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EUROPEAN SEAFOOD ECONOMY SUMMER SCHOOL 2018

Horizon 2020 Programme

THE SEAFOOD VALUE CHAIN

7 August 2018

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UNIVERSITY of STIRLING

Institute of Aquaculture

PrimeFish Team & Contributors

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Institute of Aquaculture UNIVERSITY of STIRLING

BE THE DIFFERENCE

Value Chains

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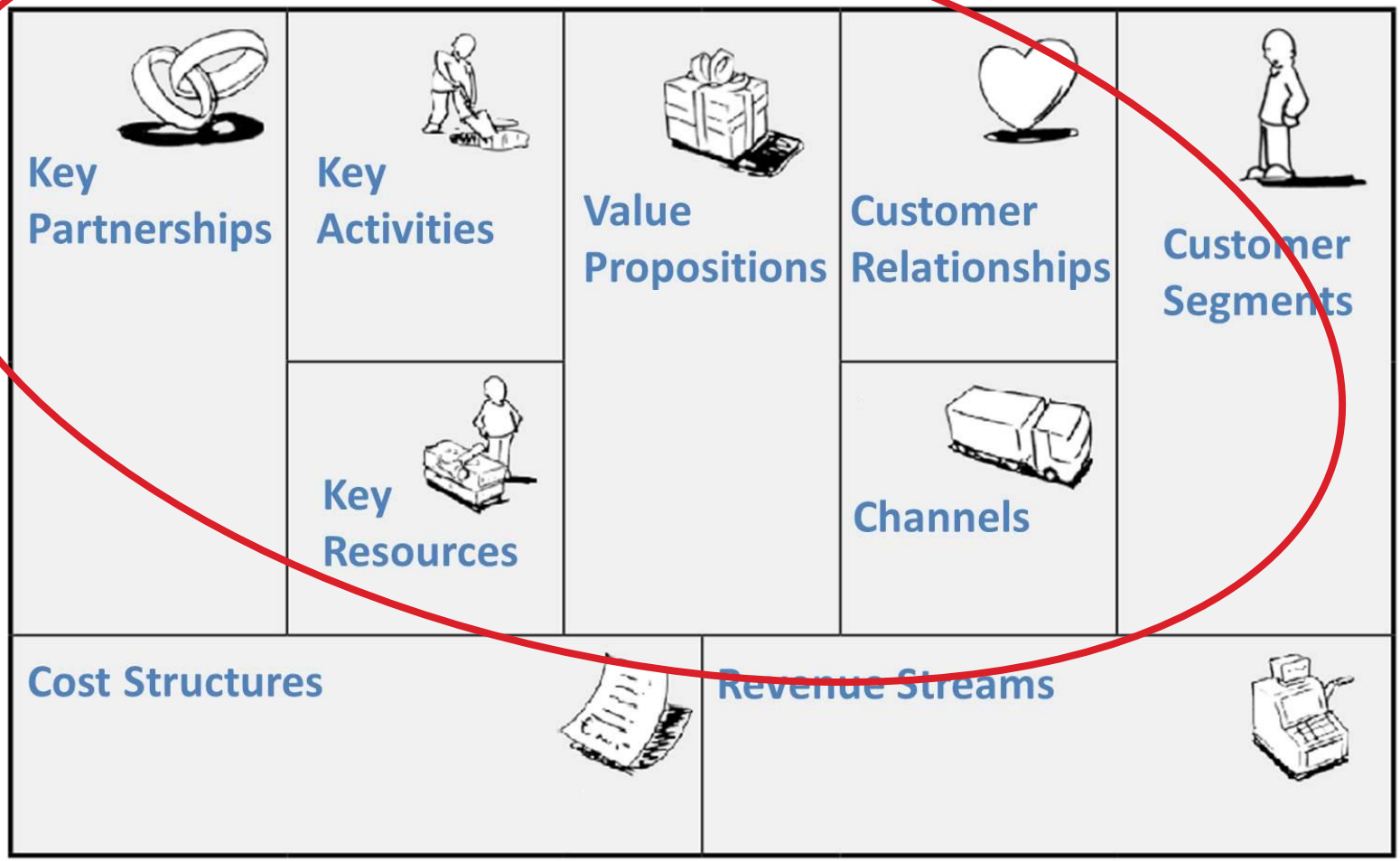
Business canvas mapping – Value Chain



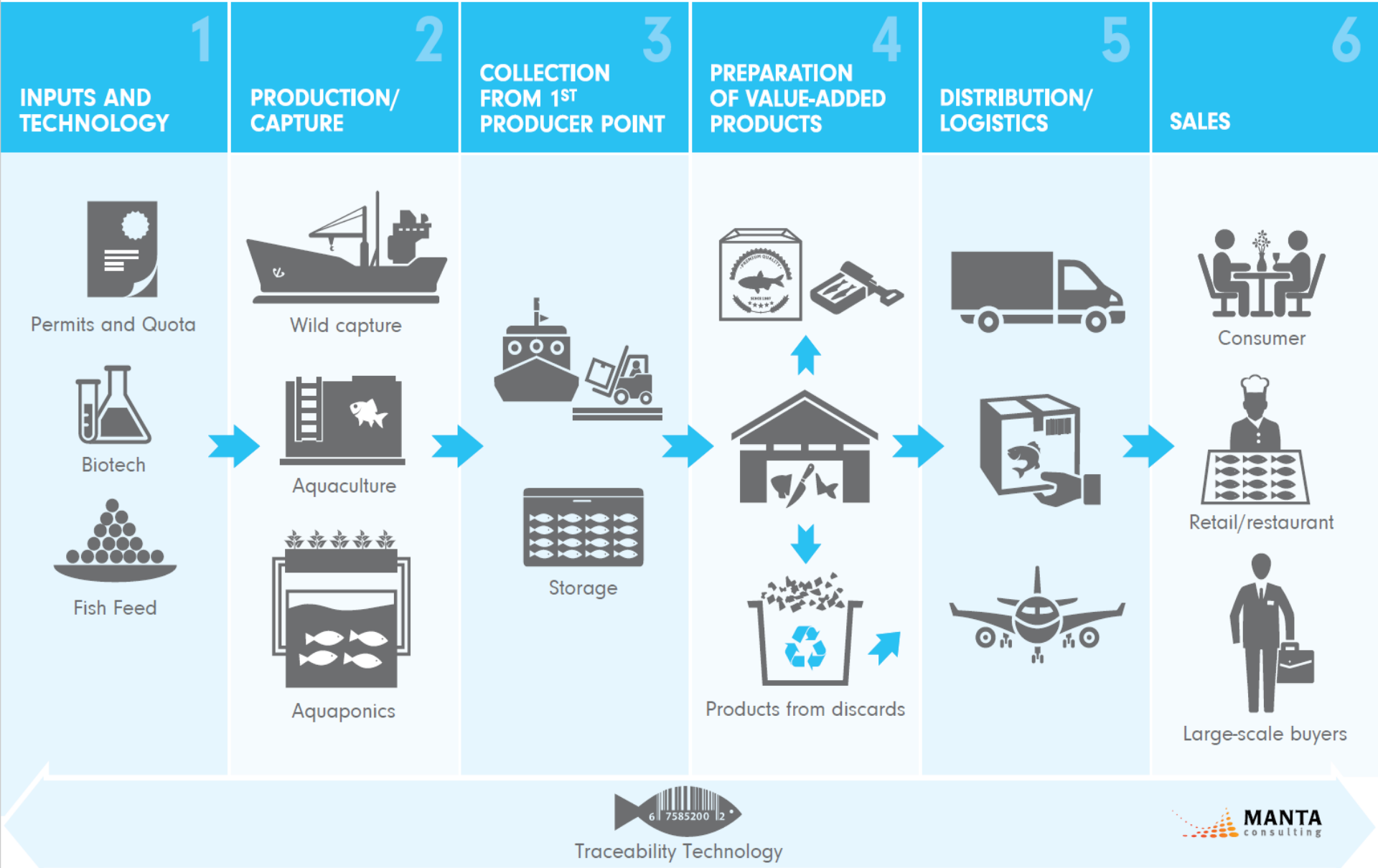
Identification of company activities and key partnerships

http://www.colinnewlyn.com/2013/08/12/entrepreneurial-thinking-and-the-business-model-canvas/

SEAFOOD SUPPLY CHAIN SUMMARY

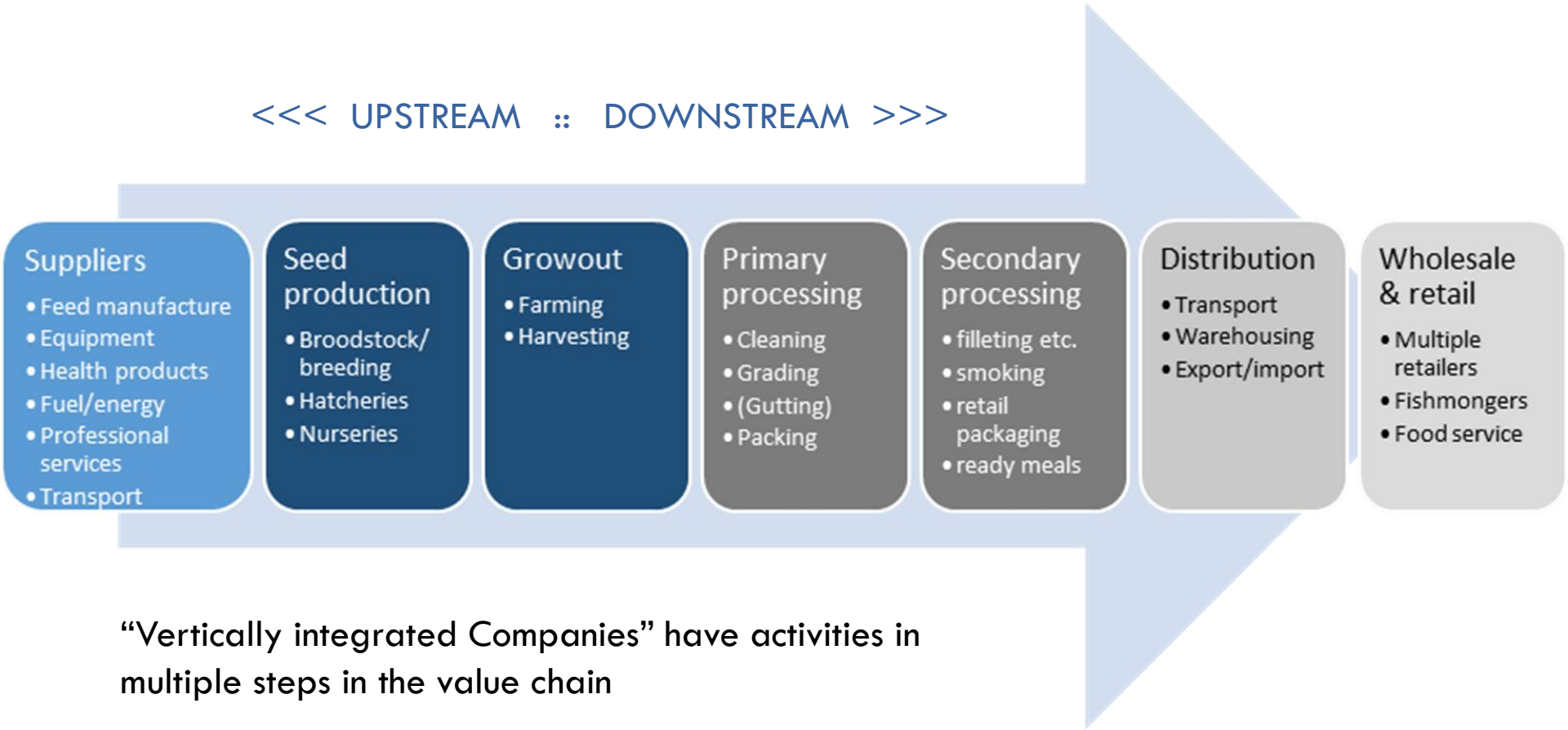
FISH2.0 Where Seafood Businesses and Investors Connect

2015



Source: https://www.fish20.org

Generic aquaculture value chain



"Vertically integrated Companies" have activities in multiple steps in the value chain

"Upstream" activities are **suppliers**; "Downstream" activities are **customers**

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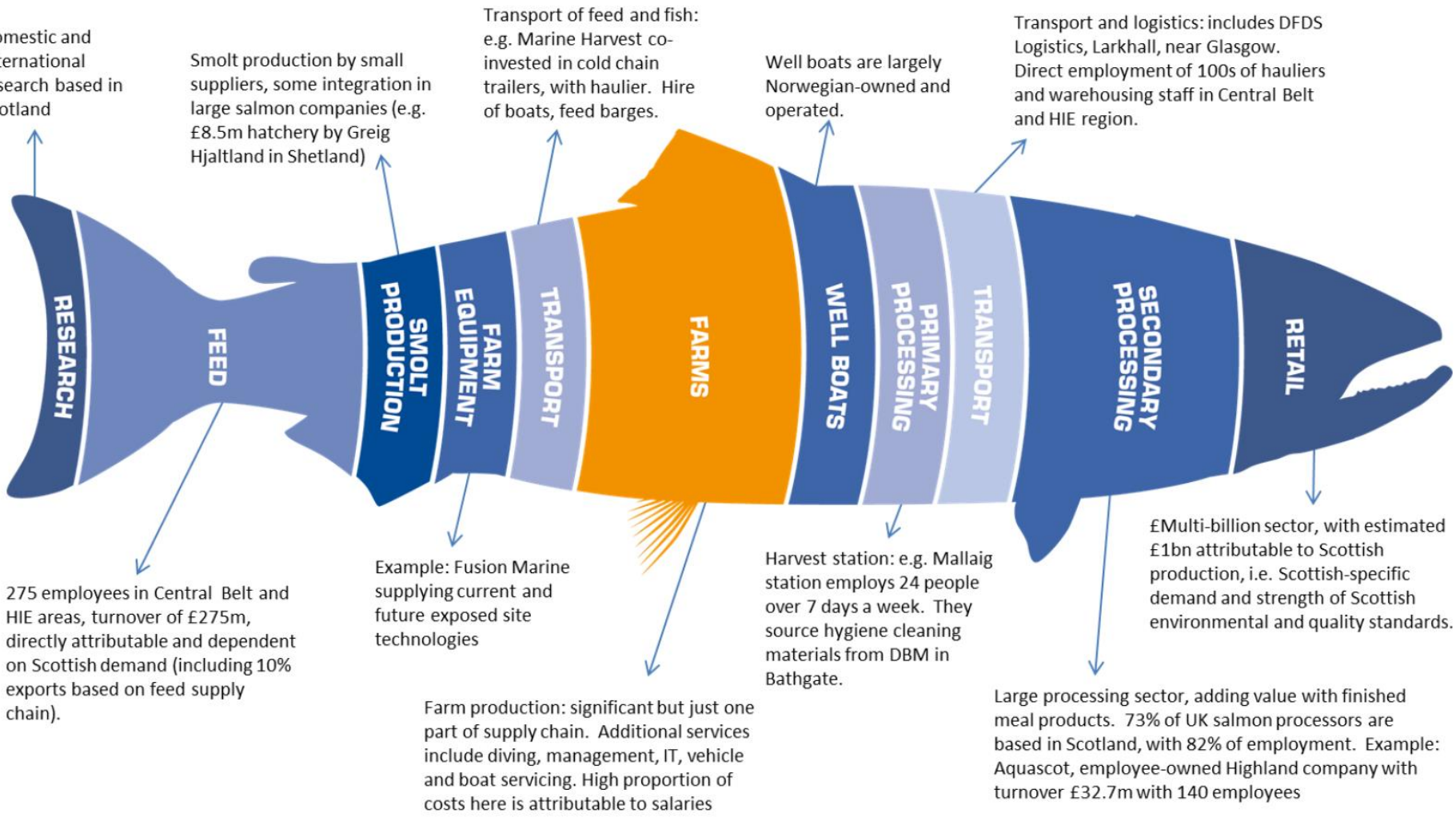
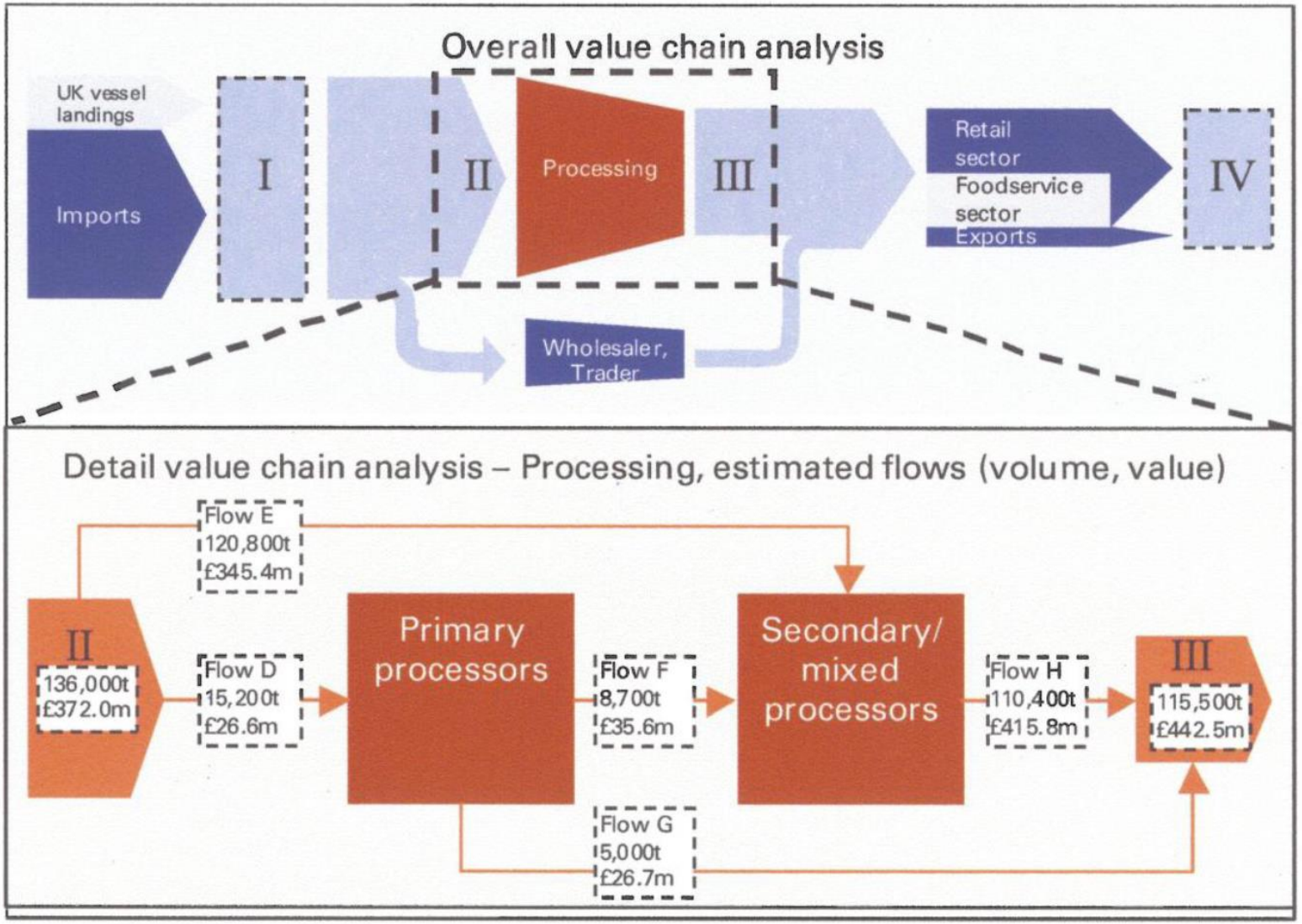
The salmon value chain



Source: IMANI & SRSL, 2014

http://seatglobal.eu/2013/04/ask-the-experts-the-seat-forum/#.UySCNvl_vHQ

Example value chain breakdown - cod



Tracking product flows and processes (from EUMOFA)

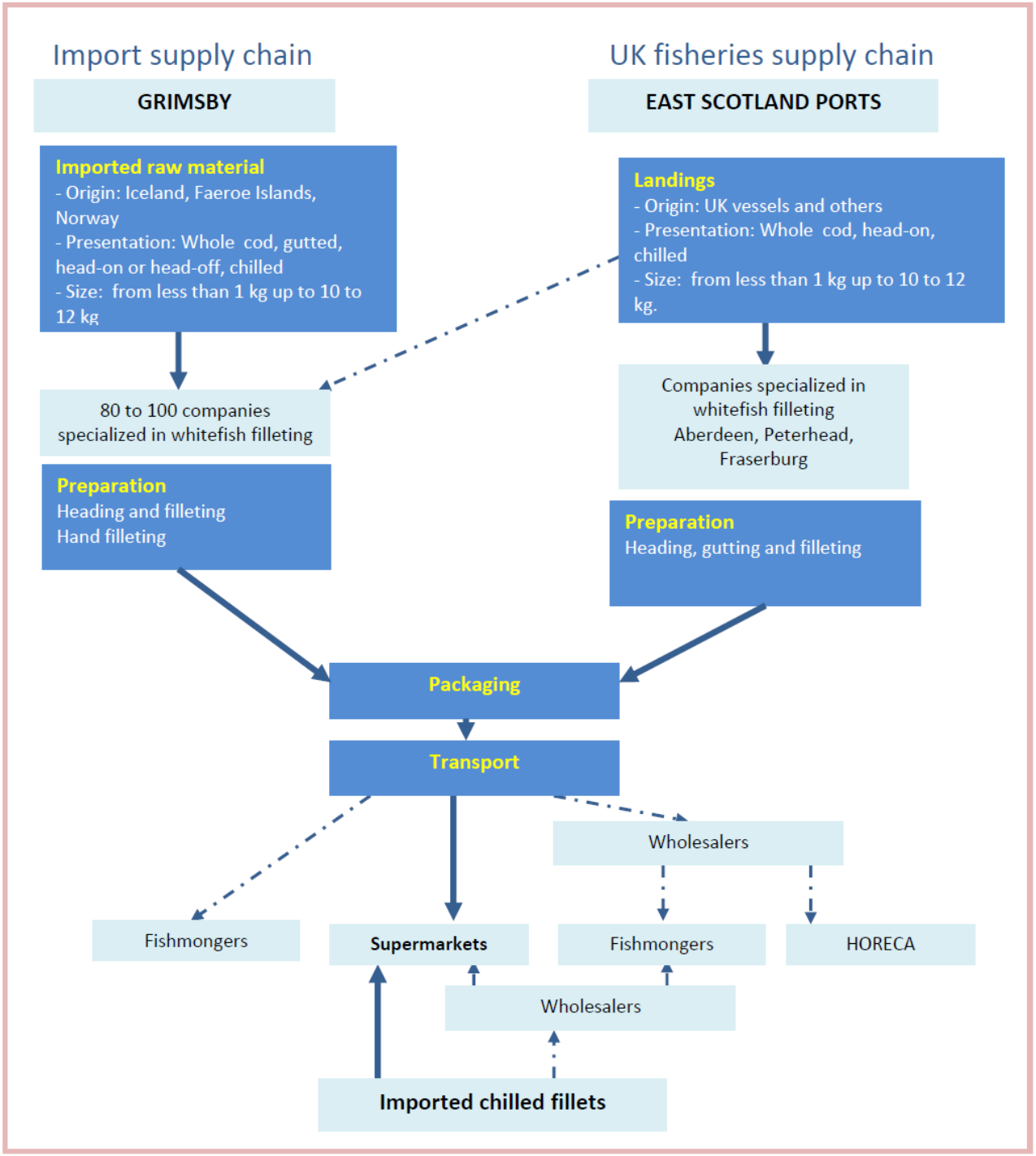


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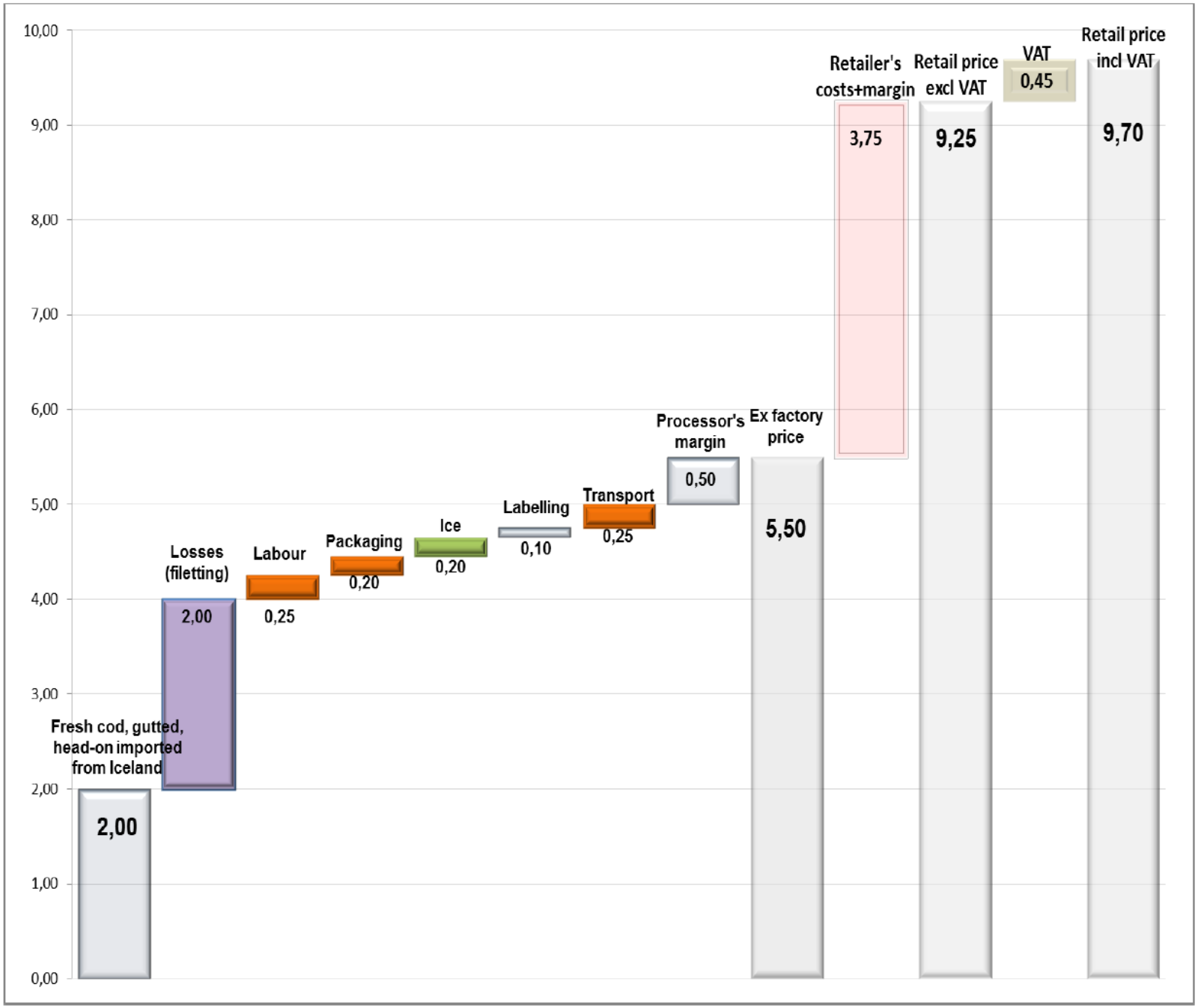
Figure 14 – Price structure analysis for fresh cod fillet in the UK (£/kg)

Determining value added through the chain (EUMOFA)



