FROST & SULLIVAN

INDEPENDENT EQUITY RESEARCH

SONOVIA

March 8th, 2021

INITIATION OF COVERAGE

Stock Exchange
TASE

Symbol
SONO

Sector
TECHNOLOGY

Sub-sector
ELECTRONICS & OPTICS

Stock price target
NIS 30.7

Closing price
NIS 20.6

Market cap
NIS 309.3 Mn

No. of shares
14.9 Mn

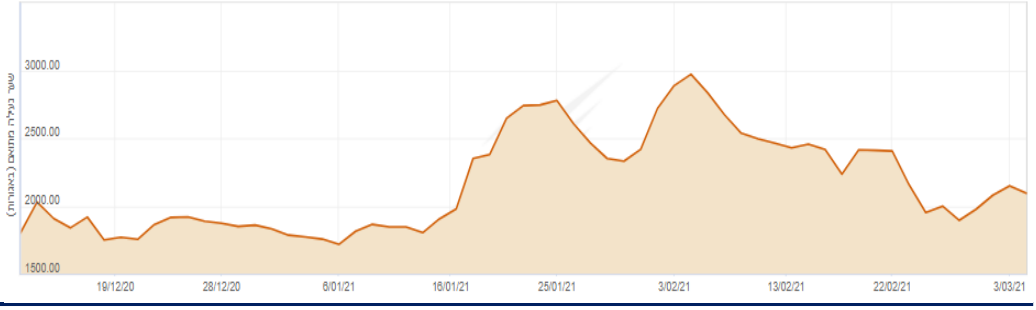
Daily Trading Volume
NIS 401.7 K

Stock Performance (Since Dec. 2020)
16.4%

- Sonovia develops high-performing, durable, and sustainable textile finishing applications, such as anti-pathogenic, flame retardancy and water repellency, while using ultrasound at the core of its technology.
- **Strategy and market** - Sonovia's **ultrasonic technology aims to disrupt the textile wet-finishing industry** – the 2nd most polluting industry globally – by integrating with existing textile finishing lines and proprietary chemical formulations. Sonovia operates within a **$15.8 billion market for functional textile finishing agents and textile dyeing**.
- Sonovia has partnered with a globally renowned fabric finishing machinery manufacturer and conducts pilots with leading multinational brands; **we assume global market penetration is expected to be rapid and aggressive**.
- Financially, Sonovia was accepted to the "*Fashion for Good – Plug and Play*" accelerator to support Sonovia's water repellency R&D. Sonovia also received a grant of €2.4 million from the European Commission's SME program; By Q3 2020, Sonovia generated over $5 million in revenue from global sales of its branded anti-pathogenic face mask.
- **The Company has a novel platform technology with a great promise in becoming the future incumbent technology for performing textile wet-finishing applications in versatility, performance, durability, ease of use, cost-competitiveness, and sustainability. However, like any other tech firm, we will have to see how Sonovia is scaliing up its sales.**

Valuation - We value Sonovia's equity at NIS 458 million; price target to be in the range of NIS 29.6 to NIS 31.8 with a mean of NIS 30.7.

Year	Revenues (000 NIS)	EBITDA (000 NIS)
2021E	12,000	365
2022E	16,607	665
2023E	28,641	5,083



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Contents

Investment Thesis

Sonovia is an Israeli publicly-traded high-tech company focusing on R&D of high-performing, durable and sustainable textile finishing applications while using ultrasound at the core of its technology. Sonovia's anti-pathogenic application, which provides over 99% active protection against viruses (including covid-19), bacteria, and fungi, is already generating revenues (over $5 million in Q1-Q3 '20) and is tested by leading brands and manufacturers. Additional applications - water repellency, flame retardancy, and dyeing – are either in R&D, or in the company's R&D pipeline.

Sonovia operates within the textile industry, which is constantly growing yet is currently at a tipping point: Increased consumer awareness of and preference for textiles produced with a low ecological footprint, coupled with increasingly stringent regulation and enforcement of chemical use, are expected to drive a significant industrial change as manufacturers are already forced to seek innovative, 'green' solutions.

Sonovia's technology and its advantages over conventional methods and its ongoing activity with leading brands and OEMs across several key markets have the potential to disrupt the textile finishing and dyeing industries significantly and increase demand for new functional products. Realization of that potential depends greatly on successful entry into various verticals, achieving a global installation base, and creating brand awareness.

Sonovia's technology utilizes ultrasonic energy to physically infuse textiles with the required functional compounds, based on the required application, via a sustainable process. The Sono-finishing process eliminates the need for polymeric chemical binders and other harmful chemicals and dramatically reduces water and chemistry consumption in the process.[1] The result:

- High performance: Sonovia's anti-pathogenic application displays 99.9% elimination of viruses, including SARS-COV-2, bacteria, and fungi;
- High durability: Fabrics treated with Sonovia's technology exhibit high durability to industrial and home laundry as well as to high temperatures;[2]
- Versatility: Sonovia's technology applies to all types of textiles;

[1] Chemical and water consumption varies per application.
[2] Additional durability assessments to different washing protocols need to be executed.

- Cost-effectiveness and sustainability: Sonovia's technology may reduce up to 95% of the water consumption compared with conventional textile wet-finishing and eliminate chemical binders' need.

The Sono-finishing process vis-à-vis traditional methods – a comparative overview

	Padding	Extrusion	Sono-finishing
Applicability to all textile compositions	Requires different formulas and chemical binders	Only synthetic	Yes
Durability to industrial laundry	Moderate to poor	Very high	Very high[3]
Durability to home laundry	Moderate	High	Moderate (expected to improve with R&D)[4]
Durability to high-heat	Low	High	High
Cost-effectiveness	High	Low	High
Sustainability	Moderate to poor	Poor	High
Scalability	High	Low	High

Source: Sonovia and F&S analysis

Sonovia operates two distinct departments:

(1) The personal safety department, which currently operates a D2C model: Direct sales of branded personal protective products – such as the SonoMask – to end-clients in the private sector;
SonoMask sales Exceeded $5 million as of September 30, 2020, and represent about 85% of Sonovia's revenues.

(2) The Sono-applications department, which is due to operate under a B2B model:
- Capital sales of machines; with Brückner Trockentechnik GmbH & Co. as the machinery partner, global market penetration is expected to be rapid and aggressive.
- Repeating sales of required chemical formulations are expected to become the company's core revenue stream (the current install base of the Brückner alone is over 5,000 machines).
- Potential revenues from "Sonovia-inside" trademark tags

The most immediate needs are personal safety in the healthcare, automotive, and hospitality markets. Hospital Acquired Infections (HAIs) represent a persistent challenge in the healthcare sector, exacerbated by

[3] Pending additional assessments
[4] Pending additional assessments

covid-19. HAIs affect hundreds of millions of patients worldwide each year, leading to significant morbidity and mortality as well as financial losses for health systems:

- 136,000 annual deaths in the US and Europe are attributed to HAIs.
- The direct financial burden of HAIs is estimated to account for €7 billion in Europe and $6.5 billion in the US. Yet, research suggests that the total (direct + indirect) economic burden is significantly higher – up to $45 billion per annum.

Textiles with anti-pathogenic properties show great promise in reducing the prevalence of HAIs and their associated economic burden. Evidence indicates that textiles treated with anti-pathogenic reduce HAIs rate dramatically and could result in cost reduction of up to €8,038 million. The severe impact of covid-19 on hospitals has elevated awareness of the speed and breadth with which HAIs spread in healthcare institutions and is expected to act as a catalyst on institutional demand for anti-pathogenic textiles, especially as novel solutions are proven effective in eliminating SARS-CoV-2 and other pathogens.

Covid-19 is also a catalyst for the rapidly growing interest in textiles with anti-pathogenic properties by additional verticals, such as the hospitality market, the sportswear market, and the automotive upholstery market. Sonovia holds a competitive advantage in the latter: Fabrics treated by Sonovia's durable anti-pathogenic application show elite anti-microbial and anti-viral performance while eliminating the use of hazardous chemicals

Sonovia operates within the functional textile finishing agents market was valued at $5.2 billion in 2020 and is projected to exceed $6.9 billion by 2027, at a CAGR of 3.9%. Sonovia estimates the TAM for its anti-pathogenic application for its four verticals – medical textiles, hospitality textiles, sportswear, and automotive upholstery – at an aggregated value of $1.56 billion.

Sonovia also aims to enter the textile dyeing market, which was valued at $9.4 billion in 2018 and is projected to reach $15.5 billion by 2026, growing at a CAGR of 6.3% from 2019 to 2026. While Sonovia's entry into the textiles dyeing market is pending upon successful development and proof-of-concept, which are expected in the near future, its potential to disrupt the textile dyes market is equal – if not greater – than its potential to disrupt the textile finishing market.

R&D milestones

	H1 '21	H2 '21	H1 '22	H2 '22
Lab R&D	Anti-pathogenic Water repellence	Water repellence Fire retardancy Dyeing	Fire retardancy Dyeing Softening	Softening
Beta testing		Anti-pathogenic	Water repellence	Fire retardancy Dyeing
Clinical testing[5]		Anti-pathogenic		
Regulatory approval			Water repellence Anti-pathogenic	Fire retardancy Dyeing
Go-to-market			Water repellence Anti-pathogenic	Fire retardancy Dyeing

We believe Sonovia is on a path for growth and success on a global scale:

- Sonovia's novel platform technology and its unique value propositions present great promise in becoming the future incumbent technology for performing textile wet-finishing applications in versatility, performance, durability, ease of use, cost-competitiveness, and sustainability.
- Sonovia's technology has been endorsed by the "*Fashion for Good – Plug and Play*" accelerator and by the European Commission's SME program for its potential in fighting Hospital-acquired infections and dramatically reducing the ecological footprint of the fashion industry.
- Sonovia partnered with a globally-renowned designer and producer of finishing systems for textiles with a presence in 90 countries and an installed base of over 5,000 machines, and is already conducting pilot tests with leading brands in the fashion, sportswear, and automotive verticals, and has a clear strategy and R&D pipeline for the next 24 months.

Therefore, we view Sonovia as a good investment opportunity and value the company at NIS 458.4 million

[5] As obligated under the H2020 SME grant, and required for penetrating the Healthcare industry.

1. Company Overview

Sonovia is an Israeli publicly-traded high-tech company focusing on research and development of high-performing, durable and sustainable textile finishing applications, such as anti-pathogenic, flame retardancy, and water repellency while using ultrasound at the core of its technology. The Sono-finishing process eliminates the need for polymeric chemical binders and other harmful chemicals and dramatically reduces water and chemistry consumption in the process. Sonovia's anti-pathogenic application, which is currently being implemented and commercialized in Sonovia's face-masks, provides over 99% active protection against viruses (including covid-19), bacteria, and fungi. Sonovia's water repellency application is currently in the pilot phase with a global brand of water-repellency laminates (IP and know-how remain confidential and proprietary of Sonovia). Flame retardancy and dyeing are expected to enter into the R&D stage within the next 12 months.

Sonovia operates within the textile industry, which is constantly growing yet is currently at a tipping point: Increased consumer awareness of and preference for textiles produced with a low ecological footprint, coupled with increasingly stringent regulation and enforcement of chemical use, are expected to drive a major industrial change as manufacturers are already forced to seek innovative, 'green' solutions.

Sonovia's technology utilizes ultrasonic energy to physically infuse textiles with the required functional compounds, based on the required application, via a sustainable process. The Sono-finishing process eliminates the need for polymeric chemical binders and other harmful chemicals and dramatically reduces water and chemistry consumption in the process.[6] The result:

- High performance: Sonovia's anti-pathogenic application displays 99.9% elimination of viruses, including SARS-COV-2, bacteria, and fungi;
- High durability: Fabrics treated with Sonovia's technology exhibit high durability to industrial and home laundry as well as to high temperatures;[7]
- Versatility: Sonovia's technology is applicable to all types of textiles;
- Cost-effectiveness and sustainability: Sonovia's technology may reduce up to 95% of the water consumption compared with conventional textile wet-finishing[8] and eliminate chemical binders' need.

[6] Chemical and water consumption varies per application.
[7] Additional durability assessments to different washing protocols need to be executed.

Vision and mission

Sonovia's vision is to become the future incumbent technology for performing textile wet-finishes. Sonovia is driven by the urgent need to address global challenges with its anti-pathogenic application, such as the spread of pandemics and hospital-acquired infections, along with a long term vision of using its novel Sono-finishing process and applications pipeline to dramatically reduce the ecological footprint (particularly the use of chemicals and water consumption) of the fashion industry.

