail. I knew that today's consumers are willing to pay more for high quality products from brands that resonate with them, so I set out to create a luxurious, sustainable bath tissue brand that made the world a better place.

“Peach is a digital-first brand which means that most of our sales come directly from our website, where customers can sign up for subscriptions to have the product delivered directly to them on the schedule that works best for them. Being digital-first is critically important for us because it enables us to have a direct relationship with our customers which leads to valuable, actionable feedback and brand loyalty.

“Our customers find that being loyal to a brand that values environmental and social responsibility makes them more comfortable than a legacy brand that doesn't stand for anything.”

“Travel broadens the mind ... have you found it’s also broadened your commercial opportunities?”
“I've done a lot of traveling, both for Peach and for pleasure, and I've noticed that consumer preference for tissue products vary greatly across different regions. If you tried selling popular bath tissue from the US to other regions of the world, like China, it wouldn’t sell. The inverse is also true in that consumer preference for bath tissues in a country like China wouldn’t appeal to the American consumer.

“I think that's why having direct customer relationships is so important. Just as there are broad differences between geographic markets, there are also nuanced differences within each market that are impossible to detect and cater to unless you have a direct line of communication with your customer. If you're simply selling retail with no direct feedback, you're designing a lowest-common-denominator product that is barely good enough for a lot of consumers, as opposed to a product that a subset of consumers will fall in love with.”

PROJECT SURVEY:

COUNTRY	COMPANY MILL	INVESTMENT	PM NO	NEW / REBUILD	START-UP DATE	CAPACITY CHANGE (tonnes/yr)	PM TRIM (m)
Algeria	Warak	Setif	2	New	2020	30000	2.8
Algeria	Paper Mill Investment (PMI)	NA	1	New	2019	NA	2.85
Argentina	Celulosa Campana	NA	3	New	2019	100tpd	2.7
Argentina	Celupaper	Buenos Aires	5	New	2019	23400	2.75
Argentina	CMPC Zarate	Zarate	NA	New	2020	60000	5.6
Argentina	San Andres de Giles	San Andres de Giles	NA	New	2019	30000	2.8
Asia	Confidential	Confidential	1	New	2020	60000	5.66
Asia	Confidential	Confidential	2	New	2020	60000	5.66
Bolivia	Confidential	NA	4	New	2020	32000	2.8
Brazil	Indaial Paper	NA	5	New	2019	32000	2.8
Brazil	Manikraft	NA	1	New	2020	21000	2.3
Brazil	OL Papéis	NA	3	New	2020	19500	2.8
Brazil	Tangará Papéis	NA	NA	New	2020	20000	2.8
China	APP	26	Rudong	New	2021	34300	3.6
China	APP	25	Rudong	New	2021	34300	3.6
China	APP	24	Rudong	New	2021	34300	3.6
China	APP	23	Rudong	New	2021	34300	3.6
China	APP	10	Rudong	New	2021	34300	3.6
China	APP	9	Rudong	New	2021	34300	3.6
China	APP	8	Rudong	New	2021	34300	3.6
China	APP	7	Rudong	New	2021	34300	3.6
China	APP	6	Rudong	New	2021	34300	3.6
China	APP	5	Rudong	New	2021	34300	3.6
China	APP	16	Rudong	New	2020	34300	3.6
China	APP	15	Rudong	New	2020	34300	3.6
China	APP	14	Rudong	New	2020	34300	3.6
China	APP	13	Rudong	New	2020	34300	3.6
China	APP	4	Rudong	New	2020	34300	3.6
China	APP	3	Rudong	New	2020	34300	3.6

SPECIAL FEATURE

TWM's annual Projects Survey charts all new capacity being added, ordered or in final planning stages during 2019- 2020, as well as noting any projects already planned for 2021.

	PM SPEED (m/min)	SUPPLIER	COMMENTS
	2000	Valmet	Advantage DCT 100 with ViscoNip press
	2000	Andritz	PrimeLineCOMPACT VI (ShoePress)
	1700	Recard	Crescent Former
	1300	Toscotec	MODULO-PLUS
	NA	Valmet	Advantage DCT 200 with ViscoNip press
	2000	Valmet	Advantage DCT 100 with ViscoNip press
	2000	Andritz	PrimeLineST W22-XT
	2000	Andritz	PrimeLineST W22-XT
	1600	Hergen	New Crescent Former Machine EVO 16
	1600	Hergen	New Crescent Former Machine EVO 16
	1600	Hergen	New Crescent Former HCF 1225
	1300	Hergen	New Crescent Former Machine EVO 12
	1600	Hergen	New Crescent Former Machine EVO 16 ECO
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap

All the figures in the survey are based on the best information provided and this has included TWM's own extensive research as well as relying on reliable responses from the many companies asked to detail their present and future developments. Additionally, some companies declined to comment at this time and there are also a substantial number of confidential projects, where the company and country is not announced.

A crucial part of compiling the report also includes first-hand knowledge gained by TWM from the many visits to tissue mills around the world for our bimonthly Country Reports analysis, which during 2019 included face-to-face interviews with your peers and competitors in the USA, France, Germany, Spain, the United Kingdom and Poland. The visits give TWM a unique insight into why that region and its tissue players are investing – or not, and how and on what they're spending their money.

It needs also be noted that for this year, as with last, many of the projects are subject to revision as, in many cases, information was not provided because it was deemed commercially sensitive or subject to financial uncertainty. It's also the case that a distinctive feature of this time in the cyclical development of tissue production is marked by the timely closure of old facilities to make way for the new.

In some cases, delayed start-ups have meant projects have been repeated from last year's survey; some of the 'new' capacity announced this year in fact includes some of last year's estimate.

And lastly, the survey is solely interested in complete tissue machine projects that will increase tissue capacity, rather than the numerous smaller rebuilds or press substitutions around the world that won't substantially impact capacity.

COUNTRY	COMPANY MILL	INVESTMENT	PM NO	NEW / REBUILD	START-UP DATE	CAPACITY CHANGE (tonnes/yr)	PM TRIM (m)
China	APP	2	Rudong	New	2020	34300	3.6
China	APP	1	Rudong	New	2020	34300	3.6
China	Auswei Paper	Jiangmen	1	New	2020	17000	2.8
China	Baoding YuSen mill	Baoding	2	New	2020	NA	3.5
China	Baoding YuSen mill	Baoding	1	New	2020	NA	3.5
China	C&S	Hubei Xiaogan	NA	New	2020	33565	3.5
China	C&S	Hubei Xiaogan	NA	New	2019	33565	3.5
China	C&S	Hubei Xiaogan	4	New	2019	33565	3.5
China	C&S	Hubei Xiaogan	3	New	2019	33565	3.5
China	C&S	Hubei Xiaogan	2	New	2019	33565	3.5
China	C&S	Hubei Xiaogan	1	New	2019	33565	3.5
China	Taison	Anhui	13	New	2020	60000	5.6
China	Taison	Anhui	15	New	2020	60000	5.6
China	Vinda Paper	Xiaogan, Hubei	7	New	2019	32000	3.4
China	Vinda Paper	Xiaogan, Hubei	8	New	2019	32000	3.4
China	Yibin Paper	NA	2	New	2019	NA	NA
China	Yibin Paper	NA	3	New	2019	NA	NA
China	Yibin Paper	NA	4	New	2019	NA	NA
China	Yibin Paper	NA	5	New	2019	NA	NA
Confidential	Confidential	NA	NA	New	2019	30000	2.75
Confidential	Confidential	Confidential	NA	New	2021	70000	5.6
Confidential	Confidential	Confidential	NA	New	2020	35000	3.5
Confidential	Confidential	Confidential	NA	New	2020	NA	5.6
Confidential	Confidential	Confidential	NA	New	2019	60000	5.6
Confidential	Confidential	Confidential	NA	New	2020	60000	5.6
Confidential	Confidential	Confidential	NA	New	2019	60000	5.2
Ecuador	Confidential	NA	1	New	2020	18250	2.7
El Salvador	Ala Doradas	San Salvador	NA	New	2021	30000	2.8
Europe	Paloma Higienski Papirji	Sladki	6	New	2020	65000	5.6
France	Global Hygiène	Charavines	NA	New	2019	NA	2.8
Hungary	Drenik	NA	2	New	2020	120tpd	2.8
India	Century Pulp and Paper	Lalkua	NA	New	2020	30000	2.8
Indonesia	APP	OKI	4	New	2021	41650	3.7
Indonesia	APP	OKI	3	New	2021	41650	3.7
Indonesia	APP	OKI	2	New	2021	41650	3.7
Indonesia	APP	OKI	1	New	2021	41650	3.7
Italy	Cartiera Confalone	Montoro Inferiore (AV)	2	New	2020	32000	2.85
Italy	Cartiera della Basilica	Botticino	1	New	2020	24000	2.74

