Group 4

Al Jubaiar (26107) Shahnawaz Alam (32445) Md Tuhin Islam (32279) Safayet Hossain Shimul (32167)



- Results of Presentation 1
- Results of Presentation 2
- Risk Profile
- Decision Making Method Analytic Hierarchy Process
- Decision Making Method SWOT Analysis

Results of Presentation 1

Group	Stakeholder	Decision
4	Henkel AG & Co. KGaA	From which country should green hydrogen in the form of LOHC be imported?

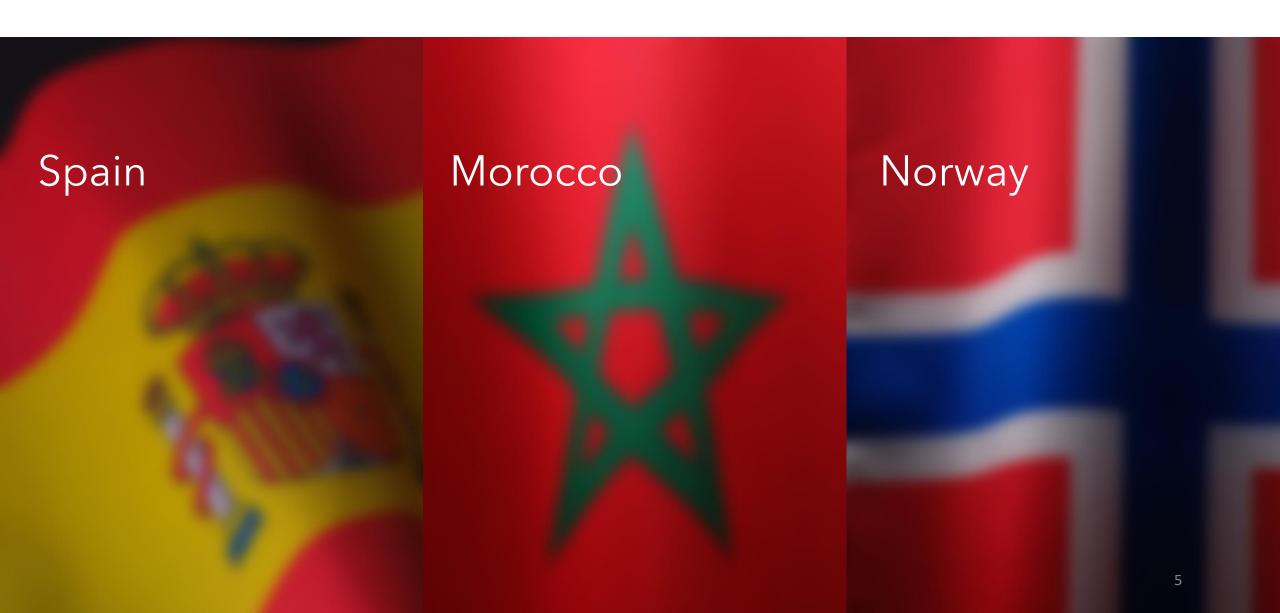
Potential LOHC import countries

- The EU and UK countries: UK, Spain, Sweden, Norway, Denmark, Finland
- The Middle East and North Africa (MENA) region countries: Saudi Arabia, Oman, UAE, Morocco, Turkey, Algeria
- Other countries: Australia, Brazil, Canada, Chile, New Zealand, USA, Iceland

Results of Presentation 2 (Requirements & Criteria)

Requirements	Criteria
Strong/Slightly export-oriented country	Exporting countries
Maximum production cost < 3,00€ by 2030	Cost
Transportation via ship or pipeline	Mode of transport
Maximum distance < 7500 km	Transport distance
Existing bilateral agreements between governments on hydrogen development	Geopolitics

Results of Presentation 2 (Candidate Solution)



Results of Presentation 2 (Uncertainties)



Results of Presentation 2 (Risk Profile)