Today Sonovia is accelerating the industrial scale-up process for its anti-pathogenic finishing application and invests in R&D of additional applications, such as water repellency, flame retardancy, and textile dyeing.[9]

The SONO project

The SONO project[1] was a part of a Nanosciences, Nanotechnologies, Materials, and new Production Technologies Cooperation Programme under the 7th Framework Programme (7FP). The project's aim was to address the global challenge of Hospital-Acquired Infections (HAIs) by developing a novel platform for producing medical antibacterial textiles. The technology is based on early results demonstrating that metal oxide nanoparticles (ZnO, CuO, and MgO) sono-chemically coated on various fabrics can kill a large variety of bacteria efficiently. It was demonstrated that due to the special properties of the sono-chemical method, the antibacterial nanoparticles are adsorbed permanently on the fibers even after 70 "laundry cycles." The research revealed that the metal oxide nanoparticles could also kill bacteria resistant to antibiotics.

The SONO project achieved the following:

a) The construction of two 'roll to roll' sonochemically coating machines and successful execution of antibacterial applicative treatment on fabric;
b) Successful scale-up of the platform to a semi-industrial capacity;
c) Proof that antibacterial activity is retained even after 100 wash-cycles at 75°C;[10]
d) Proof of clinically-significant decrease in bacterial infection in use of treated fabric in a small-scale clinical trial.

[8] Chemical and water consumption varies per application.
[9] R&D on flame retardancy and dyeing is expected to commence at H2/2021.
[10] Using an ecological, PH neutral detergent.

The project received €8.3 million in funding from the European Commission.

The success of the SONO project led to the establishment of Sonovia in 2013 and to a 2014 licensing agreement with BIRAD Research & Development Company Ltd. – Bar-Ilan University's Technology Transfer Office – which grants Sonovia exclusive global commercialization rights for a metal-oxides based anti-pathogenic sono-finishing process for reusable textiles. IP and know-how developed beyond the scope of the patent at the core of this agreement will be proprietary to Sonovia.

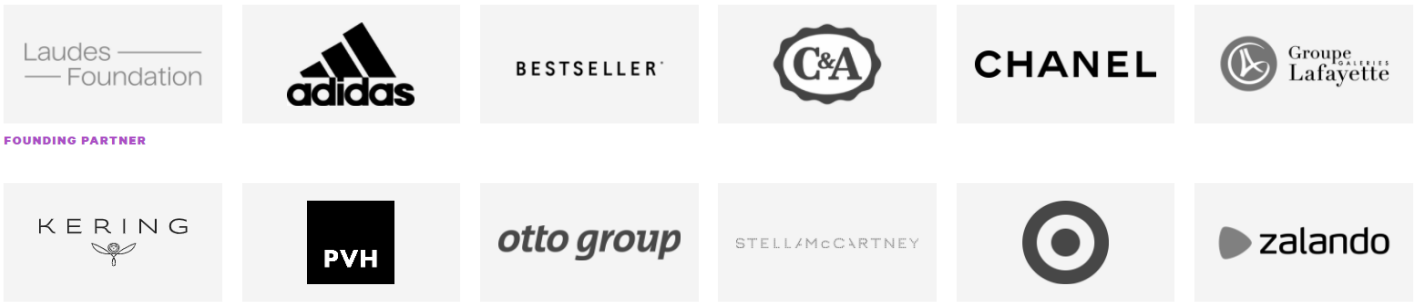
In January 2018, Sonovia signed an agreement with Brückner Trockentechnik GmbH & Co. – a globally-renowned designer and producer of finishing systems for textiles with a presence in 90 countries and an installed base of over 5,000 machines – for the development of an industrial-scale Sono-finishing module.

The Sono-finishing process that provides the anti-pathogenic treatment to the fabric is performed today at a 20 meter/minute speed, which equates to an annual production capacity of about 8.5 million meters (at 80% utilization).

Special programs, grants, and additional funds raised

In 2018 Sonovia was acceded to the "*Fashion for Good – Plug and Play"* accelerator program that supports a selection of startups driving innovation in sustainability, circularity, and transparency in the textile field, with an investment of €200,000 from the accelerator. Sonovia also acceded to the scaling program, which offers pilots for testing the technology with leading global brands in the fashion industry. The reason for Sonovia's acceptance to the programs is its potential to replace the conventional, highly polluting textile wet-finishing process with a high-performing, cost-effective, durable, and sustainable technology that eliminates the need for polymeric chemical binders and other harmful chemicals in the process, and could dramatically reduce water consumption.

Figure 1: Fashion for Good – Plug and Play accelerator and scaling program partners



Source: Fashion for Good – Plug and Play

In August 2019, Sonovia received a non-diluting, partner-free grant of €2.4 million under the European Commission's SME program, with an advanced payment of €1.176 million and the remainder paid upon fulfillment of milestones set for the first 12 months – which the company had achieved.

In Q4 2020, *Fashion for Good* proceeded to invest an additional $30k in Sonovia to support the R&D efforts into a fluorocarbon-free and durable water repellency application. This endeavor is conducted in collaboration with a commercial partner, a global leader in water repellency laminates.[11]

Covid-19 as catalyst

The healthcare Personal Protective Equipment (PPE) industry has witnessed unprecedented global demand for its products during the COVID-19 pandemic, resulting in dramatic and dynamic impacts, such as steep price increases followed by sharp price drops, widespread circulation of sub-standard and counterfeit equipment, and emergency authorization of alternatives (e.g., KN95 masks) followed by their removal for failure to meet required filtration efficacy.

Perhaps most importantly, numerous market verticals which haven't widely assimilated purification technologies began actively and strategically looking for antimicrobial solutions that were capable of effectively extinguishing viruses and bacteria to protect the public and prevent infection. Among them, the washable and reusable face mask market was valued at $1.3 billion in 2019 and is projected to exceed $7 billion by 2027, growing at a CAGR of 23.5%.[2]

[11] All IP and Know-how in this project retains solely under Sonovia.

Upon the outbreak, Sonovia identified an opportunity to test consumer awareness and market demand for fabrics with antimicrobial and anti-viral properties and embarked on manufacturing and selling branded face masks. Sonovia's face masks – made from fabrics treated with Sonovia's anti-pathogenic application – offer over 99% active protection against viruses (including covid-19), bacteria and fungi, and can be washed 55 times without losing their potency. By September 30, 2020, Sonovia generated over $5 million in revenues (unaudited) and reached profitability, proving its core technology's competitive advantage and establishing brand awareness.

Sonovia expects demand for protective masks in the western world to remain stable in the foreseeable future. Indeed, as covid-19 persists and consumer awareness of the importance of personal safety and protection vis-à-vis pandemics and infections increases, the global demand for anti-pathogenic products is expected to rise. Sonovia plans to meet that demand with additional protective anti-pathogenic products.

2. Technology Overview

Sonovia's novel technology utilizes ultrasonic energy to physically infuse any type of textile composition with functional compounds or dyes via a sustainable and environmentally process, while eliminating the use of polymeric binders, potentially dramatically reducing water and chemistry consumption, achieving high-performance, durability, and cost-competitiveness.

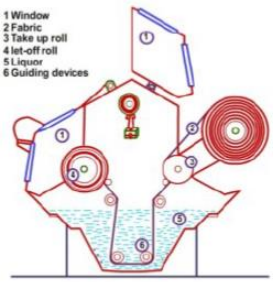
Today, two traditional methods (incumbent technologies) exist for textile applicative treatment or finishing: Padding/Exhaustion ("wet-finishing") and extrusion (synthetic fiber engineering). Wet-finishing accounts for ~80% of the textile applications and extrusion to ~20%. In the wet-finishing process, the fabric is soaked in an aqueous dispersion containing (1) the functional compound or dye and (2) a polymeric chemical binder. The fabric is then squeezed by a pair of rolls (hence 'roll-to-roll') and heated for drying and cross-linking of the binder, and then sent to the cutting & sewing stage.[3] Extrusion is the process of engineering a synthetic fiber by forcing a thick, viscous liquid through the tiny holes of a spinneret to form continuous filaments of a semi-solid polymer.[4] Both methods have several drawbacks, as detailed in Figure 2 below. Importantly, both methods are highly polluting: Textile wet-finishing and dyeing generate about 20% of all freshwater pollution and use some 20,000 chemicals – some carcinogenic – in the process.[5]

Figure 2: Traditional textile finishing methods: Pros & Cons

1st METHOD [DOMINANT METHOD]

APPLICATION VIA PADDING

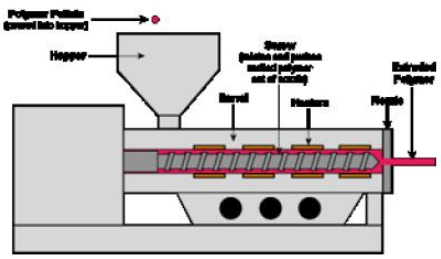
DRAWBACKS	X	NOT DURABLE [UP TO ~30 HOME WASHINGS]
	X	CHEMICALS LEACH OUT OF TEXTILE
	X	POLLUTES THE END-USER & ENVIROMENT
	X	REQUIRES ADJUSTMENT TO EACH TEXTILE COMPOSITION
ADVANTAGES	√	SIMPLE AND EASY
	√	CHEAP [COMPARED WITH EXTRUSION]



2nd METHOD

APPLICATION VIA EXTRUSION

DRAWBACKS	X	ONLY SYNETHETIC FIBERS
	X	EXPENSIVE
	X	REQUIRES EARLY STAGE COMMITMENT, LOW AGILITY
	X	REQUIRES LARGE ORDER QUANTITIES
	X	POLLUTING [WASTE IN PRODUCTION, FIBER SHEDDING
ADVANTAGES	√	VERY DURABLE



Source: Sonovia

Introducing the Sono-finishing process

Sonovia's Sono-finishing process is based on using ultrasonic energy for the high-velocity physical impregnation of performance compounds – such as anti-pathogenic, water repellency, fire retardancy etc. – for achieving special functional properties, or dyes, onto any kind of textile composition.

The conjunction of the proprietary chemical formulations with the ultrasonic energy results in the formation of ultrasonic cavitation bubbles, which upon their expansion to a critical mass, implode and generate a "shock-wave" which is shot onto the textile at an extreme velocity of over 1,500 meters per second.

The unique ultrasonic sono-finishing process provides key merits compared with traditional wet-finishing and extrusion methods:

- It eliminates the need for polymeric chemical binders;
- It is agnostic to the fabric type;
- It reduces water consumption and chemical usage significantly;[12]
- It is durable to industrial and home laundry as well as to exposure to hot temperatures;[13]
- It is highly versatile in the applicable chemistry that can be used;
- It is cost-effective and can be easily integrated with existing production lines.

The Sono-finishing machine combines a traditional roll-to-roll textile finishing machine ("padder") and a Sono reaction system integrated within it. The current pilot machine operating by Brückner Trockentechnik GmbH & Co. is capable of processing 20 meters of fabric per minute, which equates to an annual production capacity of about 8.5 million meters (at 80% utilization).

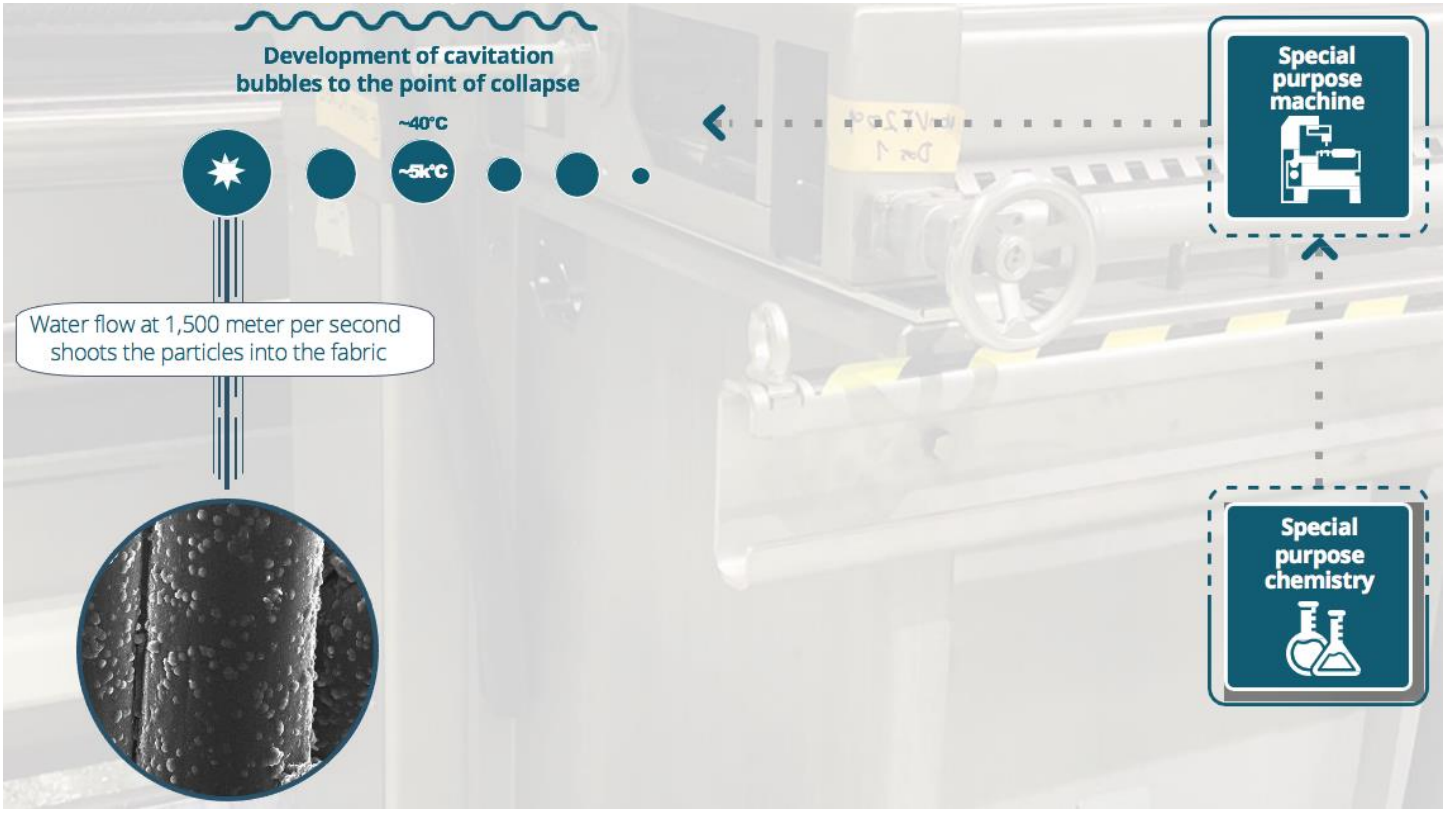
The Sono-finishing process eliminates the need for polymeric chemical binders and other harmful chemicals and dramatically reduces water and chemistry consumption in the process.[14] The result:

