



Technological Development in the Icelandic Fish Processing, impact on productivity and performance

Ólafur Klemensson
Central Bank of Iceland

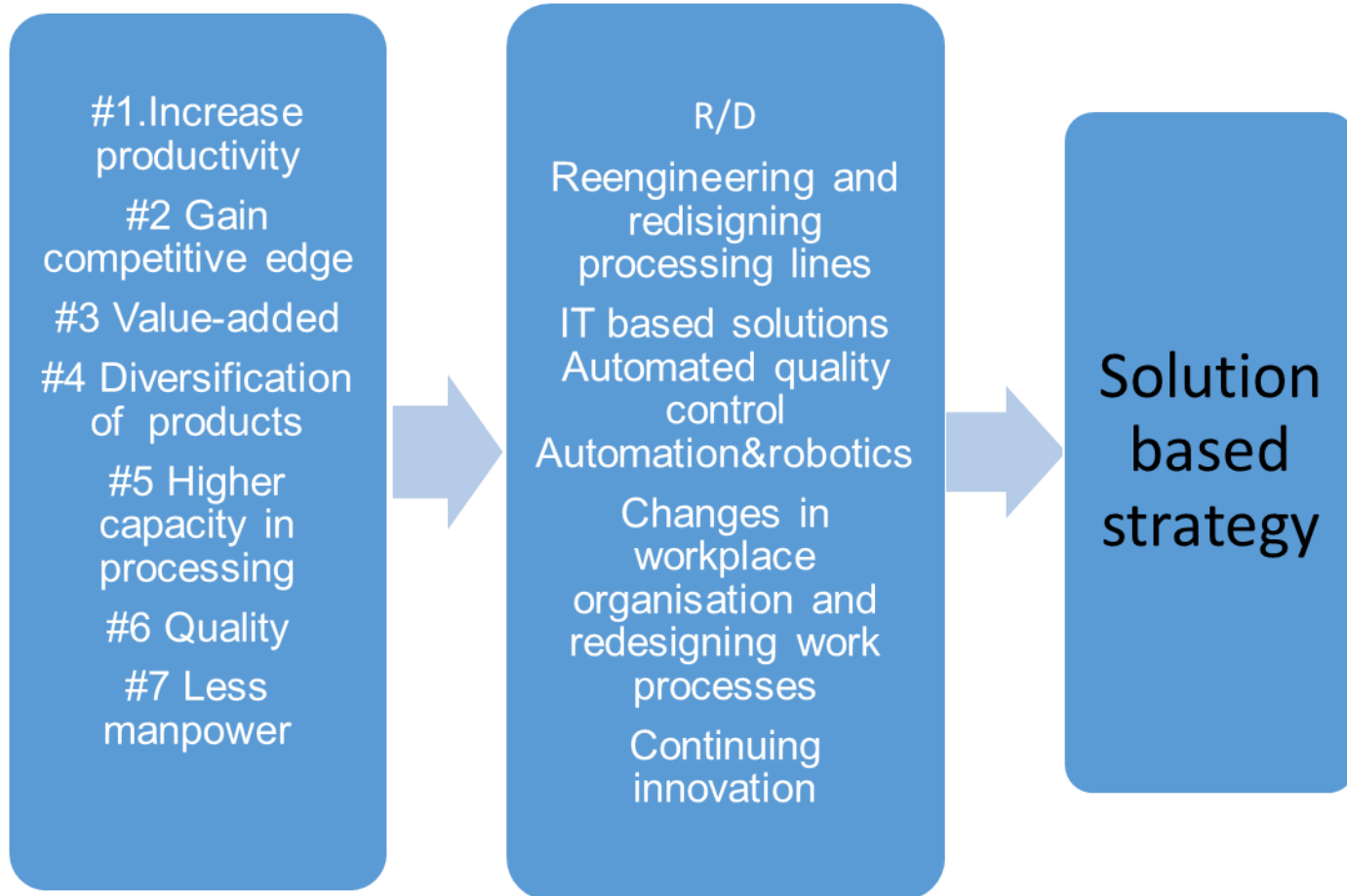
The research question

- **The fundamental question is:**
 - **How technical development and innovation has changed the Icelandic fish processing industry**
- **Focus on:**
 - Productivity-throughput (kg/man-hour, kg/man-year)
 - Yield-better products
 - Value-added-upscale products
 - Better economic performance
- **How:**
 - Analysing the rich numerical data on fish processing and financial performance in Iceland, value and quantity of catch and export production with special attention to land-based processing-frozen and fresh products.
 - Interviews and surveys used to good measure

