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Oceans of change: Seafood trends for 2024

Introduction

Oceans of change: Seafood trends for 2024

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Many of the trends we talk about in this report feed into one another. Health is tied to sustainability and eco-certifications in the minds of many consumers. Technology – in particular algorithms and artificial intelligence (AI) – serves to improve traceability but also offers new solutions to challenges such as safe ocean harvesting or smart aquaculture. Some of the trends we examine here were amplified or changed by Covid-19: the pandemic put health into sharp focus of course but it also opened up a new way of convenience eating that has endured and expanded. Then came supply-chain issues and the cost-of-living crisis – further influencing decision-making around seafood.

Fishing in Lofoten. Photo: Kristoffer Lorentze

With the global seafood market projected to reach a value of $605.46 billion by 2029 and a compound annual growth rate of 8.92% from 2022 to 2029[1], what are the factors influencing and driving this growth in 2024?

As we look at the key trends for the coming year, we also feature interviews both with NSC insiders and others within and related to the industry: a nutritional biologist talking about ultra-processed foods, an ingredients solutions director talking about novel feed solutions – including those made with genetically modified ingredients – a Norwegian seafood firm putting AI to work and the female CEO of a high-end tinned fish company creating a buzz in the US.

1 Statista, 2023

The lucky winner

‘It’s health, it’s convenience, it’s indulgence and it is country of origin,’ says Christian Chramer, CEO of the Norwegian Seafood Council, talking about how, coming back to the sector after an eight-year hiatus, the megatrends affecting seafood have remained as, if not more, relevant.

That isn’t to say things haven’t changed of course. Health is an area Chramer points to as example of a key theme that has expanded in recent years. ‘In some regions, it will be more about lifestyle, the way we live and how we treat our body,’ he says. ‘Elsewhere, coming out of the pandemic, it is more about the effect of our way of living and wanting to be healthier.’

Photo: Norwegian Seafood Council

Christian Chramer
CEO of the Norwegian Seafood Council

At least in in the US and Europe, Chramer describes this health focus 'as a new norm,' though he warns that it is sometimes at odds with the cost-of-living crisis. 'For many – in Europe at least – it's about balancing a desire to eat healthier with what you can *afford* to eat.' That balancing act is a shorter-term issue though. However long inflation remains high and the costs of fuel and food a key consideration for many, the health benefits of seafood will be longer lasting and an increasing focus as the world demands an ever-greater supply of sustainable protein.

This is also where health ties into other megatrends on Chramer's radar: the demand for healthy but sustainable, low-fat, high-protein foods puts an emphasis on country of origin. 'With seafood, you know where it comes from, and that's a big factor in health – the food you're sourcing and the type of protein it is.' This in turn brings technology into the mix, with developments – including in AI – allowing for better tracing as well as everything from working to improve production or analyse stock for disease.

Back at the consumer end, the rise of convenience is another key factor. Snacking might traditionally have been seen as something to avoid, but Chramer notes that this segment increasingly includes not just fast food but eating on-the-go, quick eating and eating in-between meals. And he points to the globally ubiquitous poké bowl as the posterchild for how seafood, and salmon in particular, has tied together health, convenience and popularity.

Photo: NSC / Aina Hole

'What's striking when I move around the markets where we operate and have offices, is just how really global poké bowls have become. They're in Brazil, the US, in China, in Japan, in France. You find them from Sweden to Greece.' The endlessly adaptable options allow each country and each consumer to tailor their bowl to their tastes, with Chramer noting how the trend appeals across age groups too.

'Salmon has been the lucky winner of first the sushi megatrend, then the sashimi megatrend. And now also the poké bowl megatrend,' he says. It is the globalisation of salmon.

‘Salmon has been the lucky winner of first the sushi megatrend, then the sashimi megatrend. And now also the poké bowl megatrend,’

Photo: Norwegian Seafood Council

Chapter 1

Health and nutrition

Photo: Pexels / Terje Sollie

Health and nutrition

Seafood has long been seen as the healthy choice. And one of the legacies of the Covid-19 pandemic is the greater focus on health and well-being – and the *prevention* of ill-health. A OnePoll survey found that 70% of Americans consider themselves to be more health-conscious as a result of the pandemic. And a key part of a healthy lifestyle is, of course, diet. That same survey found an increase in health *awareness* too: 64% said they were motivated to lose weight because they know it has an impact on their immunity, while six in 10 had a greater understanding of how a healthy diet and lifestyle could better protect their long-term health.

Skrei. Photo: Knut Åserud

Norwegian shellfish. Photo: Studio DreyerHensley

Seafood has a big role to play in these healthier lifestyle choices. Research consistently points to a broad score of health benefits associated with regular seafood consumption, from weight management, to a reduced risk of obesity, enhanced nerve cell function, inflammation regulation and support for a robust immune system[1]. There is also compelling evidence suggesting that incorporating seafood into your regular diet can lower the risk of developing both type 2 diabetes and cancer[2].

The benefits of seafood as a very lean source of protein, abundant in essential nutrients like omega-3 fatty acids, vitamins and minerals can serve as a strong motivating factor for consumers to add more seafood to their daily diet.

1 Seafish, n.d.; Healthline, n.d.; Seafood Nutrition Partnership, 2021
2 British Journal of Nutrition, 2020

Alternative proteins

Photo: Mosa / World Economic Forum

But there is competition. The growth of veganism (though vegans remain a very small proportion of any population, despite the hype), vegetarianism, pescatarianism and flexitarianism, means people are increasingly motivated to incorporate meat-free – and, to a lesser degree, fish-free – days.

In the US for example, an estimated 15% of Americans consider themselves to be flexitarian – a figure that appears to rise among younger consumers (24-39). A OnePoll survey commissioned by Sprouts Farmers Market indicated 47% of Americans in this age group thought of themselves as flexitarian and that they were specifically looking to cut down on the amount of meat in their diets.

Lab-grown beef burger. Photo: David Parry / AFP / Getty Images / The Washington post

In the UK, a study based on UK Biobank data found that just over 2% of participants identified as pescatarians, highlighting the fact that while some people may choose to have one or two meatless meals per week, adopting a full-blown vegetarian, vegan or pescatarian diet is less common. Interestingly, a recent study found that US consumers were more likely to choose vegan food if it was labelled 'healthy' or 'sustainable' than if it was actually labelled as 'vegan'.

Still, these trends and a growing awareness of the environmental impact of animal proteins, has opened the door for 'plant-based' proteins – and the potential for lab-grown meats too.

From Burger King to the 'meat' aisle at your local supermarket, plant-based 'fake meats' have become a much talked-about trend. Although sales growth plateaued somewhat last year, these products continue to appeal to segments of both health-conscious and eco-conscious consumers.

The World Economic Forum suggests that, by 2035, alternative proteins could make up at least 11% of global protein consumption. And this is not just a meats trend. A literature review from The Good Food Institute (GFI) notes that plant-based and cultivated seafood will be necessary to meet global demand within less than a decade. It points to expectations that demand for seafood will rise by as much as 30% by 2030 (from 2010 levels), suggesting 'aquaculture growth is anticipated to keep pace with increased demand for only 17 countries, leaving around 170 countries with substantial unmet demand'[1].

1 GFI, 2021

Plant-based seafood, more difficult to produce and seemingly less headline-grabbing than meat alternatives so far, is expected to play a role in filling that gap. Numerous new options are in the pipeline or already on offer – and alternative seafood is already established on supermarket shelves: the UK's Morrison's chain began stocking Tuno back in 2019. The canned alternative tuna is made up of 60% textured soya protein, spring water, sea salt, yeast extract, seaweed powder, potassium chloride and Dha algal oil, retailing at £1.49 for 140g (NOK19.49 at the time of writing).

Although plant-based seafood might fill a gap, it doesn't necessarily serve the same purpose in the consumer mind as alternative meats – largely because meat (and red meat in particular) is already considered unhealthy and is known to come with a huge environmental burden. Seafood on the other hand, is already well-established as a healthy choice, though concerns around sustainability have grown in recent years.

These products come with another word of caution. This past year has seen an increasing press and consumer focus on ultra-processed foods (UPFs) – a conversation marked as one of the *New York Times'* 2024 food trends. Some products are clearly unhealthy fast-food but other items are marketed with a health angle while packed full of ingredients that are hard, if not impossible, to recognise.

Photo: Dr. Tricia Pingel

Alternative proteins and the ultra-processed food market

Richard Hoffman
Nutritional biochemistry lecturer
University of Hertfordshire

Photo: Northern Virginia Magazine

'I'm not a fan of UPFs,' states Richard Hoffman, nutritional biochemistry lecturer at the University of Hertfordshire, author and advocate of the Mediterranean diet. While he agrees there is a need to reduce the amount of meat we eat 'probably more radically than is being promoted [in many countries] at the moment,' he doesn't see alternative proteins as the answer.

‘For me, these UPFs are a sales pitch – and I don’t consider them healthy. I think it’s a misnomer, calling these products alternative proteins, or even describing them as plant-based products. If you actually look at the ingredients, there’s nothing at all related to a plant. They might contain ingredients derived from a soybean or a pea but it has been so highly processed that what you’re left with is chemicals that have been flavoured and textured to make them look like meat.’

As the focus – and criticism – of UPFs has grown over 2023, the conversation has not necessarily been about sugar, salt or fat, and Hoffman says that his main complaint with these products is what he describes as a lack of micronutrients. ‘If you’re eating a main meal of a ‘burger’ and chips, that’s displacing what you should be eating: fruit, vegetables and pulses – and some meat or fish. There’s a big issue of micronutrient deficiencies among younger people who eat a lot of junk food,’ he warns.

Although he recognises the popularity of veganism – ‘a lifestyle as much as a diet trend’ – and the need to find alternatives to the global demand for protein, Hoffman says plant-based alternatives fail to provide the complete proteins, with all the necessary essential amino acids, offered by meat and fish. ‘There’s a lot of uncertainty here,’ he says, noting concerns around the ways micronutrients are absorbed – or not – after being isolated and then combined back into a ‘burger,’ for example. ‘Analysing what is in the food is one thing, what actually gets absorbed across the gut is what matters,’ he says.

Describing these products as 'plant-based' is part of the marketing push behind them, argues Hoffman. 'It's about giving these products a 'health halo' by associating them with plants. If we described them as synthetic, which is what they are, consumers would better understand these products.' He also points to confusion in the narrative around these items. 'There are lots of good, processed foods' – olives or smoked fish are two examples – 'but when you read about this in the press, often the terms 'processed' and 'ultra-processed' are used interchangeably, which is very confusing'.

For Hoffman, it comes down to education – and moving away from marketing fluff. 'You can buy healthy foods – fruit and vegetables, pulses and so on. And in a cost-of-living crisis you can buy a tin of sardines. You need to know how to cook these cheap, healthy foods in a way that makes them appealing.'

Saltfish fillet Photo: Tom Haga

Chapter 2

Sustainability and ethical consumption

Photo: Pexels / Kervin Edward Lara

Sustainability and ethical consumption

Sustainability has been a growing buzzword in recent years and the trend only remains more relevant going into 2024. At COP28 in Dubai – the biggest UN climate meeting to date – for example, campaigners highlighted the potential offered by aquatic food systems to feed our growing global population, providing essential protein in particular to low and middle-income countries. WorldFish for example noted the benefits of sustainable ocean food systems in providing livelihoods and nutrition, while also arguing that global food systems can achieve negative emissions by 2050.

Feeding farmed salmon. Photo: Thomas Qvale

Outside of big events like COP28, consumers are also increasingly aware of the impact their choices have on the environment and are making conscious decisions to support sustainable and ethically sourced seafood options[1].

Seafood businesses that prioritise sustainability and ethical practices can tap into the growing market segment of eco-conscious consumers[2], while also contributing to the long-term health of marine ecosystems and the overall sustainability of the seafood industry.

This long-term view is a key element that should not be forgotten. While many consumers think in terms of current catch practices, sustainability is about preserving seafood for the future.

1 GFI, 2021; Pew Trusts, 2022; World Wildlife Fund, n.d.
2 NOAA Fisheries, n.d.

Skrei fishing. Photo: Try Reklamebyrå

Seafood is already recognised as having a lower environmental footprint than land-based sources of protein[1] – something that is important to a certain consumer profile – and these same consumers are also more likely to be aware of the risks of overfishing: the WWF estimates that more than 85% of the world's fisheries are pushed to or beyond their limits.

This often results in something of a contradiction for consumers: are they concerned about overfishing?

1 Pew Trusts, 2022; World Wildlife Fund, n.d.

Should their focus be on aquaculture and farming practices? How do they weigh the benefits and sustainability credentials of one product over another? Certification programmes like the Marine Stewardship Council (MSC) and Aquaculture Stewardship Council (ASC) serve as drivers in moving the industry toward sustainability as well as providing consumers with confidence that the seafood they eat is sourced responsibly. But education is needed to help consumers understand what all this means.

Interestingly, research from FMI – The Food Industry Association in the US, finds that while seafood consumers state a growing preference for farm-raised (20%) and wild-caught (45%) products, confusion abounds. Its 2023 seafood study finds that 43% either partially understand or are not sure what wild-caught means; 51% are not clear what farm-raised means; and 71% don't understand the term aquaculture.

It is clear that education should play a greater role in helping consumers make informed choices around sustainability more broadly – even before we tackle issues such as antibiotic use in farming or deforestation-free feeds for example. It is likely also necessary where the seafood industry wants to make use of some of the novel fish feeds already available or coming to the market – feeds that are needed to grow the industry and meet the growing demand for essential proteins.

Photo: Marius Fiskum

Predictable feed for fisheries growth

Ted Mollan
Ingredient solutions director at Cargill

‘If we want the industry to grow and expand over time, we need new sources of omega-3 because there will not be enough sustainable fish oil in the future,’ says Ted Mollan, ingredient solutions director at Cargill, talking about both the algae oils that are increasing in popularity and a new product recently approved in Norway: genetically modified (GM) canola oil.

