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JANUARY/FEBRUARY 2019

The independent news provider for the global tissue business

TWM

TISSUE WORLD MAGAZINE

GERMANY
The rise and rise of private label

PLUS:

PROJECTS SURVEY
Global tissue's market growth

TECHNICAL
PM suppliers talk innovation

MARKETISSUES
Russian market ups its game

CONSUMERSPEAK
'Toilet Twinning' talks luxuries

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Top: *WEPA Group's ethos mirrors Germany's stable tissue performance. We talked to chief operating officer Hendrik Otto in our Country Report.* ***Right:*** *Kimberly-Clark appoints Michael D. Hsu as chief executive, World News.*

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TWM

TISSUE WORLD MAGAZINE

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Cover: image showing the dominance of private label tissue products and popularity of discounter stores in the German tissue market.

From east to west – the sun is rising on tissue's New Year

A Happy New Year to you all. I don't know whether you gave Auld Lang Syne a burst as the clock ticked down to the midnight hour on December 31, but we gave it a run for its money here at TWM.

As befits tissue's most globally devoted magazine, we are acutely aware that many of tissue's personnel, in whatever capacity, will not have heard of the Scottish poet Robbie Burns' ode to friendship old and new.

So however you celebrated the ushering in of 2019, may it be one of the best.

What will be the next advance?

TWM's coverage spans the world, so I've taken the sun rising on the first day of the New Year and as it spreads westerly across the nations as a record of that coverage. I hope you'll bear with me.

The first rising sunshine of the New Year always falls on Australia. They deserve the honour, we say. TWM was well ahead of the ticking clock as we had already lined up a special report from that very region.

In *ExitIssues*, Tim Woods, managing director of consultancy Industry Edge, details how steady population growth, an ageing population and rising per capita consumption have combined to push tissue production in Australia and New Zealand to capacity.

The question is, when, where, and what will the next manufacturing development be, he asks? He's not alone.

We also have news from Japan, China, Thailand, India, and Russia, from where Greg Grishchenko reports in this issue's *MarketIssues* that there are encouraging signs of the retail sector, particularly in second and third level cities and towns, beginning to make major improvements in the number of outlets, display, marketing and pricing. Morning is also breaking in Italy, Spain and Portugal, and we have the latest news from there too.

From the home of private label

Our *Country Report* analyses Germany, one of the most developed and saturated markets – the third most in western Europe – across the industry. Hendrik Otto, chief operating officer of the WEPA Group, tells us about a key 'produce where you sell' policy.

Germany has no overcapacity issue; production and sales are essentially level. Balance is very much the word, and while growth is no more than 2%, it is stable. The search for key innovation is intense, and has niche potential.

Domenico D'Angelo, line of business director – private label, Sofidel Germany, says: "The main opportunities are related to innovation. That's how we can create more value in a mostly price-driven industry, with the possibility to enlarge the market size.

Helen Morris

Senior Editor,
Tissue World magazine

"Just to give you an example: if you succeed to launch a household towel to be used outside the kitchen, you have created a new market that simply did not exist before."

Germany is the home of private label, as our dramatic front page image shows ... in retail tissue value terms its share is more than 75%, the highest in western Europe.

At day's end in the east, production is getting under way in the west in Brazil and the US. We report, and to conclude our global coverage, TWM's annual *Projects Survey* which charts an impressive 115 new tissue projects being added, ordered or in final planning stages during 2018-2019. Make it a great one for all.

Country Report analyses Germany, one of the most developed and saturated markets across the industry. Hendrik Otto, chief operating officer of the WEPA Group, tells us about a key policy.

EDITORIAL HEADQUARTERS
UBM Exhibition Singapore Pte Ltd.
10 Kallang Avenue, #09-16 Aperia Tower 2, Singapore 339510
Tel: +65 6233 6688 Fax: +65 6233 6633

DEPUTY EVENT DIRECTOR & PUBLISHER
Agnes Gehot
agnes.gehot@ubm.com

SENIOR EDITOR
Helen Morris
helen.morris@ubm.com

ASSISTANT MARKETING MANAGER
Lei Ching Yew
leiching.yew@ubm.com

MANAGING DIRECTOR
Paul Wan
paul.wan@ubm.com

CEO
Margaret Ma Connolly
margaret.connolly@ubm.com

PRESIDENT
Jimé Essink
jime.essink@ubm.com

UBM

ADVERTISING ENQUIRIES

Italy – Germany
Studio Luciano Arati sas
Silvio Arati
Tel: +39 02 4851 7853
sarati@studioarati.it

China, Hong Kong & Macau
Jennie Zhan
Tel: +86 20 86660158
info-china@ubm.com

Rest of the World
Özgür Kayihan
Tel: +65 6233 6641
Ozgur.kayihan@ubm.com

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Please send address corrections to **UBM Exhibition Singapore Pte Ltd.**
10 Kallang Avenue, #09-16 Aperia Tower 2, Singapore 339510
Tel: +65 6233 6688 Fax: +65 6233 6633
Email: info@tissueworld.com
Subscription online at www.tissueworldmagazine.com
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Growing consumer awareness and education is driving Russia's market performance in spite of sanctions

Industry analyst Greg Grishchenko examines the rising level of quality products, retail display, home production and consumer choice in the world's largest landmass tissue market.

The unique nature of the tissue paper business among the majority of paper industry segments has assured its success and continuing growth across the world for the last 50 years despite local wars, natural disasters and economic difficulties.

This trend is also applicable for the Russian tissue market. Russia, the largest country in the world by territory, entered another round of financial calamity after 2014 caused by several waves of economic sanctions after territorial conflict with Ukraine.

Despite growing oil prices and significant government spending on energy, transportation and industrial projects (including several privately funded greenfield tissue mills), the highly expected recovery of the Russian economy did not occur in 2017. As a result, the anticipated improvement of Russian consumer's purchasing power did not happen, leaving GDP uncertain in 2018.

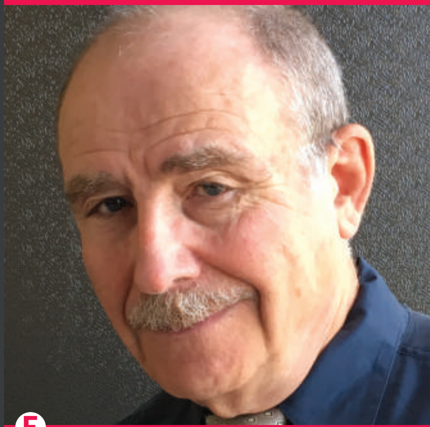
Despite that, Russia's tissue market with about 550,000 tonnes consumed in 2017 continues to grow. According to Euromonitor International, tissue retail segment sales while coming across 76% of 2012-17 growth rate and 12% of 2012-17 compound annual growth rate, in 2017 grew, however, only 5.8% compared to 2016. In Russia, tissue retail dynamics are driven by the toilet paper segment share (about 70% compared with about 55% in the USA and Western Europe).

Even with ongoing economic sanctions from the USA and European Union, Russia's economy shows growth by implementing its "import replacement" strategy that was introduced in 1998 when financial default caused acute local currency devaluation. This strategy might help to reduce tissue products imports to 5% of total value while at the same time increasing export to Asian markets, mostly jumbo rolls.

Business outlook

The competitive setting in the Russian tissue market remained steady in 2017 with many powerful players and one leader, Essity, holding nearly one third of all value sales. Even if top local companies were robust players, mainly in toilet paper and facial tissue, the major multinational players – Essity, Kimberly-Clark and Metsä Tissue – held nearly half of all tissue retail sales. In the ongoing competition between domestic and international players each side uses its own strong attributes to maintain their market shares.

Greg Grishchenko



Industry analyst

International companies employ globally well-known brand names, significant financial and advertising support and comprehensive business experience. However, local players such as Syassky and Syktyvkar (number two and four respectively) are gradually reaching world quality standards and offer competitive products for price sensitive Russian consumers, especially during uncertain economic development.

Despite growing oil prices and significant government spending on energy, transportation and industrial projects (including several privately funded greenfield tissue mills), the highly expected recovery of the Russian economy did not occur in 2017.

Russian economy: *its highly expected recovery did not occur in 2017, and as a result the anticipated improvement of the country's consumer's purchasing power did not happen*

By Greg Grishchenko, industry analyst

It took Hayat Kimya, the Turkish based domestic tissue manufacturer, only two years to reach the number three ranking in the Russian tissue market by 2017. This company started its modern production site in Tatarstan in 2015 and very soon made its major brand Familia recognisable enough to achieve a top standing on supermarket shelves.

Sale dynamics: *tissue categories vary from year-to-year, but in general they follow changes in family income caused by shifting economic conditions*

Manufacturing on the rise

From 1987 to 2009, at least a dozen companies started industrial scale toilet paper production across the country. Among them were Syktyvkar Tissue Group (Republic of Komy – 1987), Atlas-Market (Sovetsk – 1988), Bumazhnaya Fabrika – Chaltyr (Rostov-na-Donu – 1988), Naberezhniye Chelny KBK (Republic of Tatarstan – 1988), SCA – Svetogorsk Mill (1998), Kuban-Papir (Krasnodar Region – 1999, Nikmas (Chelyabinsk – 1999), PKF Chisty Dom (Moscow Region – 2004), Bumazhnaya Fabrika – Adischevo (Kostroma Region – 2004), Nega (Kazan, Republic of Tatarstan – 2006) and Viva (St. Petersburg – 2007).

While the larger local and international mills could allow themselves to invest in the tissue forming and converting equipment from front row suppliers, the rest could rely on second hand or low cost equipment from China and Turkey.

The period of the highest tissue industry growth began in 2010. This year was marked by the opening of three new production facilities by SCA (now Essity) at Sovetsk (Tula Region), Kimberly-Clark at Stupino (Moscow Region) and Constell Group at Takhtamukay (Republic of Adygeya). In 2013, Syktyvkar Tissue Group started production of its new greenfield site at Semibratovo (Yaroslav Region). In the same year Pulp Invest spent almost two billion rubles (about $32m) for its new mill with an annual capacity of 30,000 tonnes at Kazan (Republic of Tatarstan). The project was financed by Gazprombank to produce 100 % virgin fibre tissue products.

Hayat Kimya became one of the top players in the Russian market since 2015 with the opening of a modern production facility in Yelabuga (Republic of Tatarstan).

Its two principal brands Papia, in the higher-priced segment of toilet paper, and the economy brand Familia gradually grew to become leading performers in the respective tissue product segment.

Another greenfield project started in 2017 by Austrian-German group Pulp Mill Holding will add 70,000 tonnes of tissue paper to Russian market in 2019. Arkhbum Tissue Group in Vorsino (Kaluga Region) will run Andritz tissue line PrimePress XT with new control system ShortFlow and Steel Yankee cylinder, providing quick tissue content recipe change at 5.6m production width and 2,100m/min.

Market structure

Bath tissue is the largest (about three quarters) segment of the market, followed by facial tissue and paper towels. The share of 2-ply bath tissue in 2017 prevails at 61%. Presently this type of tissue is the most popular and remains a core product of the market. However, the sales of 3-ply toilet paper keep growing and reached 24% in 2017. 1-ply toilet paper is still being sold both in virgin and recycled form.

Sale dynamics for the tissue categories vary from year-to-year, but in general they follow changes in family income caused by shifting economic conditions. 3-ply bath tissue production shows the highest growth rate (about 10-12%) despite several waves of economic crisis. 4-ply brand product share is very small and represents super-premium segment on the shelves of upscale supermarkets in large cities.

Indeed, the tissue market structure in Russia changed dramatically during the past five years. During this time the share of "basic" 1-ply mostly coreless recycled rolls with substandard packaging fell sharply and was replaced with 2-ply recycled or virgin contemporary labelled products in the economy price range. If in 2011 the share of 1-ply bath tissue made about 60% of the market, in 2017 this paper category had shrunk to 12%.

While toilet paper shows robust sales growth, the other tissue products still lag behind.

Sale dynamics for the tissue categories vary from year-to-year, but in general they follow changes in family income caused by shifting economic condition.

By **Greg Grishchenko**, industry analyst

Facial tissues (including popular and inexpensive boxed type) take second place after toilet paper with 14.5% share in 2017, followed by paper towels (8.7%) and napkins (5.9%). Locally made facial tissues offered by domestic companies show fastest growth rate having a wide selection in various types and price segments. However, as a simple household staple, facial tissues did not develop brand devotion amongst consumers looking for a better deal notwithstanding of quality.

Many Russian households still prefer fabric towels at their cleaning and drying routine, finding paper towels not indispensable enough to include it in the family budget. As the result paper towels continued to be considered as less necessary products in comparison to toilet paper and facial tissues in 2017.

Brand development

Imported tissue brands appeared in Russia in the early 1990s and retained their leading position for a while especially in the medium-to-premium price segment. Brands Zewa and Zewa Plus, now owned by Essity, continue to keep the leading retail tissue positions in Russia in 2017 for the key categories of toilet paper and facial tissues.

The company continues to invest with the opening of a greenfield tissue mill in Sovetsk (Tula) in 2010. The other European brand which was competitive in medium-to-premium price segment, Lotus, was introduced at about the same time as Zewa and remained active for long time.

However, with the departure of Georgia-Pacific Corporation from European markets this brand was sold to Metsä Tissue and practically disappeared from the Russian retail business.

While the Zewa brand is firmly positioned in the medium-to-premium price segment and being such a high-quality product keeps resisting the general consumer preference for cheaper products, it cannot compete with the local brands and private labels in economy bath tissue segment.

The latest trend in brand recognition, however, represents a significant increase of high quality domestic brands on sale by all distribution channels. Number two player Myagkij Znak produced by Syassky CBK and number four Linia Veiro by Syktyvkar Tissue Group offer wide range of products from recycled economy to premium 2-ply and 3-ply tissue products.

The company continues to invest with the opening of a greenfield tissue mill in Sovetsk (Tula) in 2010. The other European brand which was competitive in medium-to-premium price segment, Lotus, was introduced at about the same time as Zewa and remained active for long time.

Syassky CBK started up a new Toscotec tissue former in 2016 and Syktyvkar operates modern tissue converting lines supplied by Fabio Perini. There are about two dozen companies located in all of the country that developed recognisable tissue brand like Pero (Lilia LTD), Reina and Perina (Pulp Invest), Eco-Semeika (Naberezhniye Chelny KBK) and Premial (Bumfa Group).

The widespread popularity of video clips did not miss Russia and has created local "clip mentality" aided by new distribution channels. Ironically, as a result the majority of well-known tissue brands (not only owned by multinational companies) carry non-Russian names written in Latin instead of Cyrillic letters.

Even 3-ply premium bath tissue brand Pero (which means feather in Russian) from Lilia Ltd. is written with Latin letters. The exception is the very popular local brand Myagkij Znak (soft sign) from #2 market player Syassky CBK, which is a consonant letter from the Russian alphabet with no phonetic meaning and cannot be depicted in Latin letters.

AfH, HoReCa tissue and economic ambiguity

According to Euromonitor International, in 2017 the AfH segment reached $190m in sales, showing a 5% increase compared with the previous year. Despite a remaining low confidence level in terms of disposable income over the past several years many consumers returned to eating out in 2017. Moreover, a growing number of international visitors attracted by 2018 football World Cup caused the substantial recovery of the HoReCa (Hotels/ Restaurants/Cafes) food industry segment.

Projected 2018 data for AfH toilet paper and napkins, according to Rosstat (Federal Agency of Russian State Statistics), also show slight increases due to many industrial projects originated by the state and municipal authorities.

The share of the HoReCa segment in the AfH distribution business in Russia took about 76% in 2017, with almost no fluctuation from previous years. There is a small growth for business/industry segment share (9.1% in 2017), and a small decrease for hospitals/healthcare segment share (10.4% in 2017). In the public segment share (4.4% in 2017) there is a small rise for a couple of previous years. This data reflects current development of the business environment when recovery of tourism comes along with impasse in industry and health care.

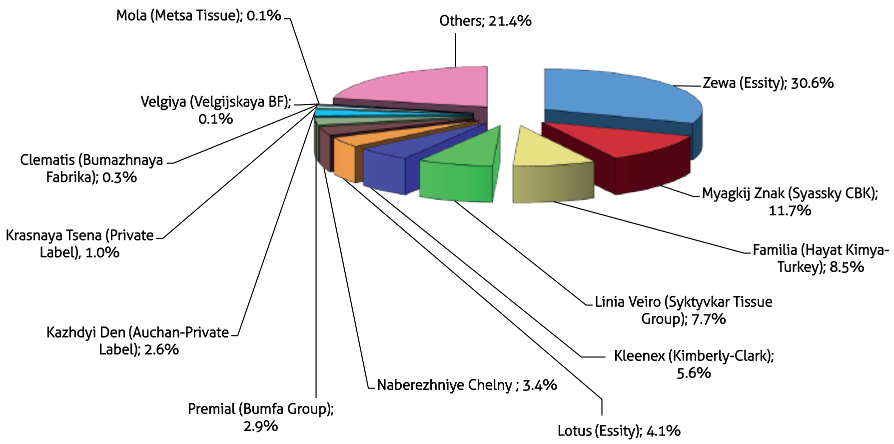
While more established AfH participants prefer international brands made in Russia like Tork (Essity), Kleenex (Kimberly-Clark) and Focus (Hayat Kimya) who dominates sales in this area due to their quality and ability to provide stable supply flow, there is still room for others. In recent years a number of local tissue converters (Pulp Invest, PKF Chisty Dom, Atlas-Market, Kuban-Papir and Nega) began to enter the AfH area, offering low cost recycled toilet paper and folded napkins.

Retail sales indicate economic state of affairs

Despite the ongoing hurdles in Russia's food industry, its biggest grocery retail chains are still performing above

By Greg Grishchenko, industry analyst

Tissue Brands in Russia 2017



and beyond expectation. Impressive increases in profits and revenue with store network expansion suggest a definite robustness in Russian food retail operations. While the combined share of retail tissue distribution by supermarkets and hypermarkets remains unchanged at about 43% of total value, for the last five years according to Euromonitor International the supermarket fraction keeps gradually falling and the hypermarket one keeps rising.

This precedent shows a trend of growing switch from grocery shopping only to more expanded shopping experience for the large metropolitan areas.

Popular domestic grocery chains Magnit, X5 Retail Group (Perekrestok and Pyaterochka), Dixi, O'key and others show better growth dynamics than four remaining foreign based chains Auchan (France), Billa (Austria), Metro (Germany) and SPAR (Netherlands).

International grocery chains still show good turnover and come up with many new advertising programs despite some players, like headquartered in France Carrefour, leaving the Russian market several years ago claiming unspecified difficulties.

Growing popularity of chain supermarket shopping instigated the rise of the private label stake in retail tissue sales, especially in toilet paper. As a lower economy-priced segment private label share in bath tissue grew from a single-digit number in 2012 to a double-digit in 2017. The range of private label tissue goods expanded considerably with inclusion of more high-level products like Mon Rulon wet wipes made by Russian company Avangard LTD in St. Petersburg.

While Euromonitor International attributes the growing demand for tissue private labels to "continuous uncertainty in the Russian economy and depreciation of consumer purchasing power", some domestic specialists from Rosstat and Forbes Russia also point out growing consumer awareness and education.

During my recent travels in Russia I have noticed quite significant improvements in displaying and advertising tissue products not only in big city stores but even in small grocery shops in small and remote Russian towns. Decades ago, a rural consumer could find only basic recycled poor quality toilet rolls, now even small grocery shop can offer a dedicated isle of tissue products with sufficient selection by price and brand.