	PM SPEED (m/min)	SUPPLIER	COMMENTS
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	PMP	Intelli-Tissue 1600, 18' SYD and Yankee Cap
	1600	Kawanoe Zoki	BF-1000S
	1600	PMP	Intelli-Tissue EcoEc Premium
	1600	PMP	Intelli-Tissue EcoEc Premium
	1600	PMP	Intelli-Tissue 1600 EcoEc Premium
	1600	PMP	Intelli-Tissue 1600 EcoEc Premium
	1600	PMP	Intelli-Tissue 1600 EcoEc Premium
	1600	PMP	Intelli-Tissue 1600 EcoEc Premium
	1600	PMP	Intelli-Tissue 1600 EcoEc Premium
	1600	PMP	Intelli-Tissue 1600 EcoEc Premium
	1900	Andritz	PrimeLineST W8
	1900	Andritz	PrimeLineST W8
	1600	Toscotec	AHEAD-2.0M
	1600	Toscotec	AHEAD-2.0M
	NA	A.Celli	iDEAL tissue machines
	NA	A.Celli	iDEAL tissue machines
	NA	A.Celli	iDEAL tissue machines with a 16’ Yankee
	NA	A.Celli	iDEAL tissue machines with a 18’ Yankee
	1300	Toscotec	TADVISION
	2000	Toscotec	AHEAD-2.0L
	2000	Valmet	Advantage DCT 135 with ViscoNip press
	NA	Valmet	Advantage ThruAir
	NA	Valmet	Advantage DCT 200 with ViscoNip press
	2000/1800	Valmet	Advantage NTT 200
	2000/1800	Valmet	Advantage NTT 200
	1100	Hergen	New Crescent Former Machine – Smart Fit
	2000	Valmet	Advantage DCT 100 with ViscoNip press
	2000	Toscotec	AHEAD-2.0L
	1800	A.Celli	iDEAL 1800S tissue machine
	1850	Recard	Crescent Former
	2000	Valmet	Advantage DCT 100 with ViscoNip press
	1700	PMP	Intelli-Tissue 1800, 18' SYD, Double Press, Steam Hood
	1700	PMP	Intelli -Tissue® 1800, 18' SYD, Steam Hood
	1700	PMP	Intelli -Tissue® 1800, 18' SYD, Steam Hood
	1700	PMP	Intelli -Tissue® 1800, 18' SYD, Steam Hood
	2000	Toscotec	AHEAD-2.2
	1200	Toscotec	MODULO-PLUS

With the above in mind, 2019 records a total of 101 new tissue projects globally that have started up or are expected to start-up in the next couple of years. This is down from 115 recorded for 2018, 121 projects in 2017, 111 in 2016, 126 in 2015 and the 146 recorded in 2014.

The main change over recent years is that growth in China in 2018 was only half of that recorded in 2017. However, in 2018, the dynamic marketplace has seen world tissue consumption in China larger than that of Western Europe in market size, and approaching the size of North America.

While the survey last year reported 27 projects recorded for start-up in China in 2018 and 2019, this figure now has increased, with China set to start-up 35 of the recorded 101 project noted in 2019, 2020 and 2021. Asia Pulp and Paper was a notable exception after investing in 18 Intelli-Tissue EcoEc 1600 Premium machines. Supplied by PMP, the 18 complete tissue machines will be installed at the company’s new mill in Rudong, Jiangsu. All the machines will be designed and manufactured with the same concept to produce tissue from 11.5gsm up to 22.0gsm at the reel.

Latin America, Asia Far East and Eastern Europe are becoming increasingly important regions. Brazil recorded four projects, down from five in 2018 and the nine reported in 2017. Indonesia also reported four projects while Japan reported seven.

As with last year, the scale of these machines is also significant – a large proportion of these new start-up machines have widths of 5.6m and substantial capacity increases.

In 2020, TWM endeavours to bring you more in-depth analysis on tissue mills and their projects across the world with our Country Reports on Scandinavia, Canada, Portugal, Serbia, Turkey and Japan.

CAUTION:
All aggregates taken from the survey should be treated with some caution. While all care has been taken to publish comprehensive data, it is inevitable that projects will be missing or details incomplete. Many projects have also been delayed so start-up data used in the 2018 Project Survey has had to be repeated. We welcome your help to ensure as comprehensive a survey as possible at the end of 2020.

COUNTRY	COMPANY MILL	INVESTMENT	PM NO	NEW / REBUILD	START-UP DATE	CAPACITY CHANGE (tonnes/yr)	PM TRIM (m)
Japan	Confidential	NA	5	New	2019	18000	2.7
Japan	Confidential	NA	2	New	2019	29000	3.3
Japan	Confidential	NA	2	New	2019	23000	2.8
Japan	Confidential	NA	2	Rebuild	2020	46000	3.5
Japan	Confidential	NA	6	Rebuild	2020	18000	2.5
Japan	Marutomi	Ono mill	2	New	2020	22500	2.85
Japan	Marutomi	Fuji mill	1	New	2019	22500	2.85
Latin America	Confidential	Confidential	NA	New	2019	107tpd	3.5
Mexico	Blue Tissue	Apizaco	NA	New	2019	110tpd	2.7
Mexico	Convertipap	Mexico City	NA	New	2020	35000	2850
Mexico	Fabrica Papel San Francisco	Mexicali	8	New	2020	30000	2.8
Peru	Papelera Reyes	NA	4	New	2020	27000	2.8
Poland	Filar	NA	1	New	2020	28000	2.8
Romania	MG TEC Industry	NA	1	New	2020	30000	2.85
Romania	MG TEC Industry	NA	2	New	2022	30000	2.85
Russia	Arkhbum Tissue	Kaluga	1	New	2019	60000	5.6
Russia	Hayat Kimya	Yelabuga	7	New	2019	60000	5.6
South Africa	Confidential	Confidential	2	New	2019	25200	2.75
Spain	ICT Iberica	Burgo	NA	New	2019	60000	5.6
Sweden	Klippans	NA	11	New	2019	110tpd	3.2
Thailand	Berli Jucker Cellox	Prachinburi	5	New	2020	30000	2.8
Thailand	C.A.S. Paper Mill Co.	Singburi	1	New	2019	30000	2.85
Tunisia	Azur	NA	2	New	2019	115tpd	2.7
Turkey	Lila Group	Corlu	2	New	2020	60000	5.6
UAE	Crown Paper Mill	Abu Dhabi	NA	New	2019	60000	5.6
UAE	Star Paper Mill	NA	1	New	2019	139tpd	3.6
USA	Confidential	Confidential	NA	Major rebuild	2019	NA	NA
USA	Confidential	Confidential	NA	Major rebuild	2020	NA	NA
USA	First Quality Tissue	NA	7	New	2019	NA	NA
USA	Irving Tissue	NA	NA	New	2022	NA	5.6
USA	Irving Consumer Products	NA	NA	New	2019	NA	5.6
USA	Sofidel	Inola, Oklahoma	2	New	2020	70000	5.5
USA	Sofidel	Inola, Oklahoma	1	New	2019	85000	5.5
Vietnam	Xuan Mai Paper	NA	1	New	2020	NA	2.85