Photo: Cargill

‘Right now, there is a scarcity of fish oils in the market,’ he continues. ‘This [GM oil] is needed in the market – like algae oil as well – to make sure that we can maintain enough omega-3 in the fish, which will then be also transferred to humans.’

Europe has traditionally been reluctant to adopt GM raw products, notes Mollan. Although he describes Cargill customers as ‘curious and interested to learn about what this can offer,’ he also recognises the fact that reluctance stems from end-consumer concerns back through retailers, processors and farmers. Education on the issue is needed, he says, noting ‘concerns around changing the image and reputation of salmon’.

Mollan likens the use of GM products in feed to the use of animal waste. ‘It’s similar to what we’ve seen with the use of animal byproducts: slaughterhouse waste from chickens, for example, which we see highly used in other industries. That has been allowed for many years. However, the seafood industry [in Europe] has chosen not to include it, even though it would contribute both economic and sustainability positives.’

Some markets are more open to such ingredients though. Mollan cites Canada and Chile as examples where GM is already used and widely accepted.

What sets these countries apart? 'Those markets have been more accepting of both GM and animal byproducts for many years,' explains Mollan, adding that 'on the animal byproducts side, they didn't go through the historical bans seen in Europe after Mad Cow Disease. It's taken a long time to reassess and reopen some of those raw-material flows.

'On GM as well there has been a historic scepticism in Europe,' he notes, pointing to 'quite some lobbying against such products' in the bloc.

But why the need for GM ingredients in the first place? Mollan says that Cargill considers algae oil a sustainable and renewable source of Epa Dha but that, as demand grows, additional new sources will need to be found – and existing shortages are already an issue.

'Algae oil allows you to have a consistent and reliable source of Epa Dha. It's not affected by environmental changes that create fluctuations in the availability of fish oil and thereby also fluctuations in price,' he explains.

Essentially, it's all about predictability, which in turn fosters stability and growth.

Predictability helps 'reduce pressure on vulnerable fisheries,' says Mollan: 'it becomes easier to meet your feed needs while not exploiting fisheries beyond what's sustainable.'

GM ingredients are an extension of that reliability. 'Producing something in a field is more predictable than fishing something out of the sea,' says Mollan.

Chapter 3

Brand loyalty and country of origin

Photo: NSC / Andreas Kleiberg

Brand loyalty and country of origin

With the growing focus on sustainability comes greater scrutiny of the seafood industry – with impacts for businesses as consumers show a growing interest in understanding the origins of their food and the environmental implications of their choices. To build consumer trust and differentiate themselves in the market, brands are publishing detailed information about their sourcing, production methods and sustainability efforts, a trend the World Benchmarking Alliance (WBA) expects will intensify in 2024.

Highlighting the industry's crucial role in creating sustainable, equitable food systems and protecting and restoring ocean ecosystems, the WBA's third evaluation of sustainability performance among the world's 30 most-influential seafood companies points to slow progress however.

Its research reveals that most companies fail to make significant efforts to address their social and environmental impacts. For example, despite global efforts to eradicate illegal fishing, companies remain inactive: just three out of the 30 companies assessed indicate that they evaluate illegal, unreported and unregulated (IUU) fishing risks in their operations and supply chains – and none disclose the results of those assessments.

Additionally, while more companies are committing to traceability, they remain vague on specific progress. The complexity of seafood supply chains often obscures social and environmental issues and contributes to fraud and mislabelling. To ensure seafood products are legally caught, ethically produced and environmentally sustainable, it's crucial for companies to trace their seafood products from boat to plate. This is information that consumers want and transparency helps drive trust – and loyalty.

In the UK, Marks & Spencer – a brand long synonymous with quality – is an example of how transparency and a focus on sustainability helps cement trust. M&S became the first UK retailer to report its seafood sourcing back in 2012. Today, it is signed up to a host of seafood and sustainability initiatives and it works closely WWF and the Marine Conservation Society to ensure the almost 60,000 tonnes of seafood it uses annually is sourced responsibly. Members of the public can use an interactive seafood sourcing map to find out where M&S seafood comes from, how it is caught and which certifications it holds.

Opportunities in the shift to QR codes – but education needed

As QR codes replace barcodes, there's a huge opportunity in the information available at consumers' fingertips: everything from country – or even square mile – of origin, to what the fish was raised on and how you might like to cook it.

Fishing in coastal communities. Photo: Luca Righi

Kjetil Hestad
Director of aquaculture and market access, Sjomatbedriftene

'You can put all the information you want about your product into a QR code – it can take you to a website if you want,' says Kjetil Hestad, director of aquaculture and market access, at Sjomatbedriftene. 'It gives consumers the *possibility* of information.'

This possibility isn't necessarily being realised however. 'To pick up your phone and scan a QR code to get that information, to read it and make a decision on whether you take a product or not? That's a time-consuming process,' he points out – and one that is certainly off-putting for many consumers at the moment.

'Actually scanning a QR code to find out more about a fish is possible,' he adds, 'but at the moment that happens very rarely.'

Another issue is that many consumers don't even realise what's on offer through these codes – even when they contain information that consumers want. 'People are gradually becoming more aware of their food,' notes Hestad. 'Where their salmon or their cod comes from is something that consumers more frequently want to know.' There is a consumer, he says, that wants to eat fish for example, but wants to know more about the life of that fish before it arrived in their shopping basket.

'These are the important, underlying questions that can be answered by QR codes.'

Still, the big barrier is simply awareness – and the added steps required to access that information.

'Consumer education is vital,' says Hestad, 'and it needs to be done joined up and at a large scale at the company and at the organisation level. It's not enough for one company to do this.

'The only way we can give consumers the *opportunity* to use QR codes, is to help them understand what these codes are.'

This will become increasingly important as there is also potential that some suppliers will use QR codes instead of certain information points in print on packaging. 'If it's cheaper for producers to use a QR code instead of printing information on packages, they might start to do that, even though it's certainly easier for consumers to read what it says on the package than it is to pick up a phone and scan a QR code.'

A side effect of this possibility, if realised, is that while QR codes are used more often, stating country of origin – or another key purchase driver – prominently and on the packaging, could well become more powerful.

Photo: QR Code Chimp


Photo: Norwegian Seafood Council

Where does country of origin fit into this narrative? Looking at a selection of NSC research reports[1] spanning several markets, country of origin continues to be a firm factor in how consumers choose where to buy their fish and seafood. Across these studies, researchers asked consumers to state whether a range of different factors were relevant or irrelevant in how they choose where to shop. At least half of consumers across the board said that clearly marked country of origin was relevant to their decision making, with highs of over 80% in some markets.

Data from NSC Deep Dive research covering: Brazil, China, France, Germany, Italy, Japan, Norway, Portugal, Saudi Arabia, South Korea, Spain, Sweden, Taiwan, Thailand, the UK, US and Vietnam.

1 Data from NSC Deep Dive research covering: Brazil, China, France, Germany, Italy, Japan, Norway, Portugal, Saudi Arabia, South Korea, Spain and the US.
References: World Benchmarking Alliance. (2023). World's largest seafood companies continue to lack transparency on social and environmental impacts.
Retrieved from https://www.worldbenchmarkingalliance.org/news/worlds-largest-seafood-companies-continue-to-lack-transparency-on-social-and-environmental-impacts/

In Italy and South Korea, it was the factor cited as relevant to most consumers (78% and 82% respectively) and country of origin is among the top two or three almost across the board – alongside a store offering a broad assortment of fish and seafood products and the ability to buy everything in one place (the one-stop-shop experience) – as well as the availability of sustainable seafood.

Often, even where country of origin isn't the top cited factor, it remains a key part of the decision-making process. In China, for example, 89% of consumers see a wide assortment of seafood as a relevant factor in retailer choice – making it the number-one answer. But in second place, 86% of people cite country of origin. Among consumers in Portugal, country of origin is the third-most cited factor in retailer choice but is still cited as relevant by 72%. In the US, it is fourth, after assortment and the ability to buy everything you need in one place, which share the first spot. Then comes the availability of sustainable products before country of origin – though again, it is still seen as relevant by 62% of consumers.

86%

see country of origin labeled seafood as a relevant factor in retailer choice.

Chapter 4

Cost and luxury

Photo: Pexels /cottombro studio

Clipfish Bacalhau à Brás. Photo: Jorge Simão/Simon Says Studio

Cost and luxury

Despite the fact that fish and seafood is a regular weeknight meal around the world, with some 3.3 billion people relying on wild-caught and farmed seafood as their primary source of protein, seafood often comes with an aura of luxury. With the growing focus on sustainability – and the premium attached to wild-caught fish when so much is farmed – how have consumers been adapting during the cost-of-living crisis?

Inflation began climbing in late 2021 and many countries saw the cost of living – including food prices – rise faster than at any point in the last 40 years. Seafood, of course, was not exempted from this trend. Many consumers evolved to seek out cheaper deals for food more broadly, looking for a balance between quality and cost. Across many countries, consumers switched supermarkets as they tightened their belts, either opting for more value-focused brands or looking for special offers that provide savings, loyalty programmes that reward frequent purchases or bundle deals. In the current economic climate, reduced price has become an increasingly powerful attraction for budget-conscious consumers.

Even though inflation has eased somewhat, food prices in particular remain high at the time of writing and consumers have yet to feel the benefit of a shift in western economies. FMI's 2023 seafood study found that seafood department sales totalled $16.2 billion in 2022 – a 3.8% decrease over 2021 as inflation pushed up the prices of both fresh and frozen seafood. This drop in sales reversed an upward trend seen under the pandemic when US seafood sales reached record highs. Despite this reversal, figures remained higher in 2022 than in 2019, something FMI put down in part to shoppers' desire to both eat healthier and include more environmentally friendly options in their diet.

NSC specifically asked consumers across dozens of countries how price was impacting their seafood decisions. When asked what actions they were taking in response to increased seafood prices, the key theme was a shift towards eating at home more often – cooking at home more while buying fewer ready meals and eating less often at restaurants while enjoying more 'occasion' meals at home. In fact, among the 17 markets studied, this was the main response across the board, with just a handful of exceptions (in France, Germany, Norway, Portugal and Thailand, consumers are more focused on deals than cutting out of-home consumption, though this still remains a popular action).

Fresh salmon and trout on a fish counter in Thailand. Photo: Fredriksen, Bendik

Some countries saw a more drastic shift in top actions – in Portugal, for example, 47% of consumers say they are looking for deals and coupons on fish and seafood, versus a high of 25% of Japanese consumers eating at restaurants less frequently – and the way consumers are responding to price rises is varied. Even outside of top one, two or even top-three actions, notable numbers of people are shopping for seafood differently.

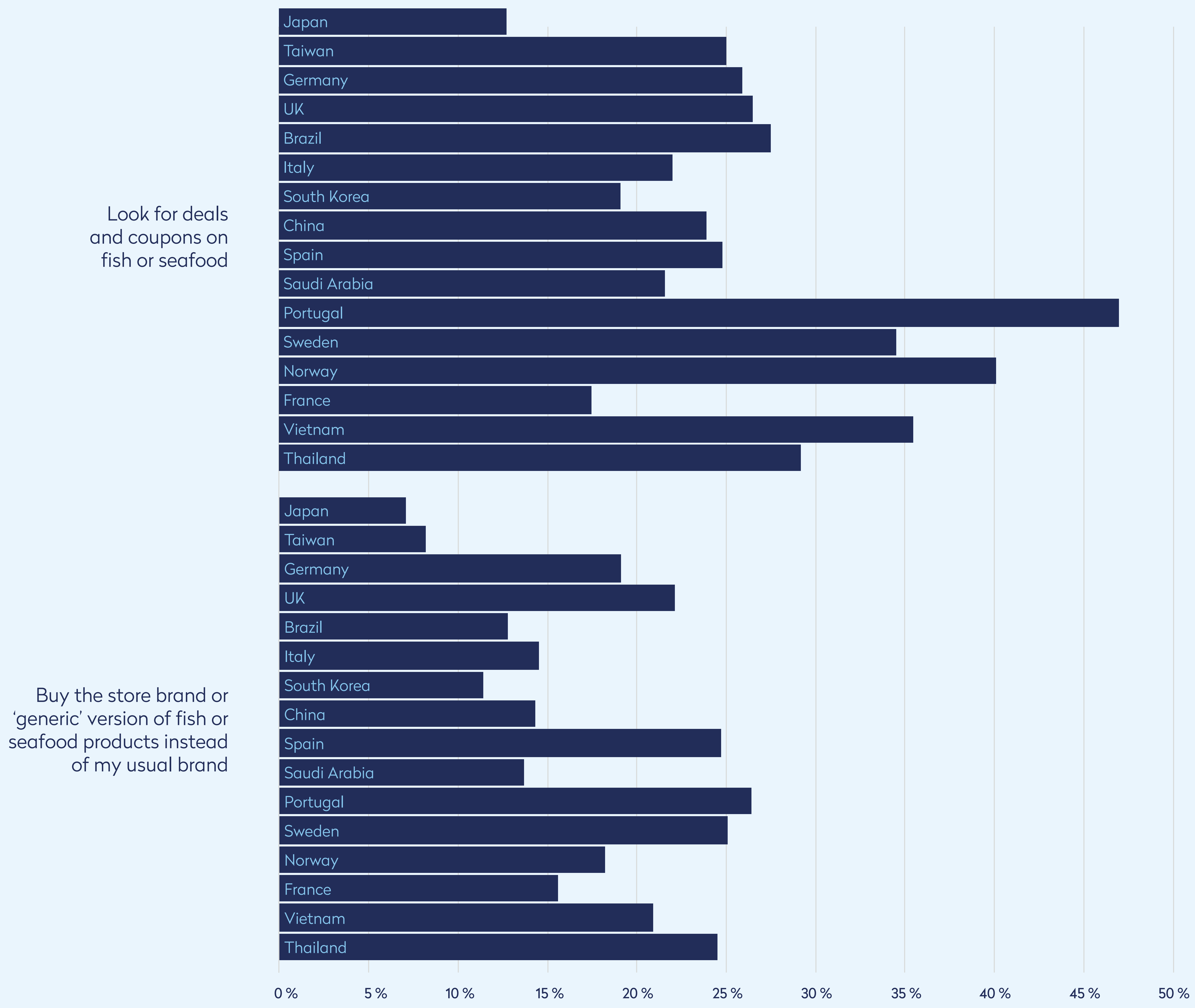
Spain is a good example of what is seen almost across the board. There, the biggest shift has been in people cooking at home more and buying fewer ready meals (34%). This is followed by eating less often at restaurants and having more meal 'occasions' at home (32%), comparing prices and price matching on fish or seafood (31%) and shopping at different stores that have more competitive prices (28%).

