



DANISH MEAT
RESEARCH INSTITUTE

The value of sorting

Selection and routing of raw material to the products where it brings the highest value → Meeting customer specifications – no more, no less.

Uffe Thrane, Director Operations Improvement
uft@teknologisk.dk

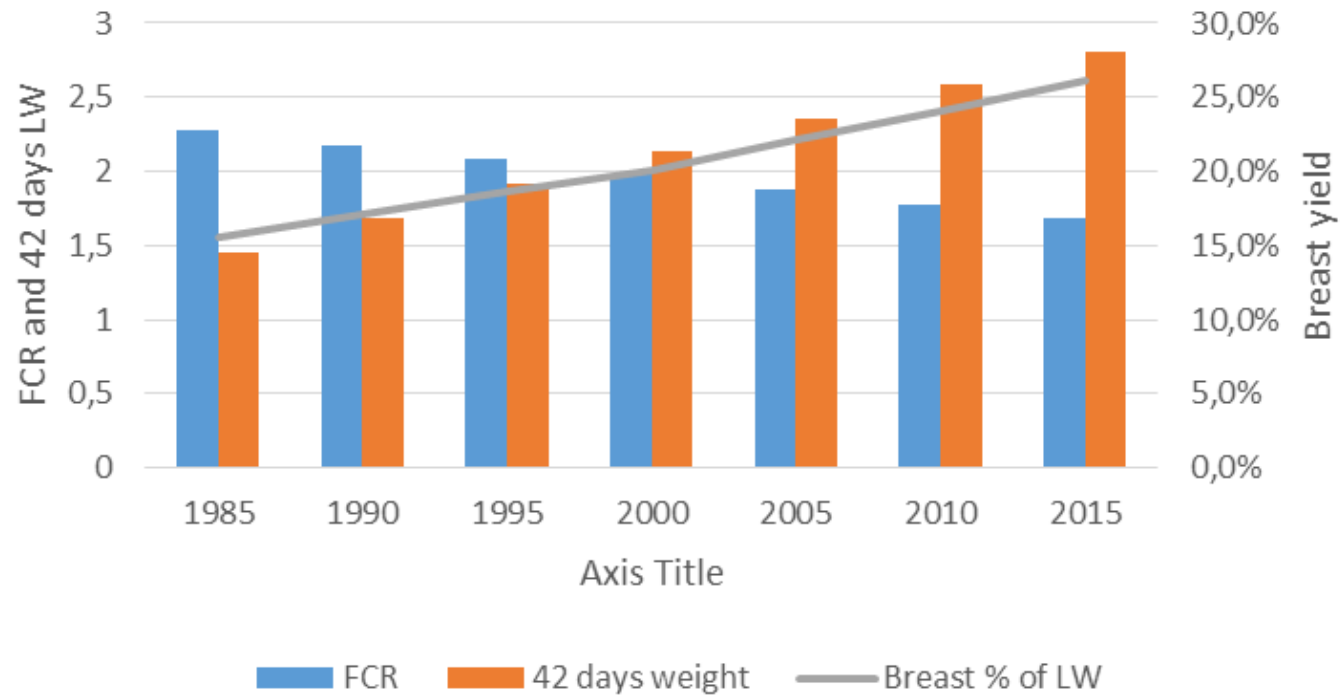
The value of sorting

A large industrial poultry processing plant. Numerous carcasses are hanging from overhead conveyor belts, moving through the facility. The scene is filled with complex machinery, metal structures, and blue overhead lighting. In the lower left, a worker in a white uniform and blue head covering is visible. The overall atmosphere is one of a busy, large-scale food production environment.

- Where is the money?
- Basic conditions
- Right carcass to order
- Red meat industry (pork)
- White meat industry (poultry)
- Learnings
- Future

Here is the money

30 years Broiler development



l with

Fulfill orders with the raw material quality meeting the specification



Here is the money

Downgrade the smallest possible part

Avoid (minimize) costs of downgrading a damaged carcass

Here is the money



Perfect raw material
destroyed by processing

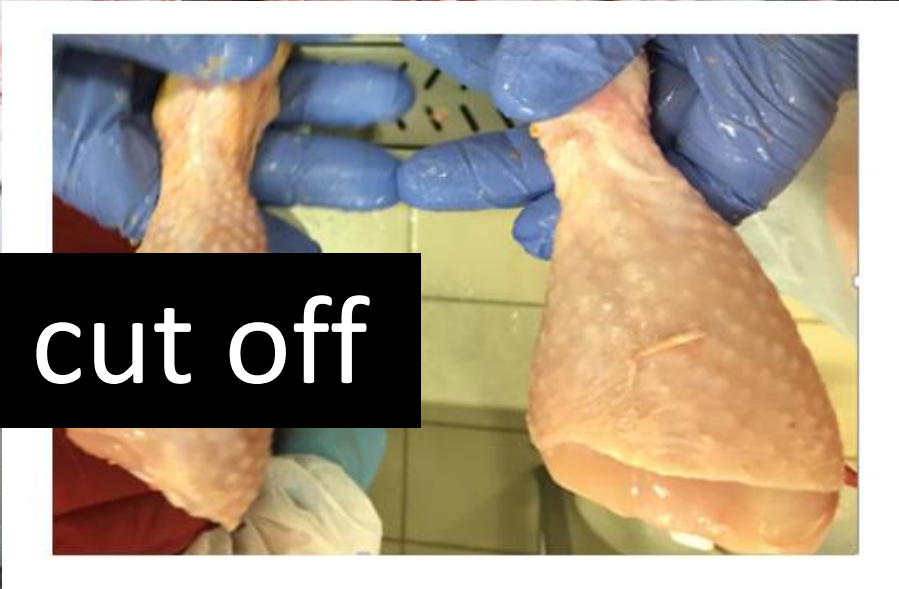


Sorting carcasses to
fit machine settings

Here is the money



Avoid give away and cut off



Parts fitting product and packing specification

Where is the money - summarized

- Use the lowest cost raw material
- Downgrade smallest part (damages)
- Avoid machine damages
- Avoid cut off
- Avoid give away

