



Global Tissue Industry Study Report 2022



Table of contents

Introduction 03

Survey responses and interviews from experienced tissue producers 03

Sustainability: Hand in hand with Digitalization 04

Many sides of sustainability 05

Developments and focus on sustainability 05

Digitalization has the biggest effect on production 06

Gap Analysis shows the biggest need for improvement lies in profitability 08

Sales & Operations Planning 09

People at the center of development 09

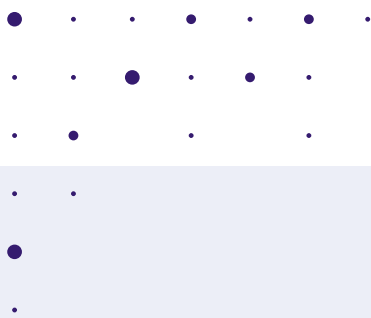
Efficiency 10

Energy efficiency at the top of mind 10

More innovations in raw materials usage required 11

What's next? 13

Contacts 13



This report goes through key findings of our study regarding the tissue industry and tissue producers' thoughts and insights on the current business and its challenges as well as views on the future of the industry.

Introduction

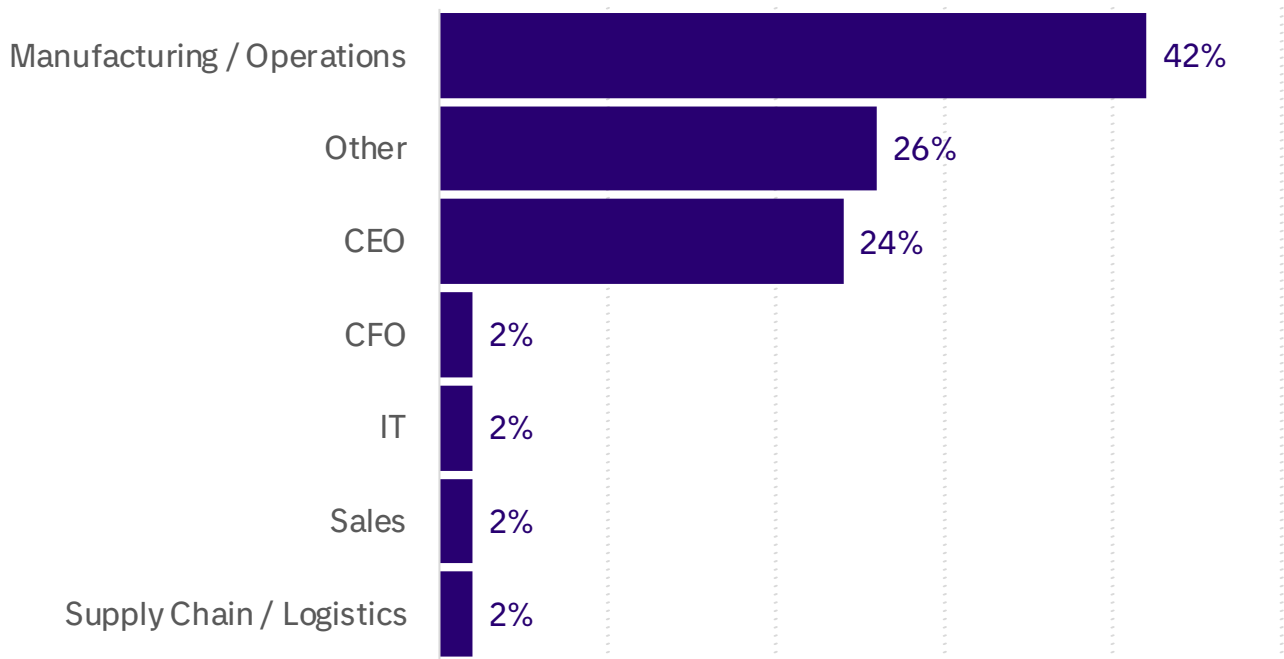
Together with Fisher International, I-Plan, and Valmet Automation, Tietoevry conducted a global market study among the tissue industry in June–October 2022.

The purpose of the study was to find new ways and areas to improve and focus on efficiency; enable cross-border thinking and end-to-end value creation through digitalization; and support a sustainable industry future.