Uncertainties	Outcomes	Consequences of Alternative Spain	Consequences of Alternative Morocco	Consequences of Alternative Norway
	Developed	Low cost	Low cost Higher generation	Low cost High generation
Technological	(80%)	Reliable transport	Reliable transport	Reliable transport
maturity	Underdeveloped	Not having comparative low production cost	Not having comparative low production cost	Not having comparative low production cost
	(20%)	Not Reliable transport	Not Reliable transport	Not Reliable transport
	Stable conditions	Extension of H2Med could deliver a pipeline network	Repurposed pipeline network by 2030	
Geopolitical	(70%)	Potential Reliable supply chain / transport	Potential Reliable supply chain / transport	Potential Reliable supply chain / transport
Stability	Geopolitical tensions	No pipeline network by 2030	No repurposed pipeline by 2030	
	(30%)	Disruptions in supply chain	Disruptions in supply chain	Disruptions in supply chain



HENKEL ANNUAL REPORT 2022







THE COMPANY

SHARES AND BONDS

CORPORATE GOVERNANCE

COMBINED MANAGEMENT REPORT

CONSOLIDATED FINANCIAL STATEMENTS

FURTHER INFORMATION

CREDITS

CONTACTS

FINANCIAL CALENDAR

As already discussed in our last Annual Report, our meeting on February 18, 2022 focused on the annual and consolidated financial statements for 2021, including the combined management report for Henkel AG & Co. KGaA and the Group, together with the risk report, corporate governance report and separate combined non-financial statement for Henkel AG & Co. KGaA and the Group, which was issued in the form of our Sustainability Report. We also approved the declaration of compliance for 2022, as well as discussing progress in implementing the strategic framework and looking at the status of individual portfolio measures.

Our meeting on April 4, 2022 focused on the developments surrounding the war in Ukraine, the associated crisis management and the impacts on our business activities. The agenda further included a discussion of various scenarios relating to how to proceed going forward. We also looked at business performance in our business units over the first three months of the fiscal year and at the provisional expectations with regard to future business development, bearing in mind that the anticipated surge in commodity prices and transport costs due to the geopolitical and economic disruptions continues to be a major factor of uncertainty. Further, we discussed additional measures to improve the efficiency of the Supervisory Board and how it works.

In our meeting on September 21, 2022, we focused both on the performance of our business units over the first eight months and on the progress achieved in implementing our strategic priorities in the business units and functions. We analyzed in more depth the progress regarding the merger of the business units Laundry & Home Care and Beauty Care into our new Consumer Brands business unit. We likewise discussed our sustainability targets for 2030 and examined issues relating to the exit of our business activities in Russia and Belarus.

Our meeting on December 9, 2022 focused on the expected results for 2022 and our assets and financial planning for fiscal 2023. We also examined in detail the associated budgets of our business units based on comprehensive documentation. Further areas of focus included the exit of our business activities in Russia and the status of our new business unit Consumer Brands.

HENKEL ANNUAL REPORT 2022



THE COMPANY

SHARES AND BONDS

CORPORATE GOVERNANCE

COMBINED MANAGEMENT REPORT

CONSOLIDATED FINANCIAL STATEMENTS

FURTHER INFORMATION

CREDITS

CONTACTS

FINANCIAL CALENDAR

Procurement

We use externally sourced materials (raw materials, packaging and purchased goods) and services to produce our finished products. These items all fall under the general category of direct materials. Examples include washing-active substances (surfactants), adhesive components, cardboard boxes and external bottling services.

Aside from supply and demand, the prices of **direct materials** are mainly determined by the prices of the input materials used to manufacture them.

Prices for direct materials (raw materials, packaging and purchased goods and services) rose exceptionally steeply in 2022, with an average increase in the mid-twenties percentage range compared to the previous year. This trend was driven by the impacts of the COVID-19 pandemic and of the war in Ukraine — which include unprecedented increases in energy prices — and by the ongoing recovery of industrial demand, especially in the first half of the year. At the same time, supply chains remained extremely strained, while logistics costs were rising. Prices inflated sharply not just for petrochemical feedstocks across the board but also for inorganic substances, synthetic resins, washing-active substances (surfactants) and packaging.

