



Top Seafood Consumer Trends 2023



Introduction

Top Seafood Consumer Trends: 2023



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The geo-political landscape we find ourselves living in is bleak. Wars, a pandemic (which is loosening its grip), inflation, climate change, social strife, uprisings, sky-rocketing energy and commodity costs are all contributing to the suffering of millions of people. In a recent trend report by Ipsos, they highlighted that "the world is not in crisis – it is in crises. Perhaps, this is the 'new normal' we now must adjust to? One thing is for certain - some of the issues highlighted in this year's report are quickly becoming more pertinent – even during the short time it has taken to write it.

This year, we wanted to focus on a couple of key topics. Firstly, sustainability, but with an emphasis on the social dimension. We recognize that many parts of the world have come a long way in addressing these issues, however, there is much work still to do. Secondly, the issue of transparency, the importance of which is reflected in an increasingly aware and concerned populace. We, among other things, look at a new law of transparency here in Norway called 'Åpenhetsloven', or The Transparency Act.

We have also looked at the world of fast-moving consumer goods and tried to shed light on current times by examining what we can learn from history. This section also addresses consumer behavior during crises, as well as seafood consumption patterns. Additionally, we take a short peek at technological development – specifically artificial intelligence and robotics.

But first, let us look at what has happened since our last consumer trends report.

From one crisis to another: What has happened since the last report?

Finally emerging from the most serious and invasive effects of a long pandemic, the world

enjoyed a brief respite and economic optimism. We could travel more freely, and economic sentiment improved after hitting record low levels during Covid-19.

But, at the time of writing (January 2023), war is ravaging Ukraine for the twelfth straight month, trade flows are changing, energy and commodity prices are still high, and many people understandably view this, and upcoming winters with a substantial measure of trepidation.

And this anxiety is with good reason.

According to a monthly survey (What worries the world, 2021-2023) conducted by Ipsos, the top global worry is inflation, whereas only a

year ago, Covid-19 held the top spot (and did so for many consecutive months). As we can see from the graph in Figure 1, inflation became the top worry in April 2022, and is still retaining the top spot even at the start of 2023. In June 2022, the World Bank published its Global Economic Prospect report predicting that “the world is expected to experience its sharpest deceleration following an initial recovery from global recession in more than 80 years.”

One thing is for certain: The bottom line of both businesses and consumers is being strained. Typically, a crisis will lead to shifting consumer behavior and research on consumer purchase behavior shows that, during a crisis, consumers tended to focus purchases on basic

goods rather than luxury ones (Vázquez-Martínez, 2021). A recategorization of luxury items also occurred, with an emphasis on more economical products rather than high-value ones. Perhaps one of the more interesting findings is that crises could manifest in long term behavior as well, thus driving the development of new habits or resulting in new brand preferences.

After the 2008 financial crisis, several new habits or trends were identified according to researchers. These were: Demand for simplicity, green consumerism, ethical consumerism, extensively seeking out bargains (mercurial consumption) and being smart or thrifty about spending (discretionary thrift) (Flatters and Willmott, 2008).

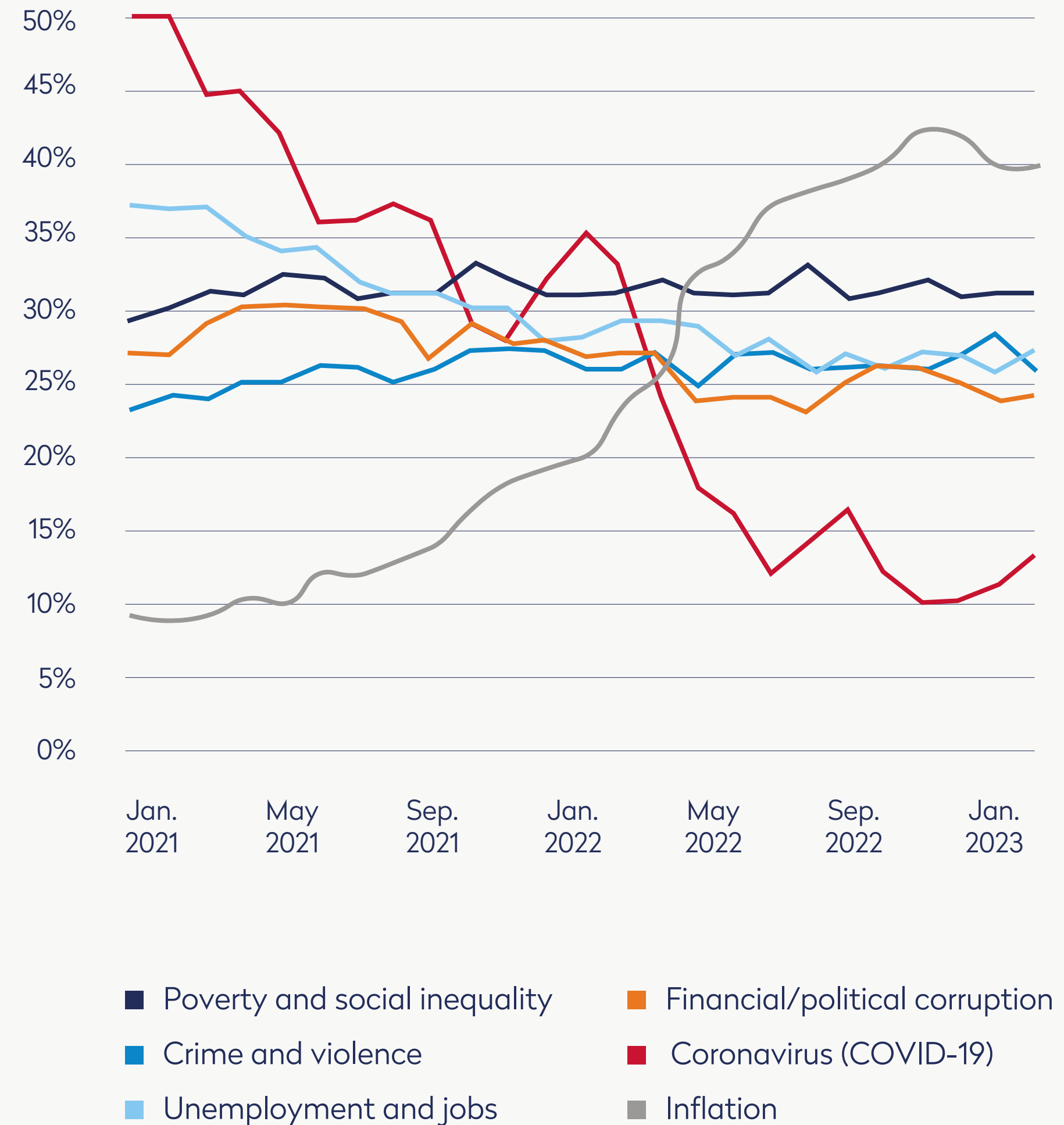


Figure 1: Top Global Concerns
Source: Ipsos MMI 2022

Crucially, consumer purchasing behaviors tend to change with levels of perceived risk during a crisis, as was the case for the most severe periods of the Covid-19 pandemic. Risk perception is subjective, and a study did not find an association with country of residence, even if that country was highly impacted by the virus – what mattered was the perception of risk (Vázquez-Martínez et al, 2021). Salient macro-economic bad news may also temper discretionary spending according to researchers (Garmaise et al, 2020). In other words, while the perceived health risk of the pandemic has, for many consumers, subsided – and thus normalized spending behaviors (in developed countries) – the financial situation

imposed on many households will reduce spending on non-essential items in the short, or longer term, depending on how long it takes to curb inflation.

Evidence of this is already being published. According to Kantar’s ‘entertainment on demand’ survey from Q3 last year (Kantar, 2022) an increasing number of households are cancelling their streaming services due to increasing inflation and the cost of living. However, the findings also point toward a possible stabilization with penetration numbers lower for the third quarter, compared to previous quarters in 2022.



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Chapter 1

Summary & Recap

Executive Summary

In this comprehensive analysis of the seafood industry for 2023, we delve into the key trends shaping the sector. Our focus is on sustainability, but we emphasize the often-overlooked social dimension. We explore the evolving world of fast-moving consumer goods, highlighting the seismic shifts in consumption patterns brought about by the Covid-19 pandemic.

Transparency is another crucial trend we examine, particularly in light of Norway's Transparency Act ('Åpenhetsloven'), which mandates companies to publicly report on social factors. We also touch on the transformative potential of technology, specifically artificial intelligence and robotics, in the seafood industry.

Lastly, we delve into the changes in consumer behavior during crises. We discuss how perceived risk influences purchasing behaviors and how this has manifested in seafood consumption patterns during the pandemic.

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Recap

In our first Top Seafood Consumer Trends report (in 2021), we chose to focus on five trends:

1. NEW SALES CHANNELS
2. SUSTAINABILITY
3. CONVENIENCE
4. HEALTH & WELLNESS
5. TRANSPARENCY

We will now give an updated look at each of the five trends and some examples of how they have affected or been implemented in the seafood industry.



NEW SALES CHANNELS have evolved a lot since 2021. Back then, the emerging trend of e-commerce was heavily discussed – and this sale channel has since just evolved.

One of the biggest changes in the e-commerce landscape is the introduction of *Modern Marketplace* or *Social Commerce*. This is when companies use social media companies (e.g., TikTok, Snapchat, Instagram, or Facebook) to sell their products. This option also allows for collaboration with KOLS (Key Opinion Leaders) or influencers to increase sales. We have seen examples of this throughout

the seafood industry with two specific cases in mind: MOWI's collaboration with the Norwegian actor Kristofer Hivju or Salma's collaboration with the winner of Masterchef 2020 Simen Vatne.

In 2021 the Norwegian Seafood Federation outlined a strategic plan to focus on **SUSTAINABILITY** in the seafood industry called “A blue change of pace” (Et blått taktskifte). The report outlines five key topics: (1) Sustainable Resource Management (2) Climate Change Mitigation (3) Circular Economy (4) Social Responsibility (5) Innovation and

Technology. This moves us to what remains of the main challenges for the seafood industry with respect to sustainability, fish feed, and the impact from production of fish feed on the environment.

In last year's report, we mentioned steps taken by a key player in the industry BioMar in using locally grown raw materials in their fish feed and their goal of increasing their share of circular and/or restorative raw materials to 50% by 2030, and in 2022 BioMar has reduced their Carbon Footprint by 5,5 % since their baseline in 2020 (BioMar Group 2022).

For the **CONVENIENCE** trend in 2021, we chose to focus on the role of convenience in consumers everyday life and how meal kits, ready-to-eat and value-added products will shape the future for seafood consumers. Looking at this in 2023, the trend is very prevalent in North America. There are several brands that provide ready-to-cook and pre-portioned seafood products.

HelloFresh is the largest meal-kit provider in the United States and has wide range of seafood selection. They focus on convenience and freshness. One of the key advantages of HelloFresh's

seafood selection is the freshness of the ingredients. HelloFresh works directly with trusted suppliers to ensure that the seafood is sourced sustainably and arrives at the doorstep of customers in peak condition. The seafood is carefully packed and insulated with ice packs to maintain its freshness during transit. This means consumers can enjoy the highest quality seafood without the need to visit a fish market. Additionally, HelloFresh recognize the importance of dietary preference and restrictions. This means that they also offer gluten-free or dairy-free recipes and meal-kits (HelloFresh 2023).

The major change in **HEALTH & WELLNESS** since 2021 is the introduction or more precise the rise in demand for plant-based alternatives to meat and seafood products. For plant-based alternatives to seafood, there are several companies gaining momentum and popularity here.

Good Catch and Sophie's Kitchen are two examples of this. With Good Catch, that specializes in plant-based tuna, crab cakes and fish burgers and Sophie's Kitchen plant-based alternatives to shrimp, crab cakes and smoked salmon. Using soy-and wheat-based protein, the hope of these chains is

to be an alternative to already well-known and popular seafood dishes. As consumer preferences continue to evolve, the retail landscape will witness further growth and diversification in the sector for plant-based alternatives to seafood.

In last year's report we took a closer look at blockchain and how it can be used to improve the traceability and **TRANSPARENCY** of the value chains of seafood companies. Along with blockchain, new technologies are being introduced in the path of achieving true transparency. A report from Argentus Insight points at three of the

most promising technologies companies are using to achieve transparency in the value chain: Blockchain, Artificial Intelligence and DNA tracing (Argentus, 2023). We have not touched upon the latter – DNA tracing, which is described as “absolutely the future for seafood traceability” by Katherine Bryar, global marketing director of BioMar (Jackson, 2022).

So, what is DNA tracing? DNA tracing is briefly explained by using DNA-analysis to document the composition of a product – for example the specie composition in fish feed. The Norwegian-based company ORIVO

has pioneered a unique science-based testing and certification service for the global feed and supplement industry. Based on laboratory testing, ORIVO provides verified origin (species and geographic origin), verified production process (organic versus non-organic) and verified specific feed formulations (algae, insect protein, etc.). This advancement could be a game-changer for the seafood industry and is quickly changing standards of trust and transparency for food industries (Jackson, 2022).

Chapter 2

Sustainability, with a social focus

Our first Top Seafood Consumer Trends report in 2021 presented sustainability as a megatrend. As a result, in last year's report, we took a deep dive into sustainability, expanding the concept by presenting its three integrated dimensions - environmental, economic and social - and further analyzing Norway's performance on the UN Sustainable Development Goals (SDGs) 2 and 14.

The increasing focus on the importance of sustainability looks set to stay, so it can't be neglected in this year's report either. For 2023, however, we

want to elevate the topic further by highlighting the social dimension of sustainability as, in many ways, this is not always given as much consideration as pure environmental impact.

As we highlighted in last year's report, results from a survey in 2020 confirmed that people mostly had environmental impact associations in mind when they considered what sustainability means to them.

In 2021, our survey was built a little different. The most recent results look like this:

What does sustainability mean to you?

All the respondents' answers were categorized in different categories: "ethically sound value chain", "environment" and "positives". The answers couldn't directly be categorized in a social vs. environmental category, as many of the answers are overlapping, but still there was a category for solely environmental answers. The keywords from the answers placed in each category are shown under the graphs, and as we can see there is a preponderance of environmental and biology related answers. The environmental concern for seafood is not only among consumers, but also the legislative branch of the EU.

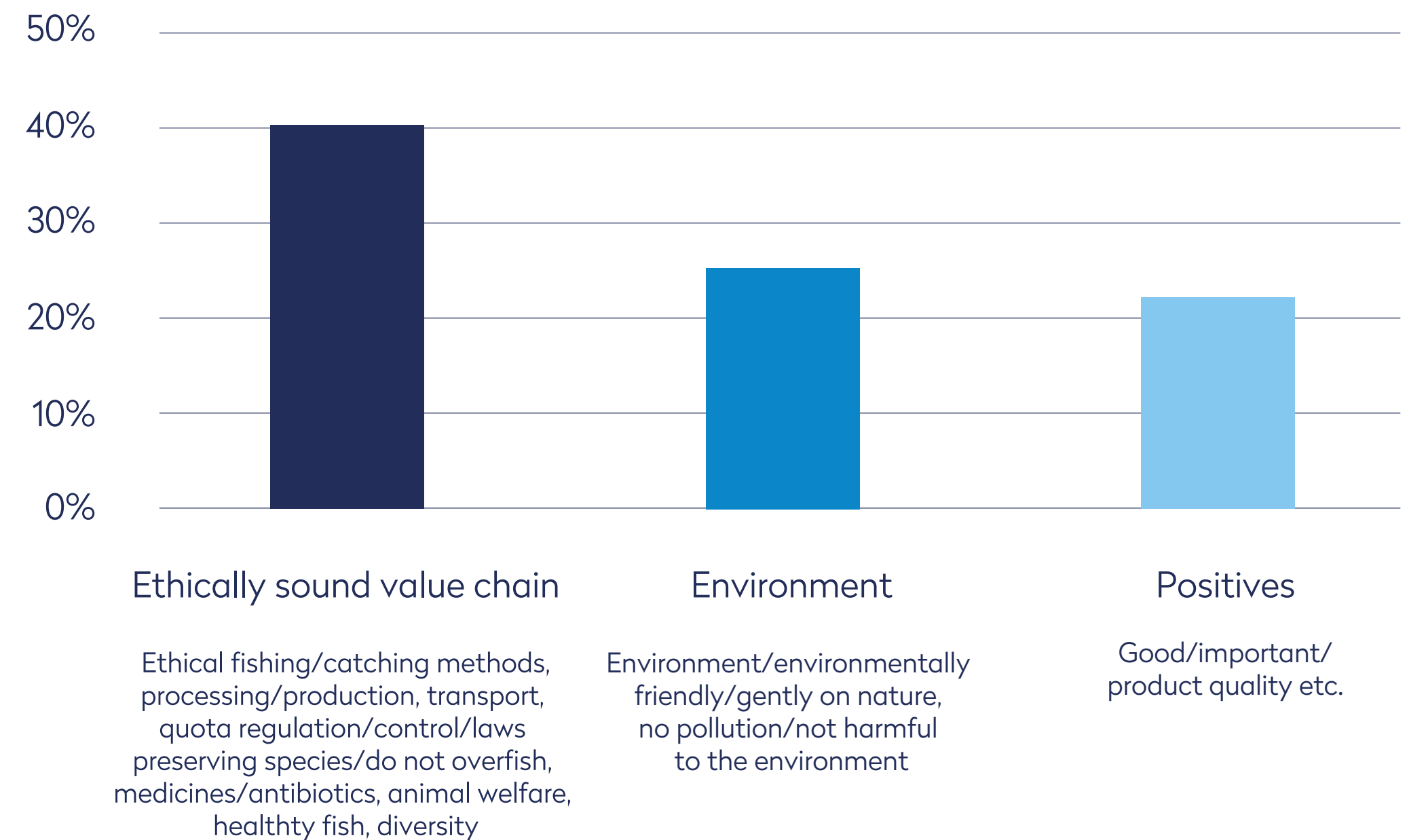


Figure 2: Open ended answer categories "seafood and sustainability"

This has resulted in The European Green Deal (Implementing the European Green Deal, 2022). Outlined in the box, is the goal that will mostly concern the seafood industry.