Survey responses and interviews from experienced tissue producers

A total of 50 respondents from 36 validated tissue producing corporations globally took part in the study, giving insight into their current situation and focus areas, but also sharing valuable information on the anticipated impacts of the current market situation and possible investments and trends.

More than one in four respondents are at C level, and nearly a third represent manufacturing or operations. The respondents are leaders and decision-makers who are from all around the world, residing in 22 various countries and five continents. Most of the respondents reside in Europe, but some were also from Africa, Asia, North and South America.



Graph above shows the share of each respondent role.

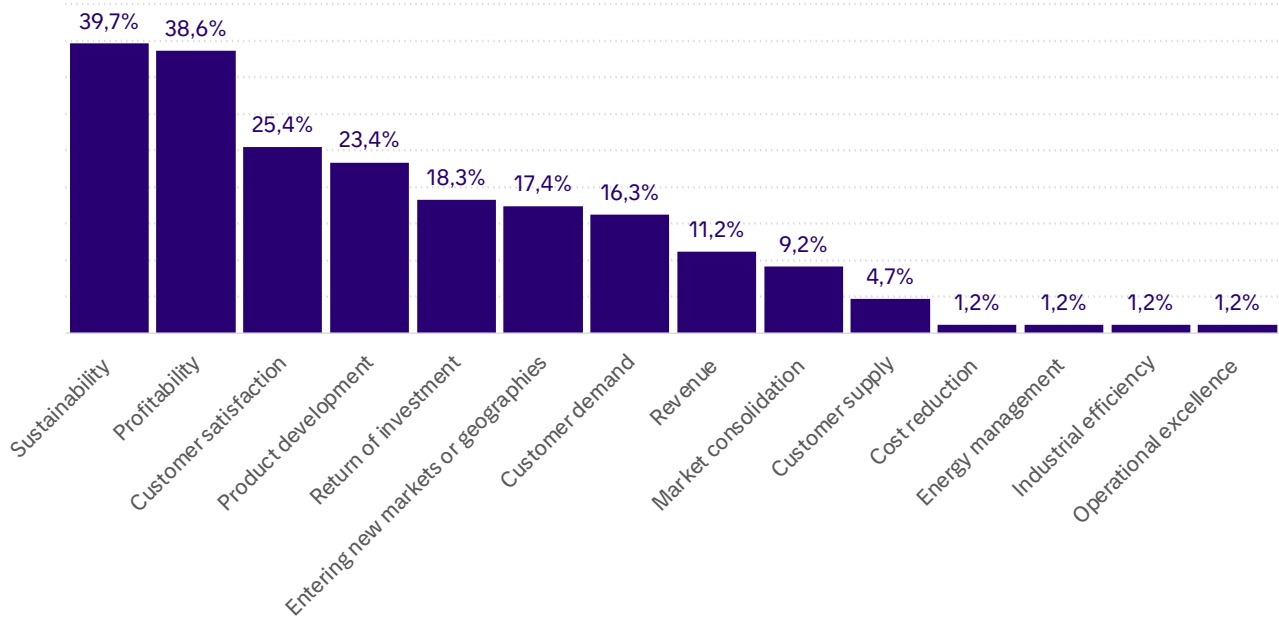
Sustainability: Hand in hand with Digitalization

In the study, profitability and sustainability were at the top of the list when asked about important development and improvement areas. One of the key messages from the respondents is that the outlook for tissue business is uncertain in many ways and business fundamentals are being reviewed because of the volatile market situation with rising raw material costs and increasing inflation.

One of the biggest uncertainties in the industry relates to the cost and availability of raw materials. Shortages of raw materials, chemicals and spare parts have led to substantial increases in price in numerous areas and extended lead times.

Increased inflation has such a dramatic and overall impact because it raises the costs of the entire supply chain including transportation, labor, etc. At the same time, it reduces the consumer purchasing power, which puts a lot of tension on production costs and sales prices.

Thus, tissue producers are under pressure to protect their profitability and search for efficiency through sustainability and digitalization.



Graph above shows the distribution of answers to the multiple-choice question "In your Tissue business, what are the most important development and improvement areas?"

