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welfare indicators from sensors: achievements and barriers

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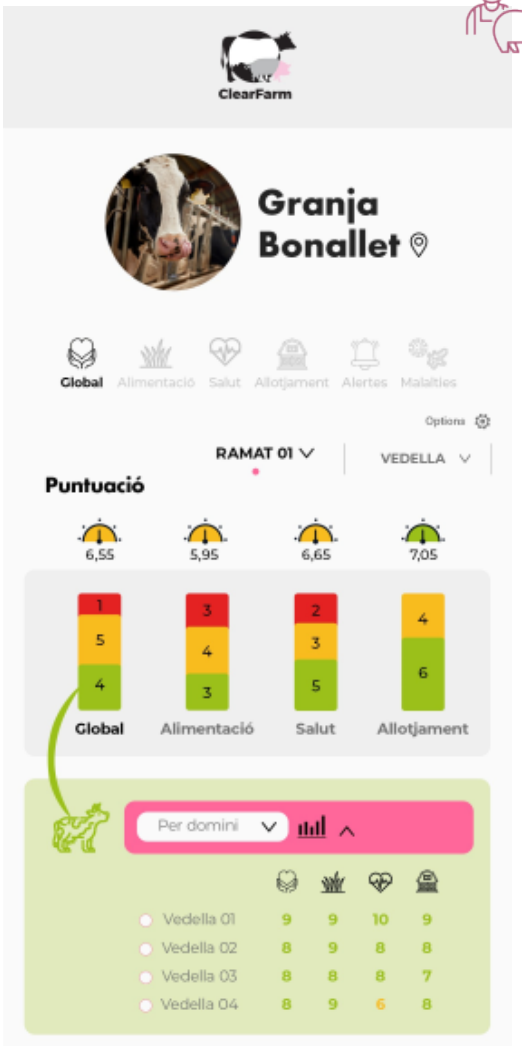
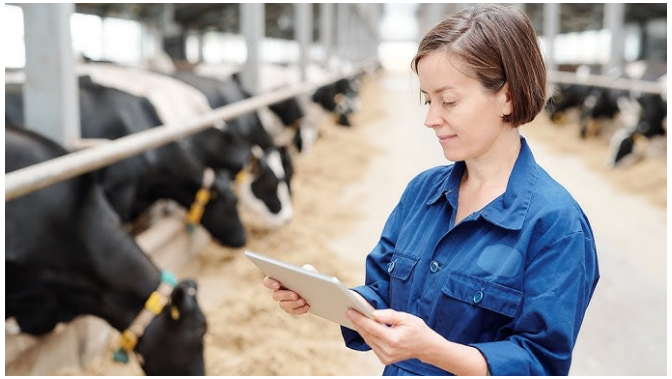
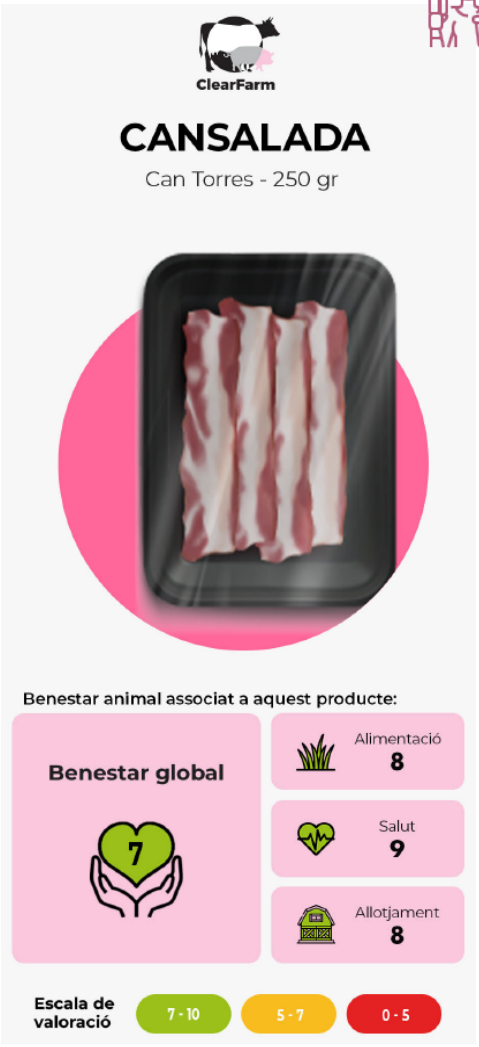
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 862919