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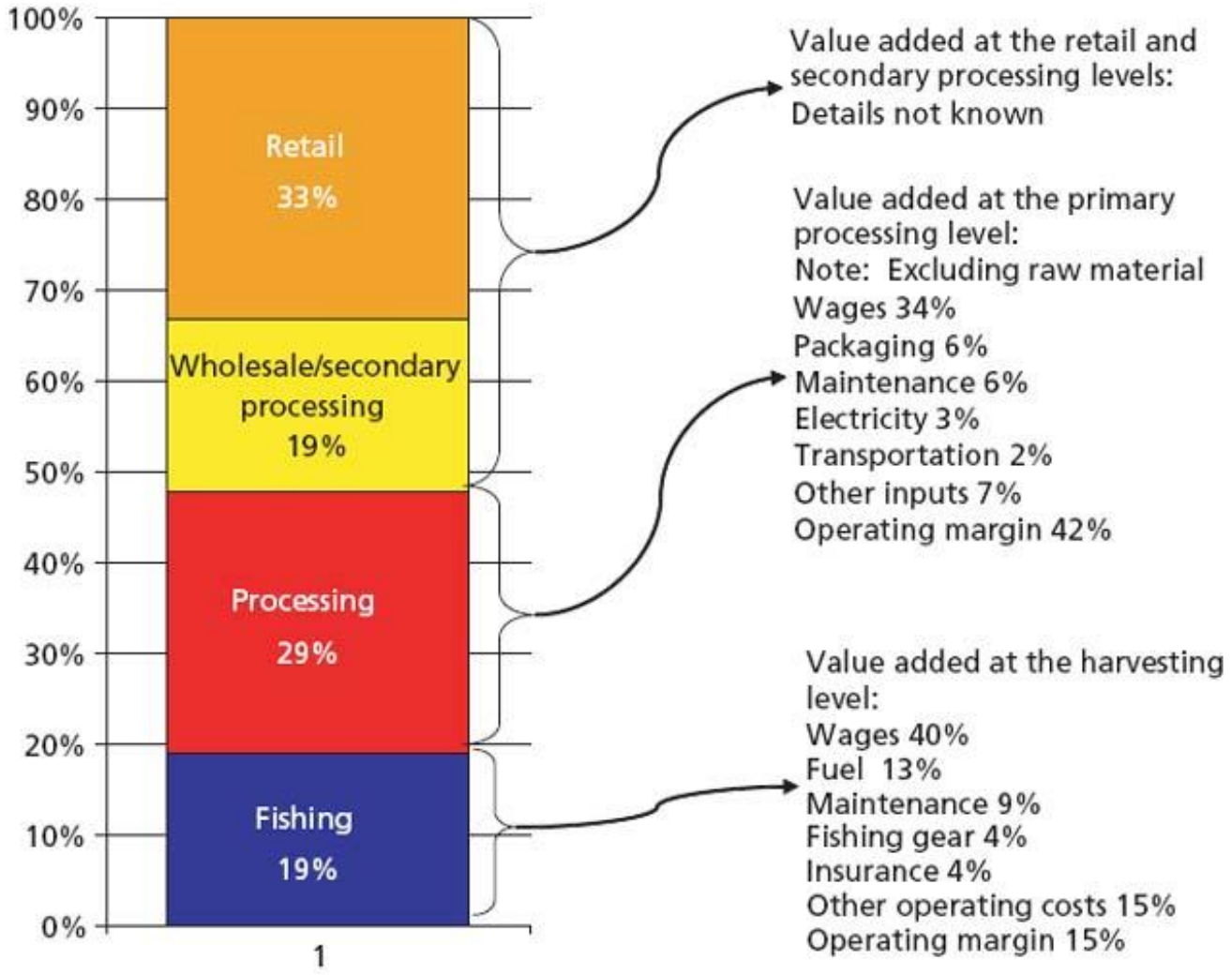
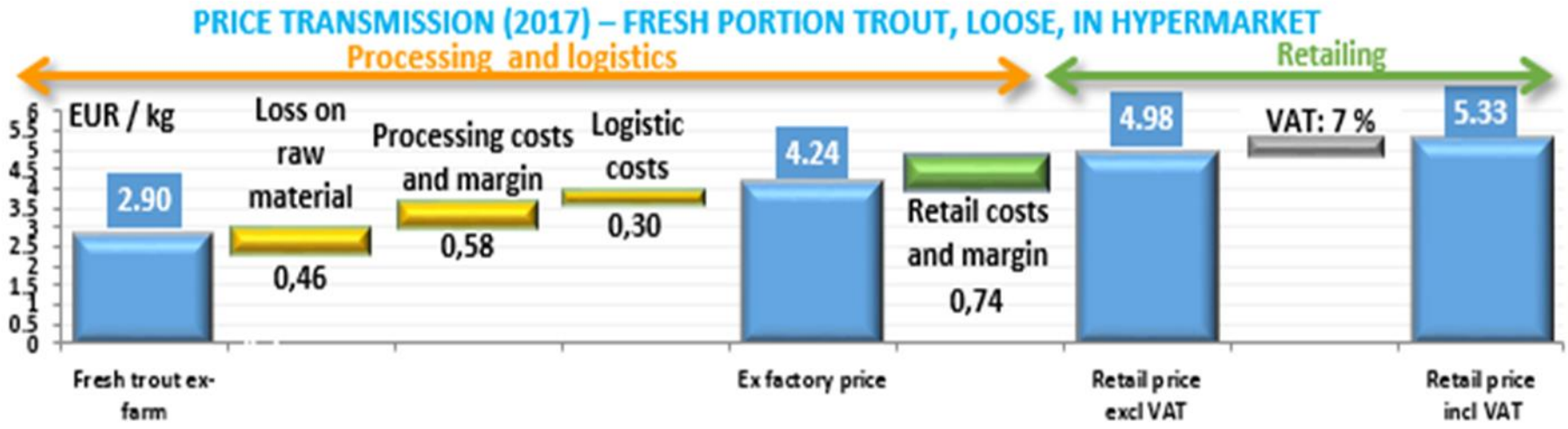
Example Value Addition – Icelandic Cod, USA



http://www.fao.org/docrep/009/a0564e/a0564e05.htm

Example Value Addition – Farmed trout, Poland



Analysis tools

Sectoral level

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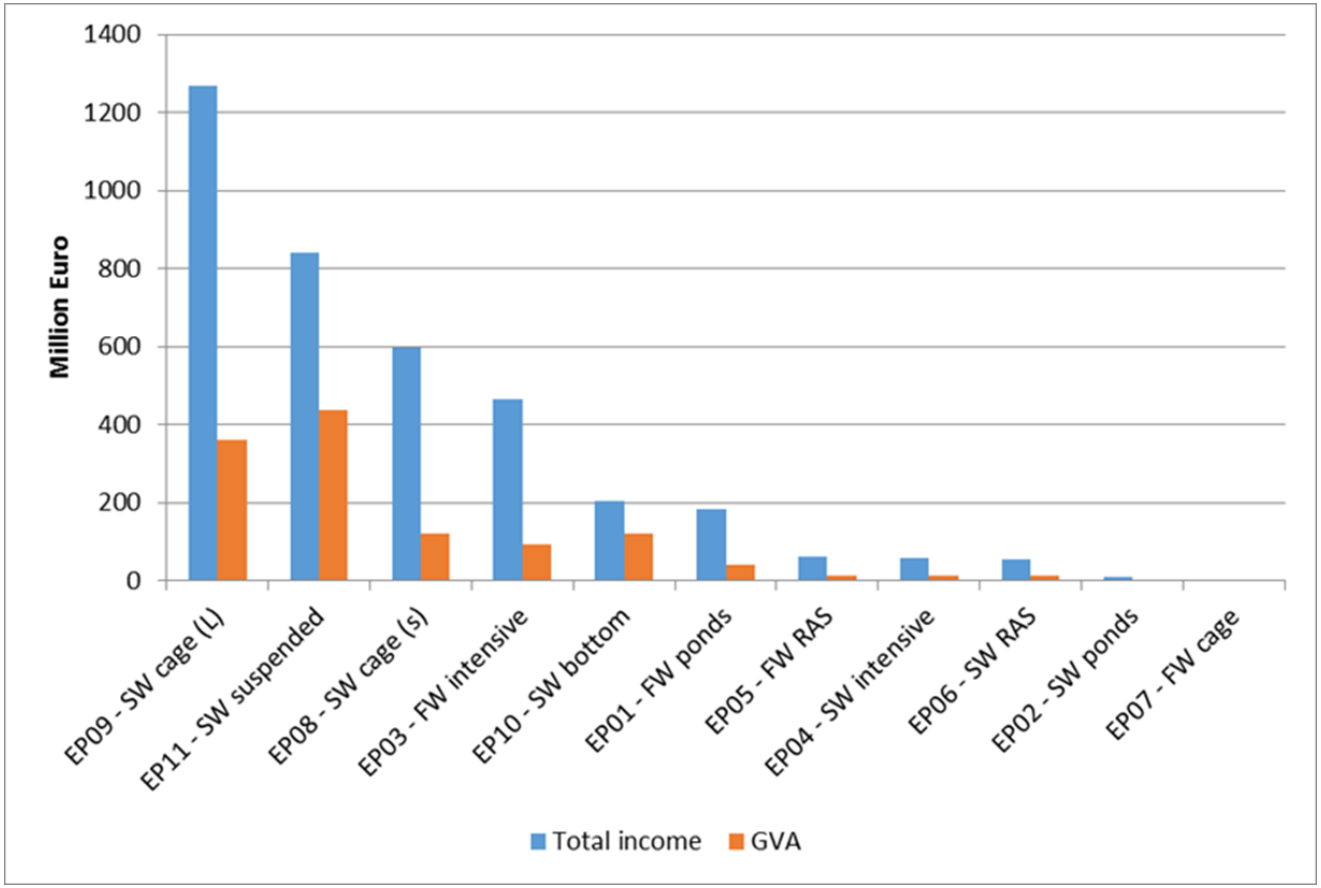
Gross Value Added (GVA)

- GVA is the value of the output minus the cost of purchased inputs (e.g. feed, medicines, fuel, services etc.).
- The value that is added is therefore comprises employee costs, the cost of capital employed and the profit that is made.
- GVA values are therefore substantially lower than output values.

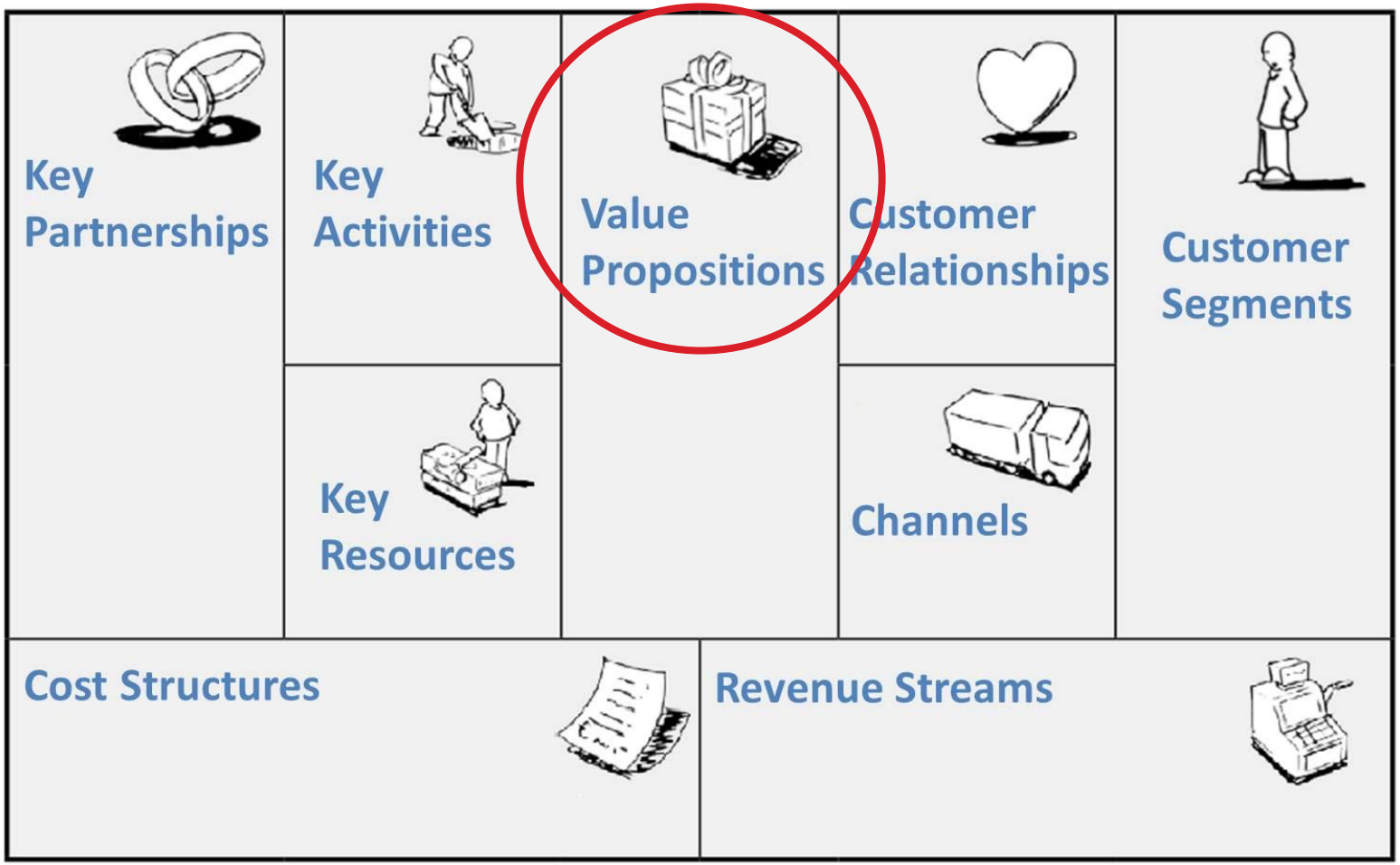
GVA Example – EU Aquaculture



GVA for the EU aquaculture sector in 2012 was reported to be €1,294 billion whilst total turnover (output) was €4,365 billion (i.e. the multiplier from turnover to GVA is around 0,3) (STECF, 2014).

The GVA multiplier varies by sector with shellfish averaging 0,54 and sea bass and sea bream less than 0,1. Shellfish provides a greater GVA in relation to output because there are no costs for feed. The GVA for Sea bass and sea bream is low due to negative profitability in the sector at this time (2012).

Business canvas mapping – Consideration of product



Identification of company activities and key partnerships

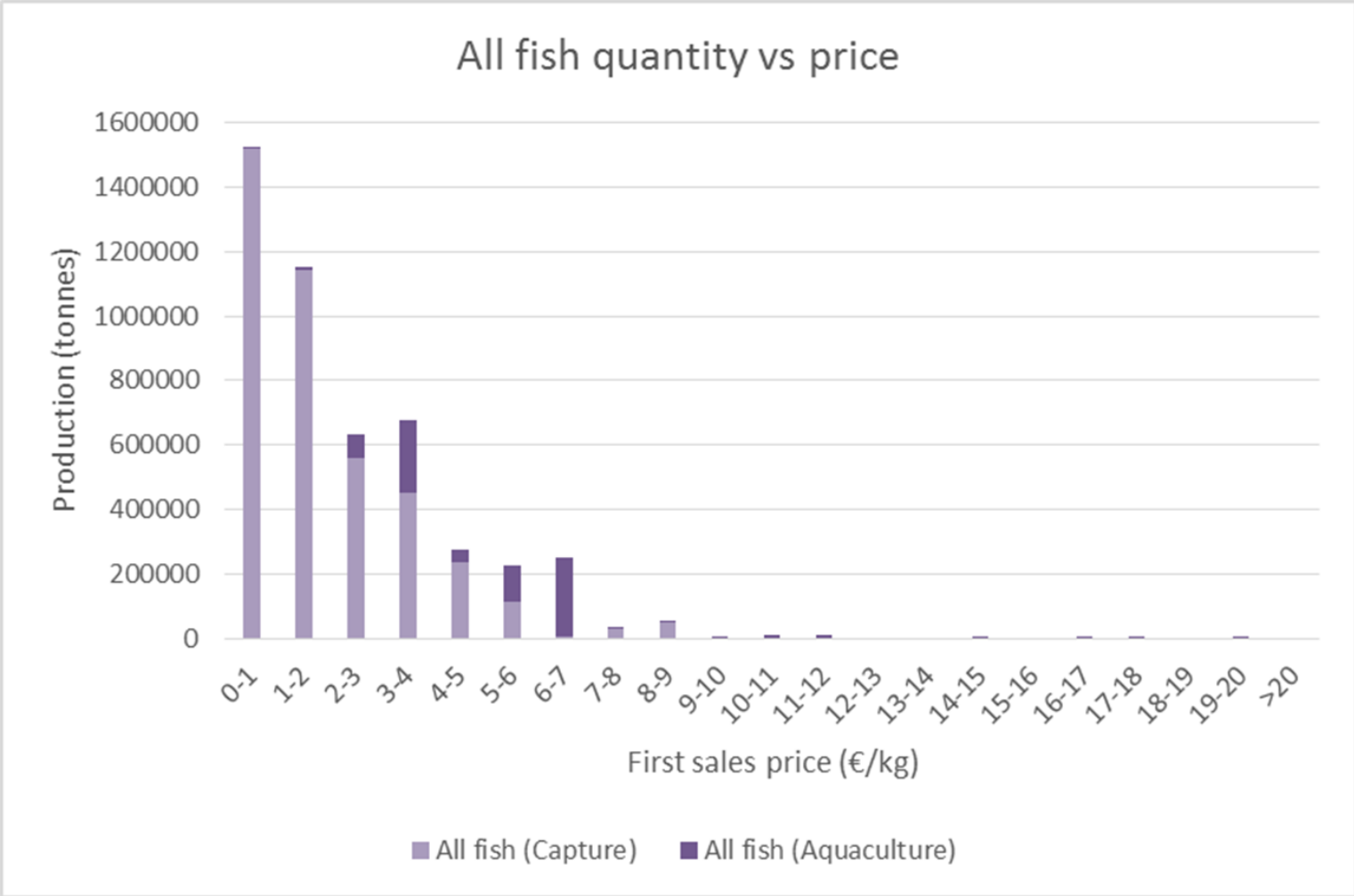
http://www.colinnewlyn.com/2013/08/12/entrepreneurial-thinking-and-the-business-model-canvas/

The basic “seafood” product

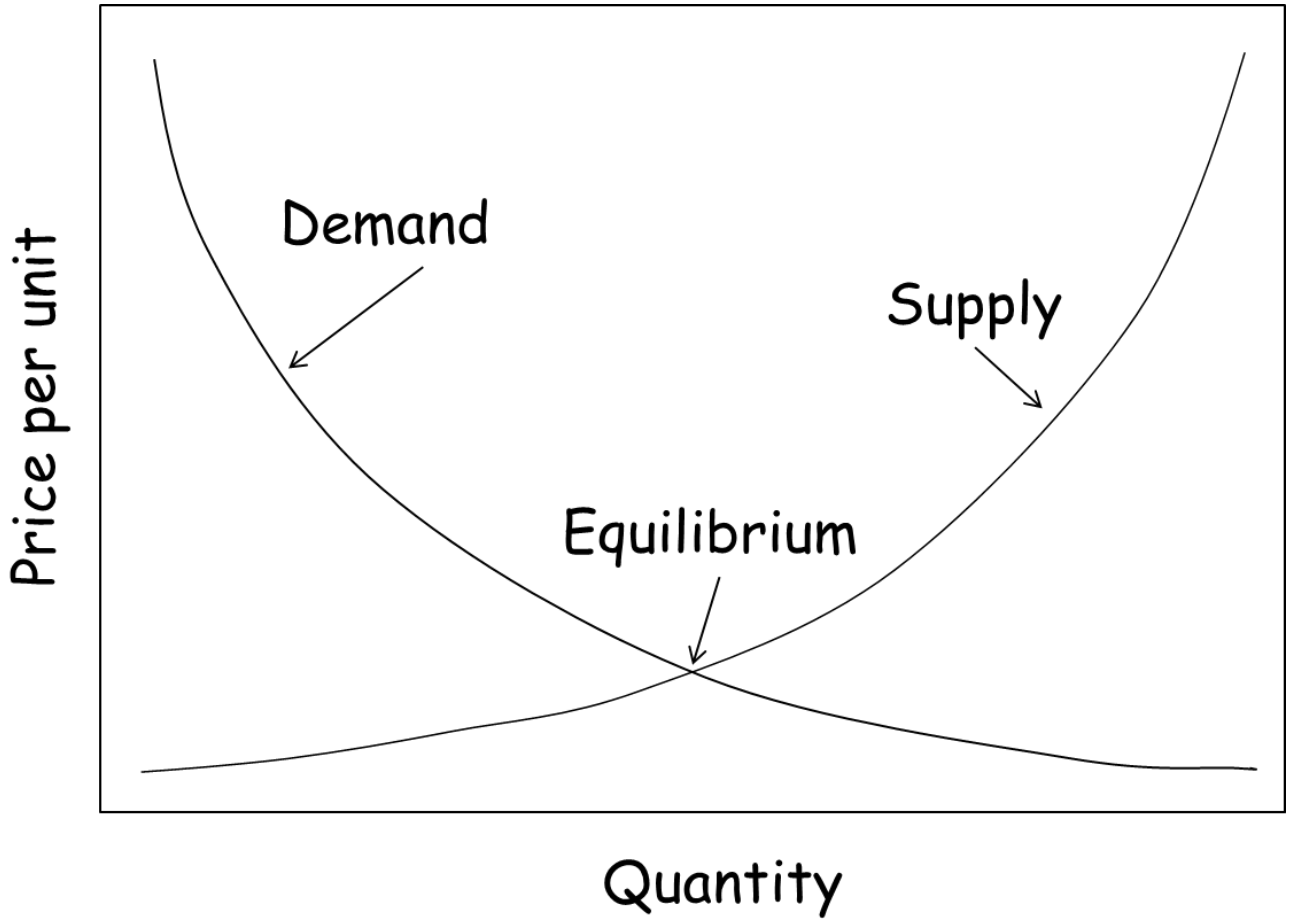
- Output from capture and aquaculture is mostly commodity product – little differentiation
- Further processing of this “raw material” adds value and differentiation
- Competing with other seafoods and wider protein sources

Price structure of the EU fish market

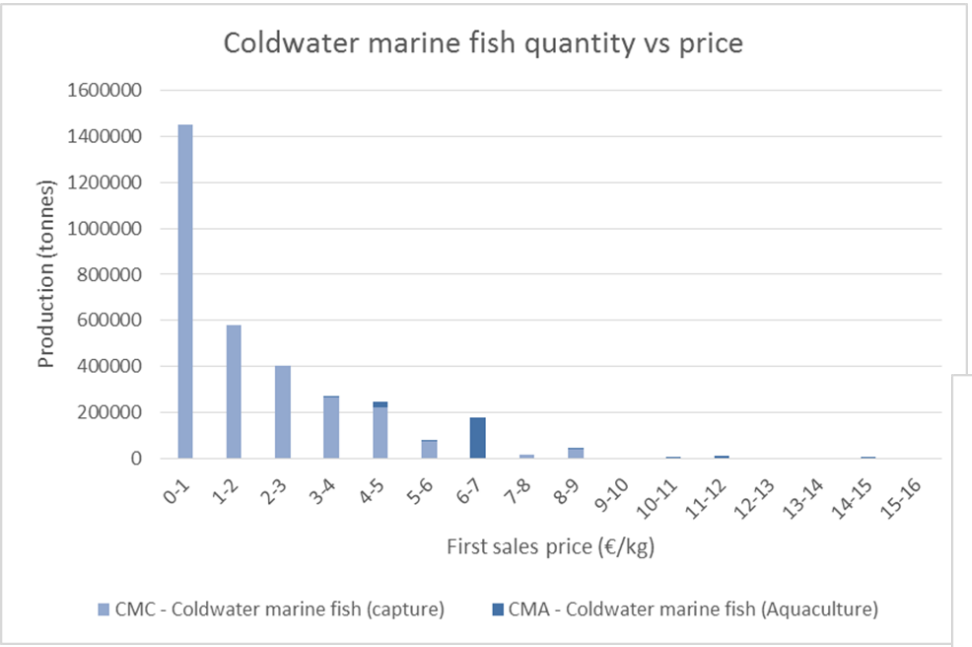
General pattern follows classical supply/ demand economics

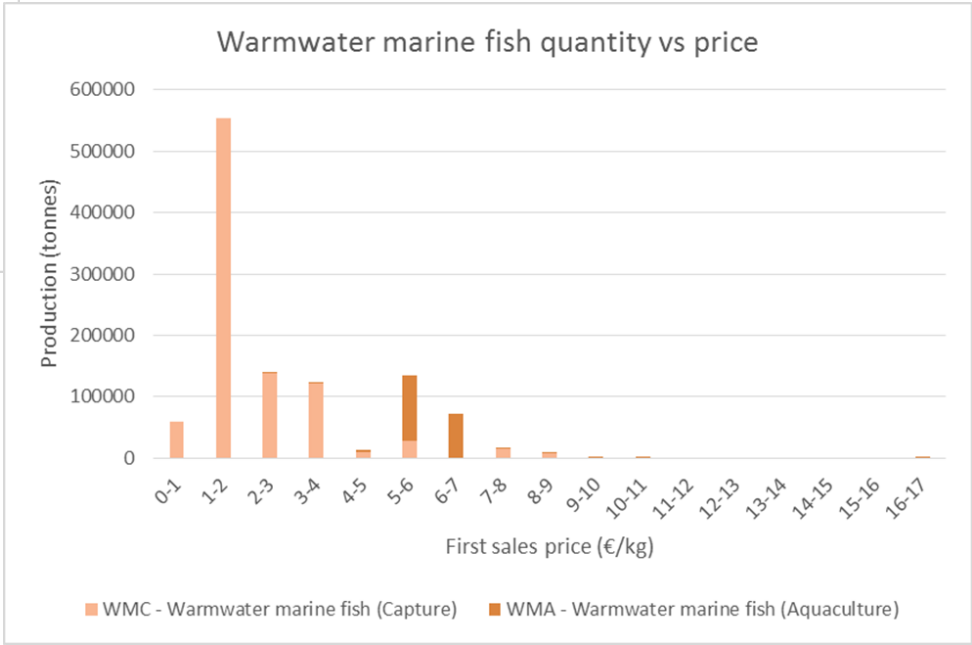


The classic supply-demand curves



Further examples





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Competition

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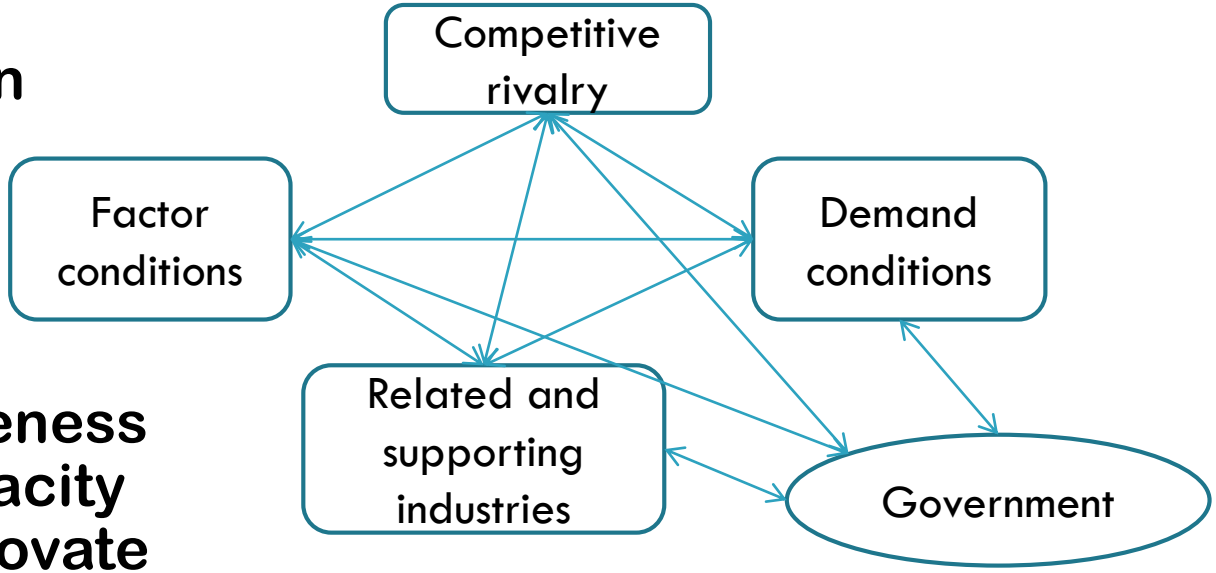
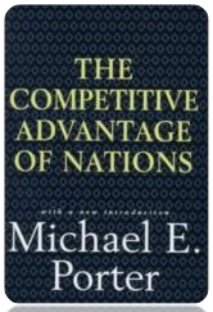
Evaluting Competitiveness - regional/national level

- **The role of nations in global competition - location plays a significant role in competitiveness**
- **National competitiveness depends on the capacity of its industry to innovate and upgrade**
- **Companies gain advantage against the world's best competitors because of pressure and challenge**

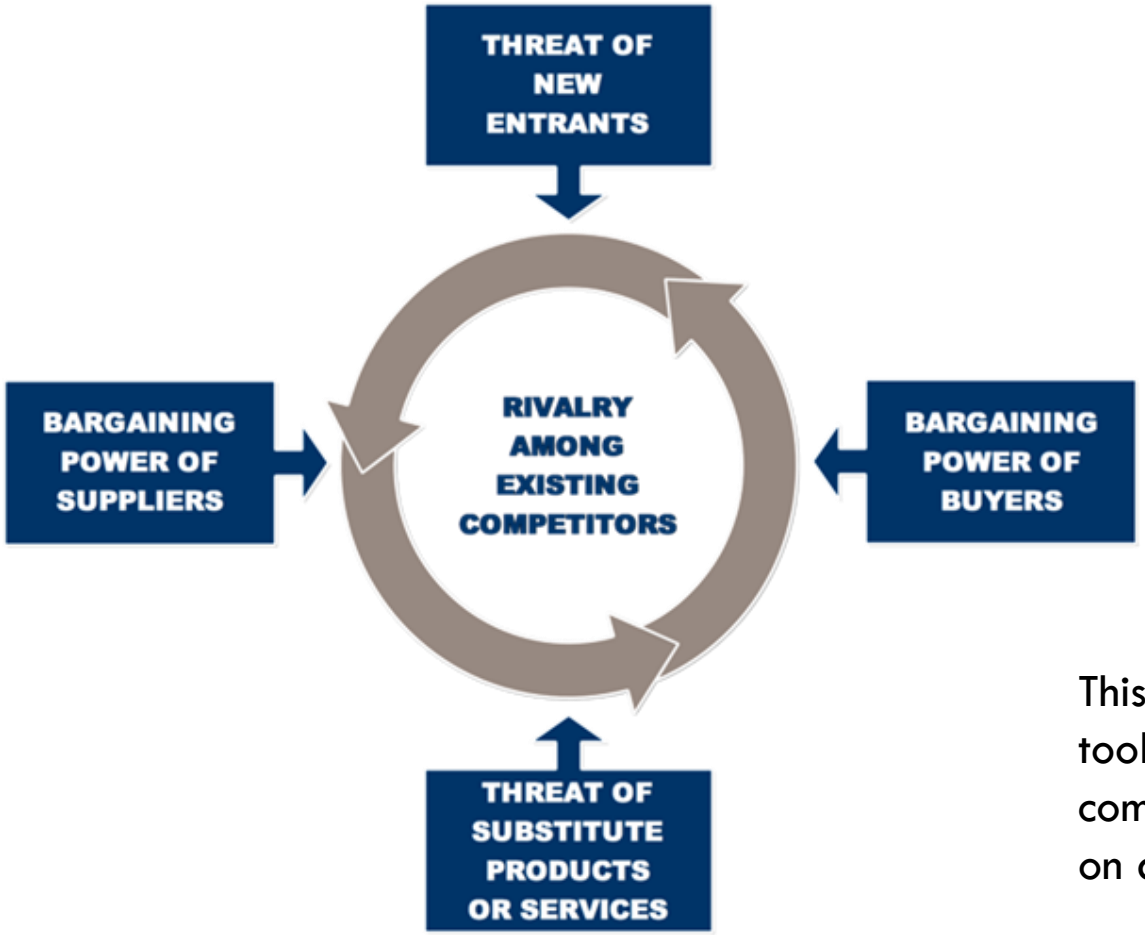




12 pillars of national competitiveness (WEF)

Basic factors (key for factor-driven economies)				Efficiency enhancers (key for efficiency-driven economies)						Innovation and sophistication factors (key for innovation-driven economies)	
Institutions	Infrastructure	Macroeconomic stability	Health and primary education	Higher education and training	Goods market efficiency	Labour market efficiency	Financial market sophistication	Technology readiness	Market size	Business sophistication	Innovation

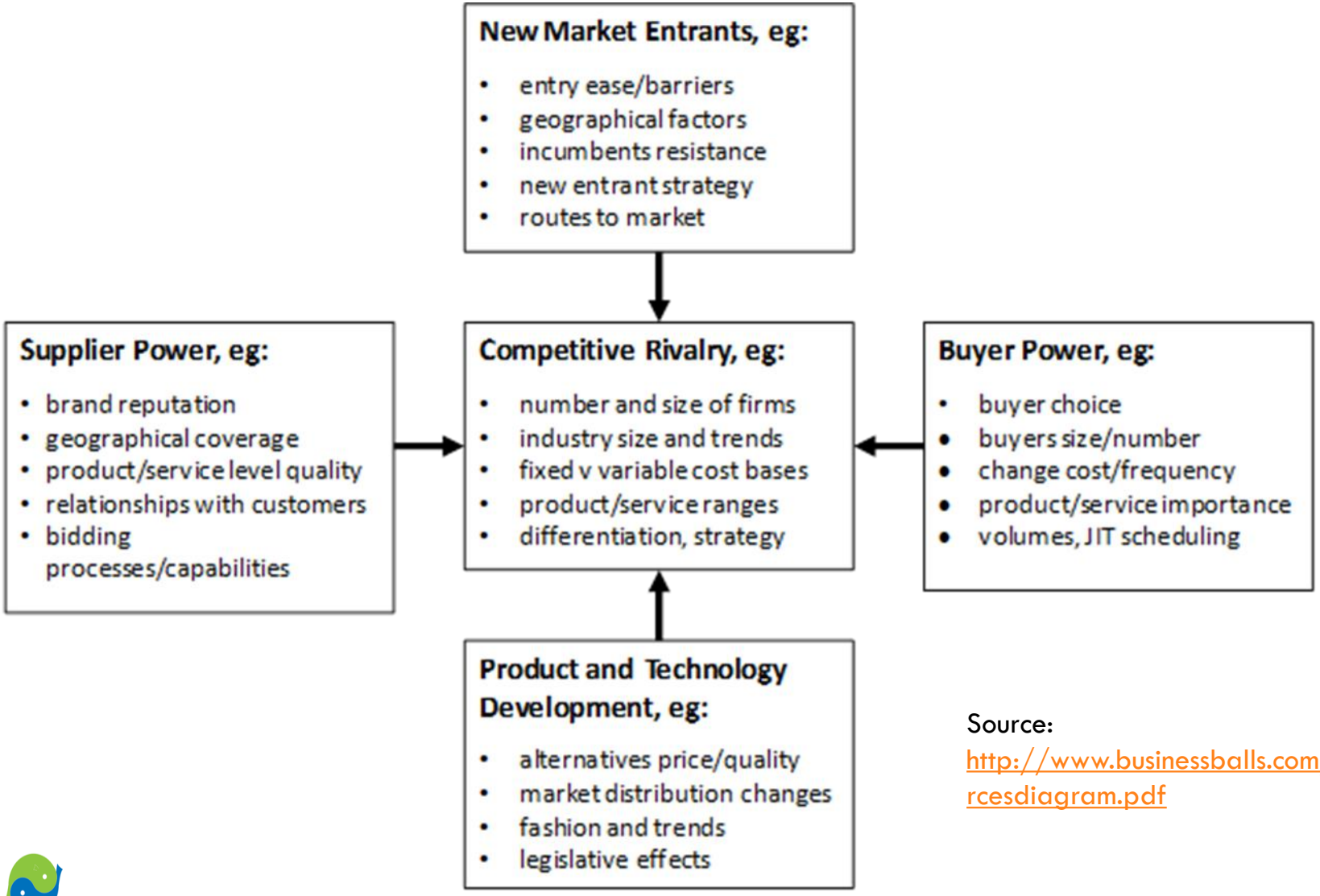
Sectoral level competition – Porter's 5 Forces



This is a common tool for analysing competitive forces on a company

Source: http://www.businessballs.com/portersfiveforcesdiagram.pdf

Adding detail



Source:
http://www.businessballs.com/portersfiveforcesdiagram.pdf

Threat of competitor entry may depend on:

- extent of economies of scale in relation to market size
- degree of product differentiation
- capital requirements
- costs of customers switching suppliers
- access to distribution channels
- availability of resources
- government policy

The higher the barriers to entry, the lower the rate of entry and the higher the level of profits for existing companies. Expected reactions by existing firms will also affect the threat of entry

The intensity of rivalry between existing companies may depend for instance on:

- numerous or equally balanced competitors
- slow industry growth
- high storage costs
- lack of differentiation
- low switching costs
- capacity increases in large increments

The power of buyers and suppliers

The power of buyers is strengthened if

- they are few in number
- purchases are a significant proportion of costs
- their profits are low
- threat of backward integration

Business principles: Buy as cheaply as possible from your suppliers: Sell at the highest price possible to your buyers...