Significant increase in turnover and profit compared with random usage

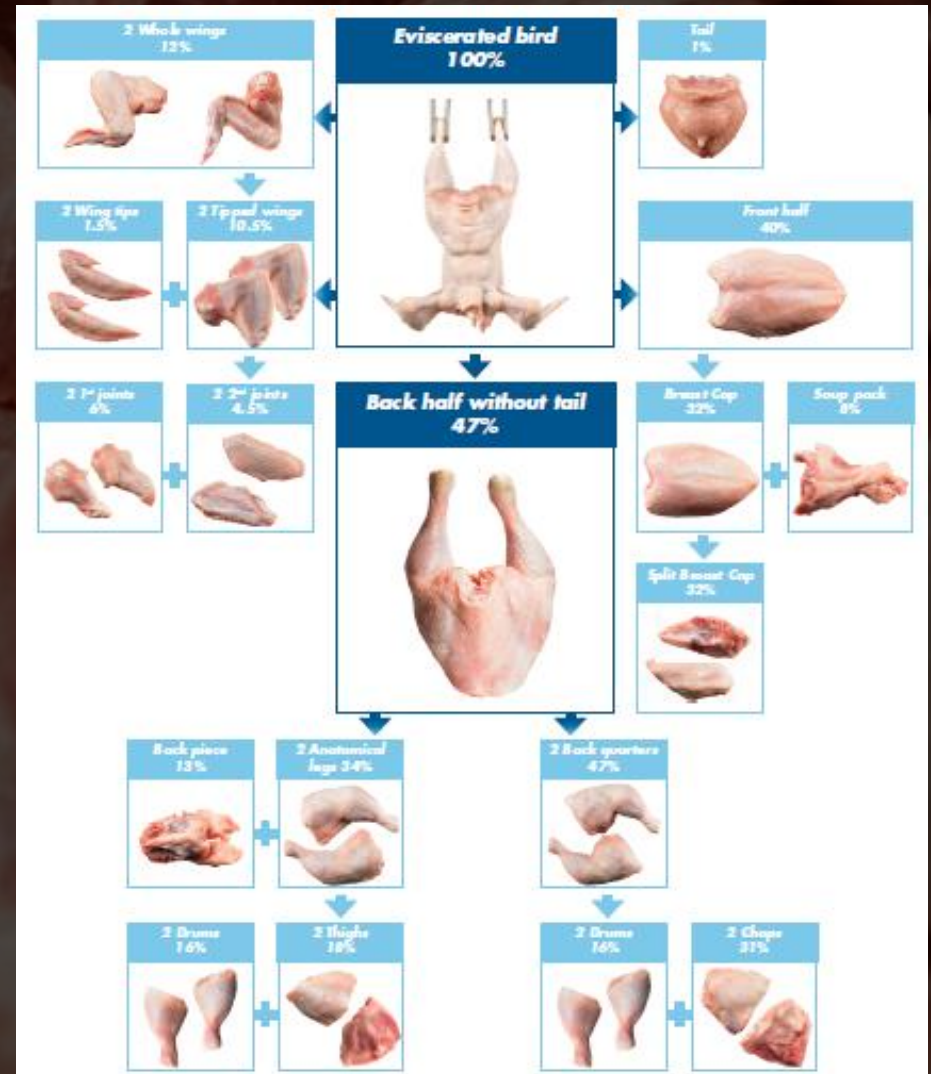
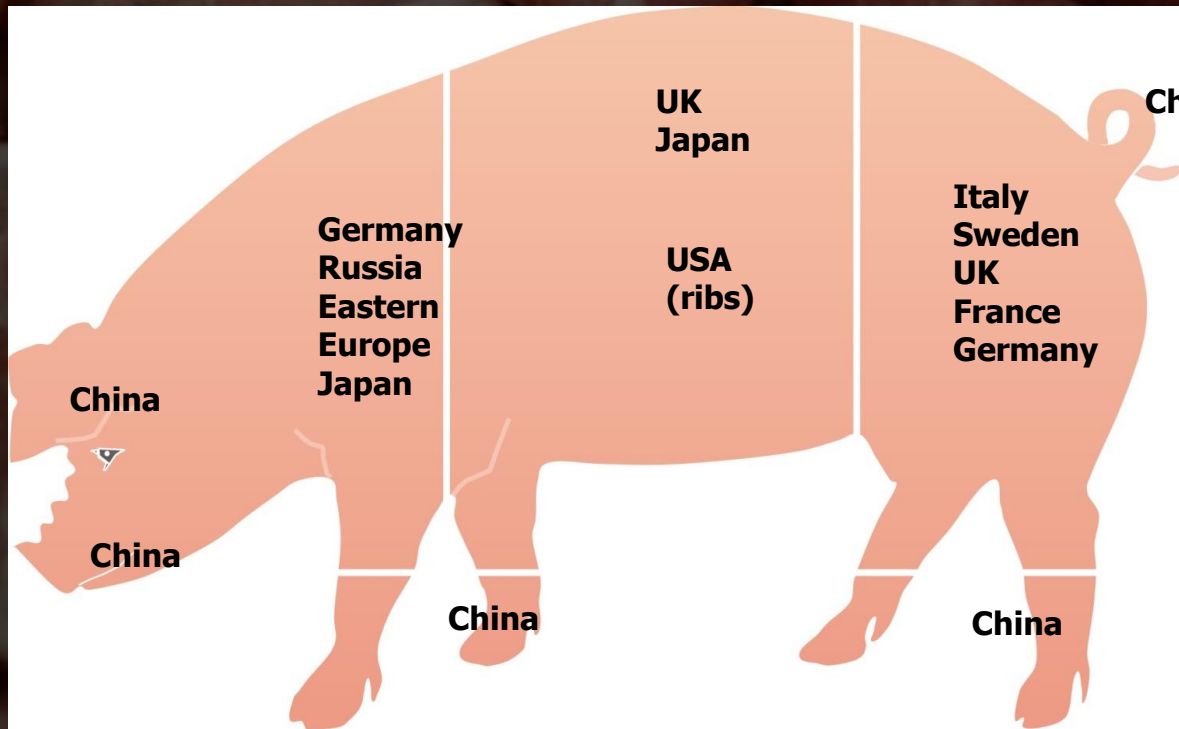


Basic condition

A photograph of a meat processing plant. In the foreground, several large, pinkish-red carcasses are hanging from a metal conveyor system. The carcasses are arranged in a line, moving from left to right. In the background, two workers in grey uniforms and white caps are standing near a control panel with several monitors. The plant has a clean, industrial appearance with stainless steel surfaces and overhead lighting.