However, we can see a growing trend regarding awareness of human rights and decent working conditions, especially with the ongoing debate surrounding the 'fast fashion' industry as a major driver. As Oxfam states: "The textile industry produces more greenhouse gas emissions than the shipping and aviation industries combined. To keep prices low, throwaway fashion is made by garment workers often from the world's poorest communities, and paid below the living wage" (Oxfam, 2019). Showing this in action, videos have recently been posted on social media which draw attention to poor working conditions at popular fast fashion brands' factories.

During the last decade, it has been clear that environmental sustainability is not the only challenge that the global seafood industry

THE SIX GOALS LAID OUT IN THE EUROPEAN GREEN DEAL ARE:

- I. Climate change mitigation
 - a. A company's effect on climate change
- II. Climate change adaptation
 - a. Actions that aim to reduce negative effects of climate change
- III. **Sustainable use and protection of water and marine resources**
- IV. Transition to a circular economy
- V. Pollution prevention and control
- VI. Protection and restoration of biodiversity and ecosystems

For an activity or investment to be defined as sustainable in accordance with the European Green Deal, it must assist in fulfilling at least one of the six goals. Additionally, it must not have a negative impact on any one of the other goals.

is facing. The fishing industry in particular has also been exposed as one of the biggest culprits in human rights violations worldwide (Etisk Handel Norge, 2018). So, does this also include Norway?

From 2017 to 2019, the Norwegian Institute of Food, Fisheries and Aquaculture Research (NOFIMA) prepared a report to document social sustainability in the Norwegian fishing industry. It concluded that severe violations on human rights are virtually absent within the country, and that Norway has systems and regulations in place to address all of the issues raised internationally about social sustainability in the seafood sector. However, this reality is not reflected around the globe. Reports about abuse, slavery and child labor in South-East Asian fisheries has led to more attention and awareness of the social dimension in the seafood industry. There have also been reports from Europe regarding poor safety and the exploitation of foreign labor, along with negative coverage in the media about discrimination and social dumping (Nøstvold et al., 2019).

THE IMPACT OF THE EUROPEAN GREEN DEAL ON THE SEAFOOD INDUSTRY

“The largest effect, and the one that is most imminent – is to reduce the impact that activities involved in the production of seafood has on the environment directly. Starting from fishing and harvesting, throughout production and preparation and ending up with the transportation of seafood.”

“Secondly, the industry must be aware of the environmental effects its production of seafood has. Additionally, the seafood industry must communicate this on the packaging of their products, so consumers know the environmental impact on different products when choosing at store level.”

“A set of ‘how-to’ rules when it comes to filling out and sticking to the environmental tracking will also be developed. Organizations, such as Sjømat Norge (Norwegian Seafood Federation), works alongside its European counterparts in developing these.”



Henrik Stenwig
Norwegian Seafood Federation (NSF)

Photo: Norwegian Seafood Federation

Despite the fact that Norway has one of the best human freedom rankings in the world (World population Review, 2021), these questions around social sustainability are, understandably, of great concern to many Norwegian companies. As we remember from last year's report explaining the UN spillover index, Norway also needs to ensure to not contribute to any negative impacts on other countries' abilities to reach the UN SDGs. There is now an increasing demand for companies to not only document their own social sustainability, but also the social sustainability throughout their entire value chain.

With this in mind, the following chapter will focus on the social dimension of sustainability - why it is important for consumers and other stakeholders, and how companies can better their efforts on ensuring robust attention to social factors within their businesses.

But first, some definitions and explanations of conceptual terms.



Photo: Norwegian Seafood Council

Social sustainability



Photo: Norwegian Seafood Council

Social sustainability is a relatively new term, and several studies have tried to clearly define it. However, perhaps the most fitting definition comes from The World Bank, (UN Global Compact, 2022) which states that social sustainability, is:

“About inclusive and resilient societies where citizens have a voice and governments respond. Social sustainability is also about expanding opportunities for all people today and tomorrow.”

Furthermore, the World Bank goes on to explain this in detail, saying that:

“The core tenet of social sustainability is to help people – regardless of their gender, race, religion, ethnicity, age, sexual orientation, or disability – overcome obstacles that prevent them from fully participating in society and supporting their efforts to shape their own future.”

Putting this into a larger context, the United Nations Global Compact team urges businesses to take additional steps towards social sustainability, and:

- Contribute in other ways to improve the lives of people they affect, such as by creating decent jobs, goods and services that help meet basic needs, and more inclusive value chains.
- Make strategic social investments and promote public policies that support social sustainability.
- Partner with other businesses, pooling strengths to make a greater positive impact.

The main key to secure social sustainability is by securing human rights and decent working conditions and making sure to not be involved directly or indirectly in any human rights violations (FN-Sambandet, 2019).

Why is social sustainability important?



Photo: Norwegian Seafood Council

We have all heard about the UN sustainable development goals (SDG) by now. It is claimed that over 90% of the SDGs are directly, or indirectly, linked to international and regional principles for human rights and working conditions (WBA, 2021). To meet the SDGs, and the aim of doing so by 2030, it is therefore important that companies need to ensure that the social dimensions of their operations are a priority. Later, we will examine Norway's performance on the SDGs.

We also need to talk about transparency, which was one of the main trends covered in our previous reports. Supermarkets have recently begun to request documentation on social sustainability as well (Nøstvold et al. 2019).

According to Nielson IQ, consumers are seeking transparency around sustainability, processing (for example, if a product is organic or natural) and/or ingredients.

“In the retail space, the highest sales growth, according to data from NielsenIQ Product Insider, can be seen in products that talk about sustainable farming and social responsibility, at 14% and 8%, respectively. Products promoting their sustainable resource management are seeing sales growth of 6% and sales of sustainable seafood are up 3%.” (Nielsen IQ, 2018)

Last year, we examined the topic of blockchain, and how this is used to meet the standards of a growing, younger generation of consumers that are conscious of health, climate, and animal welfare issues.

This year, we talk about transparency in the form of openly reporting or communicating how a company works to secure human rights. Consumers should be able to gain insight on how companies ensure

ethical production and work conditions throughout their entire value chain. It is no longer enough for companies to claim they prioritize human rights – consumers, and other stakeholders, need tangible and specific information on exactly how this is done. Without a clear oversight of supply chains, social and environmental progress in the seafood industry will continue to be hampered (WBA, 2021).

With the seafood industry being increasingly globalized, the value chain of many Norwegian seafood-producing companies is often long, complicated and includes suppliers from all around the world. It can therefore be difficult to get an overview and control all the links in this chain. With the spillover-index in mind, there is a need for tools to help reduce the risk of human right violations in the supply chains. One such tool is the Fair Trade label.

Fair trade

Fair trade was introduced as a product label for coffee back in 1988, by the Dutch Max Havelaar Foundation. The concept of fair trade is to ensure better prices, where the workers are, at least, secured a minimum wage, decent working conditions and a fairer deal for both farmers and workers in developing countries (Fair Trade International). Fair trade is an international label that focuses on commodities, or products, that are typically exported from developing countries to developed countries, but the term is also used in domestic markets.

After coffee, fair trade labeling was introduced for many other items, allowing the initiative to expand (Oosterveer et al., 2014). The label is mostly used for coffee, cocoa, wine, sugar, and fruit.



Photo: Pexels

Since 2019, there has been a significant increase in the recognition of the Fair Trade mark. As the figure illustrates, 41% of the US consumers recognize the mark. On a global scale, this percentage is reaching 67 (GlobeScan, 2021).

In 2014, Fair Trade USA included labeling for seafood. Seafood products with fair trade certification today include Indonesian yellowfin tuna, Mexican blue shrimp, Maldivian skipjack tuna, Alaskan salmon, and scallops from New England. As well as mahi mahi, swordfish, yellowfin, and bigeye tuna (Kearns, 2019).

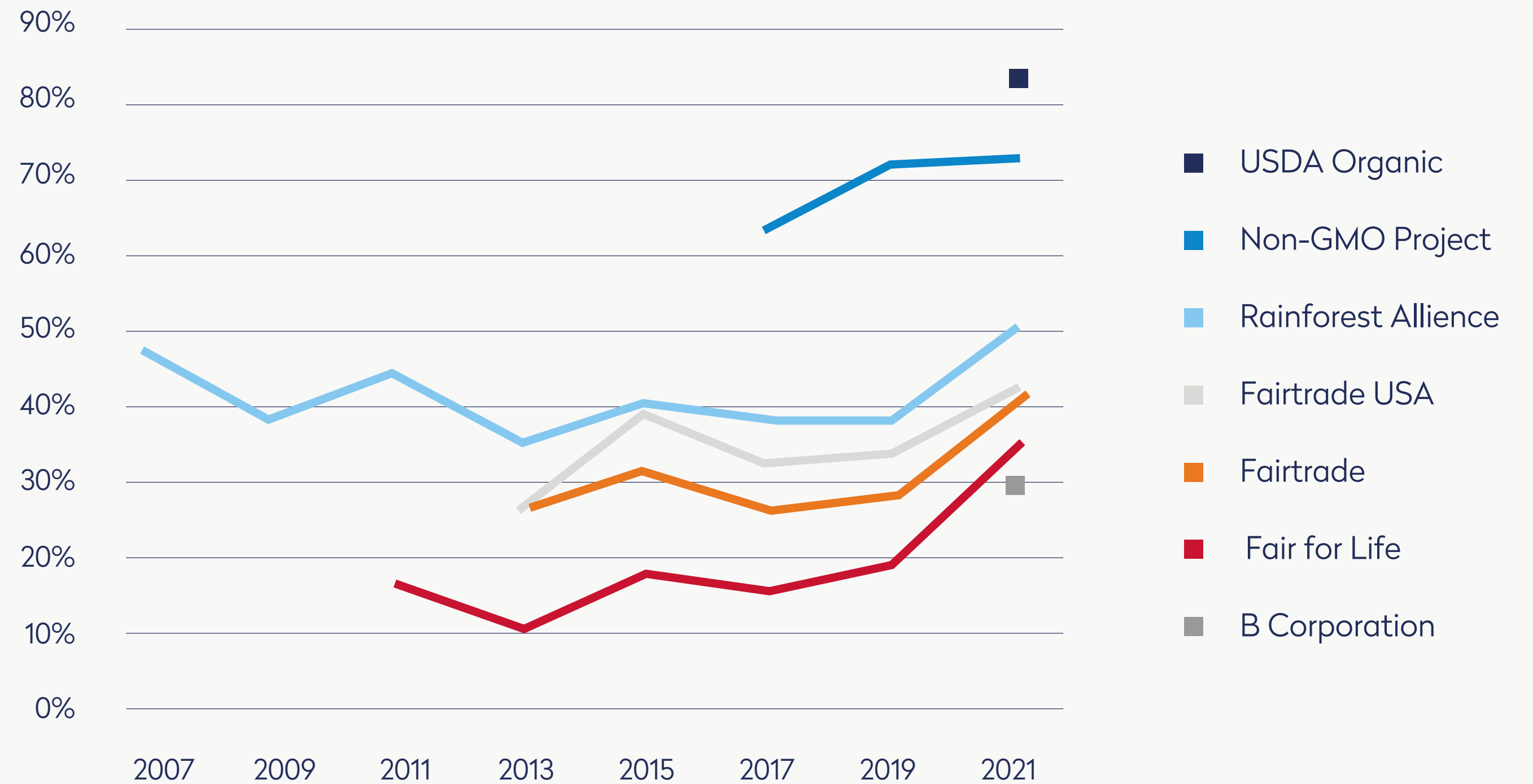


Figure 3: Awareness of eco labels in the United States (GlobeScan, 2021).

The Fair Trade label went on farmed salmon for the first time ever in 2021. The Norwegian salmon farmer Kvarøy Arctic was the very first to earn the Fair Trade USA mark for all their products sold in the US market (Korban, 2021).

Paul Rice, CEO and founder of Fair Trade USA, is quoted in Kearns' research that "shoppers are increasingly opening up their minds and wallets to seafood that appeals to their growing sustainability sensibilities". One of the companies that Fair Trade USA worked with in their sustainability program experienced 3% year-on-year growth in scallop sales, but when they introduced fair trade scallops, their sales growth jumped to 38%.

This may be an unusual result, but, according to Rice, it illustrates the point that "consumers are hungry to reward companies that are doing the right thing and are looking for products that speak their values" (Kearns, 2019).

Other studies confirm that there is a higher willingness to pay (WTP) for fair trade-labeled seafood products, but that this WTP was lower than for local origin and the MSC label (Alfnes, Chen & Rickertsen, 2017). However, a study from GlobeScan shows that the WTP for socially and environmentally responsible products has decreased in the past two years in most countries.

A contributor to this trend is most likely the increases in daily expenses and rising costs of living we are experiencing (GlobeScan, 2022). We can also see that more developed countries in general have a lower WTP than others. A potential explanation could be that drivers for purchase typically do not place sustainability aspects front and center, they are secondary - especially when prices are soaring. Furthermore, more developed countries typically do not see the same levels of social inequalities as less-developed nations, so these issues are not part of general discussion in the same way and are therefore less relevant.

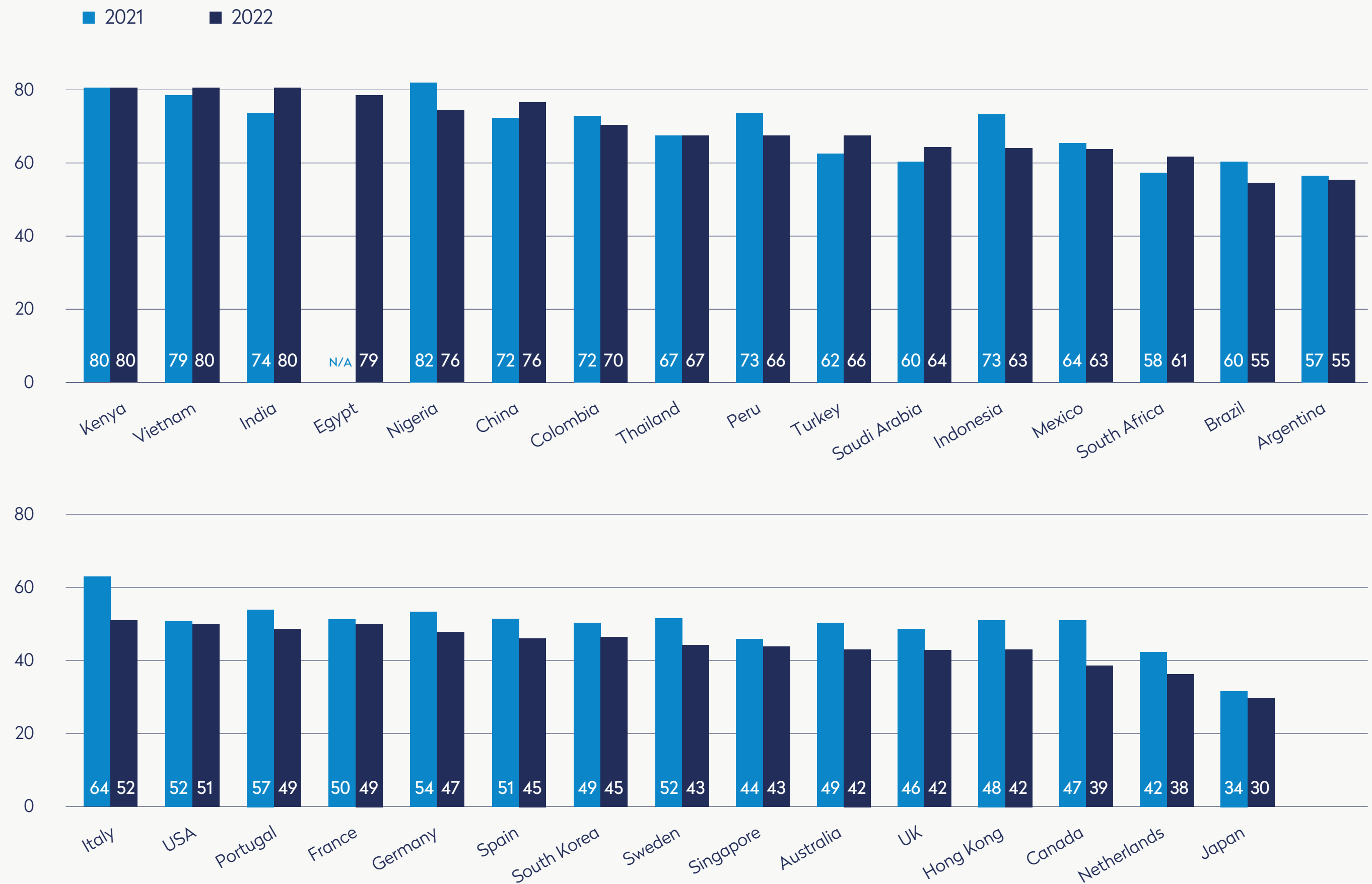


Figure 4: Willingness to pay for sustainable products (GlobeScan, 2022).