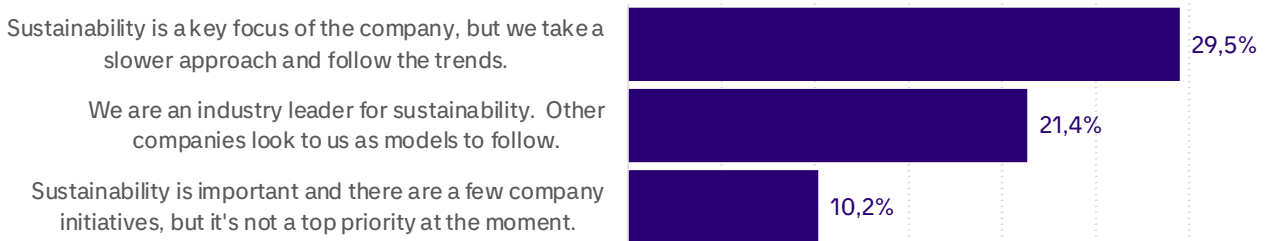
Many sides of sustainability

In the next two years, nearly 70 % of respondents are planning on investing in producing green energy on-site with solar panels or wind turbines, for example. Two thirds of the respondents are investing in any equipment that helps reduce carbon emissions. Over half of the respondents are aiming to reduce their use of plastic and are changing their fuels to fossil-free options.

Any investment in modern machinery or digitalization of manual or old-fashioned tools is positive. With artificial intelligence or predictive analysis, it is possible to develop and improve profitability by avoiding manual labor and human errors.

Developments and focus on sustainability

The survey then asked respondents to choose from one of the following:



Graph above shows the distribution of answers to a multiple-choice question regarding the respondent's company's stance on sustainability.

Nearly half of the respondents find sustainability important but are still following trends and take on a slower approach on the topic. 36 % of the tissue producers said they are an industry leader when it comes to sustainability. Surprisingly, 18 % of respondents said that sustainability is not a top priority for their company at the moment, even though it ranked the second highest when asked about key improvement areas.

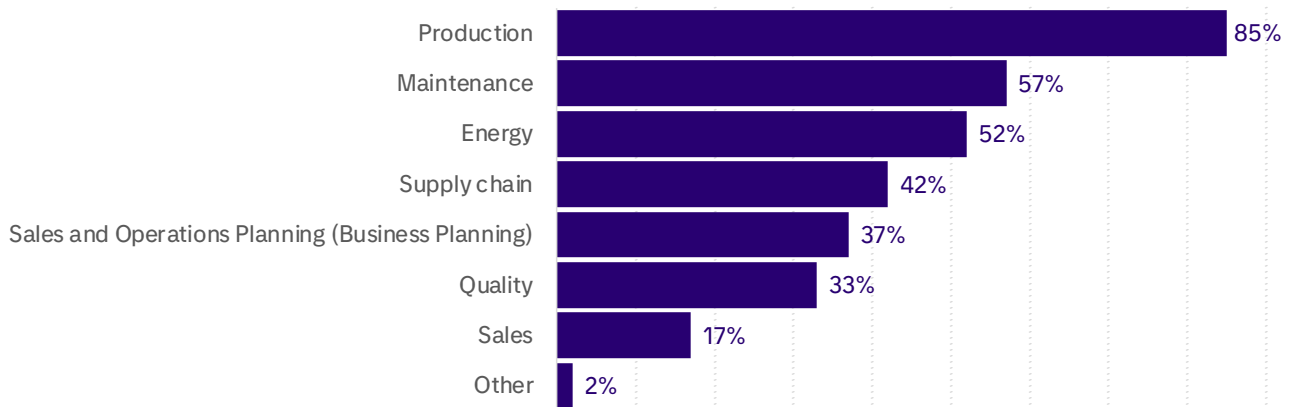
Sustainability is not only about reducing emissions and choosing carbon neutral options, it also includes shortening the supply chain and managing it more efficiently. Data collection, tracking and tracing, setting the right Key Performance Indicators, and appropriate reporting are key issues.

Efficient management does not come cheap, but better efficiencies create savings in the long run. This applies to both the supply and logistics chain, and mill and production operations.