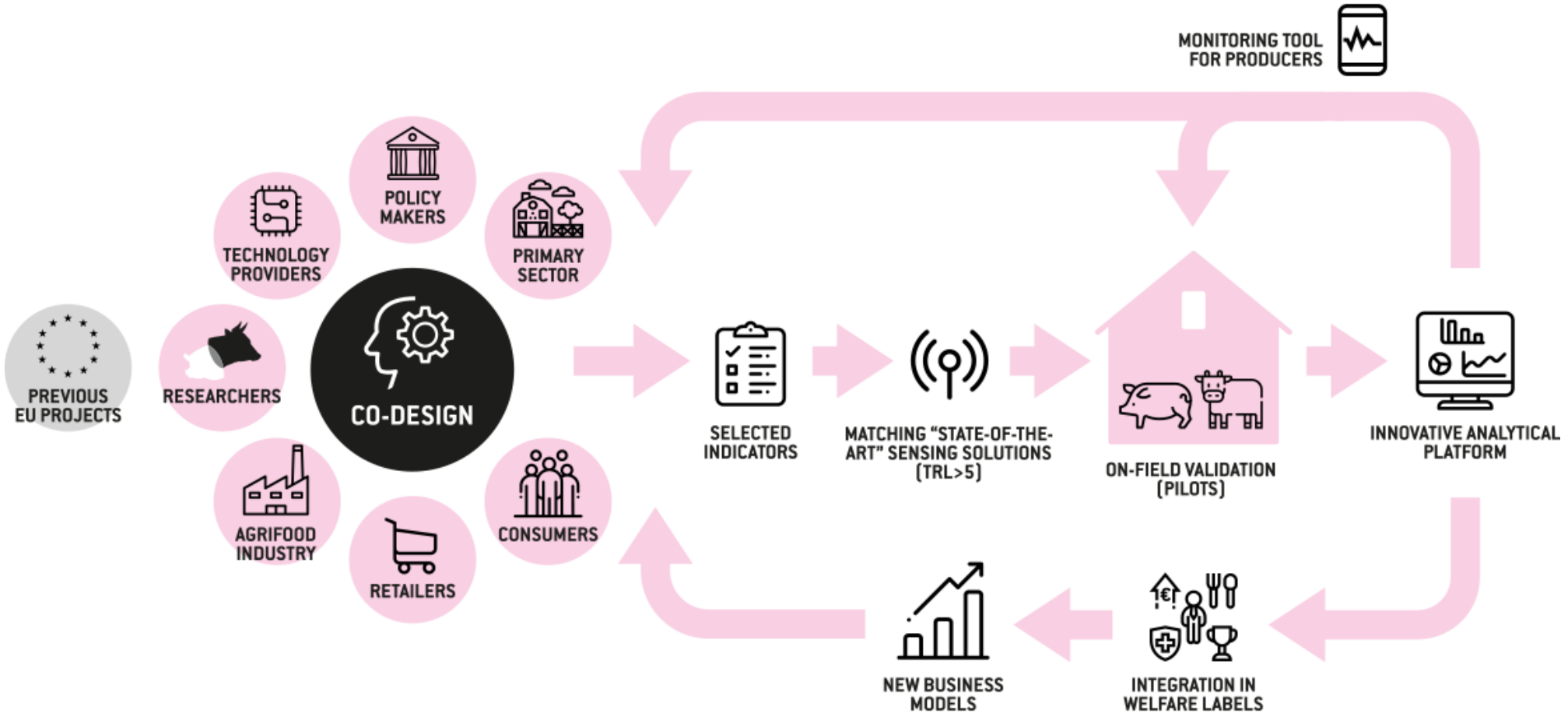
The ClearFarm aim



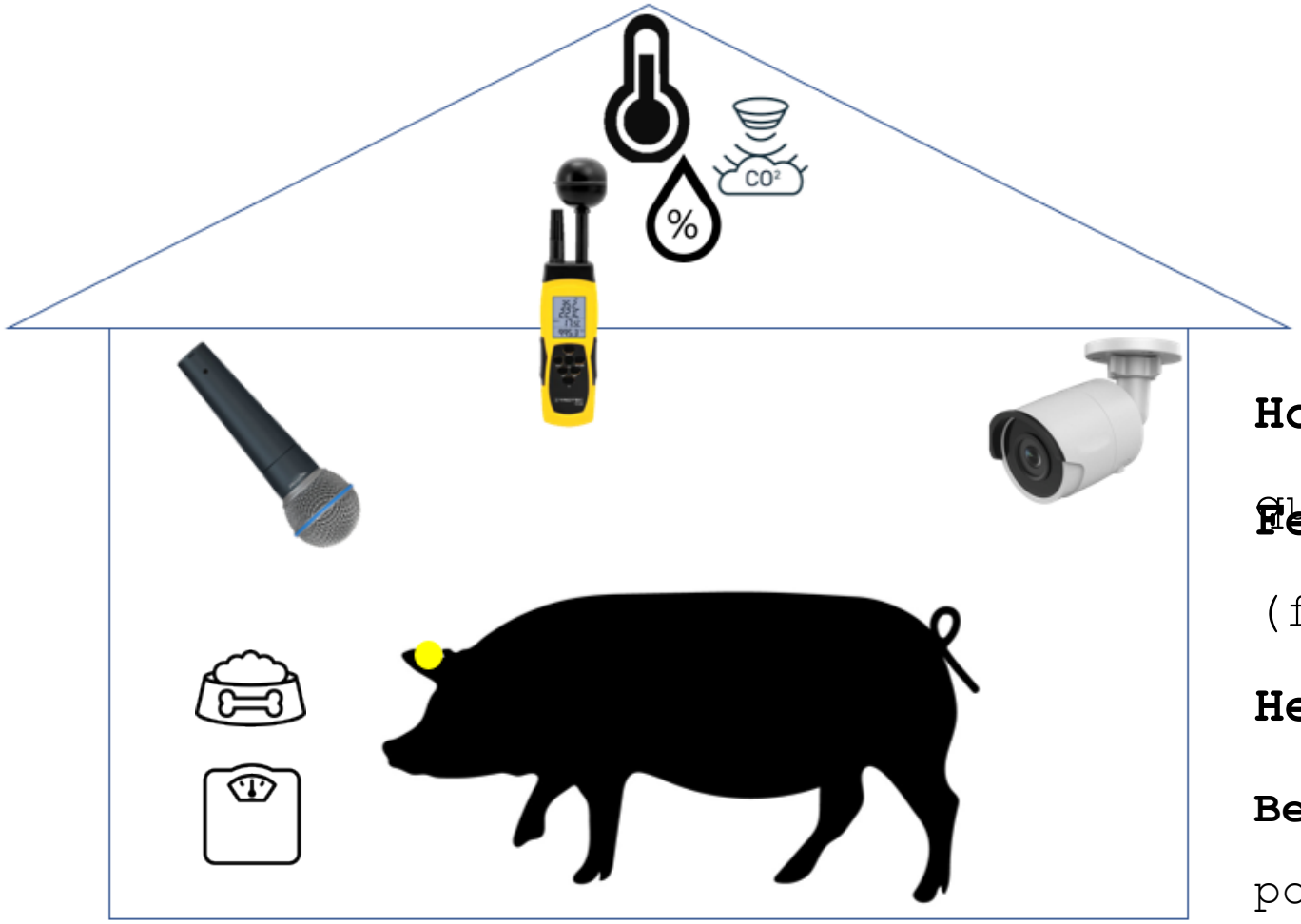




The ClearFarm project



Sensor technology available in pigs



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Gomez et al., 2021

Housing: climate sensor (T°, H, air quality)