There are not many fair trade-labeled farmed seafood products today, and Alfnes et al. (2017), claims that there are several reasons as to why this is the case. One example is that social responsibility is already covered by system-wide sustainability labels, and that these labels are likely adequate enough for retailers. Another explanation could be that consumers see other sustainability factors as more important, or just that there is a stronger awareness to other issues.

From more recent research, it seems that the social dimension already has grown in importance in consumers' minds. Fair Trade America claims that sustainability will be top of mind for brands and consumers moving into 2023, along with **increased transparency and due diligence in supply chains**.

FAIR TRADE FACTS

- Shoppers with high levels of income and education are most aware of, and most trust, Fair Trade America.
- 62% of middle-aged shoppers who have seen the symbol buy Fair Trade products every month.
- Overall, 73% of Fair Trade shoppers are willing to pay more for a product to ensure producers are paid a fair price.
- Shoppers looking for ethical products are most concerned about child labor, poverty, deforestation, and working conditions.
- 72% of Fair Trade shoppers said they are proud to shop at retailers that support Fair Trade.
- 80% of consumers would feel more positively about a brand if it started carrying the Fair Trade trademark.

(GlobeScan, 2021)

In December 2022, Fair Trade America published a report pointing to five trends that will propel consumer behavior and brand priorities in 2023:

1. Consumers will change their diets to lower environmental impact.
2. Consumers, governments, and organizations like Fair Trade are prioritizing a decrease in deforestation.
3. Supply chain due diligence requirements will become more prevalent.
4. There will be growth in products marketed as sustainable.
5. Consumers and brands will prioritize regenerative agriculture practices.

Fair Trade America (2022).

What we have written about so far in this chapter all leads up to point number 3 in the list. More retailers are seeking brands that can provide transparency along the supply chain, including the form of third-party certifications. Fair Trade America also mentions the fact that a wave of regulations on human rights and environmental due diligence has begun in Europe in recent years, which brings us to the next chapter.

Introducing

“The Transparency Act” – a new law of transparency

In 2021, to better meet the demands previously discussed, the Norwegian government introduced a new law of transparency called “The Transparency Act” (‘Åpenhetsloven’) – a legal requirement for mid-size and large companies to implement and publicly report due diligence assessments for human rights. These requirements have, for many years, been present in the form of voluntary guidelines and expectations from authorities. However, on the 1st of July 2022, they were rooted in legislation.

Reporting specifically on social factors is indeed more complicated than environmental factors, due to a lack of measurable indicators which can be clearly demonstrated in annual reports (WBA, 2021). The many different guidelines and frameworks can be confusing, and questions often arise as to what should actually be included.



A FOCUS ON EQUALITY: ALICE ROSETH HELLEBERG

The organization “Hun Fisker” (in English, “She Fishes”) was officially started in 2021 by five female fishers to better the day-to-day life for women that work in the industry in Norway.

One of its founders, the chairman of the board, Alice Roseth Helleberg, is now a fisher on her 8th year in the business, operating from her own 35 feet sharp. She remembers the start as a few female fishers gathering in Alta, before organizing a Facebook group in 2017. She mentions that organization was not officially started here, but the meeting in Alta laid the foundation to what would eventually become “Hun Fisker”.

For Alice, it became important to enact real political change in the way the organization worked, while also being a social arena for women in the fishery fleet industry. She saw that often when there were government-appointed working groups to tackle female related issues at sea, they were mostly including male fishermen

and female academics. The shortage of female fishers in these working groups led to there not being no tangible change.

By 2023, the organization has grown to 50 members, from Tana in the north, to Oslo in the south of Norway. The organization advises its members to take part in organizational work, both in making the life at sea easier and, at the same time, maintaining the balance of work and home life.



Due diligence on human rights

The principles of The Transparency Act are based on existing guidelines for responsible businesses and due diligence work. In 2018, the Organization for Economic Co-operation and Development (OECD) launched a specific guide for due diligence assessments, with the purpose of making it easier for companies to follow the UN Guiding Principles, UN Global Compact, and the OECD guidelines for

responsible businesses. The Transparency Act is the first regulatory demand for mid-size companies to publicly report on social factors. This framework can, and shall, be used as a tool for multi-faceted reporting, for example for the “S” in ESG, for social responsibility in the annual report, or for inclusion within the general sustainability report.



Photo: Pexels

The due diligence assessments require companies to map, prevent and limit risks of whether the company (both directly and indirectly) has caused or contributed - or can cause or contribute - to violations of human rights throughout the entire value chain and its other business relationships. How the company handles existing and potential negative consequences of their operations must be communicated in the annual report, or in another public document. The due diligence assessments should be an ongoing process, as human rights risks may change over time.

The specific guide is illustrated in figure 5.

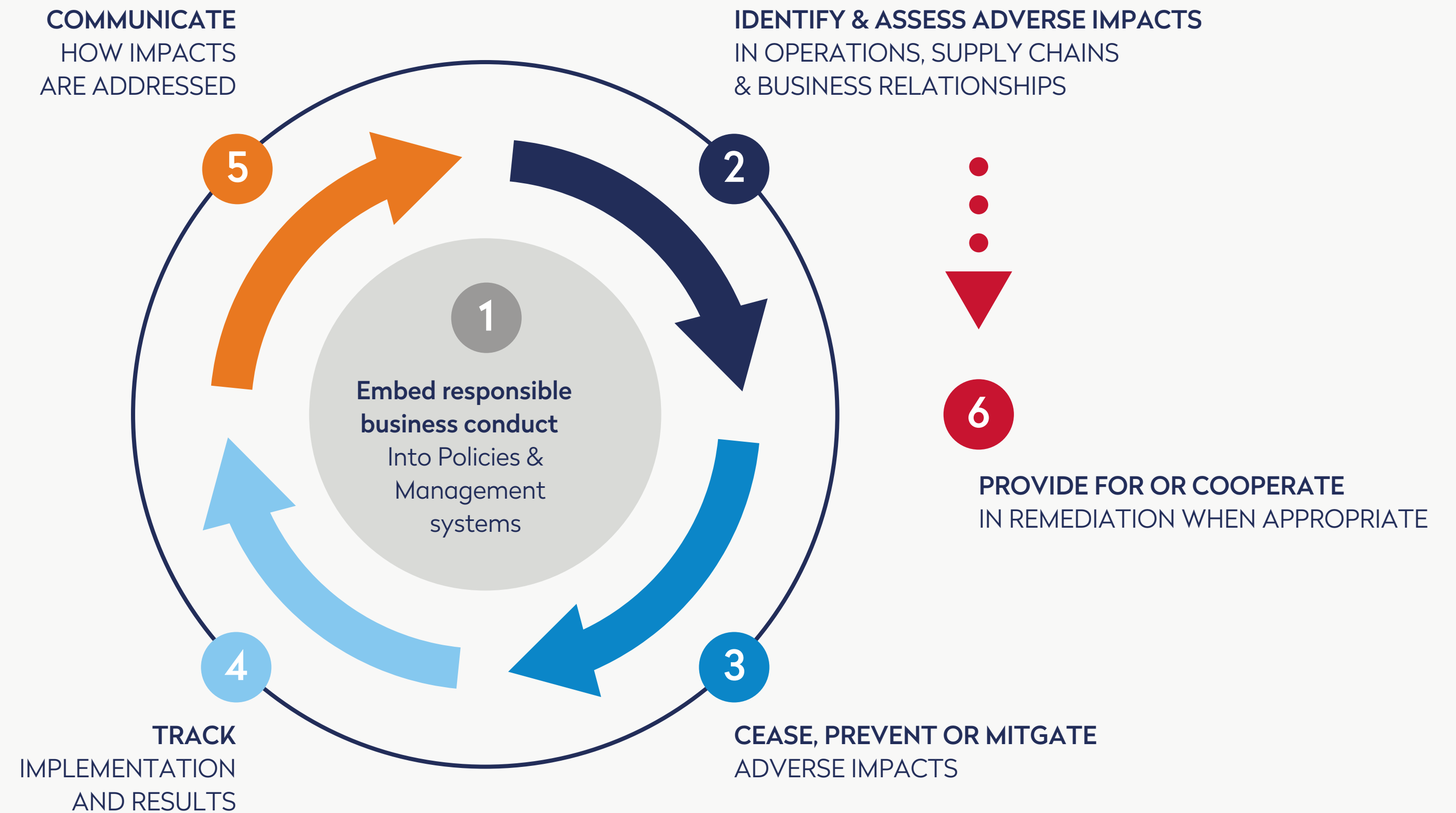


Figure 5: Due diligence-guide on human rights. Source: National contact point for responsible business Norway (2019)

Addressing on-board working and living conditions



Illustration: World Benchmarking Alliance 2021

WBA SEAFOOD STEWARDSHIP INDEX

The World Benchmarking Alliance was launched in 2018 with the belief that to boost companies' motivation to perform on the SDGs, there needs to be a change in the way that business impact is measured. This will further stimulate action for a sustainable future for everyone. WBA develops transformative benchmarks assessing 2000 of the world's most influential companies, ranking and measuring them on their contribution to the SDGs (WBA).

In October 2022, the World Benchmarking Alliance dropped their 2021 Seafood Stewardship Index. The index measures the world's 30 most influential companies in the seafood industry on their contribution to the SDGs. The countries are scored on 30 different indicators by using a set of criteria based on stakeholders' expectations, the SDGs, the best available science, guidance from experts, and extensive research on existing initiatives and current practices. Three Norwegian companies were included, achieving rankings of 2nd, 7th, and 13th place.

Some of the key findings from the results showed that seafood companies perform poorly on critical social issues and fall short on addressing human and labour rights. In the social responsibility measurement area, the average score was around 15%, where 29 out of 30 companies scored below 30%, highlighting the need for major improvement (WBA, 2021).

The SDGs

In last year's report, we presented the 17 UN SDGs, and considered Norway's performance across the goals. To summarize, all of the SDGs could be considered relevant for the seafood industry (as they are relevant for everyone) and key to this assessment is appreciating balance across the range of goals and their criteria - the 17 goals are integrated, and action on one goal may influence the outcomes in others. However, **SDG 2: Zero hunger** and **SDG 14: Life below water**, were pointed out to be particularly relevant and

these were also the two goals where progress had stagnated in Norway's scorecard.

In the overall ranking, Norway, with its score of 82.3, is only bettered by Finland, Denmark and Sweden. This is a climb from last year's position of 7th to this year's 4th.

In this year's report we will mainly focus on **SDG 8: Decent work and economic growth**, as it is highly relevant for the social dimension of sustainability.

NORWAY

OECD Countries

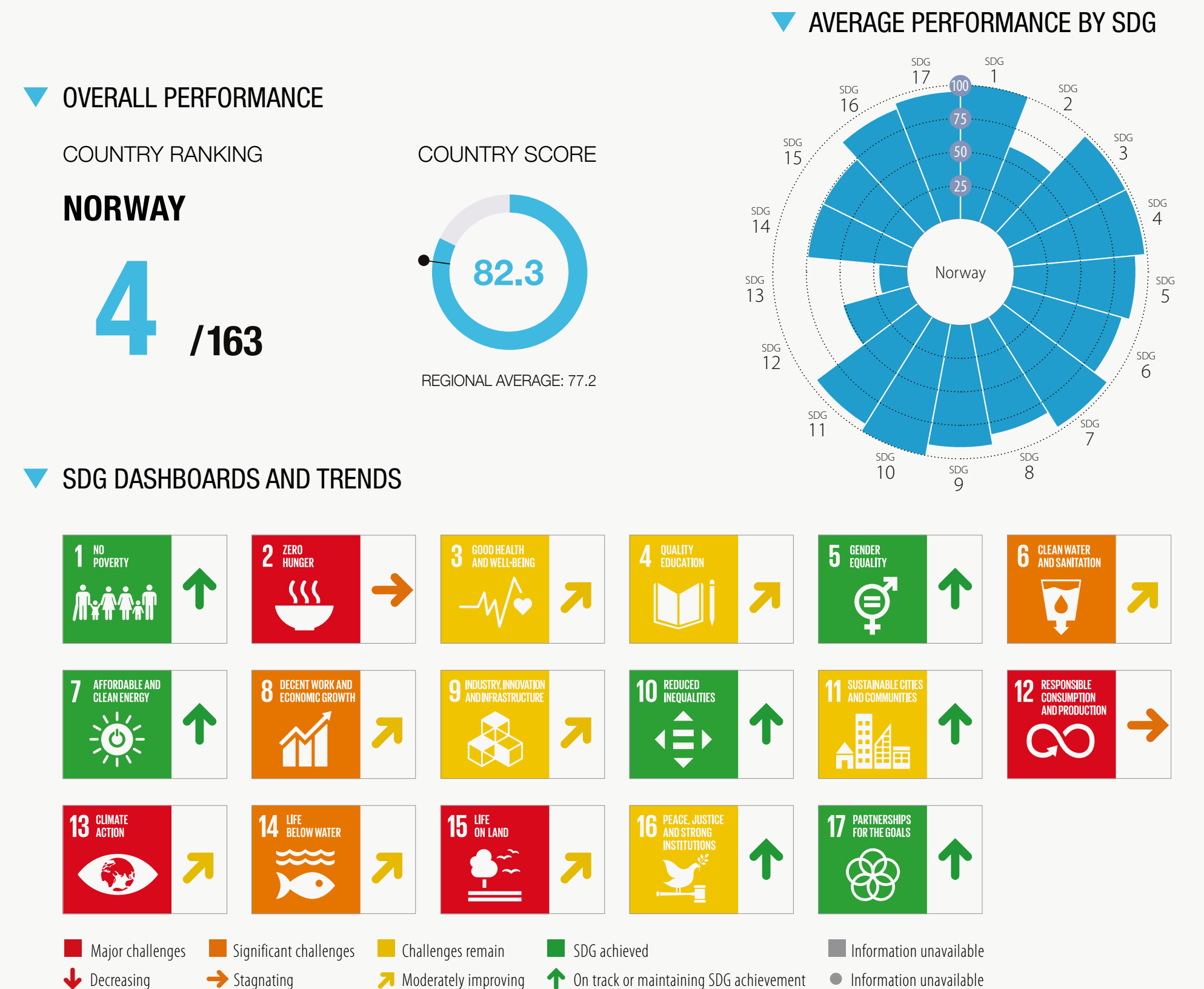


Figure 6: Report card of Norway's performance on the SDG index. (Sachs, Lafortune, Kroll, Fuller & Woelm (2022). From here on we will refer to this source as "SDR, 2022.")

SDG 8: Decent work and economic growth

For a society's sustainable economic development and well-being, it is crucial that economic growth generates not just any kind of jobs but “decent” jobs. This means that work should deliver a fair income, workplace security and social protection for families, as well as better prospects for personal development and social integration, and equality of opportunity (Eurostat, 2022).

Sustainability in Norwegian fisheries was introduced back in 1977, when the authorities put forward a long-term plan for the industry. This plan included “sustainable resource management” as a new fisheries policy goal, in

line with “to preserve the settlement pattern along the coast, as well as to ensure good and safe jobs with incomes in line with other industries” (Snl, 2022). What we probably didn't know back then, was that the latter is also directly linked to the social dimension of sustainability.

One would probably expect, in a country like Norway, that these factors would all be green. However, the scorecard shows a different reality. Goal 8 has deteriorated from “challenges remain” in last year's report to “significant challenges” this year, while still moderately improving.