- High performance: Sonovia's anti-pathogenic application displays 99.9% elimination of viruses, including SARS-COV-2, bacteria, and fungi;

[12] Chemical and water consumption varies per application.
[13] Pending additional assessments.
[14] Chemical and water consumption varies per application.

- High durability: Fabrics treated with Sonovia's technology exhibit high durability to industrial and home laundry as well as to high temperatures;[15]
- Versatility: Sonovia's technology is applicable to all types of textiles;
- Cost-effectiveness and sustainability: Sonovia's technology may reduce up to 95% of the water consumption compared with conventional textile wet-finishing[16] and eliminate chemical binders' need.

Figure 3: The Sono-finishing process (illustration)



Source: Sonovia

Table 1 below provides a comparative overview of the advantages of the Sono-finishing process vis-à-vis the padding and exhaustion method and the extrusion method:

[15] Pending additional assessments.
[16] Chemical and water consumption varies per application.

Table 1: The Sono-finishing process vis-à-vis traditional methods – a comparative overview

	Padding	Extrusion	Sono-finishing
Applicability to all textile compositions	Requires different formulas and chemical binders	Only synthetic	Yes
Durability to industrial laundry	Moderate to poor	Very high	Very high[17]
Durability to home laundry	Moderate	High	Moderate (expected to improve with R&D)[18]
Durability to high-heat	Low	High	High
Cost-effectiveness	High	Low	High
Sustainability	Moderate to poor	Poor	High
Scalability	High	Low	High

Source: Sonovia

Research into additional applications

Sonovia is actively investing in improving the performance of existing Sono-finishing applications and the R&D of new applications. As an example for a new application, the company signed an agreement with the world's leading supplier of water repellency laminates and the Fashion for Good accelerator, under which the accelerator invested $30,000 into research and development of a sustainable water repellent application without the use of *fluorocarbon* – a pollutant chemical widely used for applying water repellency properties, that is expected to be banned for use by global regulators in the near future. IP and know-how will be exclusive to Sonovia.

Between January 2018 and June 2020, Sonovia invested a total sum of $1.936 million in R&D, with an additional $2 million planned for investment in R&D activities in 2021/22, including a small-scale clinical trial in Israel and installments of 'beta-sites' with leading companies.

Table 2: R&D milestones

	H1 '21	H2 '21	H1 '22	H2 '22
Lab R&D	Anti-pathogenic Water repellence	Water repellence Fire retardancy Dyeing	Fire retardancy Dyeing Softening	Softening

[17] Pending additional assessments.
[18] Pending additional assessments.

Beta testing		Anti-pathogenic	Water repellence	Fire retardancy Dyeing
Clinical testing		Anti-pathogenic		
Regulatory approval			Water repellence Anti-pathogenic	Fire retardancy Dyeing
Go-to-market			Water repellence Anti-pathogenic	Fire retardancy Dyeing

3. Business model overview

Sonovia aims to become the future incumbent technology for performing textile wet-finishes by positioning itself at the front line of the functional textile industry, as its ultrasonic platforms enables the production of high-performing and highly durable functional fabrics, using only a fraction of the water used by conventional methods, and without the need for chemical binders.

Sonovia has captured the interest of globally-leading companies from the sportswear, automotive, fashion, healthcare, and air filtration verticals that are actively piloting with Sonovia on its most mature application – the anti-pathogenic application – with intentions of becoming early adopters of Sonovia's technology.

Sonovia operates two distinct departments:

(1) The personal safety department, which currently operates a D2C model: Direct sales of branded personal protective products – such as the SonoMask – to end-clients in the private sector;
SonoMask sales Exceeded $5 million as of Sept. 30, 2020, and represent about 85% of Sonovia's revenues.

(2) The Sono-applications department, which is due to operate under a B2B model:
- Capital sales of machines; with Brückner Trockentechnik GmbH & Co. as the machinery partner, global markets penetration is expected to be rapid and aggressive.
- Repeating sales of required chemical formulations is expected to become the company's core revenue stream (the current install base of the Brückner alone is 5,000 machines).
- Potential revenue from a "Sonovia-inside" trademark tags

The personal safety department

B2C: Direct sales of personal protective products to end-clients in the retail sector

In Q1 2020 Sonovia established the personal safety department with the purpose of testing the private market demand for products based on Sonovia's technology, and to generate revenues that would enable to accelerate R&D and strategic collaborations. Indeed, as covid-19 persists and consumer awareness to the importance of personal safety and protection vis-à-vis pandemics and infections increases, the global demand for anti-pathogenic products is expected to rise and Sonovia plans to meet that demand with additional protective anti-pathogenic products.

First use case of market potential: The SonoMask

Upon the outbreak of covid-19, Sonovia identified an opportunity to test consumer awareness and market demand to fabrics with antimicrobial and anti-viral properties, and embarked on the manufacturing and sale of branded face masks. The SonoMask, which is coated with Sonovia's proprietary formula, eliminates 99.4% of SARS-COV2 (the virus that causes COVID-19) within just 30 minutes of exposure in accordance with ISO 18184. This was corroborated by the internationally-accredited ATCC Testing laboratory. Sonovia's technology has demonstrated potent efficacy against different microorganisms in testing by different reputed independent labs, successfully deactivating 99.9% of viruses even after 55 wash cycles.

Sonovia exhibited important capabilities: Early identification of market pain points, quick response in product design, testing and production at large scale, and aggressive marketing and sales operation at a global scale and with high profitability using E-commerce platforms. The SonoMask sales Exceeded $5 million as of Sept. 30, 2020, and represent about 85% of Sonovia's revenues. SonoMasks are sold online via Sonovia's website (80% of sales) as well as via 3rd party platforms e.g. Amazon and EBay. Sonovia expects demand for protective masks in the western world to remain stable in the foreseeable future.

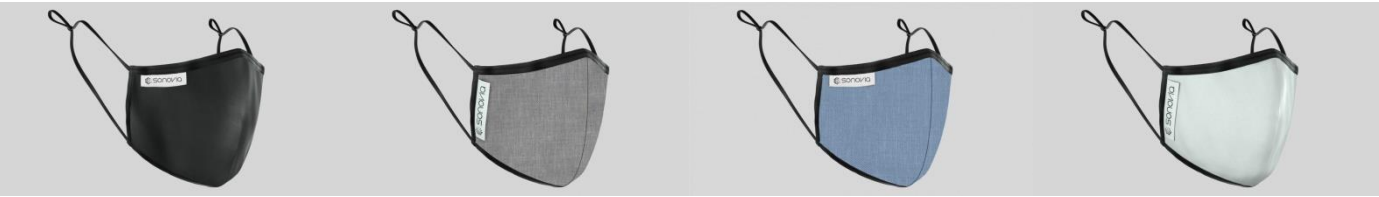
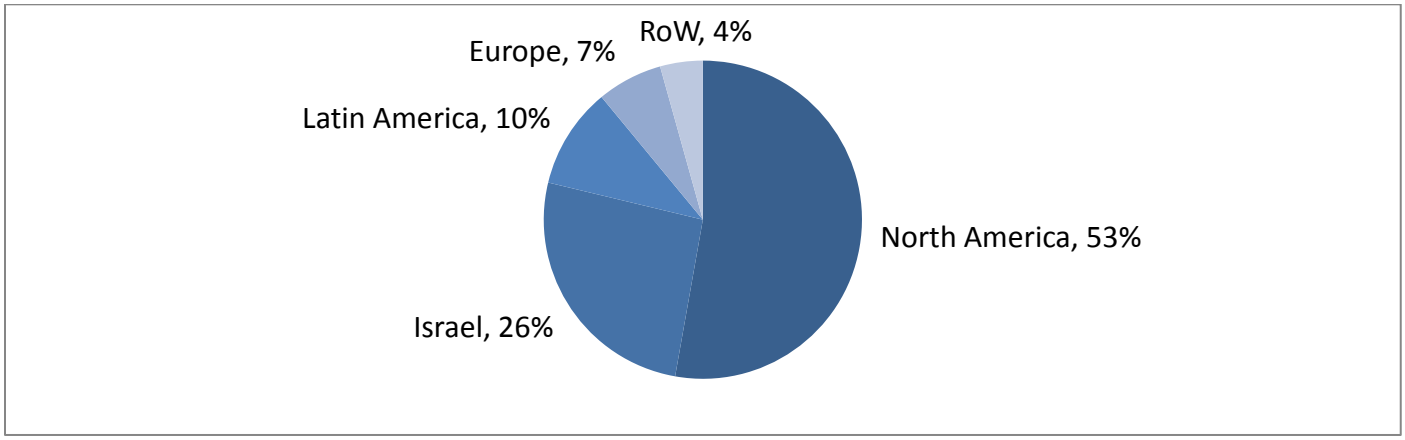


Figure 4: Sonovia's H1 '20 revenues from the private market, by geographic location



Source: Sonovia

The Sono-applications department

B2B: Utilization of the 'HP' / 'Nespresso' business model

Sonovia's B2B business model is composed of two main elements:

(1) Capital sale of Sono-finishing modules:

Sonovia will sell the Sono-finishing modules directly,[19] or via partners to fabric finishing companies at a retail price of about €120,000 (a high-end padding machine costs around €80,000). With Brückner Trockentechnik GmbH & Co. as the machinery partner, global markets penetration is expected to be rapid and aggressive.