Feeding: ear-tag and scale (feeding behaviour)

Health: microphone (coughing sounds)

Behaviour: computer vision (activity & posture)

Welfare data from sensor technology

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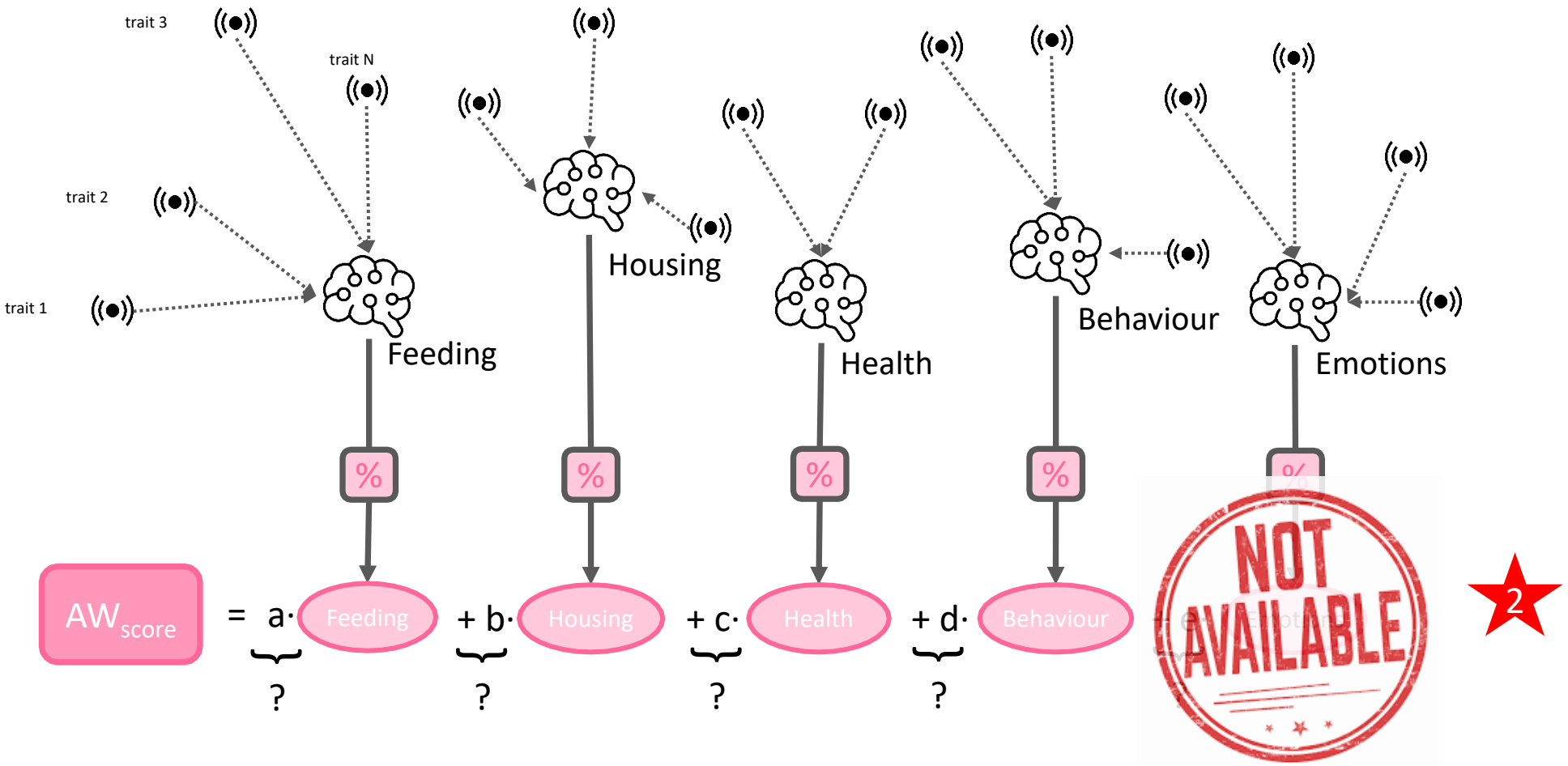
Feeding		**Housing**	
Feed access	Number of pigs in the feeding area	Resting comfort	Number of resting pigs
Water access	Number of pigs in the drinking area		Number of standing pigs
		Thermal comfort	Temperature
			Humidity
			Spatial distribution of the pigs
		Areas of interest	Number of pigs in the feeding/drinking/resting enrichment area
		Air quality	CO_2
			NH_3
Health		**Behaviour**	
Respiratory disease	ReHS (Respiratory Health Status) score	Activity level	Activity level (maximum and mean)
		Exploration	Number of pigs in the enrichment area