Direct material expenditures were up year on year at 10.8 billion euros (2021: 9.0 billion euros), mainly driven by higher prices on the commodity markets. Savings from our global procurement strategy and cost reduction measures combined with improvements in production and supply chain efficiency were unable to fully offset the significantly higher material prices and negative currency effects.

The five most important categories of direct materials are washing-active substances (surfactants), raw materials for use in hotmelt and water-based adhesives, polyurethanes, and inorganic raw materials. These account for 39 percent of all direct material expenditures. Our five largest suppliers represent 14 percent of purchasing volume in direct materials.

HENKEL ANNUAL REPORT 2022



Overview of major risk categories and quantitative evaluation of short-term risks

Risk category	Probability Potential financial impact	
Geopolitical risks	Low	Major
Business-/industry-specific risks	AND THE PROPERTY OF	200000
Procurement market risks	Moderate	Major
Production risks	Moderate	Major
Business environment and sector-specific	- Marian	677
risks	High	Major
Financial risks		
Credit risks	Low	Major
Liquidity risks	Low	Minor
Currency risks	Moderate	Major
Interest rate risks	High	Minor
Risks from pension obligations	Low	Minor
Risks from pension obligations	to the second	
(impact on equity)	High	Major
Social risks		
Personnel risks	Moderate	Minor
Risks in connection with the company's reputation and its brands	Low	Major
Technological risks	0-0000	777E
(IT and cyber risks)	Moderate	Major
Environmental risks (environmental, safety and health risks)	Moderate	Major
Legal and regulatory risks	Moderate	Major

In the following presentation of the risk categories, long-term risks are dealt with separately where they give rise to additional relevant assertions.

HENKEL ANNUAL REPORT 2022 178









THE COMPANY

SHARES AND BONDS

CORPORATE GOVERNANCE

COMBINED MANAGEMENT REPORT

CONSOLIDATED FINANCIAL STATEMENTS

FURTHER INFORMATION

CREDITS

CONTACTS

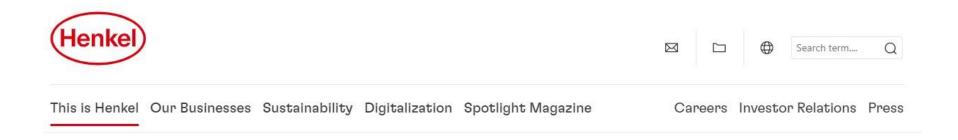
FINANCIAL CALENDAR

Additional price and supply risks exist due to possible demand- or production-related shortages in the procurement markets, and may also have long-term impacts. The development of new business models may also produce shortages in the supply chain over the long term.

Measures: The measures taken include active supplier portfolio management through our globally engaged, cross-divisional sourcing capability, together with strategies aimed at securing price and volume both through contracts and, where appropriate and possible, through financial hedging instruments. Furthermore, we work in interdisciplinary teams within Research and Development, Supply Chain Management and Purchasing on devising alternative formulations and packaging forms so as to be able to respond flexibly to unforeseen fluctuations in raw material prices. We also avoid becoming dependent on individual suppliers to better secure the constant supply of the goods and services that we require. Finally, close collaboration with our strategic suppliers plays an exceptionally important role in our risk management. Further details regarding the assessment of supplier financial stability can be found in the section on "Procurement" on pages 147 to 149. The basis for our risk management approach is provided by a comprehensive procurement information system aimed at ensuring permanent transparency with respect to our purchasing volumes. Over the long term, we continually adapt our structures in response to developments on the procurement markets and the requirements of new business models, as well as in order to avoid shortages and bottlenecks along our supply chains.