- More than one product
- Specifications based on measures
- Price differences

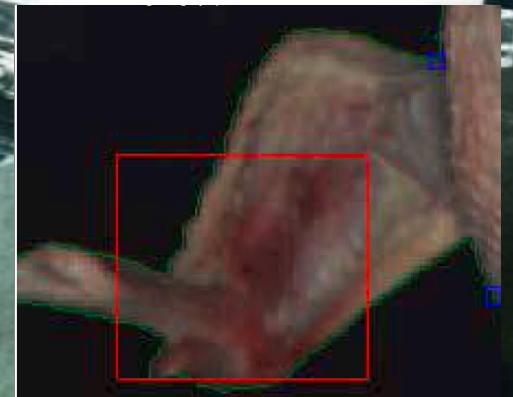
More than one product



Specifications based on measures



- Well-defined weight, and sizes
- Thickness of fat layer
- Lean meat content
- Well defined defects

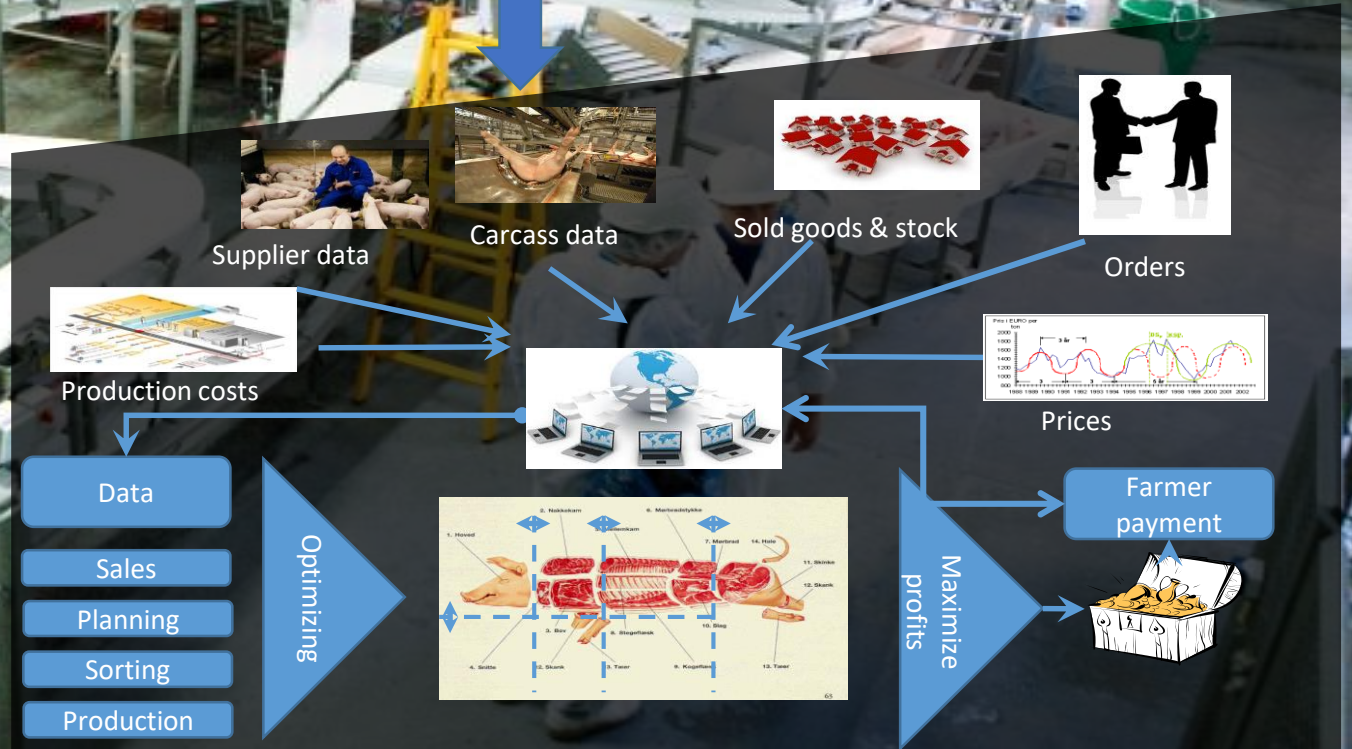


Price differences

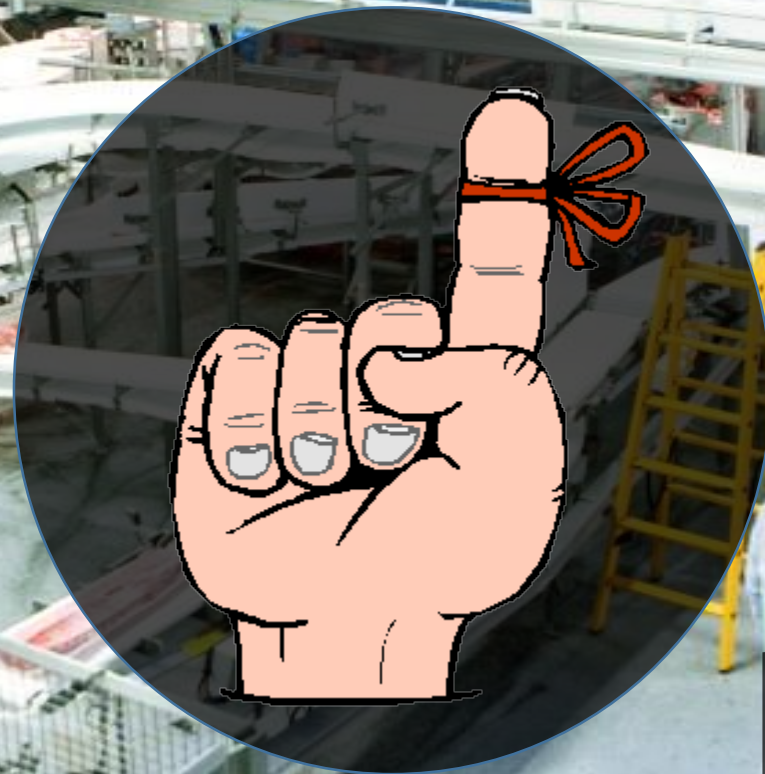


- Lean meat vs. fat
- Price dependent on size
- Main product vs. cut off
- Anatomical cut vs. miss cuts
- A-grade vs. B-grade

Right carcass to order



Right carcass to order



Start simple and add only complexity if it brings significant value