The power of suppliers is strengthened if

- they are few in number
- the customer is a low % of their sales
- profits are low
- threat of forward integration

Threats from technology and product development

- If the industry is threatened by close competition from substitutes or technology developments then this means low profitability.
- In order to survive the firm must have competitive strength. This can come from:
  - cost leadership
  - product differentiation
  - focus on small market segments

Quick examples – (1) Small-scale fisheries Malaysia

East coast – over 4000 vessels – over 800 in State of Pahang, employing around 12000 people with a catch of over 90,000 tonnes

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There are three main landing ports in Pahang

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A wide variety of species are captured and sold through the landing ports

Fish are auctioned into complex trader networks

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Salmon farming Scotland

Salmon in Scotland

- 170,000 tonnes production
- 92% from 5 major companies
- Approx 1,300 production related jobs
- Highly technology reliant
- Significant vertical integration
- Processing and retail sectors quite consolidated
- But globalised product…

Example analysis

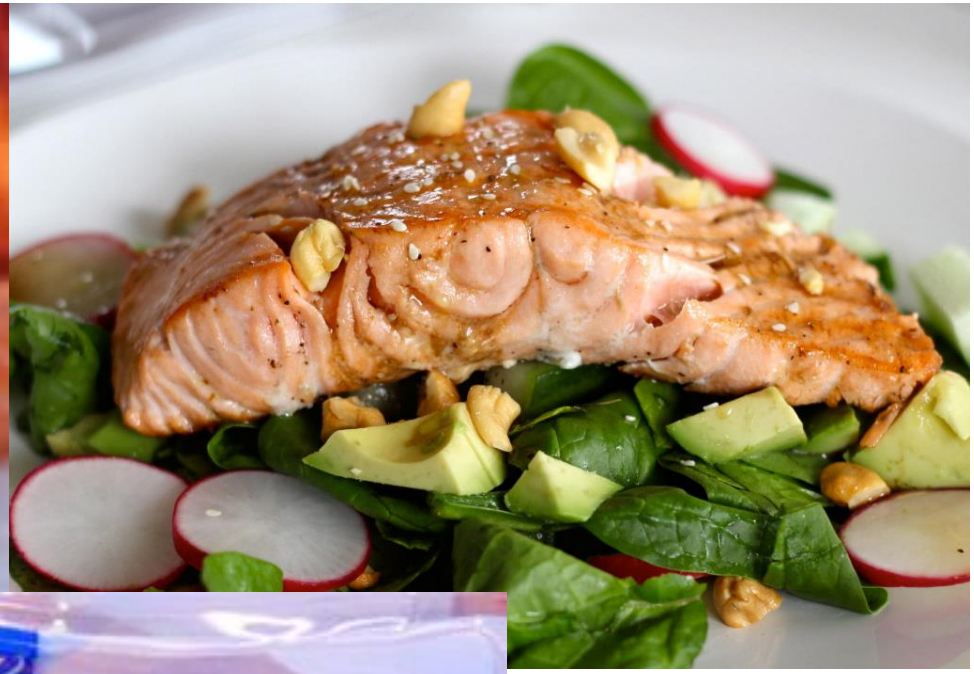
	UK salmon farming	UK salmon processing
Threat of new entry	Low	High
Competitive rivalry	Med	High
Suppliers bargaining power	High	High
Buyers bargaining power	Low to High	High
Threat of substitution	Low	Low
Overall attractiveness	**Med**	**Low**

BUT…back to value proposition

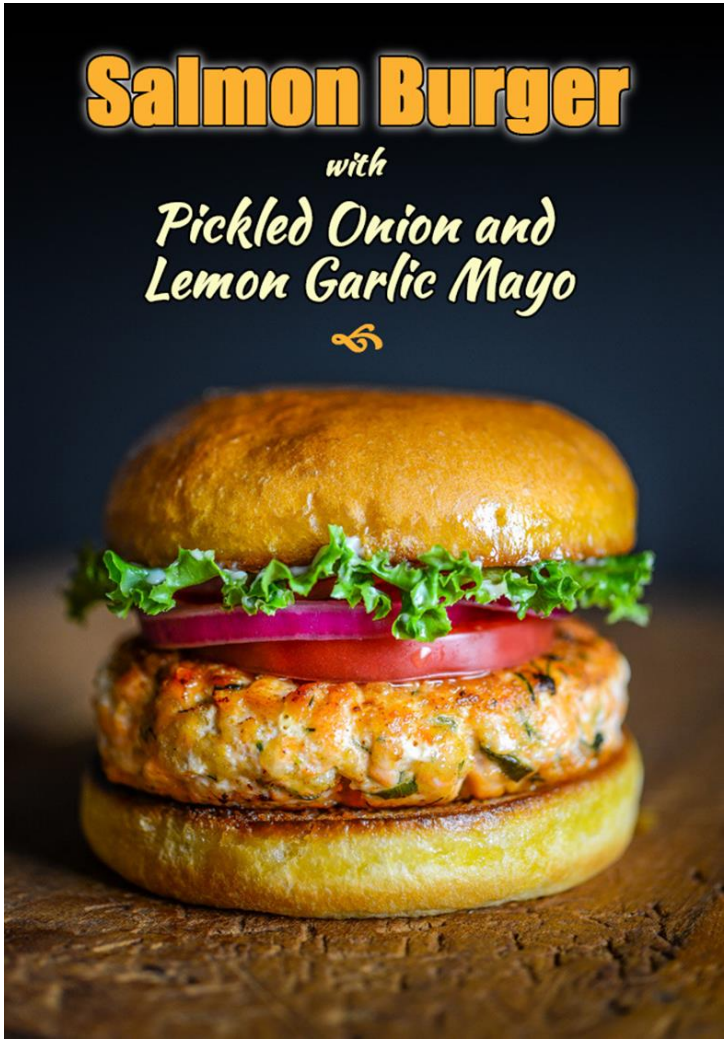
When salmon farming started the focus was on the whole fish and maintaining its position as a high priced and special occasion fish

Photo: Norwegian Seafood Council/J. Wildhagen

Acceptable



Not acceptable….



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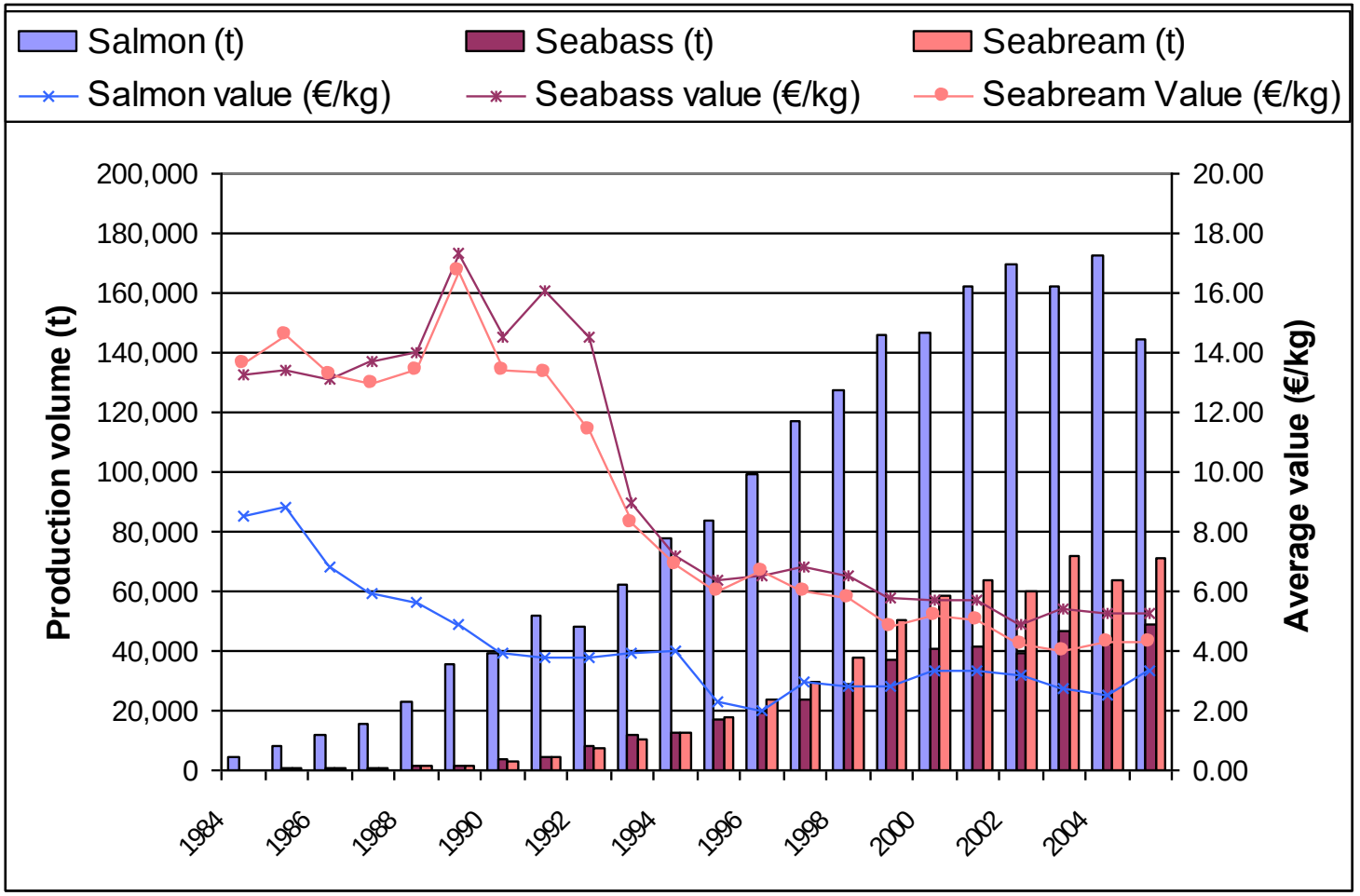
BUT – Business environments constantly evolving

High prices and available technology attracted new entrants – until supply exceeded demand and prices fell to compensate



As raw material became cheaper it was possible to add value through processing whilst producing products that were not too expensive for the market

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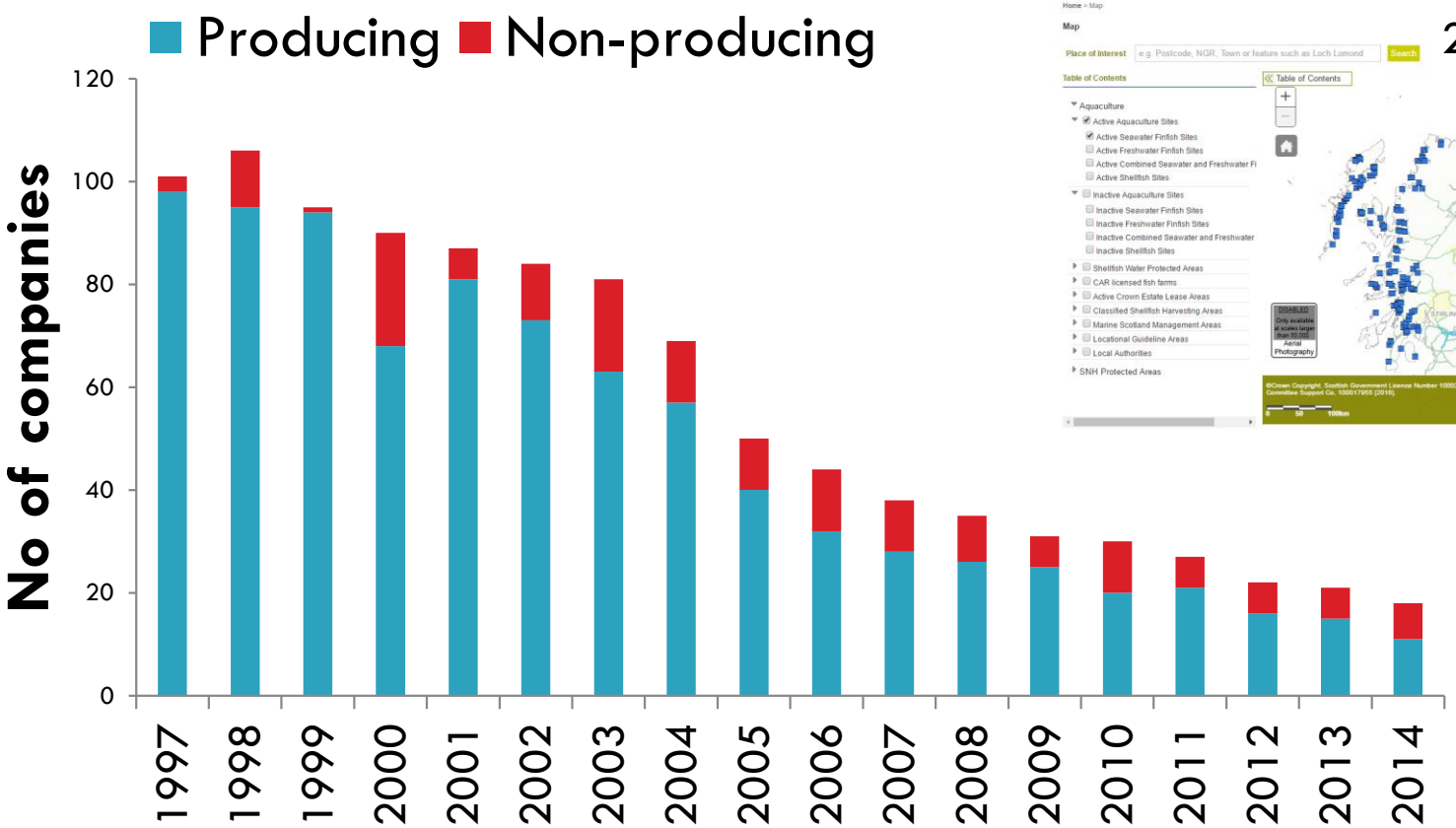
Scottish Salmon Consolidation Trends 1997-2014

Falling prices led to successive rounds of consolidation as weaker companies collapsed and assets were purchased by stronger companies



Source: Annual fish farming survey, Marine Scotland (inc. juvenile supply)

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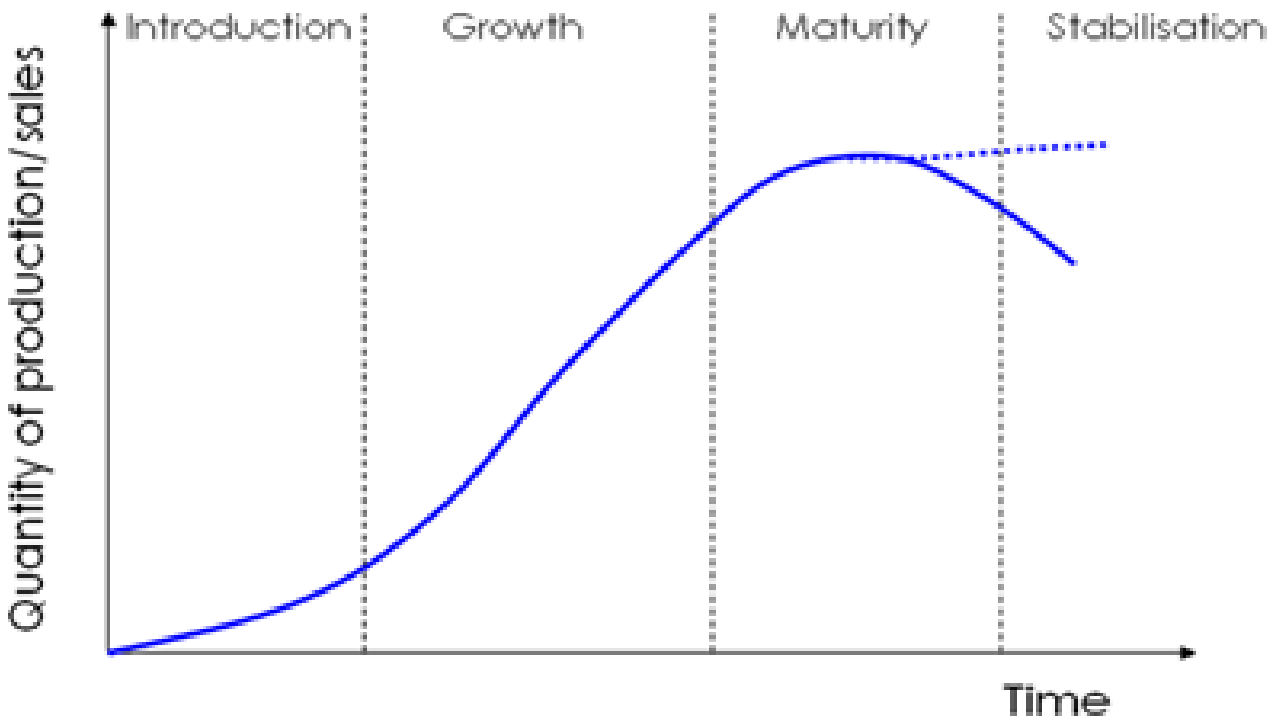
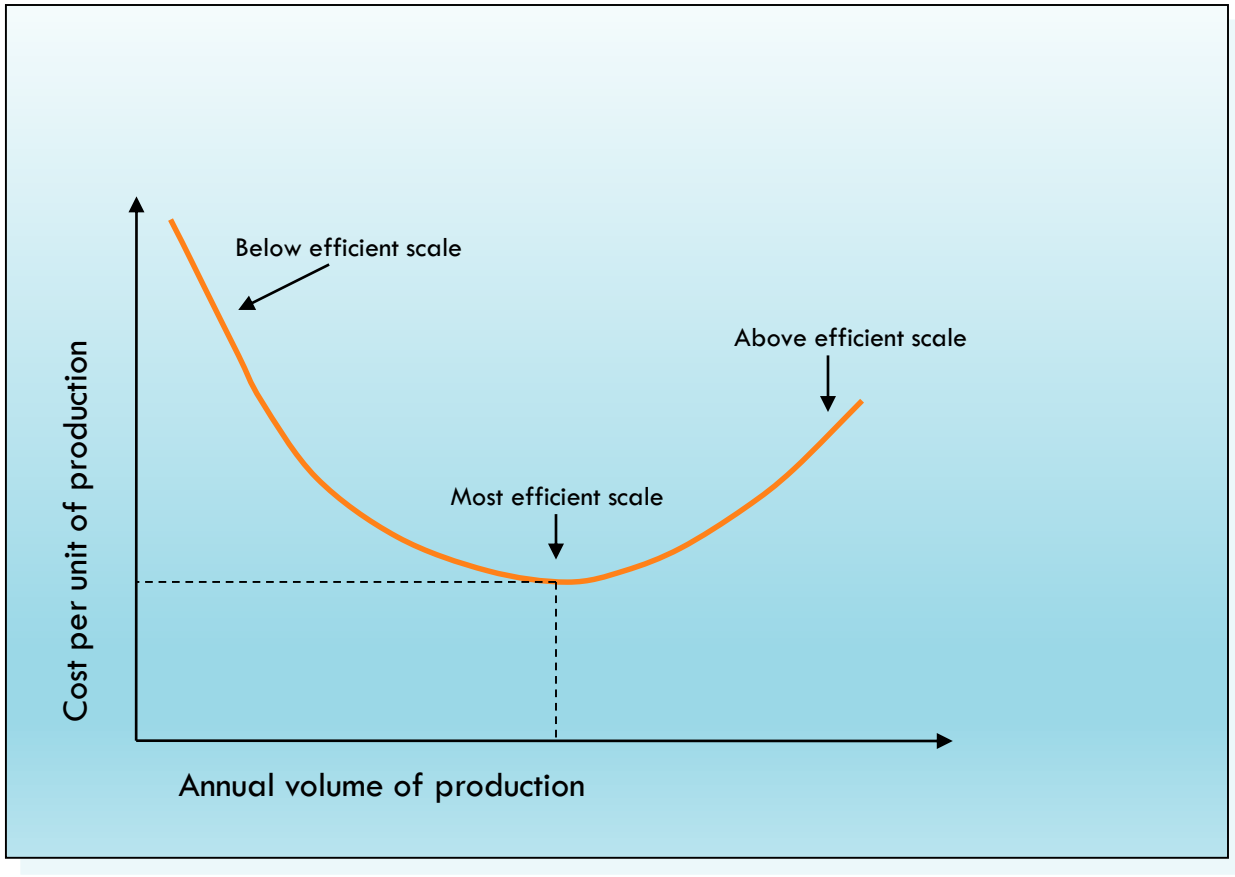
Industry life cycles



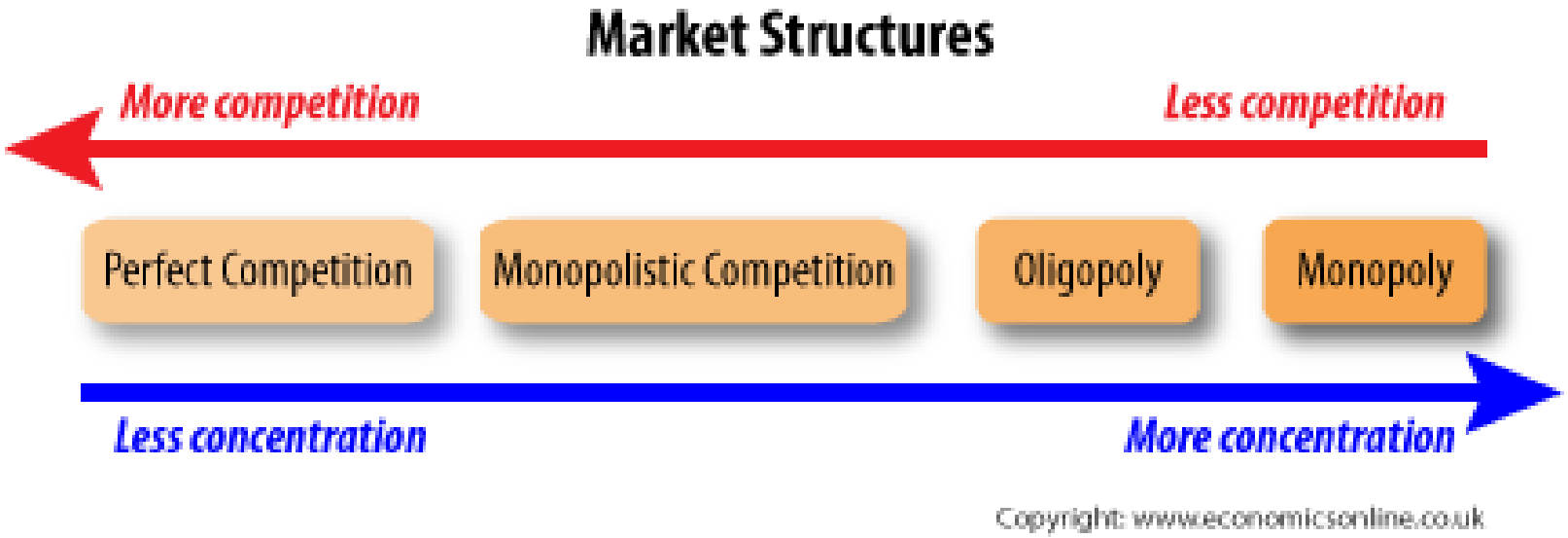
In the early stages of a new industry/product, competition is typically low and often depends on technological advantage. As technology becomes standardised and more widely available, the number of competitors increases and competition on price becomes more important. As the industry matures, scale economies can place very high barriers to entry for new entrants and force smaller producers to seek new or niche markets.

Scale effects

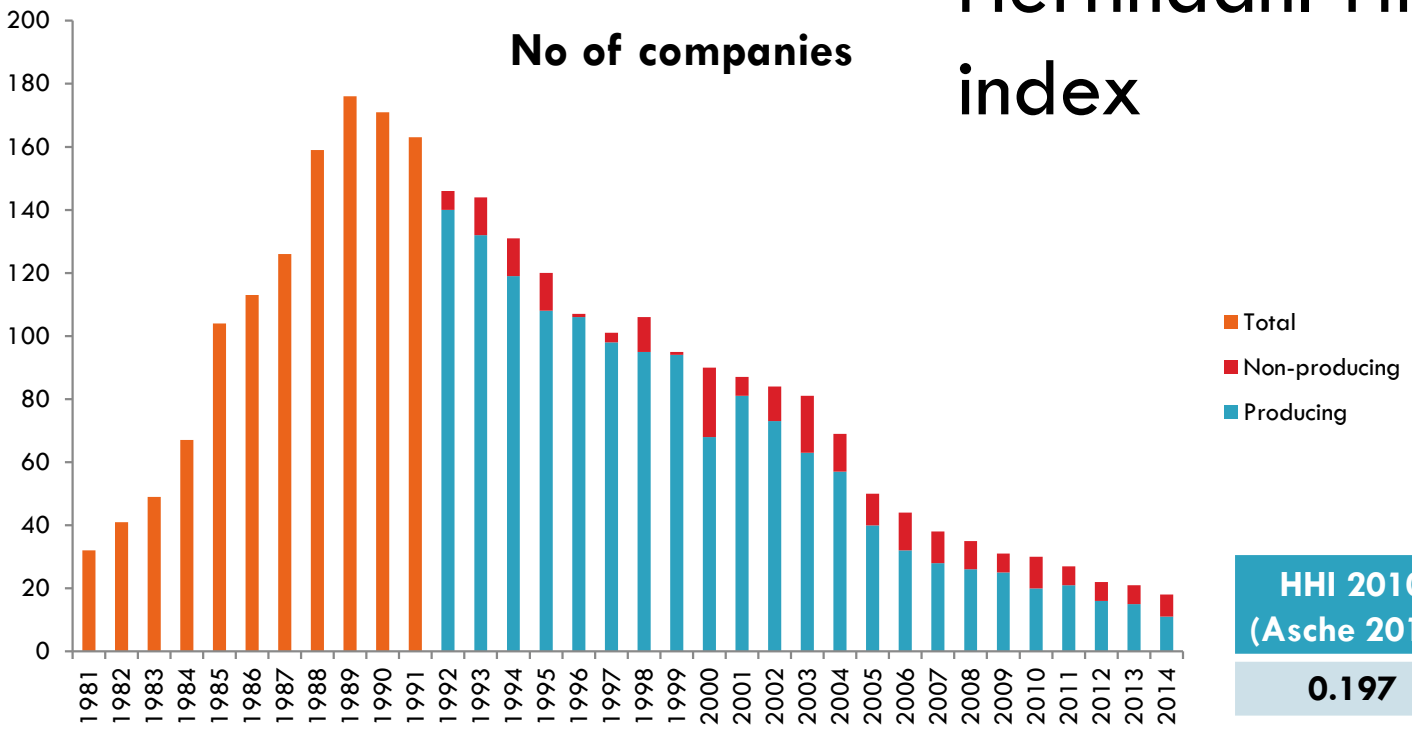
For commodity products – cost of production is the primary means of competition and efficiencies of scale and return on investment are key issues



Market structure



Numerical indicators of consolidation



Source: Annual fish farming survey, Marine Scotland

Herfindahl-Hirschman index

HHI 2010 (Asche 2013)	HHI 2014
0.197	0.252

$$H = \sum_{i=1}^{N} s_i^2$$

***Where s_i is the market share of firm *i* in the market, and *N* is the number of firms Un-concentrated Markets: <0.15; Moderately Concentrated Markets: 0.15 and 0.25; Highly Concentrated Markets: > 0.25**