47%

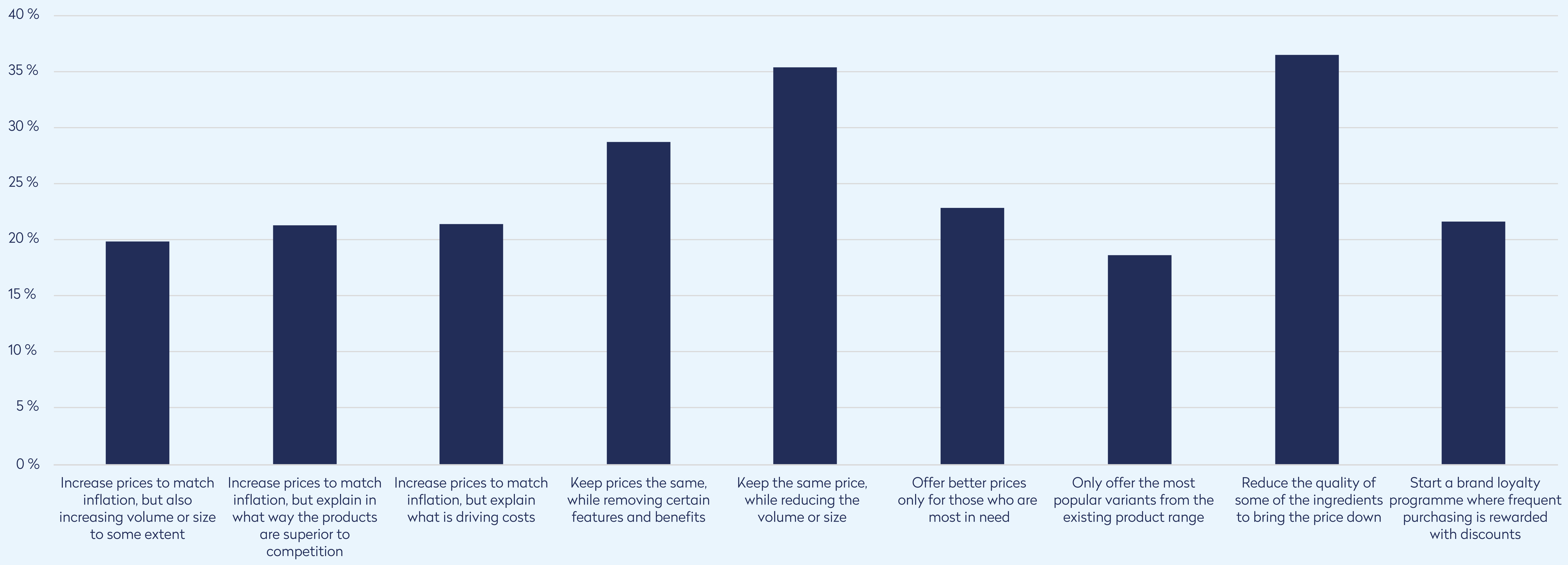
of Portuguese consumers say they are looking for deals and coupons on fish and seafood

Even outside of those 'top four' actions, consumers are making big changes: a full 25% of Spanish consumers say they are buying the store brand or 'generic' version of fish or seafood products instead of their usual brand; looking for deals and coupons on fish or seafood; buying frozen fish or seafood instead of fresh. NSC also looked at consumer attitudes to rising costs. Views around the impact on sustainability are interesting. Although at least 28% (Japan) of consumers say sustainability is less important to them in the current economic climate (rising to a high of 58% in Thailand), many consumers continue to say they will pay more for fish and seafood products that are sustainable. Chinese consumers stand out by far here: 71% agree or strongly agree with that statement, versus just 6% that disagree. Elsewhere there is typically a more even balance, with most countries displaying a stronger willingness to pay more for sustainable seafood than not. Only in Japan, Norway and Portugal do more people say they are unwilling to pay more.

COST MANAGEMENT STRATEGIES



Q5_2. HERE ARE A SERIES OF ACTIONS FISH OR SEAFOOD BRANDS COULD DO TO DEAL WITH RISING PRICES. WHICH THREE DO YOU FIND LEAST ACCEPTABLE FOR FISH AND SEAFOOD BRANDS TO DO? (N=17000)

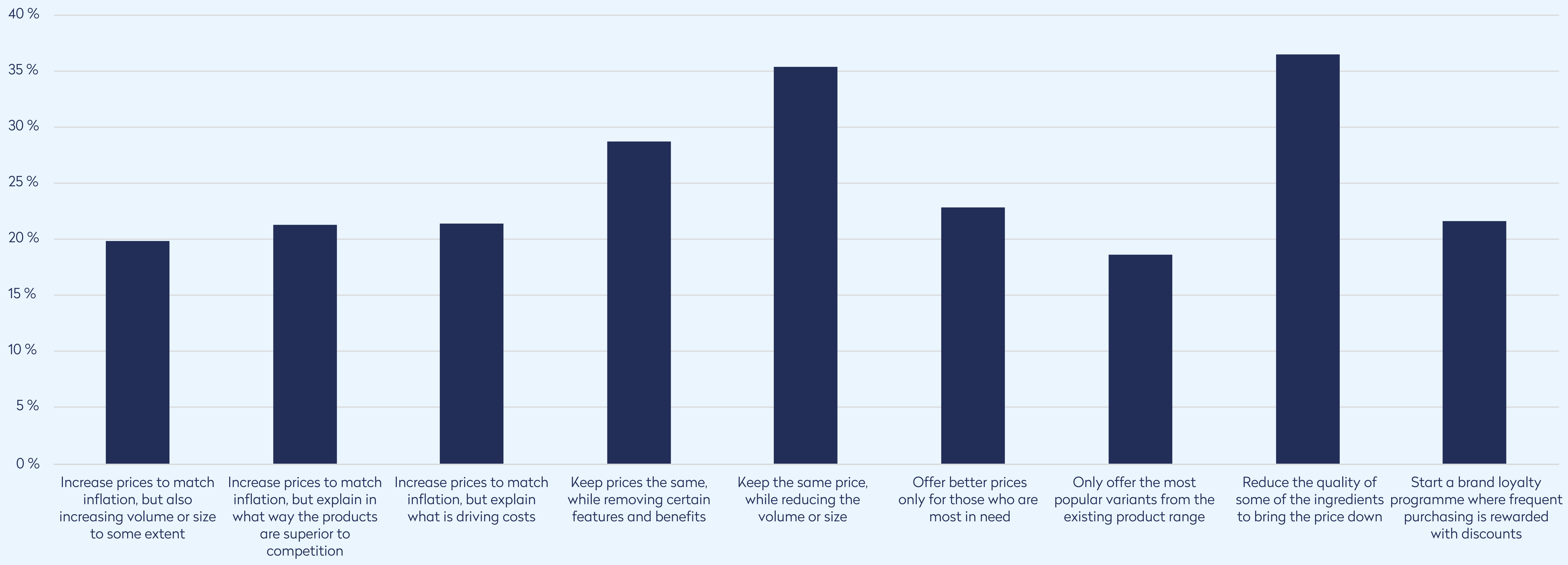


Finally, on the issue of price sensitivity, NSC asked consumers which brand concessions they were least accepting of. Options included questions around 'shrinkflation' for example – the practice of reducing the size of a product while maintaining the price, reducing the quality while maintaining the price, increasing prices while offering an explanation of the reasons why, offering brand loyalty programmes and more.

Across 11 countries, more consumers say they are least willing to accept a reduction in the quality of some of the ingredients in order to bring the price down. In France, Italy and Thailand, more people were unwilling to accept a reduction in size at the same price, with a reduction in quality a close second. Swedish consumers were equally unwilling to accept either a quality or size reduction and almost all those that cited a reduction in quality as least acceptable followed that with a reduction in size at the same price.

So, what *is* acceptable in the eyes of the consumer? It's a mixed bag: The most popular response (most tolerated across six of the markets) is to reduce the product range, though some markets also showed greater tolerance towards increased prices if an explanation was given or if the size of the product was also increased somewhat. Elsewhere, others were supportive of brand loyalty programmes to tackle price increases. What is clear from these findings is that quality remains a strong and continued driver in seafood purchasing, even in the current economic climate.

Q5_2. HERE ARE A SERIES OF ACTIONS FISH OR SEAFOOD BRANDS COULD DO TO DEAL WITH RISING PRICES. WHICH THREE DO YOU FIND LEAST ACCEPTABLE FOR FISH AND SEAFOOD BRANDS TO DO? (N=17000)



Chapter 5

The growth of seafood at-home

Photo: Pexels / Nicole Michalou

Photo: Norwegian Seafood Council

The growth of seafood at-home

It is hard to underestimate the impact of the pandemic on *where* people eat. The boost that was given to at-home consumption by lockdowns and social distancing has been given a further nudge in the cost-of-living crisis, where people have responded by further cutting restaurant visits.

Looking at data from NSC's Deep Dive research – and focusing only on salmon, though bacalao and mackerel are also covered in detail in these reports – we see that, across several markets studied and used here, at least 45% of consumers most often eat salmon at home. For most, the figure is far higher, with many countries over 70% for at-home salmon consumption. Norway comes in highest, where 85% of people say that, out of the last 10 times they bought salmon, it was eaten at home.

Those in the 45-50% range for home consumption – Brazil, China, Saudia Arabia, South Korea Thailand and Vietnam – typically eat a little more than a third of their salmon in restaurants with the rest coming in the form of delivery. Still, consumers across all markets eat most salmon at home, followed by restaurants and finally from delivery services. But what are they eating when they eat out? It's clear that raw rules – sushi, sashimi or poké bowls are most popular across most of the markets studied. In France, Germany and Spain, consumers are more likely to opt for browned or seared salmon when they eat out, while in Saudi Arabia, the UK and the US, frying comes out top.