Characteristics of the red and white meat industries



Red meat

- Focus on individuals
- Batch oriented
- Buffer storage
- Changeover between products
- Manual cutting and boning
- Sorting on fat, LMP and weight

White meat

- Focus on flock
- In line distribution
- Prior to process data
- No storage between processes
- High automation
- Distributes on vision and weight

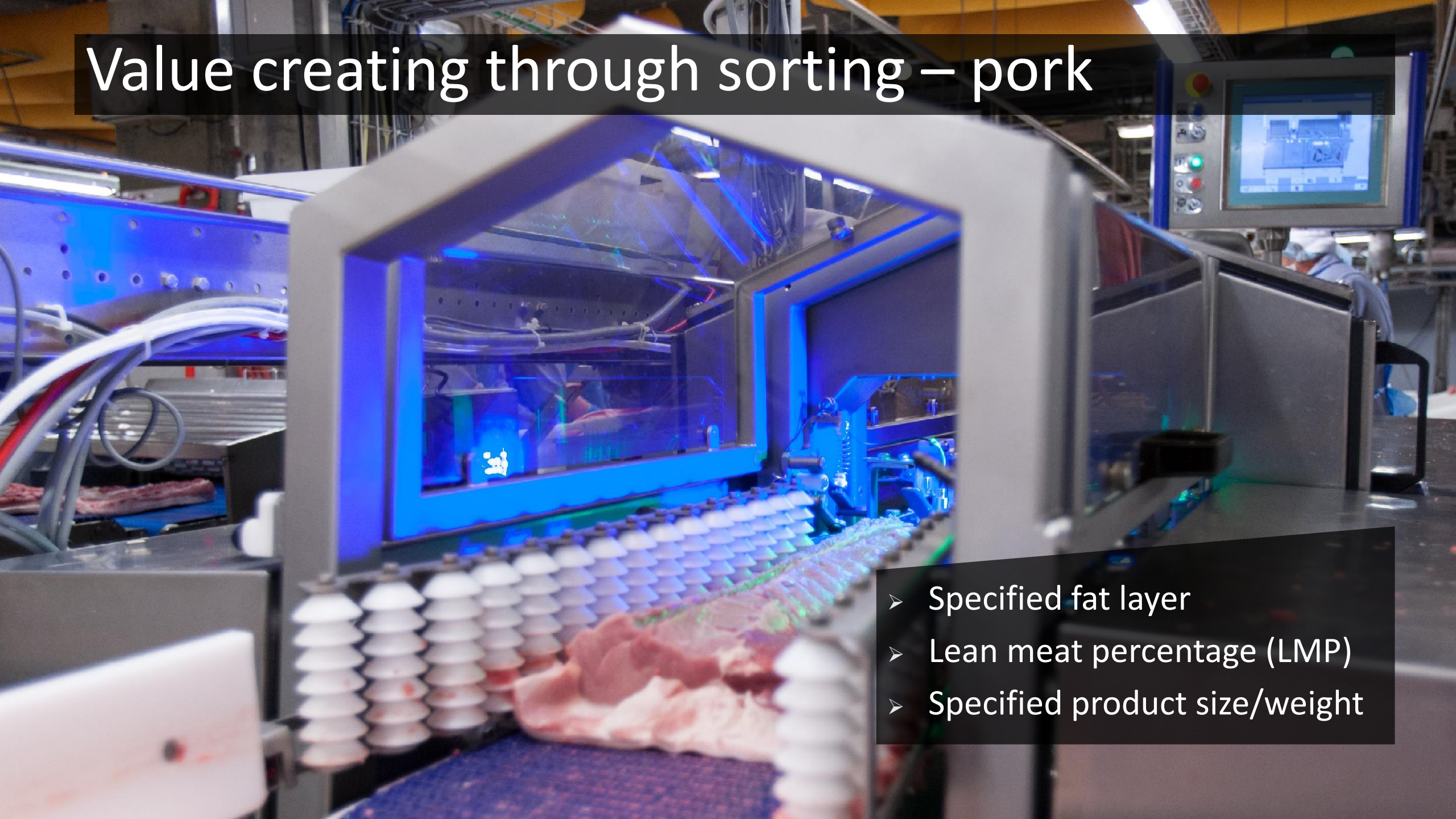
Measuring the raw material quality (pork)



Ultrasonic measurement analyzed using advanced algorithms creates detailed information regarding meat content and fat distribution.