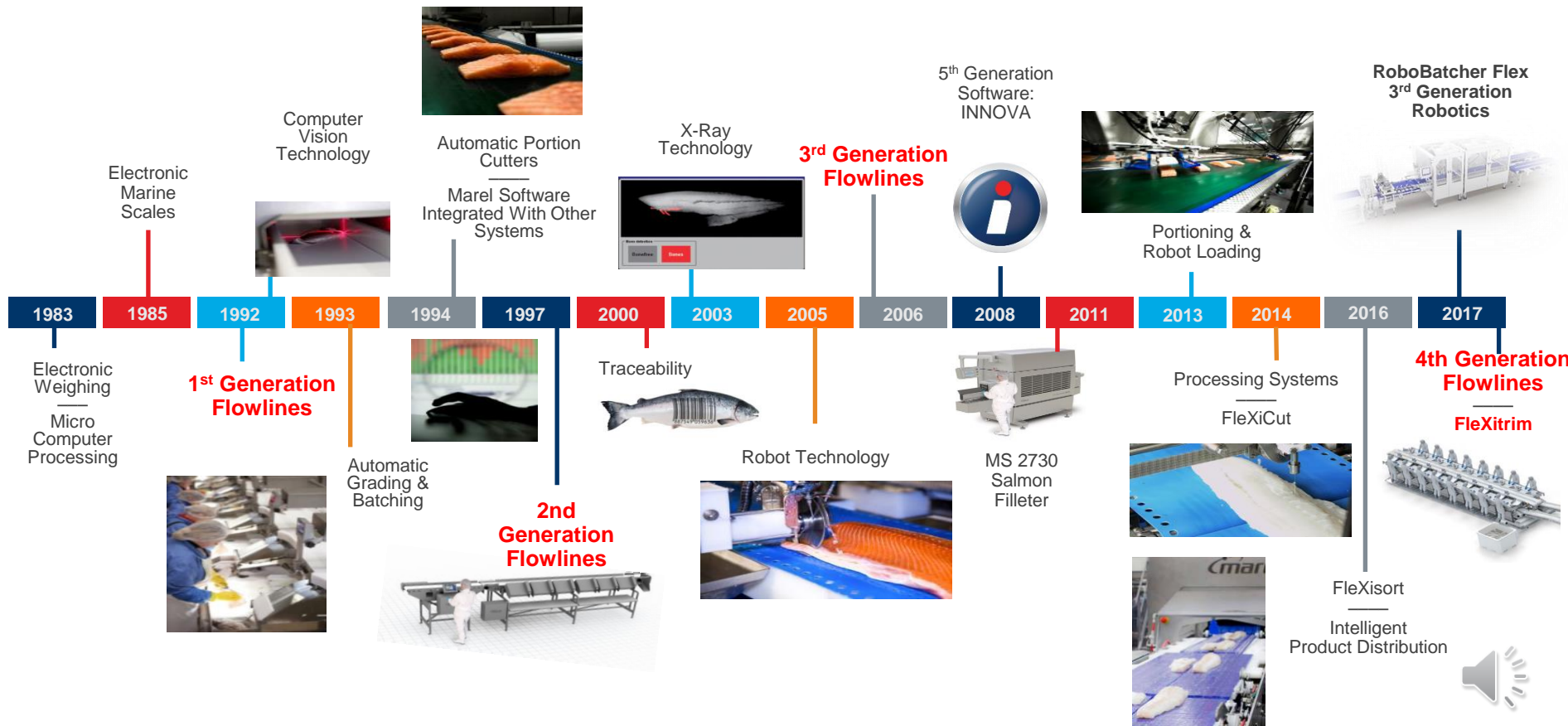
To build sustainable competitive advantage