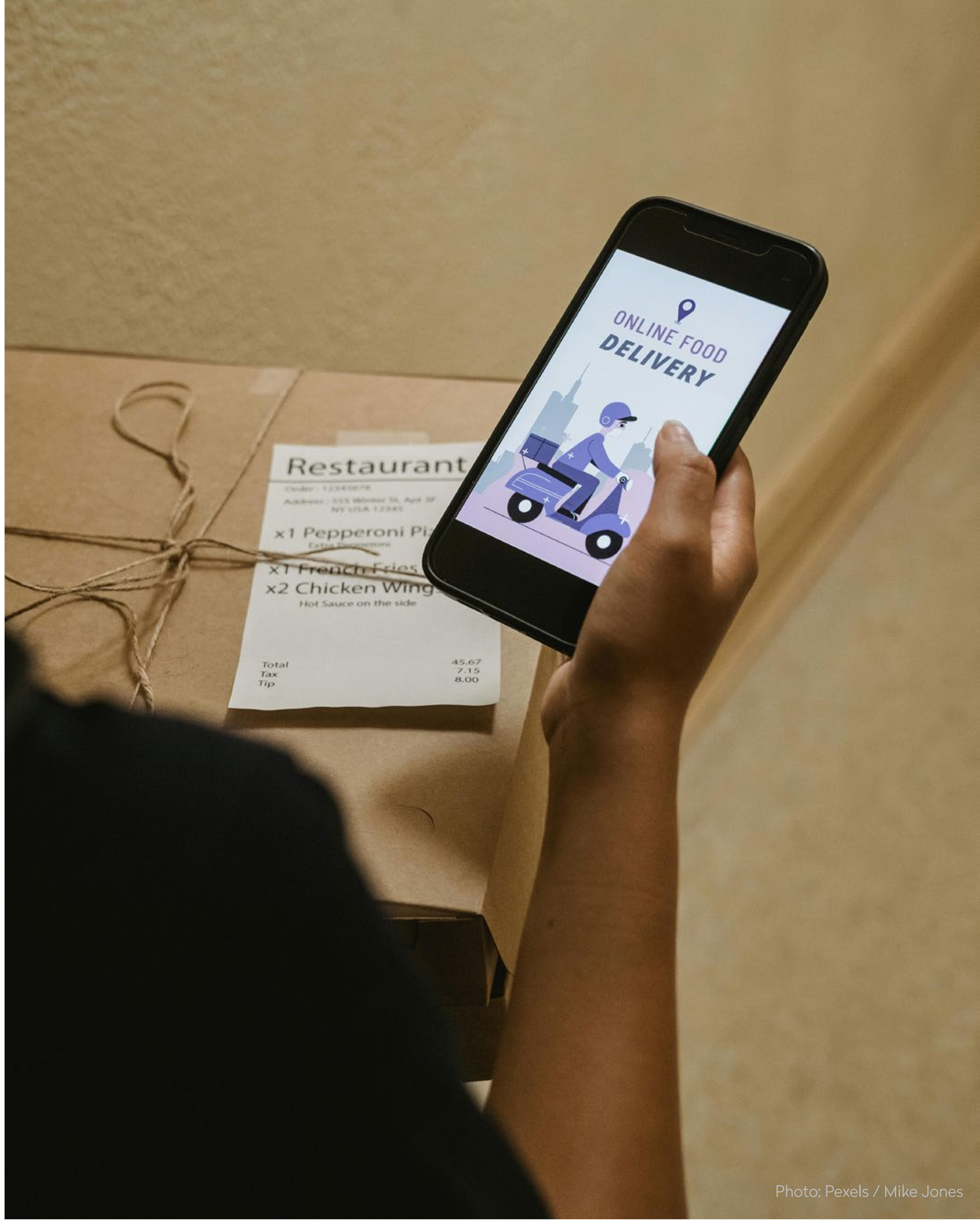
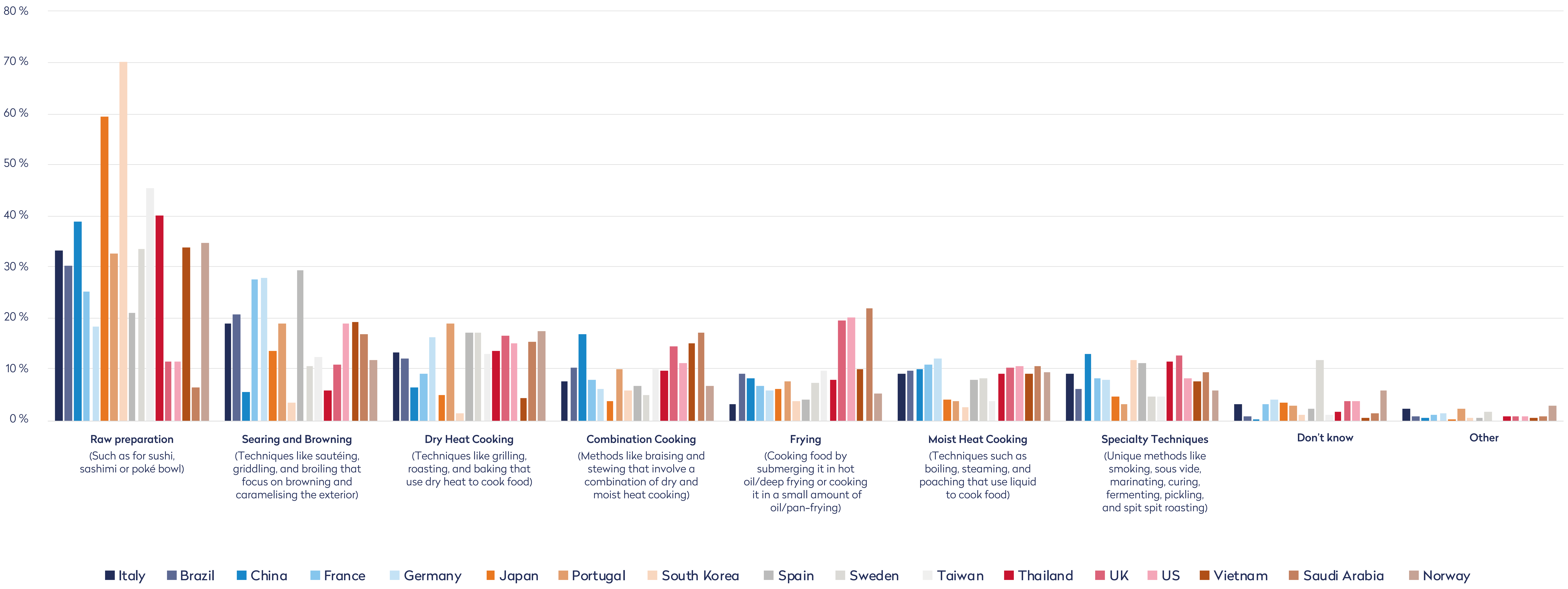


Photo: Pexels / Mike Jones

COOKING TECHNIQUES SALMON (OUT OF HOME, 17 MARKETS)



Chapter 6

The role of technology

Photo: Pexels

The role of technology

Greater efficiency is key to tackling many sustainability, waste and cost questions and these challenges are being advanced across the board by technology, particularly AI and machine learning. Innovation is revolutionising the industry from harvesting to production and distribution to better understanding consumer preferences[1]. It contributes to waste reduction and is being used to streamline the buying and selling process in a way that can ultimately result in better prices.

Photo: Autodesk / Emily Suzuki

1 British Journal of Nutrition, 2020; Frontiers in Sustainable Food Systems, n.d.; FDA, n.d.; Oceanic Society, n.d.; Pew Trusts, 2022; World Wildlife Fund, n.d.

Machine learning, coupled with computer vision, offers immense potential in analysing large volumes of data collected from fish farms for example, where it enables more effective and data-driven decision-making[1]. Innovative technologies like XpertSea's XperCount, which uses cameras and machine learning applied to computer vision, counts, sizes and weighs shrimp in a matter of seconds[1]. At Ava Ocean, technology allows the firm to identify scallops on the sea floor, harvesting without destroying the surrounding habitat[2]. Elsewhere, machine learning is being used to monitor fish growth and health in aquaculture[1].

It's not just private industry putting AI to work in seafood. The US Food and Drug Association (FDA) is also actively exploring AI use cases through its AI Imported Seafood Pilot programme[3]. A huge 90% of US seafood comes from abroad and the FDA is using the technology to examine the quality of these imports, looking through millions of seafood products to find any that may be contaminated by 'illness-causing pathogens, decomposition, the presence of unapproved antibiotic residues, or other hazards'.

And in retail, algorithms are being used to assess – and more crucially, predict – demand, streamlining inventories, making sure suppliers have what they need at the right times and minimising loss[4]. As well as using AI to analyse large chunks of data, some big retailers are using generative AI in their retail approach – something the seafood industry can learn from. According to *Forbes*, Amazon, Walmart and Target are using generative AI to personalise product recommendations and develop new products and services, optimise pricing and inventory levels and create targeted marketing campaigns.

1 Frontiers in Sustainable Food Systems, n.d.
2 SeaFoodSource.com
3 FDA, n.d.
4 LeewayHertz, 2023

The smartest smart stores

Although around for a few years already, retailers are increasingly adding smart supermarket locations. Around the world, firms from Amazon to Tesco to Hema Fresh are bringing digital and real-world concepts together to create new, exciting and engaging shopping experiences, where payments might be made through a dedicated app or simply taken automatically from a customer's account.

In China's Hema Fresh, smart technology means customers can scan QR codes on products to get more information – including when food items were harvested, where they were sourced from and when they were delivered to store. With a strong emphasis on domestic produce, this system also highlights locally sourced credentials. Payment can be made through the Hema app, while the in-store dining experience – staffed by robots – is a big draw. Customers can use the app to book a seat and order their food, before robots move items from the shelves to the kitchen and deliver meals when they're ready.

Photo: warehouse automation

Ethical AI

As revolutionary as AI and algorithms might be, they also come with risks, and it is essential to consider the broader societal impact of tech-driven retail. As algorithms shape consumer choices and influence market trends, we need to examine their impact on local businesses, smaller retailers and the overall economy[1]. Ethical considerations and transparency are paramount. To ensure these technologies align with human values and societal norms, systems must be designed with privacy, diversity, bias and more in mind.

Companies must be able to explain how their systems work, what data they use, what assumptions they make and what impacts they have. This enables accountability, trust, fairness, the protection of human rights and the mitigation of potential harms.

In recommender systems, for example, ethical considerations include ensuring that the system does not favour certain products or services based on biased data. Transparency can be achieved by explaining how recommendations are generated and what data is used. Data protection is essential, and consumers must be able to find out what data is being used where and how, as well as being able to opt out.

1 Marr, 2022; Sularia, 2023; Igini, 2022; Maiti, 2023

Photo: Jayesh Shinde / Trends in World

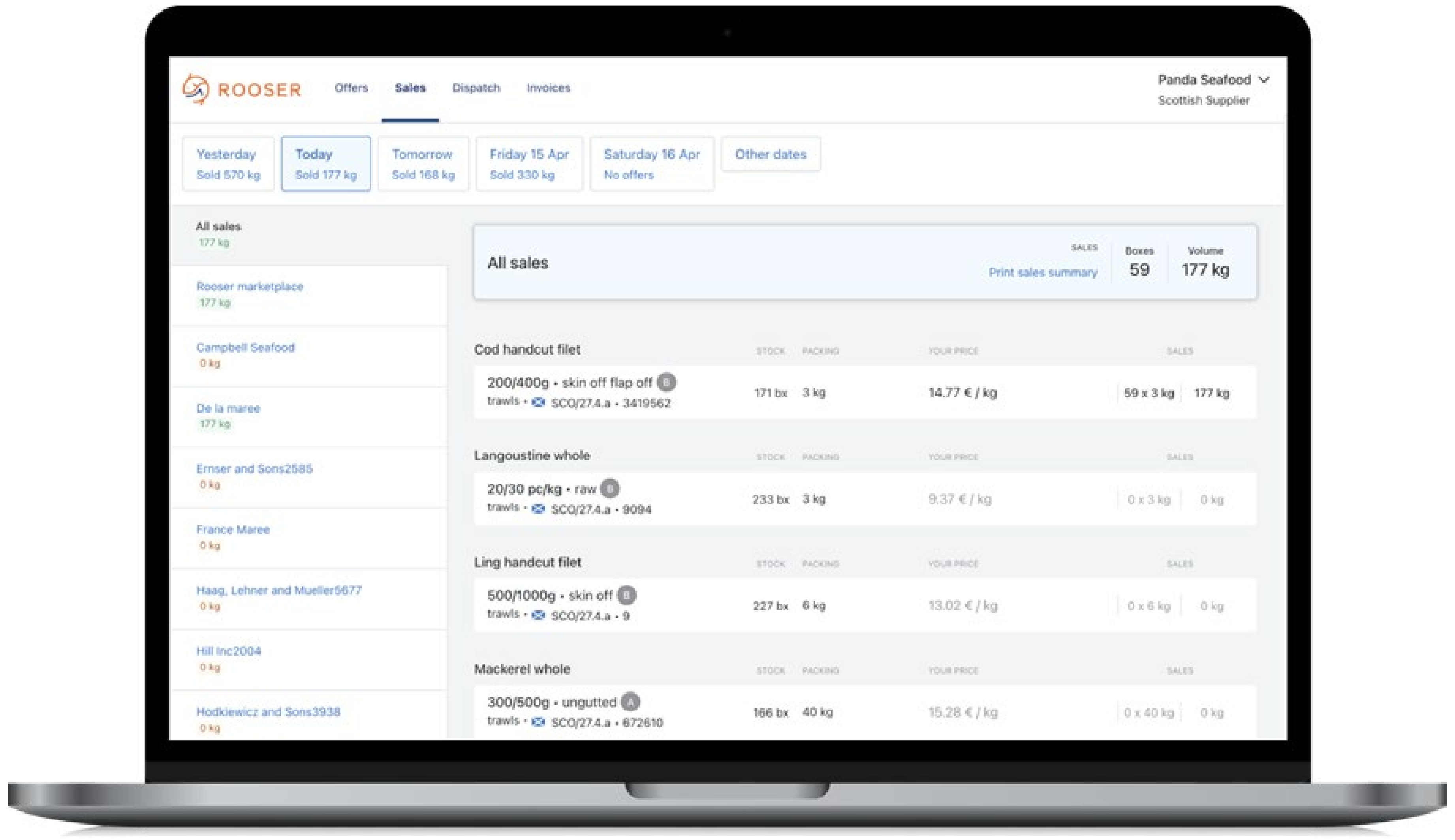


Photo: https://app.rooser.eu/

Outside of the buzz around AI, technology and data continues to drive innovation. Edinburgh-based Rooser is one example of where technology is bringing change on the B2B side, with the firm tapping into the 140,000-strong network that makes up the European seafood market through its seafood-trading platform that connects buyers and sellers across multiple countries.

Here again, technology and innovation links with sustainability and anti-waste themes. According to Rooser, one in three fish caught is never eaten. It views technology as a means to faster, more transparent buying and selling of seafood with the result that waste can be reduced. It has grand plans for traceability too: the company is looking to scale globally and connect all players in the worldwide seafood supply chain – down to individual boats and fisheries. The data harvested could be used to accurately track the carbon footprint of a piece of fish and improve its traceability for consumers. That data could then be used by governments to better manage fish stocks, according to *Wired*, which described Rooser as having the potential to ‘eventually become the Google Maps for the fishing industry.’

Photo: Gavin Mack

From scallops to urchins: precision harvesting based on data rather than luck

Anette Grøttland Zimowski
Chief marketing and communications officer, Ava Ocean

'The way we harvest wild seafood has not seen many genuine leaps in innovation in the past 150 years,' says Anette Grøttland Zimowski, chief marketing and communications officer at Ava Ocean.

'Change has largely been incremental, based on modifying and improving tried-and-tested fishing gear.'

These 'incremental' advancements had not been enough to protect the sea floor of the Barents Sea, however, and in 1993 the Norwegian government banned dredging, shutting down the scallop fishery.

Today, Ava Ocean is harvesting those scallops, having persuaded regulators that its award-winning, non-invasive technology makes the fishery both accessible and sustainable.

It does this by using its 'Ava Ray' seabed harvester to gently pluck seafood from the seabed.

Guided by multiple cameras and sensors, the harvester hovers above the seabed, using a precision water flow system to efficiently lift its target, explains Zimowski.

The advancements made by Ava Ocean are not just about technology but about a shift in mindset. 'The focus for [previous] technological improvements have been mainly geared towards improving efficiency' says Zimowski. 'It is only in recent years that environmental and ecosystem impacts have started to become a consideration to R&D in the industry.'

Describing Ava Ocean's seabed harvesting technology as 'unlike any other fishing gear in use today,' she says it allows the company to know 'exactly what you harvest, where you harvest'.