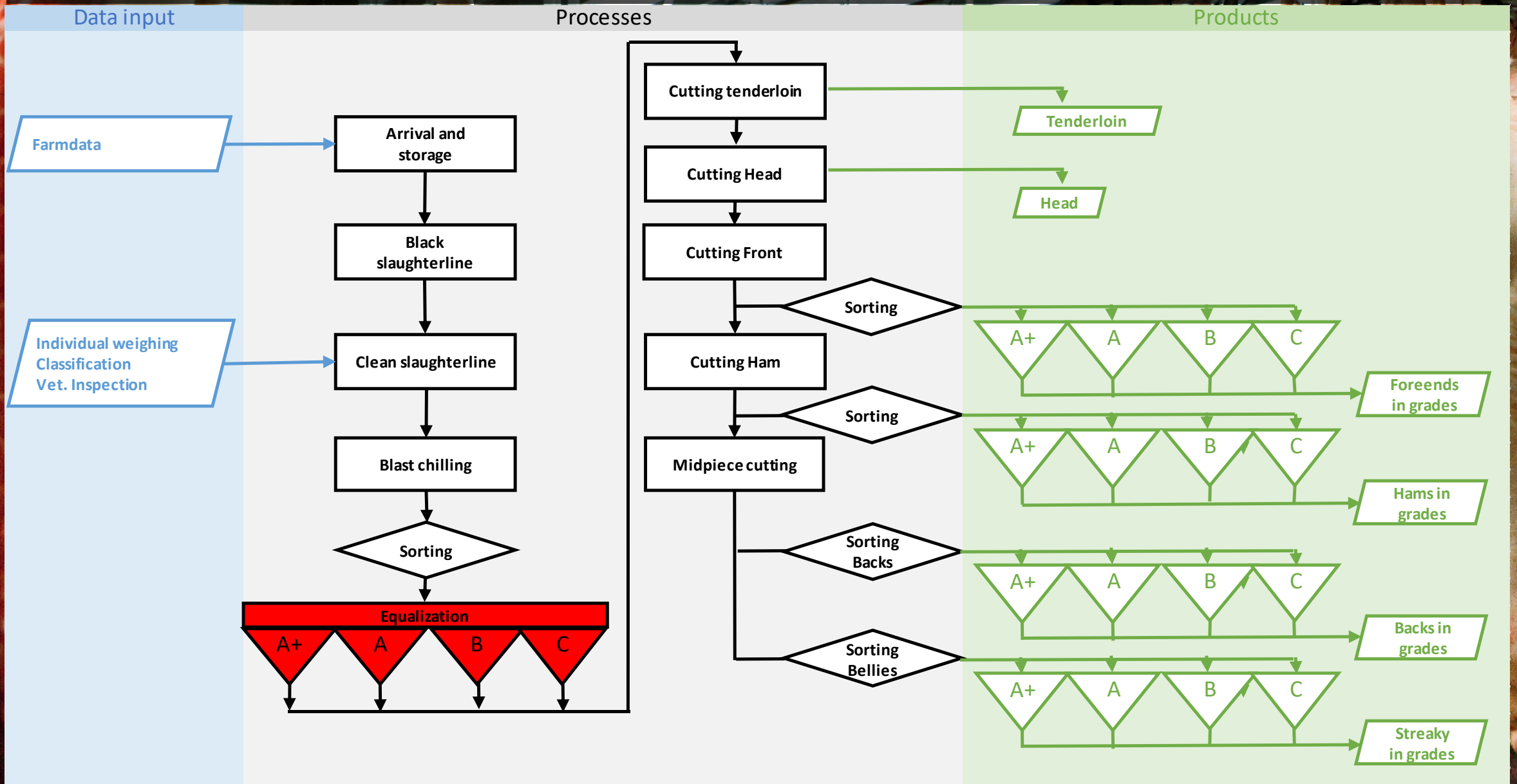
This information can be used to distribute carcasses to the products where the inbound quality parameters create the highest value.