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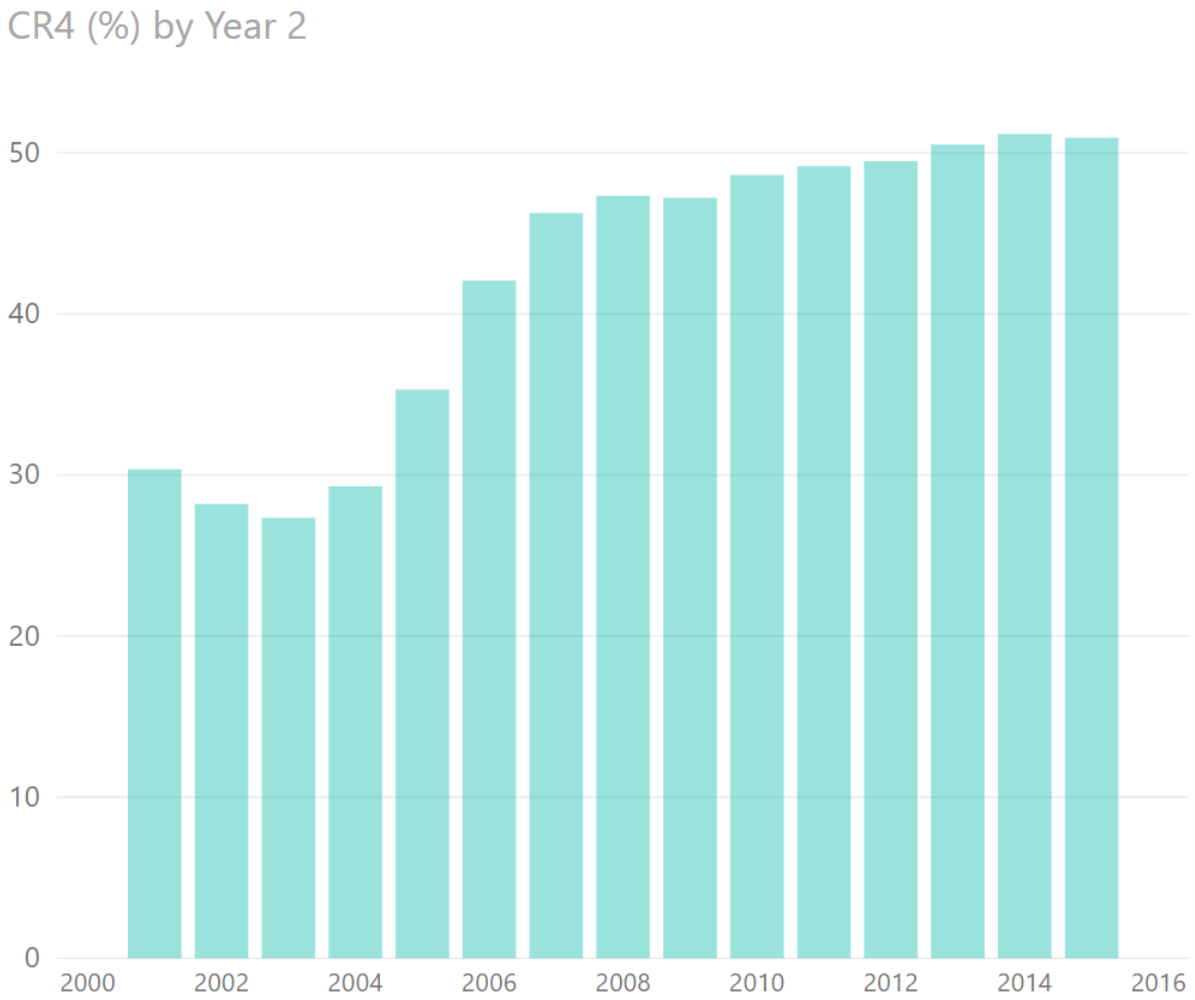
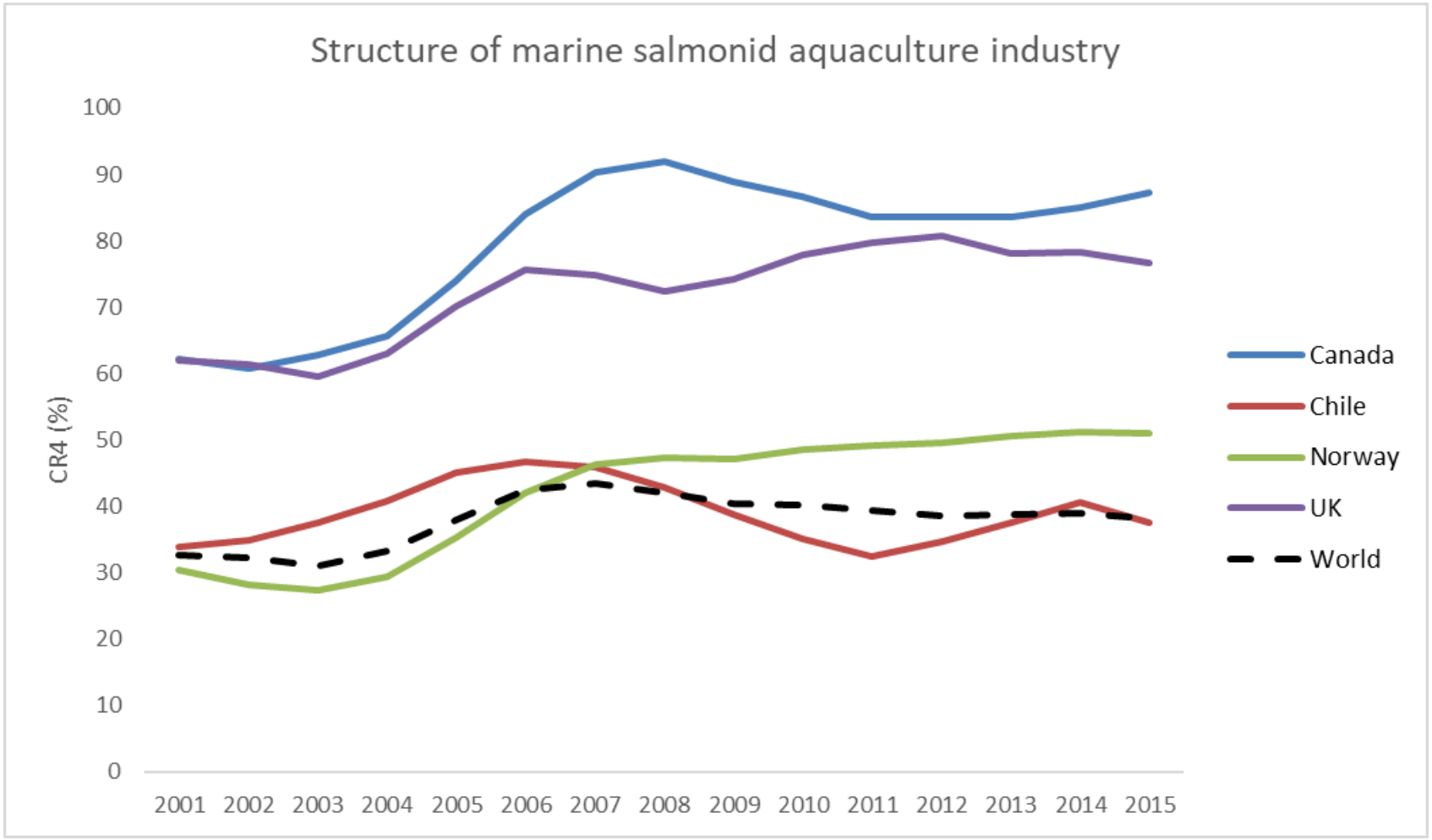
CR4 Concentration Ratio

Simply the percentage of production or turnover attributable to the largest 4 companies.

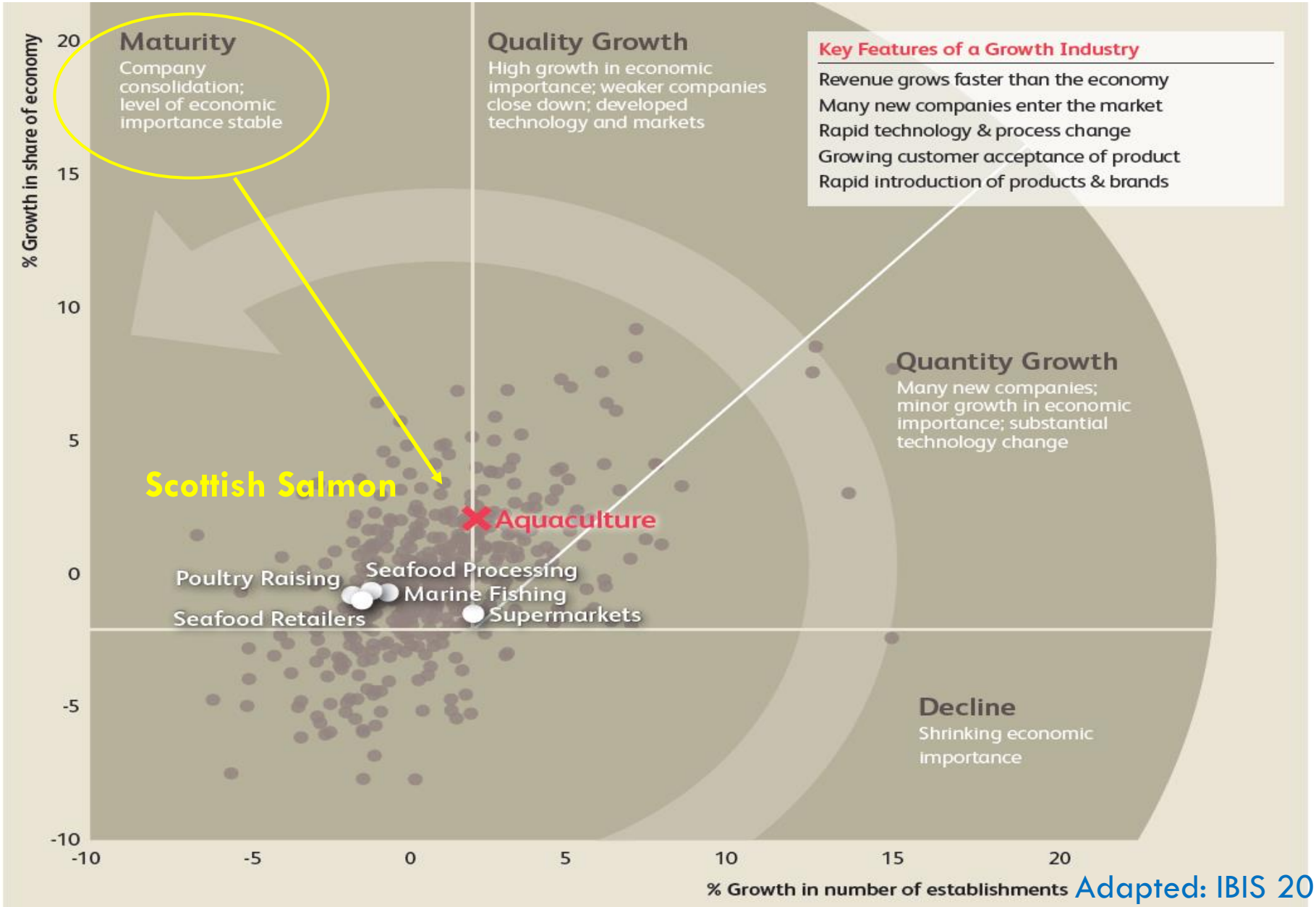
e.g. Salmon industry in Norway is only moderately concentrated



Comparison between countries

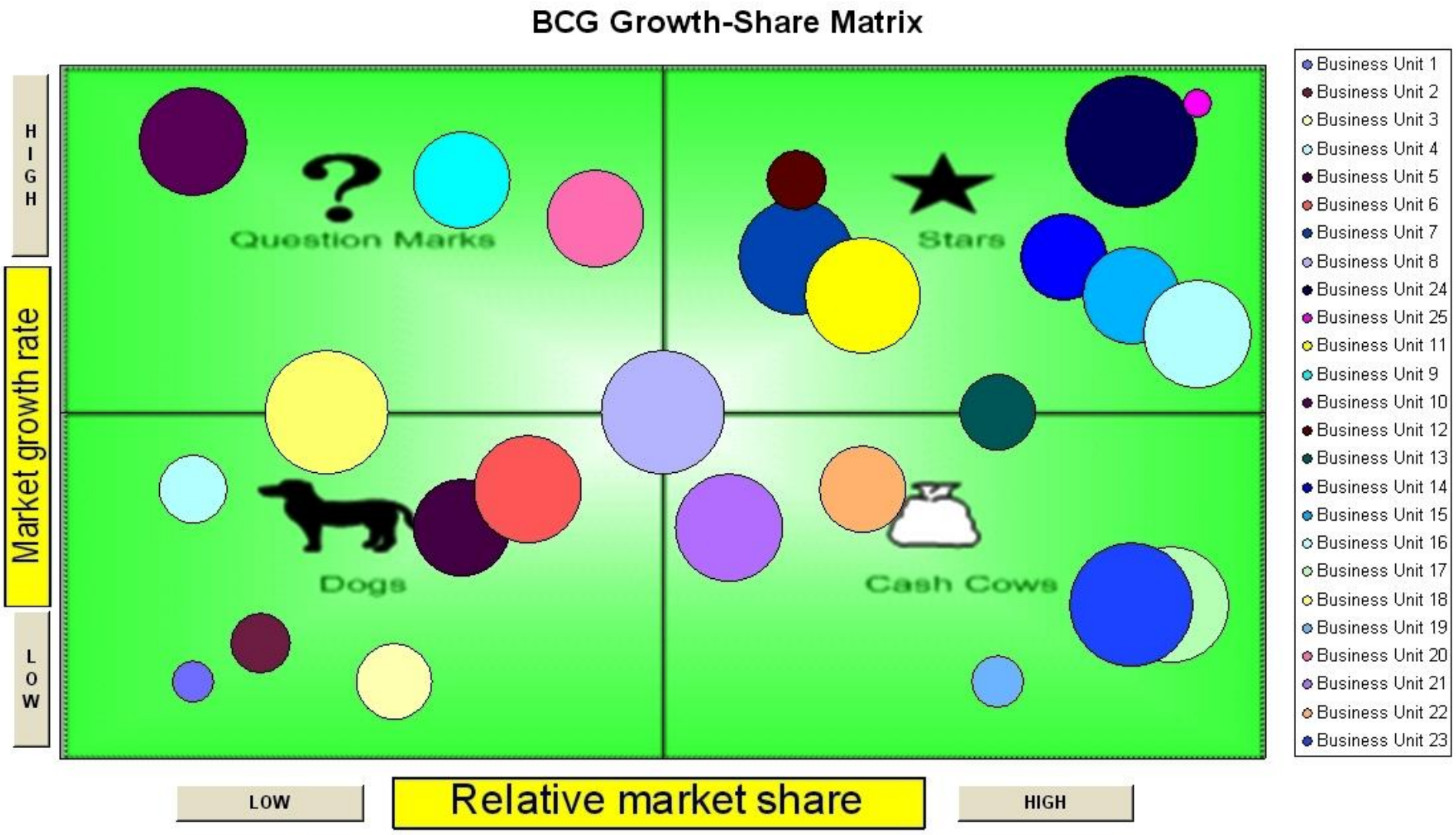


Industry dynamics – based on year-on year % changes



Adapted: IBIS 2016

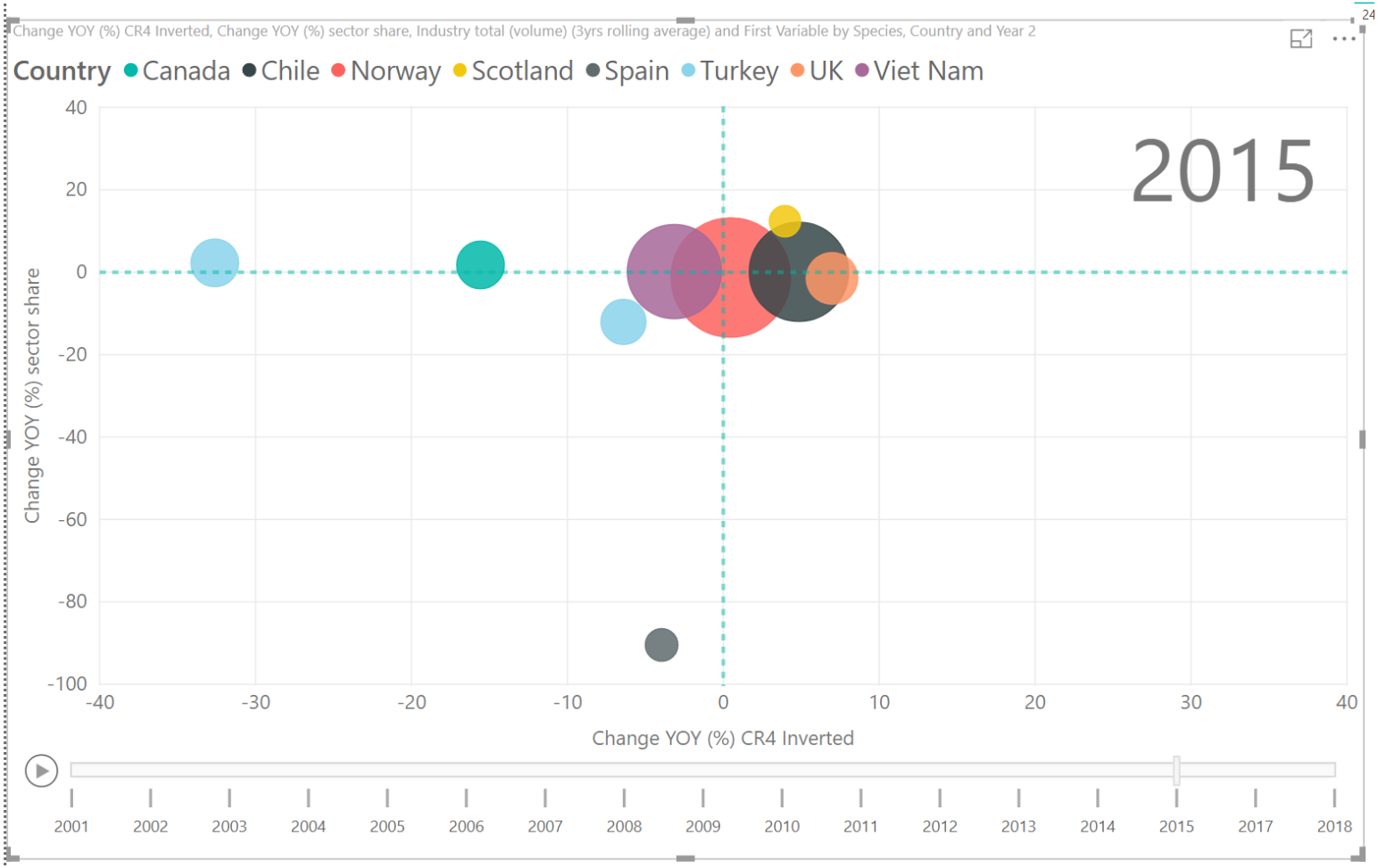
Note similarity with BCG Growth-ShareMatrix



http://www.business-tools-templates.com/BCG%20Growth-Share%20Matrix.jpg

Analysis using Microsoft Power BI

Plotting % change in inverse of CR4 against % change of sector share of global total



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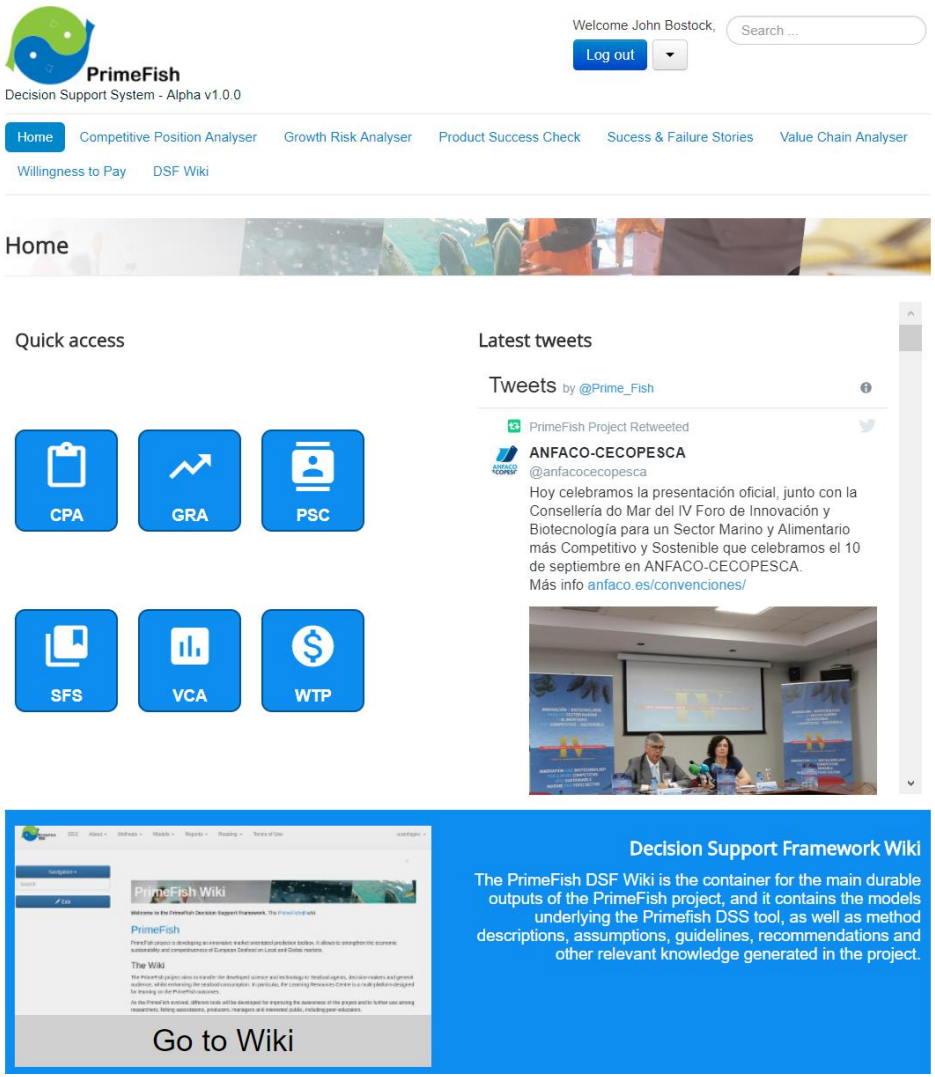
PrimeFish DSS Value Chain Analyser



Website:
www.dss.primefish.eu

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Decision support 'Value-chain analyser'

- **Primary target audience:** small & medium enterprises:
  - production, processing, marketing/ distribution, service provision
- **Challenges:**
  - (i) intense competition in sectors experiencing rapid consolidation as a result of increasingly globalised trade
  - (ii) adverse effects of market failures in more fragmented sectors
- **User needs scenarios?**
  - What strategies enable comparable enterprises to compete in more consolidated sectors
  - Access-barriers & key competition issues facing new entrants?
  - Potential exit or growth strategies for existing value-chain entities

Value Chain Analyser primary menu

Value Chain Modules

The Value chain analyser tool is built to support you with crucial information about the different value chains of the PrimeFish DSS supported species. It is composed of four different modules to help you access different levels of information about a particular value chain.

Report Generator

The VCA Report Generator Module gives you the ability to generate customized value chain reports for the different species, allowing you to easily compare results and obtain critical information.

CR4 Charts

The VCA CR4 Charts are based on current industry data and displays a timeline of measurements of the market shares of the four largest firms in the industry and is used to illustrate the degree to which an industry is oligopolistic.

GSI Map

The VCA GSI map displays the Global Salmon Initiative members and non-members progress toward ASC certifications.

Value Add Calculator

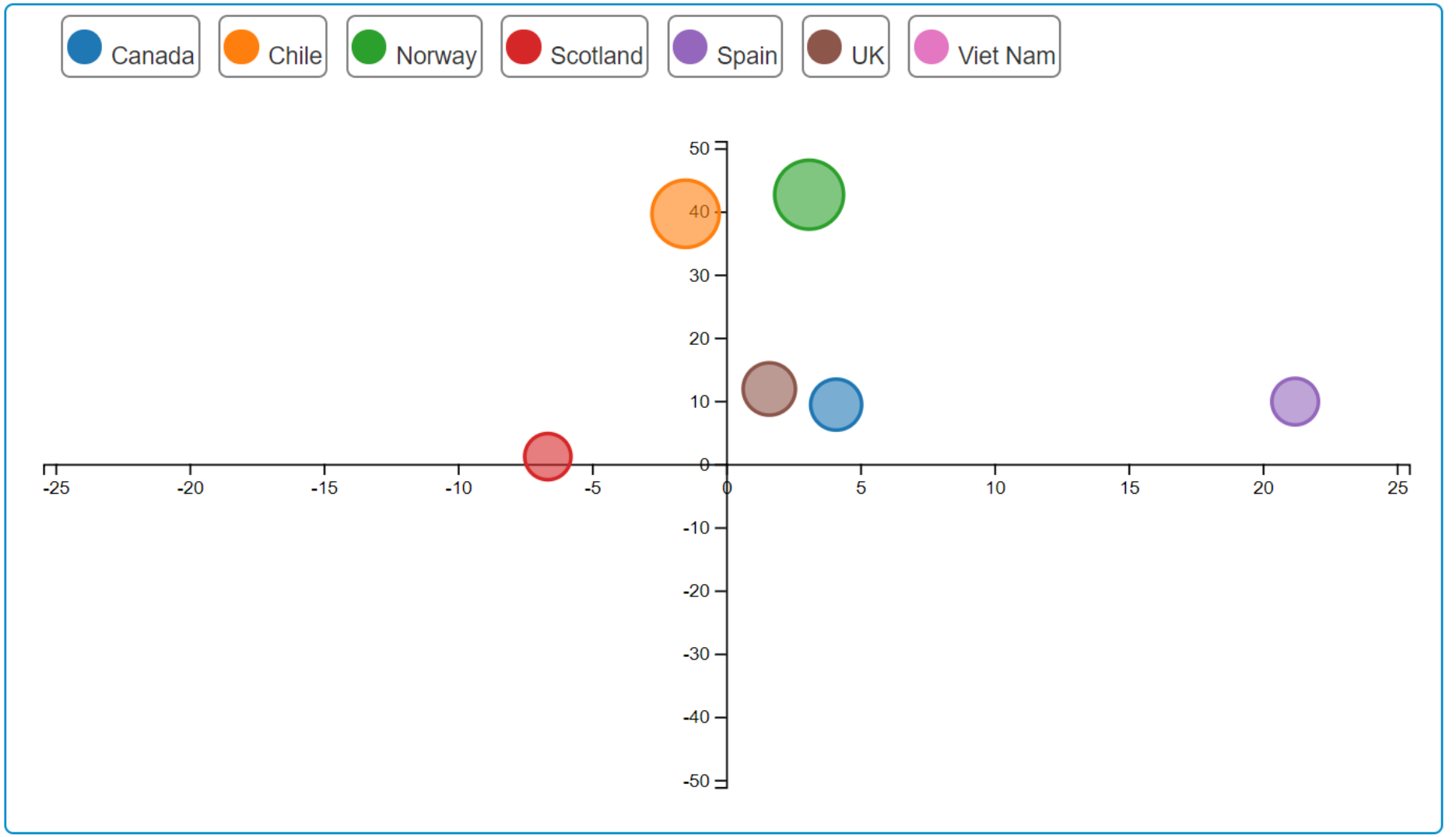
The VCA Value Add Calculator is a tool designed to help cod processors find the optimum combination of products based on their own costs, processing yields and market assessments.

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

X axis: Change YOY (%) CR4 Inverted

Y axis: Sector share in global output (%

Bubble radius: Industry total (volume) (3yrs rolli



2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

X axis

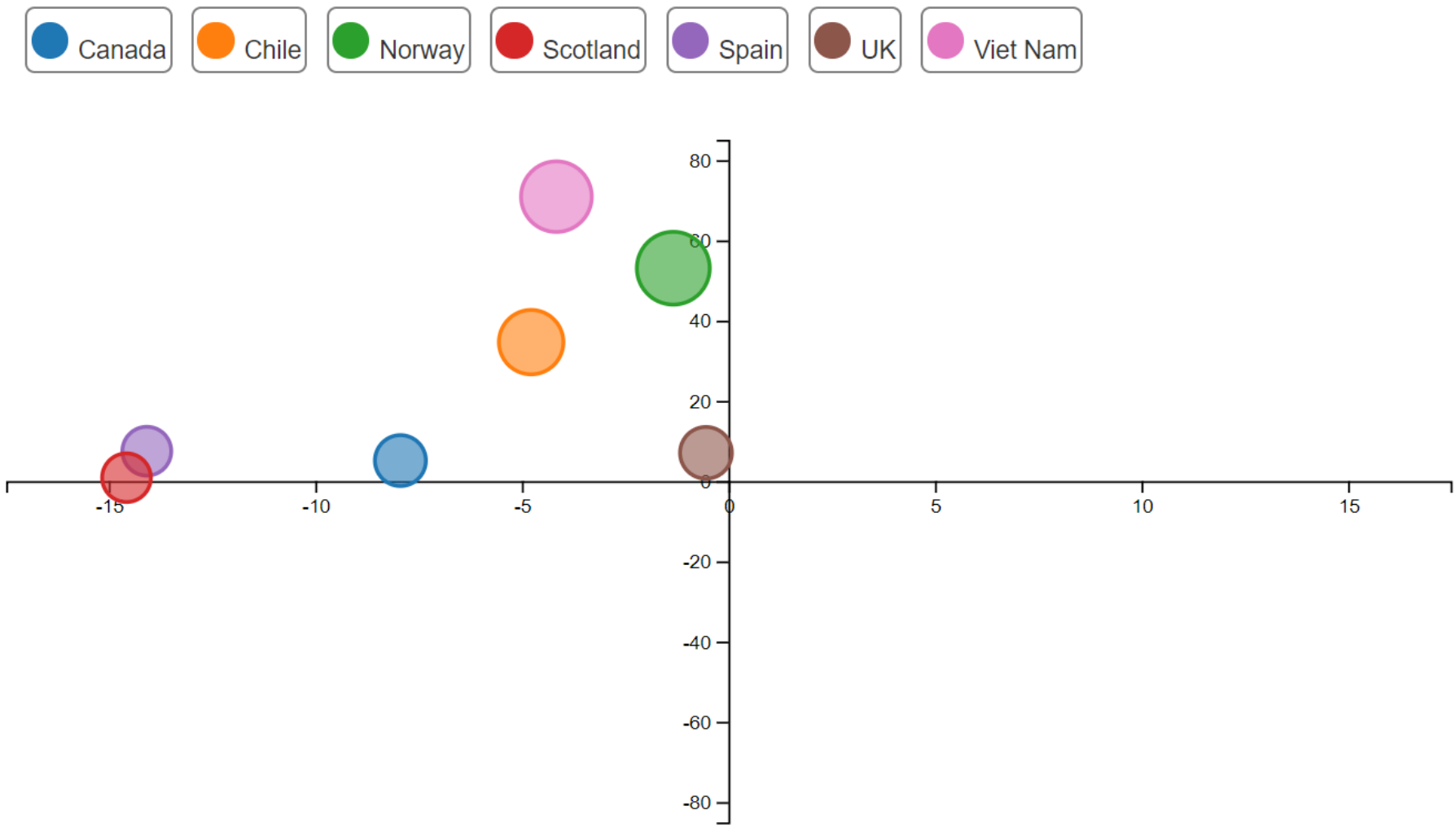
Change YOY (%) CR4 Inverted

Y axis

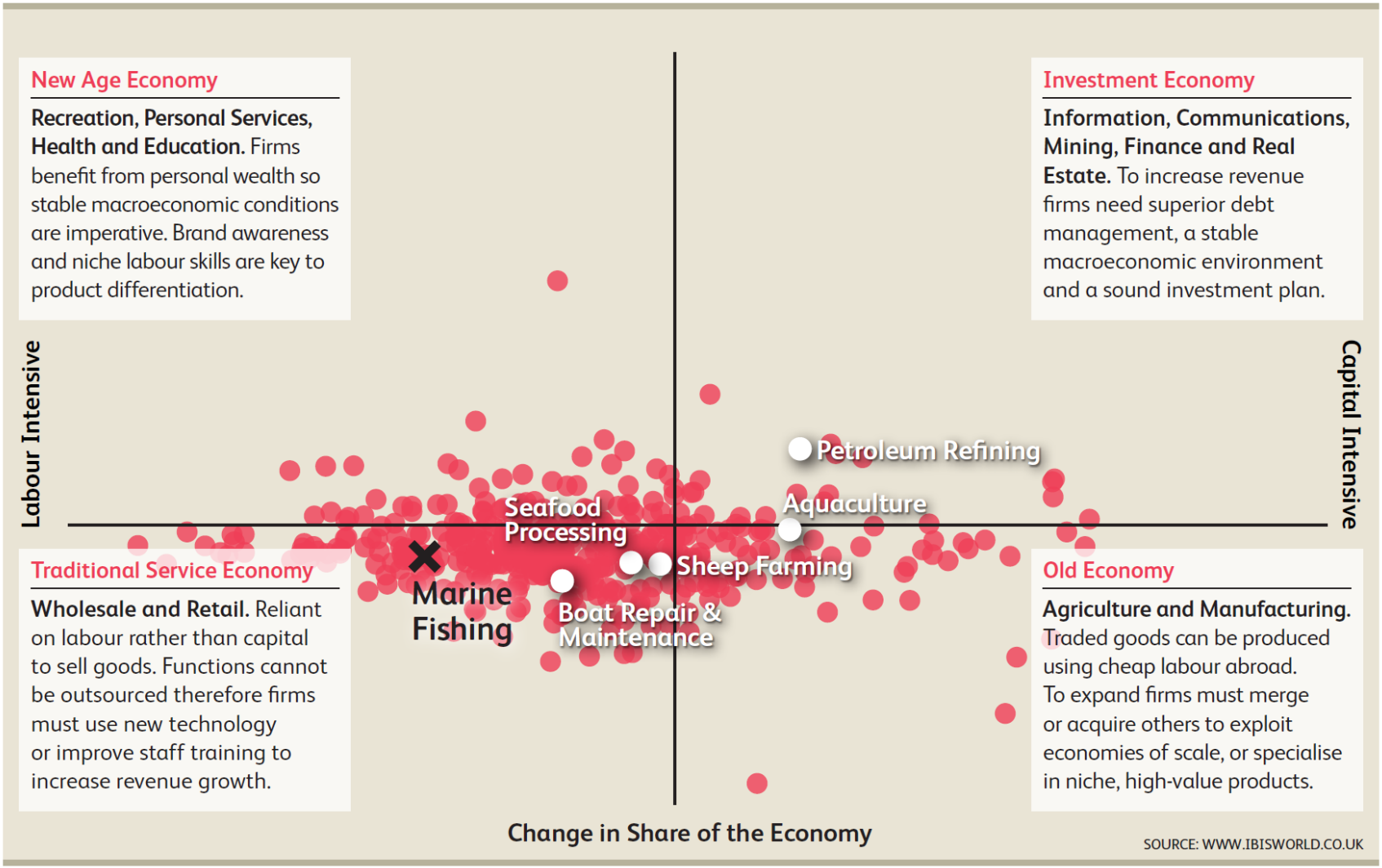
Sector share in global output (%

Bubble radius

Industry total (volume) (3yrs rolli



Further characterisation of sector competition



Strategic positioning

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Enterprise competition strategies (Porter 1985)