(2) Repeating sales of chemical formulations:

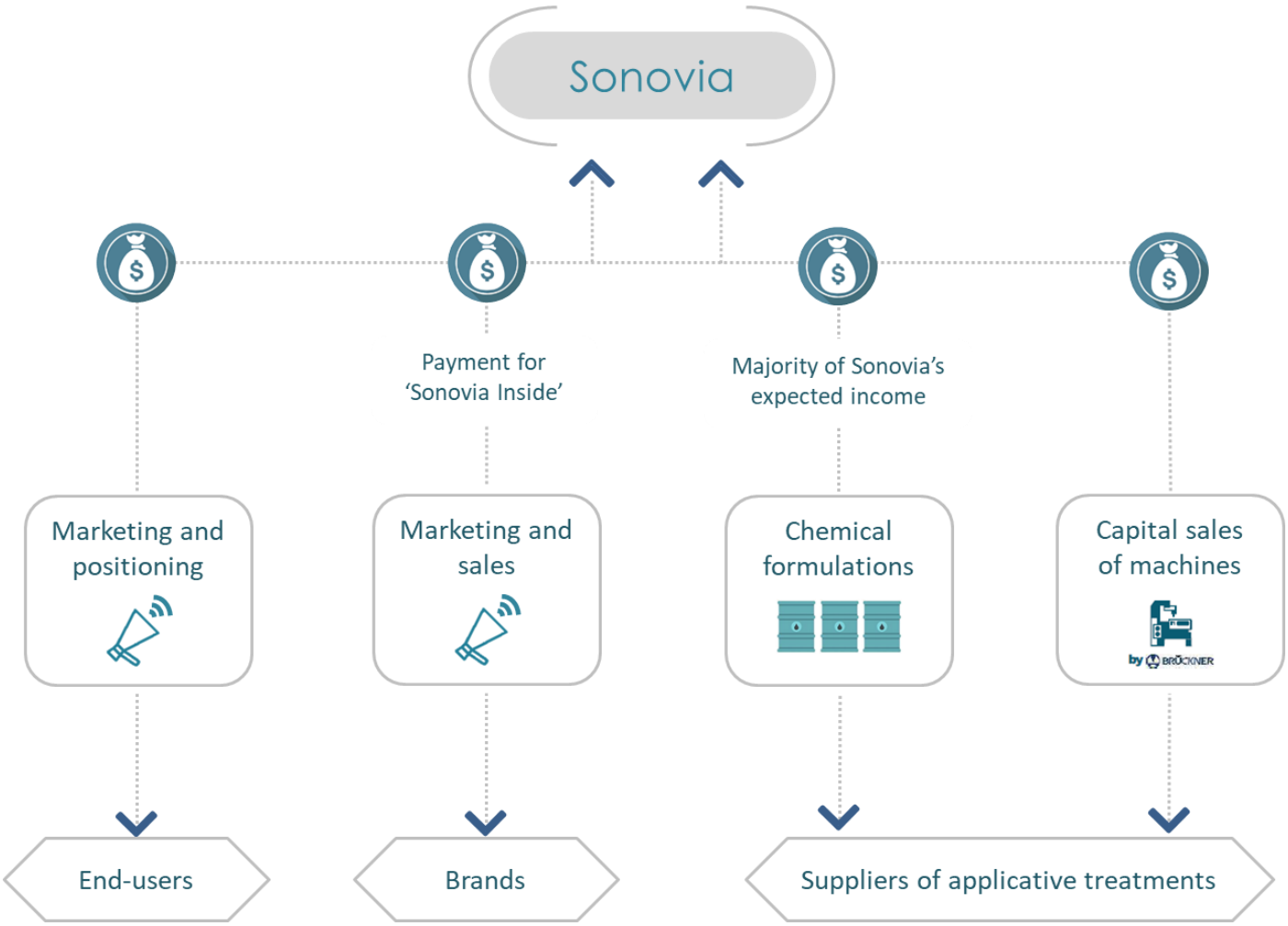
The core revenue stream of the company. Sonovia continues to develop unique chemical formulations, whose production will be outsourced to leading chemical manufacturers as white label and sold under the Sonovia brand at a planned price of $77/Kg which represents about $0.5 per kg of treated fabric.

Additionally, Sonovia anticipates that leading brands in the field of workwear and sportswear will show interest in empowering their brands with Sonovia's technology trademark - "Sonovia inside" / similar. The current market standard fee for trademark use is $0.1-$0.3 per use. However, this element is anticipated to be less significant compared to the core revenue stream of selling the chemical formulations.

Sonovia is currently conducting pilots, and have additional pilots planned, with U.S and EU based leading OEMs, Tier-1s and Tier-2/3s from the automotive industry, with leading global OEMs and brands from the sportswear and apparel industry, with a leading U.S based hospital textile supplier, and with a EU globally leading filtration media provider, while expected to execute a clinical trial under the EC Horizon2020 grant in a hospital in Israel to examine the effectiveness in reducing Hospital Acquired infections when using textile products that underwent Sonovia's Sono-finishing anti-pathogenic application.

[19] In collaboration with Brückner Trockentechnik GmbH & Co.

Figure 5: Sonovia's Sono-applications department business model



4. Markets Overview

Sonovia currently operates within the functional textile market – a definition that encompasses fabrics (from natural or synthetic fibers) that possess special properties that serve a function, such as temperature and humidity control, anti-viral / anti-microbial, water & oil repellency, flame retardancy, UV protection, anti-wrinkle, anti-static etc. Sonovia also aims to enter the textile dyeing market – with its $9.4 billion TAM potential in 2018 (projected to exceed $15.5 billion by 2026) – in the near future, and is actively investing in R&D into dyeing applications as well as non-textile coating, which could potentially open up new and highly lucrative opportunities, if Sonovia succeeds in its endeavors.

This section provides an overview of the various markets Sonovia has entered, or aims to enter in the short-term. It begins by reviewing the global market for functional textiles finishing agents market, where Sonovia currently operates with its anti-pathogenic formulation and additional applications such as water repellency and flame retardancy in development and expected during 2022. It then follows to review the five immediate markets for Sonovia's proven anti-pathogenic formulation.

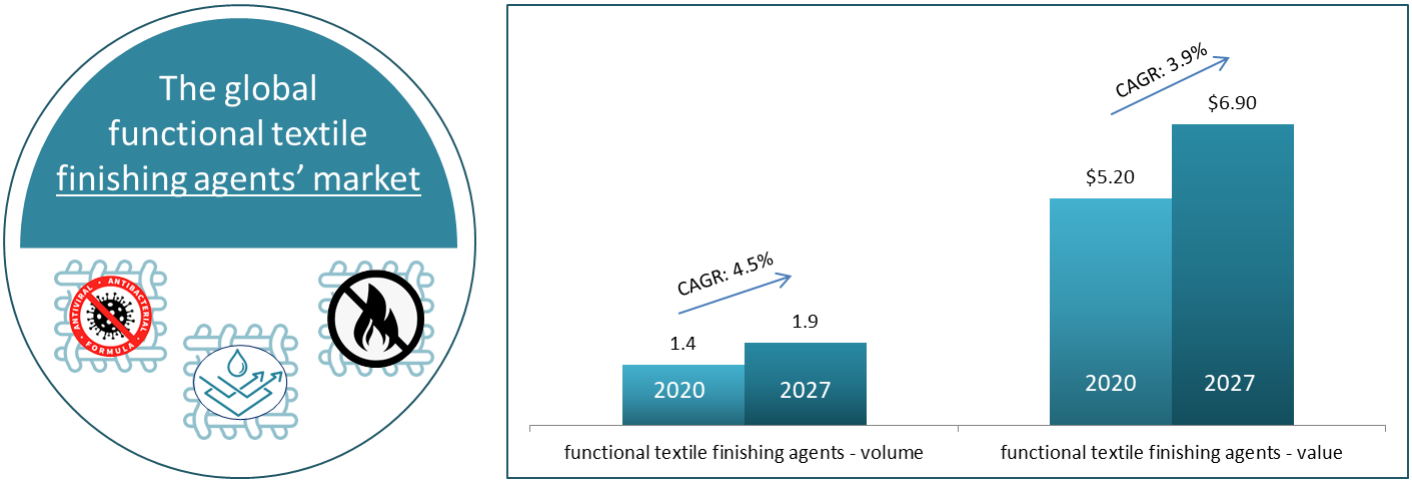
4.1 The functional textile finishing agents market

Functional textiles typically acquire their unique properties from formulations of chemical agents, also called finishing agents, during the soaking or extrusion process. Functional textiles are used in a variety of applications, such as sportswear and outdoor wear, intimate apparel, home textile, personal protective equipment in numerous industries such as healthcare, defense, hospitality and many more.

It is estimated that some 1.4 million tons of finishing agents for functional textile were used in 2020 around the world, at an estimated value of $5.2 billion.[6] By 2027 the usage volume is projected to increase to 1.9 million tons, growing at a CAGR of %4.5-5%, and exceed $6.9 billion at a CAGR of 3.9%.[7] This growth over the next several years is driven by an increasing demand for textiles across various verticals, the introduction of advanced manufacturing and fabrication techniques, and the impact of covid-19 on verticals such as healthcare and personal protective equipment.[8] The US accounted for an estimated 26.5% of the global functional textile finishing agents market with about 371,500 tons used in 2020, while China accounted for an estimated 17% with about 237,000 tons used in 2020. China is expected to exceed a usage of 400,000 tons of functional textile finishing agents by 2027, at a projected CAGR of 7.9%.[9]

However, Sonovia's ultrasonic platform holds a disruptive potential to this vertical. Fabrics treated with Sonovia's technology exhibit high functional performance, durability to high temperatures and to industrial and home laundry,[20] and the process is sustainable as it may use only a fraction of the water used by conventional methods and eliminates the need for chemical binders[21]. **Successful markets entry, wide installation and brand awareness creation – if achieved – will have the potential to increase the market size further.**

Figure 6: The global functional textile finishing agents market value, current & forecast to 2027



Source: Zion Market Research

As noted above, Sonovia also aims to enter the textile dyeing market, which was valued at $9.4 billion in 2018 and is projected to reach $15.5 billion by 2026, growing at a CAGR of 6.3% from 2019 to 2026.[10] Sonovia's Sono-finishing process uses ultrasonic energy for the high velocity physical impregnation of performance compounds onto any kind of textile composition, and will be tested for its applicability to dyes. While Sonovia's entry to the textiles dyeing market is pending upon successful development and proof-of-concept which are expected in the near future, its potential to disrupt the textile dyes market is equal – if not greater – than its potential to disrupt the textile finishing market.

For its current proven and successful anti-pathogenic Sono-finishing application, Sonovia targets five immediate markets which are primed for Sonovia's disruptive technology:

[20] Pending additional assessments.
[21] Chemical and water consumption varies per application.

1. The consumer protective products market;
2. The sportswear market;
3. The Automotive upholstery market;
4. The hospitality market;
5. The medical textile market.

4.2 The consumer protective products market

The Covid-19 pandemic has caused a huge surge in global demand for personal protective equipment in the retail sectors – particularly face masks – not least due to authorities' requirement for wearing face masks in public (mandatory in most cases) and increasing awareness to face masks' effectiveness in preventing infection. Indeed, whereas wearing a face mask in public to prevent infection and pollutants was common mainly in mega-cities and industrialized areas in APAC countries (especially following the SARS pandemic) before 2020, the inclusion of face masks in daily routine is increasingly perceived as an integral part of the 'new normal' in the post-covid19 era all over the world, and is expected to persist throughout 2021.[11] Indeed, a survey by the Covid States project (a joint consortium by Northeastern, Harvard, Rutgers and Northwestern universities) that included over 25,000 US respondents across 50 states between April 2020 and January 2021 showed that 80% of respondents wear a face mask in public.[12]

Table 3: Face masks comparative overview

	Surgical masks	Respiratory masks	Cloth masks	Sonomask
Mask type	Disposable	Disposable	Reusable and washable	Reusable and washable
Fitting	Loose	Loose	Tight	Tight
Designation	Healthcare	Healthcare, industrial	Public	Public
Anti-pathogenic protection	Incomplete (protects from large particles, droplets and spray)	95%-99% protection	Incomplete (protects from large particles, droplets and spray)	99.9% protection

Source: FDA; CDC; Frost & Sullivan analysis

In Q1 2020 the single-use, surgical and respiratory face masks virtually dominated the market, depleting stockpiles and resulting in shortages and price hikes, and leading numerous companies to start producing surgical face masks to meet demand. However, since Q2 of 2020 the retail market has witnessed an increasing demand for reusable cloth face masks. For example, more than 12 million face masks were sold at a total of

$133 million in April 2020 alone via e-commerce platform Etsy; in Q3 2020 this figure was doubled as 24 million face masks were sold, representing 14% of Etsy's gross merchandise sales.[13] This growth is driven by demand for face masks that are customized, durable and environmental-friendly, with some providing additional advantages such as anti-pathogenic and air filtration properties.

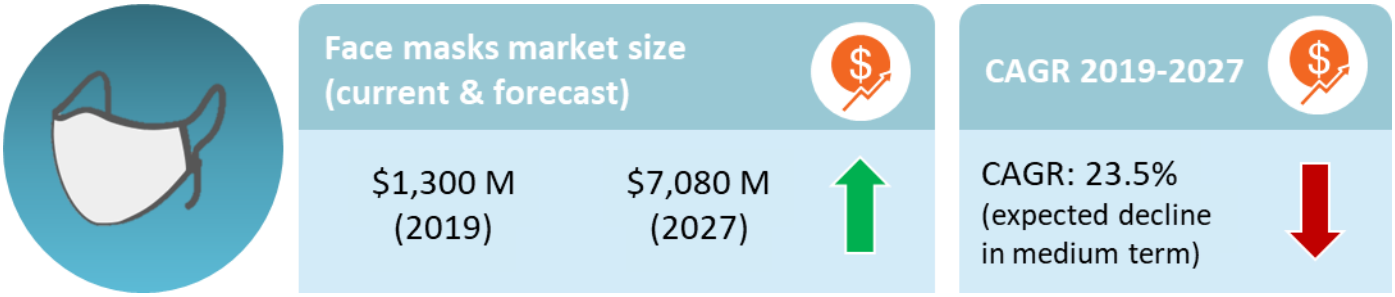
The supply side of cloth face masks today is a "red ocean" with hundreds of sellers, from multinational fashion brands to individual sellers of home-made masks at a price range of several dollars apiece. However, reusable face masks that offer anti-pathogenic protection are considered a premium product and are priced accordingly. Most products' prices range between $15 and $50, with some priced at $185 for a single mask.[14]

Sonovia currently sells its SonoMask via the company's website at $45 for a single mask, with a lower price of $27 for a pack of 10 masks. As covid-19 persists and consumer awareness to the importance of personal safety and protection vis-à-vis pandemics and infections increases, the global demand for anti-pathogenic products is expected to rise and Sonovia plans to meet that demand with additional protective anti-pathogenic products.