Value creating through sorting – pork

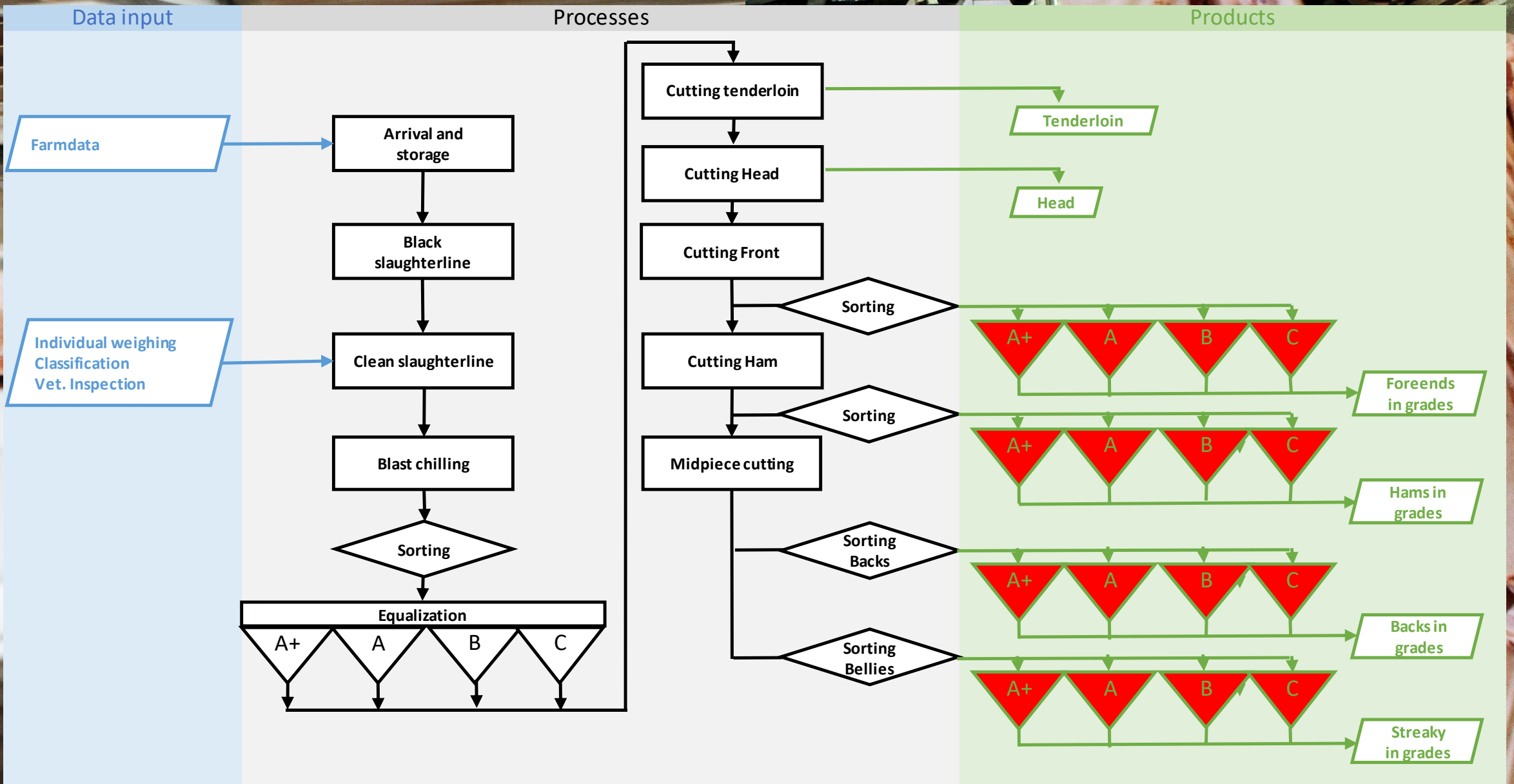


- Specified fat layer
- Lean meat percentage (LMP)
- Specified product size/weight

Sorting in batch (carcass)



Sorting in batches (primes)



Characteristics – pork cutting and boning



- Carcasses and/or primes sorted in batches
- Identity of batch on carrier or skin
- Manual labour in cut up and boning
- Lines handling one product