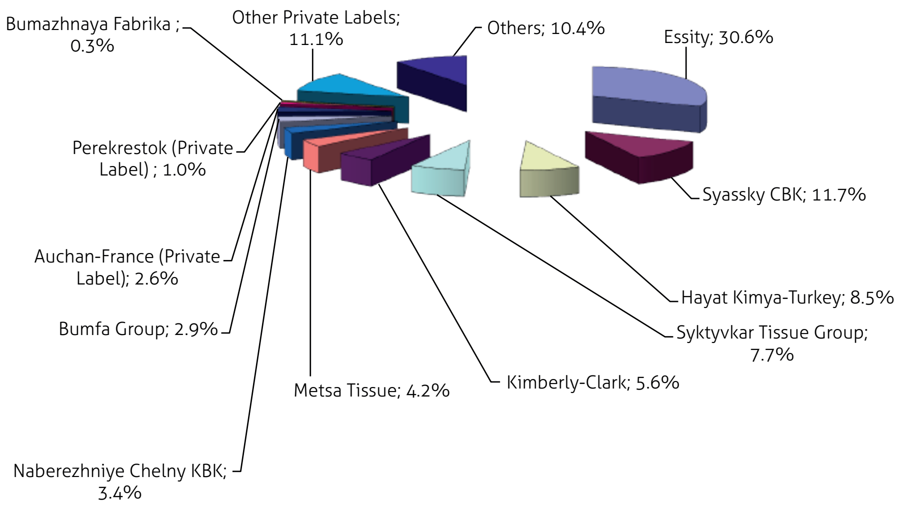
Current tissue consumption in Russia is about 4 kilograms per person per year and is far behind developed nations. But having in mind that commercial bath tissue was introduced in 1969 and only 10 years ago tissue consumption was less than a half of the current figure, the advance is apparent.

However, the averaging consumption statistics may bring confusing market picture when several major metropolitan areas like Moscow, St Petersburg and Yekaterinburg show tissue product demand at the European level and the rest of the country is much behind at about India's rate.

But looking further into market analysis by Rosstat there is an emerging group of nearly thirty cities across the country with the population of around 500,000 each showing higher than average annual growth and tissue consumption.

Economic pressure as the result of certain Russian government's political actions is not something new or unexpected to the country's hardened populace. While the negative effect of such financial hardship is not contested, toilet paper suppliers in Russia today feel as confident as ever. Euromonitor International predicts retail tissue sales rise at modest compound annual growth rate of 2% (at constant 2017 prices) to reach 73bn rubles ($1.2 billion) in 2022.

Tissue Market in Russia 2017



Capacity boost: *the two AHEAD-2.0M machines will increase Vinda Personal Care (China)'s annual production by 60,000tpy*

CHINA

Vinda Personal Care boosts capacity with twin start-up

Vinda Personal Care (China) has started up two Toscotec-supplied AHEAD-2.0M tissue machines in Xiaogan city, Hubei.
Both lines feature a second-generation large diameter TT SYD, the supplier's shoe press technology TT NextPress, and the energy-efficient TT DOES solution (Drying Optimisation for Energy Savings). The two AHEAD-2.0M machines will increase the group's annual production by over 60,000tpy.
Anna Wang, chief operating officer, Vinda International Holdings, said: "Vinda Personal Care (China) is a very strategic production base for the group, we are investing on its operations and therefore we expect efficient performances and very low consumptions on these new Toscotec's lines."
The project inaugurates the company's second production base in Xiaogan, located in the vicinity of its existing mill.
Toscotec is installing other two tissue lines at Vinda Personal Care (China), scheduled for start-up over the next few months.

Yibin Paper Industry increases capacity

Yibin Paper Industry has increased its production capacity after investing in two 18ft IDEAL Steel Yankees. Supplied by A.Celli Paper, the two lines were expected to be installed on site in early November 2018.
In total, the order by the company has included five sets of iDEAL Tissue Machines; three of which are equipped with three 16ft. Steel Yankees and have already been successfully installed.
The first tissue machine was started up earlier this year.

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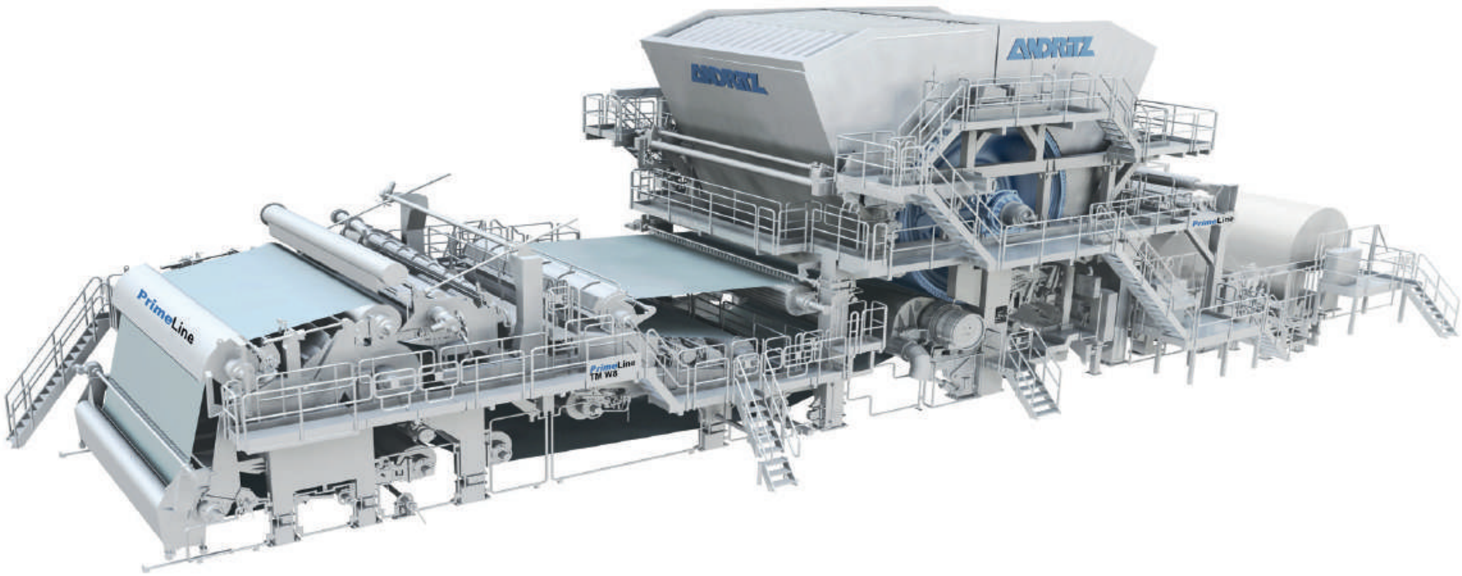
EUROPE

Bids for K-C's European tissue unit ongoing

Kimberly-Clark's European tissue unit will potentially be sold to private equity groups including Goldman Sachs, reports have claimed. The unit has been put up for sale by the New York-listed company as it seeks to reduce costs and dispose of less profitable businesses.
New-York headquartered private investment company Centerbridge Partners LP and the private equity division of Goldman Sachs Capital Partners are understood to be in the running to making the final bids, in what would be a £1bn-£2bn deal.
K-C's tissue brands include Hakle and Tela in Europe, as well Andrex.
K-C declined to comment at this time, and Centerbridge Partners LP and Goldman Sachs Capital Partners were unavailable to comment at this time.



Quality focus: *Berli Jucker Cellox's new line will boost capacity for production of high-quality products. Photo by Andritz.*

THAILAND

Berli Jucker Cellox targets high-quality T&T with investment

Thailand's Berli Jucker Cellox has invested in a PrimeLineCOMPACT VI tissue machine. Supplied by Andritz, the line includes a shoe press with stock preparation and automation systems for the company's mill in Prachinburi. The machine is designed for grammages from 13 to 40g/m2 and will produce a range of high-quality tissue and towels.

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The machine is designed for grammages from 13 to 40g/m2 and will produce a range of high-quality tissue and towels.

It has a design speed of 1,800m per minute and a paper width on reel of 2.8m.

It is equipped with the ANDRITZ PrimeControl automation system.

The scope of supply also includes the stock preparation system, with two lines in order to process both short-fibre and long-fibre pulp, and the option of adding recycled fibre.

GLOBAL

Essity results hit by raw material and energy price hikes

Essity has said higher raw material and energy costs have had a negative impact of SEK3,268m on earnings in its third quarter results.

Net sales for the period 1 January 2018 and 30 September increased 8.4% to SEK87,388m compared to the same time a year ago, while operating profit before EBITA declined 10% to SEK8,085m.

Adjusted pre-tax profit decreased 6% to SEK8,026m, while profit for the period decreased 14% to SEK4,935m.

For the third quarter, the group's net sales increased 9.1%.

Magnus Groth, president and chief executive, said: "The third quarter of 2018 was challenging as the negative impact from raw material and energy costs has accelerated further.

"On the whole, these factors negatively impacted our margins in the short term, despite higher selling prices, a better mix and costs savings in all business areas."

To increase profitability, he said the company will continue to invest in its brands: "We launched 13 innovations during the quarter that strengthened our customer and consumer offering.

"Within Consumer Tissue, we have initiated negotiations regarding further price increases that are primarily expected to impact 2019.

"For some contracts in Europe, additional price increases have already been implemented with gradual effect in the fourth quarter of 2018.

"We are intensifying our efficiency improvements and restructuring of the business. We have decided on further restructuring measures as part of "Tissue Roadmap" and are continuing our work with "Cure or Kill"."

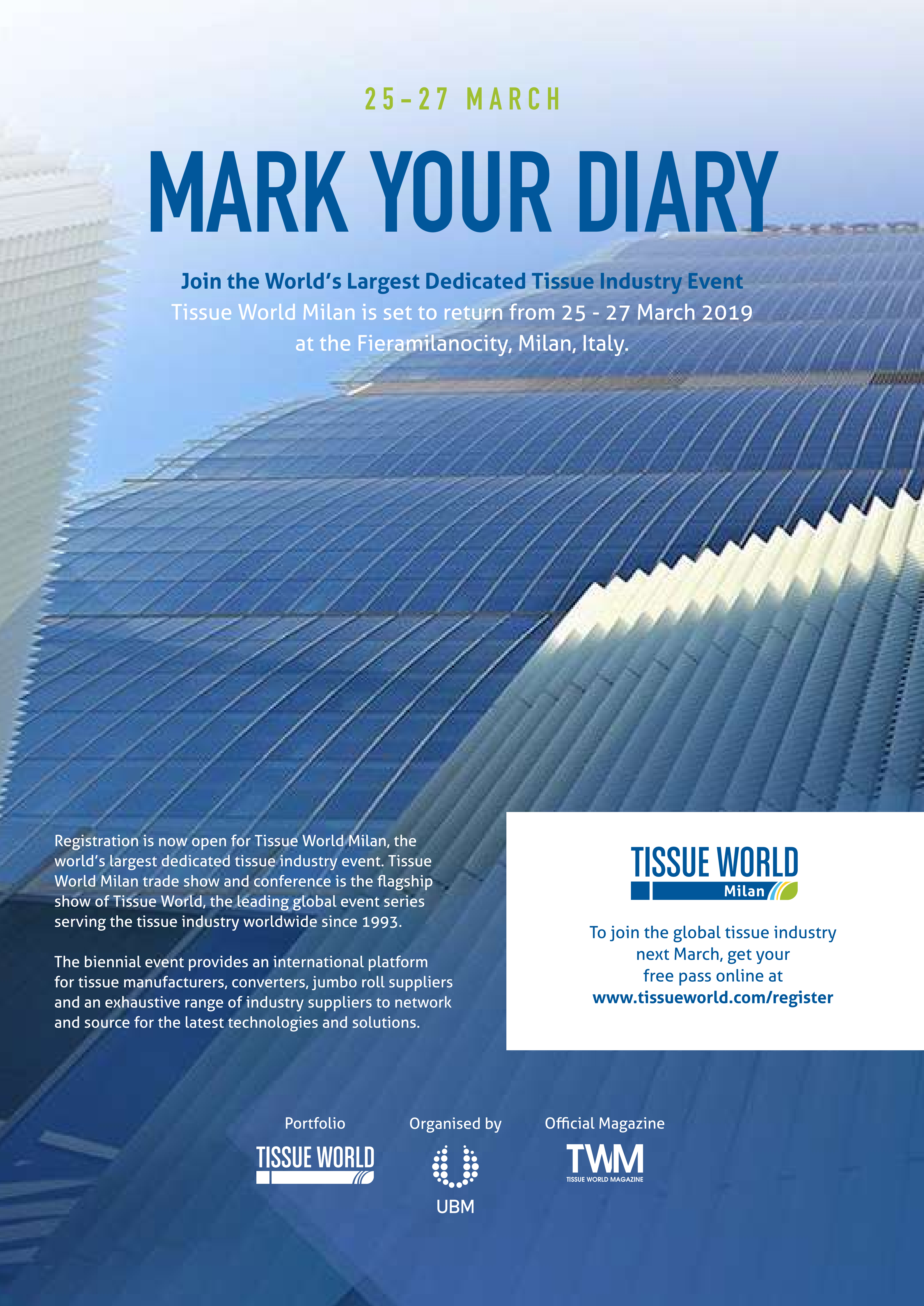
During the quarter, a Group-wide cost-savings programme was launched that is in addition to the ongoing efficiency activities in the company.

The expected annual cost savings are being increased by approximately SEK 100m to approximately SEK 900m, with full effect at the end of 2019.

The programme includes headcount reductions of approximately 1,000 positions. Essity is also making changes to its organisational structure and executive management team.

The two units, Global Hygiene Supply Tissue and Global Hygiene Supply Personal Care, will be merged into one unit under the name Global Manufacturing with responsibility for production and technology.

A new unit under the name Global Operational Services will be created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Essity has said higher raw material and energy costs have had a negative impact of SEK3,268m on earnings in its third quarter results. Net sales for the period 1 January 2018 and 30 September increased 8.4%.

with the purpose to further strengthen the group's overall work related to operational and cost efficiency. The unit will encompass sourcing, logistics, business services and digitalisation.

K-C: *Michael D. Hsu succeeds Thomas J. Falk as CEO*

K-C appoints new CEO

Kimberly-Clark (K-C) has appointed Michael D. Hsu as chief executive as of 1 January 2019.
Hsu has served as K-C's president and chief operating officer since 1 January 2017 and will continue to serve as a member of the company's board of directors.
Before that, he oversaw the company's nearly $8bn North American Personal Care and Consumer Tissue businesses.
Hsu succeeds Thomas J. Falk who has served as chief executive since 2002 and chairman of the board of directors since 2003.
Falk will become executive chairman of the K-C board of directors to help ensure a smooth transition.
Falk led the creation of the company's Global Business Plan, which prioritised growth opportunities and applies greater financial discipline to operations.
Prior to joining K-C in 2012, Hsu was executive vice president and chief commercial officer at Kraft Foods. Before Kraft, he spent six years at H.J. Heinz.

Buckman announces price hike

Buckman has announced a global price increase for its paper division. The company said the increases are "being driven by rising raw materials, constraints from supply chain tightness and growing challenges associated with freight costs".
The price increases will be effective 1 January 2019, or as contracts allow.
The expected increases across each product lines include:

- Coagulants: 10 – 15%
- Flocculants: 10 – 20%
- Defoamers: 5 – 15%
- Biocides: 5 – 15%
- Alkaline cleaners: 10 – 20%

In addition to product price increases, Buckman will implement freight delivery increases in certain regions as required.

C.A.S. Paper Mill boosts capacity

C.A.S. Paper Mill has increased its production capacity after investing in an AHEAD-1.5S tissue line. Supplied by Toscotec, delivery is scheduled for 2019 and the start-up for the first quarter of 2020. The turnkey supply includes the AHEAD-1.5S tissue machine, equipped with a second generation Steel Yankee Dryer TT SYD, Toscotec's shoe press technology TT NextPress and steam-heated hybrid hoods TT Milltech-HYH.
The paper width is 2.8m, the maximum operating speed is 1,850m/min, with a daily production of over 90 tonnes.
Toscotec will provide its proprietary Distributed Control System TT DCS and the Quality Control System (QCS), the machine's dust and mist removal systems, an offline shaft puller and a jumbo roll wrapping system.
A tissue slitter rewinder TT WIND-M is also part of the supply, along with its complete electrification and control system, and dust removal system.
It features three unwind stands and it handles parent rolls of 3,000mm diameter, with a design speed of 1,700m/min.
The scope also includes the stock preparation equipment and accessories, the patented TT SAF (Short Approach Flow), and a fibre recovery system. The investment follows the C.A.S. Group's plan to pursue its diversification by entering the tissue business.
Torpong Thongcharoen, managing director of C.A.S. Paper Mill, said: "We were happy to see that C.A.S. Paper Mill has readily adopted the energy saving concept of our AHEAD-1.5S tissue machine. The energy saving technology at the core of this design has been successfully running in tissue mills for over a decade now, especially in Asia."
C.A.S. Paper Mill Co is part of the Charoen Aksorn Holding Group (C.A.S. Group). Established in 1963, the group is a well-known paper trading company in Thailand. In 2013, it acquired a newsprint mill which had been operating since 1994, from Norske Skog (Thailand), and is now known as C.A.S. Paper Mill. C.A.S. Paper Mill operates Singburi mill, a pulp and paper mill situated in Sing Buri, Thailand.

ISRAEL

Shaniv Paper Industries increases capacity

Shaniv Paper Industries has boosted its production capacity after investing in the rebuild of its TM1. Supplied by A.Celli Paper, the rebuild was successfully completed with start-up of the machine in early October. The operation included the supply of a new reel, an innovative DCS system, a more efficient set of motors, renewed roller equipment and the relative drives. The Yankee Dryer was also insulated by shielding the heads with a layer of coating.
The project allowed the machine to reach the speed of 1,500mpm for the production of high quality tissue paper.
Shaniv Paper Industries is Israel's second largest producer in the household paper products industry.
It was established in the early 90's in the city of Ofakim.

C.A.S. Paper Mill has increased its production capacity after investing in an AHEAD-1.5S tissue line. Supplied by Toscotec, delivery is scheduled for 2019 and the start-up for the first quarter of 2020.

Sustained growth: *Lucart's AHEAD-2.0S TM will increase the Porcari mill's production capacity by 125tpd*

ITALY

Lucart targets premium market with latest investment

Lucart has started up a Toscotec-supplied AHEAD-2.0S tissue machine and a TT WIND-H slitter rewinder at its Porcari mill in Lucca.

The machine has a paper width of 2.8m, an operating speed of 2,000m/min and will produce 125tpd.

It features a shoe press TT NextPress, a second-generation TT SYD Steel Yankee Dryer, gas-fired TT Milltech-DYH hoods, and a new pope reel.

The forming section of the AHEAD-2.0S machine is designed for future integration of TT S-Crescent technology.

The scope of supply also includes erection supervision, commissioning, start-up assistance and personnel training programmes.

Massimo Pasquini, chief executive of Lucart, said: "Our sustained growth is driven by careful investments.

"We set the highest standards for our suppliers when it comes to environmental protection."

He added that the Toscotec technology offers energy-efficiency advantage.

He said: "Another important consideration for this choice was tissue quality. This line will be dedicated to premium products, with higher bulk and superior hand feel."

Lucart has voluntarily undergone an Environmental Impact Assessment (EIA) for the AHEAD-2.0S project, in order to improve the environmental performance of its new production line that replaced an existing MG paper machine.

Tissue producer Fapajal has boosted its production capacity after investing in a E-WIND T80S rewinder. Supplied by A.Celli, the rewinder is modular and fully automated, running at 1000mpm, with built-in electrical cabinets.

PORTUGAL

Fapajal increases capacity with rewinder investment

Tissue producer Fapajal has boosted its production capacity after investing in a E-WIND T80S rewinder.

Supplied by A.Celli, the rewinder is modular and fully automated, running at 1000mpm, with built-in electrical cabinets.

According to the supplier, it is "capable of managing products that involve a specific volume, diameter and cutting format while also guaranteeing extra capacity during production peaks".

Fapajal has a paper-making tradition dating back to 1755 and is headquartered in São Julião do Tojal, Loures.

Buckman announces North American price hikes

Buckman has increased the cost of its freight pricing for the pulp and paper industry in North America.