INDICATORS

- ● Adjusted GDP growth
- ● Victims of modern slavery
- ↑ Adults with an account at a bank or other financial institution or with a mobile-money-service provider
- ↑ Fundamental labor rights are effectively guaranteed
- ↗ Fatal work-related accidents embodied in imports
- ↑ Employment-to-population ratio
- ↑ Youth not in employment, education or training (NEET)

Figure 7: Norway's performance on the indicators measuring goal 8 (SDR, 2022)

First and foremost, what does Norway do well in terms of reaching goal 8? Norway score is green on five indicators, including indicator 4: “fundamental labor rights are effectively guaranteed”. This indicator measures the effective enforcement of fundamental labor rights. It includes freedom of association and the right to collective bargaining, the absence of discrimination with respect to employment, and freedom from forced labor and child labor. The source for this is data from the World Justice Project (2022), where Norway received an overall score of 0.89 (the long-term objective for this indicator is a value of 0.85) and a global rank of 2nd out of 140 countries, only trounced by Denmark.

Among this, Norway also achieves a satisfying score on the indicators that measure the percentage of adults (15 years and older) who report having a bank account, the number of people in modern slavery (forced labor or forced marriage), the employment-to-population ratio, and the percentage of young people who are not in employment, education, or training (NEET). The indicators negatively affecting Norway’s score on goal 8 are both “adjusted GDP growth” and “fatal work-related accidents embodied in imports”.

We will now take a closer look at these two indicators.

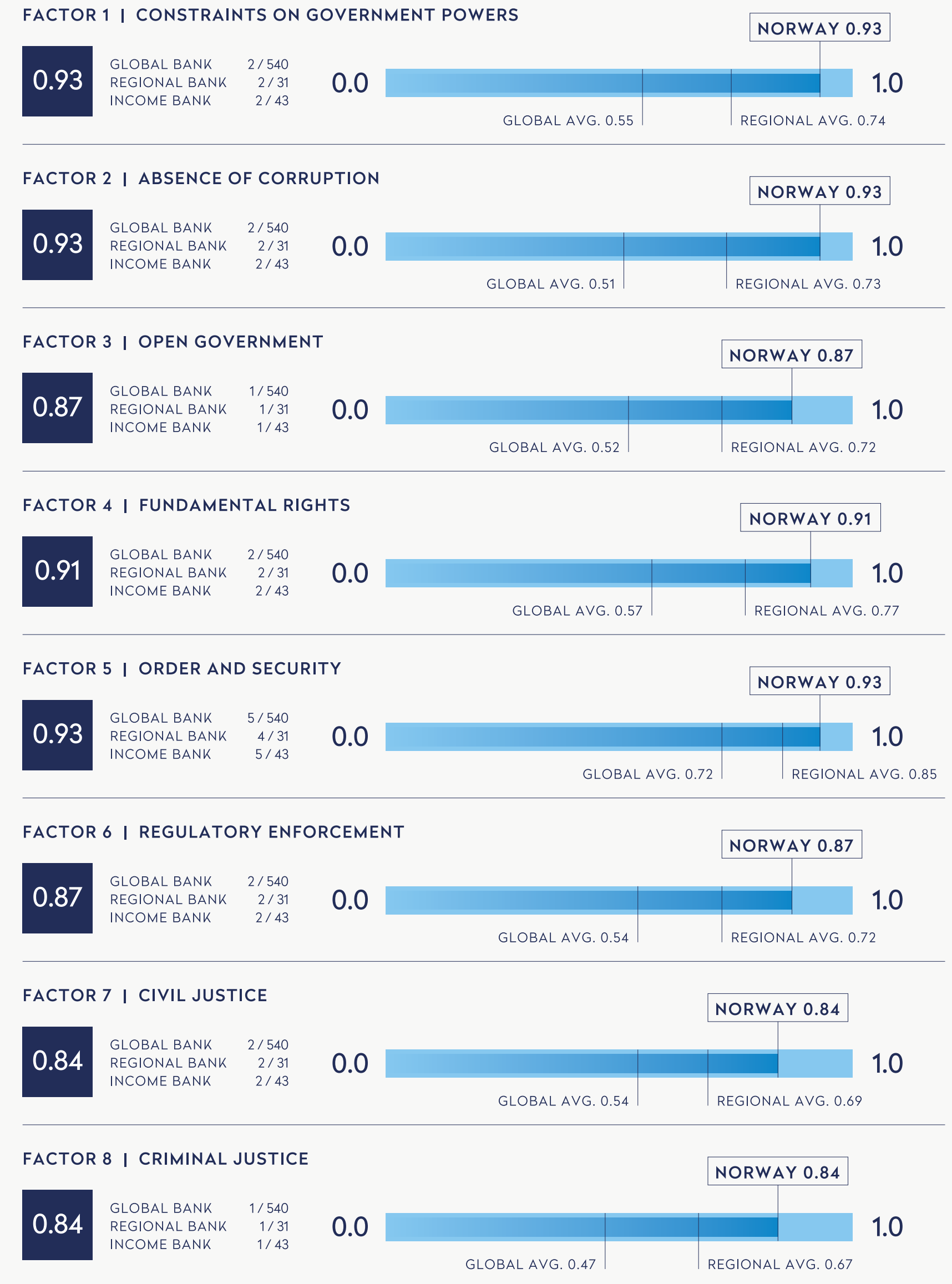


Figure 8: Norway's score on the different factors measuring indicator 4 (World justice project, 2022).

Adjusted GDP growth

Adjusted GDP growth is the growth rate of GDP adjusted to income levels (where rich countries are expected to grow less) and expressed relative to the US growth performance. Norway's calculated value in 2020 is -2.54, and the long-term objective for this indicator is a value of 5 (SDR, 2022).

To operationalize this target for OECD countries, the OECD measures progress by looking at the average 15-year GDP per capita growth rate. The benchmark for 2030 is set as the average growth rate from 2000-2015 of the top four OECD performers, which gives a target GDP per capita growth rate of 3.8%. Currently, none of the Nordic countries is close to achieving the same growth rates between 2005-2020 as was experienced from 1985-2020. This is a trend they share with the majority of other OECD countries (Query, 2022).

Fatal work-related accidents embodied in imports

Fatal work-related accidents embodied in imports is the indicator measuring the spillover-index related to target 8.8 “protect labor rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment”. The United Nations has no available data after 2015 to measure this indicator for Norway. Since 2015, the indicator has been orange, with a moderately improving trend (SDR, 2022). Because we have no available data from the UN, instead we will take a closer look at indicator 8.8.1 “Fatal and non-fatal occupational injuries per 100 000 workers, by sex and migrant status”.



Photo: Try Reklamebyrå

History of safety in Norwegian fisheries

The first law concerning safety onboard ships came into force in 1903 and was called “The Seaworthiness Act” (Sjødyktighetsloven). This has been renewed over time, most recently in 2007. In 1968, the first regulation on safety specifically onboard fishing vessels was introduced. In 1975 “Sjømannsloven” was introduced. This law concerns the seaworthiness of vessels, and states that both the master and the seaman must participate in work to improve safety. In 1987, safety training for fishermen became mandatory and, in 2005, regulations on working environments, safety and health for workers onboard ships were introduced. In 2003, regulations on working and resting time for fishing onboard vessels came into force. The professionalization of fisheries through larger vessels, modernization, permanent organization and year-round operation has led to increased technical safety and thus greater personal safety for the workers (Lie et al. 2005).

Status today

Despite robust operations and regulations in place to secure safety onboard fishing vessels, accidents still unfortunately happen. Numbers obtained from SSB, the Register of Norwegian Fishermen, the Norwegian Labor inspection Authority, and the Norwegian Maritime Directorate show that while construction, transport and storage, and industry register between one and five occupational injury deaths per 100 000 workers in 2020, corresponding numbers for the fishing fleet are ten times as high (Nyhus, Helland & Takle, 2022).

Since 2010, 67 fishermen and 11 aquaculture workers have lost their lives (Thorvaldsen & Holmen, 2022), and recently, there has been another lost life at sea. According to senior communications advisor at the Norwegian Occupational Safety and Health Administration, Per Olav Hernes, there is also a number of aquaculture accidents that are not reported (Per Olav Hernes to Intrafish, 2021).





According to scientists at Selskapet for Industriell og Teknisk Forskning (SINTEF), history shows that the regulation of activities at sea has not always put workers' safety and health first. Whereas the oil and gas industry has only one supervisory authority with a clear responsibility for personal safety, fishermen and fish farmers are subject to several supervisory authorities, all holding different areas of responsibility. This fragmented accountability can be challenging, especially as aquaculture facilities are now being placed further out to sea. Increased distance to land, harsher weather and more fish in the facilities all provide completely different conditions

for safe operation than their coastal counterparts (Thorvaldsen & Holmen, 2022).

The Norwegian parliament has recently adopted a vision that no fishermen will die at sea in the future. So, which risk-reducing measures can be done to reach a zero-vision in both the fishing and fish farming industries? Thorvaldsen and Holmen point to coordination of regulations and supervision, organization of work and smart use of technology as important factors (Thorvaldsen & Holmen, 2022).

Chapter 3

The world of fast- moving consumer goods: Change is the constant

Ultra-quick deliveries

Within the world of fast-moving consumer goods, the pandemic-induced explosion of the e-commerce channel taught consumers the true meaning of convenience. In the previous Top Seafood Trends, we explored some of these new terms and types within digital commerce, and identified what distinguishes them from one another. To reiterate the main point, we have moved past simply thinking in terms of online vs offline. The digital channel has evolved and merged with novel technological solutions and delivery platforms to enable grocery deliveries down to ten minutes in urban areas, so-called ultra-quick deliveries.

In this chapter we will share some of our thoughts about the development of seafood consumption by looking to the history of food. As we know, what influence consumer behavior is myriad: micro and macro-economic forces, supply and demand issues, psychology, geopolitics, technology and climate and environment to mention but a few. In this chapter we will try to weave some of these topics together in one single narrative – to help understand current events and the way forward.

Introduction and recap

A brief history

Seafood consumption has been changing and will continue to change for the simple reason that food production and consumption patterns have always evolved, especially with globalization. And, today, cuisine is truly global.

According to the authors of “Food and Culture” (Counihan, C. & van Esterik, 2013) the major industrialization of cuisine in the

West was made possible by developments in four main areas: preserving, mechanization, retailing (and wholesale), and transport.

If we look at the preserving of foods as an example and, specifically, at the method of producing dried codfish, we see that this has enabled Norwegian clipfish to be exported and sold to Portugal since the 1700s (and all the way back to the Vikings when we

talk about stockfish!) It’s clear that this industrialization has had a strong impact on a country’s “own” culinary identity.

Salting, drying, pickling and other methods have all played their part in colonialization, global trade, and national development throughout history. They even feature in social strife and oppression, such as French commoners revolting because of a salt tax,

and the hunger for sugar fueling the slave industry. The development and utilization of modern canning techniques can be linked to the need to feed the armies of Napoleon (Food and Culture, 2013), due to France being cut off from its overseas supplies. Its subsequent role in the food industry cannot be understated.

Without going further into the details of the role of mechanization (of both production and distribution) and the development of retailing (from open markets to closed shops and the role of industrialization) it becomes abundantly clear that the history of food is an organic and evolving one. It

can sometimes be inexorably linked to the very development of nations, as much due to strife and oppression as harmless innovation. Where things really took off, however, is with the advent of branding, packaging, advertising and marketing in the nineteenth century.

The purpose of this brief look at recent food history is to place recent and current events in a larger context, and perhaps even suggest the evolution in the popularity and availability of global cuisine as a megatrend unto itself.



Retail and consumer development

Norway

Last year, wholesale and retail indices made for relatively dismal reading in Norway. Total wholesale and retail trade was down by almost 8% when comparing the 12-month change between December 2021 and December 2022, according to the Statistics Norway Bureau. The largest shifts were found in food and beverages, ICT

equipment and cultural/recreational goods. The decline in discretionary items can be explained by previously discussed factors, such as consumers' tendency to avoid spending on non-essential items during times of economic hardship. The drop in the food and beverages category can be attributed to a large increase in commodity prices across the board. The consumer price index (CPI) similarly shows a 6%

increase year-on-year, with food and non-alcoholic beverages seeing an 11.5% increase, compared to December 2021. The upsurge in energy costs is reflected in large increases in energy-dependent industries and services, such as transport.

Naturally, prices for seafood have also been affected. For instance, from January 2022 (pre-invasion) to January 2023 retail prices for 1kg of salmon rose by 21%.

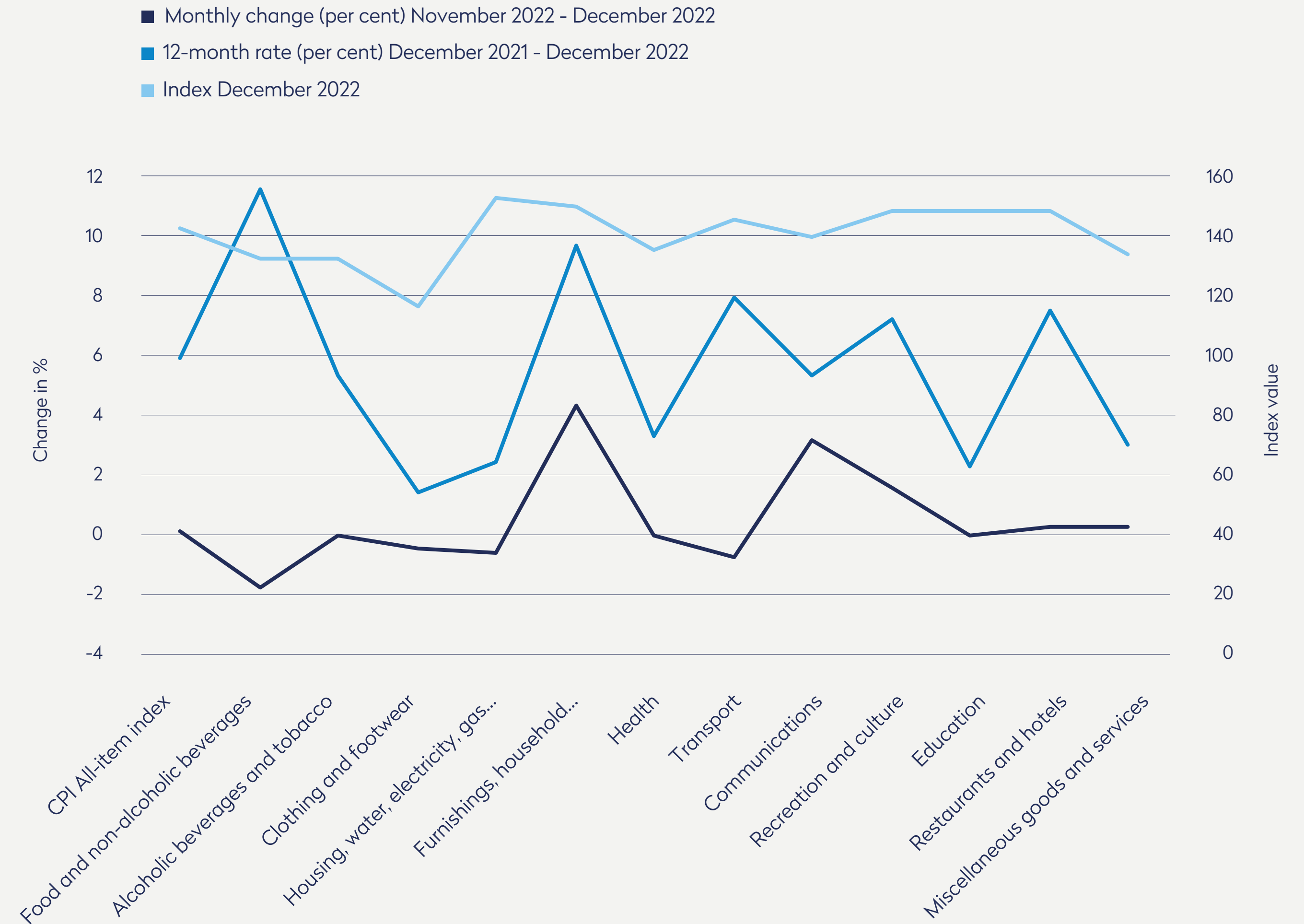


Figure 9: Consumer price index Norway
Source: SSB

Europe

Eurostat publishes monthly updates on its consumer confidence indicator (CCI) which takes several factors into account. The CCI takes the financial situation, perceived economic uncertainty, general economic situation, price trends, unemployment, major purchases and savings into account, as well as a composite confidence indicator based on these questions. According to Eurostat “the data are published as balances, i.e., the differences between positive and negative answers (in percentage points of total answers), as an index, as confidence indicators (arithmetic average of balances), unadjusted (NSA) and seasonally adjusted (SA)”.