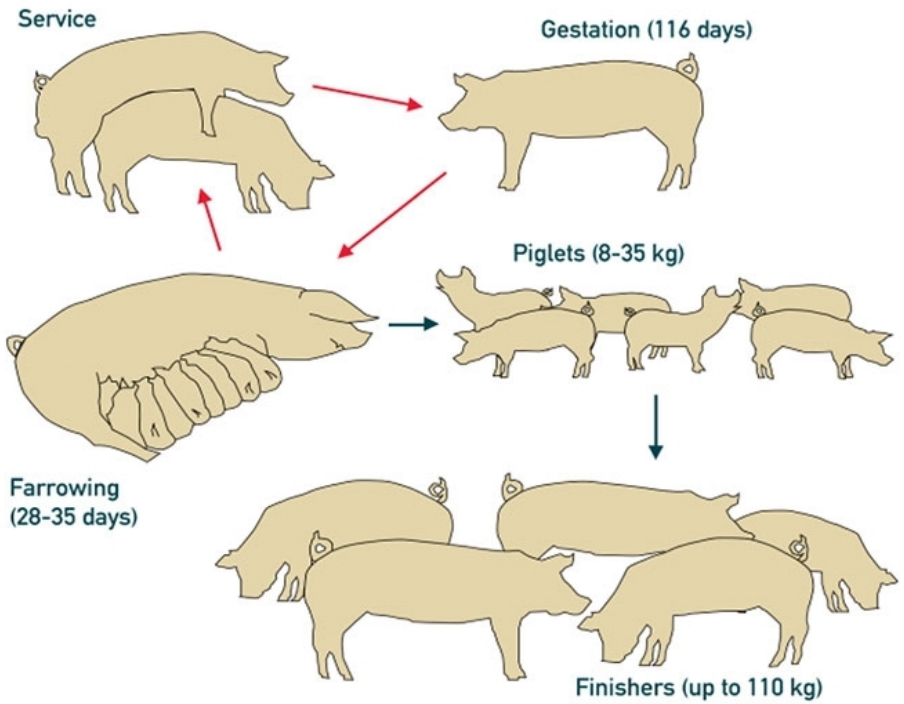
Available data and welfare domains



Assessment of the pig production chain

- Challenges due to current pig value chain and common practices
  - Different production phases:
    - Different duration
    - Different needs
    - Different welfare threats

Weighting of indicators? 3



https://agricultureandfood.co.uk/pig-production/primary-production/animal-welfare