Digitalization has the biggest effect on production

When it comes to digitalization in the upcoming 12 months, key focus areas are most commonly production related. A whopping 85% of respondents chose production when asked about areas where they are going to apply new technologies. 57% chose maintenance and 52% energy.

What are your key focus areas in digitalization and applying new technologies, e.g. artificial intelligence in the next 12 months?



Graph above shows that production is one of the biggest key focus areas in the following 12-month period when applying new technologies.

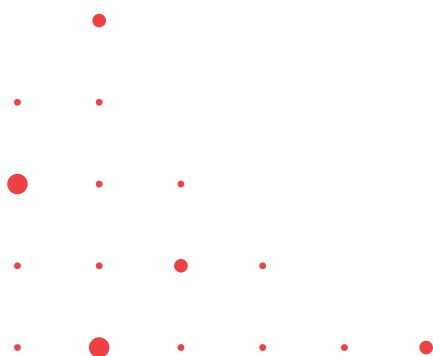
Profitability and efficiency have been at the center of discussion for several years. Next to production efficiency, there is the topic of energy efficiency, and during the current European energy crisis this has only been more pronounced.

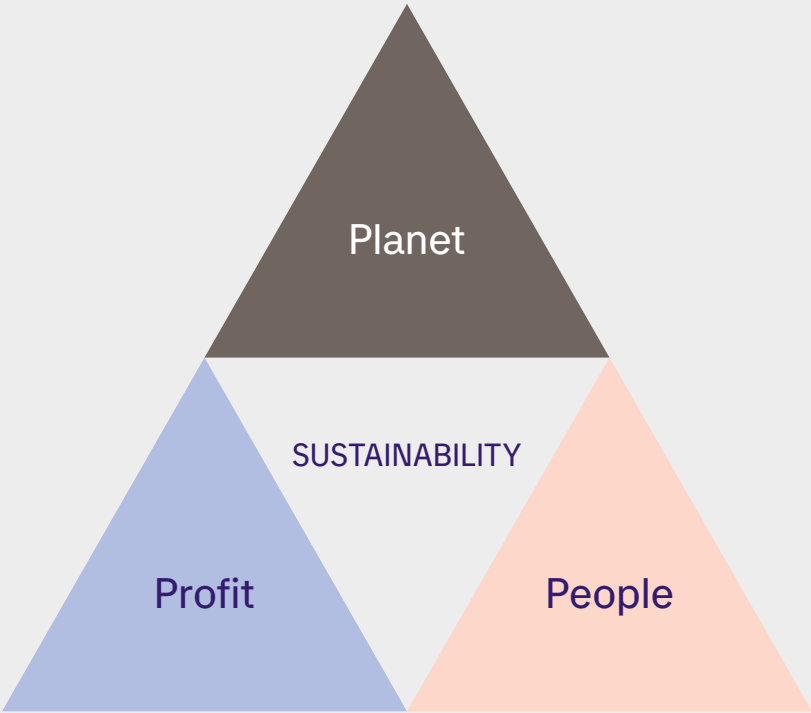
The global economy and current trends (especially in Europe) all have their effect on profitability: energy prices, raw material availability and cost are all at the top of mind of the respondents. The tissue industry is a low-margin business where cost fluctuation has an immediate impact on profitability.

Sustainability is a new theme compared to these two; sustainability has been a globally hot topic for only the past few years – and the tissue and cardboard sectors

especially have been holding more discussions around sustainability lately. While efficiency is still at the center of attention, the goal to be pursued alongside efficiency is sustainability.

Digitalization is an enabler to help improve efficiency and thus sustainability. However, no amount of digitalization or new systems will help if people and processes are not working together. People, tools, and processes are linked in a sort of “holy trinity”, where digitalization only enables more efficient working, which thus helps mills and factories to become more sustainable.





Gap Analysis shows the biggest need for improvement lies in profitability

Profitability is strongly linked on efficiency, both in production and business processes. Many respondents, especially CEOs, emphasize the importance of reliable Manufacturing Execution Systems (MES). A successful MES is seen as boosting improvements not only in production, but also in operations, maintenance, and business planning.