Effective 1 November, the increases are:
- Buckman-arranged bulk tank truck orders – \$.02 – \$.04/lb.
- Buckman-arranged IBC/drum truck orders – \$.02/lb.

The company said the change is "being driven by the continued shortage of drivers, limited capacity of truck and rail carriers, new freight regulations and rising cost of fuel".

BRAZIL

Suzano Pulp and Paper merges with Fibria

Suzano Pulp and Paper has gained approval from the European Commission to merge with Brazilian eucalyptus pulp producer Fibria.

The combination of the two companies will be concluded on 14 January 2019.

The restructuring will create Brazil's fourth most valuable company (excluding financial institutions).

Chief executive Walter Schalka said: "We are about to transform a dream into reality and set a true milestone for Brazil.

"We will combine the best operational and sustainability practices of the two companies, the best professionals and the most important innovation projects in renewable resources."

Once the corporate restructuring is concluded, the company will have a new brand, changing its name to Suzano.

Schalka will lead the company as chief executive.

Suzano will have an annual production capacity of 11 m tonnes of market pulp and 1.4 million tonnes of paper.

It will have 11 manufacturing units with the capacity to supply more than 90 countries and to ship exports worth R\$26bn.

The transaction will be concluded in accordance with the plan announced on 16 March 2018 when the merger agreement was signed.

Marcelo Castelli – Fibria's president and chief executive officer – will be the new global chief executive of Votorantim Cimentos after the conclusion of the Fibria and Suzano transaction, effective February 1, 2019.

JAPAN

Marutomi Group boosts capacity

Marutomi Group has invested in two MODULO-PLUS ES tissue lines. Supplied by Toscotec, the machines will be installed at Marutomi Paper's mill and at Ono Paper's mill in Fuji city, Shizuoka, Japan. Start-up is scheduled for the first and second half of 2019.

The scope of supply includes two MODULO-PLUS ES (Energy Saving) tissue machines featuring a second generation Steel Yankee Dryer TT SYD, steam-heated hoods TT Milltech-DYH, and the shoe press TT NextPress.

Each of the MODULO-PLUS ES machines has a sheet width of 2.8m, an operating speed of 1,500m/min, and an annual production of over 22,000 tonnes.

The scope is the same for both machines and comprises Toscotec's patented TT SAF (Short Approach Flow) system, a pope reel automatic shaft return system, an in-line shaft puller and the tissue machine's dust and mist removal systems.

Toscotec will supply its proprietary Distributed Control System TT DCS, which was developed specifically for these projects on a Mitsubishi platform, in cooperation with the Japanese Corporation.

Takeo Sano, president of Marutomi Paper Co, said: "We have been running a TT SYD for four years now and are very impressed with its performance.

"We have very high expectations in terms of both product quality and energy efficiency."

This is a repeated order for Toscotec, which supplied a Steel Yankee Dryer TT SYD-12FT to Marutomi Paper in 2013.

Capacity boost: *Two MODULO-PLUS ES tissue lines are due for start-up during 2019 at Marutomi Paper's mill and at Ono Paper's mill in Fuji city, Shizuoka, Japan. (Artist's impression).*

Sofidel America: *the latest investment is designed to produce an extra annual production capacity of over 80,000 tonnes*

AMERICA

Sofidel America boosts capacity in Oklahoma

Sofidel America has invested in two AHEAD-2.0L tissue lines at its new integrated mill in Inola, Oklahoma. Supplied by Toscotec, start-up is scheduled for the last quarter of 2019 for PM1 and for the first quarter of 2020 for PM2. The supply includes two AHEAD-2.0L tissue machines equipped with second generation TT SYD and gas-fired TT Milltech-DYH Duosystem Hoods; each AHEAD-2.0L machine features a sheet trim of 5.5m and an operating speed of 2,000m/min, and is designed for an annual production capacity of over 80,000 tonnes.
The project's turnkey scope includes the boiler plant, the compressed air station, the bridge crane, the shaft puller, the roll handling and wrapping systems, the chemical preparation system, the hall ventilation system and the water treatment system (Fresh Water Treatment Plant and Waste Water Treatment Plant). The two tissue lines will produce toilet paper and towels and will process 100% pre-dried virgin pulp. Construction of the plant started in March 2018 and will be completed by mid-2020.

Orchids Paper announces amended agreement with creditors

Orchids Paper has reached an agreement with its creditors, amending its credit agreement. The news comes in light of the company's ongoing efforts with interested parties in terms of its sale. The company has previously disclosed its initiative to refinance its existing debt obligations, as well as to explore alternative financing and capital-raising activities in order to address its ongoing liquidity needs.
Jeff Schoen, president and chief executive, said: "Our lenders continue to support and maintain access to the liquidity needed to operate our business.
"On 20 November, we executed modifications to our credit facilities to increase the amount available under our revolving line of credit by $5.9m and to defer future principal and interest payments to 31 December 2018.
"In addition, the amended agreement extends the milestone dates to execute a transaction to 31 December 2018. At the end of the third quarter, the company had $5.1m of cash on hand."
Additionally, Orchids has also won a significant bid with a new customer to supply 100% recycled ultra-premium quality tissue.
Schoen added: "We recently won a significant bid from a national supercentre retailer as the sole supplier of 100% recycled ultra-premium

Orchids Paper has reached an agreement with its creditors, amending its credit agreement. The news comes in light of the company's ongoing efforts with interested parties in terms of its sale.

kitchen towel and bath tissue supporting the sustainable product channel, which will be serviced out of our Barnwell facility using QRT paper.
"We expect this business to begin shipping in March 2019 and to make a significant contribution to the overall profitability of the company."
Orchids Paper Products Company is a national supplier of high quality consumer tissue products primarily serving the At-Home private label consumer market.
It produces a full line of tissue products including paper towels, bathroom tissue and paper napkins to serve the ultra-premium quality market segments from its operations in northeast Oklahoma, Barnwell, South Carolina and Mexicali, Mexico. The Company provides these products primarily to retail chains throughout the United States.

Cascades boosts converting capacity with $58m Wagram investment

Cascades will invest in its Wagram, North Carolina site, and install five new state-of-the-art converting lines and modernise its four existing lines. Commissioning of the new converting lines is expected to begin in April 2019 and will be finalised in the first quarter of 2020. The company was unable to officially confirm which converting machinery supplier was involved in the investment at this time.
Sixty-six full time employees will also be hired to operate the equipment.
The Wagram plant produces hand towels, paper towels, bathroom tissue and napkins marketed under the Cascades PRO brand, which serves the AfH markets.
The plant will be largely supplied by the Cascades tissue plant located 30 miles away in Rockingham.
Upon completion of the $58m project, the Wagram plant converting capacity will increase from 5.3m cases per year to close to 15m cases per year, resulting in a global capacity addition of three million cases for the group.
Mario Plourde, Cascades president and chief executive, said: "This modernisation project is directly aligned with the objectives set out in our strategic plan.
"It will not only allow us to replace ageing equipment with modern and efficient technology, but will also improve our integration rate, increase our geographical footprint and extend our ability to serve our customers in the United States.
"With today's challenging market conditions, this is a crucial investment that will reduce our manufacturing and transportation costs, improve our environmental footprint and more importantly, bring us closer to our customers."

Cascades will invest in its Wagram, North Carolina site, and install five new state-of-the-art converting lines and modernise its four existing lines. Commissioning of the new converting lines is expected to begin in April 2019

SPAIN

ICT targets high quality tissue production with investment

ICT Iberica has started up the company's fifth Valmet-supplied Advantage DCT tissue line.
The Advantage DCT 200HS machine includes an extensive automation package and was successfully started up at the company's mill in Burgo, Spain.
It will add 70,000tpy of high-quality toilet, towel, facial, and napkin grades for the European market.
Valmet has previously delivered four tissue lines to ICT companies in Italy, France and Poland.
For the Burgo mill, the scope of delivery comprised a complete tissue production line including a stock preparation system and an Advantage DCT 200HS tissue machine.
It also included a two-layer OptiFlo Headbox, Advantage ReTurne energy recovery system, Advantage ViscoNip press and Advantage SoftReel reel, as well as Advantage AirCap hood, steam generator and a complete mill equipment system from bale handling to fan pumps.
ICT Group has been in the tissue business since 1978 and is a European market leader, specialising in premium products.
ICT Group operates ten paper machines in four European countries and its global production capacity currently amounts to about 540,000tpy, which will increase to 610,000 tonnes by the end of 2018 when the latest investment in Spain will be completed.

Valmet has previously delivered four tissue lines to ICT companies in Italy, France and Poland. For the Burgo mill, the scope of delivery comprised a complete tissue production line.

Substantial investment: *APP has now started up all eight of its Toscotec-supplied AHEAD-2.0L PRODERGY TMs in Indonesia*

INDONESIA

APP Indonesia boosts capacity with four TM start-ups

Asia Pulp and Paper (APP) has started production on the remaining four of its eight Toscotec-supplied AHEAD-2.0L PRODERGY tissue machines.
Based at its OKI mill, South Sumatra, the four lines started production ahead of schedule – in just 60 days – between 14 August and 14 October 2018.
They are part of a contract with the supplier that has now seen eight TMs started up by the tissue giant. Each of the eight machines have a paper width of 5.6m and an operating speed of 2,000m/min. They feature a second-generation TT SYD Steel Yankee Dryer of 22 feet diameter, which represents the biggest diameter for tissue application worldwide.
The first two AHEAD-2.0L PRODERGY machines were started up at Perawang mill in the first quarter of 2018, and the following six machines at OKI mill in the second and third quarters of 2018.

Based at its OKI mill, the four lines started production ahead of schedule – in just 60 days

INDIA

Bashundhara Paper Mills boosts capacity

India's Bashundhara Paper Mills has started-up its Andritz-supplied turnkey PrimeLineCOMPACT VI tissue production line at its site in Bangladesh.
It has a design speed of 2,100m/min and a paper width of 2.85m and produces tissue for high-quality facial wipes, toilet paper, and napkins.
The 16ft. PrimeDry Steel Yankee is made entirely of steel, which the supplier said enables "high and efficient drying performance".
For Andritz, it is its first high-speed tissue machine to be installed in Bangladesh.
The tissue production line is equipped with its PrimeControl automation system for a high-performance production process.
For the first time, the company has also supplied a multi-motor drive (MMD) system with active line modules (ALM), designed for feeding energy back into the grid as a renewable energy solution.
The scope of supply also included the complete stock preparation plant with approach flow system, fibre recovery and broke handling.

High-quality offer: *the start-up team at India's Bashundhara Paper Mills site in Bangladesh*

Germans are serious about sustainability, and it's driving the nation's tissue performance

The economic powerhouse has slowed of late, but despite European regulatory changes underway – fibre costs, exchange rates, environmental targets – Germany's strong costs base points towards continued strength.

The German tissue business has a long history, beginning with a patent on a paper handkerchief registered in January 1929 by Nuremberg papermaker Oskar Rosenfelder. He also trademarked the Tempo trademark in Germany which became eponymous like the Kleenex brand in the United States. Germany developed a strong tissue industry and consumer culture with recognisable features like a preference for multi-ply and robust tissue sheets.

Germany currently enjoys a strong economic position in Europe to go with its early start in the tissue business. However, economic growth rates have moderated. Figure 1 shows a cumulative average growth rate (CAGR) of 1% population growth for the 2012-2017 period and CAGR of 2% growth in GDP. Unemployment fell from 5.4 to 3.8% over the same period. Germany is a major exporter of high value-added goods.

Although the country's population is growing very slowly, there is still room to increase tissue consumption per person. The average German consumer uses about 19kg of tissue per person compared to almost 23kg in Sweden or 16.5kg in the United Kingdom. These are high consumption rates compared to global standards, but slightly below the 24.5kg consumption seen in the United States. Increased per capita consumption rates in developed economies tend to come from increased use of existing products, such as household paper towels, as opposed to new tissue formats.

Germany maintains a slight surplus in global tissue trade. Figures 2 and 3 show the progression of its tissue exports and imports in finished metric tonnes (FMT) over the most recent five-year period.

Its world tissue exports amount to 31% of its total production capacity almost in balance with imports at about 29% of total production. Furthermore,

C F Bruce Janda

Senior consultant,
Fisher International

this trade is about 98% focused on Germany's neighbours in western and central Europe. Figures 4 and 5 provide Pareto charts showing tissue imports and exports valued in Euros averaged over the past five years.

Most of the top trading partners that

Germany enjoys a strong economic position in Europe to go with its early start in the tissue business. However, economic growth rates have moderated. Figure 1 shows a cumulative average growth rate (CAGR) of 1% population growth for the 2012-2017 period and CAGR of 2% growth in GDP.

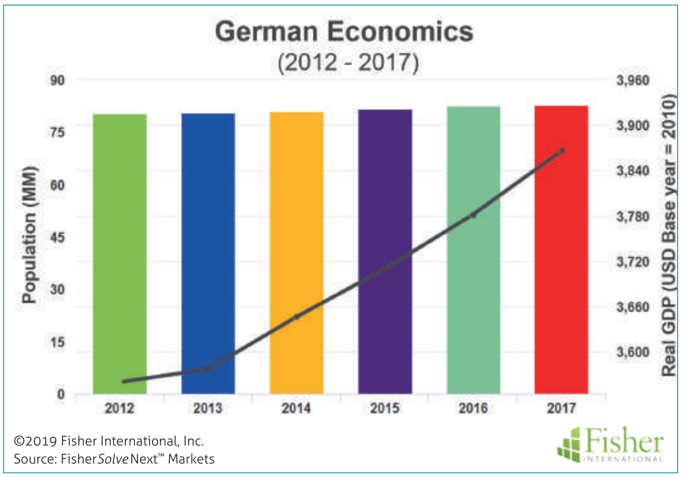

***Figure 1:** German economics*

***Figure 2:** German tissue exports to the world*

account for over 80% of the tissue trade are immediate neighbours with relatively stable two-way trade. This is important in the analysis of Germany's tissue business as it shows a focus on domestic markets with balanced tissue trade.

Tissue formats are focused on consumer bath and towel, as shown in Figure 6. Commercial or AfH tissue products account for about 12% of current production.

Overall tissue furnish is shown in Figure 7. Recycled fibre makes up about 37% of the total. German tissue makers purchase approximately 35% of tissue fibre, producing the rest on site. The first mix diversity and tissue mill fibre integration provide a stable base for the continued future of tissue production.

Tissue furnish is further broken out by grade in Figure 8. Both specialty and commercial tissue grades use significant percentages of recycled fibres, but the large consumer grade recycled consumption outweighs these amounts.

The country's tissue manufacturing capacity also includes several machines with advanced tissue technology such as TAD. About 12% of tissue capacity is advanced technology. This is a much smaller proportion than in the United States.

Figure 9 shows that product distribution for advanced tissue technology is focused on retail towel and commercial bath tissue. TAD is well known for superior retail kitchen towels around the world, but the German focus on commercial bath shows the differences in consumer preference for toilet tissue products strength and multiple plies and advanced technology between Europe and North America. TAD commercial bath appears to make more sense in Germany than the United States. In the United States, retail bath tissue is the TAD or advanced technology target kitchen towels.

The slow growth in Germany's tissue consumption has limited capacity additions. Only two tissue machines were added in the 2007-2008 period, and one machine was shut down in 2015 with no further additions planned. The net effect is a gain of only one machine in the past 12 years.

With that in mind, it's important to take a look at the relative quality or competitiveness of Germany against relevant benchmarks. Figure 10 plots the average machine speed versus average machine technical age for Germany's

Figure 3: *German tissue imports from the world*

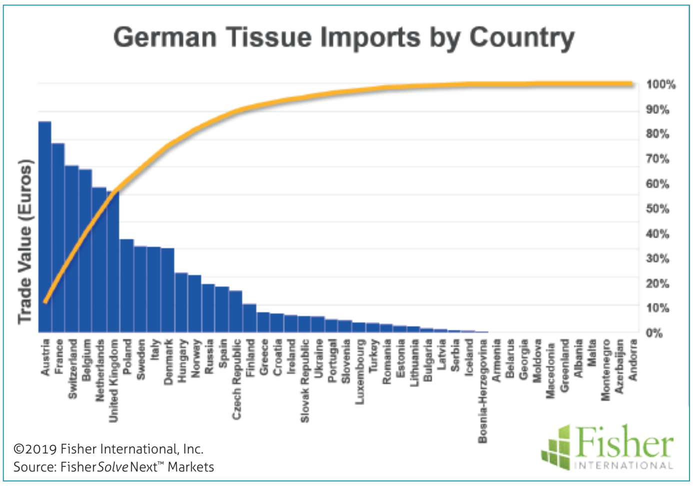

Figure 4: *German tissue imports by country*

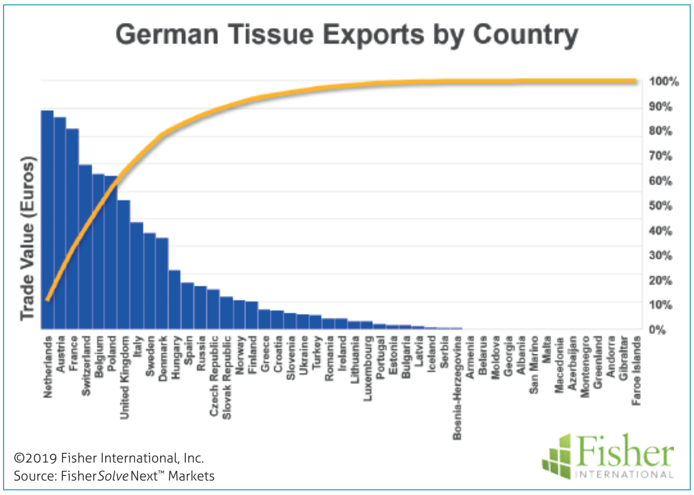

Figure 5: *German tissue exports by country*

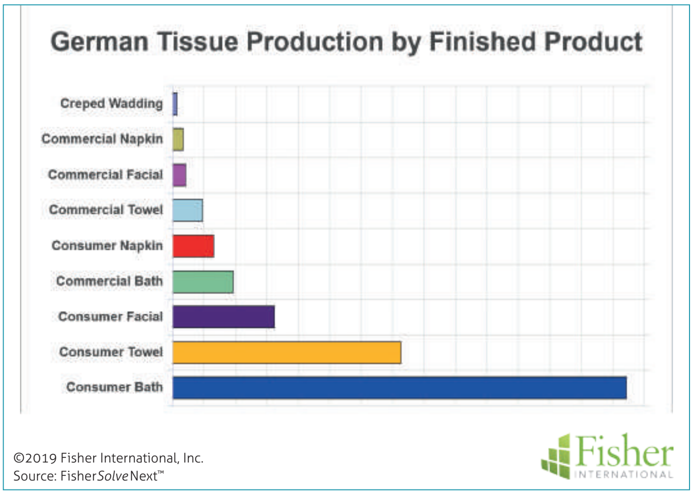

Figure 6: *German tissue production by finished product*

By Fisher International's **Bruce Janda**

immediate neighbours. The United States was also included to provide a broader reference point. The size of the bubbles represents the relative capacity of each country. Germany's average tissue machine is faster than all of the reference countries. Its average technical machine age of about 21 years is more up-to-date than every country plotted except Italy. Its average tissue capacity looks very strong by this measure.

Water and energy represent key sustainability goals for all paper production. German consumers are perhaps more focussed on environmental and sustainability issues than any other nation. The next two charts provide a comparison of the tissue business to the same local trading partners and the United States. Figure 11 plots the average water risk for each tissue machine versus the average water required to make a tonne of tissue. Germany has a very low water consumption rate compared to every country except Switzerland. Sweden has the lowest overall water risk and perhaps not surprisingly, slightly higher water consumption per tonne.

Water and energy represent key sustainability goals for all paper production. German consumers are perhaps more focused on environmental and sustainability issues than any other nation.

The outlier is the United States with an average risk equivalent to Germany but several times more water consumption per tonne of tissue produced. Germany appears to be well positioned on a water sustainability metric.