Already transformative, the firm is incorporating AI to further improve its precision techniques and reduce any impact on benthic[1] habitats.

'Fishing is, of course, absolutely possible without using AI,' continues Zimowski. 'But the increased knowledge means we will be able to make better decisions, both for the environment and the business.

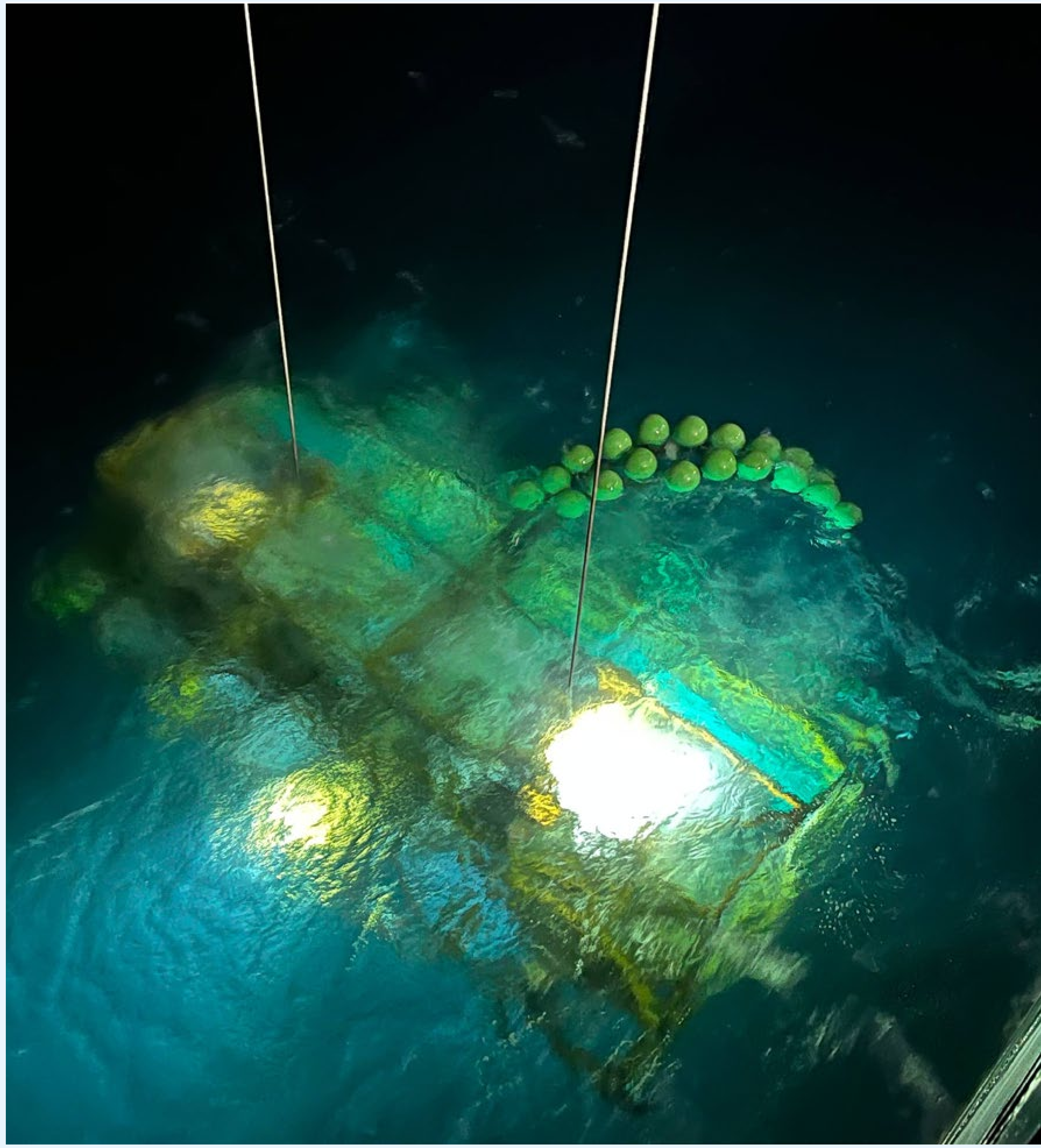
1 "Benthos, the assemblage of organisms inhabiting the seafloor. Benthic epifauna live upon the seafloor or upon bottom objects; the so-called infauna live within the sediments of the seafloor." *Encyclopaedia Britannica*

'Technology lets us move away from relying on fishing luck – casting the line and hoping for the best – and towards understanding and being able to responsibly harvest from these fragile and vitally important ecosystems.'

She recognises that, as knowledge about these habits grows, so too does the responsibility of fishing them, pointing out that Ava Ocean works closely with marine scientists to analyse everything the firm does. 'We still know so little about the intricate workings of the habitats we harvest from, and it will take time and research to begin to truly understand the impact of doing anything on the seabed,' she says, 'even with our gentle harvesting method.'

And the company is already looking outside the scallops fishery for where its 'scalable and highly adaptable' technology can be applied. 'In 2024 we will begin trials in other locations and for other seafoods, such as sea urchins and sea cucumber,' explains Zimowski.

In fact, Ava Ocean has NOK47 million in Green Platform funding from the Norwegian government to implement a 'groundbreaking' project that will see the company harvest an overgrowth of sea urchins in Northern Norway, with the goal of revitalising lost kelp forests while developing new products from the urchins it gathers.



Ava Ray 1. Photo: Ava Ocean

Artic Pearl Photo: Marius Fiskum

'Given Ava Ocean's sustainability credentials,
to what extent is that a driver for its customers?

Zimowski says that although 'sustainability and traceability are becoming more and more important to our customers,' price and supply remain a big draw.

'With a world in financial turmoil, price and availability continues to be of critical importance to most buyers,' she explains. 'Many consumers will still pay for superior quality and the knowledge that the food on their plate does not come from environmentally harmful fisheries, but it is a crowded space with a lot of tall tales and unsubstantiated claims.'

This only makes education all the more important, she continues. 'Even if they are environmentally conscious, most people have no idea how scallops are traditionally caught, or how harmful dredging is to seabed habitats. So, the job starts there, working with our customers B2B to educate and inspire.'

Chapter 7

The Internet of Things in aquaculture

Photo: aquaculture magazine

The Internet of Things in aquaculture:

Aquaculture is key to meeting sustainable seafood demand and a host of innovation is helping streamline processes and deliver better outcomes across the industry. Internet of Things (IoT) sensors in aquaculture have become increasingly important, enabling real-time data collection and analysis, allowing farmers to optimise their operations and better ensure the welfare of their fish.

IoT essentially supports 'smart fish farming' in a sector where growth takes place out-of-sight and underwater, making farming activity hard to monitor. Maximising yield via precision aquaculture is one of the main challenges that could be addressed through the addition of IoT technology, allowing:

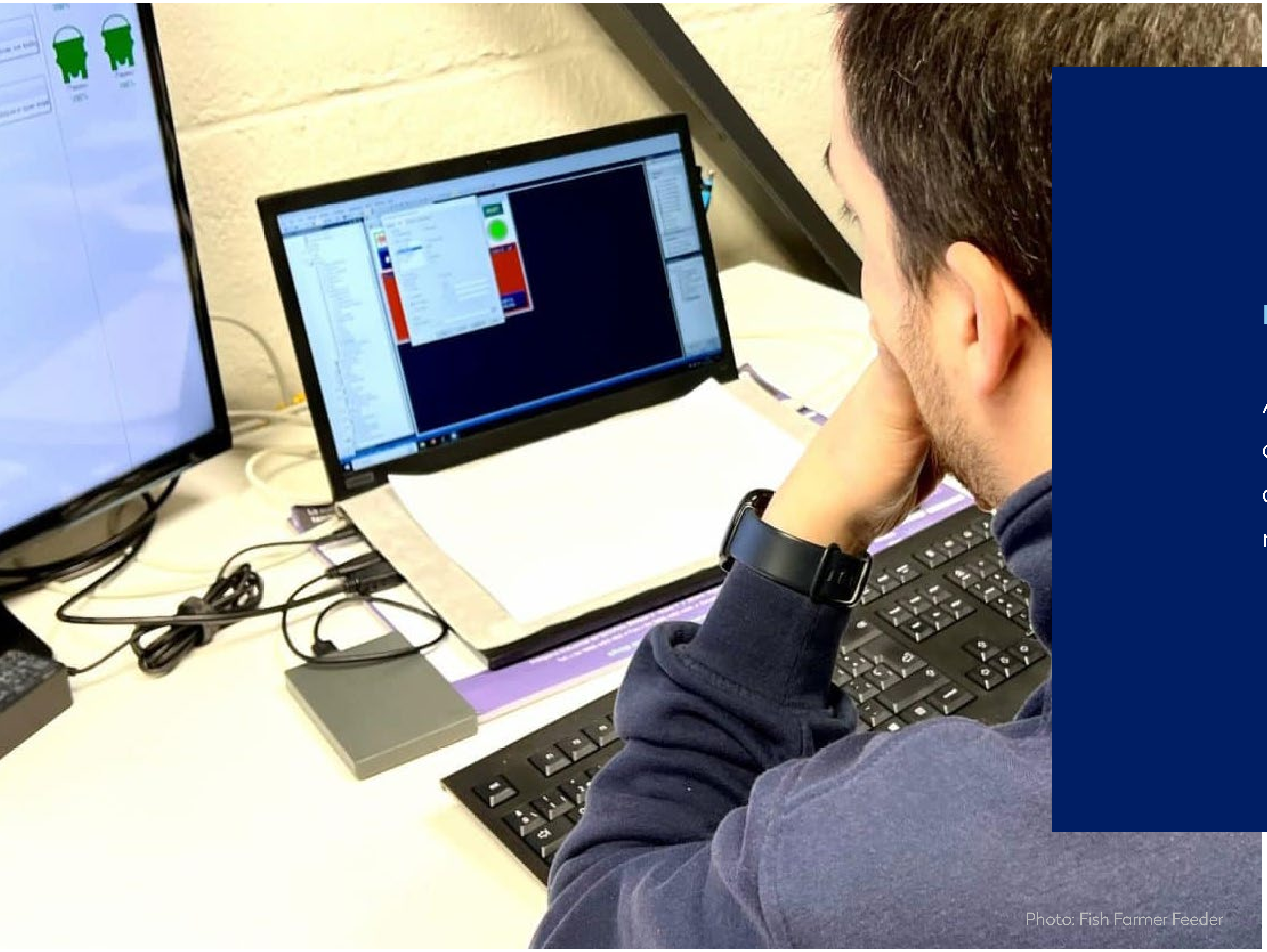


Photo: Fish Farmer Feeder

REMOTE MONITORING:

Aquaculture operations can be overseen and managed remotely. Farmers can access and control their IoT devices online, receiving alerts and notifications in case of any anomalies or emergencies, offering improved efficiency and productivity, as well as reducing labour and operational costs.

ROBOTICS AND AUTOMATION:

The use of robotics and automation can improve speed, accuracy and quality in aquaculture. Robots can perform tasks such as fish filleting, sorting, grading and packaging, with minimal human involvement, adapting to different types and sizes of fish gently and hygienically. Automation can also reduce labour and energy consumption, while increasing safety and profitability.

Salmon fillets on a conveyor belt. Photo: Tom Haga

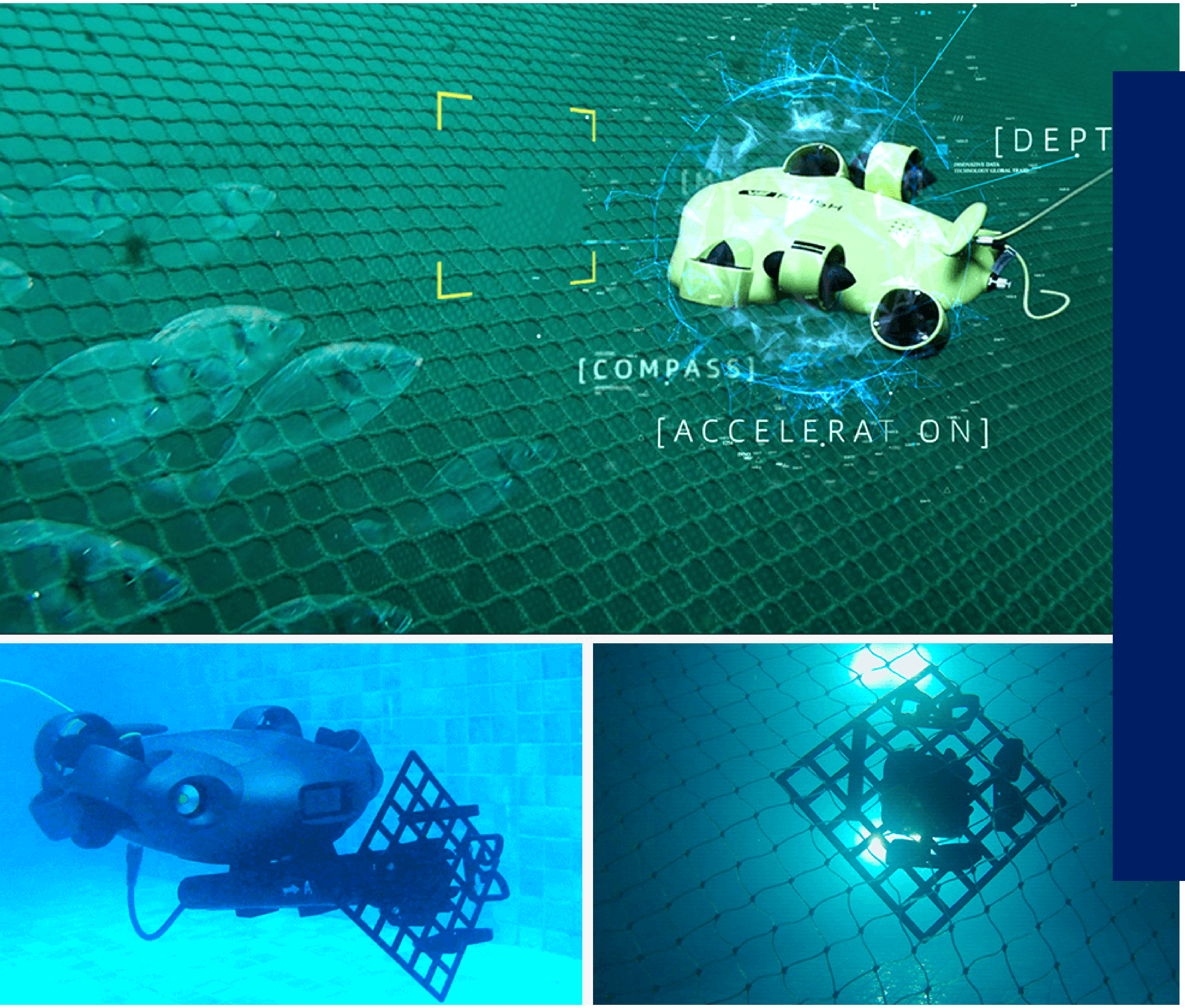


Photo: Daniel Liao

DRONES IN FISHERIES:

Drones have emerged as a valuable tool in fisheries management. Employed for surveillance purposes, they allow authorities to monitor fishing activities and enforce regulations effectively. Drones are also used for fish-stock assessment, providing valuable data on population size, migration patterns and habitat conditions, while playing a crucial role in monitoring illegal fishing activities and aiding in the conservation and protection of marine resources – particularly at offshore sites, high-risk or difficult to access locations.