Assessment of the pig production chain II

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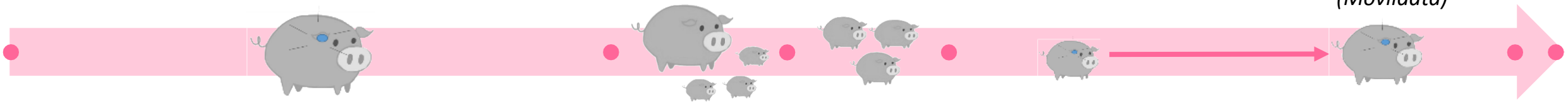
(1) DOL climate sensors *(iDOL114, iDOL19)*
(2) GPS tracker *(Movildata)*



Breeding & gestation
(3 months, 3 weeks, 3 days)

Farrowing
(1-4 weeks)

Nursery
(5-9 weeks)

Growing & finishing
(4 months)

Transport
(1 hour)

(1) Electronic sow feeder *(Nedap)*
(2) Automatic weighing scale *(Nedap)*
(3) Climate sensors *(iDOL114, iDOL19, iDOL53)*

(1) Climate sensors *(iDOL139, iDOL53)*

(1) Electronic feeding station *(IVOG)*
(2) Climate sensors *(iDOL114, iDOL19, iDOL53)*

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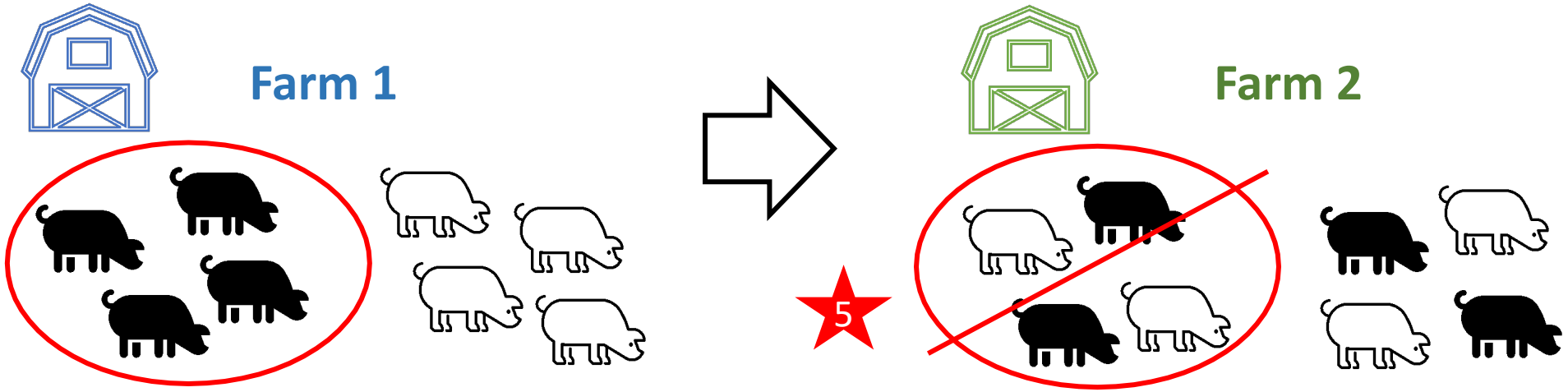
(1) Automatic animal behavioural recording camera and climate sensors *(Peek Analytics)*
(2) Automatic sound recorder and climate sensor *(SoundTalks)*
RFID ear-tag
(3) Automatic weight measuring camera *(iDOL65)*

Assessment of the pig production chain III

- Challenges due to current pig value chain and common practices
  - Regrouping and transportation:
    - Between farms
    - Between units
    - Between pens

The **pen** as a unit



Concluding limitations and barriers

1. Scarcity of validated sensors to assess pig welfare indicators
2. Some domains are not represented (emotions) and others are underrepresented (health and nutrition)
3. The weighting of indicators across different production stages through the pig's life
4. The lack of sensors to measure welfare in some production stages
5. Mixture of pigs across production stages, breaking the pen as a unit of measurement

The previous limitations and barriers should be addressed before any reliable algorithm can integrate welfare assessment throughout pigs' life

Thank you for the attention

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