Energy is the other key sustainability metric. Figure 12 provides a comparison of the same reference set of countries as Figures 10 and 11. German tissue making average energy consumption per tonne is in the middle of its immediate neighbours and trading partners. Like the previous water efficiency and risk chart, the United States data is provided as an out of area reference. Here we see a much higher energy consumption per tonne of tissue production in the United States where energy is relatively inexpensive by Europe standards.

The average cash cost to produce a tonne of tissue for Germany and the reference set is shown in Figure 13.

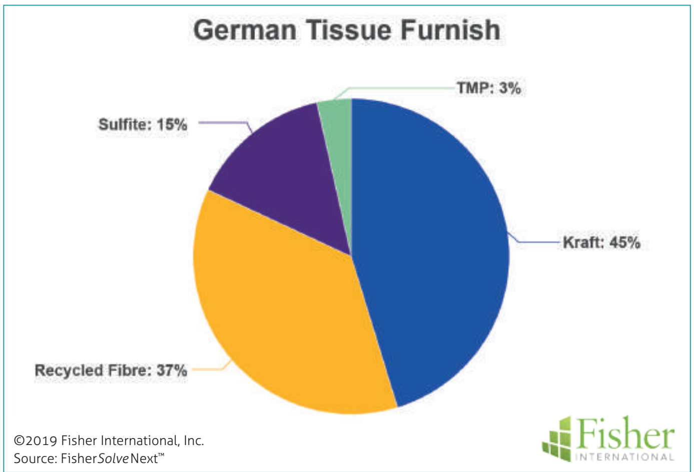

Figure 7: *German tissue furnish*

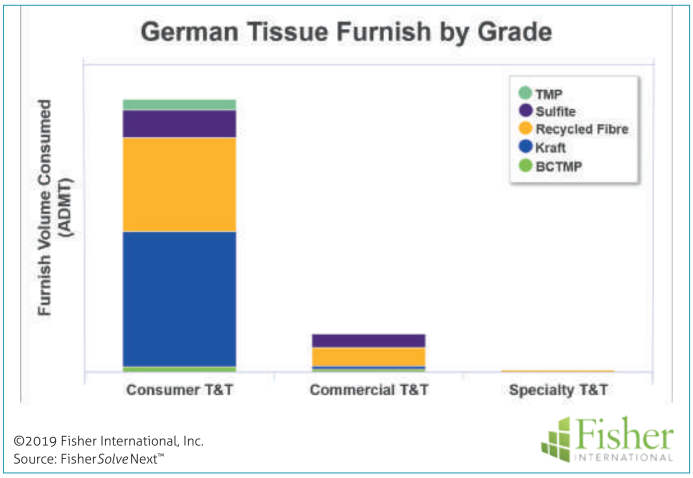

Figure 8: *German tissue furnish by grade*

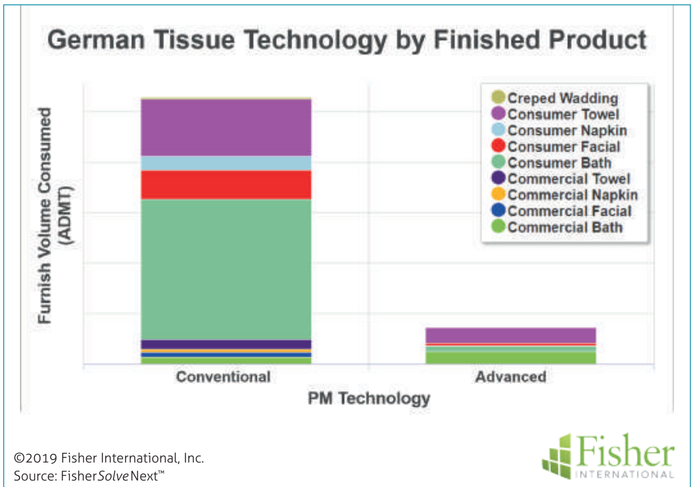

Figure 9: *German tissue technology by finished product*

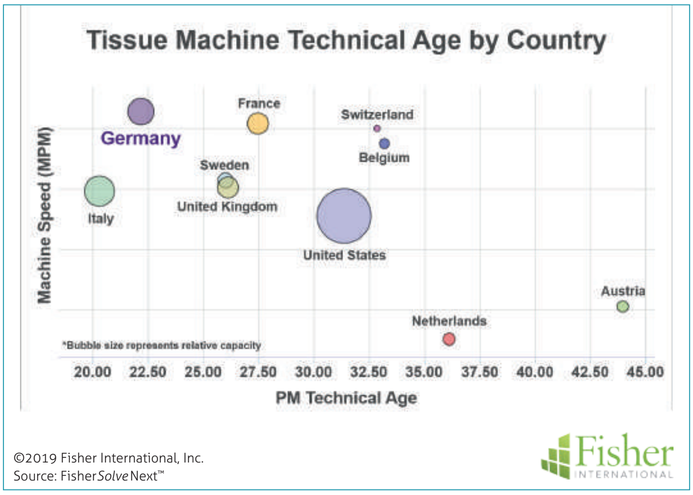

Figure 10: *Tissue machine technical age by country*

Fisher

By Fisher International's **Bruce Janda**

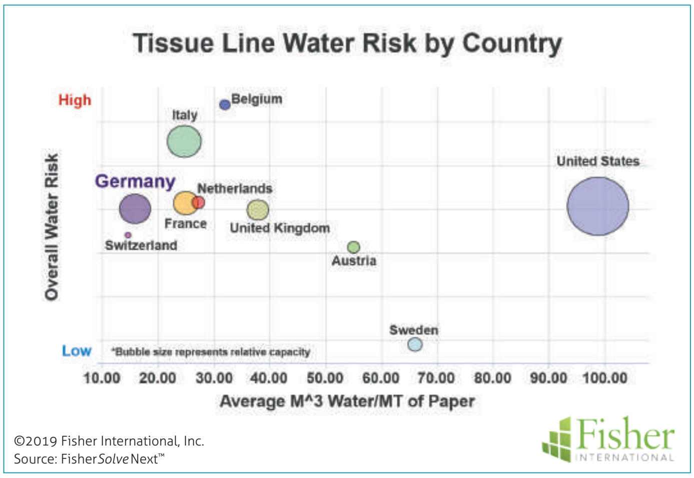

Figure 11: *Tissue line water risk by country*

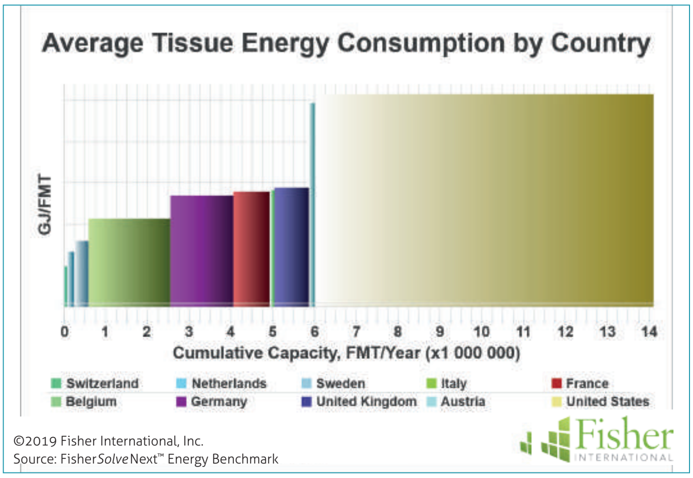

Figure 12: *Average tissue energy consumption by country*

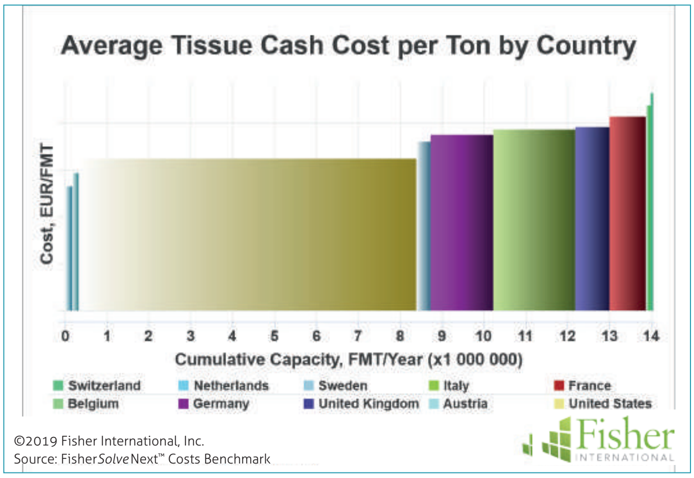

Figure 13: *Average tissue cash cost per tonne by country*

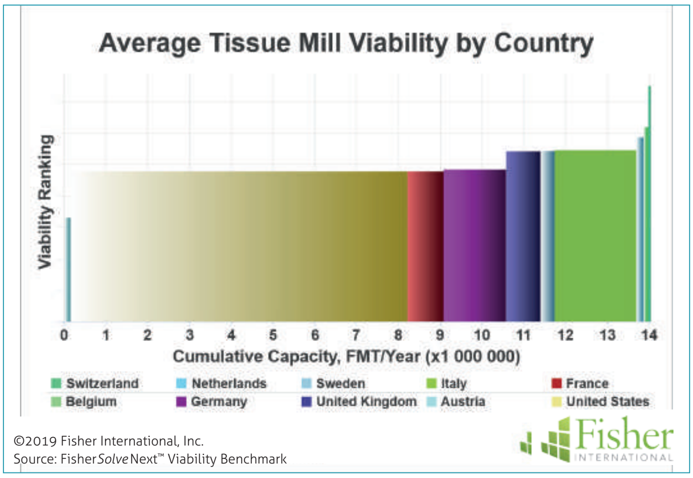

Figure 14: *Average tissue mill viability by country*

Germany is in a lower cost position to the other major European producers of Italy, France, and the United Kingdom. The lower reference costs of the United States tissue business reflect lower energy costs and the benefits of a more significant percentage of integrated tissue mills.

Figure 14 provides a look to the future by calculating an index from key business sustainability factors. Germany again looks very strongly positioned for a successful future.

While this article took a snapshot of Germany's tissue industry today, there are trends underway that will change it. Fibre prices, exchange rates, and environmental regulations will change, giving some participants advantages and others difficulties; tissue companies will continue to change hands and perhaps consolidate; neighbouring countries may invest in tissue making capacity, affecting Germany's exports; consumer preferences will continue to evolve, making TAD either more important or less – and future pulp and energy prices will affect TAD adoption, too.

About Fisher International, Inc.

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Fibre prices, exchange rates, and environmental regulations will change, giving some participants advantages and others difficulties; tissue companies will continue to change hands and perhaps consolidate; neighbouring countries may invest in tissue making capacity, affecting Germany's exports.

Consumer tissue in Germany: maturity, private label pressures, and value-added innovation

With nearly 11kg per capita retail tissue consumption in 2017, Germany is the third most saturated market in Western Europe, just behind Ireland and Austria. Subsequently, the demand for tissue and organic growth have been slow, with retail sales expected to register a volume CAGR of just 0.7% between 2017 and 2022.

Furthermore, there is very little unmet market potential in Germany, with estimated potential for incremental sales set at USD634 million in value and 189,000 tonnes in volume, compared to total retail consumer tissue volume sales of 875,000 tonnes and USD2.7 billion in value terms in 2017.

Weak fundamentals and pressure for private label

The high per capita consumption suggests that use patterns are already well-established on the market. Consequently, demand is set to be largely driven by fundamentals like population growth and GDP growth in the coming years. Since annual population growth in Germany remains below 1% - and is expected to slow down even further in the next five years - there is little scope for the population to boost demand for retail tissue in the country. Improved GDP projections though, might help consumers feel more confident and spend more on value-added products.

In addition to structural challenges, another factor is putting considerable pressure on value sales growth of retail tissue in Germany, namely, a strong presence of private label. Price elasticity being very high in retail tissue, most consumers do not show a high degree of brand loyalty and tend to look for products with the best prices and discount offers. Subsequently, Germany has the highest share of private label retail tissue in Western Europe, which stood at 73% in 2012 and further increased to reach nearly 75% in 2017 in value terms.

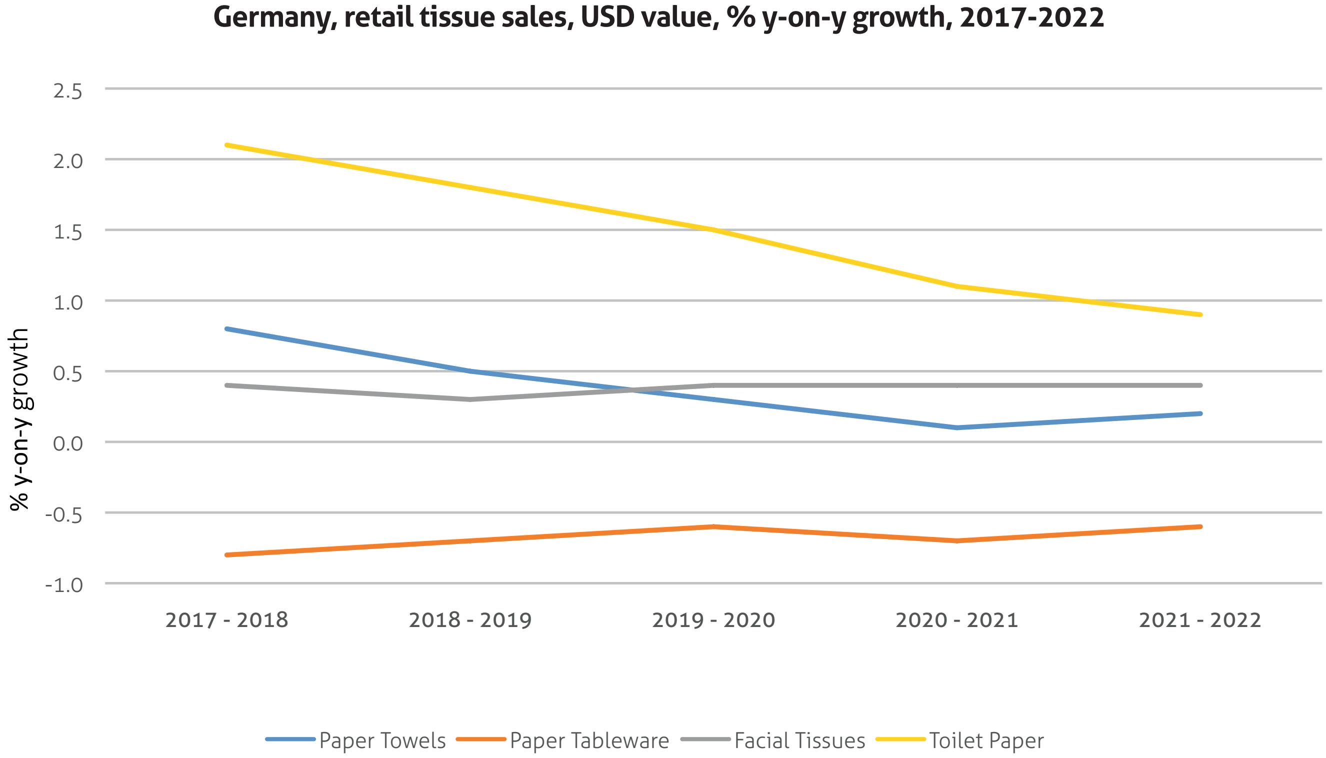
C E Manon Quillere

Analyst,
Euromonitor International

Broadly speaking, the competitive landscape for retail tissue in Germany shows a high level of concentration in the hands of three key retailers marketing strong private label portfolios, namely Aldi, Lidl, and Edeka Zentrale. Private

Source; Euromonitor International Industry Forecasting Model

By Euromonitor International's **Manon Quillere**



Source; Euromonitor International

label tissue products sold by these three leaders together accounted for 47% of consumer tissue value sales in 2017.

Even though private label lines continue to highlight low prices, these days they also do not significantly vary from renowned brands in terms of quality and efficiency in handling household tasks. Leading drugstore chains such as dmDrogerie Markt or Rossmann for example increasingly offer sophisticated and innovative tissue products with value-added features, including also a variety of designs and scents.

Encouraging GDP forecast can help value sales grow

Socio-economic changes can benefit the performance of retail tissue in Germany. Indeed, GDP per capita amounted to USD43,594 in 2017 and is set to grow at an average annual rate of 2% over the forecast period, to reach USD48,104 in 2022. In addition to relatively dynamic GDP growth, the unemployment rate is projected to remain below 4% over the forecast period. Those elements are likely to create further potential and can entice German consumers into purchasing more value-added products instead or in addition to mere essentials.

Healthy GDP growth and consumer confidence can also provide a better platform for recently announced consumer tissue price increases by the industry leaders like Essity, which can help to add to the tissue industry's revenues.

Toilet paper to be the best performing category in coming years

While a high volume growth rate in the coming years is unlikely, due to already high per capita consumption and slow population growth, some product categories hold more potential than others in value terms. This is the case of toilet paper, for instance, which registered 4% value growth in 2017 and is set to record a 1% CAGR in value terms over the forecast period.

This growth is expected to be driven by higher quality value-added tissue products. Some German consumers, especially those who are less price sensitive, appreciate products that they see as offering higher levels of softness and cleanness, usually with 3-ply paper as the minimum, but 4-ply and even 5-ply products. Additional features such as a subtle scent or appealing print often add enough value to convince some consumers to opt for slightly more expensive products.

Value growth opportunities within moist toilet wipes?

With limited growth opportunities in retail tissue, tissue and hygiene manufacturers have been making significant efforts to encourage consumers to use a wider range of products. They notably launched numerous advertising campaigns to raise further awareness around moist toilet wipes.

Additionally, they increased the selection of products available in this category across price ranges, including private label. Subsequently, growing numbers of consumers use moist toilet wipes in addition to dry toilet paper. Retail sales of moist toilet wipes in Germany recorded a 4% value CAGR over 2012-2017, and the growth is expected to continue at a healthy rate in the coming years.

German consumers are eager for innovation – and are prepared to pay

Italian tissue giant Sofidel's German sites offer a blueprint for its business strategy globally. Here, TWM meets Andreas Meyer and Domenico D'Angelo to get the latest in Europe's most price sensitive and competitive tissue market.

Helen Morris

Senior editor, Tissue World magazine

Andreas Meyer - the friendly and charismatic country operations manager of Werra Papier Wernshausen, one of two German tissue sites owned by Sofidel – greets TWM at Stendal station, located an hours drive west of Berlin.

We drive on to Arneburg, where the company's 300,000m2 mill is located alongside the Elbe river. It is, as Meyer adds, "in the middle of no-where", yet also perfectly placed to serve the substantial demand for tissue products from the neighbouring cities of Berlin, Hanover, Hamburg, and beyond.

On-site: *Country operations manager Andreas Meyer at the impressive 60,000tpy Arneburg plant*

Meyer oversees at both of Sofidel's German sites (the other one being the Werra Papier Holding paper mill and converting plant in Wernshausen).

Within Europe currently, Sofidel takes the number two position, second only to Essity. And its German sites are key in its European strategy.

Established in 2004, the Arneburg plant now has 360 staff and in 2017 reached a paper manufacturing capacity of around 60,000 tonnes. It is home to a 5.6m Metso Paper cast iron Yankee PM which has a design speed of 1.900m. min, and has achieved 2,000m/min.

Of the products made on site, 80% are for private label while the remaining 20% is Sofidel's own brand. Its pulp storage capacity is 15,000 tonnes.

It produces mainly 3 or 4ply, some 5 ply also, all mainly white, and all the "very good quality" products that are in high demand in the German market, and "very different compared to the French market where 1ply is very popular", Meyer adds.

Of the products made on site, 80% are for private label while the remaining 20% is their own branded products. Its pulp storage capacity is 15,000 tonnes.

By Tissue World senior editor **Helen Morris**

Target markets: *the site produces high-quality, large diameter products in response to local demand*

"The products that are popular in Germany are all big in diameter and also packaged in very big packs."