We got interesting results when we asked the respondents to evaluate 12 themes on a scale of 1-4 by first rating the theme's importance and then their organization's current performance on that same theme. The biggest gap by far lies in profitability. Other major gaps are found in digitalization and utilizing data, and demand planning and sales forecasting.

To increase efficiency at the mill level and fully realize the benefits of digitalization, knowledge sharing and collaboration are crucial factors together with the efficient use of data. Industry leaders are combining data from MES and Automation systems for optimizing the outcome of the mill-wide operations.

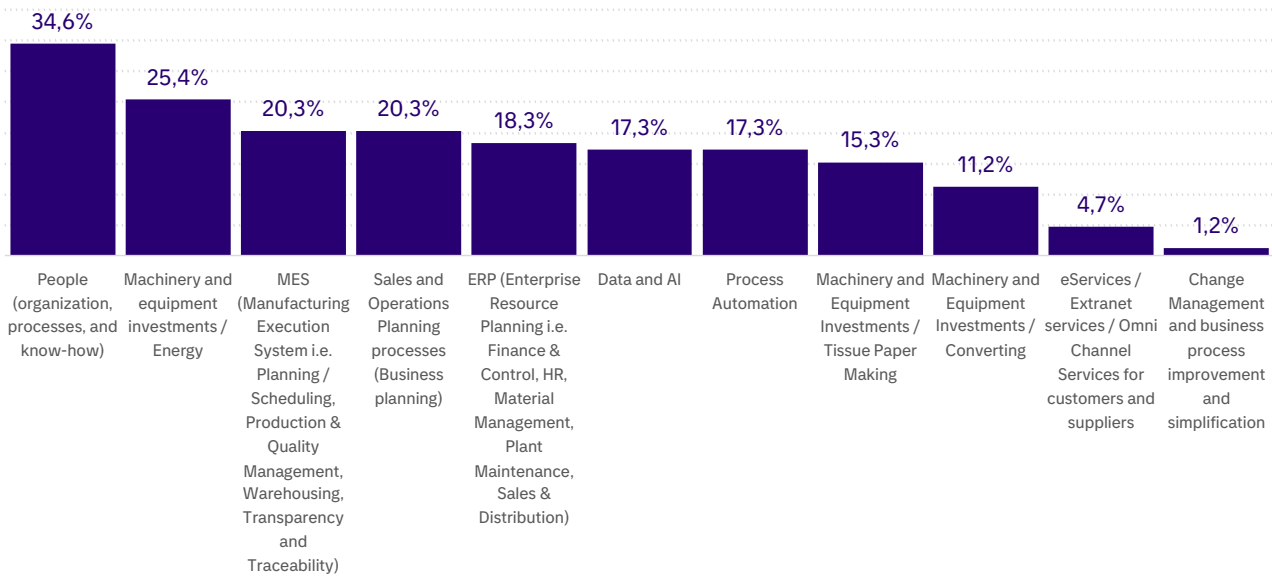
Machinery and Equipment, Process Automation, and Systems investments are largely on the same significance level. Interestingly, development needs in systems, such as MES, ERP and Sales & Operations Planning, process automation, and data and AI are seen as more important than investments in tissue or converting machinery.

The next step in digitalization will need to improve the visibility and profitability of a plant or mill by analyzing and utilizing data even more widely. New AI-driven applications are expected to bring more transparency and understanding into the decision-making process.

A topic that was repeatedly highlighted among responses was process centerlining, where new tools shall support operations by guiding how current operation parameters shall be adjusted to drive shift unity as well as meeting efficiency and cost targets.

Advanced Maintenance analytics provide good tools for evaluating real time performance, as well as provide indicators that inform the need for predictive maintenance.

To summarize, when considering your development areas, in which areas are improvements most necessary?



Graph above shows that 57 % of respondents think that processes, organization, and know-how need to be improved.