Chapter 8

The rise of convenience – and snacking

Photo: Eatzis

The rise of convenience – and snacking

On the consumer side, technology has also been driving change cross the seafood industry at an increasing rate, with the use of everything from delivery apps to omnichannel services such as 'click and collect' becoming mainstream under the pandemic. These trends only served to accelerate the existing taste for convenience, which has grown into a huge segment across all reaches of consumer society – seafood included.

Today, people around the world can have sushi delivered in minutes, easily and quickly prepare a restaurant-quality dinner at home from a meal kit or snack on healthy, nutritious seafood on the go. In this chapter we delve into some of the trends within that convenience megatrend, which has seen the increasing introduction of high-end products, advancements that could elevate the humble frozen-fish dinner and traditional cupboard staples become TikTok sensations.

Photo: Pexels / Mart Production

The snackification of seafood

Busy lives, urbanisation and the rise of an on-demand culture has led to a global rise in snacking. According to the latest Mondelēz International research on worldwide snacking habits, more people are snacking more often. It also finds that younger consumers – Gen Z and millennials – eat more snacks per day: 3.5 compared to an average of 3.3 (which is up from 3.1 in 2013). Morning snacking has seen the biggest growth (a massive 42% increase from 2013 to 2021), while afternoon snacking is also up 22%. Meal skipping has also increased notably: in 2013, 30% of consumers said they 'skipped at least one main meal yesterday'. By 2021 that had climbed to 40% as lives become ever busier.

What does all this mean for seafood? Research by Euromonitor points to an increased focus on health in snacking – and the growth of fish jerky in the US is an example of where a healthier seafood alternative to an established protein snack can appeal. The big jump in morning snacking uncovered by the Mondelēz study also looked at the factors behind those 6:00am to 10:00am choices: to sustain and nourish, to energise and fuel. This is the big window for healthy snacks.

It is interesting that snacking has continued to grow even as consumers have increasingly moved online for their purchases. Euromonitor addresses this in its research: 'The demand for impulse will not be eradicated [by digital],' it states. 'Rather, there is a need for new fulfilment methods, hence digital advances and the emergence of new business models must be leveraged. Sales of snacks through e-commerce globally increased from $18 billion in 2019 to $30.5 billion in 2021,' it adds.

Photo: Carolina Widell

Canned fish for a 'beautiful meal'

Becca Millstein
Fishwife CEO

It was during the pandemic, regularly raiding the cupboard for tinned fish staples, that Becca Millstein and co-founder Caroline Goldfarb had a 'lightbulb' moment. Having spent time in Spain and Portugal, they saw a gap in the US market for high-quality canned fish, founding Fishwife in 2020 to bring the Iberian *conservas* culture to American consumers.

Photo: Fishwife

Photo: Fishwife

The pair recognised a growing appetite for easy, clean, simple foods among peers and Millstein points out that canned fish ticks a lot of boxes for these consumers. 'Tinned seafood is incredibly nutritious. It's packed with protein, omega-3, vitamins. Our products have a shelf life of four to six years and we don't need to plug in any preservatives to achieve that,' she says.

The canned fish grocery segment is worth more than $2.2 billlion in the US, she continues, with three big brands dominating around 80% of the market share. So 'it's not a new, unfamiliar concept. But at the same time, it hadn't been innovated in at all'.

Today, Fishwife sells products so beautifully packaged and of such a high quality that people give them as presents. You can sign up for a subscription, buy Fishwife merchandise and gift cards. It has been featured in *The New York Times* and *Vogue*. And the firm's smoked salmon, which comes from Kvarøy Arctic, is one of its best sellers, says Millstein.

Fishwife tries to source local, domestic products where possible, but the company was struggling to find a scalable smoked salmon supply chain in the US, when Kvarøy was recommended by an advisor. 'It was very clear that they had done all of the work and invested heavily in equipping themselves with basically every certification that a salmon farm can have: it's the first finfish farm to carry the Fair Trade USA seal, and is BAP, ASC and Global G.A.P certified.'

'Kvarøy is hell-bent on transparency and they're at the cutting edge of innovation in salmon aquaculture,' adds Millstein.

Partnering with such a knowledgeable company was part of the appeal too – particularly in the early days of Fishwife. 'Their website was such a wealth of knowledge, it made me feel really excited to work with them,' says Millstein. 'While I was a total newcomer to the seafood industry, this family had been farming salmon for three generations and could speak to it in such great detail.'

Today, that Kvarøy farmed salmon is sold as a three pack for $33 (around NOK360 at the time of writing). So who are the consumers paying that for tinned fish? While Millstein doesn't want to use the term 'price-insensitive,' the typical Fishwife buyer is late 20s to early 40s, single or partnered but without children.

'It's largely people that would probably love to cook fresh fish at home,' she says. 'But they work long hours, they're busy. They live in urban areas and they're looking to find ways to eat really high-quality protein very quickly and without a tonne of prep and a tonne of cleanup.'

So, despite the long shelf life being a key value proposition, these are often fast-convenience products that serve as part of a healthy mid-week meal as well as something to serve guests. 'Our average order is seven tins online,' says Millstein. 'We want you to eat five of them in the first month and keep two on hand for when you get home from work and you don't have any protein: maybe you have white rice and maybe some spinach but you can still make yourself a beautiful meal.'

While it hasn't been hard to convince current fans of Fishwife of its merits, Millstein acknowledges that expansion will depend on education to some degree. 'We're still in the early-adopter phase,' she explains. 'But next year, as we go nationwide into retail, we're going to lead more with the distinct value proposition of our products.

'Speaking on behalf of all high-quality tinned fish products, we need to transform everyone's understanding of their use cases, from mashing it with mayonnaise and spreading it on bread to putting it over a rice bowl or on ramen. Some people buy a salad that has no protein and open one of our tins, others serve our products straight from the can to their kids. It's a really fun education process because it's not a totally novel product, like mushroom jerky or even plant-based meat: this is canned fish!'

Ready-to-eat products and meal kits

Ready meals themselves are not necessarily something new, but there has been a notable increase in the quality of these meals, with a range of high-end options increasingly available. This has made the seafood offerings more appealing too, with a nod to quality and health as well as convenience.

Photo: Pexels / Kawê Rodrigues

Straight-from-fridge or freezer ready meals are distinct from meal kits, which saw a particular boom under the pandemic as restaurants carved out new ways to keep their businesses going. The rise of seafood-centric meal kits has handed consumers convenient and hassle-free dishes they can easily prepare at home[1], arriving with pre-portioned ingredients and easy-to-follow recipes, allowing even those with limited cooking skills to enjoy restaurant-quality meals, without the hassle of meal planning and grocery shopping.

Seafood meal kits in particular can be attractive because of their potential for calorie control and portion sizing – as well as the hint to luxury. As well as offering convenience and quality, this appeals to people on weight-loss programmes, while the ability to filter kit orders by ingredients caters to those with allergies or other specific dietary needs[2].

Distinct from the weeknight ready meal, meal kits offer something of a treat too. Examples of what you might be able to serve from a higher-end meal kit include Cajun shrimp and sweet pepper wild Alaskan salmon, spicy maple-glazed tilapia with fig and roasted vegetable rice or baked parmesan- and panko-coated salmon with squash and garlic kale. All this is often designed to be table-ready in around 30 minutes.

1 Insider1, 2023
2 Harvest of the Sea, 2023

Photo: Aleksandra Platonova

Frozen seafood innovations

Frozen fish has typically been thought of as a cheaper, potentially lower-quality or child-friendly option, but advancements in freezing technology are driving up both the taste and nutrient preservation of frozen seafood[1].

1 Frozen Foods Biz, n.d.; Seafood Harvest, n.d.

Photo: Food Infotech Magazine

One notable technology that has revolutionised seafood preservation is the Cells Alive System (CAS)[1]. Originally developed as a medical-grade technology for freezing stem cells, CAS is now being used to preserve the freshness of seafood. The technology generates a special magnetic field around the fresh food, comprising of pulsed magnetic fields, low-frequency waves and other types of weak energy. This causes water molecules within the seafood to vibrate, with the result that cell tissues remain intact during the freezing process[1]. By preventing degradation over long time periods, the technology also helps to reduce waste, linking back to sustainability once again.

Such advances in technology allow seafood producers to ensure the freshness, taste and nutritional value of seafood are maintained – something that can drive a shift in the image of frozen seafood to a higher-quality, though still just-as-convenient, product[2].

1 Frozen Foods Biz, n.d.
2 Frozen Foods Biz, n.d.; Seafood Harvest, n.d.

Chapter 9

The way we shop and eat

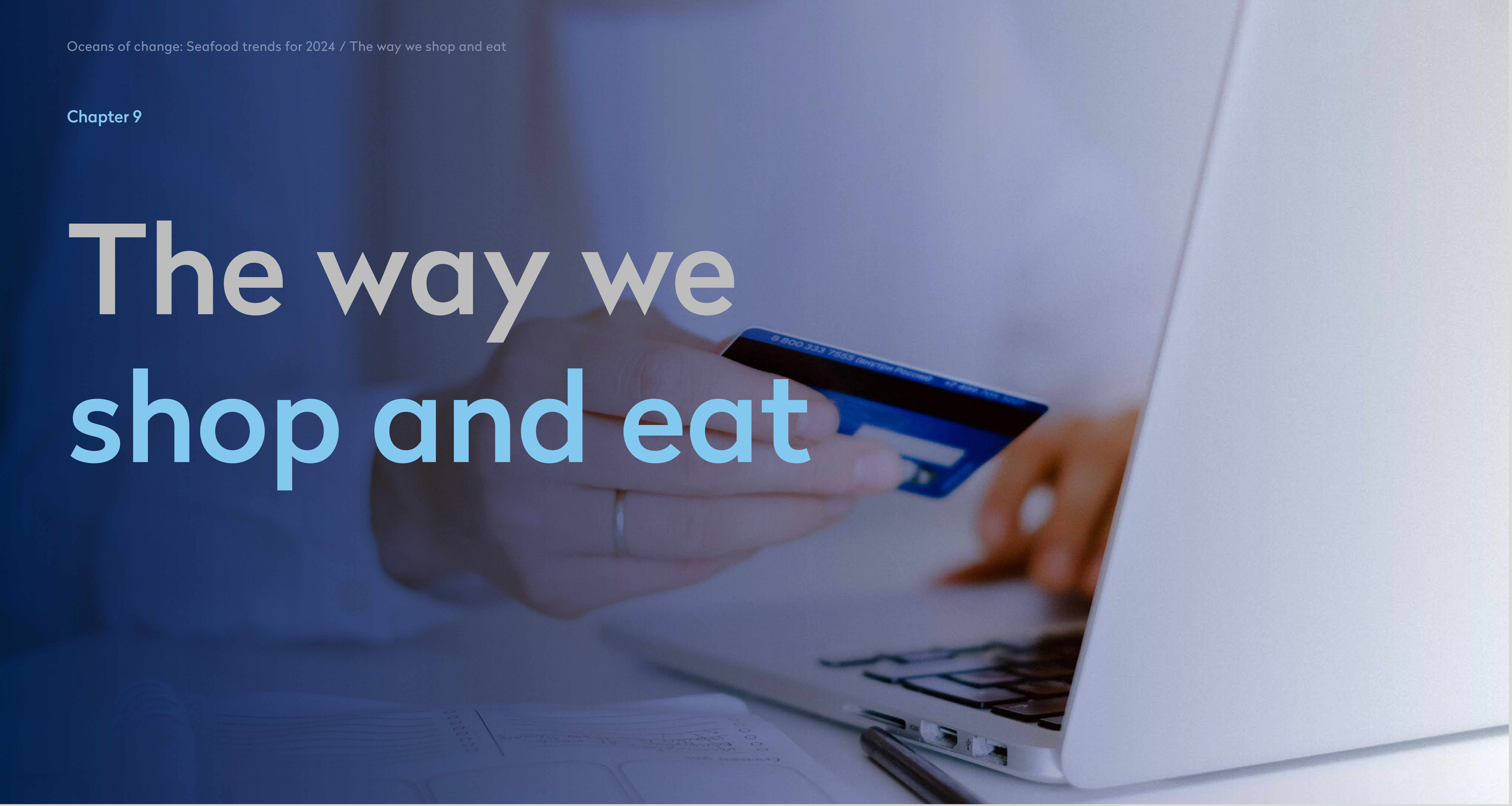


Photo: Pexels / Anna Shvets

The way we shop and eat

Another pre-pandemic trend that got a huge boost under Covid-19 is the online shopping and delivery market. Statistica analysts note that the 'market gained a great deal of traction from the pandemic,' with 'growth seen in almost every market' and a new phase opening up as aggregators like Just Eat Takeaway and Delivery Hero venture into the grocery delivery space.' Despite this, they warn that the sector comes with 'big risks' as 'quick commerce has yet to prove profitable'.