Environment is also key and the site has a range of certifications including: ISO 9001:2000, FSC, PEFC, IFS Household and Personal Care Products, ISO 14001 and 50001, and OSHAS.

Turnover in 2017 was €135m and the site exports to key countries including France, Switzerland, Poland and Austria. It also produces products for the Scandinavian market.

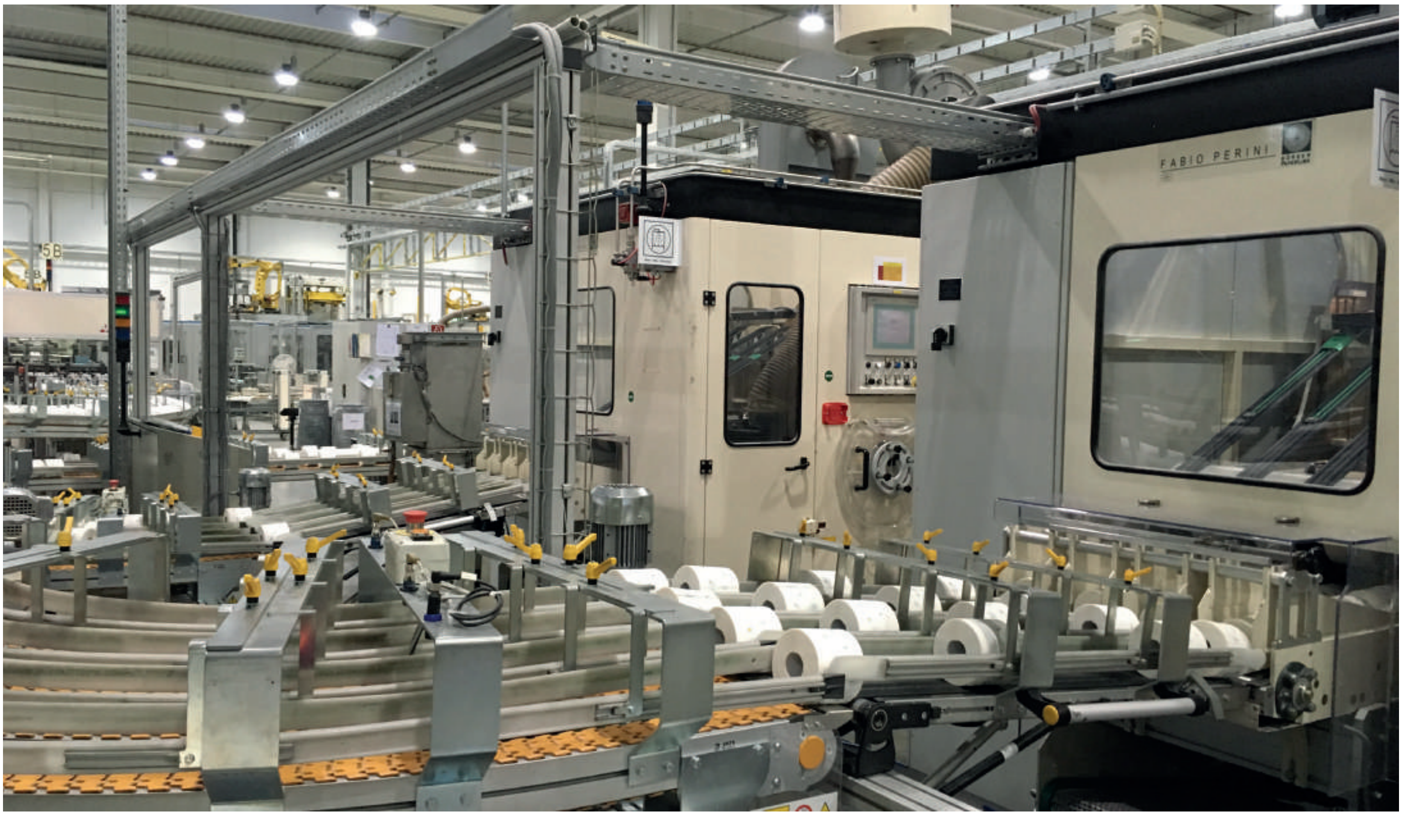
When TWM last visited the country for our Report in 2014, Germany's private label share for toilet paper was 84%; now, it's 87% while for kitchen towel it's 83%. "Tissue demand here is steadily increasing," Meyer says. "It's around 1.6% year-on-year and we expect that to continue. The AfH market in Germany is also very strong and stable, and a key focus for us."

"While we don't have plans in the near future for big investments here, we do have enough space to build the same again. For now, we are continuously making a lot of small improvements. Every year we need to improve, it is a key part of our strategy here in Germany as well as across Europe. Our aim is always to decrease our energy consumption. We do have a lot of space here which is very good for us because the whole building is very big and efficient to run."

"For now, we are continuously making a lot of small improvements. Every year we need to improve, it is a key part of our strategy here in Germany as well as across Europe. Our aim is always to decrease our energy consumption."

Andreas Meyer

Product variety: *Of the products made on site, 80% is for private label while the remaining 20% is Sofidel's own brand products (see page 29).*



Responding to customer demands: *the Arneburg site has invested in technology to produce products with a homogenic appearance for the German market*

Q&A: Domenico D'Angelo, line of business director – private label, Sofidel Germany.

TWM/1: What are the main opportunities for Sofidel in Germany's tissue markets?

"The main opportunities are related to innovation. That's how we can create more value in a mostly price-driven industry, with the possibility to enlarge the market size as such. Just to give you an example: if you succeed to launch a household towel to be used outside the kitchen, you have created a new market that simply did not exist before."

TWM/2: What are the main challenges?

"Understanding the consumer needs is key for the German market, as well as for other national markets. The combination of innovation and the ability to meet these needs drive the set-up of new products. For example, thanks to the brand new winding technology Constellation – already equipped in several of Sofidel's production lines – we are able to produce rolls (both kitchen towel and toilet paper) which have an absolute homogeneous appearance, enhancing the overall quality of the product. The consumers have shown appreciation for this improvement, and are willing to pay more for it."

TWM/3: Are you seeing flat demand for tissue products in Germany, how are you dealing with that?

"We are focusing on innovation, developing our products to stand out from competition and finding new market niches. That's what we made with Softis toilet paper, developing a brand new air bubble system guaranteeing more softness, or launching a new household towel to be used outside the kitchen."

"Understanding the consumer needs is key for the German market, as well as for other national markets. The combination of innovation and the ability to meet these needs drive the set-up of new products. For example, thanks to the brand new winding technology Constellation – already equipped in several of Sofidel's production lines – we are able to produce rolls which have an absolute homogeneous appearance"

Domenico D'Angelo

By Tissue World senior editor **Helen Morris**

TWM/4: Is demand for environmental products increasing, and how are you responding to this?

"German consumers' awareness for the environment is vital and growing, focusing not only on raw materials but on the whole production process, logistics included. Sustainability is key for the Sofidel Group, having in place strong policies to reduce carbon emissions, to source 100% certified pulp with independent forest certification schemes (FSC, FSC Controlled Wood, SFI, PEFC), and to optimise the use of water, limiting its consumption within the production processes."

TWM/5: What are the main tissue consumer trends you're seeing?

"We can see the market is keen for new, innovative products whose USP is distinctive for consumers. In this regard, New Tissue Technology (NTT) will be a key technology allowing us to launch new products characterised by unexperienced softness, thus being very resistant."

TWM/6: How have the economic conditions in Germany presented opportunities and challenges for you?

"We have experienced that the German tissue market is the most price sensitive and competitive in Europe. Especially for standard products, such as a 10-roll toilet paper pack or the 4-roll kitchen towel, you will hardly find lower prices anywhere else. That's a challenge we have to face to grow significantly in the market."

"We can see the market is keen for new, innovative products whose USP is distinctive for consumers. In this regard, New Tissue Technology (NTT) will be a key technology allowing us to launch new products characterised by unexperienced softness, thus being very resistant."

Domenico D'Angelo

TWM/7: How are you aiming to grow in Germany?

"Standing out from the crowd focusing on innovation. Alternatively, the only other opportunity to grow would be launching "me-too products" with lower prices. A strategy that, at the end of the day, means destroying market value. That's not a path we want to follow."

TWM/8: What tissue trends are you seeing at the moment?

"Germany is a mature market with high private label shares, especially for toilet paper and kitchen towel. In fact, private label accounts for 87% in the former case and 83% in the latter. The handkerchiefs' market is more open to brand products, with a private label share of 61%, even though growth margins are minimal. Instead, a growth opportunity comes for the kitchen towel market, increasing 4.1% last year: this means that consumers are starting to use kitchen towels for other purposes, and this represents a consistent drive of growth and product innovation."

Brands v private label: *a selection of the company's branded product offering*

In balance – WEPA Group ethos mirrors Germany's stable tissue performance

A key 'produce where you sell' policy is just one of the strategies behind the consumer sector's second largest private label manufacturer. TWM talked to Hendrik Otto, chief operating officer, WEPA Group.

By Tissue World senior editor **Helen Morris**

Helen Morris

Senior editor, Tissue World magazine

TWM/1: What presence does the WEPA Group have in Germany?

"In Germany, the WEPA Group has five locations: two in North Rhine-Westphalia and one each in Rhineland-Palatinate, Saxony and Saxony-Anhalt. We operate a total of ten paper machines here with a production capacity of around 400,000 tonnes. We produce toilet paper and kitchen towels in four mills, one of which also produces towel paper and industrial rolls.

"The plant in Saxony is our competence centre for folded products such as handkerchiefs and cosmetic tissues. We are constantly investing in the expansion and modernisation of all our sites. For example, in 2015 we commissioned a new, energy-efficient paper machine with an annual capacity of 30,000 metric tonnes at our Marsberg-Giershagen mill. This site is today the largest production site in the WEPA Group with around 500 employees.

"In the consumer segment, we are the second largest private label manufacturer in Germany and supply our products to all relevant retail chains. In the AfH market, we supply both private labels and WEPA branded products, e.g. Satino, to wholesalers and specialist retailers."

TWM/2: Are you looking to grow in the German tissue market, if so, how and when?

"The German market is highly concentrated. 80% of the turnover in the consumer business is generated by the five largest retailers, all of which are supplied by WEPA with private labels. Our growth is therefore generated by the usual annual growth rates, which in Germany are around 1-2%. However, we also take advantage of opportunities to acquire further quantities when opportunities present themselves and at adequate margins.

"The situation in AfH, on the other hand, is somewhat different: Here there is still potential due to the broader customer base. Market growth in this area is also higher.

"For certain product groups, such as handkerchiefs and cosmetic tissues, we have set up competence centres from which we supply other European countries.

"Also, we are able to supply neighbouring countries from all our locations in Germany and can participate in market growth there."

TWM/3: Are you seeing overcapacity in the German tissue market? How are you dealing with this?

"There is no overcapacity in Germany, and production and sales are essentially in balance. However, deliveries from neighbouring countries lead to an oversupply, which in turn keeps prices under pressure. We generate added value for our customers with a lean cost structure, marketable qualities and additional services in the service area."

"Constant investment": *COO Hendrik Otto says the company is always expanding and modernising its sites*

First and foremost, energy supply and the corresponding price development should be mentioned. In the long term, we cannot yet predict in detail how the phase-out of nuclear and coal energy will affect Germany.

Hendrik Otto, chief operating officer, WEPA Group

TWM/4: Do you export, and if so, what percentage?

"The WEPA Group has a well-established network of production sites in Europe. If it is appropriate for logistical or production reasons, products are also sold across borders, but this is not our goal. "Produce where you sell" is particularly important for WEPA in terms of sustainability.

"We are convinced that production close to the sales markets makes it possible to run plants leaner and to optimise transport costs, especially for our high-volume goods. This makes sense from both an economic and an ecological point of view."

TWM/5: What percentage of private label products make up the Germany tissue market?

"Retailers are increasingly using their private labels as "their brand" and WEPA is supporting them with quality, concepts and service. Decades ago, we specialised in private labels and have longstanding partnerships with our customers."

TWM/6: Are environmentally-friendly products popular here, is it a key sector for you?

"WEPA is regarded as a recycling specialist among the European tissue paper manufacturers. This is an essential component of our overall sustainable orientation and a determining element of our raw material strategy, because the use of waste paper protects our forests and consumes less energy and water. The fresh fibres used by WEPA come from sustainable sources and a certified timber industry.

"For some years now, we have also been present on the market with a hybrid product that is gaining increasing market share, especially in the German consumer market. For consumers, it is first and foremost the quality in terms of softness and safety that must be right. To meet these requirements, however, it is not only the choice of raw materials that is decisive. Our Hybrid Fair Fibre concept is the intelligent combination of recycled fibres and cellulose that meet consumer demands in terms of ecology and comfort. Recent studies confirm that more than 80% of respondents like the Hybrid Fair Fibre product just as much as a pulp product in a direct comparison, whereby a Hybrid Fair Fibre product with a proportion of 30% recycled fibres has a 20% improved environmental footprint."

TWM/7: Is growth in the German tissue market flat?

"In the consumer segment, the sales market in Germany is relatively stable, with overall growth rates of around 1%. However, individual products in various categories are showing higher growth, e.g. handkerchiefs in boxes. This is based on changes in consumer behaviour. The AfH sector, on the other hand, is growing somewhat faster. This is certainly also due to the fact that people are more mobile today and hygiene requirements are also rising on the move."

TWM/8: How is the current economy impacting the German tissue market? What opportunities does this present for you?

"In Germany, the quality of tissue paper is strongly linked to the number of layers, i.e. the more layers the higher the quality of the product. When the economy is weaker and incomes fall,

products with fewer layers are more likely to be purchased and vice versa. Overall, however, the quantity of hygienic papers sold is not particularly dependent on economic development."

TWM/9: What are the main challenges for you in the next few years?

"There are certainly some challenges that we will face. First of all, there are the commodity markets. The availability of raw materials - pulp as well as recovered paper - will continue to have a considerable influence on raw material prices.

"For pulp, there is also the development of the $/EUR exchange rate, which is taken into account here in Europe. This makes it all the more important for us to gain experience with alternative raw materials or optimised fibre use in order to at least partially offset these risks.

"Unstable governments and different legislations in Europe also influence the economic success of companies. Furthermore, the challenges in the field of ecological sustainability will not result in low additional costs. First and foremost, energy supply and the corresponding price development should be mentioned. In the long term, we cannot yet predict in detail how the phase-out of nuclear and coal energy will affect Germany.

"And last but not least, there is an upcoming lack of qualified and trained personnel in Germany, especially in the logistics sector. Delivery bottlenecks can already occur today because there are no longer enough drivers for the available freight space.

"Despite all the demands and changes, however, we believe to be well positioned to meet these challenges."

TWM/10: And the main opportunities?

"Hygiene papers are daily necessities that hardly anyone in Germany and Europe wants to do without. Sales are stable, growth rates result from increasing hygiene requirements and new fields of application. The paper industry is also a sustainable industry that works with renewable raw materials and the efficient use of resources. The WEPA Group is a family-owned company in this sector and particularly well positioned in the areas of raw material, energy and water consumption with a broad range of measures to increase efficiency. We produce sustainable bulk goods and attach great importance to training and further education, occupational safety and quality and environmental management. Together with our customers in the consumer and AfH sectors, we want to develop even more sustainable products and feel very well equipped for this with our value- and return-oriented corporate culture. We accept the challenges of the market and want to successfully shape our future as an agile and sustainable family-owned company."

Project Survey

TWM's annual Projects Survey charts all new capacity being added, ordered or in final planning stages during 2018-2019, as well as noting any projects already planned for 2020. The survey is solely interested in projects that will increase tissue capacity – the numerous smaller rebuilds around the world that won't impact capacity have been excluded. 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 companies

COUNTRY	COMPANY MILL	INVESTMENT	PM NO	NEW / REBUILD	START-UP DATE	CAPACITY CHANGE (tonnes/yr)	PM TRIM (m)
Algeria	Paper Mill Investment	NA	1	New	2018	NA	2.85
Argentina	Celulosa Campana	NA	3	New	2019	100tpd	2.7
Argentina	Celupaper	Buenos Aires	5	New	2019	23400	2.75
Argentina	Celupaper	Papelera Nicaragua	4	New	2018	22000	2.75
Argentina	CMPC Zarate	Zarate	NA	New	2019	60000	5.6
Argentina	San Andres de Giles	San Andres de Giles	NA	New	2019	30000	2.8
Asia	APP	Oki	5	New	2018	60000	5.6
Asia	APP	Oki	6	New	2018	60000	5.6
Asia	APP	Oki	1	New	2018	60000	5.6
Asia	APP	Oki	2	New	2018	60000	5.6
Asia	APP	Oki	3	New	2018	60000	5.6
Asia	APP	Oki	4	New	2018	60000	5.6
Asia	APP	Perawang	2	New	2018	60000	5.6
Asia	APP	Perawang	1	New	2018	60000	5.6
Bangladesh	Bashundhara Paper Mills	NA	4	New	2018	30000	2.85
Bolivia	Confidential	NA	4	New	2019	32000	2.8
Bolivia	Papeleira Vinto	NA	3	New	2018	25600	2.8
Brazil	Araucária	NA	1	Rebuild	2019	20000	2.5
Brazil	Copapa	NA	2	Rebuild	2018	16000	2.6
Brazil	Indaial Paper	NA	5	New	2019	32000	2.8
Brazil	Mili	NA	3	New	2019	21600	2.4
Brazil	Ouro Verde	NA	1	Rebuild	2019	10000	2.3
China	Baoding YuSen mill	Baoding	2	New	2019	30000	3.5
China	Baoding YuSen mill	Baoding	1	New	2019	30000	3.5
China	Baoding YuSen mill	Baoding	2	New	2019	NA	3.5
China	Baoding YuSen mill	Baoding	1	New	2019	NA	3.5
China	Confidential	Confidential	4	New	2019	30000	3.535
China	Confidential	Confidential	3	New	2019	30000	3.535
China	Confidential	Confidential	2	New	2019	30000	3.535
China	Confidential	Confidential	1	New	2019	30000	3.535
China	Confidential	Confidential	4	New	2018	30000	3.5
China	Confidential	Confidential	3	New	2018	30000	3.5
China	Lee & Man Paper Manufacturing	Chongqing	13	New	2018	60000	5.6
China	Lee & Man Paper Manufacturing	Chongqing	15	New	2018	60000	5.6
China	Lee & Man Paper Manufacturing	Chongqing	16	New	2018	60000	5.6
China	Lee & Man Paper Manufacturing	Chongqing	17	New	2018	60000	5.6
China	Taison	Anhui	13	New	2019	60000	5.6
China	Taison	Anhui	15	New	2019	60000	5.6
China	Taison	Jiangxi	7	New	2018	60000	5.6
China	Taison	Jiangxi	8	New	2018	60000	5.6

By Tissue World Senior Editor **Helen Morris**

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asked to detail their present and future developments. It also includes first-hand knowledge gained from the many visits to tissue mills around the world for TWM's bimonthly Country Reports analysis, which during 2018 included face-to-face interviews with your peers and competitors in the USA, Mexico, Thailand, the UAE, China and Turkey.