Data collection in the poultry industry

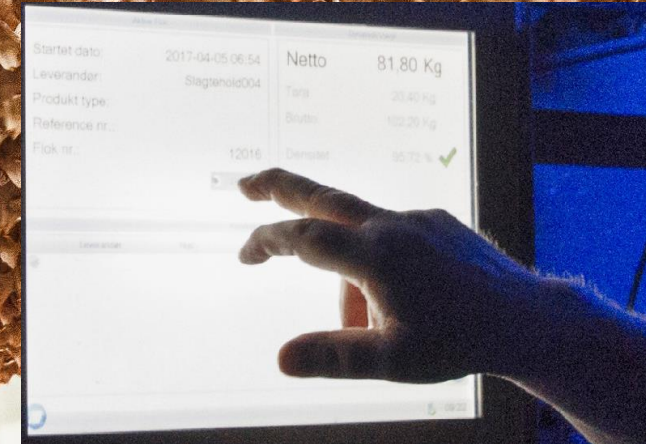


Arrival or reception

Farm and transport data registered

Crate weight recorded

Flock traceability created



Carcass vision system

Placed along the production line collecting data for optimal routing of the bird



In-line weighing

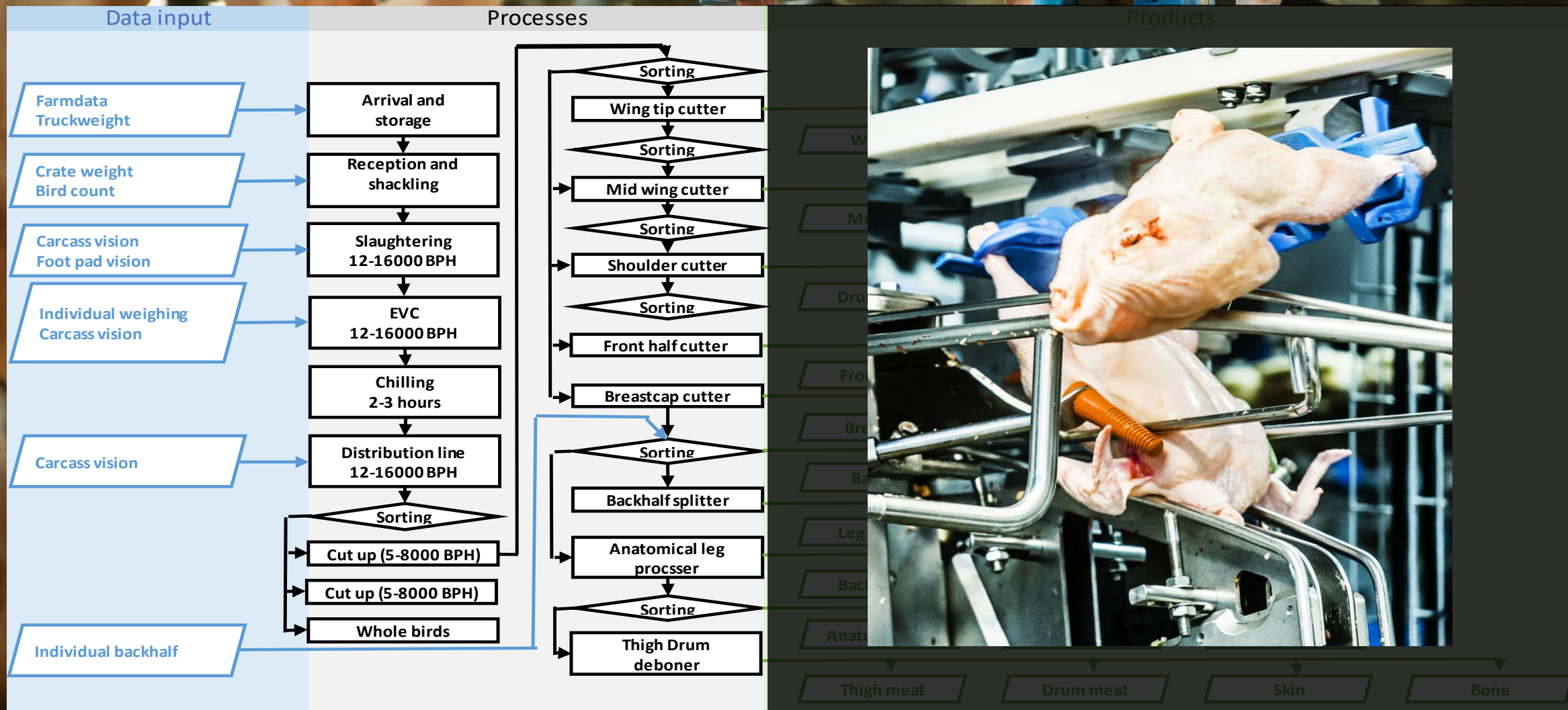
Collect individual carcass weight

Value creating through sorting – poultry

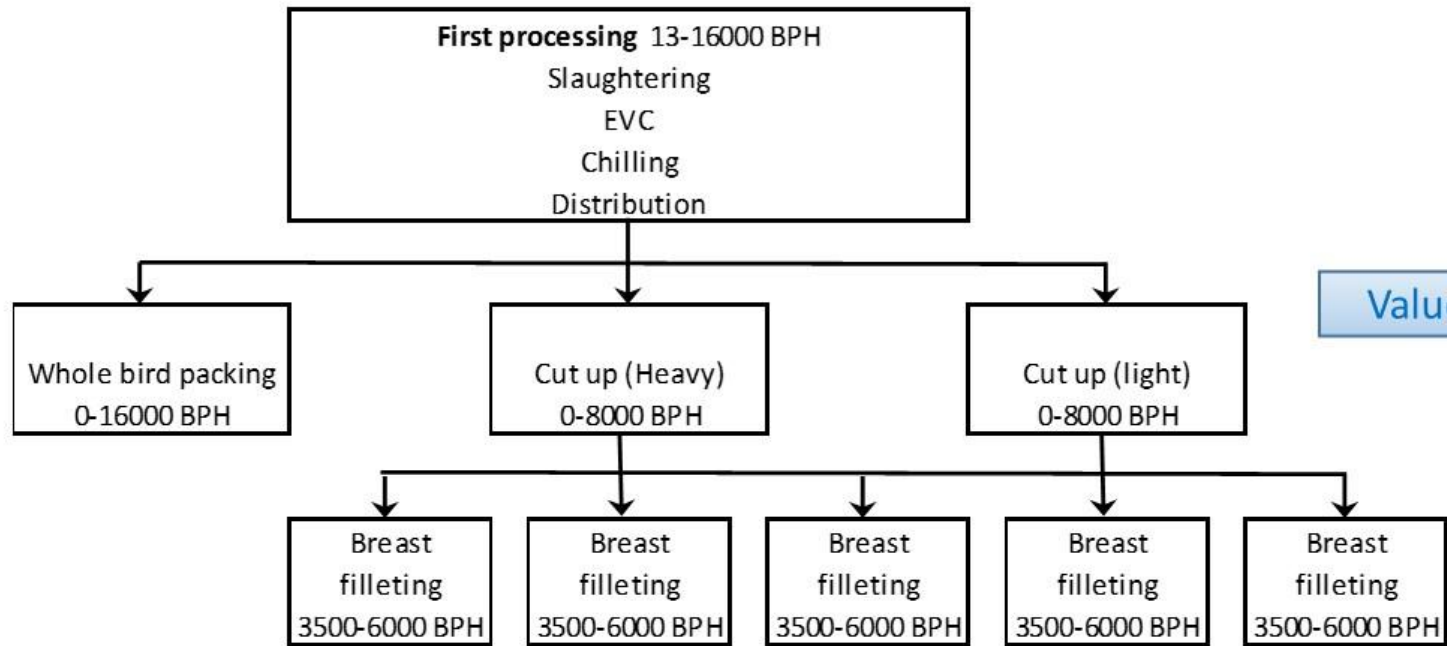
A photograph of a worker in a white lab coat and blue hairnet walking through a large industrial facility. The facility is filled with rows of hanging poultry carcasses, likely chickens, which are arranged in long, parallel lines. The floor is wet and reflective, and the overall atmosphere is industrial and clean.

- Distributing to fit machine settings
- Minimizing give away and cut off
- Minimizing the cost of damage

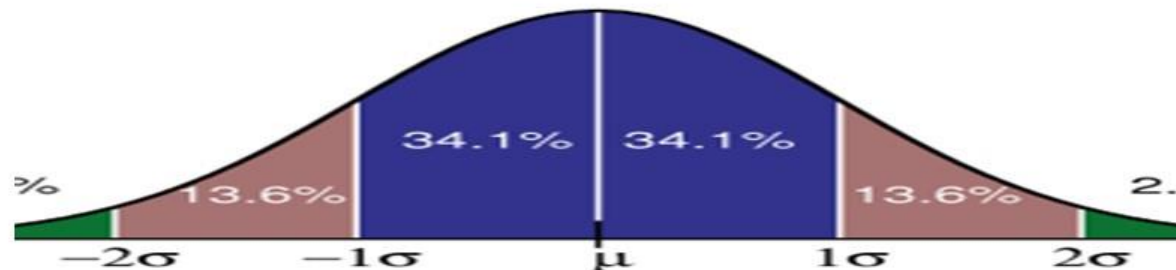
Inline distribution according to quality measures