	PM SPEED (m/min)	SUPPLIER	COMMENTS
	400	Kawanoe Zoki	BF-15 Towel
	1300	Kawanoe Zoki	BF-15
	1100	Kawanoe Zoki	BF-15
	1800	Kawanoe Zoki/ Valmet	DCT135HS
	1100	Kawanoe Zoki	BF-12
	1500	Toscotec	MODULO-PLUS
	1500	Toscotec	MODULO-PLUS
	1700	Recard	Crescent Former
	2000	A.Celli	iDEAL Master Tissue Machine
	2100	PMP	Intell-Tissue 2100 Advanced Turn Key Project
	2000	Valmet	Advantage DCT 100 with ViscoNip press
	1700	Hergen	New complete paper machine EVO 12
	1700	Hergen	New complete paper machine EVO 12
	1900	Andritz	PrimeLineCOMPACT V
	1900	Andritz	PrimeLineCOMPACT V
	2000	Andritz	PrimeLineTM W6-XT
	2200	Valmet	Advantage DCT 200 with ViscoNip press
	1500	Toscotec	MODULO-PLUS
	2200	Valmet	Advantage DCT 200 with ViscoNip press
	1700	Recard	Crescent Former
	1800	Andritz	PrimeLineCOMPACT V1-XT
	1850	Toscotec	AHEAD-1.5S
	1800	Recard	Crescent Former
	2200	Valmet	Advantage DCT 200 with ViscoNip press
	2200	Valmet	Advantage DCT 200 with ViscoNip press
	1780	Recard	Crescent Former
	NA	Toscotec	Twinwire
	NA	Toscotec	Twinwire
	NA	Andritz	PrimeLineTAD
	NA	Valmet	Advantage ThruAir
	NA	Valmet	Advantage ThruAir
	2000	Toscotec	AHEAD-2.0L
	2000	Toscotec	AHEAD-2.0L
	1300	Andritz	PrimeLineECO

Capacity expansion exceeds organic growth – in some cases double

TWM's annual Projects Survey is the result of a year-long accumulation of tissue capacity data from companies across the world.

It represents a detailed snapshot of production strategies in all the major tissue regions, set against a global picture of dynamic but shifting trends in consumption, technological advances, raw material costs, radically new energy essentials, and continuing economic uncertainty..

Over-investment and overcapacity remain central issues. The direct cause of overcapacity is anticipation of growth in consumption, a regular and to date predictable event.

China has been the largest tissue producer country since 2015, powered by a decade long consumption growth of 43%, a stark contrast to the US figure at just 12%.

The main change in 2018 was that growth in China was only half of that recorded in 2017, Japan contracted and Western European growth slowed further. Meanwhile, Eastern Europe, Asia Far East and Africa showed more positive developments.

Unmet potential in global terms is immense, but a lot of that potential is confined by cultural habits, even when economic limits are present. India, the great untapped market, will be a tissue bonanza if – and there are no real signs that will any time soon include a when – its people swing round to that particular western habit.

Announced tissue capacity expansion clearly exceeds organic market growth. In some years, such as 2019, the amount of new capacity coming on stream is double the consumption growth. Closures have helped and will continue to do so in the future, but investment activity is overheated. Major capacity closures could improve outlook, but only marginally in the short-term.

Driven by the continued and in some cases strong growth in consumption benefitting from improving global hygiene standards, ever improving quality products... but there is clear evidence that trade wars, economic uncertainty, ageing machinery being replaced, and Industry 4.0 and 5.0 creativity is allowing for a reassessment and a more stable level being found.

DRIVEN BY INNOVATION – AT THE LEADING EDGE OF MACHINERY ADVANCES

Searching for ever more quality while keeping production costs under control . . . "it's sometimes like reconciling water and fire." The world's leading tissue machinery manufacturers outline their business strategies to TWM.

Guenter Offenbacher
Director of sales tissue and drying, Andritz

Shinji Goda
Director and general manager of engineering, Kawanoe Zoki

Maja Mejsner
Vice president business development and marketing, PMP Group

Paolo Raffaelli
Technical director, Toscotec

Ingmar Andersson
Sales manager, tissue mills business unit, Valmet

Martin Jauch
Senior vice president tissue, Voith

TWM/1: What new paper machine technologies have been ground breaking during 2019? And what can the industry expect to see in 2020?

Guenter Offenbacher, director sales tissue and drying, Andritz: "In 2019, we launched our PrimeLineTEX tissue machine for textured tissue and we will focus on it in the beginning of 2020. With this intermediate technology, we have developed a competitive tissue machine for premium grades that, when compared to dry crepe in particular, enables lower fibre input and consumes less energy than TAD.

"Then, after having completed our PrimeLineTEX technology development programme, we will shift our focus regarding the PrimeLineTIAC tissue pilot plant to various trials and R&D activities in order to improve existing TAD concepts and develop new technologies for structured tissue."

Guenter Offenbacher

"HAVING COMPLETED OUR PRIMELINETEX TECHNOLOGY DEVELOPMENT PROGRAMME, WE WILL SHIFT OUR FOCUS REGARDING THE PRIMELINETIAC TISSUE PILOT PLANT TO VARIOUS TRIALS AND R&D ACTIVITIES IN ORDER TO IMPROVE EXISTING TAD CONCEPTS AND DEVELOP NEW TECHNOLOGIES FOR STRUCTURED TISSUE."

Shinji Goda, director and general manager of engineering, Kawanoe Zoki: "The trend we expect in 2020 is machine technology that can produce various grades in large quantities with single grades. The machine which can develop the possibilities of new products and which produce conventional products draws the most attention from tissue

makers. Our new machine started-up at the end of last year can be run by either wet crepe or dry crepe. This machine is highly acclaimed by the customer for superior formation gained by the new type of HeadBox."

Maja Mejsner, vice president business development and marketing, PMP Group: "Tissue fleet worldwide is predominantly driven by Crescent Former technology. Both tissue producers and machinery makers are constantly looking for innovation having in mind reaching impressive tissue quality results and keeping production costs under control. It is sometimes like reconciling water and fire. However, all depends on what consumers say and are ready to buy. In emerging markets, simplified and robust solutions take the lead. On mature markets, more activity in applying alternative, sophisticated technologies including shoe press and ideas to produce so-called texture tissue are observed.

"It is crucial to understand there are many differences in technical age of the tissue fleet worldwide. If we take China for instance the fleet is very young – eight to 10 years on average, whereas in the USA it is closer to 30 years. Also per capita consumption figures are totally different – mature markets are three or four times higher than emerging economies. Mature markets need to focus their effort on optimisation of their fleet and finding a sweet spot. That is why rebuilds and applying smart, innovative concepts take place. Emerging economies are still on the learning curve – run faster and learn every day – simplicity and flexibility help to maintain business risk and build strong foundations for the future.

"We do not expect violent changes in that trend in 2020, however we still believe, as does the industry, that we should be driven by innovation. At PMP we are planning to continue our efforts to expand our offering to respond well on all needs from all markets."

Paolo Raffaelli, technical director, Toscotec: "Toscotec is currently developing its low-energy TAD technology, which we expect to make available on the market by 2020. As we know, the tissue market has not especially rewarded the intermediate solution of textured tissue. This is part of the reason why we have decided to press on with our TAD strategy and focus on innovation for either conventional tissue of premium quality or actual structured tissue. Also, given the clear demand trend for low-consumption and more sustainable manufacturing, our R&D efforts have been centred around low-energy TAD, which will strike the right balance between the typical properties of structured tissue and low energy use.

"The digitalisation of the entire tissue making plant is no doubt among today's most revolutionary innovations. The wider dissemination of the Industrial Internet of Things (IIoT) will contribute, through edge computing and cloud computing, to bring together IT (Information Technology) and OT (Operation Technology). Based on this, Toscotec is developing its data analysis and calculation capabilities related to Machine Learning, in order to create predictive models and optimise the production process in terms of OEE, and quality combined with energy efficiency."

Ingmar Andersson, sales manager, tissue mills business unit, Valmet: "Almost all new technologies introduced in the tissue making industry are primarily driven by two areas, the need to reduce energy and to be able to produce better products with less fibre.