PM SPEED (m/min)	SUPPLIER	COMMENTS
2000	Andritz	PrimeLineCOMPACT V1 (ShoePress)
1700	Recard	Crescent Former
1300	Toscotec	MODULO-PLUS
1300	Toscotec	MODULO-PLUS
NA	Valmet	Advantage DCT 200 with ViscoNip press
2000	Valmet	Advantage DCT 100 with ViscoNip press
2000	Toscotec	AHEAD-2.0L PRODERGY
2000	Toscotec	AHEAD-2.0L PRODERGY
2000	Toscotec	AHEAD-2.0L PRODERGY
2000	Toscotec	AHEAD-2.0L PRODERGY
2000	Toscotec	AHEAD-2.0L PRODERGY
2000	Toscotec	AHEAD-2.0L PRODERGY
2000	Toscotec	AHEAD-2.0L PRODERGY
2000	Toscotec	AHEAD-2.0L PRODERGY
2000	Andritz	PrimeLineCOMPACT V1 (Steel Yankee)
1600	Hergen	New Crescent Former Machine – EVO-16
1600	Hergen	New Ribbed Steel Yankee Dryer
1100	Hergen	New Crescent Former section and new steam heated hood
1200	Hergen	New Crescent Former Machine – Smart HCF 920 + press section smart T 770
1600	Hergen	New Crescent Former Machine EVO 16
1600	Hergen	New Ribbed Steel Yankee Dryer
1200	Hergen	New Crescent Former Machine Smart
1600	PMP	Intelli-Tissue EcoEc Premium
1600	PMP	Intelli-Tissue EcoEc Premium
1350	PMP	Intelli-Jet V Hydraulic Headbox
1350	PMP	Intelli-Jet V Hydraulic Headbox
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
2200	Valmet	Advantage DCT 200 with ViscoNip press
2200	Valmet	Advantage DCT 200 with ViscoNip press
2200	Valmet	Advantage DCT 200 with ViscoNip press
2200	Valmet	Advantage DCT 200 with ViscoNip press
1900	Andritz	PrimeLineST W8 (Steel Yankee)
1900	Andritz	PrimeLineST W8 (Steel Yankee)
2000	Voith	VTM 4 with NipcoFlex T shoe press, Steel Yankee
2000	Voith	VTM 4 with NipcoFlex T shoe press, Steel Yankee

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 companies asked to detail their present and future developments. It also includes first-hand knowledge gained from the many visits to tissue mills around the world for TWM's bimonthly Country Reports analysis

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.

2018 has seen the announcement of a total of 115 new tissue projects globally which are expected to start-up in the next couple of years. This is down from 121 projects announced at the same time last year, and compared to 2016's 111 projects, 2015's 126 projects, and the 146 in 2014.

The slowdown in China has been felt; while this survey reports a still very impressive 27 projects recorded for start-up in China in 2018 and 2019, this figure is down from the 37 listed in last year's survey (although it is suspected a large number of the "Confidential" projects will also be based in China.)

In the USA, four of the eight new projects that have been officially announced to start-up will be by Italian tissue giant Sofidel.

And in Asia, Asia Pulp & Paper (APP) has already brought a staggering eight new projects on stream during 2018.

Brazil has just five projects expected to come on-stream, down from nine

Project Survey

In the USA, four of the eight new projects that have been officially announced to start-up will be by Italian tissue giant Sofidel.

projects last year and from 12 projects in 2017.

For this year, as with last, many of the projects are subject to revision

COUNTRY	COMPANY MILL	INVESTMENT	PM NO	NEW / REBUILD	START-UP DATE	CAPACITY CHANGE (tonnes/yr)	PM TRIM (m)
China	Taison	Jiangxi	9	New	2018	60000	5.6
China	Taison	Jiangxi	10	New	2018	60000	5.6
China	Shaoxing Welfare Paper	NA	6	New	2018	15000	2.8
China	Vinda Paper	Confidential	7	New	2019	32000	3.4
China	Vinda Paper	Confidential	8	New	2019	32000	3.4
China	Vinda Paper	Yangjiang	1	New	2018	32000	3.4
China	Vinda Paper	Yangjiang	2	New	2018	32000	3.4
China	Vinda Paper	Confidential	5	New	2018	32000	3.4
China	Vinda Paper	Confidential	6	New	2018	32000	3.4
Confidential	Confidential	Confidential	1	New	2020	60000	5.66
Confidential	Confidential	Confidential	2	New	2020	60000	5.66
Confidential	Confidential	NA	NA	New	2020	60000	5.5
Confidential	Confidential	NA	NA	New	2020	24000	2.85
Confidential	Confidential	NA	NA	New	2019	30000	2.75
Confidential	Confidential	NA	NA	New	2020	30000	2.8
Confidential	Confidential	NA	NA	New	2020	35000	3.5
Confidential	Confidential	NA	NA	New	2020	NA	5.6
Confidential	Confidential	NA	NA	New	2019	60000	5.6
Confidential	Confidential	NA	NA	New	2019	60000	5.6
Confidential	Confidential	NA	NA	New	2019	60000	5.6
Confidential	Confidential	NA	NA	New	2019	60000	5.2
Confidential	Confidential	NA	NA	New	2018	60000	5.6
Confidential	Confidential	NA	NA	New	2018	35000	3.5
Confidential	Irving Consumer Products	NA	NA	New	2018	NA	5.6
Ecuador	Confidential	NA	1	New	2020	18250	2.7
Egypt	Alex Converta	NA	1	New	2018	78ptd	2.8
Europe	Confidential	Confidential	NA	New	2020	35000	2.85
Guatemala	Papelera Internacianal (Kruger)	NA	6	New	2018	120tpd	2.7
Hungary	Drenik	NA	2	New	2020	120tpd	2.8
Hungary	Vajda Papir	NA	1	New	2018	NA	2.74
Italy	Cartiera della Basilica	Botticino	1	New	2019	24000	2.74
Italy	Lucart	Porcari, Lucca	NA	New	2018	35000	2.8
Japan	Confidential	NA	2	Rebuild	2018	26000	3.3
Japan	Confidential	NA	5	New	2019	18000	2.7
Japan	Confidential	NA	2	New	2019	29000	3.3
Japan	Confidential	NA	1	Rebuild	2019	16500	2.6
Japan	Confidential	NA	2	Rebuild	2019	18000	2.5
Japan	Crecia Kasuga	NA	1	New	2018	46000	3.5
Japan	Daio Paper	Kawanoe	1	New	2018	54000	5.6

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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.

PM SPEED (m/min)	SUPPLIER	COMMENTS
2000	Voith	VTM 4 with NipcoFlex T shoe press, Steel Yankee
2000	Voith	VTM 4 with NipcoFlex T shoe press, Steel Yankee
800	Kawanoe Zoki	BF-W105
1600	Toscotec	AHEAD-2.0M
1600	Toscotec	AHEAD-2.0M
1600	Toscotec	AHEAD-2.0M
1600	Toscotec	AHEAD-2.0M
1600	Toscotec	AHEAD-2.0M
1600	Toscotec	AHEAD-2.0M
2000	Andritz	PrimeLineST W22-XT
2000	Andritz	PrimeLineST W22-XT
2000	Toscotec	AHEAD-2.0L
1500	Toscotec	MODULO-PLUS
1300	Toscotec	TAD
2000	Valmet	Advantage DCT 100 with ViscoNip press
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
2200	Valmet	Advantage DCT 200 with ViscoNip press
2000/1800	Valmet	Advantage NTT 200
2200	Valmet	Advantage DCT 200 with ViscoNip press
2000	Valmet	Advantage DCT 135 with ViscoNip press
NA	Valmet	Advantage ThruAir
1100	Hergen	New Crescent Former Machine – Smart Fit
1500	Recard	Crescent Former
2000	Toscotec	AHEAD-2.0S
2000	Recard	Crescent Former
1850	Recard	Crescent Former
2000	Andritz	PrimeLineCOMPACT V1 (ShoePress)
1200	Toscotec	MODULO-PLUS
2000	Toscotec	AHEAD-2.0S
1100	Kawanoe Zoki	BF12 SYD
400	Kawanoe Zoki	BF-15 Towel
1300	Kawanoe Zoki	BF-15
850	Kawanoe Zoki	BF-12 SYD
1000	Kawanoe Zoki	BF-15 SYD
1800	Kawanoe Zoki/ Valmet	DCT135HS
2000	Voith	MasterJet Pro T headbox, CrescentFormer, the NipcoFlex T shoe press, Steel Yankee dryer cylinder.

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.

5 **Argentinian projects planned for start-up**

8 **Officially announced machines brought on-stream in 2018 by APP in Asia**

1 **Turkish projects planned for start-up**

Project Survey

COUNTRY	COMPANY MILL	INVESTMENT	PM NO	NEW / REBUILD	START-UP DATE	CAPACITY CHANGE (tonnes/yr)	PM TRIM (m)
Japan	Fujisatowa	NA	2	Rebuild	2018	11000	1.7
Japan	Havix	NA	2	New	2019	23000	2.8
Japan	Ide Sanko	NA	1	New	2018	29000	3.3
Japan	Marutomi	Ono mill	NA	New	2019	22500	2.85
Japan	Marutomi	Fuji mill	NA	New	2019	22500	2.85
Latin America	Confidential	Confidential	NA	New	2019	107tpd	3.5
Peru	Papelera Reyes	NA	4	New	2019	27000	2,8
Peru	Pap. Zarate	NA	1	New	2019	10000	2.4
Poland	Filar	NA	1	New	2019	28000	2.8
Poland	Sofidel Spa	Ciechanów	NA	New	2018	60000	5.2
Poland	Velvet Care	Klucze	NA	New	2018	60000	5.6
Portugal	The Navigator Company	Cacia	1	New	2018	7000	5.6
Russia	Arkhbum Tissue	Kaluga	1	New	2019	60000	5.6
Russia	Hayat Kimya	Yelabuga	7	New	2019	60000	5.6
Serbia	Drenik	NA	3	New	2018	120tpd	2.8
South Africa	Confidential	Confidential	NA	New	2019	25200	2.75
South Africa	Twinsaver	NA	5	New	2018	31500	2.75
Spain	Gomà-Camps	Ejea	7	New	2018	35000	2.8
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	Confidential	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	NA	NA	New	2019	NA	5.15
USA	First Quality Tissue	NA	7	New	2019	NA	NA
USA	First Quality Tissue	NA	NA	New	2018	NA	NA
USA	Sofidel	Inola, Oklahoma	2	New	2020	86500	5.5
USA	Sofidel	Inola, Oklahoma	1	New	2019	86500	5.5
USA	Sofidel	Circleville	NA	New	2018	60000	5.2
USA	Sofidel	Circleville	NA	New	2018	60000	5.2
USA	ST Tissue	Franklin, Virginia	5	Rebuild	2018	45500	6
Vietnam	Nittoku	NA	2	New	2018	20000	3.3
Vietnam	Xuong Giang Paper	NA	2	New	2018	17000	2.8

By Tissue World Senior Editor **Helen Morris**

2018/19

PM SPEED (m/min)	SUPPLIER	COMMENTS
1000	Kawanoe Zoki	HTB SYD
1100	Kawanoe Zoki	BF-15
1300	Kawanoe Zoki	BF-15
1500	Toscotec	MODULO-PLUS
1500	Toscotec	MODULO-PLUS
1700	Recard	Crescent Former
1700	Hergen	New complete paper machine EVO 12
500	Hergen	New Ribbed Steel Yankee Dryer
1700	Hergen	New complete paper machine EVO 12
2000/1800	Valmet	Advantage NTT 200
2200	Valmet	Advantage DCT 200 with ViscoNip press
2000	Voith	Pluralis refining technology, MasterJet headbox, EvoDry T steel Yankee and the EcoHood T. A, ComCore.
2000	Andritz	PrimeLineTM W6-XT
2200	Valmet	Advantage DCT 200 with ViscoNip press
1850	Recard	Crescent Former
1500	Toscotec	MODULO-PLUS
2000	Toscotec	AHEAD-2.0S
2000	Voith	NipcoFlex T shoe press, MasterJet T headbox, EvoDry T steel Yankee and the EcoHood T
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	PMP	Intelli-Jet V Hydraulic Headbox
NA	Andritz	PrimeLineTAD (Through-Air-Drying)
NA	Valmet	Advantage ThruAir
2000	Toscotec	AHEAD-2.0L
2000	Toscotec	AHEAD-2.0L
2000/1800.	Valmet	Advantage NTT 200
2000/1800.	Valmet	Advantage NTT 200
915	Toscotec	Dry-end rebuilding
1000	Kawanoe Zoki	BF-12
800	Kawanoe Zoki	BF-X10S

2 Russian tissue projects starting in 2019

121 2017's total projects

27 China-based projects in this year's survey

3 Polish tissue machine projects

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 2017 Project Survey has had to be repeated. We welcome your help to ensure as comprehensive a survey as possible at the end of 2019.

Toilet Twinning initiative brings new appreciation to luxuries like toilet roll

Lesley Quirk is a specialist relationship manager for a charity initiative called Toilet Twinning. She liaises with corporates who support its campaign to provide clean water, proper toilets and hygiene training in some of the poorest communities worldwide. She invites people to 'twin' their toilet with a latrine overseas – and so sponsor a new toilet for a family abroad.

"I used to work in the catering industry so napkins were an important part of the service we provided. They were about luxury, quality and attention to detail. Now that I work in a sector catering to more basic needs, I look on tissue products rather differently!

"Breaking the taboo around toilets – and talking openly about the fact that proper sanitation is a universal bare necessity and human right – is an important part of my working life these days. Understandably, people generally snigger when they first hear the name Toilet Twinning, but they soon appreciate the importance of what we do. I've got quite a naughty sense of humour, so that helps!

"So, first, let's start with loo roll. I tend to avoid big-name brands as I am allergic to the chemicals used to treat a lot of the branded products available. So, eco-friendly, non-bleached products are better for me.

"I enjoying cooking and entertaining so I do use kitchen roll but am not particularly discerning about which I buy and generally just opt for the cheapest. I have two hugely pampered cats – and cleaning up after them is a full-time job in itself.

"I must admit that I still prefer linen napkins for dinner if I have friends over – but there's such a wide range of beautiful paper napkins available now that the thought of all that washing, starching and ironing starts to lose its appeal.

"Paper napkins are perfect for tea and picnics – and hugely convenient. I'm rather fickle and buy napkins based on their colour or design. I do care about quality, but price matters too when I'm faced with a wall of loo roll options in the local supermarket.

'I've always cared deeply about nature and animal conservation and Toilet Twinning's work in countries badly affected by climate change means that I like to buy products with strong 'green' credentials.

"I've been lucky enough to travel a great deal – and generally, the limit of the inconvenience I had to 'suffer' previously was having to put loo roll in an unsanitary bin, in countries where you were not allowed to flush it down the toilet.

"Now, when I travel with Toilet Twinning, there's often no toilet paper at all – and sometimes there's no toilet either. We work in very poor, remote communities where there are no sewage systems and no piped water. The toilets we help fund are mostly basic pit latrines built with what materials are available locally.

"We don't provide toilet paper. Logistics and cost are the crucial obstacle but also there are cultural factors to consider too. Obviously, many Islamic and Asian countries tend to use water instead of loo roll... In areas where water is scarce, people have to be resourceful, using leaves or even corn cobs as toilet roll substitutes. Ouch.

"But toilet paper is the least of it. One in three people in the world – or 2.3bn people – don't have a proper toilet, which means they are vulnerable to disease. Women and girls risk being attacked as they squat in the bush, and teenage girls often drop out of school when their period starts. Even the most basic pit latrine, when properly built, can change lives and even save lives, literally.

"Our approach is to work with the whole community, educating them the link between disease and lack of proper toilets. It's very easy to build toilets but crucially important that people will keep using them and never want to be without one again.

"That's why, though we train people to build toilets and sometimes provide materials, we encourage them to do the hard work for themselves. In that way, they really 'own' their toilet and are always immensely proud of them. One man we met once, Bishwo in Nepal (pictured), was so proud of his new loo – the first in the village – that he held a toilet open day and invited all his neighbours to come and try it!

"I don't tend to invite people round to view my loo – but I really appreciate my bathroom and luxuries like loo roll. And I will never, ever take my toilet for granted."

Paper Machine Technical Theme: Industry 4.0 - energy – cost optimisation – high-quality grades - larger, superior machines – market consolidation

Top companies highlight their ongoing advances in technology. A TWM report.

TWM/1: What have been the most important technical developments made at your company during 2018 and what can we expect in 2019?

Michael Pichler, senior vice president, division manager, paper & tissue division, Andritz: "There are several areas we are concentrating on when it comes to paper machines. Starting in the forming section, there is a strong focus on our new, horizontal Shoe Blade Gap Former.

"This innovative concept allow graphic paper machines to be rebuilt efficiently for packaging grades in a very short time and at minimum investment costs. In addition, the design extends the possible basis weight range to well above 200 gsm, which is impossible on a conventional Roll Gap Former.

"Another important product is our new hybrid centrewind reel, which allows a conventional reel to be upgraded with a centrewind feature requiring only one centre drive that is attached to it. This is also very economical and the perfect solution for a rebuild or upgrade.

"Last, but not least, we are doing a lot of work on developing the autonomous paper machine concept. We have not reached the autonomous stage yet, but we are making good progress in collecting masses of empirical data every second, analysing it automatically to find dependencies and correlations by means of advanced mathematical models and, most importantly, making suggestions to the operator on how to improve performance. This initiative is combined under our Andritz "IoT" platform METRIS."

Antonin Kostka, director, Icone: "We have mainly been focusing on enhanced headbox design for tissue grades with the target to increase the solids content and at the same time to improve the paper homogeneity and formation quality. This solution has resulted in lower pumping energy."

Shinji Goda, director and general manager of engineering, Kawanoe Zoki: "In the Japanese market, we are seeing low basis weight products such as facial tissue with below 11g/m2 and toilet rolls more than 100 metres as well as high basis weight products such as towels and kitchen papers can be generally seen in the stores.

"Kawanoe BF tissue machine equipped with new HeadBox – developed as a special tissue machine for dry crepe and wet crepe as well as a machine which can produce towel products with superior formation either at higher or lower basis weight – will start up in 2019.

"2018 has been a record year for PMP. As we are becoming stronger, our brand is more respected, and we dare to think about a more dynamic and conscious development of solutions we provide for our customers.

Maja Mejsner, vice president business development and marketing, PMP Group: "2018 has been a record year for PMP. As we are becoming stronger, our brand is more respected, and we dare to think about a more dynamic and conscious development of solutions we provide for our customers.

"When our Chinese customer, who is one of market leaders in China, appreciated the start-ups of several Intelli-Tissue EcoEc 1600 lines, we felt very proud. Encouraged by this achievement and following our Everest Development Strategy for years 2017-2020, we decided to re-enter a segment of double width tissue machines.

"Understanding that tissue machine technology has been optimised and that most solutions available on the market are very similar, we decided to brainstorm and create a refreshed vision generated by a special working group of specialists. I am honoured to lead this team.

"It is a great opportunity to ask users what they like, what is smart and what their daily challenges are. In Autumn 2018, we launched the WIDE (Wise Solutions, Innovative, Durable, Energy Efficient) project and our driver is to create a 5.6m reel tissue line of the best consumption in the world (Crescent Former).

"In addition, it will ensure a quality advantage in a final product for customer and will be characterised by high runnability and comfortable working conditions, with an attractive conversion rate of operating costs per tonne of tissue. Wise solutions meaning all ideas that help to improve tissue quality such as double layer headbox, massive SPR or 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 (without pauperisation), 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 1.68 t/t of paper).

"TM line has been named Intelli-Tissue Ultra and will be introduced in Asia during CIDPEX and in Europe during Tissue World Milan next year."

Riccardo Gennai, sales manager for Europe, Toscotec: "This has been a very productive year for Toscotec. Eight of our top of the line AHEAD-2.0L PRODERGY tissue machines came online at APP Indonesia in just eight and a half months. Thanks to our TT DOES solution (Drying Optimisation for Energy Saving), they can run at 2,000m/min, using steam in the hoods instead of natural gas.

"On the basis of our latest developments in the winding process, the new generation of Pope Reels is running efficiently on all the lines, ensuring a more uniform paper roll winding and higher bulk on the jumbo roll.

"Overall, in 2018 Toscotec installed over 700,000tpy of tissue capacity worldwide with 15 start-ups across four continents.

"Our expanded R&D team has been continuously focusing on the redesign of Toscotec's TAD machine, the new TADVISION, and attained outstanding results in energy consumption and paper quality. Our new S-Crescent technology, designed for an increased dewatering in the forming area, is under installation in China and in Italy, and we expect to have three references in operations by mid-2019.

"For next year, we are working on a study on the use of secondary fibres in stock preparation, which represent an attractive alternative for paper mills, especially considering the cellulose price rise."