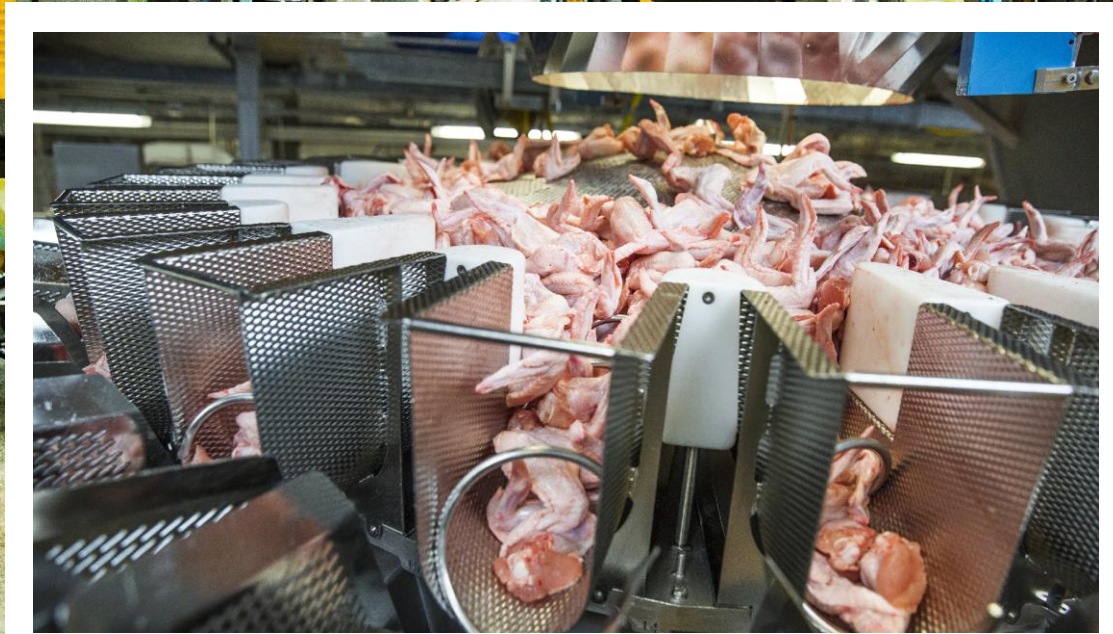
Distributing to fit machine settings



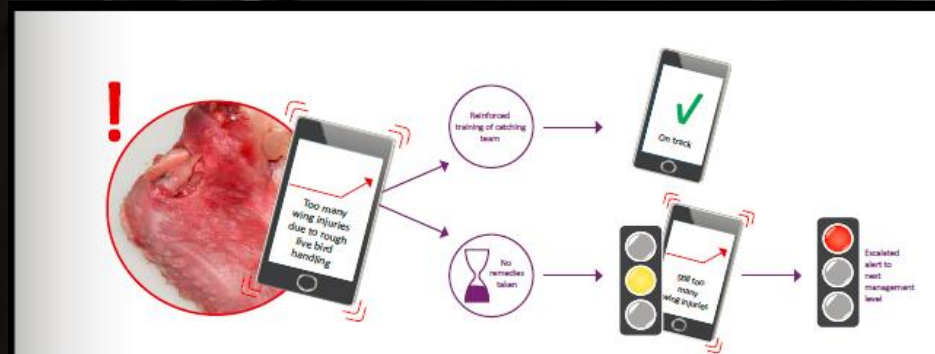
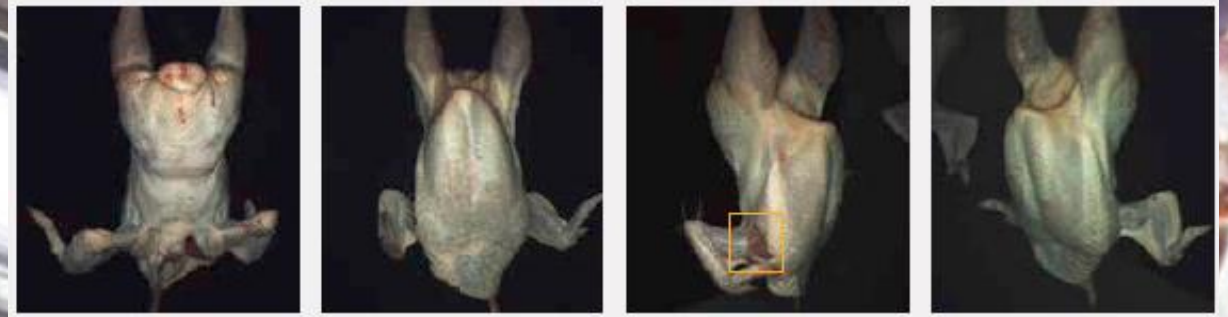
- Better anatomical cut of main products
- Higher filleting yields
- Less bone and cartilage in the meat
- Meat pre-sized for the following processes



Minimizing give away in products



Minimizing the cost of damage



Original photo taken with our ClassiEYE® vision camera. It is clearly seen that the bird's right wing has a severe downgrading injury.



Characteristics – poultry

A photograph of a poultry processing line. Several plucked birds are moving along a white perforated conveyor belt. The background shows industrial machinery and a blue coiled air hose.

- Line adjusted to avg. flockweight
- FIFO processing
- Routing controlled by measures
- High degree of automatization
- Machines not adaptive
- Missing size/weight on part level
- Lower valued products than in red meat

Learnings between red and white meat

Red meat

- Individuals to batch
- Buffer storage
- Changeover between products
- Sorting the products mainly on fat, LMP and weight

White meat

- Flock oriented – prior to process data
- In line distribution
- No buffer
- Fixed machine settings
- Distributing on vision and weight

Learnings between red and white meat

A woman with a friendly smile, wearing a light blue hairnet, is the central focus of the image. She is positioned in what appears to be a food processing facility, with blurred industrial equipment and overhead lights in the background. The overall atmosphere is professional and positive.

Red meat

- Use prior to process data
- FIFO processing
- Avoid buffers

White meat

- More sophisticated measuring systems measuring inside the product
- Individual handling

Future

The background image shows a large, complex industrial machine, possibly a CT scanner or a similar imaging device. It features a prominent central circular opening, surrounded by a metal frame with several smaller circular cutouts. The machine is mounted on a base with various control panels, including one with a red emergency stop button. The overall scene is set in a clean, industrial environment.

- Processes controlled by the optimization software
 - Sensor controlled real time processing (robots)
 - "Fix points" – when measured once (ex. CT), down stream processes will use the measurement
 - Measuring methods predicting meat quality (eating)
 - Upstream process adjustments based on measures
- DMRI
CT-onLine

Thank you for your attention!

www.dmri.com