CCI January 2020 – January 2023

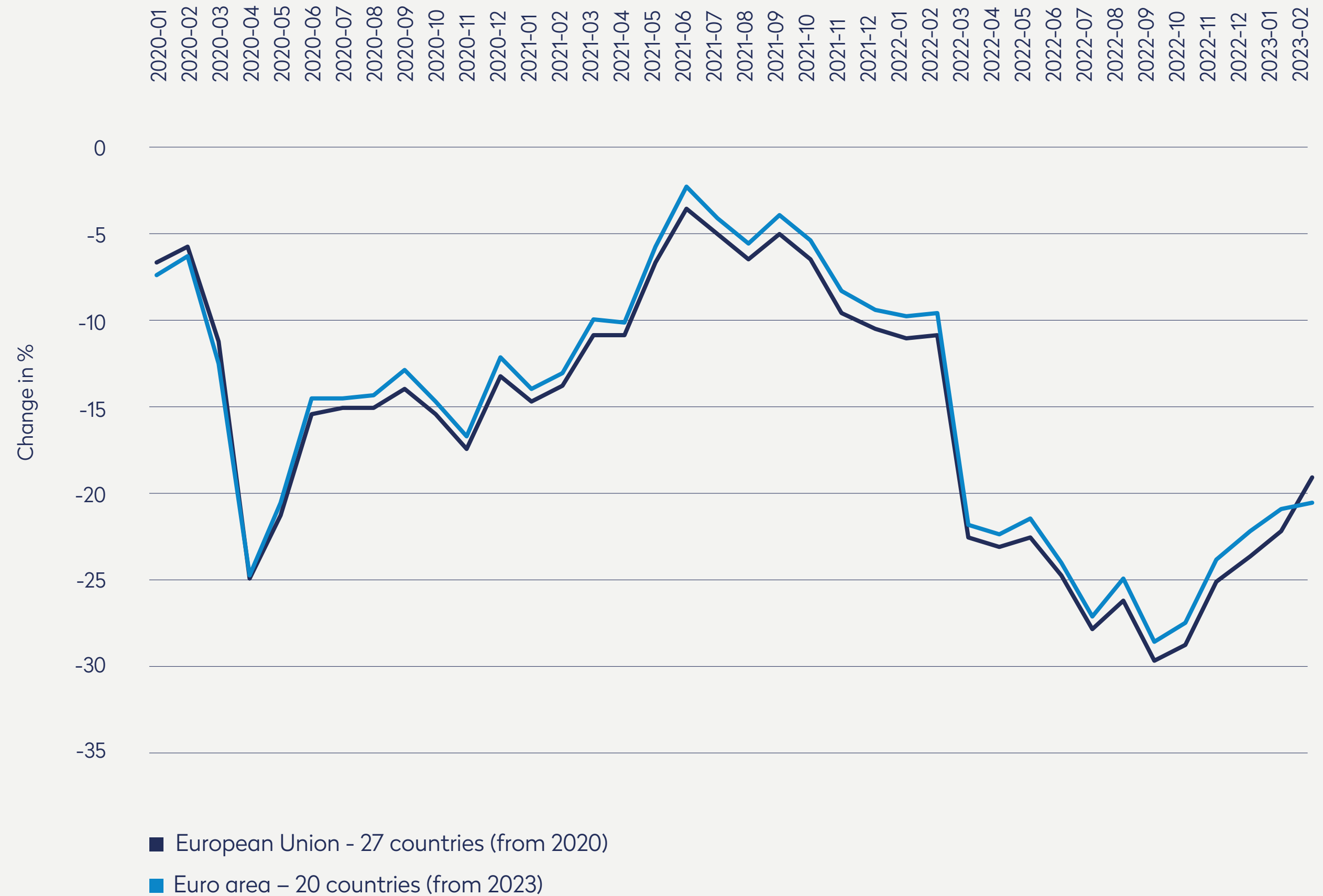


Figure 10: Consumer confidence indicator balance
Source: Eurostat

From this data, it is clear to see that sentiment has been trending in a positive direction since September 2022, albeit with some way to go before breaking out onto the positive side. This means that, taken as a whole, households in the EU are still concerned about the future economic outlook, which could likely further negatively impact seafood purchase patterns, i.e., consumers switch to cheaper alternatives.

Consumer panels (Kantar Worldpanel, 2023) indicate the increase in prices for seafood negatively impacted purchase patterns for home consumption in select European markets. For instance, in Germany, price changes first started to affect purchase frequency in late 2021. By the start of 2022, consumers purchased less per trip, and we started to see a drop-off in households who purchase seafood, and total households as well (the latter describes a change in the

composition of households within a country and their contribution to the value change). These patterns only deepened throughout the year, with the prices steadily increasing. Similar developments can also be seen in Italy and Spain.

The role of convenience: Defined concept – shifting content

We have already hailed the convenience trend as one of the persistent mega trends of our time. To clarify, this is not just about the development of new types of products, packaging, or ultra-fast deliveries, but the underlying force that propels this forward. We have traced its origins to the advent of modern retailing, processing technologies and logistics.

According to Nielsen (Nielsen IQ, 2022) the convenience channel in the USA also enjoyed a pandemic boost due to many shoppers opting for quick “in and out” shopping to limit exposure, as well as the ability to shop close to home. This trend was not to last as revenue steadily declined when societies started reopening, however the number of convenience stores remains

stable compared to 10 years ago. That being said, the demand for convenience has increased across channels and the success of meeting this demand rests upon enhancing the consumer experience. Nielsen points out that this could include everything from product and packaging innovations, to portability, ease of ordering and payment, as well as loyalty programs. One up and coming addition to the world of convenience is robotics and AI. This development will skyrocket in the years to come due to, among other things, e-commerce.



Channel and product development

Retailers are increasingly dabbling with autonomous and manned drone deliveries (e.g., Amazon, Kroger USA and Coles Australia); however, any larger scale implementations are yet to come to fruition. Smaller-scale developments have taken place, such as Gatik (an autonomous trucking company) which operated trucks delivering

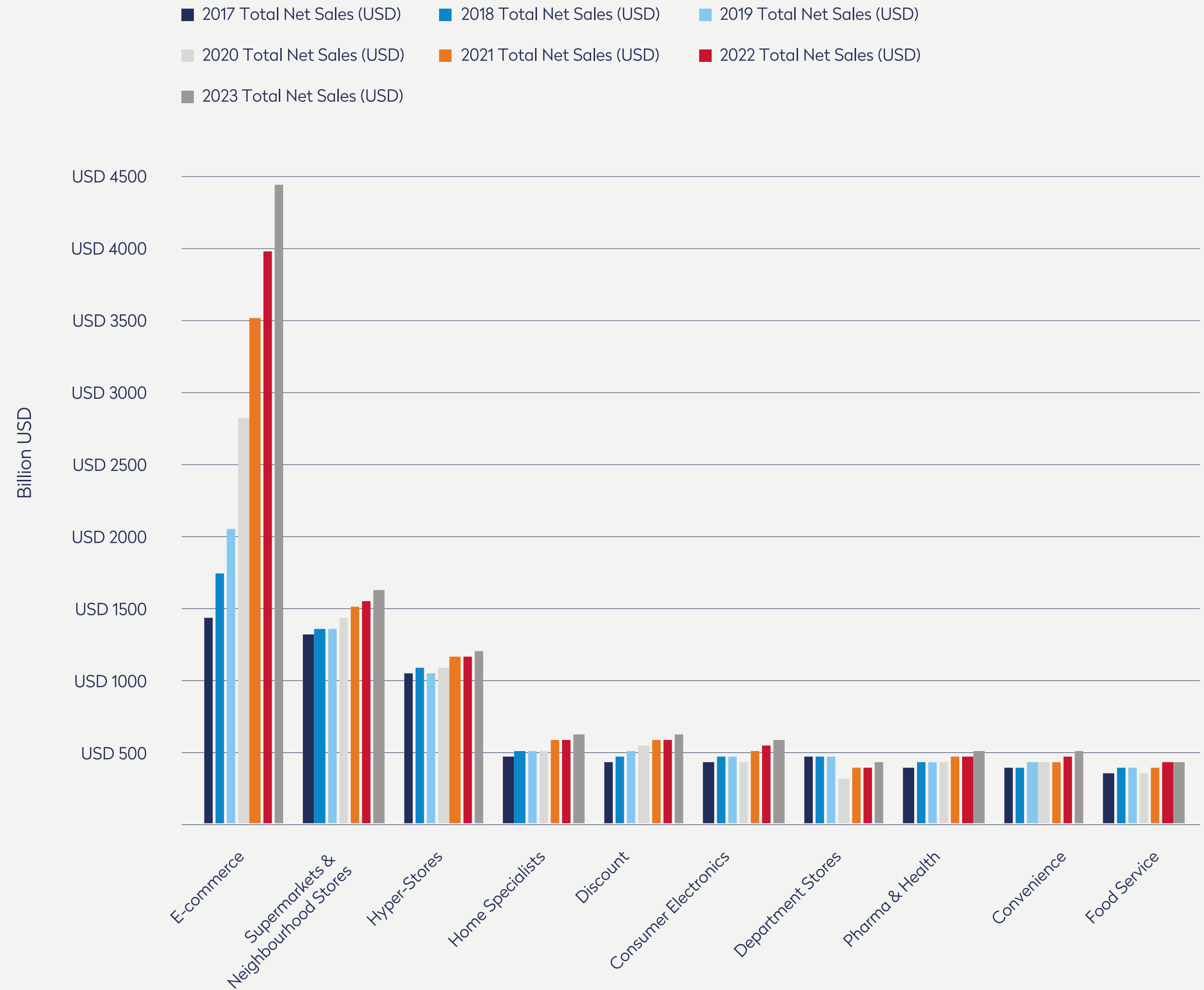


Figure 11: Retailer - Channel Size and Growth (Edge by Ascential).

select online grocery orders along a 13-mile route to some Loblaw (Canadian grocer) locations in Canada (Forbes.com, 2022). The insight agency, Edge by Ascential, hypothesize that in the current inflationary environment:

[...] retailers are likely to increasingly experiment with drones and other forms of autonomous delivery as they seek efficiencies within the supply chain and take advantage of potential benefits including delivery speed, cost, and

sustainability. Brands should be monitoring this emerging fulfillment model, to prepare for potential implications around product packaging and inventory management (Edge by Ascential 2022).

As a whole category, e-commerce is still projected to enjoy a healthy growth in the years to come, despite falling slightly, or normalizing, after the ‘pandemic high’. According to the Norwegian Trade Organization (NHO), Norwegians are

now more-or-less back to pre-pandemic shopping patterns, dividing their spending between out-of-home consumption, travel, and commerce (NHO 2022). In an August 2022 article, it further stated that grocery spending is down by almost 9% compared to the same period in 2021. As the specter of inflation looms increasingly larger, this may further change consumer habits and hamper growth on certain items in, what is, an unforeseen and perhaps economically uncertain future.

Seafood consumption patterns

The pandemic, coupled with measures to combat transmission of the virus, saw consumption patterns shifting. Eating and drinking “out” almost disappeared as consumers shifted their consumption to the confines of their own homes. Many people started cooking from scratch and the popularity of meal kits, home deliveries and online food shopping exploded. Lockdowns, and fear of prolonged lockdowns, spurred mercurial shifts in shopping patterns –

specifically towards products with long shelf lives. Consumption of seafood also changed. In the following section, we will take a closer look at household panel data (home consumption) for salmon, cod, and crustaceans from a selection of European countries from 2019 – 2022. We will also examine the development of product categories for these species, pre- and post-pandemic.

Product definitions for this subchapter

NATURAL FRESH AND FROZEN PRODUCTS

Fish/seafood which is only handled with knife, no salting or other preparations. In some cases fish fillets for cooking, with limited amount of species, is included in the natural category.

The natural fresh (total) and natural frozen (total) categories include the following products:

- **Fillet** (fillets or larger parts of fillets, without bones)
- **Steak** (and other products with bones)
- **Whole** (whole fish or parts of whole fish with back bones)
- **Fish meat** (other products without bones) e.g., minced, cubes

SALTED

Defined as products matured with salt. Lightly salted products usually end up in the natural category.

SMOKED

Cold or hot smoked, usually also salted

DRIED

Only dried, no salt. E.g., stockfish

SALTED AND DRIED

Clipfish

PREPARED

If it doesn't fit into any other category it is prepared. Raw fish for consumption also ends up here as sushi and sashimi.

The prepared category includes the following categories:

- **Prepared canned:** Products prepared or sealed in an airtight container or can. E.g., canned tuna
- **Prepared fresh:** Chilled seafood with more preparations than just fillets or pieces. E.g., fish burgers, fish buns, fresh sushi
- **Prepared frozen:** Frozen seafood with more preparations than just fillets or pieces. E.g., frozen fish fingers, frozen breaded fillets

PACKING

- **Prepared:** Includes prepacked fresh and frozen fish/seafood with mixed (factory packed) and variable barcodes (locally packed)
- **Not prepacked:** Includes fish sold unpacked from the counter

Salmon

We start by looking at the difference in-home consumption of salmon between 2021-2022 and, from there, examine the difference between 2019-2022. This is to establish if the pandemic influenced home consumption of salmon. As restaurants closed their doors and consumers spent more time at home, out-of-home consumption decreased, and home consumption increased.

PAUL T. AANDAHL – SEAFOOD ANALYST, SALMON & TROUT



Reduced supply has affected the price level for Atlantic salmon. Demand growth and reduced supply in an inelastic market, leads to high price growth for salmon. The extent to which the increased raw material price has been passed on to consumers varies between markets and product categories.

Over time, we see that hard discount increases its share of total sales of salmon for home

consumption in all markets. From 2021 to 2022, however, we see that this trend stopped in markets such as Spain and Sweden. The impact of increased consumer prices varies among different demographic groups for different product categories in different markets.

For example, the oldest consumers (65+) are increasing their share of total consumption in most markets except for Italy.

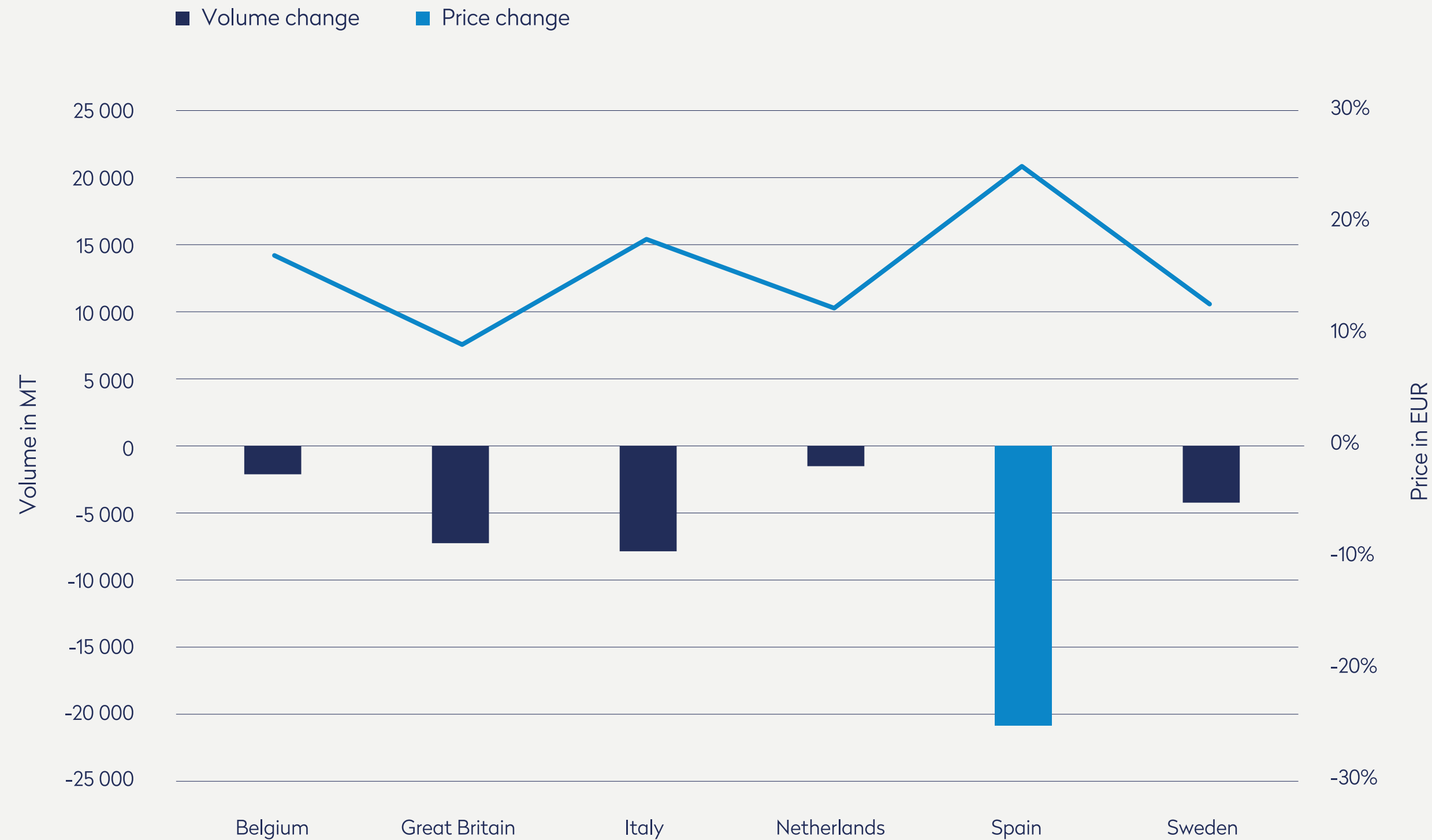


Figure 12: Volume and price change in home consumption of Salmon from 2021 to 2022 in selected European markets.
Source: Kantar Worldpanel and Gfk.