The catalyst of technical development



Milestones in Fish Processing



Computer vision

Artificial intelligence

Automatic portion cutting

Water-jet cutting

Information flow in real time to supervisors and the operation management team

Robots

Neural network

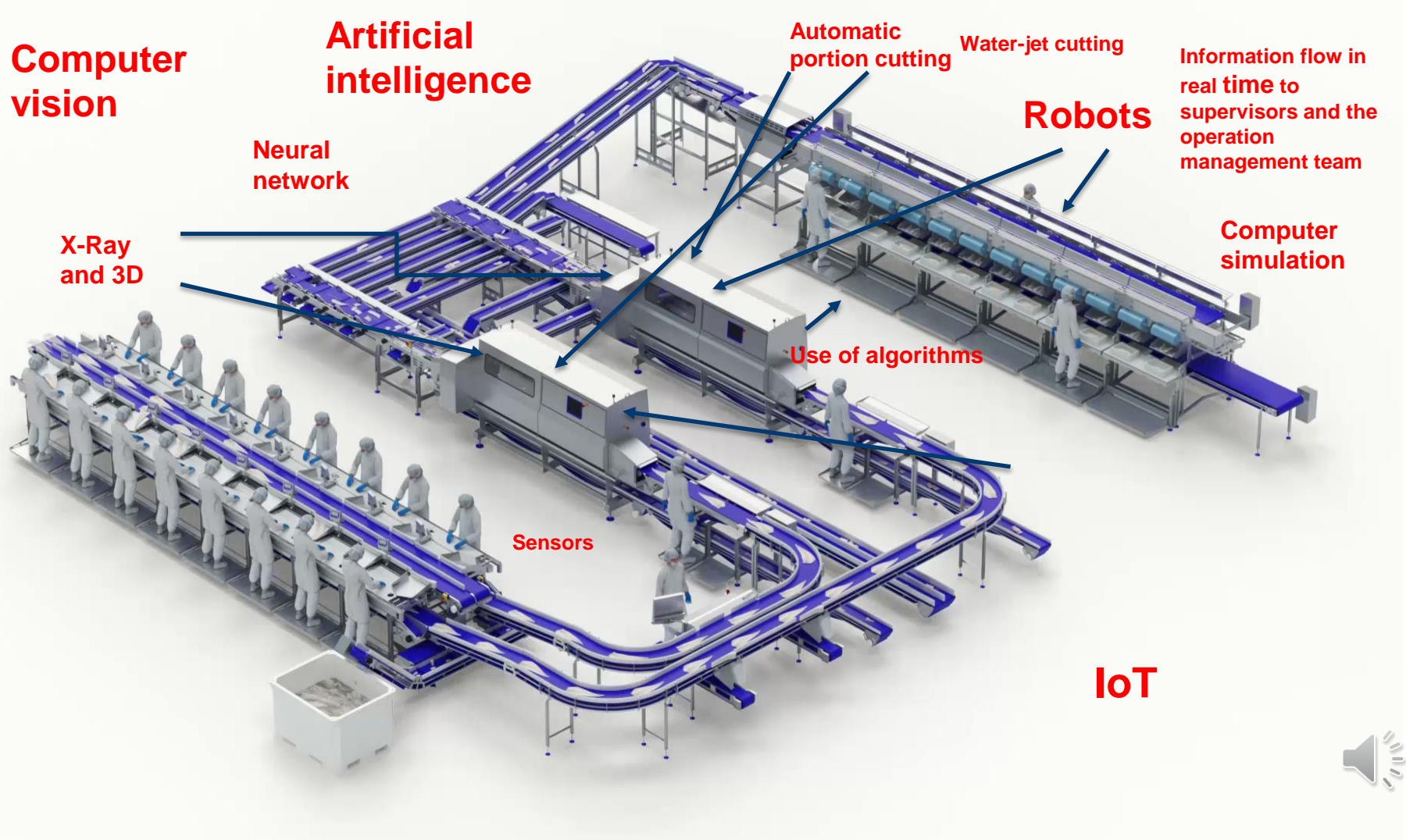
X-Ray and 3D

Computer simulation

Use of algorithms

Sensors

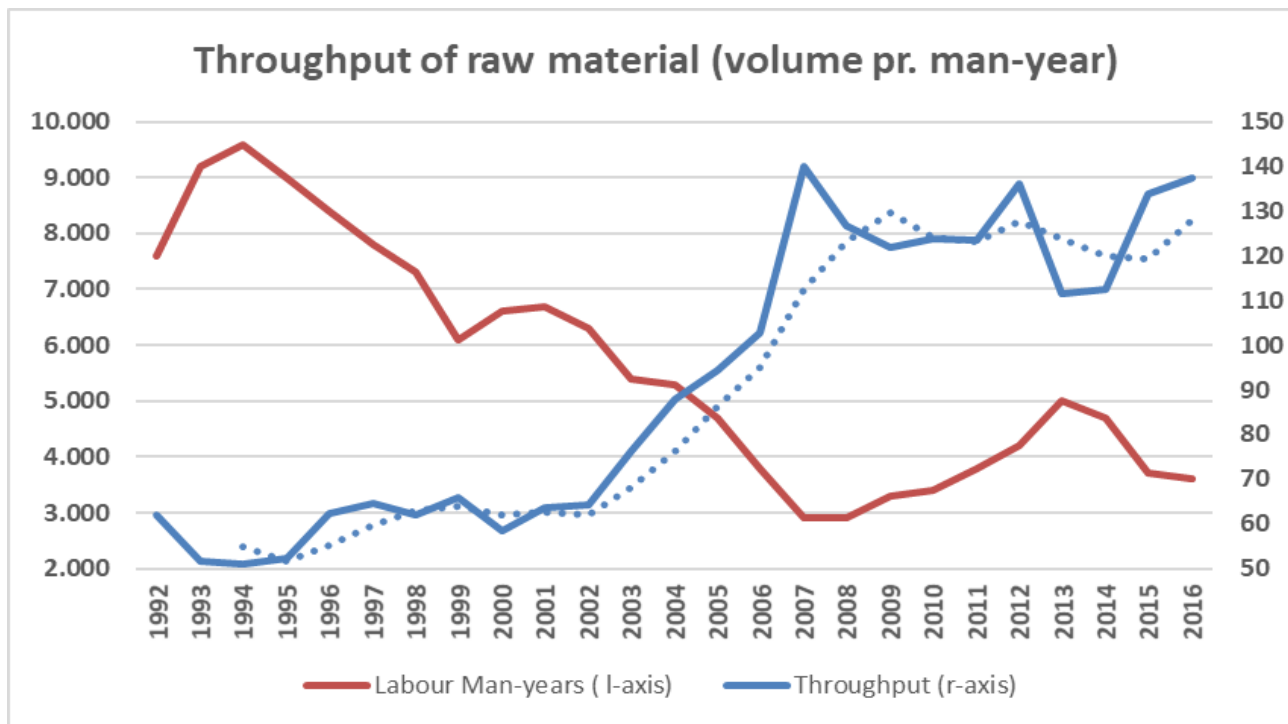
IoT



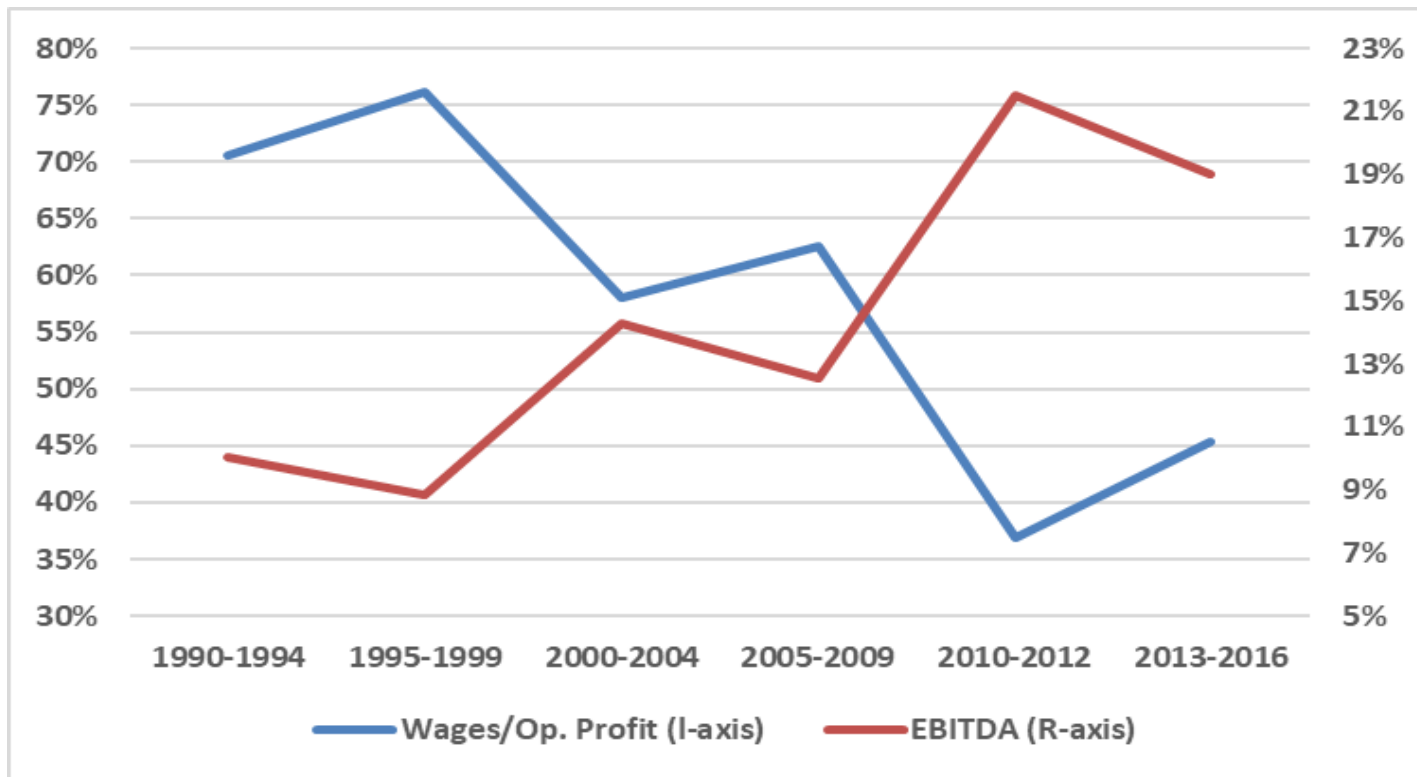
The benefits from using the new technology