Sales & Operations Planning

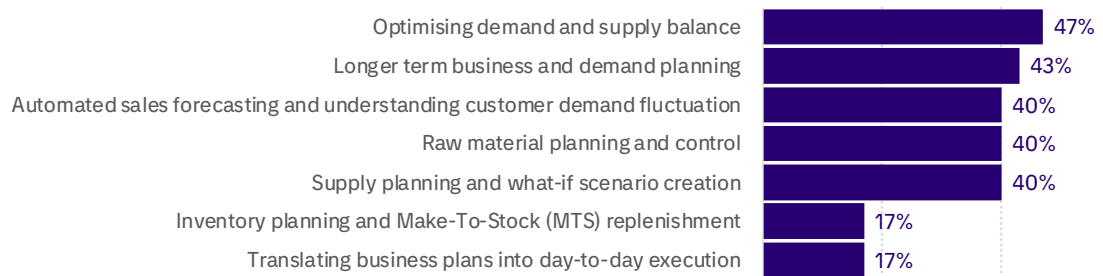
As profitability is one of the biggest concerns currently in the market, the tissue producers look for solutions in Sales and Operations Planning (S&OP) since it brings transparency to the business operations and helps to balance volatile demand and supply capabilities, particularly in short lead-time converting operations

In addition, digitalization will drive the tissue industry to higher levels of efficiency. As our study shows, automated sales forecasting and faster response to customer demand volatility by automated optimized inventory replenishment planning are key development areas currently for tissue producers. To drive profit, tissue producers must improve their supply chain planning and S&OP capabilities.

Planning semi-finished product production in large batches, where storage space is limited indeed requires forecasting tools and robust yet agile demand planning processes. Automated raw material planning (BOMs) and control are mandatory.

As the graph below suggests, best-in-class tissue businesses require planning solutions to manage longer-term, tactical demand, and supply balancing processes. That is to manage inventory buffers in semi-finished and finished goods materials and a short-term planning process for detailed, up-to-the-minute scheduling capabilities.

What are the most critical development areas within your tissue sales and operations planning (S&OP) currently?



Graph above shows that the most critical development areas within S&OP are currently optimizing demand and supply balance, automated sales forecasting, and longer-term business and demand planning. Here pictured are the top 7 themes.

People at the center of development

As shown in the earlier graph, “People” was the most important focus area to improve upon. This can mean the organization itself, processes, or know-how. As mentioned in the sustainability section of this whitepaper, people are one aspect of the “triangle” to create sustainable environments!

Depending on the respondent's region, workforce issues also came into play – scarcity of workers and their low skill level played a role.

The future manufacturing shop floor and worker are characterized by connectivity and exchange of data and information in addition to the physical parts and products. In this environment, effective communication skills are key. Effective communication

in this environment includes humans, IT and AI systems, as well as all other stakeholders.

IoT platforms and other technologies enable real-time communication and exchange of data. However, the ability to break down a complex problem and explain it to others, within or without disciplinary borders, is a key skill, as workers can change jobs frequently making fast and effective knowledge transfer more important than ever.

Efficiency

Respondents are expecting to gain more cost savings or increase efficiency by focusing on the areas like energy consumption and production, better usage of raw materials, operations, and production.

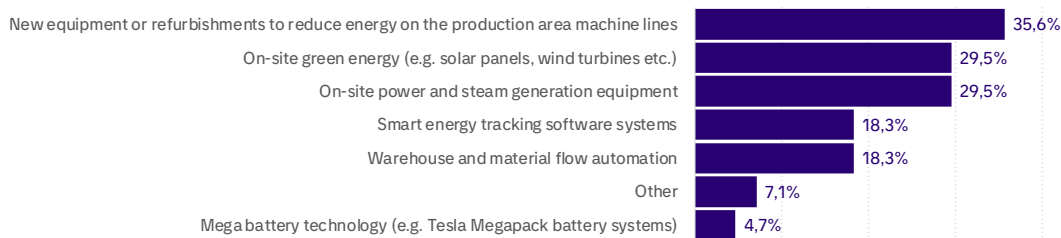
Energy efficiency at the top of mind

The two most important initiatives named by the respondents that are planned at tissue mill sites with respect to sustainability and carbon footprint are related to energy: capital investments in any equipment targeted to reduce plant emissions and on-site investments in green energy.

Thus, it is expected for companies to invest in energy efficiency in the coming years. This is also supported by our study, which shows that the most crucial investments relate to new equipment to reduce energy in production, on-site green energy sources and on-site power and steam generation equipment.