Production risks

Description of risk: Henkel faces production risks in the event of low capacity utilization due to volume decreases and unplanned operational interruptions, especially at our single-source sites. Risks from unscheduled disruptions to operations could arise in the wake of cyber attacks on IT systems, extreme weather events, energy shortages or a regionally specific shortage of labor. In light of the COVID-19 pandemic, risks may also continue to arise from disruptions to our supply chains, regional and national restrictions on production workflows and also reduced workforce availability. The risk of insolvency among key suppliers could also impair our production processes in the short term. The development of new business models may also produce shortages and bottlenecks in the production chains over the long term.



Expectations towards our supplier base

Henkel currently has suppliers and other business partners from 115 countries. We expect them to conduct themselves in a manner consistent with our sustainability requirements. In selecting and developing our suppliers, we consider alongside key commercial and operating indicators their performance with regard to safety, health, environment, social standards and fair business practices as decisive criteria. This is based on our globally applicable Safety, Health and Environment standards that we formulated as early as 1997, thereby demonstrating even at that time our commitment to assuming responsibility along the entire value chain. We supplemented these with a Responsible Sourcing Policy as an integral part of our sourcing processes. Our Corporate Standard Purchasing continue to apply.





Source: [4] [5]

- Export oriented countries has moderate importance than Cost
- Mode of transportation is less importance than Cost
- Export oriented countries has very strong importance than Mode of transportation
- Export oriented countries, and cost are extremely importance than Transport distance
- Export countries has moderate important than Geopolitics
- Geopolitics has equally important to Cost
- Geopolitics has strongly important than Mode of transport
- Geopolitics has very strongly important than Transport distance
- Mode of transport has strongly important than Transport distance

- Export oriented countries has moderate importance than Cost
- Mode of transportation is less importance than Cost
- Export oriented countries has very strong importance than Mode of transportation
- Export oriented countries, and cost are extremely importance than Transport distance
- Export countries has moderate important than Geopolitics
- Geopolitics has equally important to Cost
- Geopolitics has strongly important than Mode of transport
- Geopolitics has very strongly important than Transport distance
- Mode of transport has strongly important than Transport distance

Intensity of relative importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance of one over another	Experience and judgment slightly favor one activity over another
5	Essential or strong	Experience and judgment strongly favor one activity over another
7	Very strong importance	An activity is strongly favored and its dominance is demonstrated in practice
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2,4,6,8	Intermediate values between two adjacent judgments	When compromise is needed between two judgments

AHP - Pairwise comparison of each criterion

- Export oriented countries has moderate importance than Cost
- Mode of transportation is less importance than Cost
- Export oriented countries has very strong importance than Mode of transportation
- Export oriented countries, and cost are extremely importance than Transport distance
- Export countries has moderate important than Geopolitics
- Geopolitics has equally important to Cost
- Geopolitics has strongly important than Mode of transport
- Geopolitics has very strongly important than Transport distance
- Mode of transport has strongly important than Transport distance

Intensity of relative importance	Definition	Explanation
1	Equal importance	Two activities contribute equally to the objective
3	Moderate importance of one over another	Experience and judgment slightly favor one activity over another
5	Essential or strong	Experience and judgment strongly favor one activity over another
7	Very strong importance	An activity is strongly favored and its dominance is demonstrated in practice
9	Extreme importance	The evidence favoring one activity over another is of the highest possible order of affirmation
2,4,6,8	Intermediate values between two adjacent judgments	When compromise is needed between two judgments

	Export countries	Cost	Mode of transport	Transport distance	Geopolitics
Export countries	1	3	7	9	3
Cost	1/3	1	3	9	1
Mode of transport	1/7	1/3	1	5	1/5
Transport distance	1/9	1/9	1/5	1	1/7
Geopolitics	1/3	1	5	7	1
Total	1.92	5.44	16.2	31	5.34