4.1.1 Market size estimates

Varying estimates exist regarding the global market for face masks, ranging between $2 billion to more than $22 billion in 2021, with projections for a decrease in the long-term to $3 to $4 billion over the next few years.[15] However, **the reusable, cloth face masks segment was valued at $1.3 billion in 2019 and is projected to exceed $7 billion by 2027, growing at a CAGR of 23.5% over the forecast period.[16] According to more optimistic estimates, the global cloth face masks market was valued at $20.4 billion in 2020 and is forecasted to experience a reduction to $16.4 billion in 2021.**[17]

Figure 7: The global cloth face mask market value, current & forecast to 2027



4.1.2 The regulatory environment in brief

In the US the FDA regulates face masks, including cloth face masks, as medical devices when they are marketed for medical purposes, which include uses related to COVID-19 and masks with anti-pathogenic agents. These masks are regulated under FDA certification 21CFR878.4040, and are considered personal protective equipment (PPE). In Q2 2020 the FDA issued an Emergency Use Authorization (EUA) authorizing the use of face masks for use by members of the general public, including health care personnel in healthcare settings as personal protective equipment (PPE), in response to potential shortages. The EUA enables the marketing of face masks that meet the FDA's criteria and labeling instructions (such as claims for reuse, antimicrobial or antiviral protection, infection prevention and viral filtration efficiency).[18]

In the EU face masks are regulated under Regulation EU/2016/425 which includes masks and respirators designed and sold as PPE, and face masks that are intended for medical purposes are regulated under Regulation EU/2017/745 which lists them as medical devices under three categories. Of these, Class 1 is intended for non-invasive, non-sterile devices that do not contact wounds and can be marketed under self-declaration without the need for a Notified Body. Both types of masks must comply with requirements defined in European Standard EN 14683. The EN 14683 Standard classifies face masks to 3 categories based on criteria such as splash resistance, bacterial infiltration efficiency and microbial cleanliness.[19] In response to the covid-19 pandemic the European Committee for Standardization (CEN) issued a Workshop Agreement document (CWA 17553) which does not hold regulatory force, but provides minimum requirements and methods of testing and use for community face coverings, defined as "facepiece covering the mouth, nose and chin fitted with the head harness which can be head or ears attachment". The CEN requires community face coverings to be marked with specification of the filtration efficiency level and whether the mask is "reusable" or "disposable".[20]

Facial masks with anti-pathogenic properties are required to be registered as per the Environmental Protection Agency (EPA) guidelines in the US, and with the European Chemicals Agency (ECHA) in accordance with the Biocidal Product Regulation (BPR) no. 528/2012 and 34/2014 if the antimicrobial efficacy is to be advertised. In the EU only ECHA-listed antimicrobial agents are permitted for use in antimicrobial textiles. In the US, the EPA defines antimicrobial pesticides as any substance or substances that are used to destroy or suppress the growth of harmful microorganisms. Antimicrobial textiles containing pesticide agents as listed under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and are required to comply with FIFRA.

Sonovia is expecting an FDA and CE mark approval for its SonoMask products during H1 2021.

4.1.3 Competitive landscape

The anti-pathogenic face masks market is highly competitive with dozens of offerings, mask types and accessories. These products are sold either by originator companies (who manufacture the products using their proprietary anti-pathogenic fabric, such as *Sonovia*, *HeiQ* and *Livinguard*), or by other companies that buy the treated fabric and pay originators an additional fee for use of trademark such as *Aviro* (HeiQ fabric) and *5log* (Livinguard fabric). In both cases **anti-pathogenic face masks are considered a premium product and are priced accordingly, with prices ranging between $15 and $50, with some priced at $185 for a single mask**.

A detailed analysis of the competitive landscape for Sonovia's technology is provided in section 5 below.

4.1.4 Market drivers

- Covid-19 continues to pose a serious health risk around the world, as new strains and mutations develop that are more contagious and deadly and against whom the effectiveness of current vaccines is unknown. These developments suggest that the requirement / recommendation for wearing face masks will remain in place throughout 2021 and potentially years ahead.
- Revitalized efforts and new nation-wide policies under the Biden Administration are already proving effective as the number of US population wearing face masks in public is rising to an all-time high in early 2021, with over 70% reporting weekly usage of cloth masks.
- The issuance of umbrella EUA route by the FDA, and the CWA 17553 in the EU, for increasing availability of non-medical face masks for public use has introduced hundreds of new players and boosted sales; competition is expected to decrease significantly in the short-term due to costs of production, market prices and offerings of premium properties.
- The market entry of durable and washable masks with anti-pathogenic properties is expected to maintain its perceived added value and accompanying premium price tag.

4.1.5 Market restraints

- Despite ongoing uncertainty concerning the development of Covid-19 and its vaccines, a steady yet minimal decrease in revenues of face masks sales if forecasted in the long-term due to foreseen natural decline in the virus infection (increased 'herd' immunity) and development of new vaccines.
- The current regulatory environment in the US and the EU is favorable for non-medical face masks, yet manufacturers of premium masks intended for medical use, or masks with anti-pathogenic properties are required to undergo the full regulatory approval process which is lengthy and expensive; popular e-commerce platforms condition their use in quality approvals and certificates from independent labs.
- The supply side of premium face masks with anti-pathogenic properties is a "red ocean" with numerous sellers (including multinational fashion brands); competition could drive down prices, though only to a certain extent. However, Sonovia's Sono-mask offers several advantages such as durability to home laundry and a fabric that is completely free of chemical binders, which provides it with a competitive edge.

4.3 The medical textile market

The medical textile market is considered as one of the most important, continuously growing fields in technical textiles, which are defined by the U.S. Department of Commerce as "textile materials and products used primarily for their technical performance and functional properties" for a variety of industries.[21] Medical textiles include several sub-segments such as healthcare & hygiene products, implantable and non-implantable goods, and extracorporeal products. This report focuses on the healthcare & hygiene segment which includes material for medical uniforms (scrubs), bedding linen, towels, patient gowns, operation room textiles etc. According to the Healthcare Laundry Accreditation Council (HLAC – a nonprofit organization that inspects and accredits laundries that process reusable textiles for hospitals, nursing homes and other healthcare facilities), the annual volume of laundered healthcare textiles produced for U.S. hospitals is estimated to be 4.34 billion pounds (1.96 billion kg, or 4.78 million tons).[22] This estimate is corroborated when accounting for an estimated national average occupancy rate of 63%[23] X average laundry weight of 15.5 pounds per patient per hospitalization day[24] X 919,559 hospital beds in the US[25] X 365 days, which provides a value of 3.7 billion pounds (or 1.675 billion kg) of healthcare textile use per annum in US hospitals alone.

Medical textiles present a significant challenge to healthcare: Hospital Acquired Infections (HAIs)[26]

Hospital Acquired Infections (HAIs)

Hospital acquired infections are identified by the World Health Organization (WHO) as the most frequent adverse event in health-care delivery worldwide, with hundreds of millions of patients affected by HAIs worldwide each year, leading to significant morbidity and mortality as well as financial losses for health systems.

- Of every 100 hospitalized patients, 7 in developed and 10 in developing countries will acquire at least one HAI.
- At any given time, the prevalence of HAIs in developed countries varies between 3.5% and 12%.
- 136,000 annual deaths in the US and in Europe are attributed to HAIs.
- The direct financial burden of HAIs is estimated by the WHO to account for €7 billion in Europe and $6.5 billion in the US, reflecting 16 million extra hospitalization days.
- However, research suggests that the total (direct + indirect) economic burden is significantly higher – up to $45 billion per annum.

Medical textiles with anti-pathogenic properties show great promise in reducing prevalence of HAIs and their associated economic burden. Evidence from a body of research indicates that medical textiles treated with Copper Oxide or Zinc Oxide reduced 24% to 76% of HAIs rate.[27] A recent research that assessed the economic impact of using anti-pathogenic textiles finds that their use could result in cost reduction of €304 million to €8,038 million, while their costs are estimated at only €60 million per annum.[28]

4.2.1 Market size estimates

Varying estimates exist regarding the global market for medical textiles. **On the lower bar, one estimate value the global market for medical textiles at $12.2 billion in 2018 with forecast to grow to $18.5 billion by the end of 2025 at a CAGR of 5.3%.**[29] **However, on the upper threshold the global market is valued at $63.3 billion in 2019, with projection for growth to $99.4 billion by 2027 at a CAGR of 5.9%.** The same source estimates that the US market accounts for 40.3%, or $25.5 billion of the market.[30]

The value of the global market for anti-pathogenic medical textiles is estimated by one source to rise from around $0.56 billion in 2019 to over $1.15 billion in 2027 at a CAGR of 9.4%.[31] **However, according to Sonovia's internal calculations, the global market potential for anti-pathogenic applicative treated textiles**

for medical use is estimated at $185 million. This figure was reached by assuming an estimated annual potential of 12.6 million kg of medical textiles at an institutional price of $0.7 per kg for an anti-pathogenic applicative treatment (based on the following assumptions: 1.96 billion kg of laundered healthcare textiles produced for U.S. hospitals,[32] divided by the estimated weekly laundry per item (52 weeks / year), which provides an estimated total of 37.9 million kg of medical textiles for US hospitals, which in turn is divided by 3, to account for an estimated 3-year life-cycle per item), and extrapolation of this estimate to the global number of hospital beds.

Medical textiles

TAM for anti-pathogenic applicative treatment:
$185 M | CAGR: 9.4%

4.2.2 The regulatory environment in brief

The regulatory environment for anti-pathogenic medical textiles is similar to that of anti-pathogenic fabrics used for the production of face masks, as described above in section 4.1.2.

4.2.3 Competitive landscape

While the medical textile market today includes many players and strong competitors (many of whom rely on raw materials and fabrics from APAC countries), the anti-pathogenic application for the Healthcare textile market is relatively a 'blue ocean' as traditional anti-pathogenic wet-finishing technologies for impregnating textiles with anti-pathogenic properties are not durable for industrial laundries, and anti-pathogenic extruded fibers are costly. Sonovia's anti-pathogenic application is now being tested for its durability to a range of industrial laundry protocols and has the potential to become the first fully durable, cost effective, and high-performing anti-pathogenic application, thus, the first mass-market viable technology for Hospital textiles. The Covid-19 pandemic is expected to boost demand and procurement which would increase implementation rate and overall market potential.

A detailed analysis of the competitive landscape for Sonovia's technology is provided in section 5 below.

4.2.4 Market drivers

- Covid-19 boosted awareness to the dangers of hospital-acquired infections and the speed and breadth with which they can spread in healthcare institutions, and is expected to act as a catalyst on institutional demand for anti-pathogenic textiles, especially as novel solutions are proven effective in eliminating SARS-CoV-2 and other viruses and bacteria.
- New technological developments that increase the fabrics' anti-pathogenic effectiveness and durability to industrial laundry, as well as reduce pollutants and improve the process' efficiency and sustainability are expected to provide competitive advantages.
- Epidemiological trends – organic growth, aging and increasing prevalence of chronic diseases – as well as lessons learned from the covid-19 pandemic necessitate the expansion of healthcare facilities, expected to add steady growth rate to the market.
- Accumulation of research evidence on the clinical and economic benefits of anti-pathogenic medical textile use (such as reduction in hospitalization days and in use of antiseptics and antibiotics) could increase anti-pathogenic medical textile implementation and utilization rate and drive the market's growth in the medium-term.

4.2.5 Market restraints

- High usage volume and rates of abrasion and substitution of medical textiles place a heavy emphasis on prices in procurement; price gap between anti-pathogenic and single-use textiles may be significant, reducing competitiveness.
- Anti-pathogenic medical textiles will be required to withstand medical textile use and management protocols, which typically require high industrial laundry rates (daily to weekly) at high acidity levels and high temperatures (75°C to 92°C) and abrasion rates.
- Novel technologies for applicative treatment of textiles with anti-pathogenic properties are complex and expensive and require extensive know-how in machine and chemical engineering to develop, implement and operate, and would require considerable investments from manufacturers.

4.3 Additional markets: Sportswear, automotive upholstery, and hospitality

Demand for anti-pathogenic textiles is projected to increase significantly in the short-to-medium term in the wake of covid-19. Increasing consumer awareness to the spread of viruses and bacteria via clothing and surfaces, and new public health regulations are expected to boost the growth of anti-pathogenic textiles across multiple verticals, such as sportswear, automotive upholstery, and hospitality. Following is a snapshot of the current and forecasted potential for these markets.