In figure 12, we see the average volume change fall in all six of the chosen European markets, with an emphasis on a significant drop in Spain between 2021 and 2022. This drop can be accredited to the general increase in food prices during 2022, and a high home consumption during the pandemic. To get a better picture of the overall trend, we must look at the difference in home consumption between the last “normal” (i.e., pre-pandemic) year, 2019, and 2022.

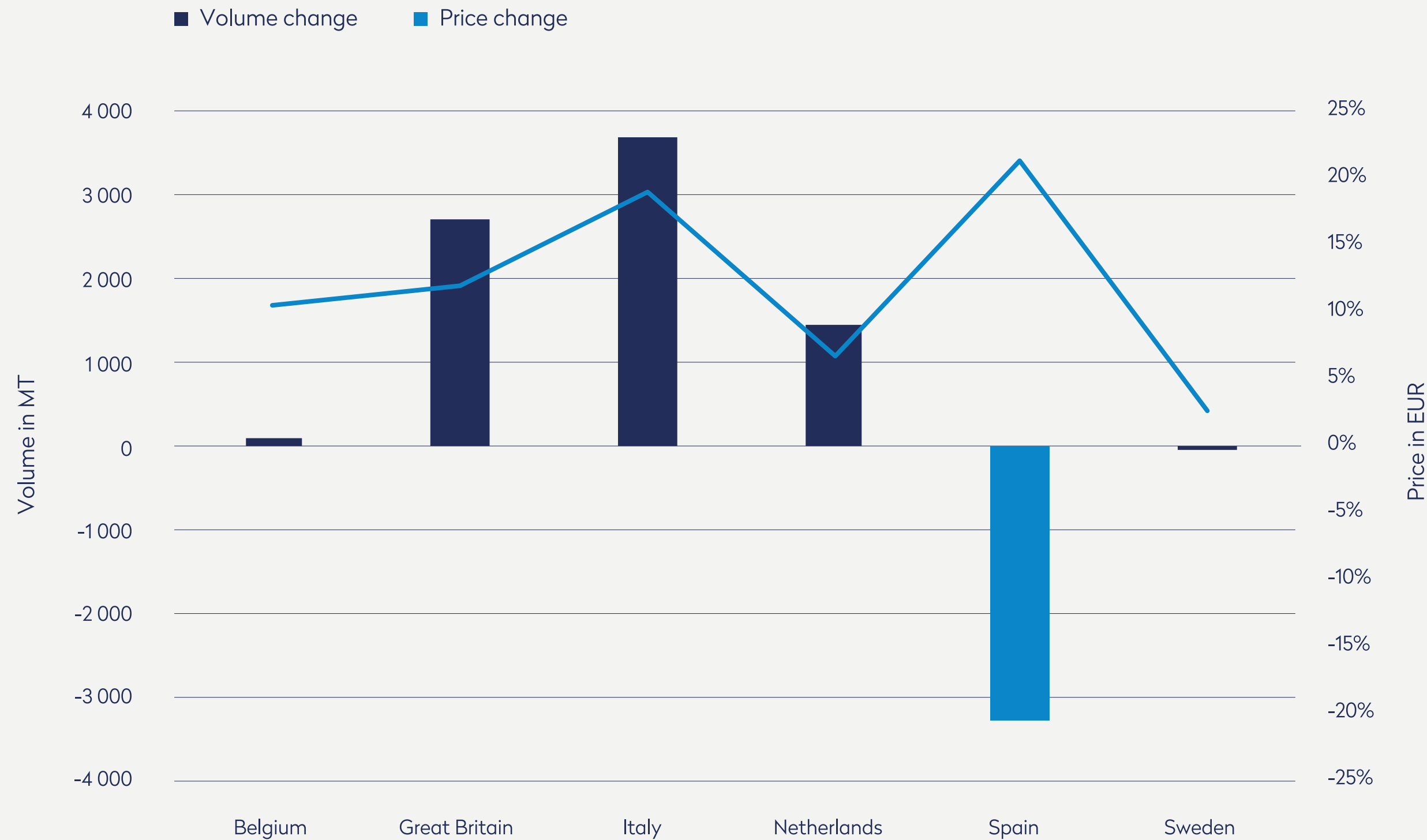


Figure 13: Volume and price change in home consumption of Salmon from 2019 to 2022 in selected European markets.
Source: Kantar Worldpanel and Gfk.

Here, the effect on home consumption during the pandemic becomes a lot more apparent. Looking at the difference in home consumption from 2019 to 2022, we see an increase in volumes for salmon in most of the markets, while the price change follows the same trend through the markets as between 2021 and 2022. Spain still has a negative change in home consumption, but by a smaller amount than between 2021 and 2022.

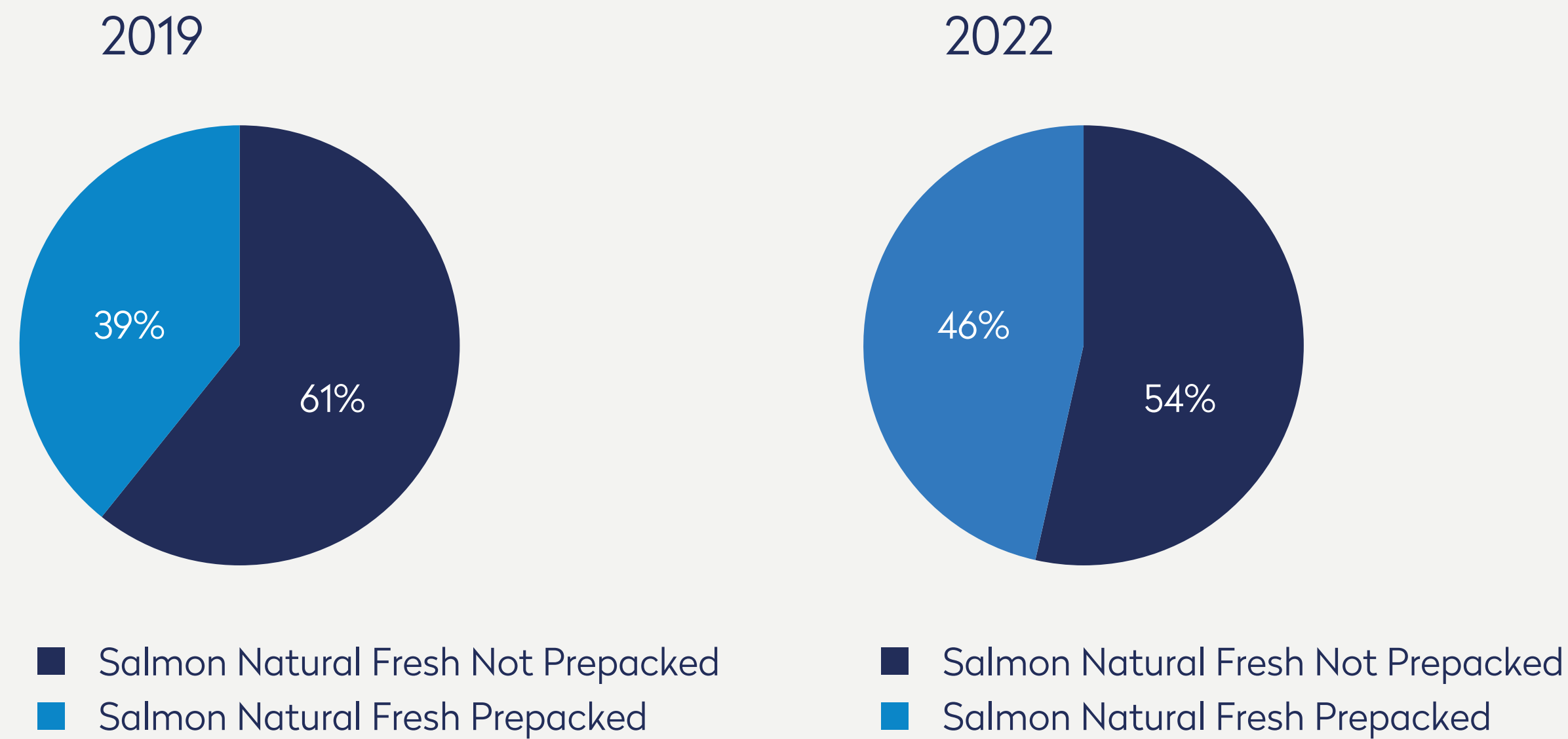


Figure 14: Prepacked vs not prepacked shares in 2019 and 2022 for the Natural Fresh Salmon category in selected European markets. Source: Kantar Worldpanel and Gfk.

We further focus on natural fresh salmon - a product format that accounts for between 55-60 % of the home consumption of salmon in the European markets presented above - and how the category has moved between 2019 to 2022.

As shown in the figures, the category has heavily shifted towards a prepacked format for natural fresh salmon. Going into more detail, we found that, in Sweden, the cover for prepacked was at 64 % of the natural fresh category in 2019, increasing to 91% in 2022. In Great Britain, this increase was from 80% to 90 % for the same period (Kantar Worldpanel and Gfk).

Cod/Whitefish

In figure 15, the difference in home consumption between both 2021 and 2022, and 2019 and 2022 are shown. The key observation here is that there has been a negative change in both cases. In all markets except Spain, the highest change was from 2021 to 2022.

Furthermore, cod is a little different from salmon, with home consumption not only being mainly affected by prices. Home consumption of cod is also affected by supply of cod, or better said, the import of cod from the European countries mentioned above. We will therefore now look at the import of cod across those countries.

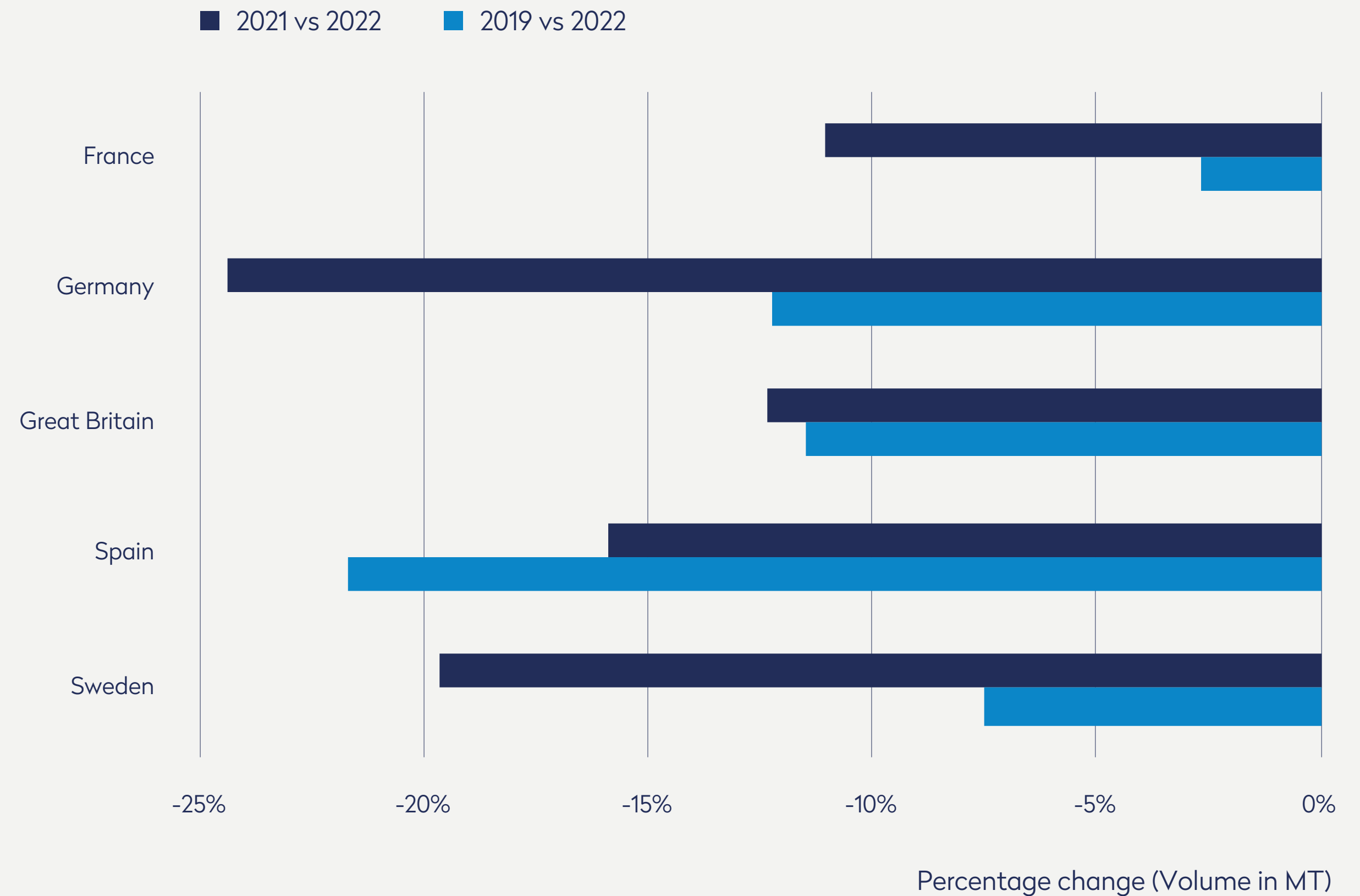


Figure 15: Volume change in home consumption of cod from 2021 to 2022 and from 2019 to 2022. Source: Kantar Worldpanel and GfK

In figure 16 we see the difference in imports of cod dived into total, fresh and frozen import to the selected European markets from earlier in this section. There is some difference in trend for fresh and frozen in the markets, but there seems to be a general trend for the total imports that it is highest in 2018 and gradually goes down towards 2022.

With supply affecting the availability of cod in the market, did consumers shift to other whitefish alternatives such as haddock or saithe/pollack?

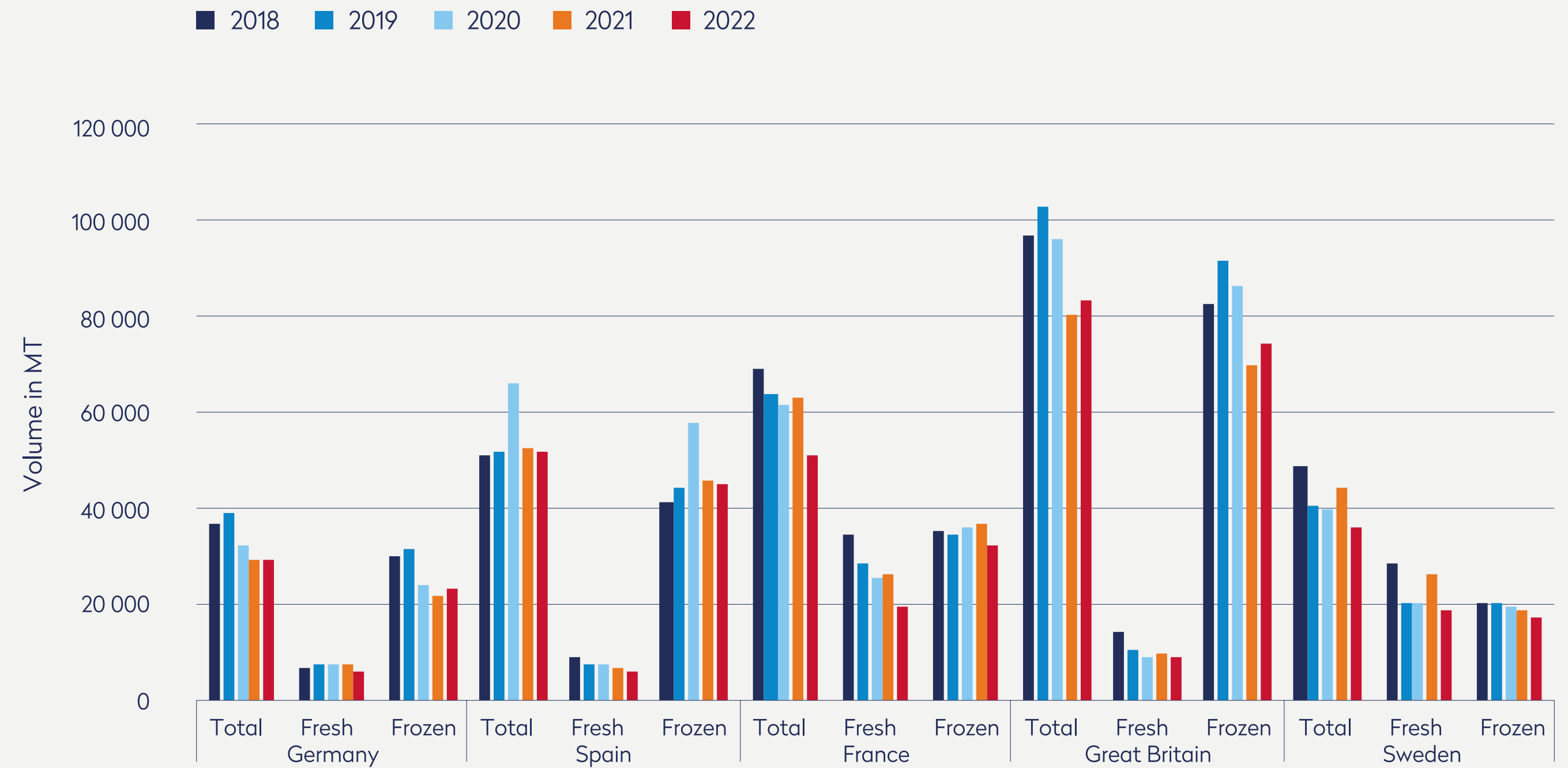


Figure 16: Imports of fresh and frozen cod to selected European markets from 2018-2022. Source: Eurostat/ Business & Trade Statistics Ltd.