AHP - Relative priority of each criterion

	Export countries	Cost	Mode of transport	Transport distance	Geopolitics
Export countries	1	3	7	9	3
Cost	1/3	1	3	9	1
Mode of transport	1/7	1/3	1	5	1/5
Transport distance	1/9	1/9	1/5	1	1/7
Geopolitics	1/3	1	5	7	1
Total	1.92	5.44	16.2	31	5.34

	Export countries	Cost	Mode of transport	Transport distance	Geopolitics	Relative Priority
Export countries	0.52	0.55	0.43	0.29	0.56	0.47 1 st
Cost	0.17	0.18	0.18	0.29	0.18	0.2 3 rd
Mode of transport	0.07	0.06	0.06	0.16	0.04	0.078 4 th
Transport distance	0.05	0.02	0.01	0.03	0.02	0.026 5 th
Geopolitics	0.17	0.18	0.30	0.22	0.18	0.21 2 nd
Total	1	1	1	1	1	1

AHP - Vector of weights

	Vectors of Weights
Export countries	2.48
Cost	1.034
Mode of transport	0.383
Transport distance	0.145
Geopolitics	1.138
Total	5.182

	Export countries	Cost	Mode of transport	Transport distance	Geopolitics	Relative Priority	cs
Export countries	0.52	0.55	0.43	0.29	0.56	0.47 1 st	
Cost	0.17	0.18	0.18	0.29	0.18	0.2 3 rd	
Mode of transport	0.07	0.06	0.06	0.16	0.04	0.078 4 th	
Transport distance	0.05	0.02	0.01	0.03	0.02	0.026 5 th	
Geopolitics	0.17	0.18	0.30	0.22	0.18	0.21 2 nd	
Total	1	1	1	1	1	1	

AHP - Consistency vector, index, and ratio

	Relative Priority	Vector of Weights	Consistency Vector
Export countries	0.47	2.48	5.27
Cost	0.20	1.034	5.17
Mode of transport	0.078	0.383	4.91
Transport distance	0.026	0.145	5.576
Geopolitics	0.21	1.138	5.419
Total	0.984	5.18	26.122

	Export countries	Cost	Mode of transport	Trar dist		Vectors of Weights	ative ority	cs
Export countries	0.52	0.55	0.43	0	Export countries	2.48	47 L st	
Cost	0.17	0.18	0.18	0	Cost	1.034	.2 rd	
Mode of transport	0.07	0.06	0.06	0	Mode of transport	0.383	078 _{Įth}	
Transport distance	0.05	0.02	0.01	0	Transport distance	0.145	026 5 th	
Geopolitics	0.17	0.18	0.30	0	Geopolitics	1.138	21 nd	
Total	1	1	1		Total	5.182	1	

 λ max = 26.122/5 = 5.2244

Consistency index, CI = 0.0561Consistency ratio, CR = 0.0500

	Spain	Morocco	Norway
Export countries	Medium	Strong	Strong
Cost	2.5-2.75 euro/kg	2.5-2.75 euro/kg	2.25-2.50 euro/kg
Mode of transport	Ship/Pipeline	Ship/Pipeline	Ship/Pipeline
Transport distance	2439.15 Km	3676.66 Km	1466.64 Km
Geopolitics	Strong	Medium	Strong

Criteria 1	Spain	Morocco	Norway
Spain	1	1/5	1/5
Morocco	5	1	1
Norway	5	1	1
Total	11	2.2	2.2

Criteria 1	Spain	Morocco	Norway	Relative Priority
Spain	0.0909	0.0909	0.0909	0.0909
Morocco	0.4545	0.4545	0.4545	0.4545
Norway	0.4545	0.4545	0.4545	0.4545
Total	1	1	1	1

Criteria 2	Spain	Morocco	Norway
Spain	1	1	1/3
Morocco	1	1	1/3
Norway	3	3	1
Total	5	5	1.666

Criteria 2	Spain	Morocco	Norway	Relative Priority
Spain	0.2	0.2	0.2	0.2
Morocco	0.2	0.2	0.2	0.2
Norway	0.6	0.6	0.6	0.6
Total	1	1	1	1