"The need for tissue product differentiation is today addressed, from Valmet side, by the well-established Advantage ThruAir, TAD process continuously being upgraded and by several Hybrid Processes like Advantage NTT, e-TAD and QRT. These new processes are now spread to most significant markets, already started up or under delivery.

"The strive for high efficiency will drive the use of Industrial Internet services to support customer's improvement and optimization of their production system, from Valmet Performance Centres. Introduction of new process sensors will enhance the knowledge of the inherent factors when producing tissue products."

Martin Jauch, senior vice president tissue, Voith: "Due to improved standards of living and personal hygiene, the global consumption of tissue products such as paper towels, napkins, facial tissue and toilet paper is increasing rapidly. Toilet paper is the biggest segment of the tissue business. Softness is one of the crucial factors in this category. Therefore, new manufacturing technologies are being developed in this field to increase paper quality. Manufacturers are striving for differentiation, while still pushing for higher productivity and lower energy consumption. Operating costs must be kept as low as possible to ensure the manufacturer's competitiveness. Voith Paper continues gaining significant improvements in end-product quality. Real-life case studies show a softness degree that is higher than 86% TSA, with high productivity and excellent performance."

TWM/2: What new technical demands are you seeing from the market, and how are you responding to that?

Offenbacher: "Competition in the global tissue industry is high and at the same time the industry is growing. Innovation is the key to success and production costs as well as product features are the centre of attention. We want to continue with our R&D activities in tissue grades ranging from conventional to premium grades, such as textured and structured (TAD) tissue.

"Our Tissue Innovation and Application Centre, the PrimeLine TIAC pilot plant,

Maja Mejsner

"IT IS CRUCIAL TO UNDERSTAND THERE ARE MANY DIFFERENCES IN TECHNICAL AGE OF THE TISSUE FLEET WORLDWIDE. IF WE TAKE CHINA FOR INSTANCE THE FLEET IS VERY YOUNG – EIGHT TO 10 YEARS ON AVERAGE, WHEREAS IN THE USA IT IS CLOSER TO 30 YEARS."

Paolo Raffaelli

"TOSCOTEC IS CURRENTLY DEVELOPING ITS LOW-ENERGY TAD TECHNOLOGY, WHICH WE EXPECT TO MAKE AVAILABLE ON THE MARKET BY 2020. AS WE KNOW, THE TISSUE MARKET HAS NOT ESPECIALLY REWARDED THE INTERMEDIATE SOLUTION OF TEXTURED TISSUE. THIS IS PART OF THE REASON WHY WE HAVE DECIDED TO PRESS ON WITH OUR TAD STRATEGY AND FOCUS ON INNOVATION."

Ingmar Andersson

"THE BEST UTILISATION OF THE PRODUCTION INVESTMENTS IS HIGHLY REQUESTED, THIS DRIVING HIGH PRODUCTION SPEEDS BUT PERHAPS MORE SO TO REDUCE ANY REASONS FOR DOWNTIME. RELIABLE EQUIPMENT, MINIMUM OF MAINTENANCE AT PRE-DETERMINED INTERVALS ARE EXPECTED."

where we develop technology together with and for the whole tissue industry, and our Metris Performance Centre, where we develop digital and new automation solutions, contribute substantially to achieving this."

Goda: "Visualisation of the paper making process is the main need from tissue makers. In case the process has several operating parameters, even small changes can impact on the production efficiency. It is very important to take a prompt action to condition changes. In order to comply with these needs, we, Kawanoe Zoki, developed the operation monitoring system easy to use at a reasonable price. We are going to extend marketing now."

Mejsner: "For several years, tissue manufactures have talked about cost per tonne production and how to minimise media consumption maintaining high tissue quality. Sophisticated technical demands play minor role. Looks like recently essential solutions and simplicity taken the lead.

"Compared to a previous decade when tissue lines were robust and were designed to run for even 35 years, nowadays a perspective is much shorter and people are ready to accept compromises meaning cost reductions (different materials, lower execution standards, etc) and a much shorter production time horizon of a particular line – a conclusion is they accept a shorter line lifetime. Attractive ROI factor is crucial – in Asia (China) – three to four years, in other areas of the world five to six years.

"If investors are ready, they want to apply plug and play scenarios. If we imagine that in the 1970's, four years were sometimes needed to build a mill. Today, as the industry, we have managed to squeeze that timeframe to 1.5 years – from a contact signing to paper at reel. That is impressive. We build mills in different way - simplified buildings (basement free), lego bricks philosophy of an erection process, more standard, repeatable solutions and so on. Some investors are agile and go ahead with multiplied orders at once – especially in Asia. As PMP, we are experiencing that right now with two customers. Process planning in case of such orders is very different and that is an excellent example of how to achieve a synergy effect – to cumulate similar purchases, to save time on similar activities, to make sure operators can be trained on one machine and run any other installation in a different location. This way we become more effective and can shift our business to the next level.

"At PMP, we believe there are still two important factors to keep in mind: safety and transparency. No matter what, all of us need to make sure applied solutions are safe for users and for the process. Machinery providers should give people a choice and stay transparent, to make sure a buyer compares apple to apple and what are the consequences of certain choices (for instance mild steel instead of stainless steel, thinner elements instead of thicker element, lower quality pump instead of top quality pump, etc). We all are responsible to keep the tissue business in a good condition and to grow it."

Raffaelli: "Consumers and retailers are driving a true transformation toward more sustainable products. There is a widespread demand for decarbonising the energy-intensive processes of the paper industry. As machinery manufacturers, we are committed to supplying the most efficient technology, which will enable tissue producers to save and recover energy, thereby reducing their carbon emissions.

"We can also effectively contribute to the optimisation of their processes, by designing energy-efficient layouts and water/chemical/fibre P&ID drawings. In short, our design and manufacturing work is focused on increasing machine performances, boosting efficiency and reducing their ecological footprint.

"We are also witnessing an increase in the use of alternative fibres. Toscotec is working cooperatively with one of its closest partners to develop the right technology for the use of alternative fibres. This project aims to investigate the fibre properties and increase the quality of the end product, as well as reduce the use of thermal and electrical energy in the stock preparation process."

Andersson: "The best utilisation of the production investments is highly requested, this driving high production speeds but perhaps more so to reduce any reasons for downtime.

"Reliable equipment, minimum of maintenance at pre-determined intervals are expected.

"Maximum operating speeds exceeding 2,200m/min are nowadays achieved but there is less incentives to further increase this as the energy consumption rapidly increase for these speeds.

"Keeping all equipment, including wires and felts, nice and clean and to closely monitor all process parameters is the basis for high productivity. Design guidelines for the equipment supplied is highly driven by this way of tissue operations."

Jauch: "The world is rapidly changing through digitalisation. Companies that miss jumping on the train to this changing environment will lose competitiveness in the mid-term. Tissue manufacturing is not immune to this change, and new technologies are being developed and implemented. Voith Paper, a pioneer in solutions for Papermaking 4.0, has launched cloud based applications suitable for the tissue industry. Products of the OnEfficiency family increase the efficiency and improves product and process quality as well as allow for improved machinery and process control. Furthermore, Voith provides

Martin Jauch

"THE WORLD IS RAPIDLY CHANGING THROUGH DIGITALISATION. COMPANIES THAT MISS JUMPING ON THE TRAIN TO THIS CHANGING ENVIRONMENT WILL LOSE COMPETITIVENESS IN THE MID-TERM. TISSUE MANUFACTURING IS NOT IMMUNE TO THIS CHANGE, AND NEW TECHNOLOGIES ARE BEING DEVELOPED AND IMPLEMENTED."

asset management solutions as well as virtual sensors. All products on the Voith automation platform ComCore offer easy implementation and provide flexibility and reliability for the tissue machine's control performance."

TWM/3: What developments have you made in terms of energy?

Offenbacher: "For many years now, Andritz has offered a series of products that counteract climate change or contribute to protecting the environment. Around 45% of our sales are already being realised using "green" products and technologies that contribute towards sustainability and conserving resources.

"Successful examples for our energy saving components in tissue mills are the Andritz stock preparation ShortFlow system, our new refining technology with the Papillon refiner, the double-dilution approach flow system, our PrimePress XT Evo shoe press, the PrimeDry Steel Yankee with head insulation as well as various heat recovery systems including steam generator, and many more."