3 generic strategies for sustainable competitive advantage

a. Cost leadership: Lowest cost producer (price: cost ratio)

b. Differentiation: offer superior value to consumer (price premium &/ or brand loyalty in a mass market)

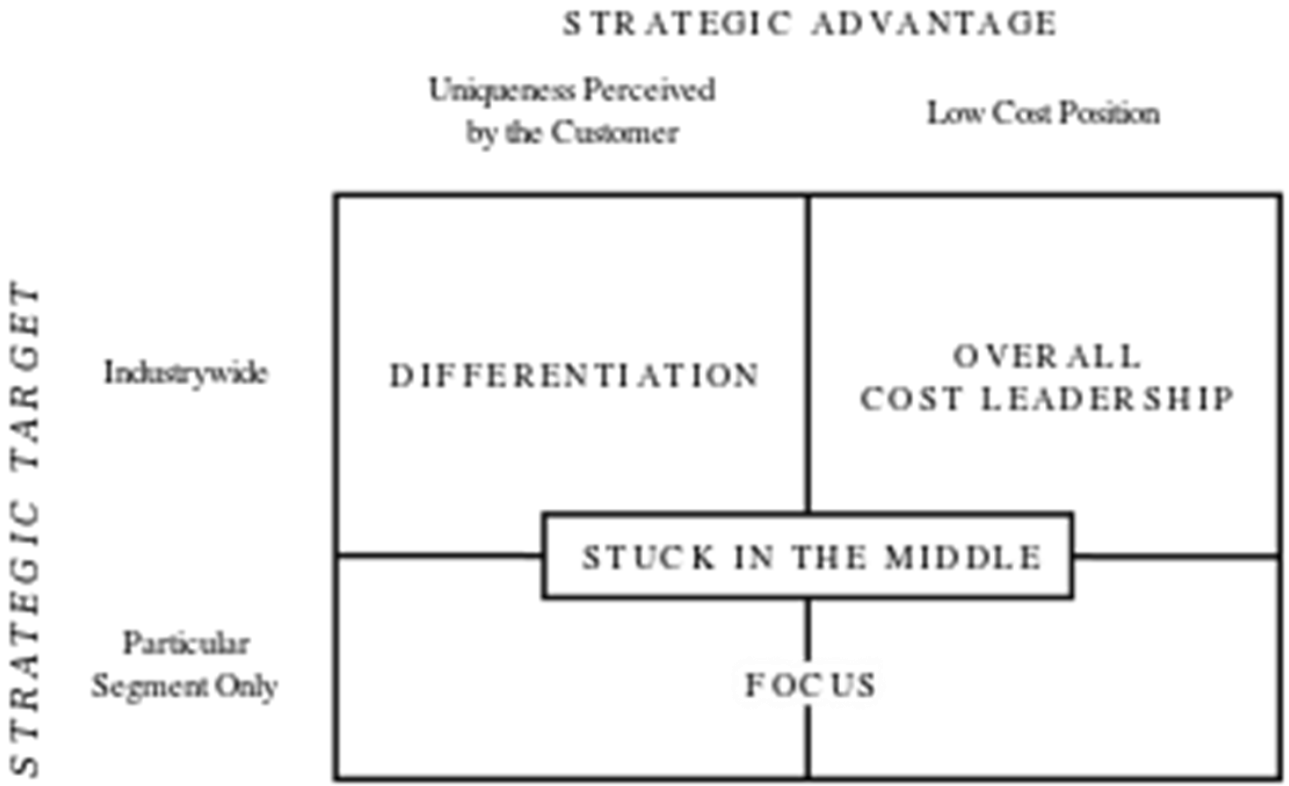
c. Focus strategy: target narrow market gap using a &/or b

Competitive advantage generally require specific focus

i.e. a, b or c

Wester Ross Salmon case study example – switch from b to c

Generic competition strategies



Industry Dynamics

- How industries change over time, through their own processes of evolution (Schumpeter)
- Some industries (esp. with rapid product turnover and/ or high capitalisation) move through intrinsic upturns & downturns in ways not necessarily related to wider economic fluctuations
- Complements comparative economic analysis

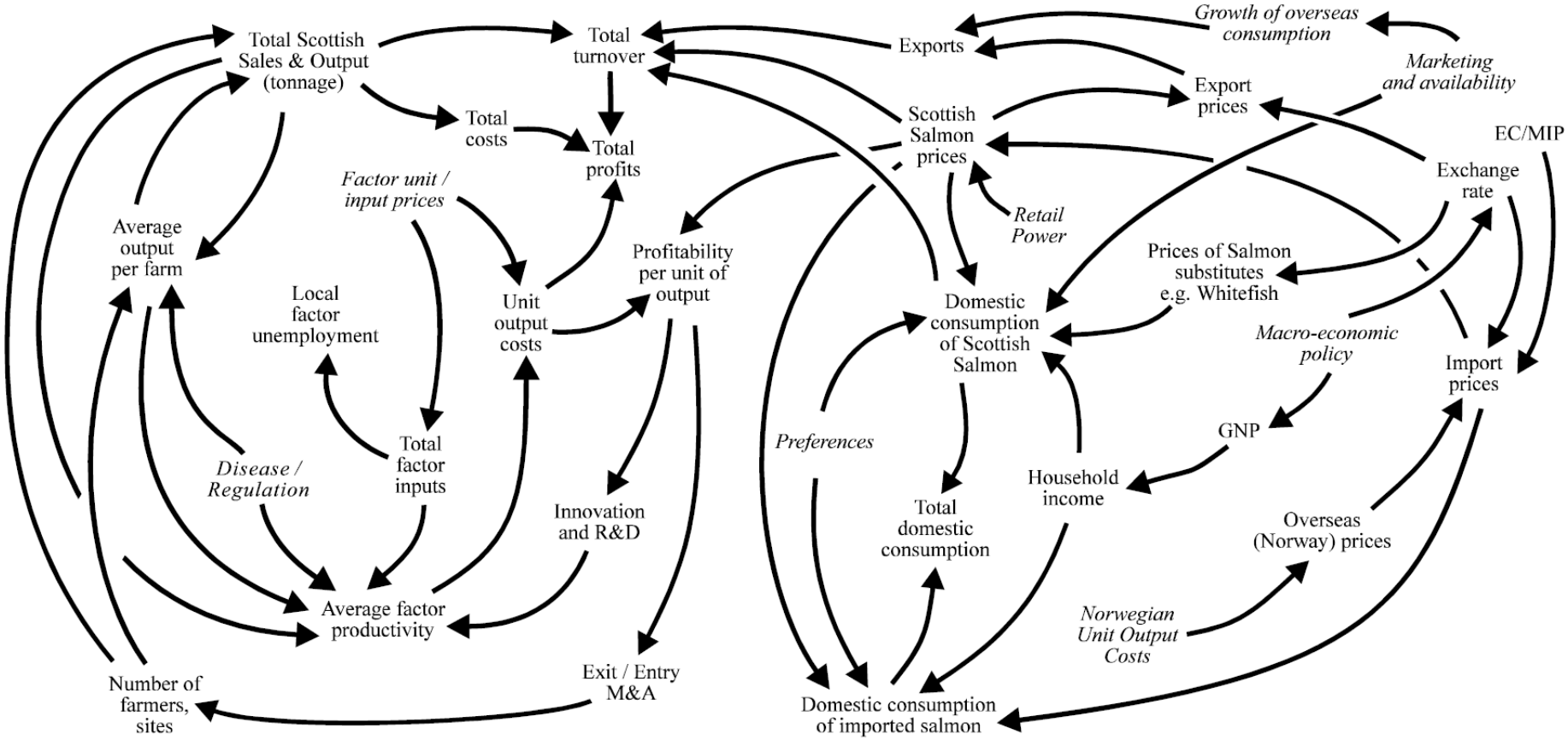
Static v Dynamic Strategy Assessment

- **Static (dominant):** industry/market conditions set average sector performance & scope of individuals to do better/ worse
- Based on Porters 'Industry Forces' paradigm
- **Dynamic view:** How strategic actions occur? Intrinsic business factors more important than industry forces → Resource Base View (RBV)
- 'You can do well in difficult industries & struggle in industries where others do well!"

Strategy Dynamics & Performance?

- What do managers seek to improve?
- £15m/yr indefinitely or £12m/yr ↑20%/yr – starting with same resources?
- Investors: profitability (return on sales or assets) v increasing future cash flows?
- Profitability? new resources for growth…
- Strategy dynamics – 'still the next frontier; under-researched & under-understood'

Conceptual framework of the Scottish salmon farming industry – many strategic options



Source: Public & Corporate Economic Consultants (PACEC) & Stirling Aquaculture, Report for Highland & Islands Development, 1998

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Company-level Strategic Positioning analysis

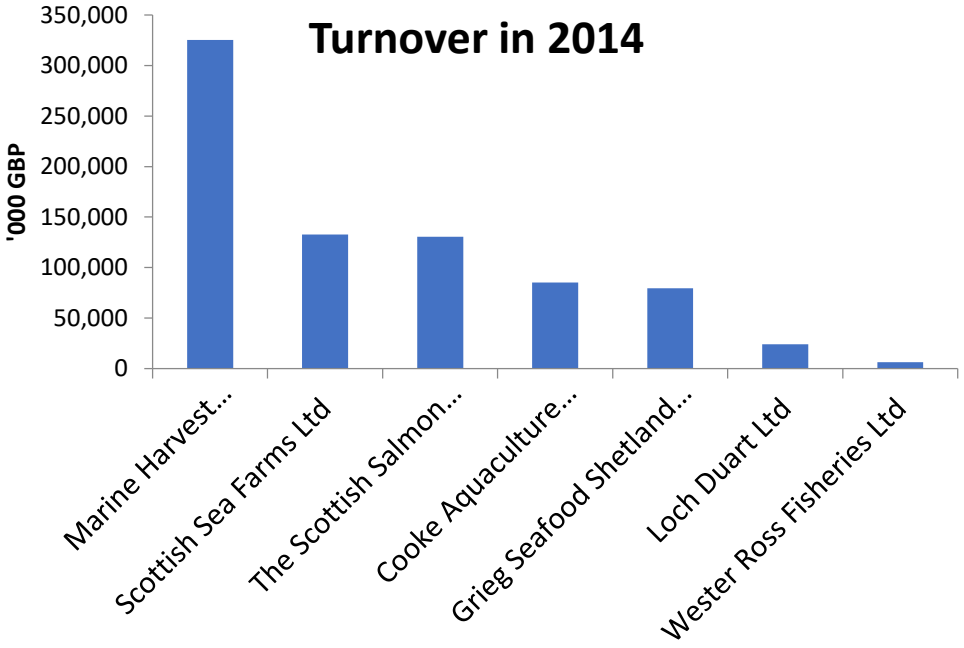
Strategic Positioning Definitions

- **Choices made about kind of value-added & how it will be created differently than rivals (*premium price or lower costs*)**

- **Positioning in the future taking into account the changing environment & the systematic realization of that positioning**

http://www.zenska-mreza.hr/prirucnik/en/en_read_change_4.htm

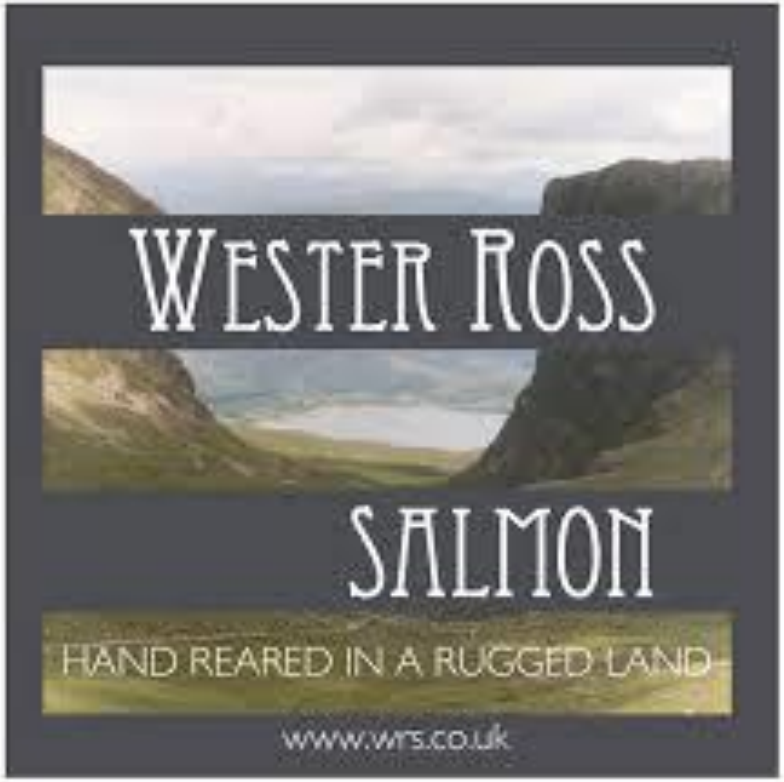
Scottish salmon sector – market share



Source: FAME

Company	% Mkt share
1. Marine Harvest (Scotland) Ltd	41.5
2. Scottish Sea Farms Ltd	16.9
3. The Scottish Salmon Company Ltd	16.7
4. Cooke Aquaculture Scotland Ltd	10.9
5. Grieg Seafood Shetland Ltd	10.1
6. Loch Duart Ltd	3.1
7. Wester Ross Fisheries Ltd	0.8

Enterprise-Level Strategic Positioning Case-Studies



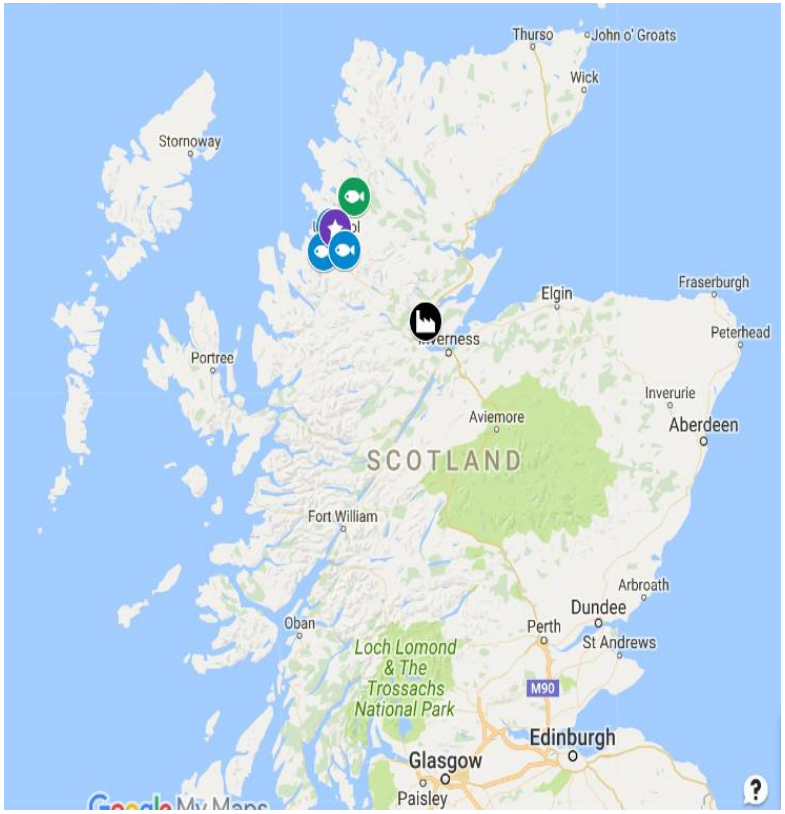
Case Study: Wester Ross Salmon

Sector: Aquaculture; Salmon

Country/ Region: Scotland/ UK

Type: Med Scale, Vert int. Farm & Processing

Company Structure

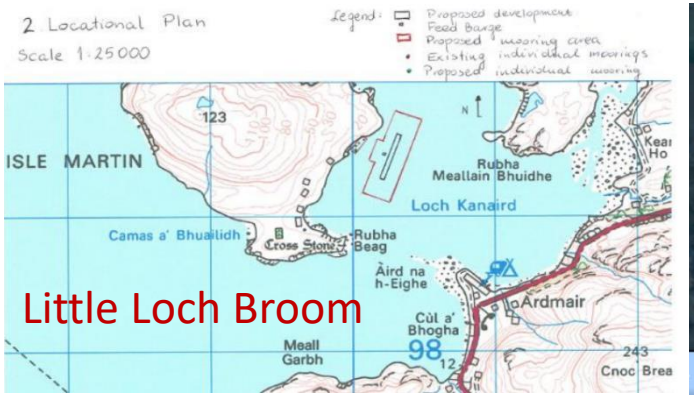


Active sites

- 3 marine
- 1 freshwater
- 1 processing plant
- 1 admin office

Capacity 2,522t/yr (from 154 cages)

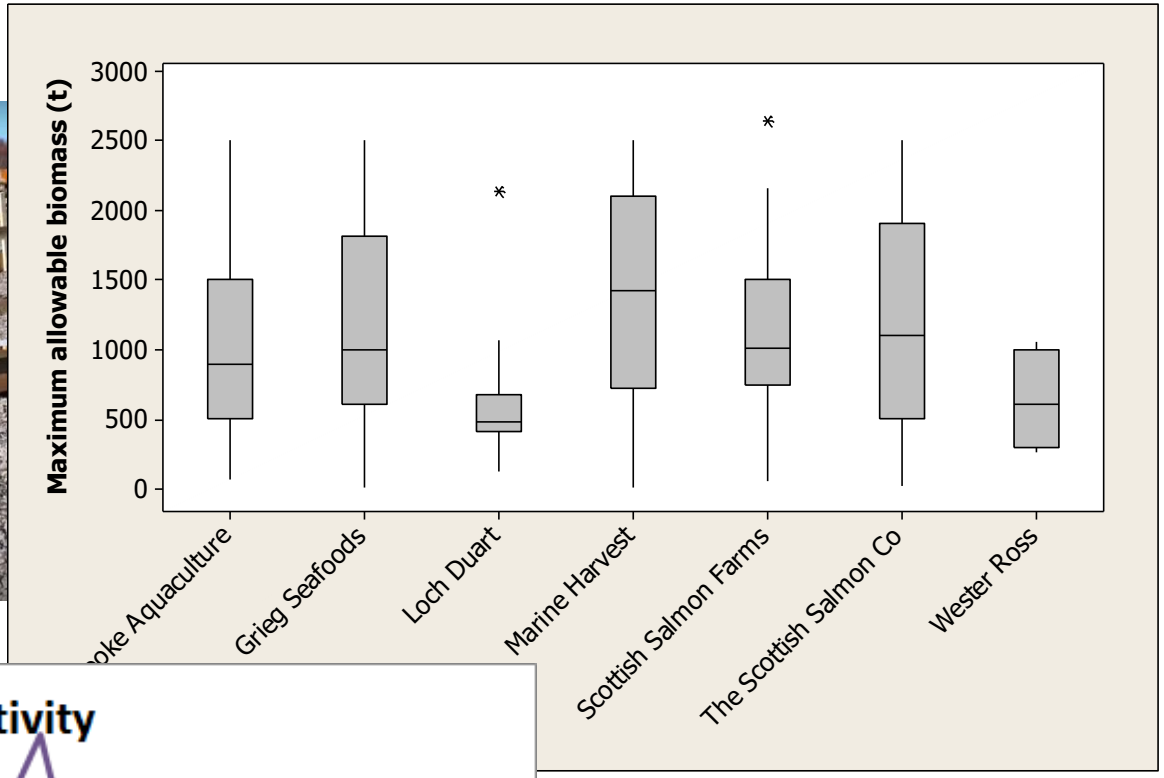
Total staff = 49 Turnover £9.5m

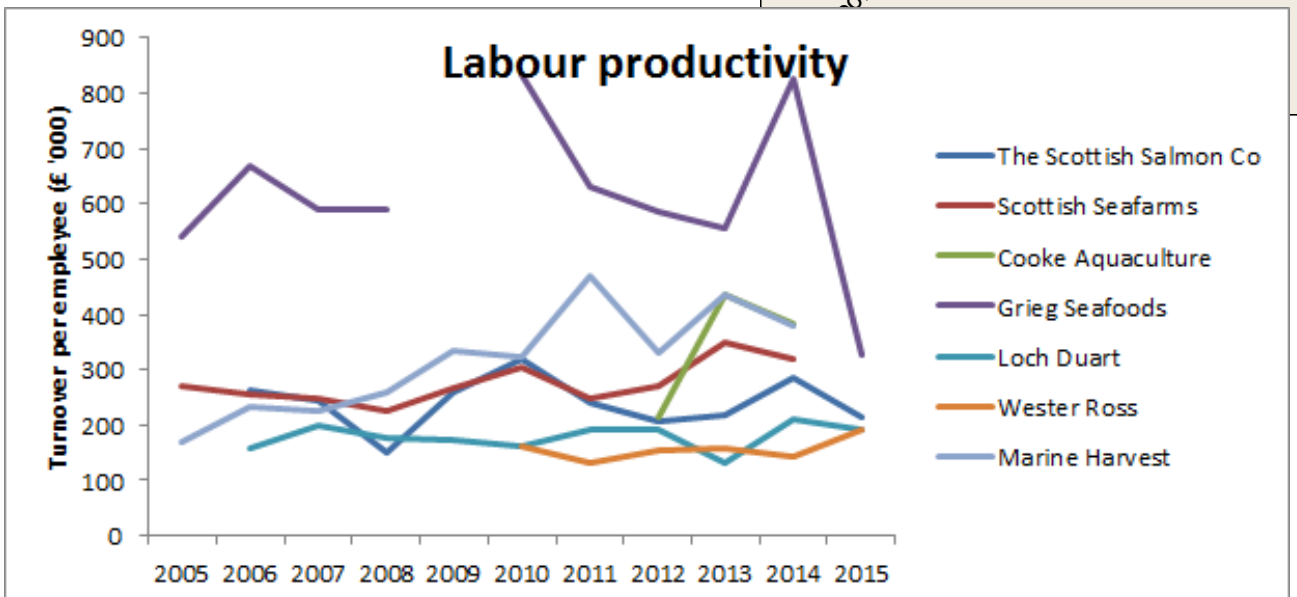


Evolution & Challenges

- **Founded 1977: Scotland's oldest independent, owner-operated salmon farm**
- **Management buyout in 2006 (then 50 staff)**
- **Two new marine sites acquired in 2008 & 2011**
- **Smaller loch systems & economic viability**
- **Challenges around new site licenses linked to poor disease (sea-lice) record**
- **Low labour productivity by industry norms**

Smaller sites & lower productivity





Strategic shift to niche differentiated marketing

Scottish campaign group questions Wester Ross farms' right to operate

April 9, 2014, 9:13 am

Two salmon farms in Scotland with very poor sea-lice records are the center of confusion as to whether or not they have planning permission to operate, says Salmon and Trout Association

Scottish salmon farmer Wester Ross sees results spiral after 20% sales drop

October 12, 2015, 10:12 am

In a year in which UK retailer Asda dropped the farm as a salmon supplier, revenue dropped 21% and profit fell through to a loss

- Asda drops Scottish salmon supplier Wester Ross – Undercurrent News Apr 2014

Scottish salmon farmer Wester Ross sees results spiral after 20% sales drop

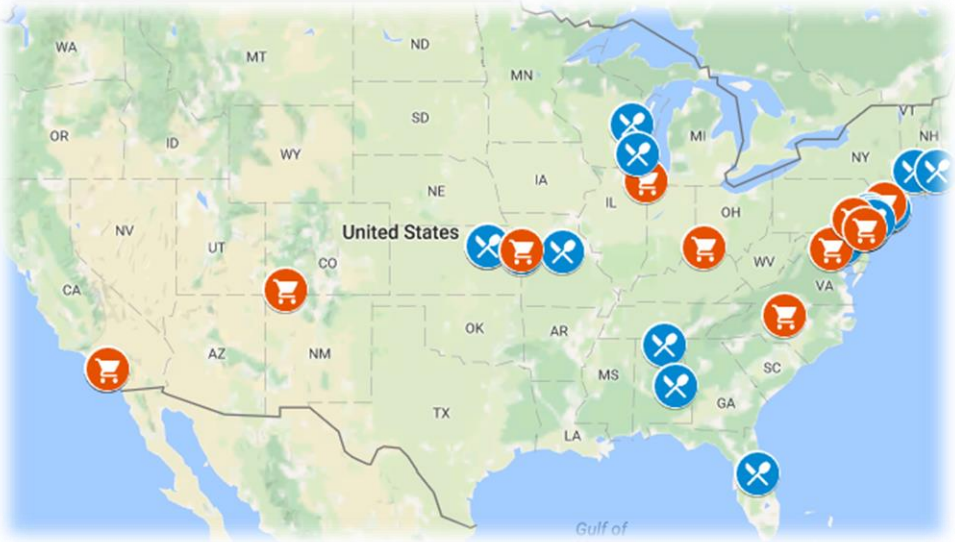
October 12, 2015, 10:12 am

Undercurrent News

During a year in which UK retailer Asda dropped it as a supplier, Scottish salmon farmer Wester Ross Fisheries' revenue dropped 21% and profit fell through to a loss.