In terms of volume change, we see a switch in both France and Great Britain in figure 17. Cod has a negative change in both France and Great Britain from 2019 to 2022 – while haddock in France, and both haddock and pollack in Great Britain has experienced growth in home consumption during the same period. Contributing to this switch is probably that the average price change for cod in France has been 4%, while, at the same time, haddock had a negative 1% price change in the same period. Simply put, consumers have switched to a cheaper product.

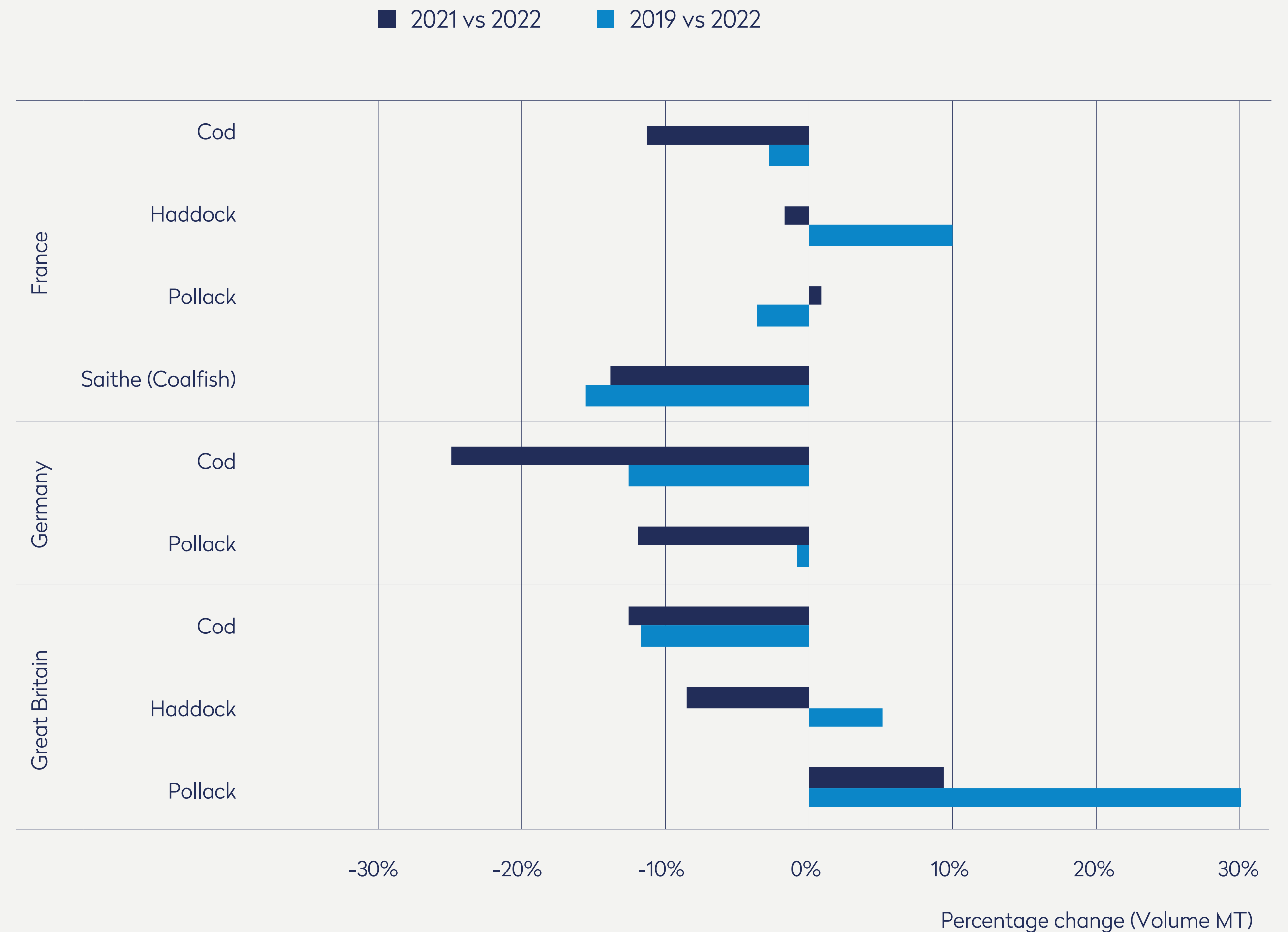


Figure 17: Volume change in home consumption of cod, haddock, saithe and pollack from 2021 to 2022 and from 2019 to 2022. Source: Kantar Worldpanel and GfK

Crustaceans

We began by looking at salmon and cod/whitefish and will now look a little deeper at the crustacean category which includes prawns, lobsters, and crabs. In Europe however, prawns constitute the largest portion of the crustaceans consumed at home with around 70 percent.

Because of an uptick in consumption during the pandemic, on returning to normal levels, the change was negative in volumes for all the European countries we looked at. When we examine consumption data before and after the pandemic, most of the countries now have the same consumption as pre-Covid times.

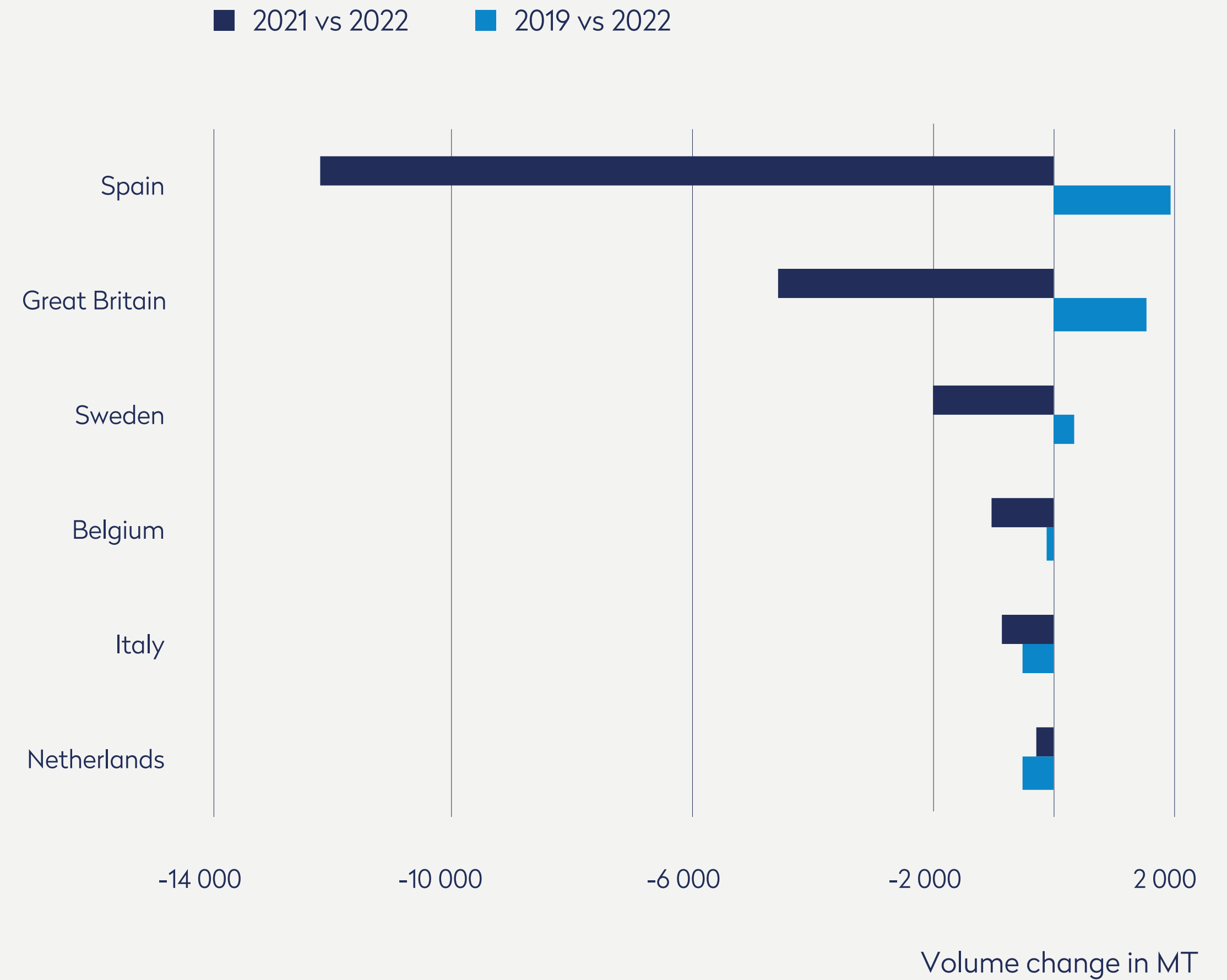


Figure 18: Volume change for home consumption of Crustaceans from 2021 to 2022 and from 2019 to 2022. Source: Kantar Worldpanel and Gfk.

We have already mentioned that prawns make up the largest portion of home consumption of crustaceans in Europe. We therefore chose to dive deeper into home consumption of prawns in specifically Great Britain and Sweden which are among the countries that eat the most prawns in Europe.

In figure 18 the vertical axis shows the price change for the different product formats of prawns, while the horizontal axis shows the volume change in home consumption in Great Britain. The size of the bubbles indicates the size of the value change in home consumption of said product format

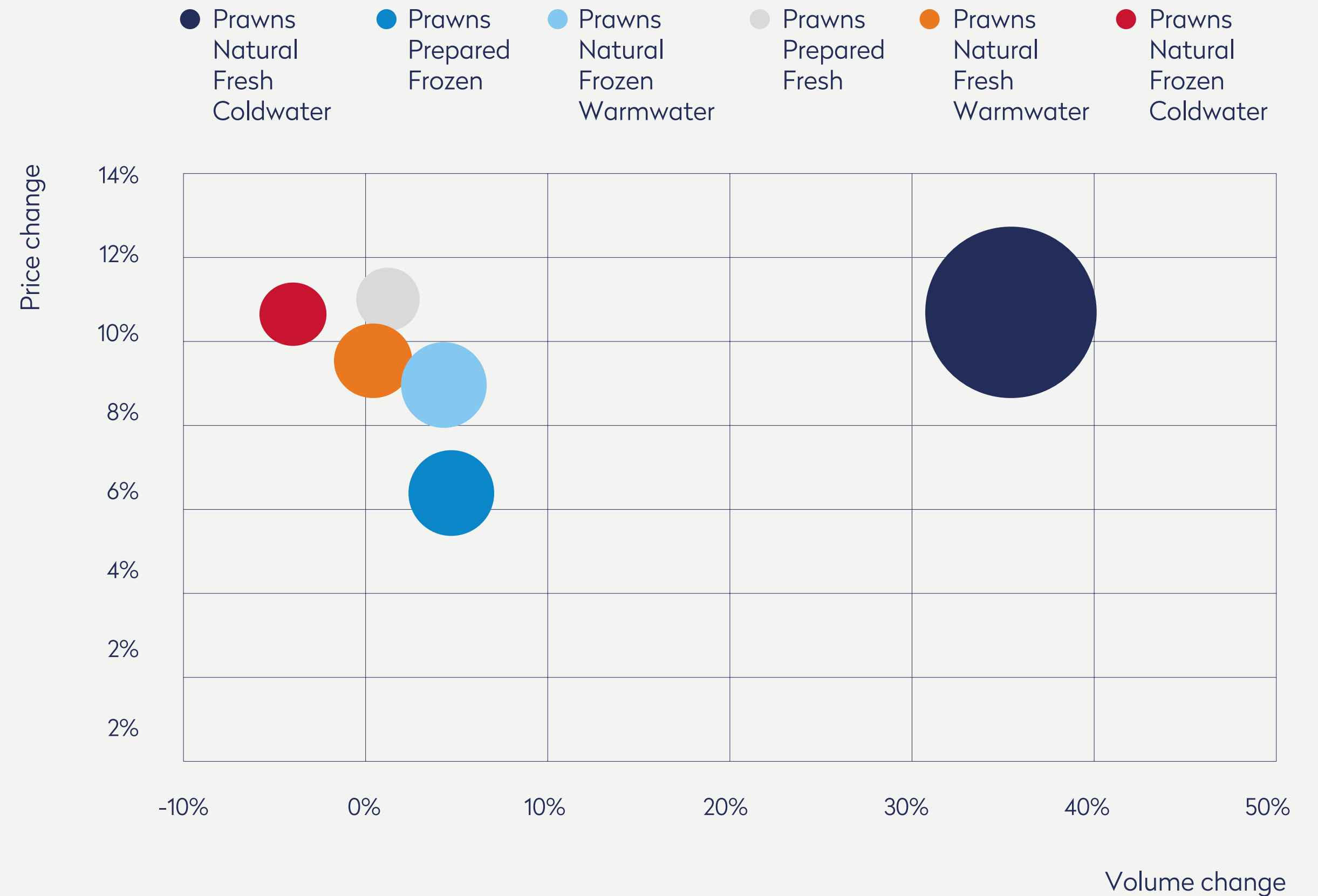


Figure 19: Price, Volume and Value change between 2019 and 2022 for home consumption of different product formats for prawns in Great Britain. Source: Kantar and Gfk.

between 2019 and 2022. The graph shows us that natural frozen coldwater prawns have reduced in volume, with their price increasing in the same period. Natural fresh coldwater prawns have the highest change in all three categories (volume, price, and value). Natural warmwater prawns (both fresh and frozen) have approximately the same volume and value change as prepared prawns (both fresh and frozen), but the price change for prepared frozen prawns is around 3-4 % lower than for the other three.

We also wanted to investigate how the volumes changed for the different categories in Sweden in relation to the price change between 2019 and 2022.

VICTORIA BRAATHEN – UK DIRECTOR



Prawns is among top five seafoods consumed in the UK where close to 70 per cent of all seafood is purchased through retail. After years of declining seafood sales, the pandemic provided a temporary increase in seafood through retail. Aligned with mega trends such as convenience, seafood offerings in UK retail are led by prepacked products with chilled as main category (Seafish 2022). Private consumption has been among economic components worst

hit by high inflation in the UK. While retail sales in 2022 grew in value, in volume sales were down as a consequence of consumers managing spend and buying less (Nielsen 2022). Similarly for other species, in 2022 prawns saw a decrease in overall consumption. Post pandemic, UK seafood consumption has changed with more eating opportunities at home such as lunch and snacking (Kantar Worldpanel 2023). In turn, these changes pose opportunities for prawns as easy to prepare and convenient meal and snacking options.

In figure 20, a picture is starting to emerge. There has been a switch between more expensive products to cheaper ones. In summary, the price of Natural Frozen, Natural Frozen Prepacked, and Natural Frozen Whole prawns has gone up, but their home consumption has decreased. On the other hand, the price of Prepared, Prepared Fresh Pealed, and Natural Frozen Pealed prawns has decreased, and their home consumption has consequently increased. This shows that price plays a significant role in prawn consumption among households in Sweden.