Goda: "Energy saving at the dry part of the machine always comes with the continuous challenge. Improved design of the steam system and the hot air hood pushes forward further energy saving. We are also working on how we can improve sheet formation with a new type of HeadBox. PEO reduction and paper making with high consistency are expected by the customers as well."

Mejsner: "In the last three years we have focused our efforts on development and optimisation of our EcoEc Premium line (single and one and a half trim tissue machines) to ensure an ultra-low media consumption level – the best possible. Running references proved our theoretical calculations were correct and even we managed to exceed expectations. It makes us feel proud to realise our machines are amount the best in the world taking the cost per tonne factor into account.

"2019 has been an outstanding year for PMP. We have been awarded by Asia Pulp & Paper (APP) with (18) Intelli-Tissue EcoEc Premium 1600 lines for Rudong mill, China, which will bring 620,000tpy of high quality tissue and (4) Intelli-Tissue Eco Ec Premium 1800 lines for OKI mill, Indonesia, that will bring 165,000tpy. In both cases we are talking about 1.5 trim machines (3.6m). PMP's Intelli-Tissue EcoEc Premium technology corresponds well with a Sustainable Development Strategy of APP

Shinji Goda

"ENERGY SAVING AT THE DRY PART OF THE MACHINE ALWAYS COMES WITH THE CONTINUOUS CHALLENGE. IMPROVED DESIGN OF THE STEAM SYSTEM AND THE HOT AIR HOOD PUSHES FORWARD FURTHER ENERGY SAVING. WE ARE ALSO WORKING ON HOW WE CAN IMPROVE SHEET FORMATION WITH A NEW TYPE OF HEADBOX."

and guarantees achieving ultra-low media consumption (total energy usage: steam and electricity as low as 1.74 MWh/t), while keeping premium quality of a final product. In addition, this technology has been also appreciated by our long-term partner C&S from mainland China which decided to purchase (3) more machines of that type following (9) lines purchased previously.

"Encouraged by superior results of medium EcoEc Premium lines, we have developed a double width TM with shoe press and incorporated this solution in our offering. Intelli-Tissue Ultra line has been introduced to the market during Tissue World Milan and CIDPEX trade fairs. A new line was developed under a WIDE project (Wise Solutions, Innovative, Durable, Energy Efficient). Wise and its main driver is to ensure the best media consumption in the world (Crescent Former type), solutions meaning all ideas that help to improve tissue quality such as double layer headbox, shoe press and others. Innovative – user friendly - solutions that correspond with robust solutions and users preferences as well as PMP smart concepts, with industry 4.0 flavours. Durable – of high quality, a compact - modular construction, trouble-free operation (TM efficiency as high as 95%, that offers a comfortable performance. Energy Efficient TM – of lowest possible media consumption (steam consumption as low as 1.68t/t of paper on certain grades in case gas in not available in the location and a TM runs with large dia steel YD and a cap). Intelli-Tissue Ultra is our response for corporate customers and mature markets, where a blend of sophisticated technology and reasonable costs is expected. It is a continuous process, however we are planning to move forward with innovations and to become more visible in more demanding market segments."

Raffaelli: "Apart from our strategic project of low-energy TAD machine, we have made significant headway in the development of other energy-efficient solutions.

"First off, we are manufacturing the third generation of Toscotec's Steel Yankee Dryer, whose first installations are scheduled for 2020. Since we are the Steel Yankee supplier with the most extensive experience globally, we have available a very large set of data collected over the course of two decades on approximately 200 TT SYD operating under different conditions all over the world, including TAD process. This database represented a key asset for our R&D to develop the latest design, where we optimised the Yankee geometry and significantly increased its heat transfer efficiency at any nip load applied.

"Secondly, we invested efforts in upgrading Toscotec's energy recovery equipment, first and foremost heat exchangers, in order to ensure the highest possible level of thermal energy efficiency in our steam and condensate, hot air and vacuum plants."

Andersson: "The most important contributor to energy saving demands from Valmet have been the already established Advantage ViscoNip pressing technology. The ViscoNip press was introduced years ago but has now become widely applied on all markets, on Valmet machines as well as others.

Maja Mejsner

"ENCOURAGED BY SUPERIOR RESULTS OF MEDIUM ECOEC PREMIUM LINES, WE HAVE DEVELOPED A DOUBLE WIDTH TM WITH SHOE PRESS AND INCORPORATED THIS SOLUTION IN OUR OFFERING. INTELLI-TISSUE ULTRA LINE HAS BEEN INTRODUCED TO THE MARKET DURING TISSUE WORLD MILAN AND CIDPEX TRADE FAIRS."

Ingmar Andersson

"IN THE TISSUE MARKET, WE ALREADY SEE A CLEAR TREND: FOR INSTANCE, CUSTOMERS DEMAND HIGHER TISSUE QUALITY THROUGH THE USE OF NEW TISSUE TECHNOLOGIES. IN TERMS OF ENERGY CONSUMPTION, THESE TECHNOLOGIES SHOULD CONSUME A SIMILAR AMOUNT TO THE ONES FOR THE PRODUCTION OF CONVENTIONAL TISSUE."

"Significant for ViscoNip pressing is the significant increase in dryness and uniformity which reduces energy per ton greatly.

"Two other unique Valmet energy saving technologies nowadays are part of our standard machines, the Advantage ReTurne, turbine for recovery of headbox jet energy, and the Advantage ReDry reusing hot exhaust gases from hood to improve dryness in the pressing against the Yankee.

"Today's technology reduces the energy used in the tissue machinery by 30% compared to 10 years ago."

Jauch: "In the latest Voith machine start-up in Europe, an interesting package in terms of energy was implemented. The new Pluralis refining disks ensure better paper quality and lower energy consumption in the respective process. The approach flow with double dilution system enables a lower carbon footprint and less energy consumption due to smaller equipment. Furthermore, the low mist former uses the Venturi effect with less installed power to reduce the mist inside the former and provides a better working environment for operators. The headbox without recirculation line needs less energy in the fan pump, with no compromise in quality or stability of the jet. The NipcoFlex T shoe press makes higher "post-press" consistency possible and consequently leads to about 20% less thermos energy consumption. Additionally, the EvoDry Y steel Yankee and EcoHood provide a more efficient drying process, reducing wastes and energy consumption at the same time. Finally, the steam booster leads to significant reduction in steam consumption. With all these elements, customers benefit from increased competitiveness and operation efficiency that are fundamental topics with regard to the feasibility equation."

TWM/4: What trends are you seeing generally in the tissue market and the current global economic climate?

Offenbacher: "In the tissue market, we already see a clear trend: for instance, customers demand higher tissue quality through the use of new tissue technologies. In terms of energy consumption, these technologies should consume a similar amount to the ones for the production of conventional tissue, however. Therefore, we need to provide resource-saving and especially energy-saving technologies for the production of premium tissue grades. Besides the energy reduction, we can contribute also with fibre savings as well as reduction of fresh water consumption to CO_2 footprint reduction of a tissue plant.

"Regarding conventional tissue, we are also working on specific ways to reduce the use of energy and water as well as on improving quality.

"Another trend in the industry is the digitalisation. Andritz has already achieved remarkable success with its Metris automation system to optimise the overall production and efficiencies of pulp and paper plants. Metris is the Andritz technology brand in "Industrial Internet of Things" (IIoT) applications. The system also includes reports on energy and resource efficiency capabilities to monitor and optimise consumption of energy and other resources.

"After our first, very successful installations in 2019 at highly acknowledged tissue customers, we will further promote the Optimisation of Process Performance (OPP) activities in the tissue industry besides improving our standard services."

Goda: "Imported products from other countries, which we didn't expect before due to the transportation cost, are increasing. As measures that Japanese tissue makers consider, they are working on the development of differentiated products with high added-value, such as bulky paper towels with high water absorption and premium products with excellent designs."