Narrow Niche Market Segments

- **Fresh whole & portion direct sales to boutique**
  - Restaurants &
  - **retail (farm shops, fishmongers)**
- **Distributors**
  - **Switzerland, France, Belgium, Germany, Canada, USA, Asia**

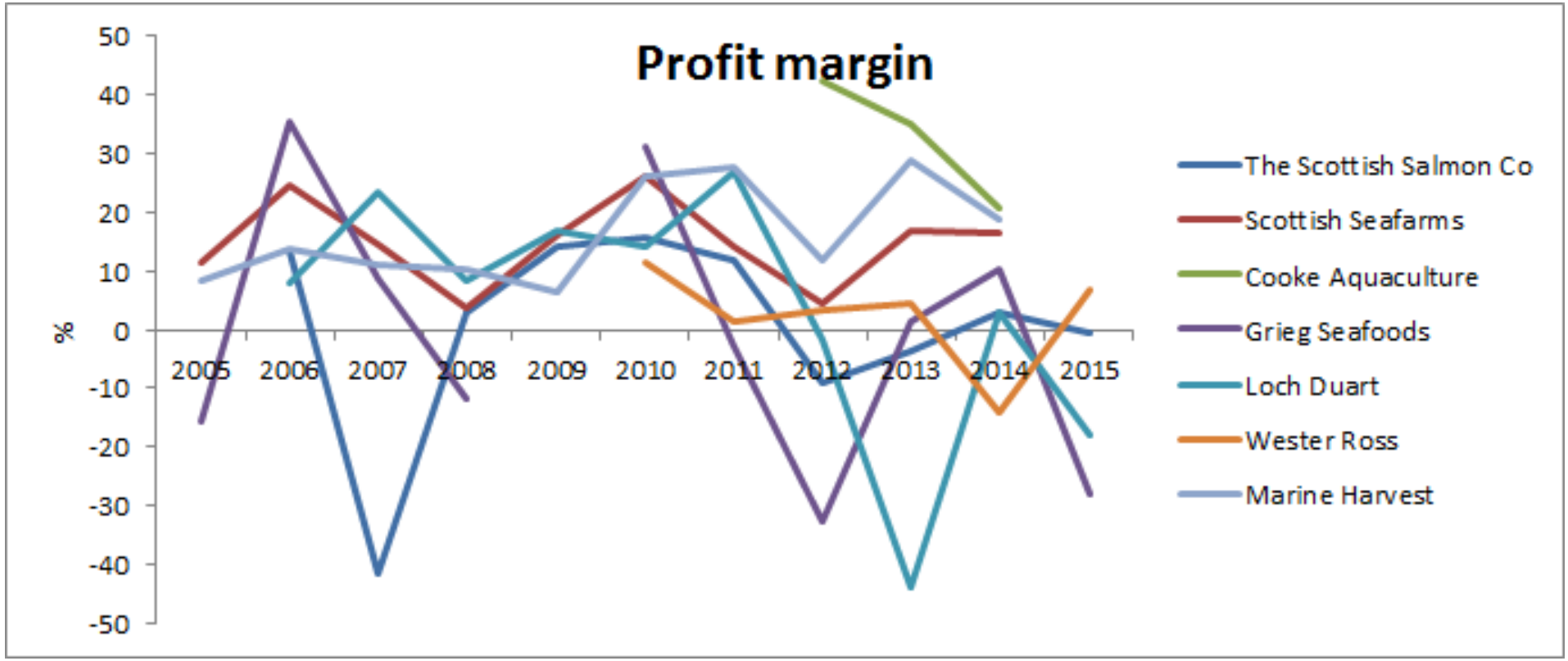


Branding

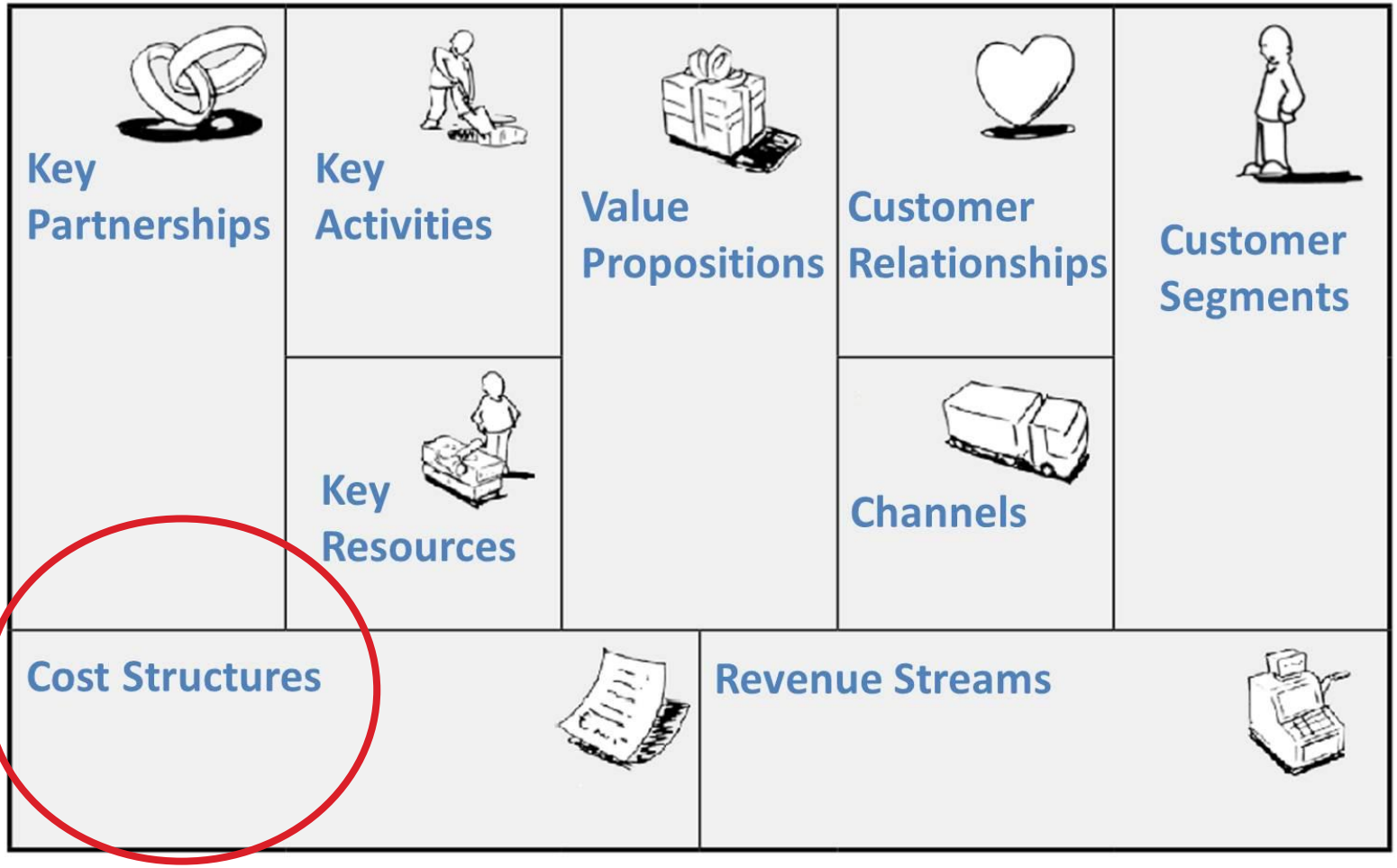
Community, Provenance, Environment

Strategic repositioning results

- Turn around by end 2015; turnover rising 50% to £9.45m.
- Increase from all active market regions
- UK turnover from £2.6m to £4.2m, and 'other' sales from £3.6m to £5m



Business canvas mapping – Consideration of product

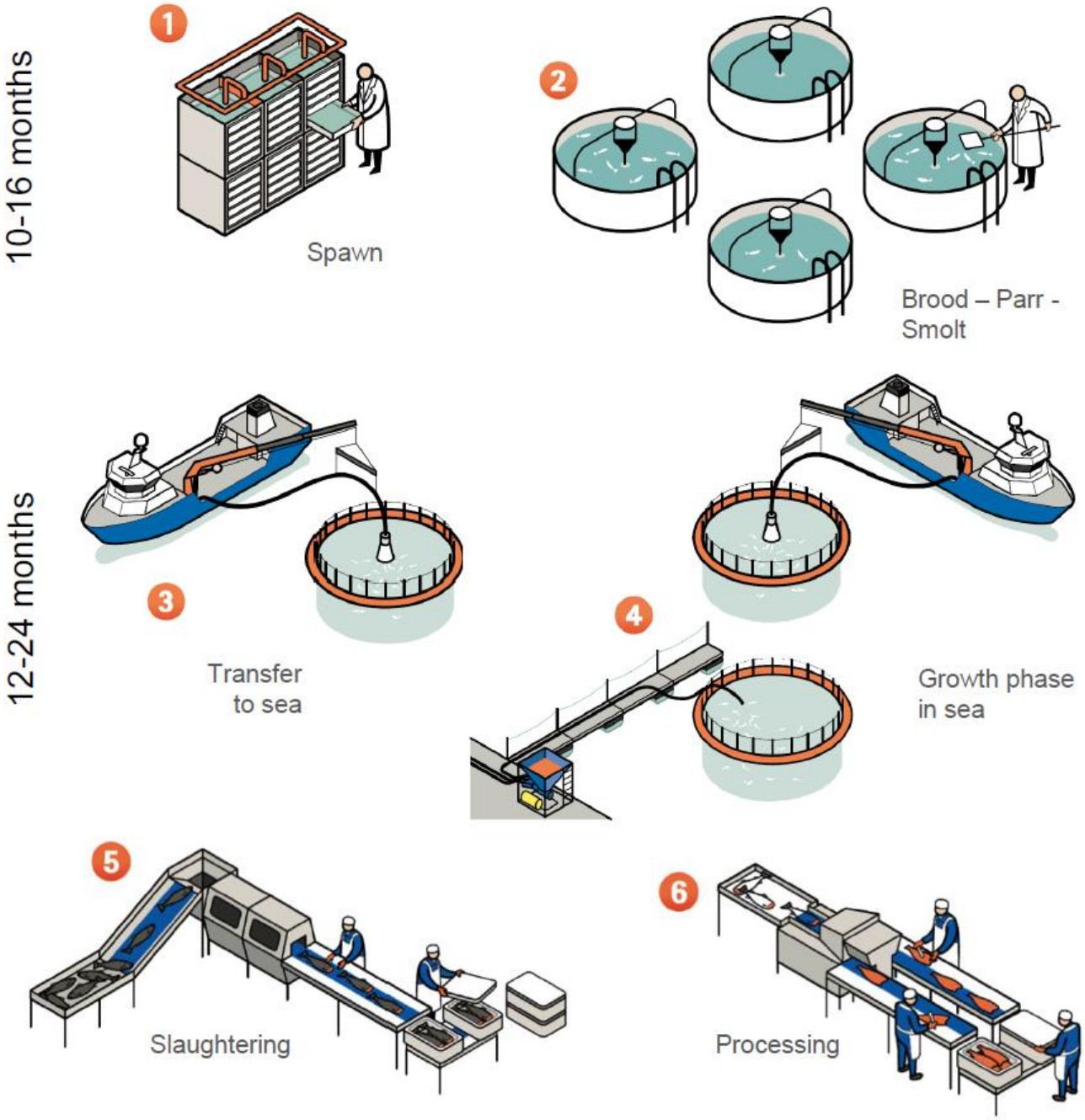


Identification of company activities and key partnerships

http://www.colinnewlyn.com/2013/08/12/entrepreneurial-thinking-and-the-business-model-canvas/

The Salmon production process

(Source: Marine Harvest Salmon Farming Handbook 2018)



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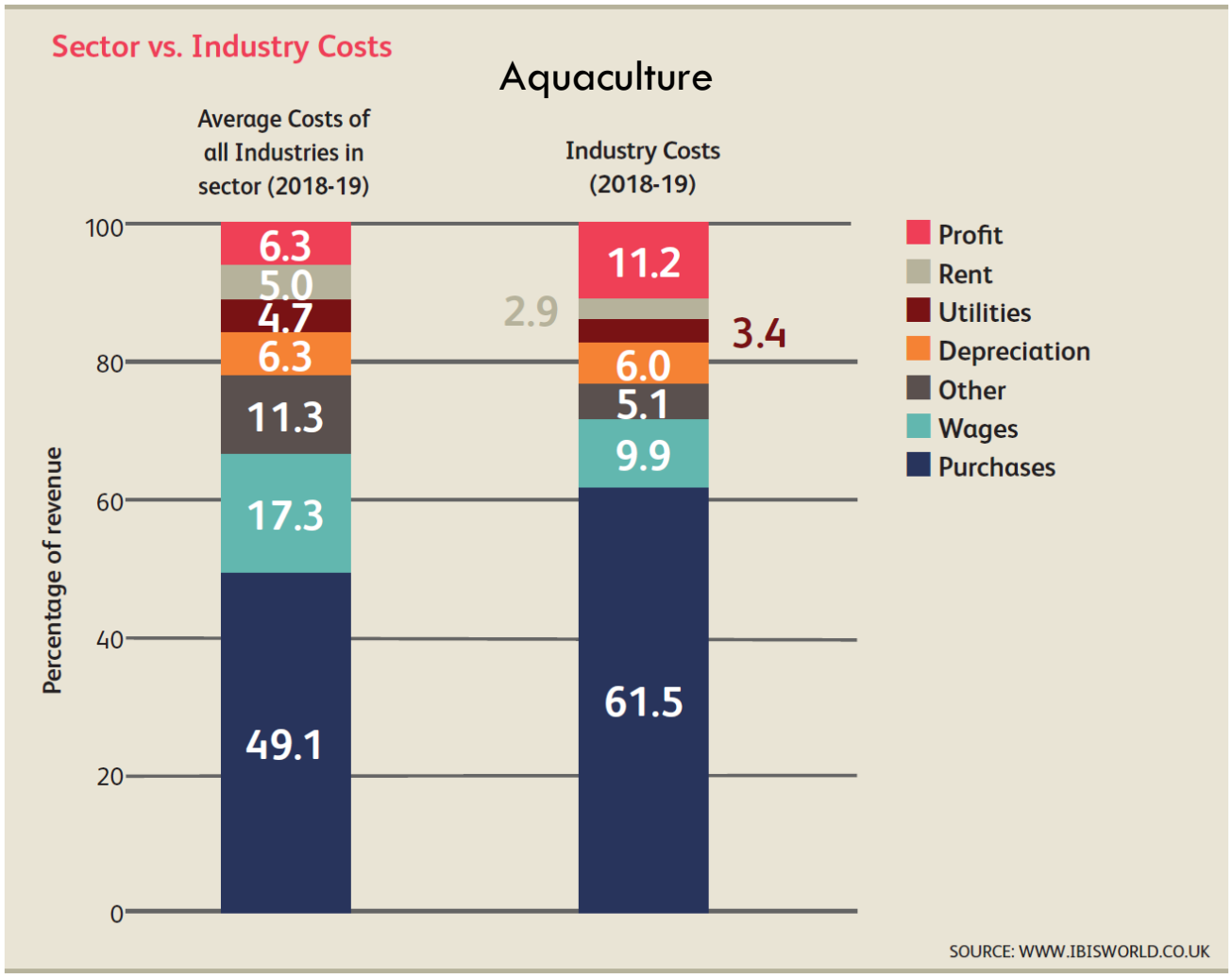
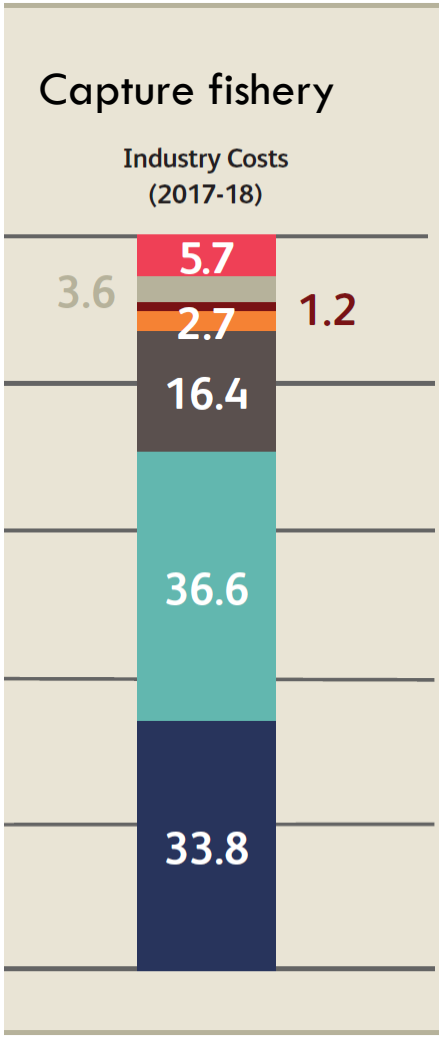
UK aquaculture (mainly salmon cost structure)





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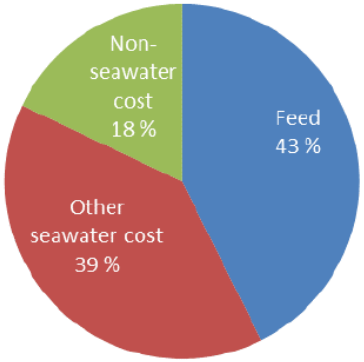
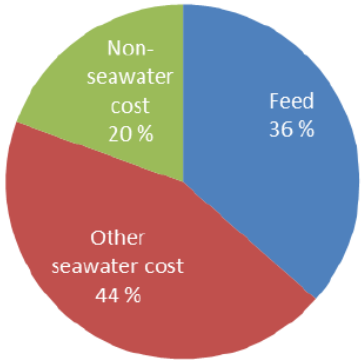
Marine Harvest – salmon production cost

Norway (NOK)

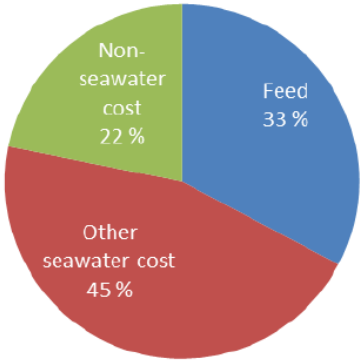


Canada (CAD)

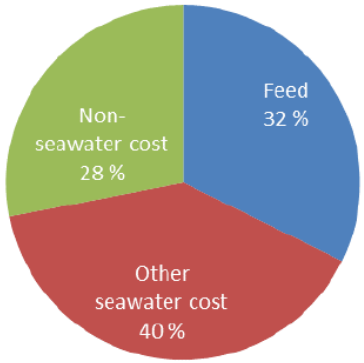


Cost structures can vary due to locational differences

Scotland (GBP)



Chile (USD)



Source: Marine Harvest Salmon Farming Handbook 2018

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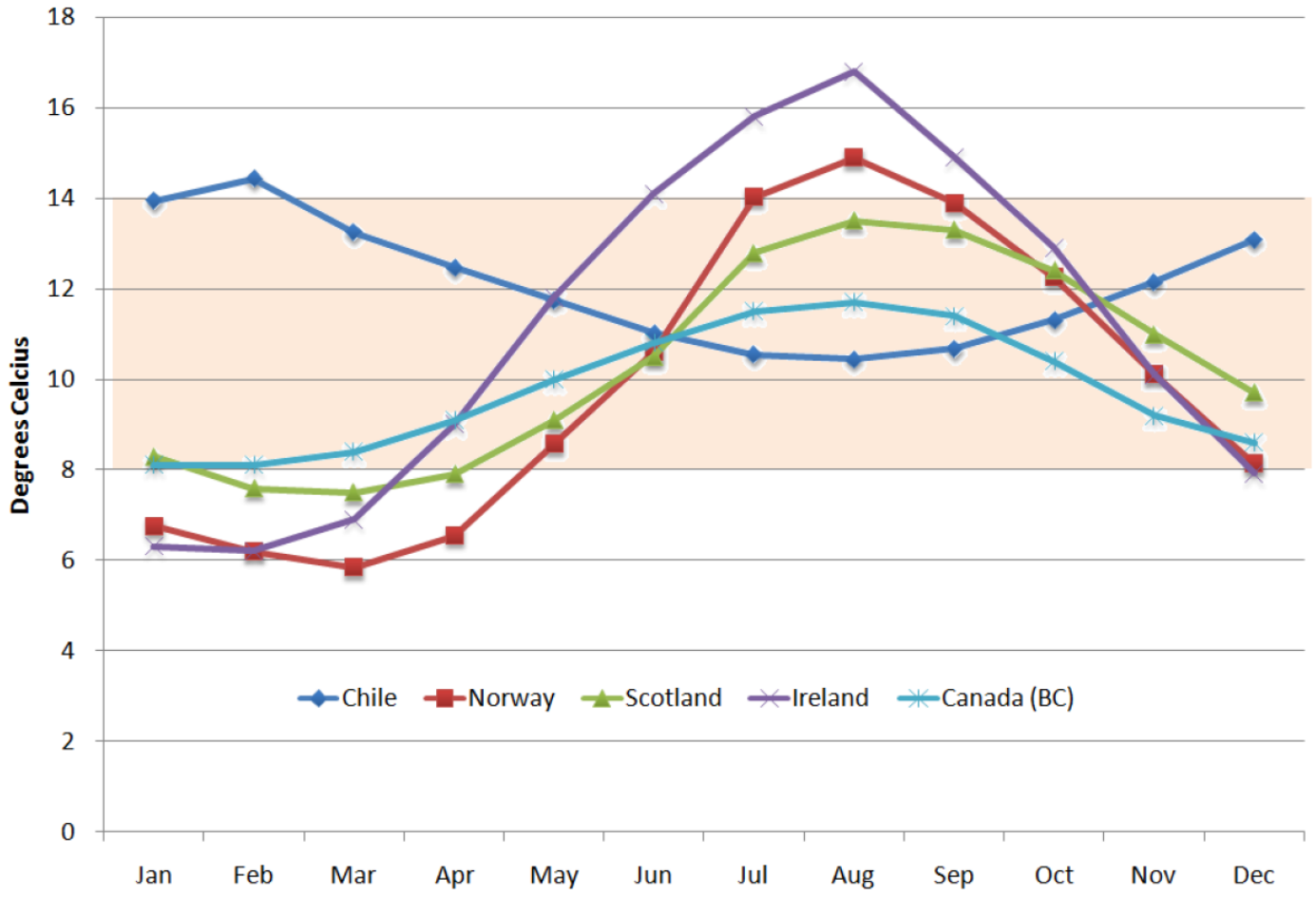
Importance of local variables including water temperature



Environmental temperature and daylength cycles can affect growth rates and hence production cycles. Shaded area is optimum for prodction

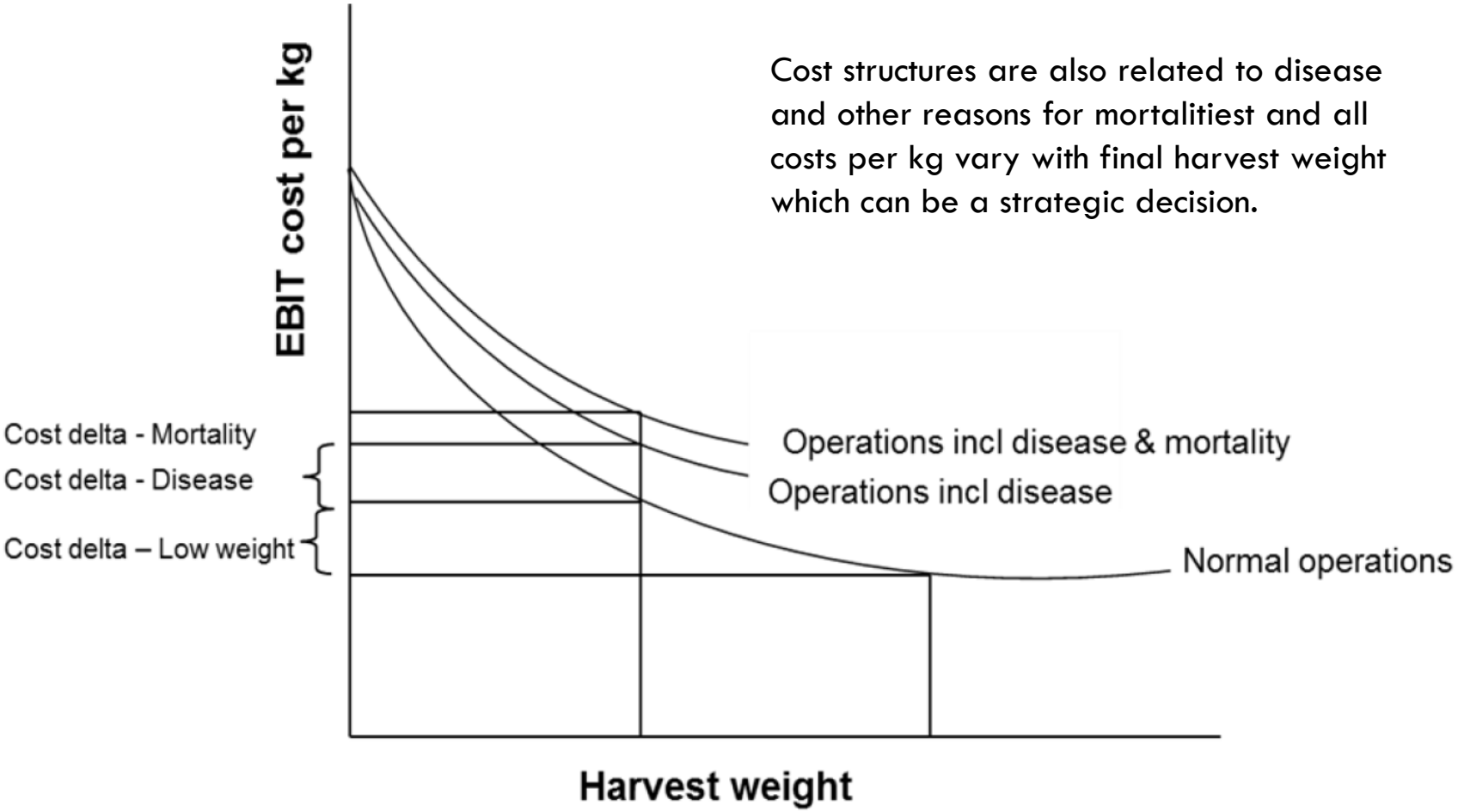
Source: Marine Harvest Salmon Farming Handbook 2018

Marine Harvest – Cost Structure

	Norway (EUR)	Canada (CAD)	Scotland (GBP)	Chile (USD)
Feed	1,70	1,73	1,71	1,45
Primary processing	0,33	0,35	0,27	0,44
Smolt	0,35	0,47	0,36	0,65
Salary	0,24	0,40	0,25	0,19
Maintenance	0,16	0,19	0,17	0,19
Well boat	0,15	0,12	0,24	0,20
Depreciation	0,13	0,21	0,22	0,15
Sales & Marketing	0,03	0,01	0,04	0,03
Mortality	0,06	0,05	0,16	0,06
Other	0,81	0,95	0,96	0,76
Total*	3,97	4,48	4,39	4,12

Source: Marine Harvest Salmon Farming Handbook 2018

Marine Harvest cost structure – disease & mortality



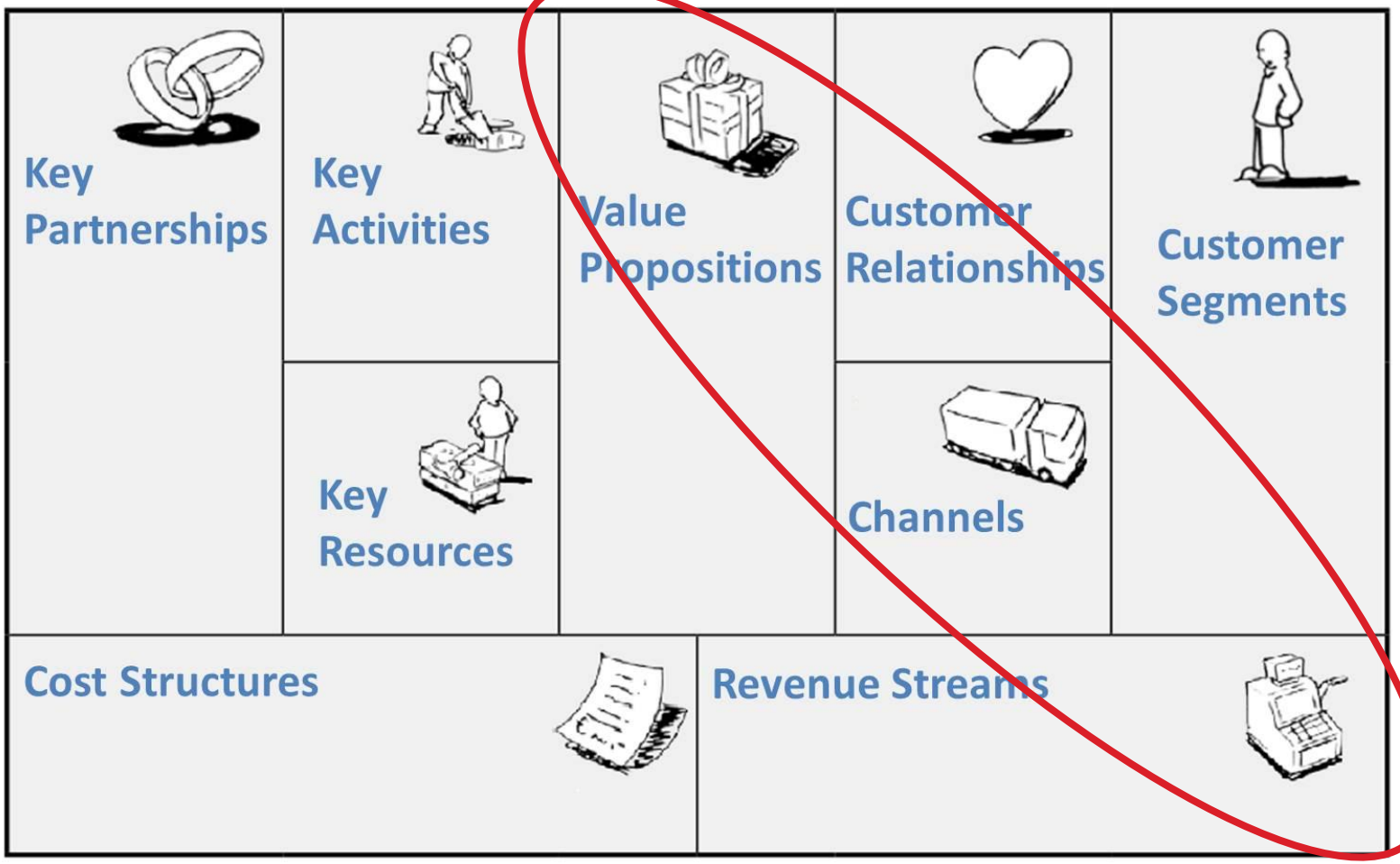
Cost structures are also related to disease and other reasons for mortalitiest and all costs per kg vary with final harvest weight which can be a strategic decision.

Source: Marine Harvest Salmon Farming Handbook 2018

Value Addition

Horizon 2020 Programme

Business canvas mapping – value add options



Maximising value from raw material

http://www.colinnewlyn.com/2013/08/12/entrepreneurial-thinking-and-the-business-model-canvas/


Commodity raw
material

Salmon is now available in a wide range of value-add products

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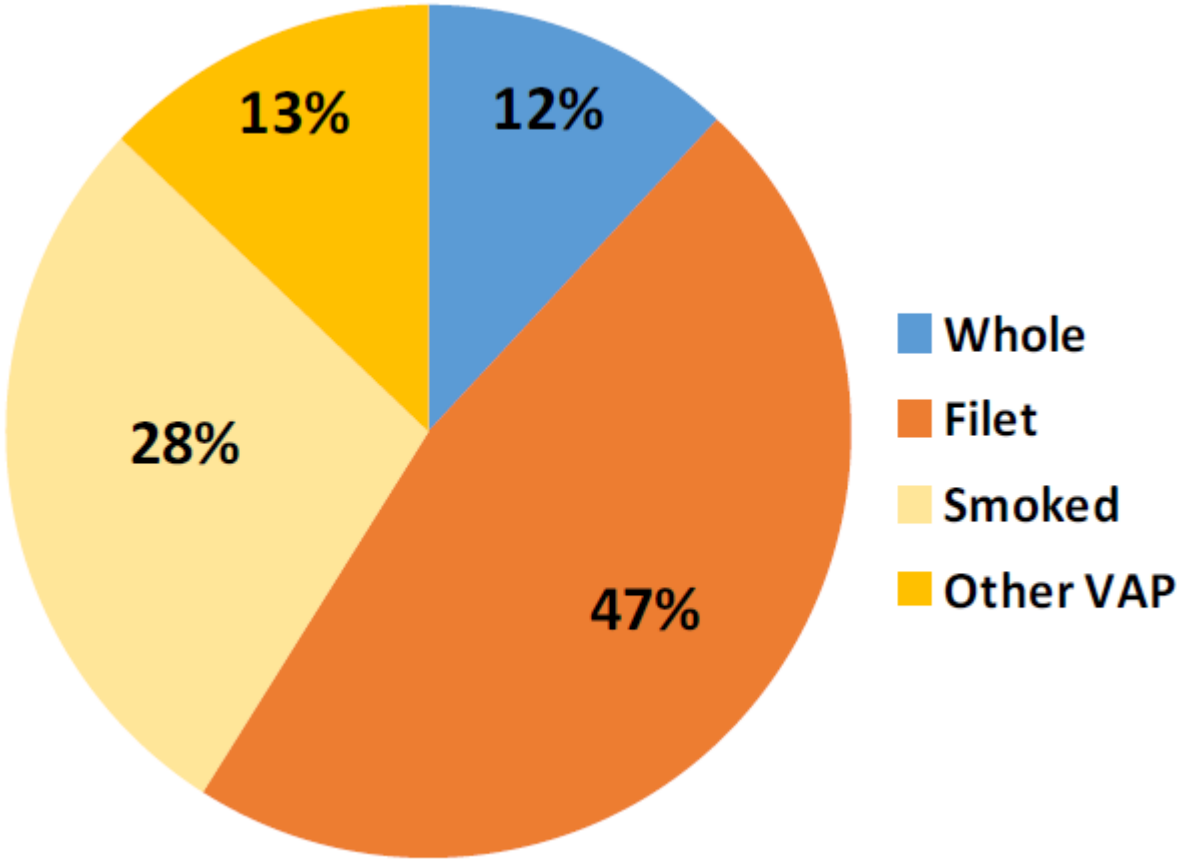
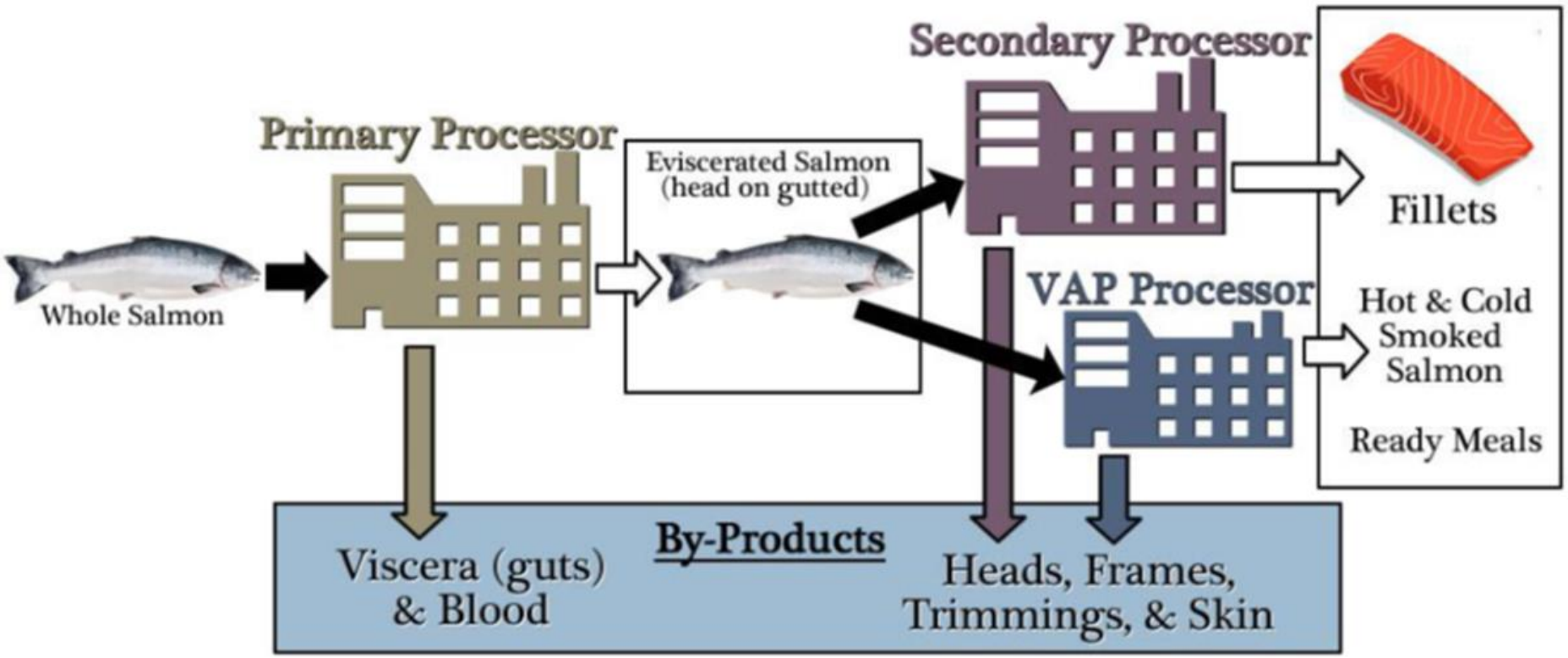
EU market supply in salmon products