As mentioned earlier, this study's gap analysis also provided interesting results when it comes to efficiency. There are big gaps between the importance and current performance in energy efficiency, logistics and supply chain efficiency, and production efficiency.

What capital investments are planned within the next 2 years at your tissue mill sites with respect to energy efficiency and savings?



Graph above shows what kind of investment tissue producers are planning within the next two years.

As new equipment or refurbishments to reduce energy in production is the biggest investment area, there are two key processes to improve energy efficiency: pressing and drying.

Energy costs are responsible for over 30 % of the total costs in the tissue industry. Of that percentage, approximately 70% of the total energy consumption at tissue mills is drying energy.

Investments focusing on improved pressing performance and nip dewatering means there is less water to evaporate in the drying section. Improved drying section operations (including Yankee cylinders, Yankee hoods and heat recovery) are key for maximizing energy efficient performance.

Quality control systems have a significant role in the tissue making process where accurate measurements are the foundation to enable raw material and drying energy savings through reduced quality variability.

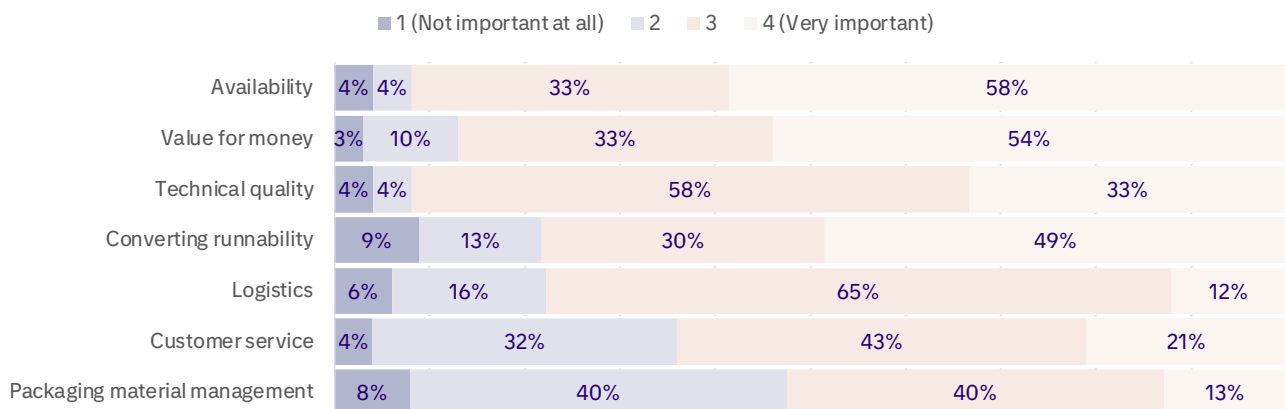
All these investments are proven to lead to increased runnability of machine lines and converting lines.



More innovations in raw materials usage required

Efficient use of raw materials is also at the center of development. Better usage of raw materials includes such things as e.g. fiber mix optimization, reducing fiber reprocessing, coreless toilet paper, and waste reduction.

How important are the following properties of raw materials to you?



Graph above shows that availability and value for money are the most important properties in raw materials.

We also found out about the expectations that the tissue producers have for fiber suppliers in the areas of quality and supply chain efficiency.

From the open-ended answers, we recognized four clear themes of respondents' expectations for the fiber suppliers. The themes are:



Quality of fiber

The most important aspect in quality is its consistency and reliability. In addition, the properties of the fiber, such as brightness, viscosity, humidity, and compliance with agreed specifications, are important.



Availability of fiber and lead time

The respondents expect reliable and consistent supply of fibers from their partners. Sufficient supply and reasonable lead time is very much appreciated.



Sustainable partner and relevant certifications

FSC certified materials, following ESG principles and sustainable supply are expected from the fiber suppliers.



Responsible pricing

Reasonable and responsible pricing, cost predictability, cost effectiveness and long-term price policy are brought up by the respondents.

Other expectations mentioned are operational reliability and innovations relating to new material development.

What's next?