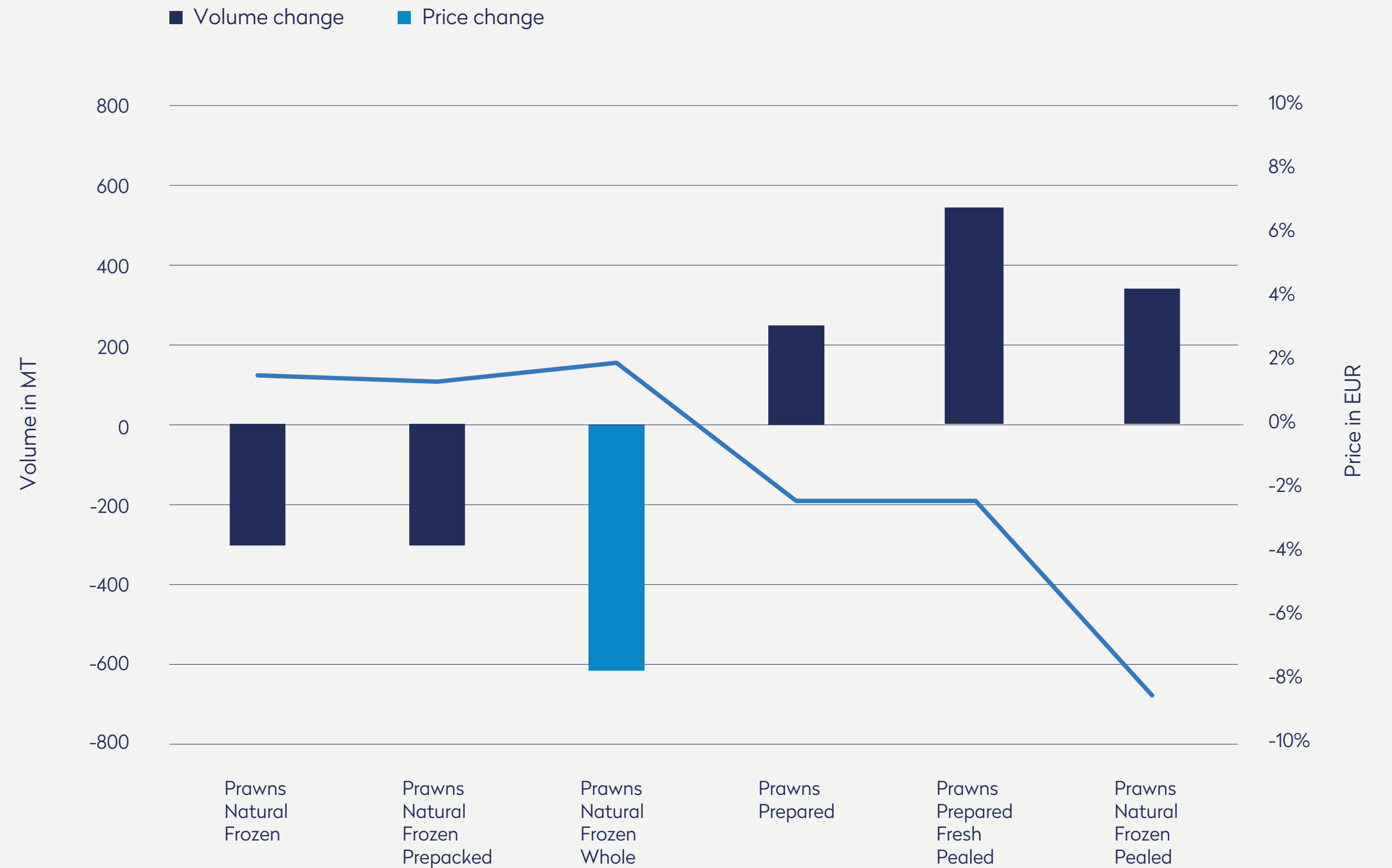


Figure 20: Volume and price change in home consumption of Prawns from 2019 to 2022 in Sweden.

Source: Kantar Worldpanel and Gfk.

The robots are coming

We know that the use of robotics in manufacturing is not new, and nowadays many of us have read and even tried out various ‘large language model’ chat bots, colloquially known as ‘AI’. Many of us are familiar with the word ‘robot’, but perhaps not its etymology which derives from the Czech word “robota”, meaning “heavy work” (Gasparetto and Scalera, 2019). And this is where robots excel –



Photo: Cottonbro studio

efficiently and safely doing repetitive and physically-demanding tasks, while keeping costs comparatively low. In this way, they outperform human beings.

Industrial robots have been used, in some form, for more than 50 years. For production, they were exclusively stationary and resembled mechanical arms of varying sizes. Automated guide vehicles (AGVs) followed guide wires and were used for transportation of heavy materials in factories. Today, warehouse

robots help increase efficiencies and optimize workflows. Importantly, they can work all day every day and are not subject to illness or fatigue (greyorange.com). These benefits became particularly salient during the pandemic when a combination of factors strained companies' abilities to get products to their customers in a timely fashion. A surge in online purchasing put pressure on warehousing and logistics, while fear of infections and lockdowns created uncertainties for corporations in areas such as staffing levels.



Whereas historically, automation has been a way to reduce headcounts – today’s enterprises are struggling to retain enough people on their teams, coupled with the challenge of increasing labor costs, as Dwight Klappich (Gartner warehousing) noted while speaking to TechTarget (Techtarget.com) in December 2021. This is not to say that robotics will replace a human workforce in the foreseeable future, but rather work alongside them, augmenting and collaborating with people. According to the technology website techtarget.com (TechTarget, 2021) there are several different types of warehouse robotics systems:

- Collaborative picker robots that follow humans to collect and carry items for an order;
- Goods-to-person robots that bring shelves closer to human pickers;
- Heavy payload robots that are essentially autonomous forklifts;
- Static robotic picking systems that pack orders or boxes;
- Engineered automation that reimagines warehouse design to support high-efficiency robots;
- Autonomous drones that fly around and constantly inventory tall shelves; and
- Facilities management robots that mop floors and cut lawns.

Although the use of robotics still comprises a rather small portion of warehouse automation, this use is expanding at a rapid pace. According to Interact Analytics (2021), even during the pandemic slowdown, mobile robot deliveries and revenues grew significantly in the second half of 2020 compared to 2019 and is projected to grow further still in the years to come. Robotics is also making advances in food packing, for instance, the use of robotic grippers in combination with AI-assisted computer vision (howotorobot.com).

In other sectors, self-driving tractors and vehicles are used in agriculture, weeding robots are in various stages of development, as are picking robots (for fruit), and aerial drones for field monitoring. There are also robots being developed for chemical factories, construction (brick laying, carrying, lifting and painting) and the pharmaceutical industry, to mention but a few.

But what is the case for the seafood industry?

Automation has also come a long way in the seafood industry, although it is not perhaps

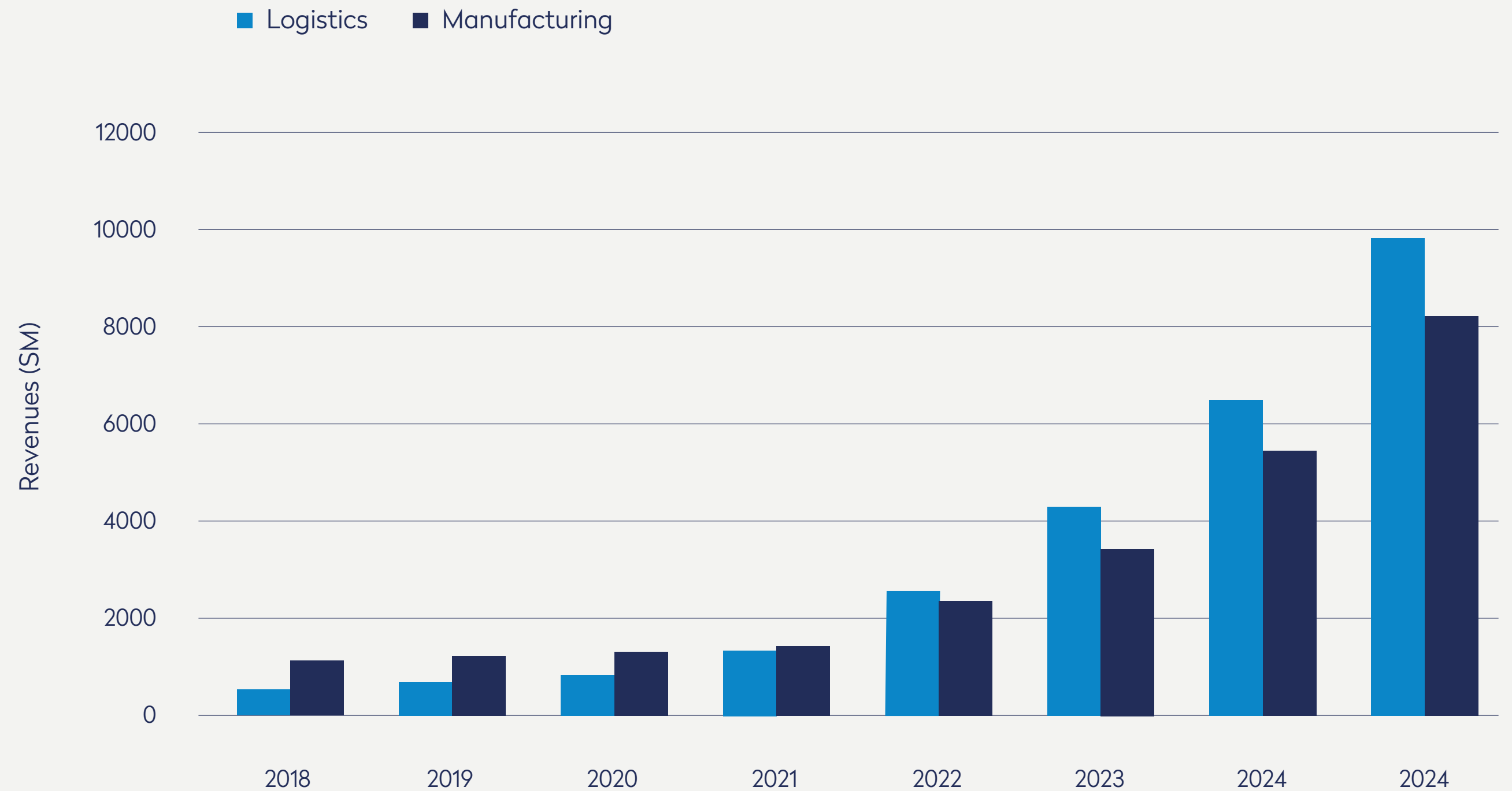


Figure 21: Mobile robot revenues forecast

Automation and robotics in the seafood industry

as prevalent as in other sectors. At the processing stage, this is partly due to the delicate nature of the products, which require systems that can ensure their food safety and quality. There are systems in existence for portioning, picking and packing which reduce labor dependency and increase yield. Systems are also in place for remote monitoring of lice, remote feeding, machine learning and the use of robots for tasks such as net cleaning.

One such example is a Norwegian producer (Eide Fjordbruk) who is, through the use of the abundance of data being produced today (sensors, cameras etc.), endeavoring to utilize this as a useful tool for ‘data driven and AI-assisted’ decision making at production localities (efb.no). They, for instance can use this data to investigate mortality, lice management, and feeding practices. Better

utilization of feed can, for environmental and economic purposes, be a game changer. Several Norwegian salmon producers are already starting to use sensor and camera technology to optimize feeding.

There is also much research and development being conducted. For instance, by SINTEF in Norway.

One such SINTEF area of focus is “the development of innovative automated processes within seafood and food production” (Sintef, 2022). According to SINTEF: “All seafood caught must be sorted and processed into products of the highest possible quality. This is done during the quality sorting process (weight, species, appearance, quality deviation), during anesthesia and slaughtering,

and during processing (filleting, deboning, trimming, removing fish with parasites or other defects). Automation in the processing stage can help ensure that as much of the raw material as possible can be used as food, ingredients, or feed.”

This is an important factor when we consider the issue of sustainability as well. We have, in previous reports, highlighted the role that seafood will play in feeding an ever-increasing population in the years to come. Sustainability in this regard also means that we utilize as much of the raw materials we harvest, as possible. According to SINTEF: “The solution is to design automated systems that do the job just as well as – or better than – humans. In such systems, the technology must act as the eyes, brain and hands to help reduce waste, while adapting it to process all types of seafood.”



Photo: Depositphotos Everett225

A spotlight on farming and innovation: **Nordlaks**



Karoline Mikalsen Sørstrøm

Nordlaks, a prominent family-owned salmon farming company in Norway, is located in Stokmarknes and has established integration throughout the entirety of the salmon farming value chain. In 2020, the company constructed the ocean farm "Jostein Albert".

Karoline Mikalsen Sørstrøm, the marketing specialist at Nordlaks, reports that there are many benefits regarding the use of the ocean farm.

“The reasoning behind the ocean farm is that it gives us the opportunity to free up new space for salmon farming and at the same time implement a new production strategy that might have a positive effect on eradicating lice. One benefit we’ve seen is that the ocean farm has had relatively low impact on the environment, even with a high production. Moreover, the ocean farm has had lower lice occurrence than other farms with comparable salmon in the same area.”

The ocean farm also has some challenges regarding production. Sørstrøm explains: “Production at exposed locations presents logistical problems. Our operations are at the mercy of the weather, and this impact both the salmon and the workers.”

Commenting on the reception from customers to the ocean farm, Sørstrøm continues: “Our customers are pleased that Nordlaks can offer more ASC-certified salmon as a result of the ocean farm’s production. We produce ASC-certified salmon on other traditional farming locations as well, but ASC-certified salmon from the ocean farm provides the customers with a selling point and added value in the form of storytelling to the end consumers.”



Photo: Karoline Mikaelen Sørstrøm/Nordlaks

Nordlaks invest in innovation in its production, but also in marketing and communication. The company has developed a concept that employs virtual reality (VR) glasses to showcase the production of salmon to customers, partners, and other interested parties. The VR glasses are used at fairs and other events to demonstrate the entire value chain to importers and customers of Nordlaks. This is an important selling point to their customers, as Sørstrøm explains: “A lot of importers have strong knowledge about how salmon is supposed to look and taste, but not always that same knowledge about how it is produced from smolt to salmon. Allowing customers to watch the whole production helps them to feel safer when choosing Norwegian salmon.”

The VR technology also provides those employees who do not work on production sites with the opportunity to learn about various aspects of the value chain without requiring a physical presence on-site. Feedback on the VR technology has been positive both in the press and on social media, and Nordlaks sees potential for reaching end customers through channels such as YouTube and the possibility of using VR glasses at home.



Photo: Karoline Mikaelen Sørstrøm/Nordlaks

Summary

This report has endeavored to build upon the theme from our previous one by exploring the social dimension of sustainability and relating it to the seafood industry. We are fortunate to have been able to include expert commentaries on the impact of the European Green Deal on our industry, and to hear the real-life experience of those carrying out pioneering work on equality for female fishers here in Norway. Pioneering work is also taking place amongst Norway's salmon producers, and we are proud to showcase some of these innovations in this report. Keeping our finger on the pulse when it comes to technological development is a hallmark of the Norwegian seafood industry, and it will be of vital importance for our continuing successes as well. This will not only allow us to stay one step ahead of our competitors, but also to meet the demands concerning the effects of climate change. In short, innovation across the entire value chain is, and will remain, key.

We have also taken an in-depth at social sustainability, which is another equally important dimension of sustainability – and something that consumers are increasingly paying attention to. Social sustainability simply put pertains to people and equal and fair treatment and opportunities. Simply put, but with a wide scope and long reach. Companies need to look at the entirety of their value chain to ensure that, say, farmers who grow feed or workers in factories, are paid a living wage and work under good conditions. Consumers are increasingly being aware of and requesting this information, however a company should prioritize and take an active role in their social responsibilities and securing of human rights throughout their value chain by default.

Inflation has deeply impacted consumers' pockets and brands and retailers have employed various strategies to deal with the issue. For example, some retailers have launched a price lock on a certain number of their own private-label products (including Aldi, Carrefour and Coop Norway to name but a few), and other pricing strategies. According to the insight agency Edge by Ascential – brands will be forced to pass through some of the increasing costs to consumers.

As prices rise there has also been observed a shift from fresh and not prepacked formats to more prepacked product formats for different species. For instance, in the case of salmon where the ratio between these categories was roughly 40/60 in favor of fresh and not prepacked in some European markets we looked at – in 2022 that ratio was edging closer together and ending up at 46/54.



Photo: Pixabay

Increased price levels are also forcing consumer shifts between protein categories – for instance, from red meats to pork and poultry – but also from branded products to private labels within the same category.

Another, perhaps worrying trend to consider, is those consumers who are, in some markets, turning to “buy now, pay later” solutions for food, as well as food help programs such as food banks, signaling an overall decline in purchasing ability and power. According to USA Today, one in five people who have used a “buy now, pay later” service have also used it to delay paying for the cost of their food (USA Today, 2022). The New York Times also outlines how consumers are increasingly using credit cards that were previously used for discretionary purposes, to cover food costs. (New York Times, 2022).

Perhaps it is worthwhile to consider the importance of food safety and food security in this context – people need to have access to food that is safe to eat, and people need to have access to food. In more ‘developed’ countries, conventional thinking may define food security as pertaining to physical availability, i.e., the main barrier is that food is hard to get. However, if food is abundant, yet the prices to access that food keep increasing, we are effectively raising barriers and increasing food insecurity and thus undermining social sustainability. We need to ask ourselves; can we do more to address this issue?

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