4.3.1 The sportswear market

The sportswear market has witnessed strong and steady growth over the past decade and is expected to maintain it in years to come, driven by numerous factors such as growth in health awareness and increase in adoption of fitness activities, rise in participation of women in sports, growing popularity of international sports events and sportswear brands, and rise in disposable income and improvement in living standards in emerging countries. Overall the sportswear market was valued at an average of $203.7 billion in 2018 with a forecast for growth to around $363 billion by 2025, registering an average CAGR of 7.5% over the forecast period.[33]

Over the past decade numerous leading sportswear brands have implemented anti-microbial applicative treatment in the production process, in order to market their sports apparel as 'anti-odor' (odor is a derivative of microbial activity). However, consumer awareness to pathogenic protection elevated by covid-19 is expected to have a positive impact on this market as well. For example, several companies are already selling apparel such as shirts, gloves and bags with anti-pathogenic fabrics.[34] This provides a strong indication for leading brands' willingness to empower their products with Sonovia's technology trademark.

According to Sonovia's internal calculations (based on the average amount of fabric used for sportswear, an estimated number of items sold around the world, and the private market price of $0.35 per kg), the total addressable market for anti-pathogenic textile for the global sportswear sector is $649 million.

Sportswear textiles

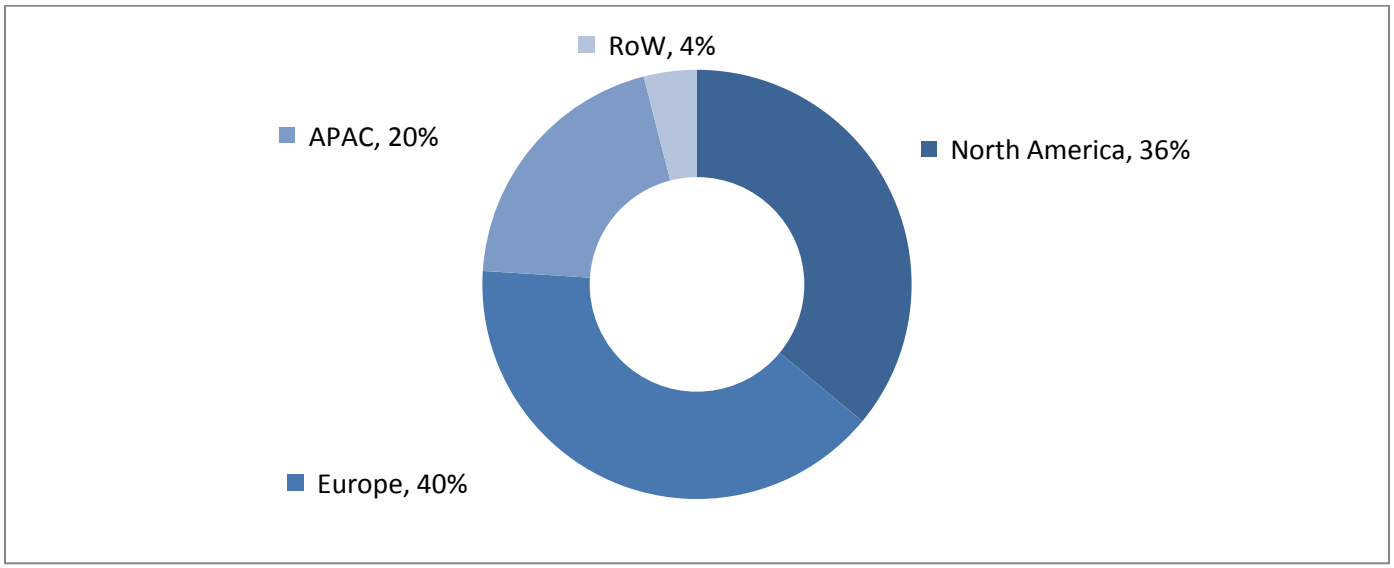
TAM for anti-pathogenic applicative treatment:
$649 M | CAGR: 7.5%

4.3.2 The automotive upholstery market

The global automotive upholstery market – including seat covers, carpets, roof and trunk liners etc. – has also experienced a negative impact by covid-19 expressed in a substantial decline in automobile sales, shortage of raw materials, reduction in vehicle production and more. However, conversely to the hospitality and tourism industries, the automotive upholstery market is expected to recover quickly. The global automotive upholstery market was valued at about $5,275 million in 2020 with a forecasted growth to $7,451 million in 2025 at a CAGR of 7.15%.[35]

Due to stringent regulatory requirements, the majority of the automotive upholstery production is conducted in geographic proximity to vehicle manufacturing facilities. Figure 8 below provides a breakdown of upholstery production by geographic location:

Figure 8: breakdown of automotive upholstery production by geographic location



Source: MarketandMarkets, 2018.

Sonovia maintains a competitive advantage in the automotive upholstery market. Fabrics treated by the sonochemical process show strong durability to high temperatures compared to textiles produced in traditional methods, i.e. using soaking with chemical binders. According to the company's internal estimates, textiles treated with anti-pathogenic properties using 'traditional' soaking cannot maintain their properties in lengthy exposure to temperatures exceeding 76°C.

According to Sonovia's internal calculations (based on the number of new vehicles manufactured annually, estimated average textile usage in various types of vehicles, and an institutional market price of $0.7 per kg), the total addressable market for anti-pathogenic textile for the global hospitality sector is $621 million.

Automotive upholstery

TAM for anti-pathogenic applicative treatment:
$621 M | CAGR: 7.1%

4.3.3 The hospitality market

Prior to covid-19 the global hospitality industry was valued at $535 billion, with an estimated 18.7 million hotel rooms in over 180,000 active hotels,[36] as well as some 6 million Airbnb rooms and some 250,000 rooms aboard cruise ships.[37]

The hospitality industry has been severely hit by covid-19, as occupancy and revenue per available room rates dropped by -33% and -47% in the US and by -54% and -62% in Europe in 2020,[38] with full recovery and growth expected in the medium term.[39] A recent survey of ~3,500 travelers from five countries by McKinsey & Company reveals that intense room cleaning is perceived as the most important action that hotels can take to protect guests from covid-19 and is most likely to secure hotel stay for leisure.[40]

According to Sonovia's internal calculations (based on the number of rooms, estimated average textile usage and abrasion rate, and an institutional market price of $0.7 per kg), the total addressable market for anti-pathogenic textile for the global hospitality sector is $111 million.

Hospitality textiles

TAM for anti-pathogenic applicative treatment:
$111 M | CAGR: 4.6%

5. Competitive landscape

The current landscape of applicative treatments for textiles includes leading textile manufacturers, growth companies and early-stage companies with novel solutions. The competitive landscape can be divided by the type of technology used, comparing between traditional textile finishing methods (wet-finishing and extrusion) with various chemical formulations, and three novel solutions for applicative treatment: Smart Foam, Plasma, and Sono-finishing.

Table 4: Comparative overview of traditional and novel methods for textile finishing

	CapEx	Water usage	Chemical binders usage	Consumables usage	Energy usage	Env. Pollution	Applicability to any type of surface	Durability to home laundry	Durability to industrial laundry
Padding	Low	High	Yes	High (polluting)	High	High	No	Medium	Low
Extrusion	Very high	Low	No	High (polluting)	High	Very high	No	High	High
Plasma	Very high	None	Yes	Low	Low	Very low	No	Medium	Low
Smart Foam	High	Low	Yes	Low	Low	Very low	No	Medium	Low
Sono-finishing	Low	Low – Very low[22]	No	Low – Very low[23]	Low	Very low	Yes	Medium[24]	High[25]

Source: Sonovia

5.1 Competitors using traditional textile finishing methods

As discussed above, two traditional methods for textile applicative treatment are used today: Padding and soaking, by which the fabric is run through a bath that contains an aqueous dispersion of microcapsules – the active material – along with a chemical binder;[41] and extrusion, by which synthetic fibers are created by forcing state polymers in semi-liquid state into a spinneret to form continuous filaments of semi-solid polymer.[42]

[22] Chemical and water consumption varies per application.
[23] Chemical and water consumption varies per application
[24] Pending additional assessments.
[25] Pending additional assessments.

Numerous companies today produce textiles with anti-pathogenic and additional properties using traditional methods. Following is a brief overview of companies that developed textile finishing platforms for providing anti-pathogenic properties using silver and copper as active ingredients:

The Dow Chemical Company is a multinational chemical company ranked among the three largest chemical producers in the world, with presence in about 160 countries and over 50,000 employees worldwide. In 2017 Dow Chemical merged into DuPont; in 2019 Dow Inc. – the Dow Chemical Company's parent – was separated into a public company via a corporate spin-off.

In late 2012, Dow Chemical Company introduced SILVADUR™ (registered today under Dupont) – one of the first aqueous-based silver-polymer delivery system. SILVADUR™ uses a patented polymer technology to deliver a low concentration of silver ions via an intelligent controlled-release mechanism. The silver ions bind to viral and bacterial polycationic surface, causing the bacterial cell walls and the viral protein capsids or envelopes to disintegrate. Fabrics treated with SILVADUR™ maintain their antimicrobial properties between 20 and 50 home laundry cycles, depending on the weight % product in bath and target silver on weight of fabric (ppm).[43]

Textile manufacturers that use SILVADUR™ include Pulcra Chemicals, Nord Trail, Standard Fiber and Akastex, as well as dozens of cloth face masks producers.

HeiQ is a Swiss textile manufacturer which was founded in 2005 as a spin-off of the Swiss Federal Institute of Technology in Zurich, and currently maintains global activity in 12 countries on 5 continents and manufacturing capacity of 35,000 tons/year in 3 sites in Switzerland, Australia & the US. Since 2020 HeiQ is listed on the London Stock Exchange Main Market (LSE:HEIQ).[44]

HeiQ developed Viroblock NPJ03, a combination of silver and vesicle technology: The micro-silver particles attract the oppositely charged viruses and binds permanently to their sulfur groups, and the fatty spherical vesicle liposomes help to deplete the viral membrane of its cholesterol content in minutes, allowing the silver to destroy the virus. **HeiQ Viroblock NPJ03 has been tested effective 99.99% in 30 minutes against SARS-CoV-2 and showed strong anti-viral and anti-bacterial effect in additional tests. HeiQ Viroblock NPJ03 lasts up to 30 gentle washes at 60°C. (140°F)**, and can be applied to woven, knit and nonwoven, cellulosic, and synthetic fabrics.[45] HeiQ Viroblock NPJ03 is EU REACH and US FIFRA compliant, OEKOTEX® certified, ZDHC and bluesign® homologized. Treated textile articles are compliant with EU BPR and US EPA. HeiQ Viroblock respirator masks with antibacterial and antiviral surface have been registered as medical device by Swissmedic and approved by US FDA.

The HeiQ Viroblock NPJ03 fabric is used by more than 150 manufacturers of face masks, including Aviro (NZ), Outdoor Research (US), Hispano Tex (ES), Itochu Corp. (JP), 1TcA (GB), Bonds (AU), ViroMasks (US), REDFLAG (CH),M4 Medical (AU), WarpMask (IT),AnyBrand (GB).[46]

livinguard

Livinguard Technologies AG is also a Swiss textile manufacturer founded in 2010, with operations in the US, India, Singapore, Germany, Japan and South Africa. Livinguard has developed a durable, safe and independently tested antiviral and antimicrobial technology that endows textiles and other materials with self-disinfecting properties and destroys viruses and bacteria, including 99.9% of SARS-CoV-2.[47]

Fabrics treated with Livinguard Technology have some 24 billion positively charged ions per cm^2, acting like a magnet and causing the negatively charged viruses and bacteria to adhere to the polycationic surface. Upon contact, the bacterial and yeast cell walls and the viral protein capsids or envelopes are disrupted and disintegrate. In addition, the textiles are specially treated to apply Polyhexanide (PHMB) molecules to the fabric.