Working on profitability is vital for tissue producing corporations at the moment. Due to current economic situations, especially in Europe (November 2022), margins are low and there are likely several factories that are unprofitable. Despite this, investments toward productivity and thus sustainability would be helpful to keeping businesses up and running while also increasing profitability.

Some expectations toward suppliers and partners are supplier accreditations and certifications, best new technologies, and breakthrough initiatives in sustainability solutions.

Compared to other production industries the Tissue industry seems to be a bit behind in AI-use with more than 33% of responses indicating that AI solutions are not yet actively used in decision making. Key Tissue industry frontrunners have however recently shared news about multimillion AI investment projects, so there seems to be a drive ongoing to close the gap.

AI solutions require a need to process a huge amount of accumulating data. Since these tools are now available, manufacturing companies will be able to take a quantum leap here and benefit from rapid AI developments.

Something to consider in the future is to invest in ecosystem collaboration. Thus far, there aren't standardized models for working in ecosystems, and it is still quite rare to see ecosystems in the industry. However, this could provide a fresh way of thinking as ecosystems could challenge old ways of working or create new ways of generating innovations or business models.

This study is also showcasing that the tissue industry is at a turning point, and plenty of investments, evaluations and testing must be made to find ways to keep businesses profitable, sustainable, and efficient in the future.

We are looking forward to present and share more additional study insights, for example, on geographical differences. Please don't hesitate to contact us for more information.

We will be happy to arrange a meeting to give you more detailed results. In these matters or to answer any questions you might have please contact

Jarmo Ropponen

Head of Sales and Marketing Pulp, Paper, and Fiber, Tietoevry

jarmo.ropponen@tietoevry.com

Matt Elhardt

Vice President, Global Sales at ResourceWise, parent brand of Fisher International

matt.elhardt@fisheri.com

Jari Kaukiainen

Director, Business Development, I-Plan

jari.kaukiainen@iplanworld.com

Jari Almi

VP, Pulp and Paper Systems, Automation Systems, Valmet Automation

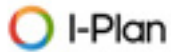
jari.almi@valmet.com

About TietoEvry

TietoEvry creates purposeful technology that reinvents the world for good. We are a leading technology company with a strong Nordic heritage and global capabilities. Based on our core values of openness, trust, and diversity, we work with our customers to develop digital futures where businesses, societies, and humanity thrive.

Our 24,000 experts globally specialize in cloud, data, and software, serving thousands of enterprises and public-sector customers in more than 90 countries. TietoEvry's annual turnover is approximately EUR 3 billion and the company's shares are listed on the NASDAQ exchange in Helsinki and Stockholm, as well as on Oslo Børs.

www.tietoevry.com



About I-Plan

I-Plan is an intelligent supply chain planning solution for process manufacturing businesses like Pulp, Paper, Tissue, and Packaging. It is a planning tool to manage the sales and production of operations based on profitability and link the business plan to execution.

The tactical and real-time advantage over competitors comes as standard with the unique I-Plan Sales & Operations Execution solution. Unprecedented weekly, daily, hourly, and minute-by-minute accuracy in your planning and execution allow responding to demand with a clear picture of capacity and stock – in all scenarios.

I-Plan implementation, training and support services fit together to help smooth customer transition and scale successfully in the face of uncertainty and change. I-Plan is a UK company.



About Fisher International

Fisher International, a ResourceWise company, offers unparalleled expertise and solutions for suppliers, producers and investors that inspires better performance in the capital-intensive pulp and paper industry.

For over 30 years, Fisher International has helped companies across all aspects of the global pulp and paper industry be more purposeful in deciding how to best utilize their assets to gain tremendous advantages in efficiency, productivity, and profitability.

We help clients leverage their distinct strengths, augmented by the guidance surfaced through our rich data, analytics, and expertise, to develop unique solutions their competitors can't imitate. Our highly detailed data helps clients make the best of their resources to forge a successful path forward.



About Valmet Automation

Valmet is a leading global developer and supplier of process technologies, automation and services for the pulp, paper, and energy industries. With our automation systems and flow control solutions we serve an even wider base of process industries.

Our 17,500 professionals around the world work close to our customers and are committed to moving our customers' performance forward – every day.

Valmet's shares are listed on the Nasdaq Helsinki and the head office is in Espoo, Finland.