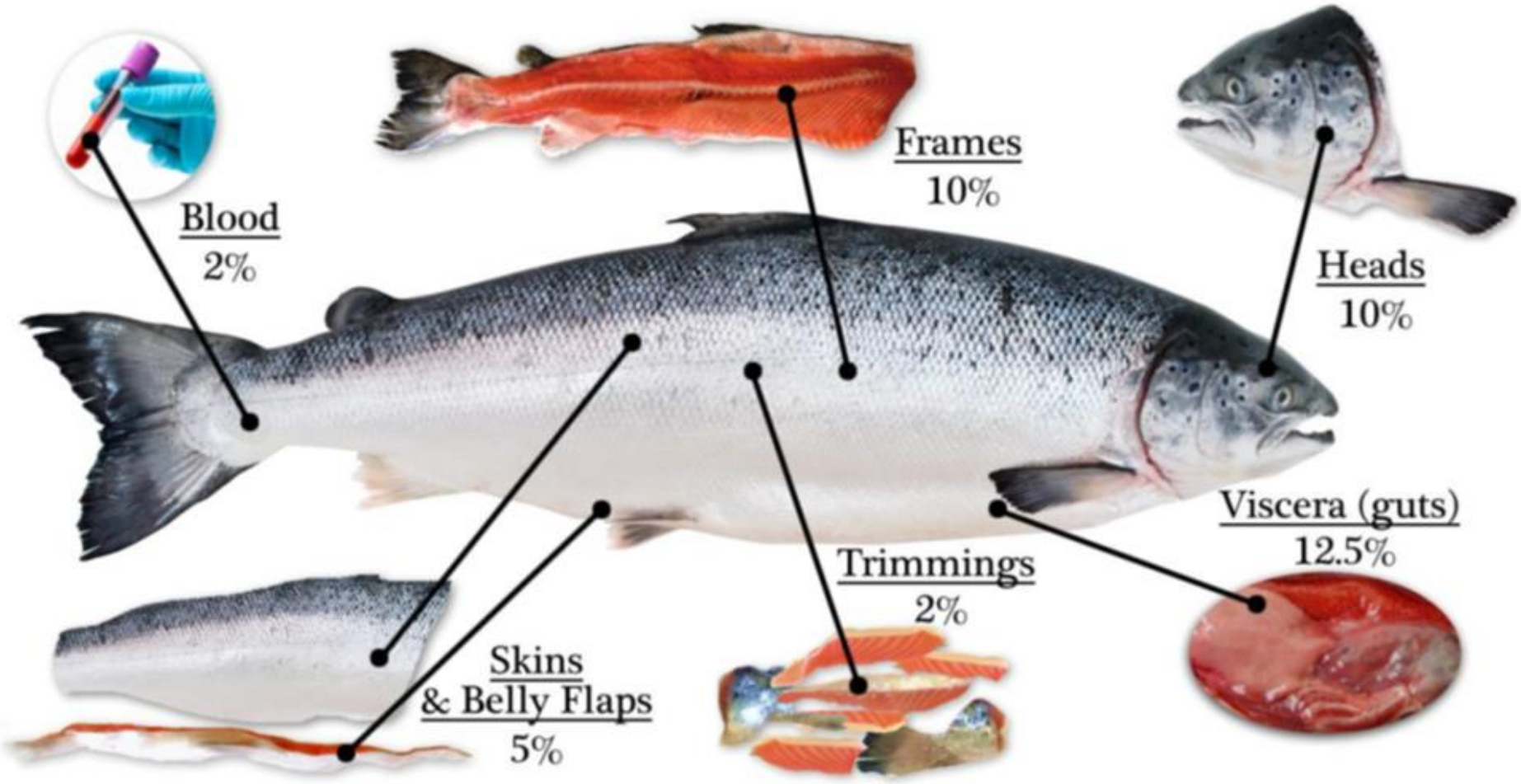
Source: EUMOFA, Smoked salmon in France, 2016

There is also value to be gained from processing by-product



Source: https://doi.org/10.1016/j.marpol.2017.12.027

By-product sources from salmon

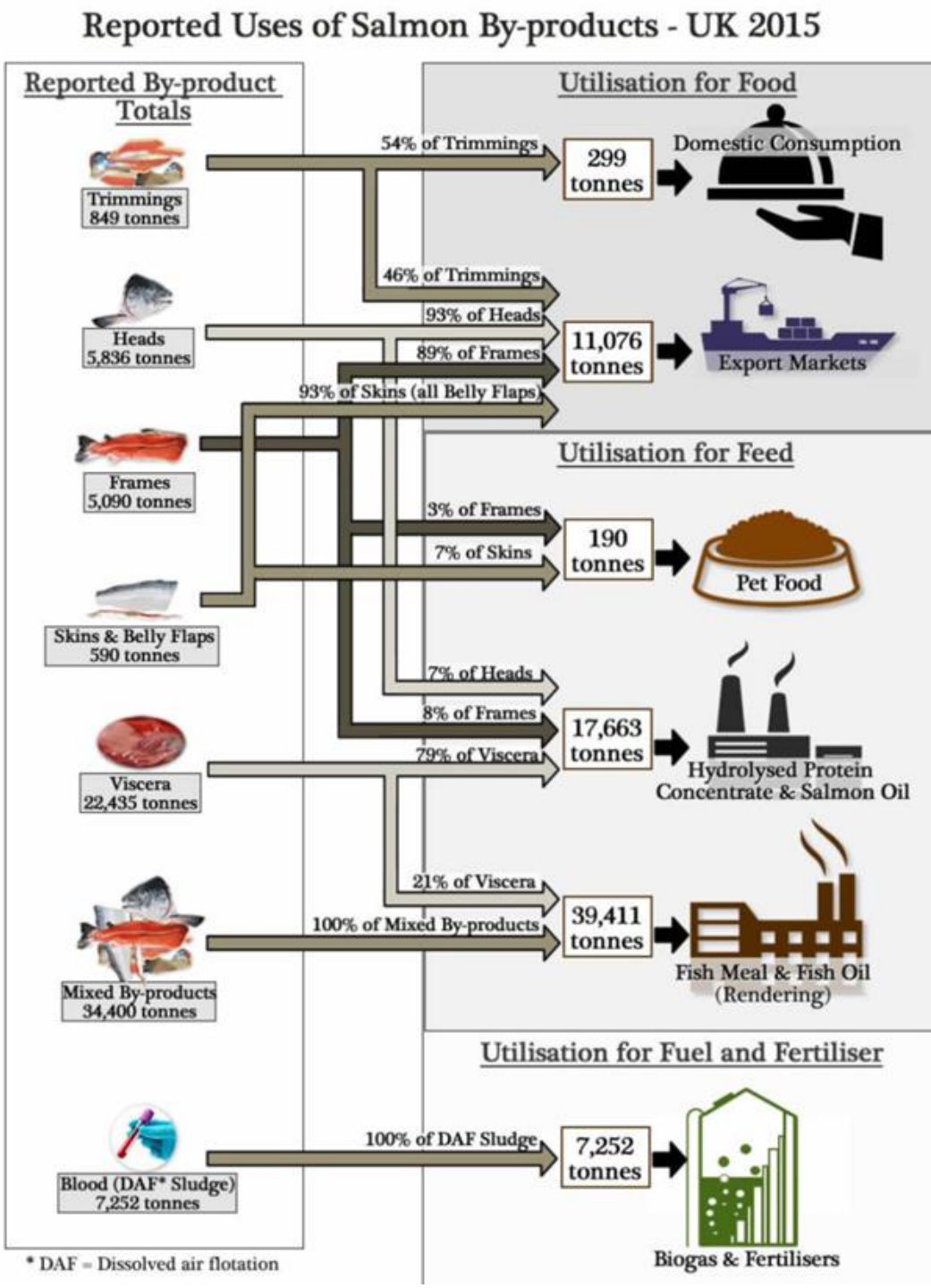


Source: https://doi.org/10.1016/j.marpol.2017.12.027

Utilisation of salmon by-product

https://www.desertcart.ae

Source:
https://doi.org/10.1016/j.marpol.2017.12.027



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Building a value-add model

- **Preferably use a standard coding scheme – otherwise develop our own? E.g:**

Product code	***Description***
1.1	Whole fillet
1.2	Steaks
1.3	Portioned fillet
1.4	Sliced/cubed fillet
2.1	whole trimmings
2.2	minced trimmings
2.3	Processed product from trimmings
3.1	Salmon skin
3.2	Salmon scales
3.3	Belly flesh
3.4	Oil from belly flesh
5.1	Whole salmon frames
5.2	Salmon bones
5.3	Salmon tails
5.4	Meal from salmon frames

Adding packaging and state information

- **Coding format = Product/packaging/state**

Product code	
1.1	Whole fillet
1.2	Steaks
1.3	Portioned fillet
1.4	Sliced/cubed fillet

Packaging codes:	
NO	No packaging
BU	Bulk pack
TR	Tray (no MAP)
MA	MAP packaging
VA	Vacuum packaging
SK	Skin packaging
CA	Canned
BA	Bag
ME	Ready-cook meal

State codes:	
FR	Fresh
FZ	Frozen
CH	Chilled
SC	Smoked/cured
AM	Ambient

Working out the product quantities

Draft Producer Model		
Harvested weight (t)	50	
Size category	5	
Primary processing	tonnes	Code
Viscera (t)	6.25	6
Blood (t)	1	7
Gutted salmon (t)	42.75	0
Secondary processing		
Fillet	29.25	1
Trimmings	1.00	2
Skins/belly flaps	2.50	3
Head	5.00	4
Frames	5.00	5

1) Consider overall process in terms of primary, secondary and perhaps tertiary processing
2) Determine basic quantities according to overall yield ratios
3) Calculate quantities of each product (and byproduct) and assign value
4) Total values to give overall harvest value

Preliminary output

Product selection and value

	Prim. Code	Prod. Code	Pack. Code	State. Code	% of Prim.	t	Value (€/kg)	Value (€)
Whole fillets	1	1.1	BU	FR	0	0.00	6.00	0.00
Steaks	1	1.2	MA	FR	0	0.00	5.00	0.00
Portion fillet	1	1.3	VA	CH	100	29.25	7.00	204,750.00
Smoked	1	1.4	VA	SC	0	0.00	12.00	0.00
Bulk trimmings	2	2.1	BU	FZ	100	1.00	2.00	2,000.00
Minced trimmings	2	2.2	BU	CH	0	0.00	2.00	0.00
Smoked trimmings	2	2.3	VA	SC	0	0.00	5.00	0.00
Salmon skin	3	3.1	BU	CH	20	0.50	0.80	400.00
Salmon scales	3	3.2	BU	CH	10	0.25	0.10	25.00
Belly flesh	3	3.3	BU	CH	60	1.50	0.50	750.00
Oil from belly flesh	3	3.4	BU	CH	10	0.25	1.00	250.00
Heads (export)	4	4.1	BU	FZ	100	5.00	0.25	1,250.00
Heads (for fishmeal)	4	4.1	BU	CH	0	0.00	0.09	0.00
Frames (for fishmeal)	5	5.1	BU	CJ	100	5.00	0.09	450.00
Viscera (for fishmeal)	6	6.1	BU	CH	50	3.13	0.09	281.25
Viscera (for protein concentrate)	6	6.1	BU	CH	50	3.13	0.10	312.50
Blood (disposal cost)	7	7.1	BU	AM	100	1.00	0.00	0.00
TOTAL							**€**	**210,468.75**
Unit							**€/kg**	**4.21**

Adjust % of products and unit value to change overall value

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Adding cost data

		(€/t)	€
Raw material (prod. cost)		3500	175,000
Primary processing cost		200	10,000
Secondary processing cost		500	21,375
TOTAL		4,200	206,375

Baseline costs established, then any additional cost for specific product options (Same 50 t model)

Adding cost data

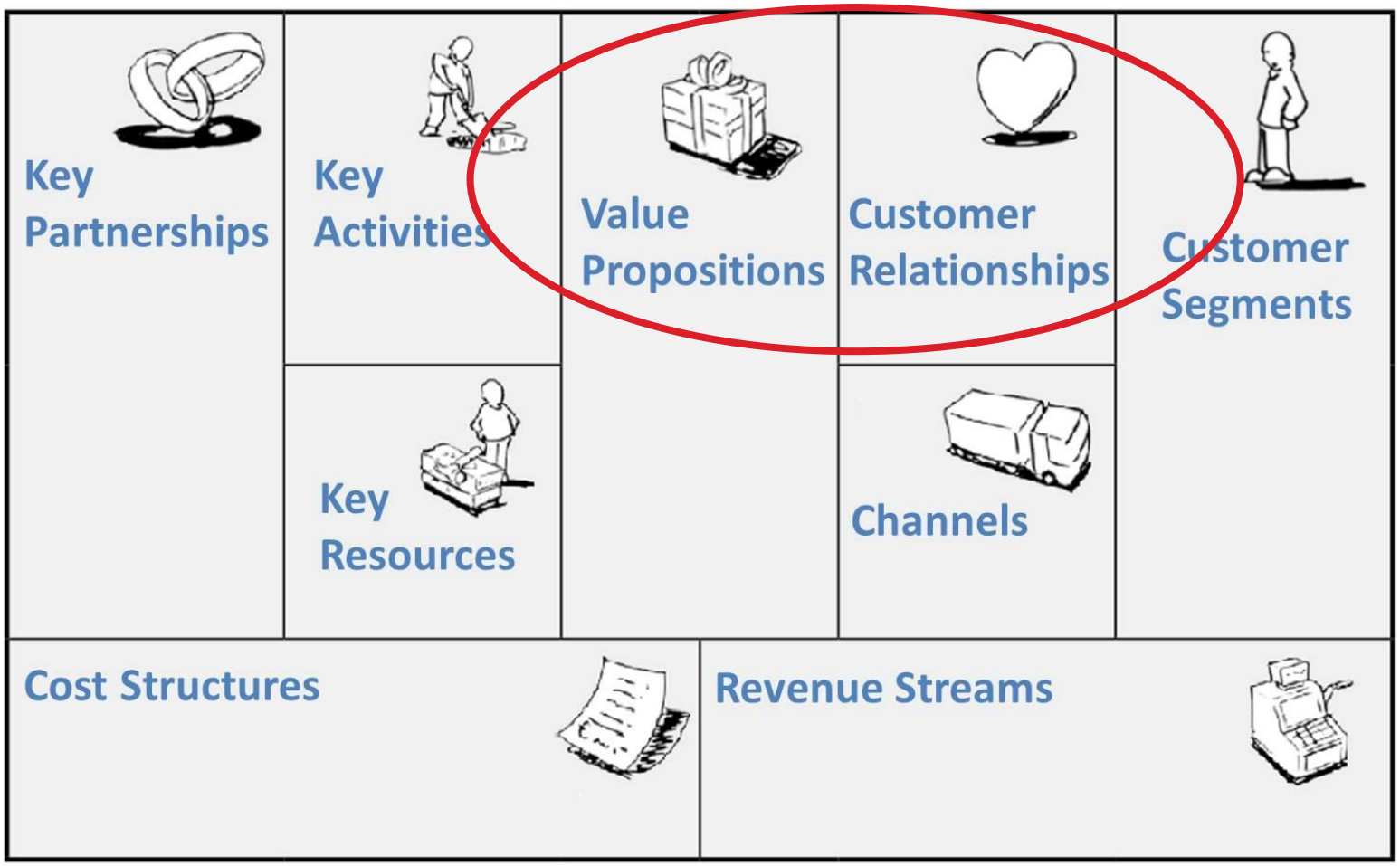
Product selection and value	Prim. Code	Prod. Code	Pack. Code	State. Code	% of Prim.	t	Value (€/kg)	Value (€)	Additional cost/t	Additonal cost total	Gross Margin	%
Whole fillets	1	1.1	BU	FR	0	0.00	5.00	0.00		0		
								131,625.0				
Portion fillet	1	1.3	VA	CH	75	21.94	6.00	0		0		
Smoked	1	1.4	VA	SC	25	7.31	12.00	87,750.00	1000	7312.5		
Bulk trimmings	2	2.1	BU	FZ	25	0.25	2.00	500.00		0		
Smoked trimmings	2	2.1	VA	SC	75	0.75	5.00	3,750.00		0		
Skins & belly flaps	3	3	BU	CH	100	2.50	0.20	500.00		0		
Heads (export)	4	4.1	BU	FZ	100	5.00	0.25	1,250.00	199	995		
Heads (for fishmeal)	4	4.1	BU	CH	0	0.00	0.09	0.00		0		
Frames (for fishmeal)	5	5.1	BU	CJ	100	5.00	0.09	450.00		0		
Viscera (for fishmeal)	6	6.1	BU	CH	50	3.13	0.09	281.25		0		
Viscera (for protein concentrate)	6	6.1	BU	CH	50	3.13	0.10	312.50	50	156.25		
Blood (disposal cost)	7	7.1	BU	AM	100	1.00	-0.05	-50.00	50	50		
								226,368.7			**11,480.**	
TOTAL							**€**	**5**		**214,889**	**00**	**5.07%**
Unit							**€/kg**	**4.53**			**4.30**	

Turnover and gross margin calculated

Alternate example

Product selection and value	Prim. Code	Prod. Code	Pack. Code	State. Code	% of Prim.	t	Value (€/kg)	Value (€)	Additional cost/t	Additonal cost total	Gross Margin	%
Whole fillets	1	1.1	BU	FR	0	0.00	6.00	0.00		0		
Steaks	1	1.2	MA	FR	0	0.00	5.00	0.00		0		
Portion fillet	1	1.3	VA	CH	100	29.25	7.00	204,750.00		0		
Smoked	1	1.4	VA	SC	0	0.00	12.00	0.00		0		
Bulk trimmings	2	2.1	BU	FZ	100	1.00	2.00	2,000.00		0		
Minced trimmings	2	2.2	BU	CH	0	0.00	2.00	0.00		0		
Smoked trimmings	2	2.3	VA	SC	0	0.00	5.00	0.00		0		
Salmon skin	3	3.1	BU	CH	20	0.50	0.80	400.00		0		
Salmon scales	3	3.2	BU	CH	10	0.25	0.10	25.00		0		
Belly flesh	3	3.3	BU	CH	60	1.50	0.50	750.00		0		
Oil from belly flesh	3	3.4	BU	CH	10	0.25	1.00	250.00	200	50		
Heads (export)	4	4.1	BU	FZ	100	5.00	0.25	1,250.00	199	995		
Heads (for fishmeal)	4	4.1	BU	CH	0	0.00	0.09	0.00		0		
Frames (for fishmeal)	5	5.1	BU	CJ	100	5.00	0.09	450.00		0		
Viscera (for fishmeal)	6	6.1	BU	CH	50	3.13	0.09	281.25		0		
Viscera (for protein concentrate)	6	6.1	BU	CH	50	3.13	0.10	312.50	50	156.25		
Blood (disposal cost)	7	7.1	BU	AM	100	1.00	0.00	0.00	50	50		
TOTAL								**€ 210,468.75**		**207,626**	**2,842.50**	**1.35%**
Unit							**€/kg**	**4.21**			**4.15**	

Business canvas mapping – Certification



Value add through certification?

http://www.colinnewlyn.com/2013/08/12/entrepreneurial-thinking-and-the-business-model-canvas/

Seafood & aquaculture certification labels

Certified from sustainable fisheries
www.friendofthesea.org

GLOBALG.A.P.

Business to consumer or
Business to business?

What is certification?

- **Certification:** a market-based approach to govern some negative externalities of business practices
- Consumers control change - purchasing power!
- Many types of ownership and certification forms:
  - different products (goods & services)
  - different stages of the supply chain (vertical integration)
  - Business to business (B2B) or business to consumer (B2C)
- but all:
  - adhere to 'third-party' verification or 'auditing' systems
  - are voluntary

Voluntary v Mandatory Standards?

- **Marketing (or business) Standards**
  - **Voluntary standards** reflecting user expectations & used strategically to gain consumer acceptance e.g. ecolabels
- **Preferential Standards**
  - Voluntary standards a company choses to adopt *in toto,* or reference in internal (often-proprietary) standards e.g. ISEAL
- **Obligatory Standards**
  - Under contractual law - an obligation to provide a product to some (usually industry) standard
- **Mandatory Standards**
  - Law mandates some attribute(s) of a product must conform to standard & must be implemented by all – e.g. food safety, HACCP (?)

Why Certification?

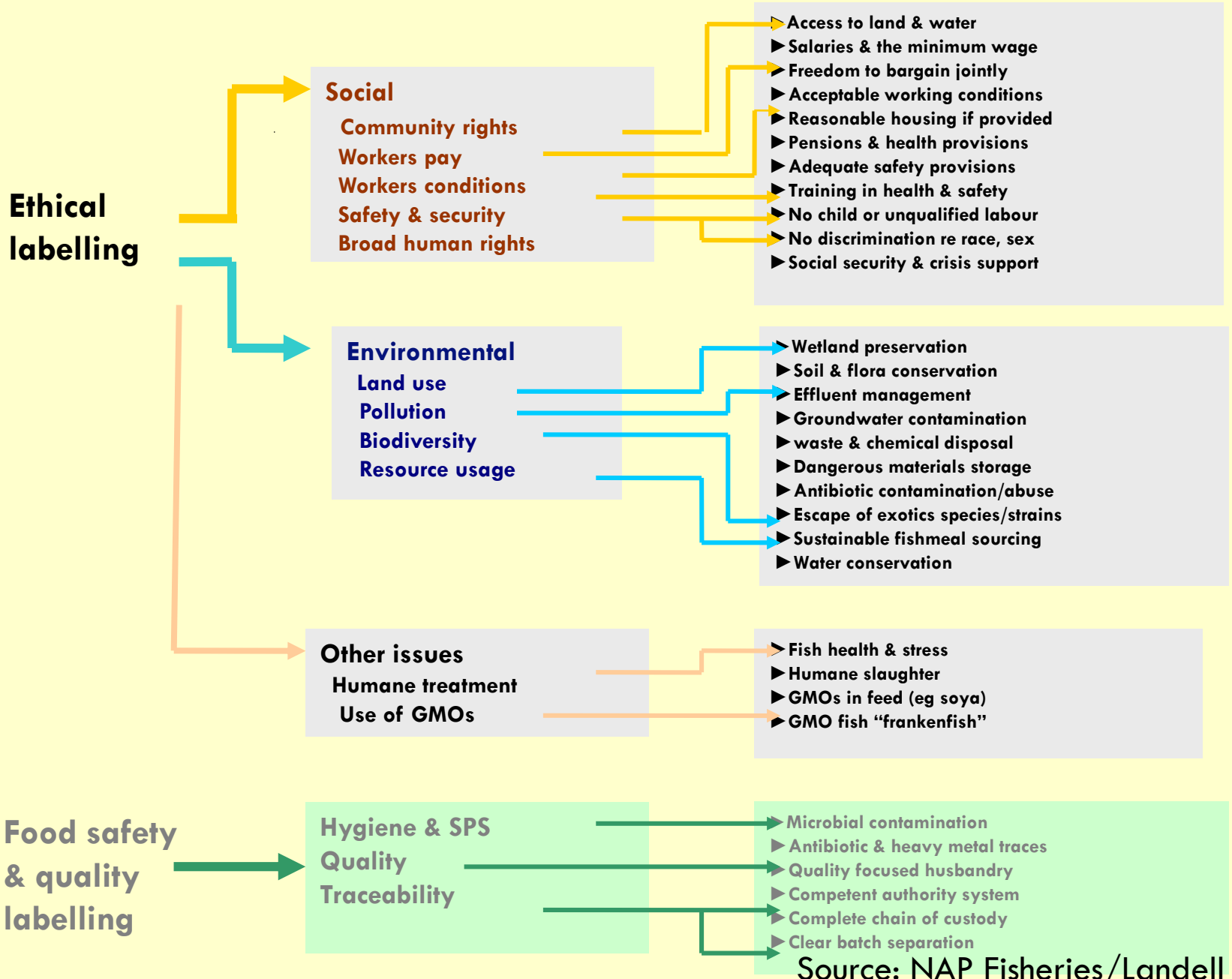
- Borne of a legislative vacuum & loss of confidence in nation states to internalise non-economic considerations valued by society
- Supports ethical consumption & production by integrating social & environmental issues
- Other emergent/ growth areas: organoleptic qualities, animal welfare, halal foods….

Market-Based Standards: Types & Examples

1. Ecolabels e.g. MSC, Organic
2. Single (or narrow) issue e.g. dolphin-safe tuna
3. 'Better Management Practice' based-standards
4. Ratings & buyers guides – based on sector or zonal rather than enterprise-level assessment (?)

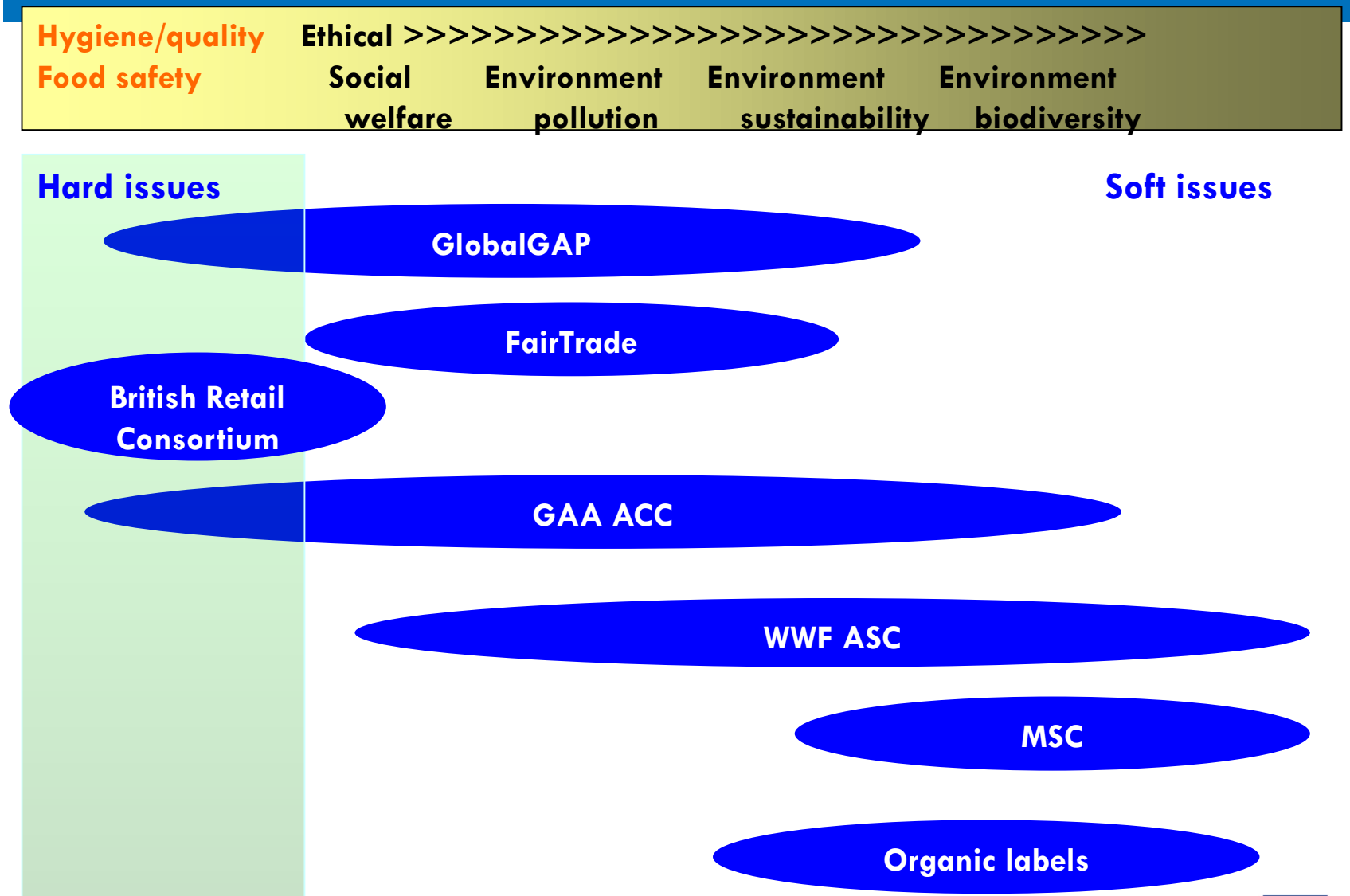
Scope: limited to production systems capable of funding assessments and auditing across the pertinent range of environmental & social issues

Specific Ethical Labeling issues for Aquaculture



Source: NAP Fisheries/Landell Mills

The Ethical Labeling Spectrum – Food Safety to Organics

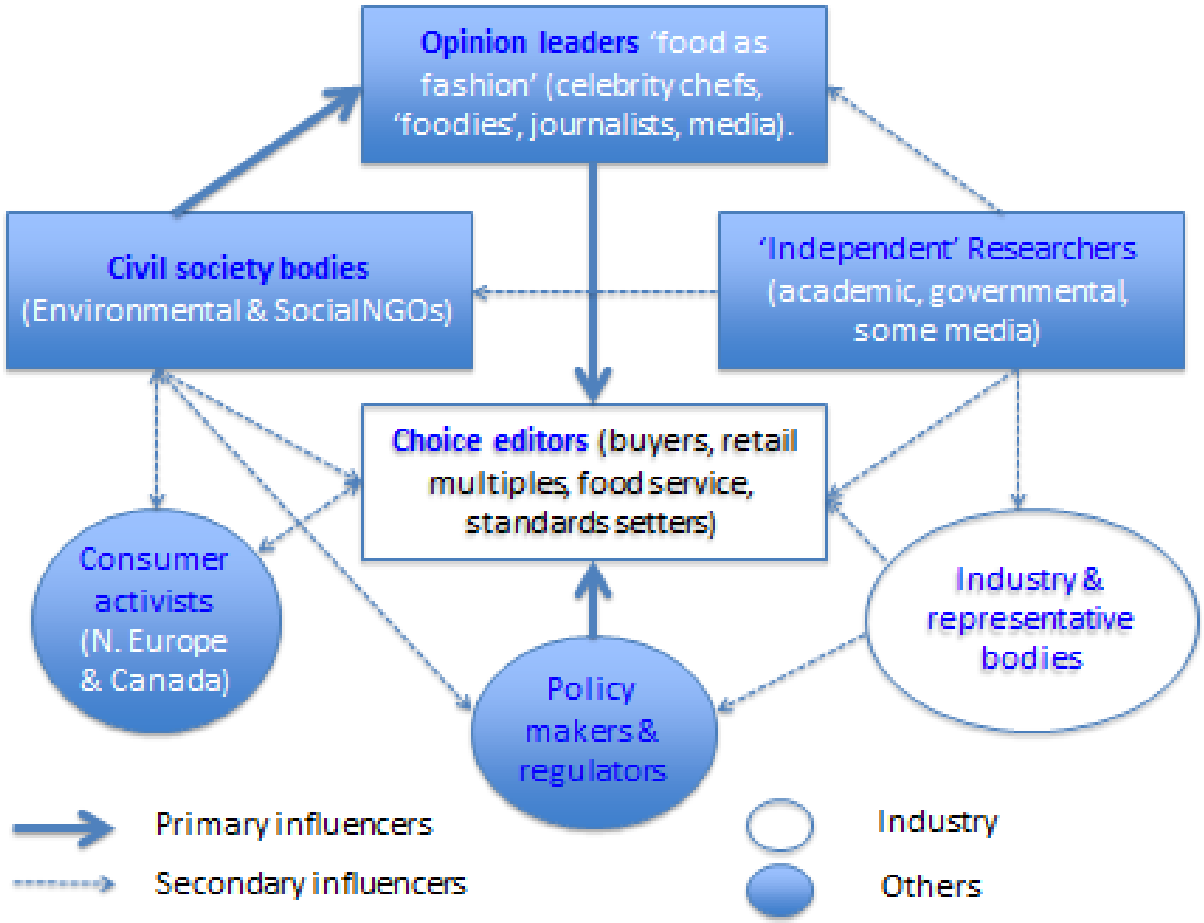


Source: NAP Fisheries/Landell Mills

Certification v
Corporate Social Responsibility CSR?