Mejsner: "The tissue industry is still healthy even as we observe regional overcapacity. Ten years ago most of new tissue machines were single width, then we observed double width machines being popular. Nowadays, there is more interest to install 1.5 width TMs as a way to be able to increase annual capacity faster that in the case of single width machines and to stay more flexible compared to double width TMs production scenario. For the first time, PMP provided two machines of that size a couple of years ago for GCPU in Indonesia. We got another order of that type of machines in 2016 from Hebei Jinboshi Group CO., Baoding City, China. Then we have been swamped by orders from C&S and APP. It is not a coincidence for sure and this trend cannot be ignored.

"Our industry is also affected by local regulations either environmental or political. For instance in China, mill closures in bigger cities are taking place and then creating new mills in rural locations are required to maintain annual capacity. Another trend: replacing outdated technological solutions with modern ones (instead of 10 lines to run one line only). In addition, consolidations play more important role than in the past. It is pretty common now that corporations are building expansion plans based on worldwide presence taking into account their working style and requirements for machinery and standardisation. The tissue industry is not local anymore!

"This way tissue makers have found a way to balance their business models and to open themselves up to new opportunities and reduce a risk of failure. It is also edifying that the technical age of tissue fleet worldwide is very low compared to for instance paper machines. There is more space for implementation of modern ideas like Industry 4.0 solutions as people do not need to think about basic problems.

"We truly believe in growing economies including Eastern Europe and Latin America. We are very proud to support Convertipap in Mexico – our first tissue reference in this country. We are taking care of Intelli-Tissue® 2100 Advanced line in a turn-key scenario and the start up in scheduled for summer next year. After our experience with Smurfit Kappa group in Mexico, it is an important and memorable project in the tissue sector."

Raffaelli: "In 2018, the price of cellulose was skyrocketing, which led many producers to put their investment plans on the back burner. Presently the trend has been inverted, which means that paper mills are determined to make up for lost time and starting to implement their expansion plans by adding new capacity. The demand for premium quality grades is still on the up and Toscotec is definitely recognised by the global market as a leading supplier with the capability to deliver premium quality tissue production.

"At the same time, we saw a consolidation of the industry on the equipment supply side, which contributes to the creation of a healthier competition climate for all players."

Andersson: "The demand for tissue products are based on the general standard of living and increased hygiene demands. The overall increase of consumption is also driven by the urbanisation taking place everywhere.

"We expect the demand will continue to grow at current pace however with local variations depending from mostly political considerations.

"Long-time growth in China depends also on competition among tissue makers and the strive for market share. Few foreign tissue-makers are carrying out direct investments in China tissue industry. Some large Chinese companies are realising ambitious investments while smaller companies, usually local, will face challenges. Many very small, outdated tissue machines in China will shut down due to environmental reasons. Indonesia and Turkey tissue industry invest largely for export.

"Brexit will probably lead to local investments within the UK, to reduce the import."

Jauch: "The tissue business is always striving for the best process parameters and outputs. Operating efficiency must be very high, whereas total cost of ownership must always be kept at a low level. As environmental demands become stricter, energy consumption has to be reduced. The slight reduction of pulp prices and the development of new business models in e-commerce are resulting in more profitability. Due to the changing buying behaviour of consumers, paper manufacturers have to position themselves in a highly competitive environment. Industry 4.0 has been gaining ground, and the opportunities force manufacturers to take actions in this direction. Voith Paper is fully dedicated to bringing Papermaking 4.0 solutions to the market to help manufacturers differentiate themselves and be more competitive in such a dynamic landscape."

TWM/5: What environmental/sustainable demands are you seeing from customers? How are you responding to that?

Goda: "In the field of sanitary paper, replacement of non-woven products and petroleum products with paper is progressing in Japan from the viewpoint of environmental considerations in products used around kitchens and toilets. In response to such demand, the machines that can produce a wider variety of products in addition to ordinary products such as toilet and tissue are required."

Mejsner: "Sustainability is a DNA of our industry. Consumers are conscious – they want to buy safe products without contamination and of high quality. Tissue products directly affect their lives. Society is getting more responsible and wants to preserve our planet for the next generations. We have started to pay more attention to resources and their utilisation. That is why a key word in tissue business is energy and all solutions that help to minimise its usage are appreciated. Producers of tissue and machinery pay more attention to invest in technologies to make sure a production process is optimised and utilisation of resources is decreased to minimum. That is a global trend.

"As PMP we continue efforts to create and offer solutions for the future. Our marketing campaign in 2020 is called #redefining papermaking. Our intension is to intensify activities to continue a dynamic company growth. Our next target in tissue filed is to lower steam usage to the level of 1.5 t/t (in case of Crescent former machine with large Steel Yankee Dryer at least 18 feet and Intelli-Cap). A reuse of waste heat in this scenario can, on the one hand help to save money, on the other, will correspond well with a sustainability trend."

Raffaelli: "Papermakers are increasingly engaged in environmental protection at all levels. From the perspective of machinery manufacturer, our priorities in every project are reducing thermal and electrical consumptions to a minimum, cutting down on fibre usage and waste volumes by boosting fibre recovery across the entire process, and reduce fresh water consumption through optimised process engineering. The technology we have been developing for many years specifically aims to enable paper mills to achieve the product quality they need, while achieving energy reduction and delivering on their sustainability commitments. These targets simply underlie all our engineering and R&D projects."

Andersson: "Environmental requirements from customers will influence the selection of fibres and more efforts will be addressing the use of various fibre sources like straw, bamboo and other farming residuals.

"Also, the use of recycled fibres will continue to be important as this appears to be natural and easy to understand by consumers.

"ECO Labelling of the products will ease the acceptance by consumers in all countries.

Valmet is delivering hybrid technologies to meet the needs for smaller environmental footprint as well as better quality. Also, the Advantage DCT and ThruAir concepts are updated with technologies to reduce the environmental footprint."

Jauch: "Environmental responsibility is increasingly important to Voith and to our customers. Consequently, the ecological footprint of products has to be optimised with regard to sustainability goals. To fulfill these goals, the reduced energy consumption is essential for the future of different market areas. Paper manufacturers have been starting new projects considering different fibre sourcing options to bring more sustainability to our planet while increasing their competitiveness and profitability. Voith Paper focuses on technological solutions combined with all possibilities in line with the Papermaking 4.0 approach, while envisioning high efficiency and excellent performance."

Shinji Goda

"ENVIRONMENTAL RESPONSIBILITY IS INCREASINGLY IMPORTANT TO VOITH AND TO OUR CUSTOMERS. CONSEQUENTLY, THE ECOLOGICAL FOOTPRINT OF PRODUCTS HAS TO BE OPTIMISED WITH REGARD TO SUSTAINABILITY GOALS. TO FULFILL THESE GOALS, THE REDUCED ENERGY CONSUMPTION IS ESSENTIAL FOR THE FUTURE OF DIFFERENT MARKET AREAS."

GROWTH IN DEMAND IN DEVELOPING MARKETS SET TO OUTWEIGH GROWTH IN THE US

Good news, bad news: US consumer tissue – a matter of perspective.