Photo: Pexels / PhotoMIX Company

Statistica expects the online food delivery market to reach $1.22 trillion in 2024, with a predicted compound annual growth rate of 10.06%, resulting in a projected market volume of $1.79 trillion by 2028. It also expects grocery delivery specifically to reach a market volume of $790 billion in 2024, with revenue growth of 20.3% the following year. Meal delivery is another sub-segment that is enjoying continued growth, with Statistica predicting the number of users to hit 2.5 billion by 2028.

Across these segments, China and the US are leading the way with their 'large consumer bases and robust delivery infrastructures'.

While the pandemic certainly added new numbers to these trends, the drivers behind the continued growth include convenience – again – attracting a premium as people lead increasingly busy lifestyles. In some markets though, the way that people's lives – and homes – are structured already lends itself quite naturally to a smaller purchase pattern.

As well as general grocery or meal delivery options, where consumers can buy fish at the same time they buy eggs or milk, or have a seafood ramen delivered alongside a fried chicken dinner, new apps and platforms are increasingly offering direct-to-consumer options specifically for seafood. In Singapore for example, a whole host of online seafood options are available, from market stalls with a 60-year history now offering online ordering, to high-end, former restaurant-only suppliers, to others promising same-day harvest and delivery. Yet others offer 5-7cm, boneless cuts designed to appeal to children.

In the UK, Dockside Seafood is one of a growing number of omnichannel seafood retailers. Founded in 1980, the Fleetwood Docks firm has a fishmongers and preparation warehouse that is open to the public seven days a week. Twenty years ago, it expanded into the wholesale business and today it also offers fresh and frozen fish and seafood online – as well as fish boxes, condiments and recipe inspiration.

In the US, Wulf's Fish has grown from a fishmongers established in 1928 to a national brand shipping a wide range of products from arctic char to bluefin tuna, cod to hiramasa kingfish, crab and lobster to octopus and squid. It offers gift cards, selection boxes and regular customers can build their own subscriptions. You can get a 'refer a friend discount' or even become an affiliate.

Another US option is Blue Circle Foods, which offers fillets as well as child-friendly online fish options – with a leaning towards more salmon products – using fillet offcuts to create salmon sausages and hotdogs, burgers and 'happy fish' (essentially fish-shaped fish fingers). Customers can get a 15% discount on first orders by signing up to the company newsletter.

Many of these options blend physical with online, offer food inspiration and education – and connect with customers on social media: Blue Circle for example has more than 17,000 followers on Instagram alone.

THE COST OF DELIVERY

Alongside a growing sector of independent suppliers moving to online are examples of global behemoths finding ways to join forces with smaller companies. With an increased focus on minimising delivery waste and cutting emissions, Amazon, for example, has launched a new programme called Amazon Hub Delivery, which aims to create opportunities for small businesses to deliver packages and earn additional income[1]. The programme, which launched in June 2023, involves Amazon dropping off packages to small businesses, such as florists or autobody shops, who then deliver them to local customers[1].

1 Entrepreneur.com, 2023

Chapter 10

Gen Z: Shaping the future of seafood

Photo: EcoMatcher / Bas Fransen

Gen Z: Shaping the future of seafood

It's easy to forget that while the youngest of the Gen Z cohort turn 12 this year – entering an age where they are developing their world views and values – the eldest of this generation turns 27. Rather than the consumers of the future, Gen Z already wields purchase power. So how do these shoppers view seafood?

Gen Z is at the forefront of a shift to sustainability and ethical consumption movements. A generation that includes Greta Thunberg and that has grown up under the spectre of climate change, it holds the potential to shape the future of seafood.

In recent years, Gen Z consumers have gained recognition for their strong environmental consciousness and social responsibility – attributes they bring to their purchasing power and their seafood choices, with an emphasis on sustainable sourcing, fair trade and companies that demonstrate a commitment to ethical practices. But it appears this generation also lacks understanding around the issues it cares about.

Photo: Pexels / fauxels

A study conducted with Gen Z students in Italy sheds light on their perspectives regarding the sustainability of seafood production and consumption. The research revealed a range of sustainability profiles, from highly sensitive and aware to relatively insensitive and unaware. Surprisingly, the study found that environmental consciousness did not directly correlate with the frequency of sustainable seafood consumption. Instead, students expressed a preference for solutions such as the creation of marine protected areas and the use of new or discarded species to meet future seafood supply and demand[1].

In the US, other research also focused on the attitudes of Gen Z to seafood. Researchers found that location – and proximity to or experience of fishing activities – impacted taste and opinions. On the issue of sustainability though, a 'commitment to sustainability' emerged as a central theme, with participants consistently highlighting the importance of sustainable seafood practices. They expressed concerns about overfishing, habitat destruction and the need for stricter regulations within the industry.

Photo: Norwegian Seafood Council

1 Forleo et al., 2023

"This generation's identity has been shaped by the digital age, climate anxiety, a shifting financial landscape, and Covid-19"

Despite their strong inclinations toward sustainability, participants acknowledged barriers such as the complexity of seafood regulations and their limited knowledge im making environmentally conscious choices. Researchers say the finding 'emphasises the need for accessible information and educational initiatives to empower Gen Z to make informed decisions.

Research by MSC in Australia came to similar conclusions in 2020 when it found that while Gen Z members were 'overwhelmingly concerned' (88%) about the availability of seafood for their children and grandchildren, education was needed to improve understanding around sustainability. Some 86% of young Australians admitted to finding it hard to know whether their seafood is sustainable or simply did not know what sustainable seafood is. In fact, 65% believed schools and universities could do more to educate around climate change and its impact on the ocean.

The influence of social media in shaping Gen Z perception and awareness about seafood issues cannot be underestimated. Gen Z is the first generation to be true 'digital nomads,' according to McKinsey, which conducts annual research into the broad preferences and habits of this group. 'This generation's identity has been shaped by the digital age, climate anxiety, a shifting financial landscape, and Covid-19,' writes McKinsey, in its 2023 analysis.

ACCORDING TO MCKINSEY'S LATEST GEN Z RESEARCH, SOME KEY ATTRIBUTES OF THAT GENERATION INCLUDE:

- **Digital comfort:** These digital natives often turn to the internet when looking for any kind of information, including news and reviews prior to making a purchase.
- In Asia, Gen Zers spend six or more hours per day on their phones.
- TikTok currently rules trends, feelings and culture for Gen Zers, who make up 60% of the app's one billion-plus user.
- **A pessimistic generation:** Feelings of 'climate anxiety are widely reported [with] many Gen Zers reporting that they think about the fate of the planet on a daily basis
- They are already seeing decreased economic opportunity and don't assume a social safety net will be there to catch them as pensions shrink, saving for retirement gets more difficult and the older population grows.
- Fifty eight percent of Gen Zers report not having a basic social need met (including income, employment, education, food, housing, transportation, social support and safety) – the largest percentage by far of any generation.
- They are generally more pragmatic [than millennials], with both complicated idealism and worries for the future. Gen Zers dream of personal career fulfilment but expect economic struggles.

- **Climate consumerism:** Gen Z is generally known for its *idealism* – they're part of a new wave of 'inclusive consumers' and socially progressive dreamers.

- Gen Zers believe in doing their part to help stop the intensification of climate change and to establish greater equity for all.

- More than any other generation, Gen Z collectively demands purpose and accountability.

- Climate change is one of the issues Gen Zers cares about most. They frequently call for reform on personal, public, and global scales to prevent future catastrophe. Many Gen Zers describe themselves as environmentally conscious, and the majority of Gen Z expects to see sustainability commitments from companies and organisations.

- This doesn't necessarily apply when it comes to fashion however. One Gen Z staple shop, Chinese fast-fashion giant Shein, adds 6,000 new products to its website per day. This may seem at odds with the generation's values of sustainability, but the speed at which Gen Z trends change and their desire for unique style can sometimes overcome their eco-scruples.

- Members of this generation care about ease of use: mobile pay, app-based services and simple online transactions are important. Brands have found major success by restructuring to suit Gen Z tastes.

- Gen Zers like brick-and-mortar stores more than millennials do but still want a great online shopping experience. Some brands have found success through online-first launches, often supported by Gen Z consumers.
- Ads are everywhere; Gen Zers experience brands 'at every moment' as they move through their digital and physical worlds.
- In the US, 40% of Gen Zers admit to being influenced online, often by the brands featured in the videos they watch.

McKinsey summarises that Gen Zers often choose brands that have a strong story or purpose, as well as those committed to green practices. It points to another McKinsey study, where almost three quarters (73%) of Gen Z reported trying to purchase from companies they consider ethical, and nine out of 10 believe that companies have a responsibility to address environmental and social issues. However, they also say they can tell when a brand is simply paying lip service and failing to back up diversity or sustainability claims with real change.

Chapter 11

Social influencers

Photo: Pexels / cottonbro studio


Photo: Quasa

Social influencers

A month after being invited by NSC onboard Ava Ocean's Arctic Pearl vessel, a video posted by *fishfluencer* Jimin to his Korean-language YouTube channel had more than 154,000 views. Another 17-minute video – this time focused on Norwegian mackerel – amassed almost 2 million views in a year.

Jimin enjoys some 1.4 million subscribers to his jiminTV YouTube channel, pointing to just how far the reach of social media in seafood can be – something that firms are increasingly taking note of.

In January 2023, IntraFish reported that 170-year old Gorton's had enlisted a team of eight influencers to promote a new air-fried shrimp offering. Gorton's itself already had 139,000 followers on TikTok, but it brought in influencers including Chef Ced (358,000 followers and 6 million TikTok likes) and Allysa in the Kitchen (470,000 followers, 12.9 million likes) for its product launch – further extending the reach of a product particularly likely to appeal to younger consumers.

It's not all upside however. Social media can be risky too. In 2021, the Australian Fisheries Research and Development Corporation warned that campaigns on platforms such as Facebook and Twitter posed a reputational risk to the country's budding aquaculture industry.

'A threat that needs to be addressed is consumer disruption from social media influencers that can pose reputational risks to markets,' the corporation said in a submission to an enquiry examining ways to boost the Australian aquaculture industry.

'[The disruption] can reduce community confidence and support for the aquaculture industry based upon inaccurate information.' News outlet ABC noted that criticism online – in particular of the Tasmanian salmon farming sector – had boomed following the publication of *Toxic: The Rotting Underbelly of the Tasmanian Salmon Industry* by Booker-prize-winning author Richard Flanagan in April that year.

While social media certainly is an influencer of opinions and purchases, the degree to which people use social media before going on to buy fish and seafood – online in particular – varies.

NSC asked consumers about their online touchpoint's pre-webstore, which gives us a view into one way in which people are consuming information online with a path to buying salmon. Although figures vary – and are typically not above 20% of respondents, with a few mostly Asian exceptions – by far the most common pre-purchase touchpoint online is searching for recipes on the internet: the top answer in the majority of the Deep Dive markets. The outliers are Brazil, South Korea, Thailand, Taiwan and Vietnam where anything from 21% to 49% (Thailand) say they watched a video online, such as on YouTube. Top two and three touchpoints include being prompted by online advertising (banner ads or pop-ups for example), seeing a message, picture or group on social media or visiting a product review website.

Photo: Liza Summer

Chapter 12

An eye on Asia

Photo: Pexels / Zhu Peng

An eye on Asia

Many of the trends we talk about in this report are more well-developed in certain Asian markets. E-commerce is an example, with one NSC country director commenting that they couldn't go back to shopping offline now they've lived with the advanced delivery options available in their host country. Social commerce and in-app shopping are also well-established in certain Asian markets.

A lot of lessons can be learned from these examples. While we grapple with questions around trust when buying seafood online for example, elsewhere, others are ordering fresh salmon online without having even meant to do so – simply stumbling across a livestream while browsing videos on social media, clicking and buying. In this chapter, we hear from NSC representatives embedded in China, South Korea and South East Asia (Thailand specifically but with a regional scope) to find out more about the trends that are shaping seafood consumption in Asia – and that might shape the future of seafood consumption in other markets in the future.

China's Little Red Book: An infrastructure for trust

Andreas Thorud
NSC's country director in China

'Atlantic salmon had a record year in 2023 – both in terms of volume and value,' says Andreas Thorud, the NSC's country director in China until april 2024, when Sigmund Bjørgo took over. He says this to make the point that even in economically challenging times – and 2023 was a year in China that was viewed as 'not the best, economically speaking' – the news and the numbers don't tell the whole story.

'Consumer confidence is something to look at in terms and how spending power might affect people going out to restaurants or, for instance, how it might impact the buying of high-end species,' he adds, 'but we should be careful not to generalise too much.'

China is, of course, a huge market. Its four original 'tier one' cities – Beijing, Shanghai, Guangzhou, Shenzhen – had a 2021 combined estimated population of 75 million. The 15 'new' tier-one cities add another 122 million people, while the 30 tier-two cities have a combined population of 218 million. China has a rich and long history of aquaculture and wild fishing, and Thorud points out that the majority of seafood consumption comes from the domestic market, while a big chunk of imported seafood consists of warm-water shrimp, brought in to fill Chinese demand.

Still, Thorud describes the market – in particular when it comes to imported seafood – as 'very dynamic'.