Ingmar Andersson, sales manager, Valmet Tissue Mills business unit: "Most importantly, we have seen the improvement of tissue product quality at the same time as energy and water consumption being optimised.

"Focused R&D efforts have been made for textured and structured products. Valmet has launched two new flexible hybrid concepts for structured tissue: Advantage QRT and Advantage eTAD in addition to the well-established Advantage NTT technology for textured tissue.

"Both QRT and eTAD are intended for the production of Premium and Ultra-Premium tissue and towel products at very low energy consumption levels. QRT has been developed at Valmet´s Technology centre and is now also operating in commercial installations.

The eTAD technology has been licensed from Georgia-Pacific Company. Valmet has supplied several of these machines to GP and now this concept can be offered from Valmet outside of North America.

"This wide choice of technologies with built-in flexibility makes it possible to introduce new and improved plain, textured and structured tissue products to the market.

Focused R&D efforts have been made for textured and structured products. Valmet has launched two new flexible hybrid concepts for structured tissue: Advantage QRT and Advantage eTAD in addition to the well-established Advantage NTT technology for textured tissue. Both QRT and eTAD are intended for the production of Premium and Ultra-Premium tissue and towel products at very low energy consumption levels."

"Besides these three hybrid technologies, Valmet has also continuously developed TAD and DCT technologies to improve energy efficiency and performance.

"Valmet F(O)CUS Tissue rewinder technology has been refined both for classic hydraulic systems as well as modern electro mechanic systems."

Martin Jauch, senior vice president tissue, Voith Group: "Energy consumption continues to be of high importance. Furthermore, with the increase of fibre prices last year, savings in fibre are essential. Voith, with its proven solutions in the area of stock preparation, adds value to the whole paper manufacturing process by reducing energy consumption and optimising efficiency in tissue production lines."

TWM/2: What developments have you made in terms of energy?

Pichler: "Energy-saving can be viewed from different perspectives. Each process improvement that leads to higher overall efficiency is at the same time reducing energy consumption per ton of paper produced. The main tool we are using to move in this direction is – as described before – our METRIS tool.

"When it comes to the equipment itself, we have made further developments on our Steel Dryer, which is now able to operate with approximately 6% more efficiency than a conventional cast iron dryer. In combination with this, we have been working intensively on a new generation of sheet stabilising elements that are able to operate with 1/3 less under pressure than others available on the market and still achieve the same sheet stabilising performance."

Kostka: "Beyond the previously mentioned solution, the company has two patented solutions for the application of extended nip in the tissue machine."

Goda: "Energy reduction for machine operation depends heavily on large equipment such as the Steel Yankee Dryer. We focus on this field and continuously develop and manufacture the best equipment.

In order to derive the maximum function of energy reduction, several heat recovery systems and its combination as well as the fine tuning of the drainage system which fits the machine are essential. Furthermore, Kawanoe Zoki challenges itself to develop coating control technology and operation monitoring system in order to improve machine operational efficiency."

Mejsner: "I heard recently that papermaker's biggest challenge is energy policy trilemma: security, affordability and sustainability. We – as a machinery company – need to constantly think how to make tissue makers life a bit easier.

"An obvious driver is to provide solutions of the best media consumption (to decrease amount of energy needed) applying smart technologies like the already known Steel YDs, Intelli-Cap, massive dia SPR (over 1,400mm) or shoe press and so on. Our focus now is to take a magnifying glass and to look for even smaller savings.

"As a part of previously mentioned WIDE project, we have already created a concept of a full energy recovery system in the area of TM dry end helping to decrease steam usage by approximately 5% and at the same time to increase TM efficiency by further 4-5%. That is the way to utilise knowledge coming from observation of running references in a conscious way.

In order to derive the maximum function of energy reduction, several heat recovery systems and its combination as well as the fine tuning of the drainage system which fits the machine are essential. Furthermore, Kawanoe Zoki challenges itself to develop coating control technology and operation monitoring system in order to improve machine operational efficiency.

"We are also convinced that we cannot stop in looking for further improvements of existing solutions. That is why we look for improvements of design of our Steel YDs to maximise energy efficiency effect. We even see further opportunities of the entire process evolution by applying an alternative configuration of a shoe press.

"This way a wall thickness of the YD can become thinner which results in decreasing investment costs and increase of process effectiveness. It is very important to join forces with agile tissue makers who are ready to share a risk of trials to become leaders of those who dare to be first.

"It is worth mentioning that as PMP we have a dedicated division: PMPower, located in Italy, that is actively working on new solutions in the area of energy. Their rich experience and knowledge has already helped many tissue makers to improve energy consumption results."

We are working to reduce the overall TAD machine's consumption to less than 4.5 MWh/ tonne for a plant of the same production capacity. The very idea of the S-Crescent technology is based on the need to increase dryness before the press and therefore lighten the workload of the drying section, which is the energy-intensive area of a paper machine.

Gennai: "All of Toscotec's projects aim to cut down on energy consumption. On TADVISION we made great progress, by reducing consumption to 4.5-5.5 MWh/tonne, which, compared to the consumption of present TAD machines represents a reduction of up to 2 MWh/tonne.

"However, we did not stop there! We are working to reduce the overall TAD machine's consumption to less than 4.5 MWh/tonne for a plant of the same production capacity.

"The very idea of the S-Crescent technology is based on the need to increase dryness before the press and therefore lighten the workload of the drying section, which is the energy-intensive area of a paper machine.

"Toscotec's pressing technology has been performing very well. Feedback from the field at both Wepa Lille and WEPA Giershagen mills is that our machines achieved very high dryness rates after the press and therefore have a comfortable margin of dryness capacity for future speed-ups.

"Toscotec's TT NextPress has also been praised by the Twinsaver Group for its very uniform moisture profile, which resulted in a significant increase in converting efficiency."

Andersson: "Energy efficient solutions are today part of any request for new capacity from all markets globally.

"Over the past years Valmet has developed a series of new Advantage energy saving solutions offered to the market such as the flexible ViscoNip Press, ReDry which use Yankee hood exhaust air to heat the web, ReTurne that recovers headbox energy and returns it back to the process as electrical power, ReGen Co-generation of electricity, hot air and steam, Yankee Dryer designs, heat recovery in Yankee hood systems, etc.

If all such energy saving solutions would be implemented, we could offer a line with an energy consumption of about 1,600kWh/tonne for the whole line, which in practice would be about 50% of the consumption for standard tissue machine 20 years ago."

Jauch: "We have several new developments in the market that increase a producer's efficiency without raising the total cost of ownership. For example, the simple concept of TissueLev combines the benefits of energy savings with efforts to limit fibre consumption.

"TissueLev optimises drying efficiency while reducing up to two gsm without changing the characteristics of the final product. That allows up to 10% in savings of operational costs."

The European authorities are moving ahead with banning plastics for certain applications. It will be very interesting to see which of those products can be replaced successfully by paper products. As we believe there could be quite a number of them, this will certainly drive the demand for so-called special paper machines in Europe over the next few years.

TWM/3: What changes have you seen in the global tissue market in terms of changes in demand, and what new challenges and opportunities has that presented for paper machine suppliers?

Pichler: "There is still an ongoing trend of converting former graphic paper machines into packaging grades in Europe and partly in the US.

"As quite a lot of machines have been converted already, we see our customers carrying out very detailed studies on operating costs after the rebuild.

"Even knowing that the packaging grades market will continue to grow, our customers expect tougher competition because the installed new or converted capacity is significant and this will result in reduced margins at the end of the day.

"So projects are only realised if a concept can be found with moderate investment costs and competitive operating costs – this means that decision-making does take longer today than it did one or two years ago.

"As we also know, the European authorities are moving ahead with banning plastics for certain applications. It will be very interesting to see which of those products can be replaced successfully by paper products.

"As we believe there could be quite a number of them, this will certainly drive the demand for so-called special paper machines in Europe over the next few years.

"In China, we see a sharp decline in the number of projects for new paper machines because of the boom in the past two years plus the ban on importing waste paper. We clearly see the trend of Chinese paper producers investing in Vietnam, Malaysia, Laos and other Asian countries – a trend we expect will continue in the next few years as well."

Kostka: "The tissue market is asking for production cost reduction which mainly means energy cost reduction. The machine suppliers must follow this demand and act consequently."

Goda: "Product differentiation is more likely to take place. Market response is getting quicker and it reflects the impact on our converting machine. Even with high-quality products, if the price is not within the expectation it will lose the market share.

"Machine suppliers like us are required to have technological competence that both tissue machines and converting machines that can obtain the maximum efficiency achieving the superior products at lower cost.

"Kawanoe Zoki aims to be a machine manufacturer capable of adapting to various needs of household tissue products with our unique technology by solving the issues of both machines accurately."

Mejsner: "It is important to look from a different angle. What we take a consumer point of view, it will be affected by where the person lives, what preferences he/she has, how much money he/she can spend on tissue products. More mature market require more innovative products – softer, smarter and more flexible.

"If a market is more mature, then a tissue line needs to be more flexible (wider product range), offer extra tissue features (extra bulk, extra softness) – simply those TMs should be more advanced so an investment cost is typically higher.

"In case of emerging markets, consumers expect less – so TMs can be simplified and cheaper.

"A couple of years ago PMP implemented Optimum Cost Solution strategy and opened an entity in China: PMP IB to provide a high-quality product, combining European expertise with a wide span of Asian market potential. Today PMP IB is a fully operational Centre of Excellence with a capacity of up to eight TM lines per year.

"When we take tissue producers angle into account, they want to make sure per tonne of tissue production is optimised. When they own one machine a challenge is smaller.

"However, if a tissue producer runs for instance 50 machines in several locations, in different countries their biggest challenge is how to standardise the process to have the business under control."

Gennai: "We have seen different trends in different areas of the world. In Europe, some producers are considering the usage of secondary fibres, instead of cellulose. Toscotec is working out various technical solutions for the entire process, in order to make it a viable alternative.

"In Asia, I am thinking of South Korea and Japan in particular, there are new rebuild opportunities opening up. Toscotec supplies highly customised upgrades and optimisation solutions that allow paper mills to reduce their consumption costs and get the superior paper quality they need to stand out on the marketplace.

Customisation is always a challenge for a paper machine supplier, because you need to go the extra mile and understand their actual working conditions, analyse their data and work out the very best upgrading solution integrated with the existing equipment.

"Customisation is always a challenge for a paper machine supplier, because you need to go the extra mile and understand their actual working conditions, analyse their data and work out the very best upgrading solution integrated with the existing equipment.

"This entails tailor-made engineering and the highest flexibility and efficiency during the entire manufacturing process.

"Then, South-East Asian countries and India are installing new lines for the export market. Toscotec is there to provide highly efficient solutions for new tissue lines, with the lowest possible running cost, so as to support the mill's export strategy.

"One trend in customer demand has not changed, i.e. the need to be listened to very carefully. Paper mills ask for attention and devotion on the supplier's part.

"Toscotec's response has been that of close attention to their needs, and that is why we are the paper machine supplier with the highest number of projects delivered each year worldwide, for the seventh consecutive year."

The level of the final product quality is increasing on virtually every market. World class technology is requested in every market, there is no market machinery is only making very basic quality. The demand for conventional technologies like Advantage DCT technologies remains in all markets but we see an increasing demand also for higher grade machines like TAD and hybrid technologies globally.

Andersson: "The making and supply of tissue products has become more of a global business. The old saying "tissue does not travel well" seems to have less meaning as local factors as cost of fibre, water, energy and people are getting ever more important.

"Therefore, major new capacity added in, for example, China and Indonesia, will impact several other markets as tissue products and jumbo rolls are exported to many local markets.

"The level of the final product quality is increasing on virtually every market. World class technology is requested in every market, there is no market machinery is only making very basic quality.

"The demand for conventional technologies like Advantage DCT technologies remains in all markets but we see an increasing demand also for higher grade machines like TAD and hybrid technologies globally.

"Digitalisation and industrial use of the internet is high on the agenda for most suppliers and tissue makers and will have an ever-increasing impact on future production optimisation."

Jauch: "Markets are currently driven by differentiation in order to add value for customers. Meanwhile, complexity, higher investments and operating costs are considered potential drawbacks. Efficiency in the dry crepe process and opportunities to implement modules to improve quality, reduce energy consumption and the usage of fibre are key objectives for Voith in order to offer benefits to the producers.

"These are all in combination with digital applications."

TWM/4: What geographical areas are you looking to next year and why? What technical PM trends and challenges are you seeing in these regions?

Pichler: "We at Andritz focus on all European countries, including the Eastern European countries. The European market will be still dominated by rebuilds and upgrades, with only a few new machines being supplied in the next three years.

"We also do not envisage there being more machines wider than 10 metres in the near future."

The European market will be still dominated by rebuilds and upgrades, with only a few new machines being supplied in the next three years. We also do not envisage there being more machines wider than 10 metres in the near future.

Kostka: "North and South America because the demand for high quality grades is high; this means new machine concepts for the production of high bulk tissue at low specific energy cost."

Goda: "Southeast Asia and India are the areas we can expect further growth. There are demands for small to medium sized machines. When it comes to selecting the machine suppliers, they tend to prioritise the proven technology.

"From the initial detailed planning, smooth start up to supportive after service, we believe that the strength of Kawanoe Zoki will be accepted in this market."

Mejsner: "Even the tissue sector has slowed down a bit recently, although it is still healthy. The tissue market is pretty dynamic. Recently there were two interesting trends that will change the shape of our industry: politics and consolidations.

"China has recently been scientifically affected by its government policy. Some mills have been closed already as their technology was obsolete.

"Some other will be closed due to expiration the business licence and energy limitations. It means some producers will be forced to go somewhere else. It is interesting to see big players like APP deciding to enter the US and Australian markets by taking over existing mills. It is a sign of the times.

"Taking current trends into account, I would still keep China in mind (even with their temporary troubles they will stay the world's leading tissue producer), however, I would also increase attention towards Latin America and Eastern Europe – areas ready to grow. The technology choice will be driven by local consumers' needs.

"Emerging markets will probably become more agile to install faster TMs than before (to increase annual production potential). Mature markets will bend themselves towards double width TMs rather than single one.

"I would also expect more interest in the area of alternative fibres understanding that recently fibre costs are in a permanent increase."

Gennai: "We are looking to North America because with our experience and expertise we definitely have the right credentials to expand our share in such a technically demanding market. The main issues in North America are prime quality and structured tissue.

"Toscotec is very well positioned for both with its cutting-edge TAD technology. Besides, we are the right partner for tailor-made upgrades and rebuilding of existing equipment.

"Secondly, South America is certainly a high potential market. Brazil, in particular, will represent a great opportunity in the next few years. Thanks to its advanced technology and vast experience, Toscotec will be a key partner for those paper mills who look for an alternative to local manufacturers

"I am thinking of producers who want to distinguish themselves for tissue quality and need high efficiency rates and reduced running costs.

"In order to be able to cater for the South American market, Toscotec is establishing a local business unit in Brazil, which will be the focal point of our operations in Latin America in the near future.

Southeast Asia and India are the areas we can expect further growth. There are demands for small to medium sized machines. When it comes to selecting the machine suppliers, they tend to prioritise the proven technology.

"Obviously, we will not forget Europe, which is the market where our headquarters are based."

Andersson: "The biggest areas of growth will be China which is the home base of some of the most ambitious investors in this industry, and which are still fighting for market position.

"The urbanisation and increase of tissue consumption will cover for some of this expansion but it seems it will result in an overcapacity putting pressure on the current smaller producers.

"The investment pace in China might be slowing down in practice as it seems stricter environmental regulations are being implemented and it takes more time to receive all necessary permits.

"North America, South America and Europe markets are more predictable and will grow more in balance, consumption and capacity.

"Ultra-Premium quality is still in highest demand in North America but also other markets are looking for better quality in order to support growth."

Jauch: "We expect the biggest growth in China with a focus on dry crepe tissue. Voith is prepared to serve this market with proper technical solutions and skilled personnel that allow significant efficiency gains as well as the reduction of energy consumption.

"We consider the following key factors as mostly relevant for all regions: flexibility to produce different high-quality tissue grades, efficiency, energy consumption, environmental-friendly operations and production costs."

TWM/5: What overall trends in tissue machine manufacture will have the greatest impact on the production process in the next five years?

Pichler: "We believe that the trend towards highly standardised machine sections and entire machines will continue.

"This is because highly standardised sections ensure trouble-free manufacturing, installation, start-up, and performance of the plant, which results in a secured ROI and reduces delivery time.

"This trend is also supported by the fact that many paper producers do not always need to have a big technical and technological team and rely more and more on paper machine manufacturers' competence.

"Regarding the impact on the production process, I believe that the "autonomous" trend will go from strength-to-strength, as mentioned above. Data analytics and predicting the result of each change in operational parameters will start to play a major role in supporting the operators directly at the paper machine."

Kostka: "Extended nip application and TAD."

Goda: "We assume that the mill environment of tissue makers will have a significant change. A safe and clean environment is the essential factor for better production efficiency. Automation of equipment, dust collector and cleaning system will develop further. Equipment diagnosis and maintenance will be designed into the package.

"Now, our mission as a tissue machine supplier is to offer the machine which enables tissue makers energy saving with less operators that eventually transforming working practices."

Mejsner: "There are three main drivers that fuel a technological growth in tissue machinery: an energy saving need, a tissue quality improvement and an increase of safety.

"In addition, there is a need of higher system automation according to a philosophy of Industry 4.0. Let's understand operators and make their life easier.

"Energy saving solutions are directly connected with robust solutions like large dia Steel YDs, suction press rolls or shoe presses, air caps, highly efficient auxiliary systems, etc. I would also mention our recent ideas like full energy recovery system.

"The next level is to improve those technologies for instance to apply alternative configuration of shoe press to optimise YD configuration. Time will tell.

"The shaping of tissue quality might be achieved by applying technology on the machine (layer type headbox, shoe press, etc) as well as to work with alternative fibres.

"Papermakers are getting more open to test alternative fibres like coca, coffee, hazelnuts as well as nanofibers). We should move ourselves in the field of innovation more than before.

"Safety is also a priority worldwide. I believe it is a right time to join forces at an industry level to define safety standards for the entire industry. We should take this subject and discuss during industry events to learn from one another and make our industry a better place.

"How to make operators' life easier? The only way is to visit installations and ask what they like and what is a daily challenge. It is crucial to maintain a connection link between design engineers with users. Brainstorming about it? Why not!"

Gennai: "We believe that the development of tissue machines with increased artificial intelligence represents a key trend. The implementation of this revolution may take longer than five years, but AI is definitely the future in our field, like in other sectors.

"Besides, the industry has shown an overall growing trend of supply of turnkey projects, which has been consistent over the past two decades and growing in the past three to four years.

"Paper mills prefer to entrust a complete plant to one single supplier for a number of reasons, including the fact that by making the supplier fully accountable of the entire process, they will get the best product quality in the end.

We believe that the development of tissue machines with increased artificial intelligence represents a key trend. The implementation of this revolution may take longer than five years, but AI is definitely the future in our field, like in other sectors.

"Turnkey projects are the opportunity to optimize the process head-to-toe, because you have full control. Toscotec has done almost 40 turnkey projects so far. The last one, a major plant for Sofidel Group in Oklahoma, will be delivered in 2019."

Andersson: "Increased tissue quality demand, increase in AfH and towel consumption, cost of fibre and energy, limited fresh water supply, digitalisation of production and processes."

Jauch: "We see high pulp prices as a challenge for the industry since there is no indication that they will drop in the short term.

"Therefore, we expect other adaptions within the markets in order to increase profitability, such as integrated mills, more efficient fibre usage, optimised energy sourcing, supplier responsibility for whole installations, industry 4.0 solutions, as well as various business models like the growth of tissue e-commerce."

TWM/6: How are new paper machine technologies changing the marketplace for the paper machinery manufacturers?

Pichler: "As we know, the paper industry is quite conservative simply due to the fact that it is very capital-intensive. Neither a paper producer nor a machine builder can take the risk easily of implementing a new technology that has not yet been proven.