Livinguard offers several types of face masks with 2 or 4 layers and designed for various uses, as well as gloves and protection bags, with one 3-layer mask - the Livinguard mask Pro - certified by the Hygcen Institute as

Medical Face Mask Type I according to EN 14683:2019. **The masks are recommended for hand-wash only in cold water (max. 30 °C) for about 2 minutes, without using detergent, bleach or disinfectants**.[48]

Agion Technologies Inc. was a US-based start-up company that developed Agion® silver-based antimicrobial technology and Agion Active XL™ dual-action anti-odor technology, which was acquired by US-based Sciessent in 2011. Agion and Active XL platforms are based on the use of silver and copper ions, feature ion exchange which confer treated products with anti-pathogenic activity that claims to inactivate viruses in under 5 minutes and bacteria in under 60 minutes, and are designed to automatically release its antimicrobial components only when conditions for bacteria growth are present, resulting in long lasting protection against microbes. **Fabrics treated with Agion® silver-based antimicrobial technology maintain their anti-pathogenic properties up to around 50 home laundry cycles.**

Additional companies that offer anti-pathogenic finishing using silver-based technology include:

- Microban International Ltd. (US) - SilverShield® [as well as Aegis® (Bonded Antimicrobial Polymer) and ZPTech® (Zinc pyrithione)].
- Rudolf Group (Germany) – RUCO BAC AGP.
- AddMaster Corp. (UK) - Biomaster®.
- Kleen Fabrics (US) - Kleen Silver Technology™.
- Trevira GmBH (Germany) – Trevira Bioactive and Trevira CS Bioactive.
- PurThread Technologies (US) – PurThread.
- Milliken & Company (US) – BioSmart®.
- Noble Biomaterials (US) – X-STATIC®.
- HHL Group Limited (UK) – PureTex®.
- Boomer Naturals (US) – Boomer®.
- Sanitized (Switzerland) – Sanitized®.

It is however essential to note that both the padding and soaking method and the extrusion method are relatively inefficient and are highly polluting.[49] Furthermore, fabrics treated via padding tend to lose their properties faster due to leaching of chemicals out of the textiles. This exposes both the skin and the environment to Nano-particles. Frequent use of silver has reportedly contributed to development of resistant bacteria. Similarly, regulatory authorities are moving towards the elimination of the use of Fluorocarbon – a pollutant chemical widely used for applying water repellency properties – as well as other toxins in the textile manufacturing process. **This means that companies that rely on padding and soaking or on extrusion for applying finishing properties to their fabrics will be required to look for alternative solutions in order to abide with the changing regulatory landscape.**

5.2 Competitors using Smart Foam method

Garmon
Kemin Group

Smart Foam is a novel platform for textile finishing developed under a collaboration of Garmon Chemicals (owned by Kemin Textile Auxiliaries), Itaclab and Mactec. Smart Foam is generated using Garmon's chemical formulations and special foaming agents *easyfoam* and *easyfoam pro*. Smart Foam replaces water as the chemical carrier and the treatment is performed at room temperature, thus reducing energy consumption and saving up to 80% of water use compared to traditional methods. Smart Foam also loads chemicals in the washing machine up to 3 times faster, and doesn't require sealed equipment, allowing technicians to interrupt finishing treatments and check garments with safety and ease. Smart Foam can be used to perform treatments fully compliant with greenofchange® requirements. Garmon Chemicals' Smart Foam platform was tested for compatibility with multiple finishing formulations, including HeiQ's Viroblock NPJ03.

5.3 Competitors using Plasma method

Plasma is referred to as the "fourth state of matter". It is reached when matter is continuously supplied with energy, which causes the matter's temperature to increase, thus transforming from solid state to liquid state and gaseous state. Then, if energy supply persists, the atomic structure disintegrates and charged particles are created (negatively charged electrons and positively charged ions). This mixture is referred to as plasma, and it can be artificially created.

The use of plasma technology by the textile industry is relatively new, yet plasma can serve several key applications such as materials cleaning activation and coating, as well as dyeing, printing and finishing. Plasma can make textile surfaces water and dirt repellent, as well as improving wettability (a prerequisite for the adhesion of binding partners in painting, gluing, printing or bonding), sliding and dyeing properties of textiles. The process of coating textiles is done either by low-pressure plasma systems, where liquid or gaseous short-chain monomers are introduced into a vacuum chamber, and then polymerize (forming form long-chain polymers) under the influence of the plasma, or by atmospheric process where the liquid / gaseous monomers are introduced via carrier gas into plasma jets which focusses the monomer on the surface and polymerises it. In the process, molecular contamination residues are decomposed as well.

In brief, applicative treatment of textiles using plasma technology provides similar to superior results at zero usage of water and hazardous chemicals. The process, however, is considerably more expensive compared to traditional methods, which constitute a strong entry barrier.

GRINP® lights your plasma

GRINP is an Italian company founded in 2005 that design and manufactures proprietary plasma technology platforms for laboratory and industrial scale machinery use. In the field of textiles, GRINP developed PLAtex™, a fully-automated industrial-scale machine that is designed for easy integration in existing production lines, can be paired (two or more modules) to increase production speed, and allows choice of fabric width (1m/2m/3m/4m) with compatibility with Industry 4.0 requirements. **According to the GRINP its PLAtex machines are in regular use by some companies in the textile industry, and are capable of producing applicative treatment at 70% less chemicals, 80% less energy, 90% less water, and with zero toxic discharge.**

Additional companies that design and manufacture plasma machines compatible with the textile industry requirements are Diener Electronic, PlasmaTreat and Henniker Plasma, although their activity in the textile industry is currently unknown and assumed to be minimal.

5.4 Competitors using Sono-finishing method

Argaman Technologies Ltd. is an Israeli-based company founded in 2012 that develops, designs, and manufactures multiperformance textiles for a wide range of applications, such as activewear and workwear, medical textiles and upholstery, and focuses on developing permanently self-sterilizing, flame-proof yarns and fabrics. According to Dun & Bradstreet, the company generated $1.14 million in sales.

Argaman Technologies developed its own sonochemical platform – CottonX™ - which impregnates cotton fibers with different particles using a similar ultrasonic process as Sonovia. Argaman developed four distinct products based on copper oxide:

1. CottonX™ SKINCARE: Fabrics made of cotton treated with copper oxide using the CottonX™ platform that provide anti-microbial properties (anti-odor) as well as skincare benefits, and is durable for up to 100 wash cycles.
2. Feelament™: Accelerated copper formulations developed especially for synthetic fibers that increases bio-inhibitive efficacy and provides anti-microbial (anti-odor) protection.
3. Corebody™ - a two-sided hydrophobic (water-repelling) fabric combining different polymer yarns with polypropylene fibers.
4. BioBlock™ - a reusable, washable, breathable facemask. The BioBlock™ mask is composed of four layers made from Hypoallergenic cotton and polyester treated with copper oxide particles (CottonX™) which provides anti-microbial protection, and an inner layer of RESPILON© nano fiber filter membrane that block microorganisms. The mask is marketed in the US under the EUA, at a price tag of $50. However, the company states that "**The masks and the materials have not been tested against the Coronavirus. The active material has been shown to deactivate other viruses, but does not have FDA registration**". **Current recommendations are to discard the mask after three months of use**.

NanoSono is another Israeli Early Stage company that developed a nanoparticle coating technology that can transform nearly any type of medical device, fabric, filter, or surface into an antibacterial surface and prevent biofilm. Using a patented process and materials to achieve long-term antibacterial and antibiofilm properties, the company has achieved an up to 8 log reduction of MRSA, KPC, E. coli, and other resistant bacteria in less than 30 minutes. Because its mode of operation is not based on leaching of the coating, NanoSono is able to achieve high antibacterial efficacy over a long period of time. NanoSono's antibacterial coating solution is designed for modular use, and can be applied to a very broad range of verticals, from medical textiles, medical devices and pharmaceutical creams to disposable nonwoven public transport seat covers, food packaging, anti-bacterial wall paints, water filter membranes and glass coating on buildings' exteriors.

NanoSono raised $5 million to date.

6. Financial Analysis & Valuation

6.1 Valuation method & approach

Valuation of a start-up company in its early stages can be challenging due to limited cash flow (if any) and uncertainty regarding the future. As part of a Discounted Cash Flow (DCF), the accepted method used in financial valuations, there are several modifications to a start-up company's valuation. In general, there are three primary methods within the DCF method:

1. Real options – this valuation method is designated for pre-clinical and early-stage clinical programs/companies where the assessment is binary during the initial phases and based upon scientific-regulatory assessment only (binomial model with certain adjustments).
2. Pipeline assessment – a valuation method used for early-stage companies before the market stage where time-to-market may be a few years for full operations. The company's value is the total discounted cash flow for its products/signed agreements plus unallocated costs and its technology platform assessment.
3. DCF valuation - this method applies to companies with products that have a positive cash flow from operations.

We conducted Sonovia's valuation under the DCF valuation method as Sonovia already has revenues and a solid business model. We also explored for industry multiples as benchmarking for Sonovia's value.

6.2 Valuation by DCF Method

The company was founded in 2013 and is based in Ramat Gan, Israel. The company was formerly known as Nano-Textile Ltd and changed its name to Sonovia Ltd. in 2017.

Sonovia is an Sonovia's anti-pathogenic application, which provides over 99% active protection against viruses (including covid-19), bacteria, and fungi, is already generating revenues (over $5 million in Q1-Q3 '20) and is tested by leading brands and manufacturers. Sonovia conducts pilots with global leading brands and manufacturers with its anti-pathogenic application. Additional applications such as water repellency, flame retardancy, and dyeing – are either in R&D or in the company's R&D pipeline.

Sonovia operates within the textile industry, which is constantly growing yet is currently at a tipping point: Increased consumer awareness of ecological impact and preference for textiles produced with a low ecological footprint, coupled with increasingly stringent regulation and enforcement of chemical use, are expected to drive a significant industrial change as manufacturers are already forced to seek innovative, 'green' solutions.

Sonovia's technology and its advantages over conventional methods and its ongoing activity with leading brands and OEMs across several key markets have the potential to significantly disrupt the textile finishing and dyeing industries and increase demand for new functional products. Realization of that potential depends greatly on successful entry into various verticals, achieving a global installation base, and creating brand awareness.

To gain global primacy in the field of advanced applicative treatments for textiles, Sonovia is accelerating the industrial scale-up process for its' antiviral and antimicrobial Sono-finishing treatment.

Revenues Forecast

Sonovia is an established applicative treatment for textiles company. The company's primary revenue stream is expected to come from the sales of its' chemical formulations. Yet, Sonovia identified the opportunity to test consumer awareness and market demand for fabrics with antimicrobial properties and embark on manufacturing and selling branded face masks.

We estimated the company value using data received from the company and our team analysis. We segmented Sonovia's revenue stream into two main categories, aligned with the company business plan. Assumptions and revenue forecast by revenue stream:

1. **The personal safety department** – currently operates a D2C model: Direct sales of branded personal protective products – such as the SonoMask – to end-clients in the private sector; Sonovia's face masks offer over 99% active protection against viruses (including covid-19), bacteria, and fungi for over one year and can be washed 55 times without losing their potency. By September 30, 2020, Sonovia generated over $5 million in revenues (unaudited). We estimate that demand for protective masks and other personal safety products would remain stable in the western world's foreseeable future.

   Since Sonovia already had the technological solution needed to manufacture face masks (which is antibacterial etc.); thus, we estimate that it will have a high-profit margin on this product.

2. **The Sono-applications department** - is the core revenue stream of the company. Sonovia focuses on the research and development of ultrasound-based applicative treatments for textiles. Its Antiviral and Antimicrobial Sono-finishing application is the most technologically-mature. The company further invests in the research and development of additional applications, such as water repellence, flame retardant, UV protection, and dyeing. We anticipate initial sales of Sonovia's chemical-formulation in the 2nd half of 2022 and gradual assimilation of sonochemical systems in the industry.

   The sono-applications department revenue forecast assumptions:

   a) Machine width: 2 meters.
   b) Fabric weight per square meter: Weight may vary upon use-case. E.g., Sportswear 100-150 gr; Transportation 350 gr; Hospitals 200-250 gr. We took an average of 250 gr based on the company target markets.

c) **Fabric weight per running meter** = Machine width * Fabric weight per square meter = 500 grams.

d) Machine speed, per minute: 20 running meters.

e) Number of working minutes per year: 382,560 minutes

   i) 249 working days per year on average (in Israel*), 24 hours per day.

   ii) 50 short-working days (Fridays), 8 hours per day.

f) Utilization rate of a standard machine: 80%.

g) **Total sono-processed running meters, per year** = (Machine speed, per minute) * (Number of working minutes per year) * (Utilization rate) = 6,120,960 running meters.

h) **Total KG of sono-processed fabric, per year** = (Fabric weight per running meter) * (Total sono-processed running meters, per year) = 3,060,480 KG.

i) **Price per KG of treated fabric**: $0.5, based on the average of current industry prices.

   i) Institutional market pricing: $0.7.

   ii) Private market pricing: $0.35.