Criteria 3	Spain	Morocco	Norway
Spain	1	3	1
Morocco	1/3	1	1/3
Norway	1	3	1
Total	2.333	7	2.333

Criteria 3	Spain	Morocco	Norway	Relative Priority
Spain	0.428	0.428	0.428	0.428
Morocco	0.142	0.142	0.142	0.142
Norway	0.428	0.428	0.428	0.428
Total	1	1	1	1

Criteria 4	Spain	Morocco	Norway
Spain	1	3	1/3
Morocco	1/3	1	1/6
Norway	3	6	1
Total	4.333	10	1.5

Criteria 4	Spain	Morocco	Norway	Relative Priority
Spain	0.230	0.3	0.222	0.250
Morocco	0.077	0.1	0.111	0.096
Norway	0.70	0.6	0.666	0.655
Total	1	1	1	1

Criteria 5	Spain	Morocco	Norway
Spain	1	5	1
Morocco	1/5	1	1/5
Norway	1	5	1
Total	2.2	11	2.2

Criteria 5	Spain	Morocco	Norway	Relative Priority
Spain	0.455	0.455	0.455	0.455
Morocco	0.090	0.090	0.090	0.090
Norway	0.455	0.455	0.455	0.455
Total	1	1	1	1

AHP - Compound priority

	Relative Priority – C1				
Spain	0.0909	0.2	0.428	0.250	0.455
Morocco	0.4545	0.2	0.142	0.096	0.090
Norway	0.4545	0.6	0.428	0.655	0.455



Relative Priority General	/-
0.47	
0.2	
0.078	
0.026	
0.21	

AHP - Compound priority

Relative Priority - Composed
0.218157
0.286087
0.479579

Why SWOT Analysis?

SWOT Analysis -

- Shows Comprehensive Evaluation
- Focuses on Internal and External Factors
- Supports Strategic Planning and Scenario Exploration
- Provides Actionable Insights

Force-Field-Analysis

- Focuses mainly on driving and restraining forces
- Simplistic Approach
- Lack of Comprehensive Analysis

Delphi-Technique

- Involves expert opinions but may overlook internal insights.
- May not sufficiently capture the internal dynamics
- Time-Consuming

Scenario Planning

- Plans can take months to create
- Uncertain Predictions
- Risk of Overemphasis on Singular Scenarios
- Can introduce unnecessary complexity for specific decisions

SWOT Analysis

STRENGTHS

- Innovation and Sustainability Leadership
- Financial performance
- Strong orientation towards R&D
- Extensive Global Network

W

WEAKNESSES

- Dependence on External Suppliers
- Supply Chain Complexity

OPPORTUNITIES

- Market Leadership in Sustainable Solutions
- Government Incentives
- Collaboration and Partnerships
- Scope to enter new markets

THREATS

- Intense market competition
- Regulatory Uncertainties
- Competition Technological Risks

References

- 1. https://www.henkel.com/resource/blob/1804852/5055ed4c7729a3a6ae50c6169fc8f303/data/2022-annual-report.pdf
- 2. https://www.henkel.com/company/partners-and-suppliers/suppliers
- 3. https://www.henkel.com/resource/blob/638576/58f5962df41e31e43b5904c39e319d3f/data/responsible-sourcing-policy.pdf
- 4. https://www.henkel.com/resource/image/725546/3x2/1000/666/5638766054c4be525f806267fc55bc4/F33CEF3EAB9
 E5B046395E4CBF1389264/code-of-corporate-sustainability-en-de-pdfpreviewimage-1-webp
- 5. https://www.henkel.com/resource/image/1756994/3x2/1000/666/be85d3545e9674db274323e32c0ccf3/D985D1598
 f48E520C0F77D56AA52F09D/she-standards-en-com-pdfpreviewimage-3-.webp
- 6. https://cdn.uconnectlabs.com/wp-content/uploads/sites/82/2020/02/Henkel.pdf