The paper machine manufacturers must invest in innovation, this is the discriminant for a long term industrial strategy.

"That is why we believe that innovation will definitely continue as it has in the past – step by step for equipment, processes, and technology.

"Such topics as nano-cellulose or micro-cellulose will continue to be of interest and an area of investigation, as in the past, but it will still be a few more years before a process is developed that can have a real impact on paper production processes."

Kostka: "The paper machine manufacturers must invest in innovation, this is the discriminant for a long term industrial strategy."

Goda: "Our assumption is that the technological innovation for wet and semi-wet crepe is going to progress. In addition to upward trend of towel and kitchen papers, its application is expanded to household use and AfH. Tissue making technology to produce durable products with high absorbency and the machine development with lower energy cost as dry crepe can create an attractive market

"The tissue machines with the capability of the combination of conventional proven technology and innovative technology will open up new markets."

Mejsner: "The tissue business is a growing place, however its priority is to be stable and keep production costs under control to make business profitable. There is a small area of taking risk and to run trials. Finding a sweet spot is not easy.

"I rather see PMP and our competitors as machinery builders pushing tissue producers to move forward and apply novelties. I strongly believe in a long-term partnership. Then both parties know each other and can create something spectacular.

"We are lucky to have such partners. It is a privilege to be involved in development projects that might become a breakthrough for the industry. Time will tell!"

Gennai: "Toscotec is developing eco-friendly tissue machines, with low energy consumption and the highest possible production efficiency. As manufacturers, we have a commitment to paper mills and down the line to paper converters, and ultimately to consumers, to improve the environmental performance of our manufacturing process.

"And secondly – and this is even more important in the long run for the environment at a global level – we have a commitment to deliver advanced design and technology, which will improve the paper mill's green performance, reduce their usage of fresh water, electricity and thermal energy, and minimise their atmospheric emissions.

"With this in mind, we are focusing on higher efficiency, i.e. machines that will exceed the operating speed of 2,000m/min."

Andersson: "Some suppliers will invest in the development of new and alternate technologies to meet the challenges and others will concentrate its efforts for lower cost standard machines.

"The digitalisation and Internet of Things will be a challenge but also providing an opportunity for suppliers as well as tissue makers."

Jauch: "Integration is key. Voith is fully committed to reducing customer pain points and offering required differentiation in technology development. We offer solutions for stock preparation, tissue machines and clothing that are all integrated with Voith's papermaking 4.0. Papermaking 4.0 brings the papermaking process to the next level.

"That, among others, includes activities such as higher efficiency, operator trainings in virtual environments and the integration with different systems and suppliers."

The tissue business is a growing place, however its priority is to be stable and keep production costs under control to make business profitable. There is a small area of taking risk and to run trials. Finding a sweet spot is not easy. I rather see PMP and our competitors as machinery builders pushing tissue producers to move forward and apply novelties. I strongly believe in a long-term partnership. Then both parties know each other and can create something spectacular.

Fundamentals drive Australian and New Zealand tissue consumption higher

Steady population growth, population ageing and rising per capita consumption have combined to push tissue production in Australia to capacity. The question for the Australian tissue market is when, and where, the next manufacturing development will come. By Tim Woods, managing director, IndustryEdge

Australia is a developed and mature economy. In general, its consumption of tissue and tissue products is expected to also be mature. Yet its growing and simultaneously ageing population has expanded its consumption of tissue products over the last decade.

The country's consumption of tissue stock rose 5.6% over the year-ended June 2018, reaching 321,000 tonnes. The new record was delivered courtesy of a solid increase in local tissue production, as Figure 1 shows.

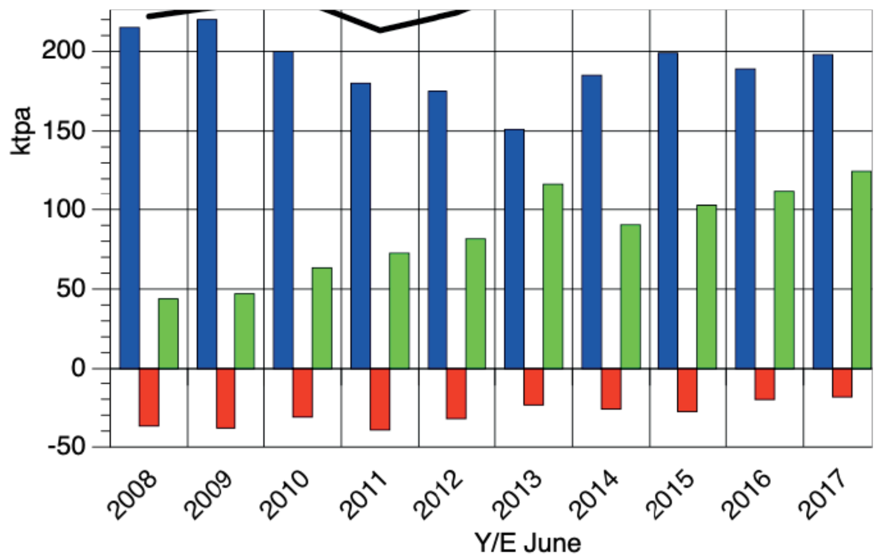
Production lifted 9.6% on the prior year, to 217,000 tonnes, with the small volume of exports largely stable and the larger volume of imports modestly lower than the prior year. Local sales accounted for 62% of apparent consumption for the year, with imports holding 38% of the market.

It is important to note that apparent consumption is not the same thing as actual consumption or demand. The Australian data does not include inventory movements, which in a small market could account for 8% to 10% of the consumption in any year.

Per capita consumption rises to 13.0 kg

Australians are, on the latest data, using an average 13.0 kg of tissue per annum,

Fig. 1: Australian Apparent Consumption of Tissue Stock: 2008 – 2018 (ktpa)



Source: ABS & IndustryEdge research and estimates

Tim Woods

Managing director, IndustryEdge

every year. The growth in per capita consumption over the decade has averaged 2.1% per year, which can be seen in Figure 2, along with Australia's population.

To some, this solid growth in per capita tissue consumption is questionable, especially because population growth of 1.6% per annum over the decade to 2018 helps to explain why more tissue is being consumed by the country, but does not explain why each person is consuming more.

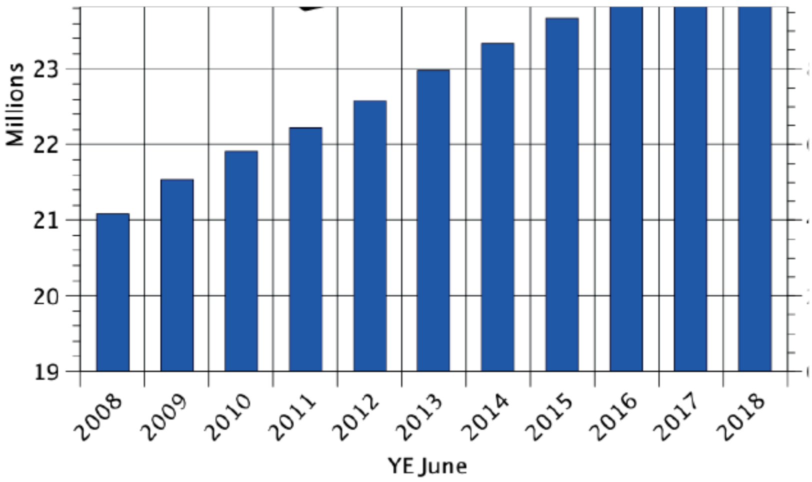
But the nature of the population growth, the ageing of the population, and the way in which Australians live their lives, is driving tissue consumption higher.

Put at its simplest, in addition to net migration, Australia's population growth has been driven by increased births and less deaths, as the population ages. These are the two periods in a person's life where they will use more tissue products (or at least As part of that, they live and eat outdoors, in an increasingly café culture. Some local tissue producers report their strongest sales growth in the AfH segments, especially related to napkins, serviettes and towel products.

These factors, along with severe retail cost controls that has resulted in toilet paper being sold to consumers at the same price as a decade ago, are pushing per capita consumption of tissue products higher, in the otherwise mature Australian market.

As a comparison to the Australian experience, per capita tissue consumption in New Zealand was calculated at 11.5 kg per person for 2017-18. Growth in per capita consumption over the decade has been a more substantial average of 2.5% per annum.

Fig. 2: Australian Per Capita Tissue Consumption & Population: 2008 – 2018 (millions & kg)



Source: ABS & IndustryEdge research and estimates

Tissue production nears decadal highs

For all that Australian tissue consumption has grown strongly over the decade, production in the last financial year was just short of the decadal high. IndustryEdge assessed production as reaching 217,000 tonnes for the year, but this was below the peak of 220,000 tonnes achieved in 2008-09. Production of tissue in Australia, almost all supplied by imported pulp, is not remarkable in itself, but its growth from the prior year is very strong, as Figure 3 shows.

Other than general consumption growth, improved competitiveness of local manufacturing, fuelled by a depreciated Australian dollar, appears to have allowed local manufacturers to grow their production at the expense of imports of tissue stock, and pre-converted tissue product imports.

Australia's four tissue producers, the locally owned ABC Tissue and the much smaller Encore Tissue, the Australian Stock Exchange listed Asaleo Care in which Essity retains a significant share and the global giant Kimberly-Clark, have a combined capacity we estimate to be 256,000 tonnes per annum.

As we describe in the 2018 Pulp & Paper Strategic Review, history shows that it is at or around the 85% capacity utilisation mark that new capacity has been introduced to the Australian tissue market.

For some time it has been widely considered that ABC Tissue would likely deliver on the final instalment of its announced expansion plans at or around these levels. It commenced a program of investment in late 2014, and has been progressively introducing new production capacity. At the time of writing however, no announcements have been made or are understood to be imminent.

Imports stable, but their share has grown

With its close proximity to the rest of Asia, its stable economy and capacity to pay, Australia has long been a key export destination for the region's tissue producers.

Imports of tissue to Australia grew very strongly through most of the last decade. Look back ten years and imports totalled just 43,800 tonnes and accounted for a little less than one-fifth of Australian consumption. A decade on and 123,400 tonnes of imports had almost doubled their influence, accounting for close to 39% of total consumption.

Across all time periods, two countries dominate, as Figure 4 shows. China is the dominant supplier, supported by an ever-growing presence from Indonesia. The other noticeable participant is New Zealand, not because of its volumes, but because these imports are from Asaleo Care's New Zealand facility, back into the Australian market.

In the most recent year, shipments from China accounted for 58% of the total, and those from Indonesia, for 30%. By any measure, combined, the two countries dominate imports to Australia.

Perhaps counter-intuitively, the local producers are among the converters of the imported tissue. Under severe pressures from the domestic retailers to hold consumer prices, local producers have resorted to importing tissue stock, for conversion in Australia. In essence, they would rather control the competition for their locally produced tissue than have little influence over it.

That there is still some margin in this approach is evident by the expanding Australian converting operations of Asia

Fig. 3: Tissue Manufacturing Capacity in Australia: 2008, 2013 – 2018 (ktpa & %)

Y/E June	2008	2013	2014	2015	2016	2017	2018
Estimated Capacity (ktpa)	260	235	235	240	269	256	256
Estimated Production (ktpa)	215	151	185	199	189	198	217
Estimated Capacity Utilisation (%)	83%	74%	79%	83%	70%	77%	85%

Source: ABS & IndustryEdge research and estimates

Pulp & Paper's local affiliate, Solaris Paper. Its operations in Sydney and Melbourne convert APP's tissue stock. Cottonsoft, their sibling in New Zealand operates the same model.

Local producers fend off converted imports, despite higher pulp prices

In Australia, tissue producers are reliant on imported pulp for the significant majority of their fibre supplies. All of the local producers import pulp.

As global pulp prices increased over the last year, local producers faced a still larger impost because the Australian dollar had depreciated against the US dollar.

At the same time, the value of Australia's imports of pre-converted tissue products was rising, in Australian dollar terms, primarily for the same reasons. Unfortunately, the pre-converted tissue import data is only available by value.

However, as Figure 5 shows, growth in the value of tissue product imports has slowed over the last two years, especially for the major products. The value of converted toilet tissue imports in 2017-18 was just 0.8% higher than two years prior, while facial tissue imports were 1.0% higher over the same period. The implication is that with prices rising, import volumes have declined.

Despite their reliance on higher-priced imported pulp, local producers have expanded their production and to some extent, displaced imports of pre-converted tissue products. It is not irrelevant that the major supplier of facial tissue is Asaleo Care from its operations in New Zealand. Take that supply out, and pre-converted tissue product imports to Australia have barely grown over the decade.

Tissue consumption will rise further

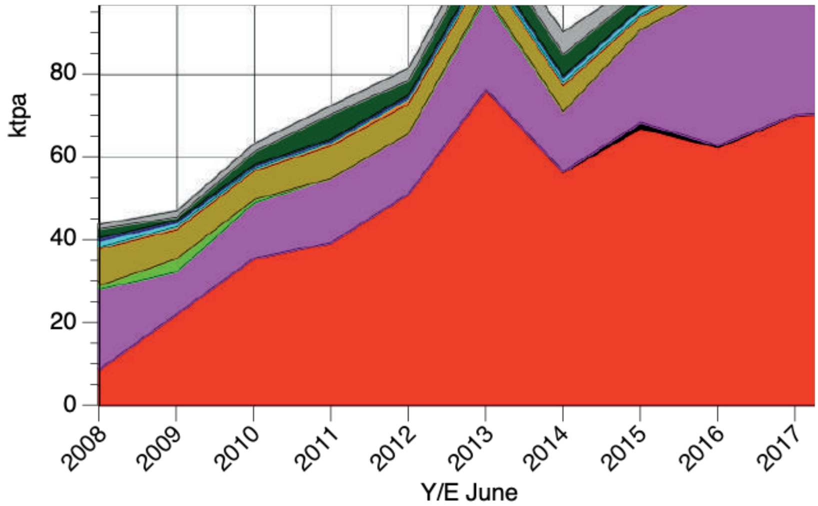
For all that it may seem Australia's tissue consumption must be near its top, IndustryEdge forecasts further growth to 2023. The model deploys three trend scenarios, each of which shows strong growth over the next half decade, from a low of 3.8% per annum to as much as 6.9% per annum. The forecast based on the prior five years of consumption experience suggests consumption will rise an average 5.6% per annum.

Although there are different considerations for each, our assessment is the middle forecast is the most credible, assuming stable population growth and normal economic cycles. If it does eventuate, by 2023, Australia's tissue consumption will be a little more than 420,000 tonnes per annum.

The really interesting question is whether the additional consumption will be supplied locally, or by imports, or a mix of the two. If there is an additional role for domestic production, the next questions are the by who, where, when and how much questions.

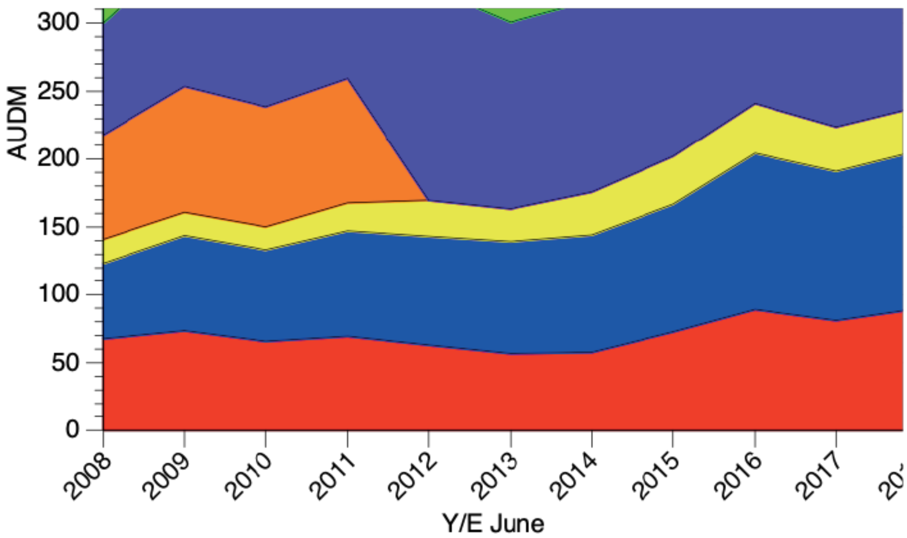
IndustryEdge is Australia's and New Zealand's paper and fibre market expert. The firm publishes the monthly Pulp & Paper Edge and the annual Pulp & Paper Strategic Review, now in its 27th consecutive annual edition. www.industryedge.com.au

Fig. 4: Australian Imports of Tissue Stock by Country of Origin: 2008 – 2018 (ktpa)



Source: ABS & IndustryEdge research and estimates

Fig. 5: Australian Imports of Converted Tissue Products by Grade: 2008 – 2018 (AUDM)



Source: ABS & IndustryEdge research and estimates

Events Calendar

Event	Date	Location	Website
Paper Expo 2019	26-28 January 2019	Gujarat, India	www.paperexpo.in
Paper One	28-30 January 2019	Beirut, Lebanon	www.paperoneshow.net
Paperweek Canada	4-7 February 2019	Montreal, Candaa	www.paperweekcanada.ca
SPAPER	5-7 February 2019	Zaragoza, Spain	www.feriazaragoza.es/spaper-2019
Tissue World Milan 2019	25-27 March 2019	Milan, Italy	www.tissueworld.com/milan
CIDPEX 2019	17-19 April 2019	Wuhan, China	www.en.cnhpia.org
Papercon 2019	5-8 May 2019	Indianapolis, USA	www.papercon.org
International Pulp Week	5-7 May 2019	Vancouver, Canada	www.internationalpulpweek.com
Paper Vietnam 2019	26-29 June 2019	Ho Chi Minh, Vietnam	www.paper-vietnam.com/
Int. Paper Chemicals Tech. Expo China	4-6 June 2019	Guangzhou, China	www.paperexpo.com.cn/
Guangzhou P&P Intelligent Equipment Expo	4-6 June 2019	Guangzhou, China	www.paperexpo.com.cn/
Int. Pulp and Paper Industry Expo-China	4-6 June 2019	Guangzhou, China	www.paperexpo.com.cn/
Zellcheming-EXPO	25-27 June 2019	Frankfurt, Germany	www.mesago.de/en/ZEX2019/home
PackPrint 2019	18-21 September 2019	Bangkok, Thailand	www.pack-print.de
MIAC 2019	9-11 October 2019	Lucca, Italy	www.miac.info
Pulp and Paper Asia	16-17 October 2019	Jakarta, Indonesia	www.pulppaperasia.com
Tissue World Sao Paulo	22-24 October 2019	Sao Paulo, Brazil	www.tissueworld.com/saopaulo
EXPOCORMA	November 2019	Concepción, Chile	www.expocorma.cl
Paperex 2019	3-6 December 2019	New Delhi, India	http://india.paperex-expo.com/Home

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Job Title*

Company*

Address*

Postal Code*

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Telephone* Fax*

Email*

Company Website*

What is your company's primary field of business (tick all that apply):

A. INTEGRATED TISSUE PRODUCTS MAKER

Primary business making paper and producing:

☐ Consumer (At Home) Finished products
☐ Away-from-Home (AFH) Finished products
☐ Other Tissue Grades, please specify: ....

B. JUMBO ROLL SUPPLIER

☐ Jumbo Roll Maker, for sale to converters

C. TISSUE CONVERTER

Primary business is converting jumbos and producing:

☐ Consumer Finished products
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☐ Other Tissue Grades, please specify: ....

D. RETAILING AND DISTRIBUTION

☐ Retailer
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☐ Distributor

E. SUPPLIER TO THE TISSUE INDUSTRY Please check all that apply:

☐ Paper making machinery
☐ Fabrics, felts, clothing
☐ Drying technologies
☐ Process automation and control
☐ Water treatment, environmental and effluent control
☐ Dust control and air treatment systems
☐ Doctors and creping blades

☐ Deinking
☐ Stock preparation, fiber processing and pulping equipment
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