- Share same goal - improving business practice
- CSR - change lead by business
- Certification lead by consumers (?)
- OECD: choice-editing!
- Choice editors: environmental NGOs, the media and retailers
- Linked issues of ‘ethical supply chain management’ & brand protection

Choice-Editors



MarketingWeek

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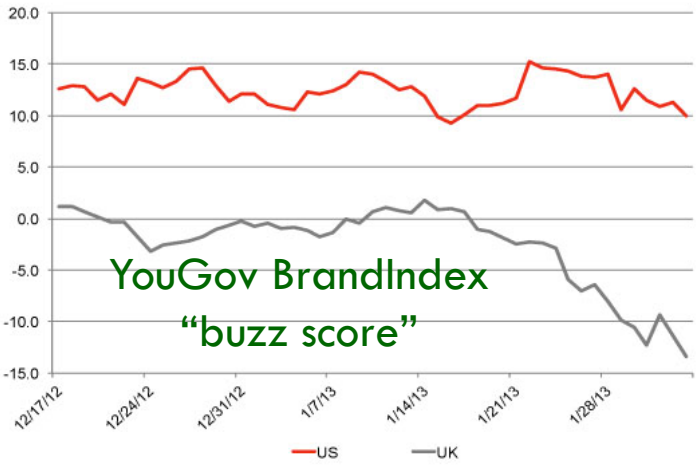
"Tesco brand trust dented by horse meat debacle!"

- **Up to 29% of Tesco Value burgers was found to be horse meat!**
- **Horse DNA also found in Iceland, Aldi, Lidl, Burger King products**

Tesco's Facebook page besieged by comments from angry consumers: Amanda Thourgood-Hayes

"I'm sad that Tesco my trusty local store is selling horse meat disguised as burgers!"



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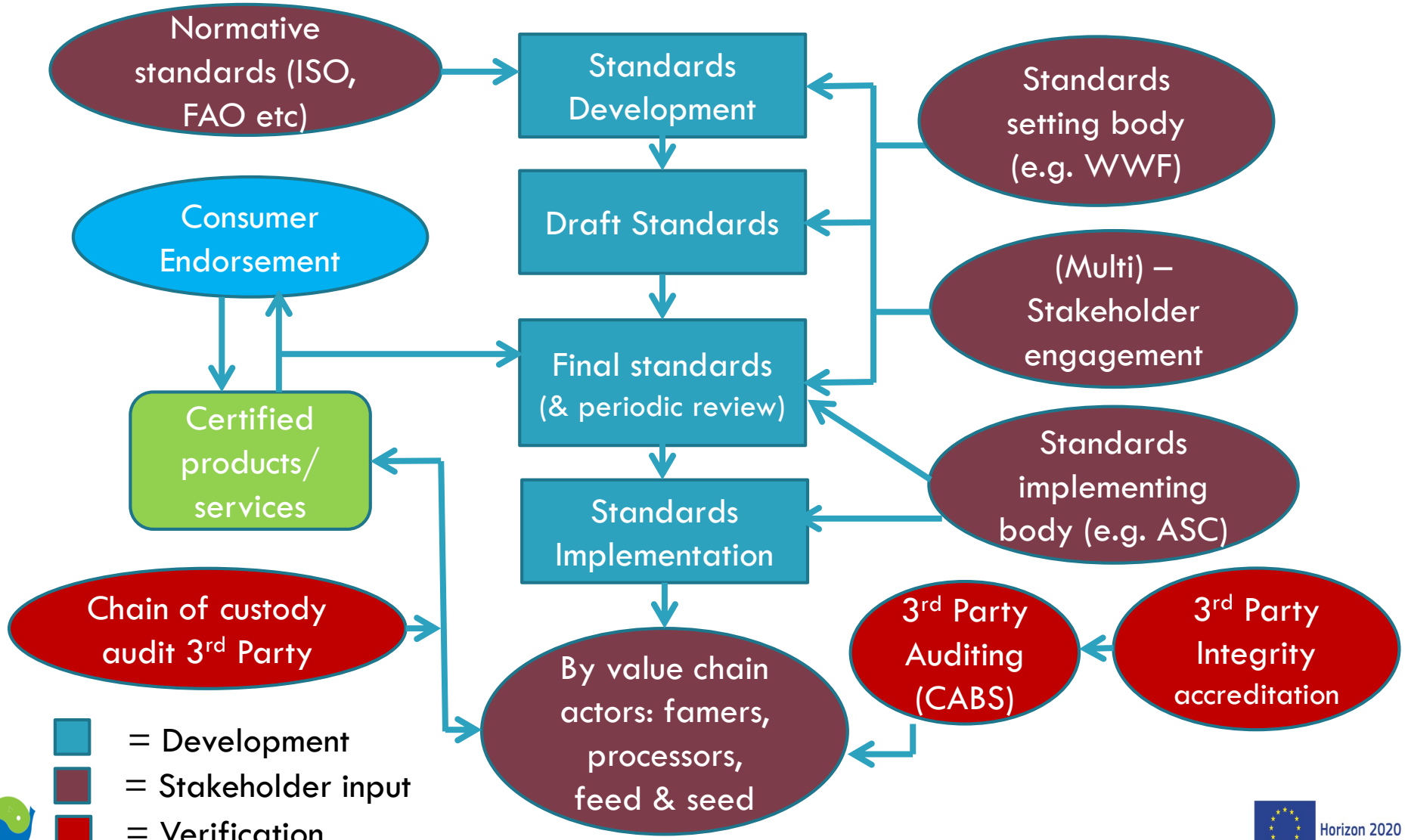
Setting Standards for Certification



Traceability

- Often confused but distinct from certification
- The ability to verify the history or location of an item at any point in the supply chain by means of documented recorded identification
- A requirement of most food certification schemes – with food safety as a primary driver
- Essential for ensuring compliance with all credible standards; voluntary or mandatory

Certification Benefits?

- **Environment**
  - Sustainable resource management
- **Social**
  - Labour standards (work conditions, occ. health, discrimination)
  - Community relations
- **Economic** (trade & **business**)
  - Political - improves trade accountability
  - Opens new markets & secures expanded share
  - Brings price premiums (or just continued market access?)
  - 'Social license': builds reputations & improves public relations re. marketing, site licensing objectives etc.
  - Resilience through long term relationships
- **Measuring the impacts ??**

Limitations?

- **False security?** – de-politicisation & demobilisation of civil society in demanding stricter (more effective?) State regulation
- Public relations – manipulation – fraudulent claims….. **'green wash'**
- Reduced **consumption** v increased consumption of green goods?
- Trans-boundary & mixed spp. fisheries, polyculture, new spp., new markets
- Farm level v zonal certification?

The anti-globalisation critique
Certification as a barrier to small-scale enterprise

Burdens of certification to farmers:

- Direct costs of (i) pre-assessment and
  (ii) actual certification
- On-going compliance costs
  - Training requirements, record keeping and adaptation of production practices
- Costs should match benefits?
- Improver programmes, multi-site & group certification
- Progressive improvement or tariff systems?

Governance of voluntary standards
Standards Proliferation!

- **Three main international standards Institutions**
  - International Standards Organisation (ISO)
    - ISO 14000 series deals with environmental standards
    - ISO 9000 Business quality management and assurance
  - Global Eco-labelling Network (GEN)
  - Int. Social & Env. Accred. & Labelling Alliance (ISEAL)
    - ISEAL & GEN industry orgs for main private standards
- **FAO**
  - Code of conduct for responsible fisheries (1995)
  - Guidelines on responsible Aquaculture
  - 'Ecolabelling of Fish and Fishery Products from Marine Capture Fisheries' & 'Technical Guidelines for Aquaculture Certification'

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iseal alliance

Benchmarking schemes

- Of sustainability certification schemes, typically against normative standards e.g. FAO, ISO etc.
- Assess management process and standards coverage – rarely performance measures/ metrics (if set)
- Global Food Safety Initiative (GFSI): Global supply chains, foods inc. fisheries and aquaculture products
- Global Seafood Sustainability Initiative (GSSI): environmental standards; fisheries and aquaculture
- Global Social Compliance Programme (GSCP): Global supply chains, inc. food & beverage

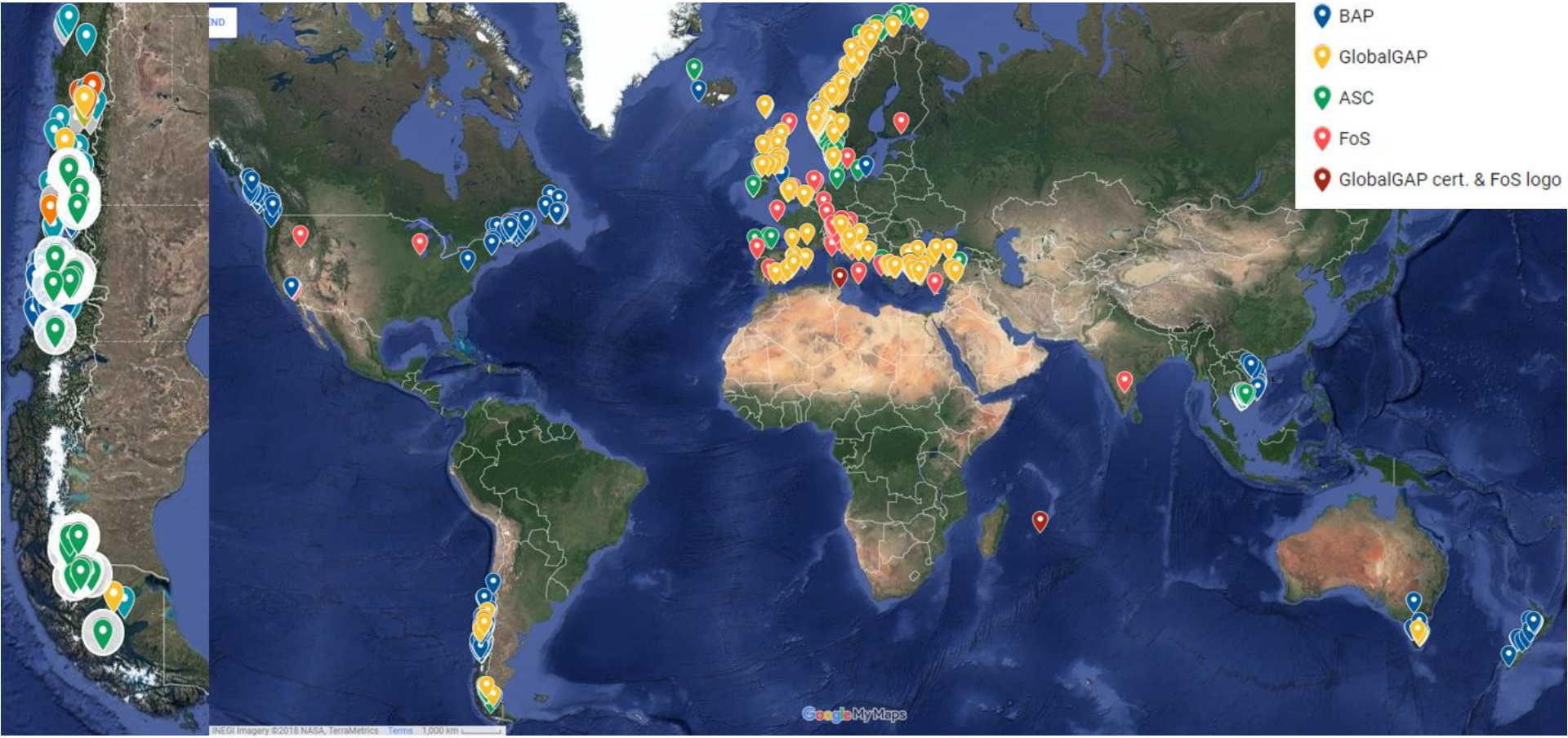
Harmonisation

- To remove barriers & promote trade – requires international agreement to ‘harmonize’ standards
- ISO definition = where same subject areas (species/ systems) are approved by different standardizing bodies, establishing inter-changeability of products, processes, services, or information according to these standards
- Rather than identical standards, involves convergence of international methods for developing & administrating standards

Harmonisation approaches

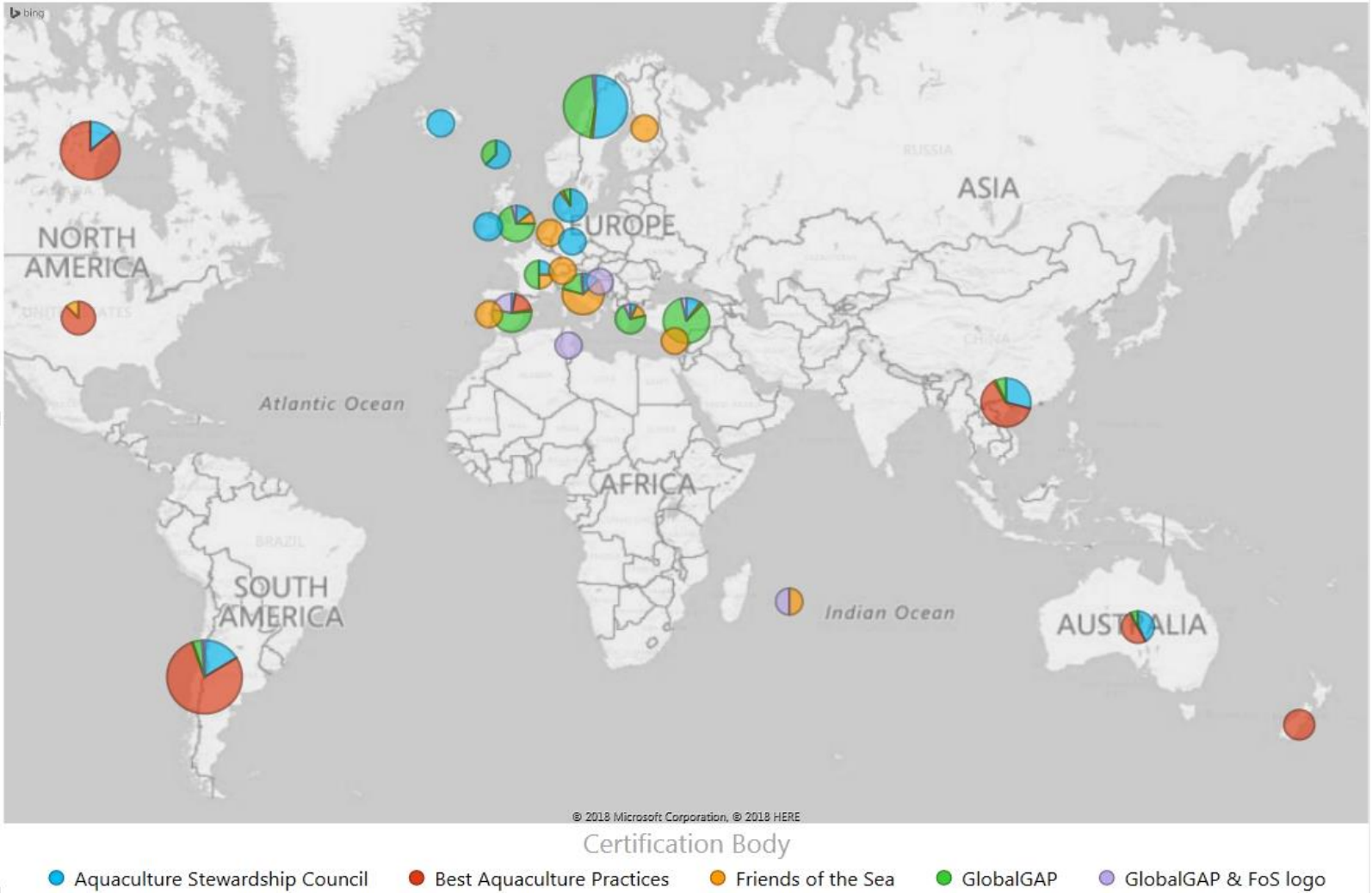
- ***Pre-market harmonization***
  - procedures for review, approval, or registration of products – risk harmonisation e.g. chemicals
- ***Mutual recognition***
  - products lawfully manufactured sold in one country may enter other countries, implies mutual acceptance of standards
- ***Equivalency***
  - equivalent effects despite quantitative differences
- ***Reference standards***
  - Most comprehensive approach through multilateral bodies, internationally accepted *reference standards e.g.*
  - WTO: Technical Barriers To Trade (TBT) & SPS agreements
  - *WHO/FAO* Codex Alimentarius (food safety),
  - OIE (animal disease), IPPC (plant disease)

Global distribution of certified aquaculture entities by standard body to Oct 2017



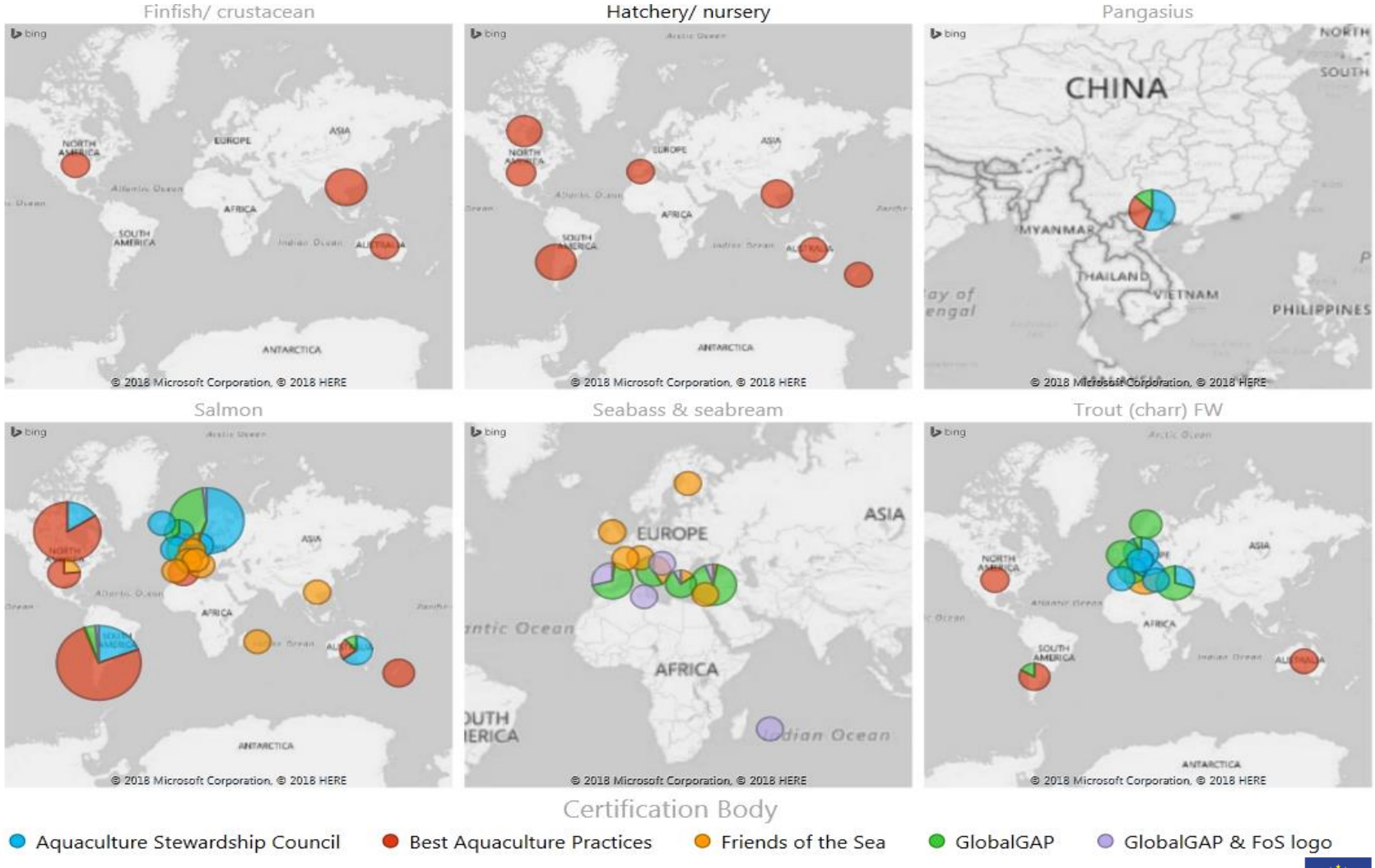
Source: Murray, Taskov 2018

Global distribution of certified aquaculture farms by standard body as to 2017



Source: Murray, Taskov 2018

Global distribution of certified aquaculture farms by spp. group & standard body to Oct 2017



Source: Murray, Taskov 2018

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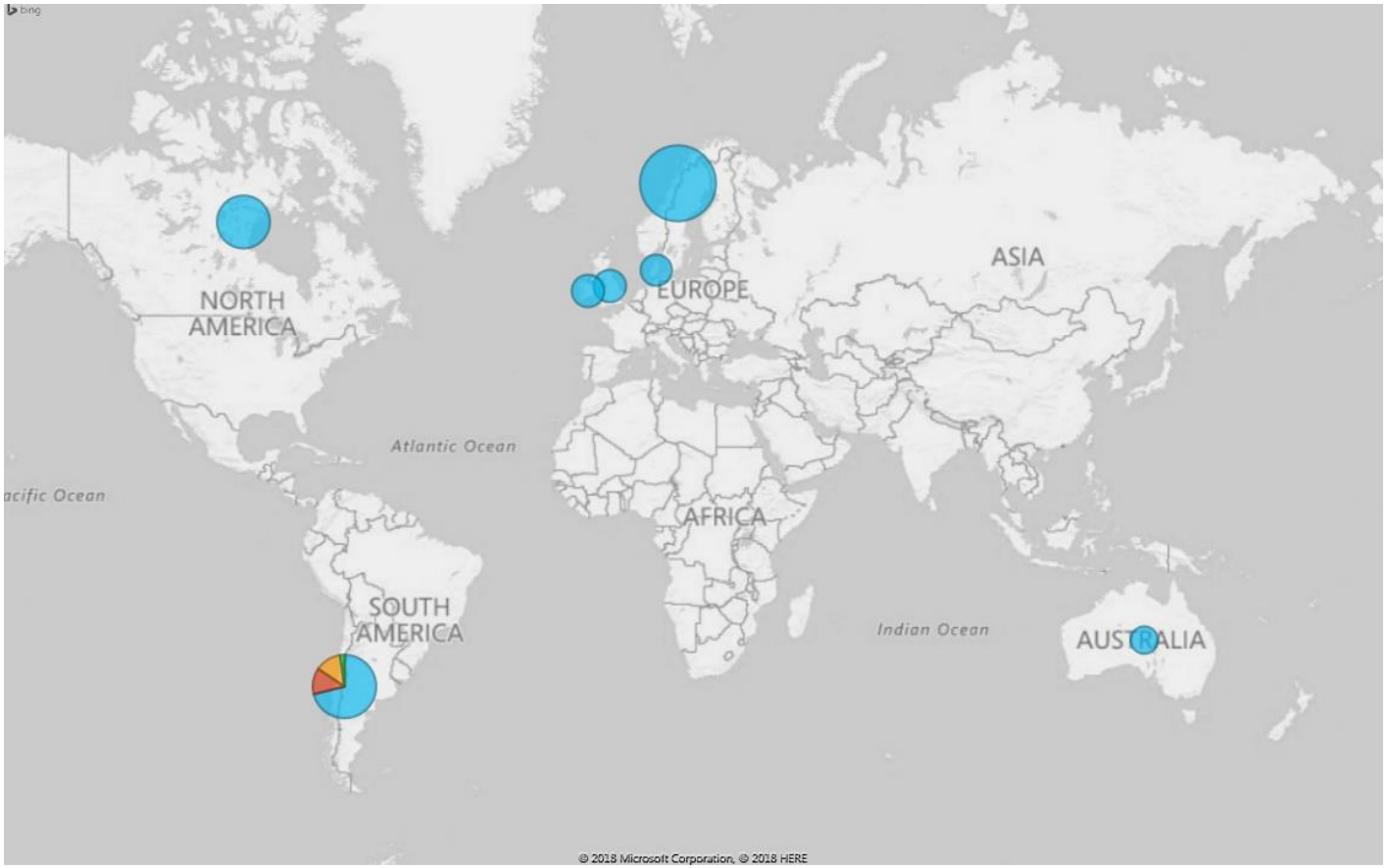
Numbers of GSI member sites, under assessment or with ASC certification, by production species to Oct 2017



Source: Murray, Taskov 2018

Prime DSS GSI Map

Value Chain Analyser

GSI Map

The VCA GSI map displays the Global Salmon Initiative members and non-members progress toward the BAP, GlobalGAP, ASC and FoS certifications.

Example - site details

GGAP - Producer - Atlantic Sal...

SppStandardID

GGAP - Producer - Atlantic Salmon

CertUnitSN

1416

SiteSN

1

GPS_SN

1

CompanyID

Hebridean Smolts Ltd

CertSystemID

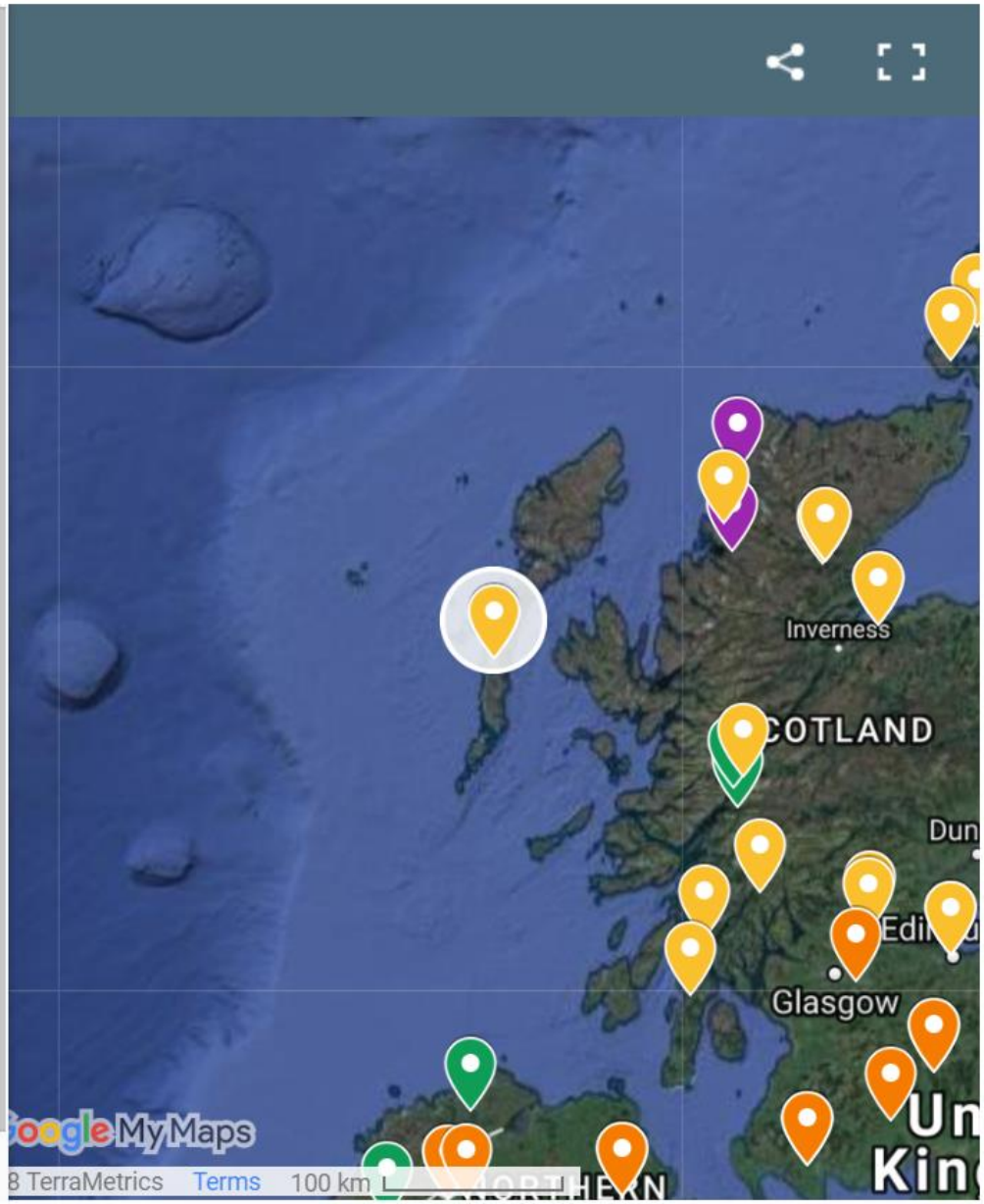
GlobalGAP

Latitude

57.423081

Longitude

-7.336387



PrimeFish WP3 Reports

- 3.1 - Description of value chains and input-output structure
- 3.2 - Market institutional analysis and implications for competitiveness
- 3.3 - Costs & benefits of compliance with voluntary market-based labelling & certification schemes
- 3.4 - Evaluation of industry dynamics, opportunities and threats to industry
- 3.5 - Population assessment and valuation of nonmarket effects of aquaculture and capture fisheries activities.

See all PrimeFish outputs at http://www.primefish.eu/project-results

THANK YOU

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