Svetlana Uduslivaia
Head of research, Home & Technology, Euromonitor International

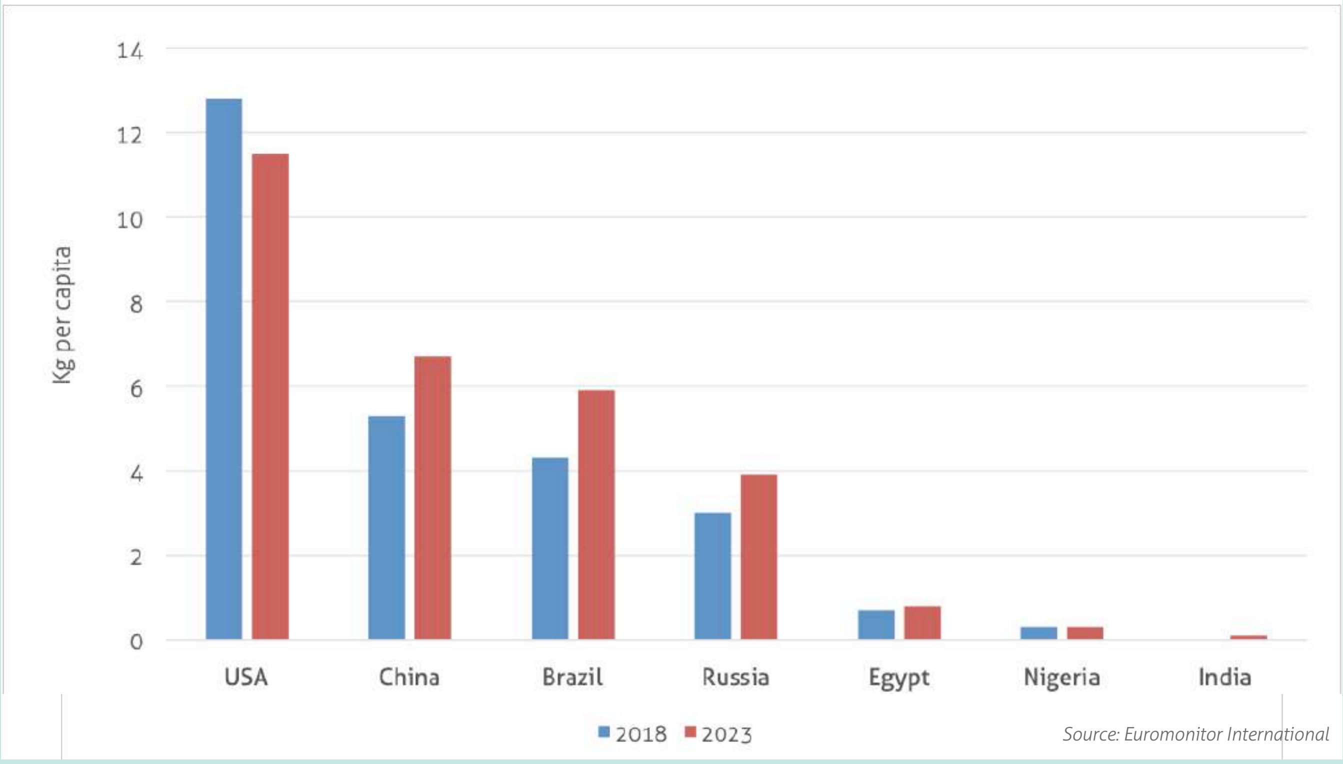
The US remains one of the world's two largest retail consumer tissue markets, accounting for 17% of the global consumer tissue volume (tonnes) sales in 2018. The country's share of global sales, however, is expected to drop to 14% by 2023, as growth in demand in developing markets will outweigh the growth in the US. In fact, the combined estimated unmet potential of the six markets - China, India, Egypt, Russia, Brazil and Nigeria – stands at over 11 million tonnes, compared to only about 100 thousand tonnes in the US.

The retail market saw a sluggish performance in the country in 2018, and growth is projected to remain weak over the next five years. With already one of the highest per capita retail consumer tissue consumption in the world, mainly key macro-fundamentals shape demand and retail sales. Subsequently, concerns over economic growth and persistent low levels of population growth (holding under 1% annually) will continue to impact the industry. Furthermore, the Euromonitor Industry Forecasting model predicts that US-China trade wars are likely to shave some growth off going forward. While the downgrade in projections due to trade wars is not likely to be significant, any further slowdown in an already sluggish market is not good news. Trade wars can and likely will lead to further increases in prices in retail across consumer goods, in addition to price increases already implemented in 2018, thereby forcing many consumers to re-evaluate their spending priorities once again.

In such a challenging operating environment, are there any good news? This depends on where along the supply chain and in the competitive spectrum one is positioned.

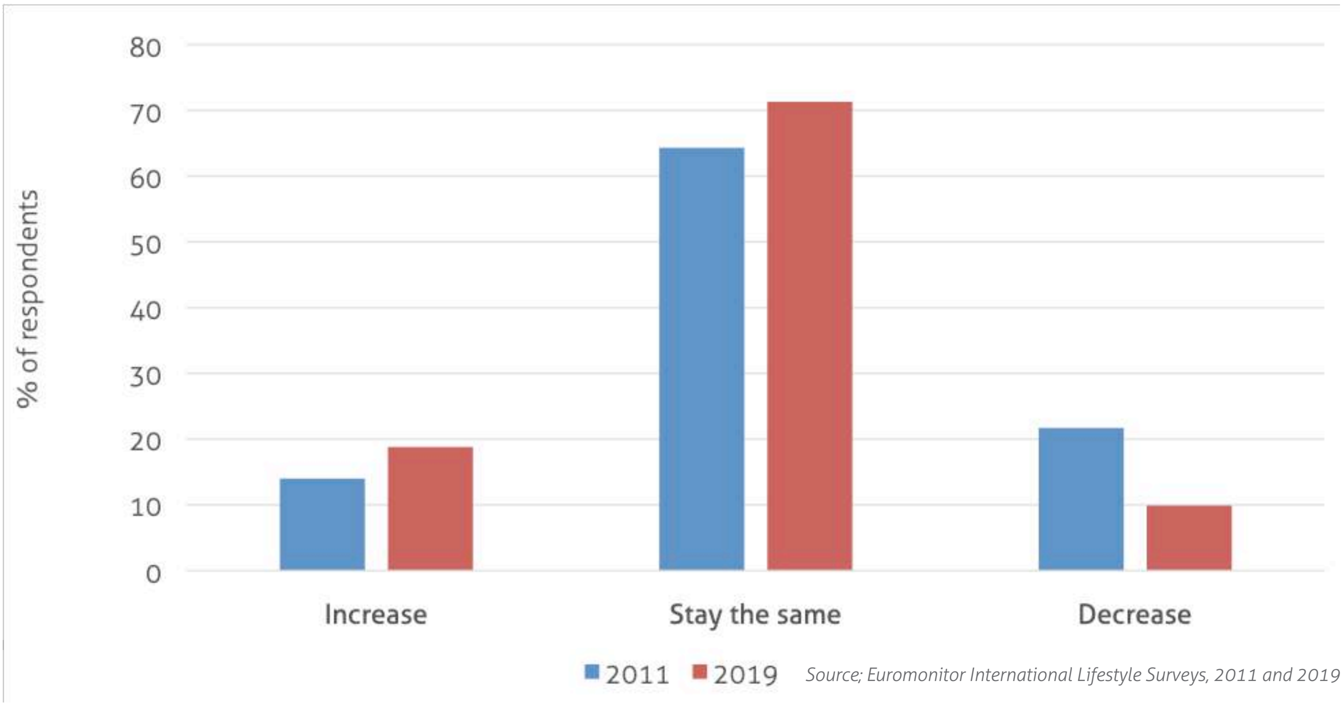
Euromonitor consumer surveys indicate that many consumers in the US intend to increase their spending in discounters and spend more on private label in 2019. In fact, the proportion of US respondents planning

Table 1: US vs select developing markets, kg per capita, retail tissue, 2018/2023



Source: Euromonitor International

Table 2: Spending in the next 12 months, % of US respondents to increase/decrease spending on private label, 2019