'There is an inherent curiosity among consumers to try new things, which we also see in the seafood space,' he explains. 'That's very encouraging in terms of developing China as a seafood market,' he adds, describing China as 'one of the most exciting growth markets for seafood'.

This curiosity extends to new species, though Thorud says these often need to be incorporated through existing domestic tastes. It extends to the way people buy as well, with China a trailblazer in e-commerce and social commerce too – offering exciting opportunities for Norwegian seafood. 'We did some research back in 2022, where we looked at the Chinese consumer journey for imported seafood,' he explains.

Although often grouped together, Thorud explains that 'social commerce is very different to e-commerce, where you go in with a clear objective of buying something'.

With social commerce, you might be browsing Douyin – the Chinese version of TikTok – scrolling through videos and content you like. 'Suddenly, you come into a livestream room where fresh salmon is being promoted. You put it in your shopping basket and before you know what happened, it's arrived the next day'.

Thorud explains that although the NSC in China has typically focused on B2B – an area it continues to work with of course – it has had success in consumer channels in recent years.

As well as social commerce and more 'traditional' online shopping, Thorud talks about China's Little Red Book App (Xiaohongshu) – a marketing app that has become the go-to for consumer reviews and that he says describes itself as 'Instagram, Pinterest and Amazon in one'.

'If you came to Shanghai and gathered 10 people aged 25 to 45 around a table, and asked where you should buy Norwegian salmon in Shanghai, I'm sure nine out of 10 will look on Red rather than Baidu (the equivalent of Google). Red is where consumers go and read, view and talk about things, where you see a lot of human-to-human marketing,' explains Thorud.

'In 2023, we had a very successful strategic collaboration with the Red platform, working with various types of users – key opinion leaders, key opinion consumers.' Those collaborations generated more than 390 posts and an incredible 15 million views across various articles.

Apps like this help build the trust that allows people to try new things, to buy online or through social channels – even when they haven't set out to buy anything at all. 'It's like an infrastructure for you to verify whether or not something is dependable,' says Thorud.

Origin increasing in importance: Inside South Korea

Mia Sætre Bernhardsen

NSC's country manager in South Korea

'There is an opportunity in the increased focus on origin in the region,' explains Mia Sætre Bernhardsen, South Korea country manager for the NSC, talking about how concern over ocean pollutants in particular has galvanised both quality – and safety – minded consumers in Korea.

‘Green consumers are even more conscious about where their food comes from,’ she explains, adding that this is ‘a real opportunity for the Seafood from Norway mark, for that stamp that shows this food comes from somewhere far, far away, from very cold and clear waters.’

A dynamic and fast-paced market, an expectation among Korean consumers that the industry will ‘continuously innovate and develop new products’ for consumers, offers further potential for Norwegian exporters.

‘We’re often asked what Norway can offer besides salmon and mackerel,’ explains Bernhardsen. ‘Koreans are interested in all kinds of species: whitefish, pelagic species or shellfish. And there’s a lot of diversity around a single species like mackerel for example. In Norway, if you eat mackerel, you probably eat it one way: in tomato sauce on bread. But in Korea, there are many different ways to eat it.’

Even with a taste for new products, mackerel in particular remains a staple seafood. So much so that the government eased import tariffs on mackerel (as well as cuttlefish and some other products) last year in a bid to control inflation.

Photo: Barker, Lee - Seafood

An innovative solution to the demand for new products amid rising costs, is a boom in sauces. Bernhardsen points to sauces – from teriyaki to soy sauce to different kinds of spices – as an easy and expanding way to deliver new tastes, without necessarily adding new species. 'That's interesting to see,' she comments.

What many of the new products on offer have in common though is a focus on convenience. A new sauce might be added to a ready-made product for example, microwaveable products appeal, while there's also innovation in child-friendly salmon fillets, which use offcuts too small for a grown-up portion.

South Korean seafood choices are also increasingly influenced by a fast-paced lifestyle and the country's changing demographics.

Bernhardsen talks about a generational shift away from the choices of older people as well as an increase in single-portion seafood options, catering to the growing number of single-person households: by 2030, some 42% of the population is expected to live alone.

'That has an impact on the kind of products people buy and how they shop. And it is a big change from the traditional family structure.' Even the focus on convenience is very much shaped by the modern Korean way of life. Talking e-commerce, something that is incredibly advanced in the country, Bernhardsen notes how 'Korea has a clear advantage of logistics'.

'This is a very small country that is highly urbanised, so it has a totally different logistical set up than most other countries,' she explains. And a reliable cold chain is essential if you want to build trust in buying seafood online.

Advanced logistics and this reliable cold chain means companies can offer quality products, continues Bernhardsen, though she adds that it's important to understand that the high levels of trust Koreans have in their digital seafood choices are not something that happened overnight.

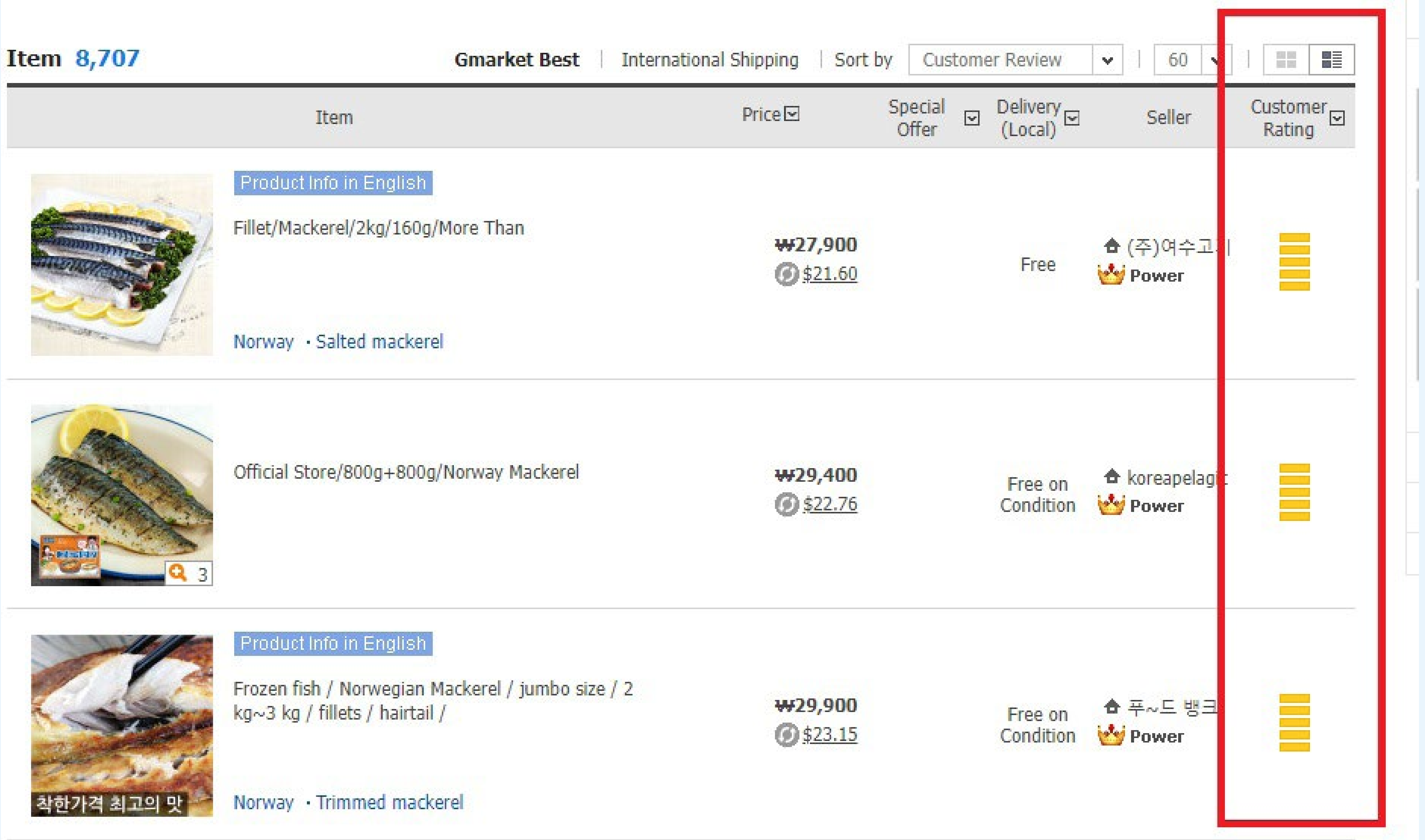


Photo: Gmarket

‘Another factor is that many Koreans started out buying frozen products online and that’s something we continue to see,’ she explains. ‘I think that, as a consumer, there is greater confidence in a frozen product when buying online.’ Mackerel remains an example of something that is commonly sold frozen in e-commerce – much more so than fresh salmon.

A third trust factor comes back again to particularly Korean traits. ‘People are very honest here,’ explains Bernhardsen, so when a seafood e-commerce product has 20,000 reviews, consumers can feel really confident that this is a good product. The reverse is also true: ‘If you make an error and deliver a product that is of lower quality, people will know.’

As a host of K-pop bands ride the K-wave of cultural appreciation, what elements of the Korean seafood market does Bernhardsen see as most likely to be exported elsewhere? For her, it’s all about e-commerce and convenience. But she’d like to see mackerel become more popular too. ‘Today, it’s basically Korea, Japan, China and Taiwan that really eat a lot of mackerel,’ she notes. ‘But it’s a favourite dish here, so maybe the K-wave can bring mackerel to more people.’

From up-and-coming markets to halal certification: Diversity in South East Asia

Asbjørn Warvik Rørtveit
NSC's country director in South East Asia

'We expect Vietnam to be the next Thailand,' says Asbjørn Warvik Rørtveit, of the NSC, talking about the country he sees as the 'up and comer' in the region. 'It has a very young population – a median age of 33 years – and it has just passed 100 million people.'

As director for South East Asia, Rørtveit oversees dramatically different markets: Singapore and Malaysia, 'both mature, steady markets, though Malaysia imports more trout than salmon.' Thailand, which has increased a lot in the past decade and is still growing, and Vietnam – 'which is growing faster'.
In Thailand, where Rørtveit is based, he

says trends in superfast online and app deliveries, coupled with typically smaller living spaces, means people shop in a different way than they do in the US or Europe. ‘In Thailand, we’ve seen a massive growth in online shopping, and you can have all kinds of food – or anything really – delivered to your doorstep in just in a few minutes,’ he explains.

‘That changes how a lot of consumers do their shopping. Also, people often live in small apartments so to do a massive grocery shop as we do in Europe just doesn’t seem very relevant to them. People shop for what they need at the time – getting everything, including seafood, delivered.’

Photo: Pexels / Ingo Joseph

Photo: Mark Wiens

The Thai modern retail model is also quite small, he adds. Traditional markets remain important – but where big stores do pop up, Rørtveit says they offer a 'sophisticated' consumer experience with a wide range of products, an equally wide price range and, often, options to have the food you just bought prepared in-store.

Elsewhere in the region there are the 'promising markets of the Philippines and Indonesia,' where Rørtveit says there is huge potential – but challenges too.

While there's hope for growth in the Indonesian market for example, a new rule requiring halal certification for all food imports is set to come in this year, potentially complicating the outlook. 'We don't know yet how it will play out or what kind of obstacles this will create,' says Rørtveit. 'There's a lot of uncertainty and it could be something that hinders exports to Indonesia.'

With the NSC keeping a close eye on developments, Rørtveit notes the global demand for salmon means that 'to fight into a market – where there is potential, but access is sub-par – feels unnecessary'.

Conclusion

Photo: Pexels / Pixabay

Conclusion

Some years a single trend drives the path of the seafood industry. In 2024, it is a handful of converging trends that influence and push each other along: technology, innovation, sustainability and the cost-of-living-crisis to name a few. The seafood industry can use technology to streamline processes, saving money and potentially making products more affordable to consumers. As well as offering the potential to cut waste and costs, innovation also addresses many of the questions around the sustainability of fish ans seafood as an essential – and increasingly important – source of protein.

Why do consumers continue to add fish and seafood to their shopping backets in a cost-of-living crisis? While taste, tradition and the general appeal are obviously big factors, an overarching theme is health: a focus on living longer, better and the avoidance of ill-health. Fish and seafood was always the healthy choice, but that healthy lifestyle was further thrust into the spotlight under Covid-19 and has become a lasting legacy of the pandemic.

Photo: Pexels / fauxels

As finances are squeezed, people do look to alternatives to save money – they might switch store, look for coupons and discounts or simply eat more often at home, a trend that is certainly expected to continue into 2024. What is clear though from NSC research is that they don't want to compromise on quality. NSC research also points to a continued focus on sustainability issues, even as prices rise.

What this report highlights is a pivotal transition – from traditional practices to a more sustainable, technology-driven approach, reflecting a broader societal shift towards environmental stewardship and health-conscious consumption. The spotlight on sustainable aquaculture and the emerging role of AI underscores a vital movement towards innovation, aiming not only to meet the burgeoning global seafood demand but also to address the pressing challenges of ecological balance and resource conservation.

As we look to the horizon, it's evident that the seafood industry stands at a crossroads. The path forward requires a blend of consumer awareness, industry adaptation and regulatory foresight. This journey offers immense opportunities for stakeholders to redefine the norms of seafood production and consumption, aligning them those of a rapidly changing world. And we are already seeing examples of companies innovating in shopping segments that have stagnated or firms delivering oceans solutions that reopen long-closed fisheries.

Photo: Pexels / ThisIsEngineering

As the pace of change speeds up – and the solutions enabled by technology to answer the big questions facing the seafood industry grow – this report becomes a clarion call for a collective stride towards a future where the bounty of the seas is harvested responsibly and sustainably, ensuring the well-being of our ecosystems and communities alike. This is the future of seafood. It is a future that demands our concerted effort, creativity and commitment.

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Photo: Norwegian Seafood Council

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Photo: Norwegian Seafood Council

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