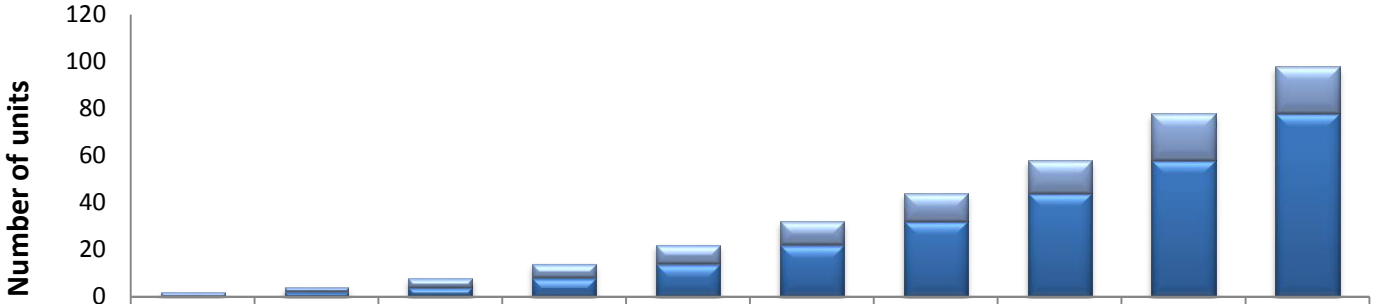
j) **Total KG of sono-processed fabric, per year** = (Fabric weight per running meter) * (Total sono-processed running meters, per year) = 3,060,480 KG.

k) Total revenue from one deployed machine = (Total KG of sono-processed fabric, per year) * (Price per KG of treated fabric) = $1,606,752

Lastly, we estimated the number of machines deployed to the market for each year and multiplied this number by the Total revenue from one deployed machine.

Over the years, we anticipate that the sonochemical machines will be widely spread worldwide, with the potential to replace the current industry standard machines. Yet, we have taken a more conservative approach in our revenue forecast. Below, we present our forecasting for the **number of machines sold and accumulated number of machines deployed** in 2022– 2026:

Sono-machines sold and deployed forecast, 2022-2026



	H1 2022	H2 2022	H1 2023	H2 2023	H1 2024	H2 2024	H1 2025	H2 2025	H1 2026	H2 2026
Units sold	2	2	4	6	8	10	12	14	20	20
Units deployed	0	2	4	8	14	22	32	44	58	78

Sonovia's success will rely on the assimilation of finishing systems for textiles via joint effort and Brückner Trockentechnik GmbH & Co. and on developing additional applications.

From our standpoint, the additional applications under development are currently not mature enough to be included in our valuation. Nonetheless, upon maturity, these applications could add a substantial upside to Sonovia's valuation. Thus, we see an upside in Sonovia's valuation we did not include in our valuation.

Below, we present our forecasting for the **company over-all revenue from the different divisions** in 2021–2026:

USD in (000)	2021	2022	2023	2024	2025	2026
Revenue						
Personal safety division	12,000	15,000	19,000	20,000	20,600	21,218
Sono-applications division	-	1,607	9,641	28,922	61,057	109,259
Total Revenues	**12,000**	**16,607**	**28,641**	**48,922**	**81,657**	**130,477**
YoY change	*0.0%*	*38.4%*	*72.5%*	*70.8%*	*66.9%*	*59.8%*

Costs:

We calculated the company expenses in the forecasted years based on bottom-up analysis, data received from the company, and standard industry benchmarks.

- **Costs of Goods**

  Products division - COGS consists mainly of textile costs for the face masks production and 3% royalties' payment to Bar-Ilan University.

Technology division - COGS consists mainly of chemicals needed to produce Sonovia's formulation and 3% royalties' payment to Bar-Ilan University.

We maintained a steady-state relative to revenue growth; i.e., COGS will be a fixed 30% for both divisions.

- **Operating Expenses**

  R&D - As the company still develops additional formulations, we expect growing R&D expenses over the years. We estimated approx. 30% increase in R&D costs about each half year.

  S&M - In the coming years, the company plans to invest heavily in S&M as it strives to establish its brand worldwide. To do so, we estimate the company S&M expenses as followed:

  Products division – We maintained a steady-state relative to revenue growth; i.e., S&M costs will be a fixed 25%-28% of products division revenue.

  Technology division – We estimate S&M costs to reach approx. $5.8M in 2021, and gradually reach $15.5M by 2026.

  G&A - We estimate the company G&A expenses to be roughly $1.3M in 2021. Then, to maintain the company growth, we added 300K annual growth to that amount.

- **Tax** - Sonovia is an Israeli company. Therefore, the average corporate tax rate for the company is 23%. We assume the company will pay taxes starting 2021 alongside its' revenue growth.

Below, we present our P&L forecasting for the years 2021 – 2026:

USD in (000)	2021	2022	2023	2024	2025	2026
Total Revenues	**12,000**	**16,607**	**28,641**	**48,922**	**81,657**	**130,477**
COGS	3,600	4,982	8,592	14,676	24,497	39,143
Gross Profit	**8,400**	**11,625**	**20,048**	**34,245**	**57,160**	**91,334**
Operating Expenses						
R&D	944	1,739	3,092	5,497	9,772	17,373
% of chemical revenue	-	*108.2%*	*32.1%*	*19.0%*	*16.0%*	*15.9%*
S&M	5,791	7,620	9,973	10,821	12,218	15,657
% revenue	*48.3%*	*45.9%*	*34.8%*	*22.1%*	*15.0%*	*12.0%*
G&A	1,300	1,600	1,900	2,200	2,500	2,800
% revenue	*10.8%*	*9.6%*	*6.6%*	*4.5%*	*3.1%*	*2.1%*
Total Operating Expenses	8,035	10,959	14,965	18,518	24,491	35,830
Operating Income (EBIT)	**365**	**665**	**5,083**	**15,727**	**32,669**	**55,504**
Operating Income %	*0.0%*	*4.0%*	*17.7%*	*32.1%*	*40.0%*	*42.5%*

6.3 Equity Value

We also calculated Sonovia's equity value based on the following parameters:

- Non-operational assets/liabilities - Company had $17.5M cash as of 31/12/2020 with no loans.
- CapEx – Over the life of an asset, total depreciation will be equal to the net capital expenditure. Sonovia plans to outsource the production of its' chemical formulations to leading chemical manufacturers. Thus, we don't expect any significant CapEx investment on behalf of the company in the forecasted period.
- Working capital (WC) changes – based on the current balance sheet and future WC needs, we assume 60 days of working capital needs.
- CAPM – we calculate CAPM to be at 19.61% (see appendix A).

Sensitivity analysis

The table below presents Sonovia's price matched with different capitalization rates (along with a 1.5% growth rate). We set a range of 0.5% change from our CAPM model (see Appendix A). The company has 14,954,164 shares as of 08/03/2021.

Cap. Rate (%)	*Price target (NIS)*
18.61	33.0
19.11	**31.8**
19.61	**30.7**
20.11	**29.6**
20.61	28.6

Using the DCF method, we estimate the price target to be in the range of NIS 29.6 and NIS 31.8; with a mean of NIS 30.7.

Valuation by EV/Revenue multiple

A revenue multiple measures the value of the equity of a business relative to its revenue. We examined Sonovia's industry, the chemicals (specialty) industry, using data on 97 firms (as of January 2021[50]). We found that the average EV/Revenue was 3.27.

In 2020, Sonovia revenue was about $9M; however, we deem this income as not representing. Most of the company's future revenue is expected to come from the Sono-applications division. We accounted for the company's future growth while using valuation multiples by applying the First Chicago Method, which VCs use to evaluate growth firms like Sonovia[51]. According to our forecast, the company revenue will be $130.5M in 2026, alternatively, $53.3M at present (using our CAPM rate). Thus, following the first Chicago method, Sonovia's current EV will be $53.3M multiplied by 3.27, which equals $174.5M. Adding the cash as a non-operational asset of $17.5M, we reach an equity value of $192M.

We also examined similar publically traded companies. We identified two relevant similar companies to Sonovia that operates in their specific industry (specialty chemicals for textile finishing). We calculated the following revenue multiple:

Currency	Company (Ticker)	Market Cap. (M)	TTM Revenue (K)	EV/Rev
GBP	HeiQ Plc	$252.28	$39,005	6.5
CAD	ifabric	$115.17	$16,446	7.0

Source: Yahoo Finance, as of 08.03.2021

The revenues multiple for the mentioned sample is 6.7, more than twice higher than the commonly used revenue multiple in the industry. However, the sample is too small for us to base conclusions. The mentioned findings further validate the company valuation via multiple benchmarking.

6.4 Valuation summary

We conducted Sonovia's valuation using market benchmarks such as market multiples; and analyzed bottom-up valuation using the DCF method. Given all the findings mentioned above and assessments. We value the company's stock price target to be in the range of NIS 29.6 to NIS 31.8 with a mean of NIS 30.7.

Appendix #.1: Capital Asset Pricing Model (CAPM) model

The cost of equity capital (Ke) represents the return required by investors. The capitalization rate is calculated using the CAPM (Capital Asset Pricing Model). It is based on an Israeli long-term 10-year governmental bond with a market risk premium and based on Professor Aswath Damodaran's (NY University) commonly used sample (www.damodaran.com). As of January 2021, the equity risk premium for Israel was estimated at 5.4%. A three-year market regression averaged Beta is 0.78, according to a sample of 97 companies representing global chemicals (specialty) companies. We used an unleveraged beta of this sample, which is higher than a leveraged beta due to the high cash versus debt rate. The implied CAPM is 19.61%.

CAPM model (ke) is estimated as follows: $ke = rf + \beta(rm-rf) + Sp + Ar$

Sonovia is a small-cap company in which marketability and size premiums need to be considered. Duff and Phelps's data research in 1963-2020 indicates that a 10.24% premium needs to be added to the CAPM for small-cap companies. Due to company structure and early growth stage, an additional executive turnover risk premium of 4% should be considered. We, therefore, estimate the company's CAPM to be 19.61%.

CAPM Model		Value	Source
Long-term (10 years) bond	R(f)	1.15%	Israeli Governmental bonds (10Y)
Market risk premium	R(m)- R(f)	5.4%	Based on Professor Damodaran's sample (01/21)
Beta unleveraged	B	0.78	Averaged Beta, a sample of 97 firms, chemicals (specialty) companies (01/21)
Cost of Capital	Ke	5.37%	
Size Premium	Sp	10.24%	Duff and Phelps data, 10dz.
Additional Risk	Ar	4.0%	
CAPM		19.61%	

Appendix #.2: About Frost & Sullivan

Frost & Sullivan* is a leading global consulting, and market & technology research firm that employs staff of 1,800, which includes analysts, experts, and growth strategy consultants at approximately 50 branches across 6 continents, including in Herzliya Pituach, Israel. Frost & Sullivan's equity research utilizes the experience and know-how accumulated over the course of 55 years in medical technologies, life sciences, technology, energy, and other industrial fields, including the publication of tens of thousands of market and technology research reports, economic analyses and valuations. For additional information on Frost & Sullivan's capabilities, visit: www.frost.com. For access to our reports and further information on our Independent Equity Research program visit: www.frost.com/equityresearch.

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Frost & Sullivan is delighted to have been selected to participate in the Analysis Program initiated by the Tel Aviv Stock Exchange Analysis (TASE). Within the framework of the program, Frost & Sullivan produces equity research reports on Technology and Biomed (Healthcare) companies that are listed on the TASE, and disseminates them on exchange message boards and through leading business media channels. Key goals of the program are to enhance global awareness of these companies and to enable more informed investment decisions by investors that are interested in "hot" Israeli Hi-Tech and Healthcare companies. The terms of the program are governed by the agreement that we signed with the TASE and the Israel Securities Authority (ISA) regulations.

For further inquiries, please contact our lead analyst:

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Appendix #.3: Team biographies

Dr. Tiran Rothman is the head of Frost & Sullivan Research & Consulting Ltd., a subsidiary of Frost & Sullivan in Israel. He has over 10 years of experience in research and economic analysis of capital and private markets, obtained through positions at a boutique office for economic valuations, as chief economist at the AMPAL group, and as co-founder and analyst at Bioassociate Biotech Consulting. Dr. Rothman also serves as the Economics & Management School Head at Wizo Academic College (Haifa). Tiran holds a PhD (Economics), MBA (Finance), and was a visiting scholar at Stern Business School, NYU.

Ma'ayan Laufer is a Senior Consultant at Frost & Sullivan Research & Consulting Ltd., a subsidiary of Frost & Sullivan in Israel. Ma'ayan has over 7 years of experience in research and analysis in the fields of healthcare and life sciences, obtained through positions at boutique consultancy firms and by working with blue-chip organizations including the US Chamber of Commerce, PhRMA, BIO and EFPIA. He is the author of a number of research papers and academic publications, and holds an MSc in Healthcare Management & Administration from the University of Haifa.

Almog Josef Sokolik is an Analyst and Consultant at Frost & Sullivan Research & Consulting Ltd., a subsidiary of Frost & Sullivan in Israel. He has experience in valuation of public and private firms, research and market analysis obtained through positions at the Ministry of Finance - Department of the Chief Economist, and Ben-Gurion University - Laboratory for Judgment & Decision Making as research analyst. Almog holds a BA in Economics and Psychology.

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Endnotes

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