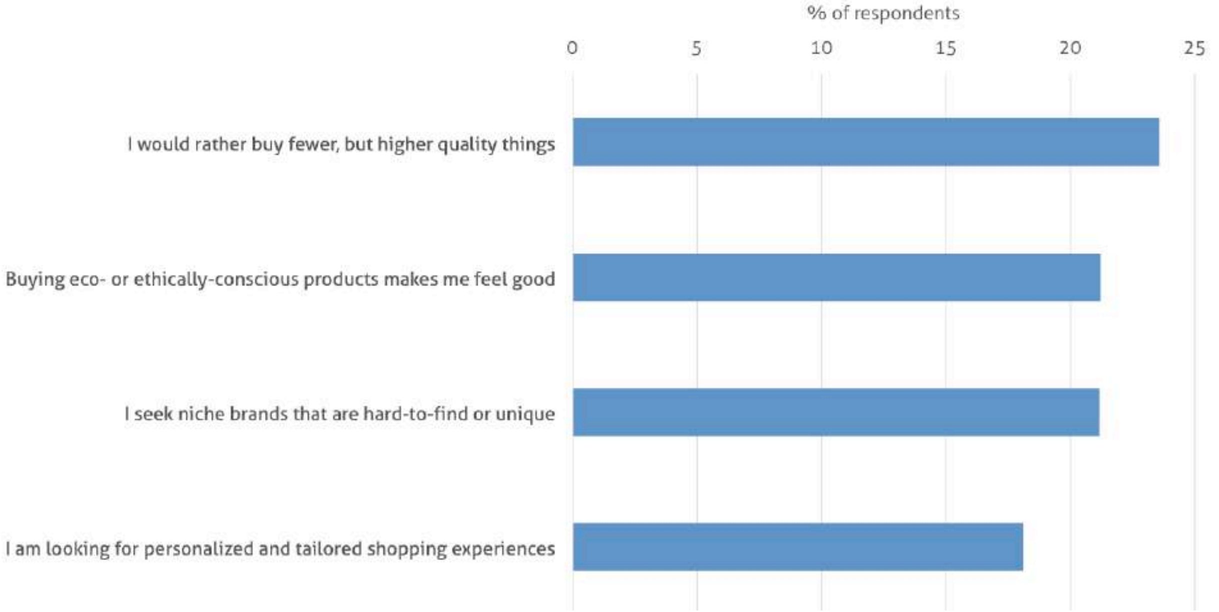
Source; Euromonitor International Lifestyle Surveys, 2011 and 2019

to increase their spending on private label in the coming 12 months went up from 14% in the 2011 survey to 17% in the 2017 survey to 19% in the 2019 survey. While not necessarily good news for key brands operating in the market, those with stakes in private label consumer tissue can feel somewhat more confident, and so should those who operate discount retail or work with discounters as retail partners.

Discount retail and private label aside, there is a consumer group in the US willing to spend more on quality and pay premium. This is the consumer segment many niche direct-to-consumer premium positioned brands are betting on. In recent years, the US saw the appearance and growth of DTC brands that use subscription-based model to reach consumers, examples being Peach Goods, Who Gives a Crap and a number of others. Usually featuring young teams, these companies seek to also appeal to younger consumer base – Millennials first and foremost – with the messages of quality, sustainability, mindful consumerism, ethics and community involvement. Free of big brands' "legacy",

Above: *The US saw the growth of subscription based DTC brands like Peach, based in New York City*

Table 3: US shopping preferences, Millennials, 2019



Source; Euromonitor International Lifestyle Surveys, 2019

these startups provide a fresh look at consumer tissue staples.

The messaging is hitting a sweet spot with some American Millennials. Euromonitor Lifestyle surveys released in 2019 indicate that 24% of Millennials would rather buy fewer but higher quality products, 21% seek unique brands, and 18% look for personalized tailored experience. Furthermore, 21% of American Millennials indicate that buying eco-or ethically-conscious products make them feel good.

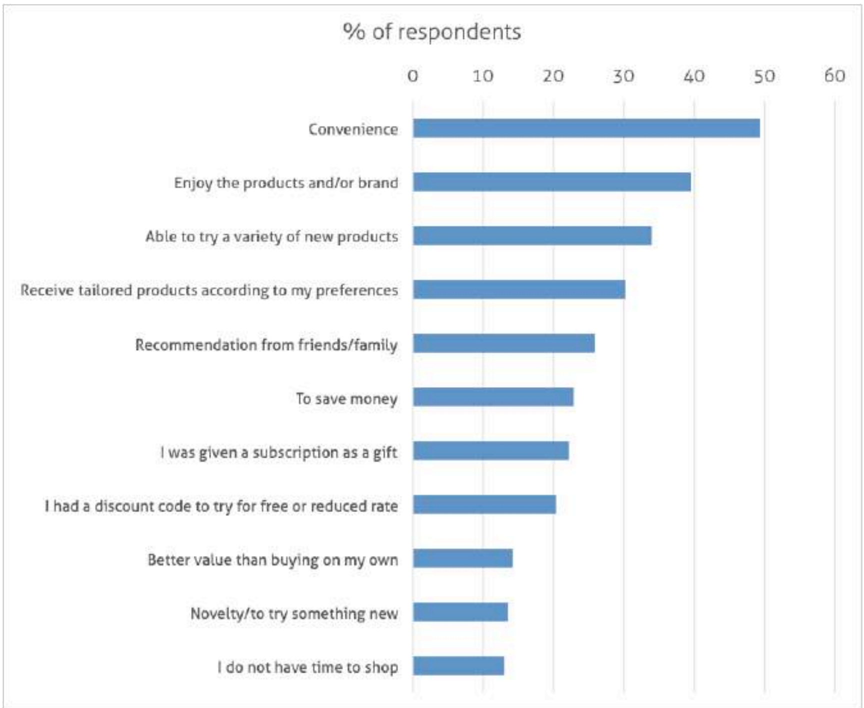
Subscription model used by most of the startup brands works well too. It allows the brands to target a specific consumer audience and avoid direct competition for shelf space and attention at mass retail. Moreover, it allows for data-driven innovation and marketing strategies, as the brands are able to communicate with consumers directly and gain valuable insights into consumer preferences, likes, dislikes, and expectations.

Subscription services have been on the rise in the US, with more Americans using subscription in 2019 than a few years back. Subscription service use among Millennials remains high. Euromonitor Lifestyle surveys indicated that 34% of Millennials have used a subscription service in 2019. Furthermore, while convenience is a key motivator behind the choice of subscription service, brand uniqueness and tailored experiences do play a role in consumer choice of subscription vs other shopping options.

Consumer business aside, novelty premium niche brands of tissue are finding their place in away-from-home spaces, mainly high-end hospitality and foodservice businesses. Luxury hospitality and foodservice businesses continue to present an opportunity for niche brands in both tissue and disposable hygiene, as operators of these businesses are seeking to provide their customers with unique and complete luxury experience.

To sum up, US highly mature consumer tissue business will continue to present a challenge and a risk of overcapacity as the overall demand is hampered by slow population growth, macro-economic concerns, and consumer knack for bargains. However, pockets of opportunities exist for brands with the right messaging and distribution strategies to target certain consumer groups, found mainly among the young generation looking for uniqueness, experiences, and mindful consumption.

Table 4: US subscription service motivation, 2019



Source; Euromonitor International Lifestyle Surveys, 2019

EVENTS CALENDAR

25-28 JAN 2020	Paper World Europe	Frankfurt, Germany	aperworld.messefrankfurt.com/frankfurt/en.html
3-6 FEB 2020	Paperweek Canada	Montreal, Canada	www.paperweekcanada.ca
12-14 FEB 2020	Expo ACOTEPAC	Cali, Colombia	http://www.acotepacolombia.com/
3-5 MAR 2020	PACK EXPO East	Philadelphia, USA	www.packexpoeast.com
9-11 MAR 2020	European Conference	Lisbon, Portugal	https://events.risiinfo.com/european-conference/
10 MAR 2020	PPI Awards	Lisbon, Portugal	https://events.risiinfo.com/ppi-awards
11-13 MAR 2020	Tissue World Miami 2020	Miami, FL, USA	www.tissueworld.com/miami/
15-17 MAR 2020	Paper2020	New York City, USA	papermeets.com
31 MAR-3 APR 2020	INDEX	Geneva, Switzerland	www.edana.org
22-24 APR 2020	CIDPEX	Nanjin, China	http://en.cnhpia.org
26-29 APR 2020	PaperCon 2020	Atlanta, Georgia	papercon.org
3-5 JUN 2020	Asian P&T World 2020	Bangkok, Thailand	www.tissueworld.com/bangkok/
14-16 JUN 2020	International Pulp Week	Vancouver, Canada	https://internationalpulpweek.com/
16-26 JUN 2020	DRUPA	Düsseldorf, Germany	www.drupa.de
17-19 JUN 2020	Paper Vietnam	HCMC, Vietnam	https://www.paper-vietnam.com/
23-25 JUN 2020	Zellcheming Expo	Frankfurt, Germany	https://zex.mesago.com/frankfurt/en.html
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