- Most of the labour intensive parts of the processing is substituted by automation
- The products are highly uniform
- Easier to adapt to the customers' demand
- Higher ratio of primary products
- Higher priced products
- Flexibility in product-mix
- Gentle/less handling
- Less waste, higher yield, higher quality
- Much speedier production process
- The optimal is 3-5 min. from de-heading the fish to ready prepared loins and other portions into the shipment box or into the IQF tunnel

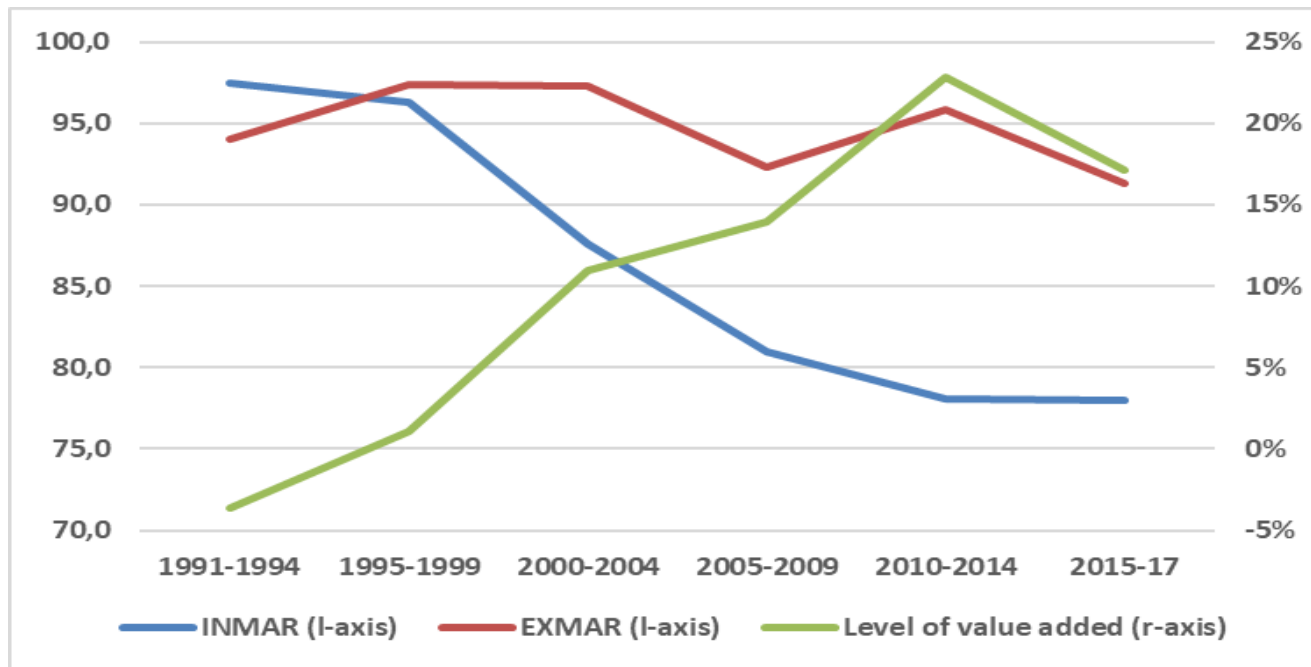
The outcome of technical development



Why lower wage ratio is important for profitability



Higher value pr. processed unit of catch



The benefits from high-tech equipment

	Plant A	Plant B	Plant C	Plant D	Plant E	All
Increase in throughput	65%	60%	25-30%	38%	40%	53%
Value added	10%	10%	8-10%	10%	5-7%	9%
Yield (gain)	some	significant	not significant	some	not significant	some
Better products and quality, customise prod	significant	some	significant	significant	not significant	significant
Man-years 2015	65	24	35-40	78	90	294,5
Man-years 2018 (estimate)	55	24	30-35	85	62,5	259
Raw material 2015 tones	2.700	1.400	3.000	6.000	5.000	18.100
Raw material 2018 tones(estimate)	4.500	2.300	4.000	7.800	5.750	24.350