

RESULT 2: OPEN PLATFORM FOR SHARING KNOWLEDGE

WP 1: Learning Environment for SMEs

CASE STUDIES DEVELOPMENT

Application of Robotics In Dairy Farming

Part 1: General information for the enterprise

1. Thomas Duffy
2. Virginia, Co. Cavan, Ireland
3. Subject of activity: Dairy farming
4. Legal status: Partnership
5. Management
 - a. Gender: **Male / Female** / Other
 - b. Age: **up to 35 / 36-45 / 46-55 / 56-65** / over 65
 - c. Education: primary / secondary / **higher**
6. Farm size
 - a. cultivated land: 52 ha owned with 13 ha rented.
 - b. species and numbers of animals: 90 dairy heifers, 21 heifers, 21 heifer calves.

Part 2: Smart technologies used on the farm

<https://www.lely.com/ie/solutions/milking/astronaut-a5/>

Robotic milking machine – Lely Robot Astronaut A5.

The milking machine is accompanied with an application which supports the monitoring of data.

Part 3: Owners' satisfaction with the use of smart technologies

1. Utility assessment

The Lely Robot Astronaut A5 is a robotic device which milks cows. The robot replaces the need for humans to prepare the cows for milking and to milk the cows, as the robot cleans the teat of the cows and puts the cluster on the cow for milking.

Overall, the farmer is very satisfied with the smart technology that is being used on the farm. The robot has resulted in less physical effort being needed on the farm and as a result, direct costs of labour have been reduced.

The partnership are very data driven; and with thanks to the data retrieved through the system, the farming partnership are able to detect heat monitoring of the cows. The farmer uses AI and sexed

semen to enhance the quality of his herd, and through the data, they can make more data driven answers to enhance their farming operations.

The technology which forms part of the robotic milking machine is user friendly and according to the farmer, is not more complicated than an iPad. The data is available through an application on a smartphone and shows the number of rumination minutes, eating minutes of the cow, their activity and their behavior.

In addition, the technology supports the farmer to recognize the health of their animals. Indications regarding somatic cell count is available through the app, as well as the electrical conductivity of the milk which can support farmers to recognize cows which are suffering from mastitis. Blood indicators are also available through this technology. Through all of the data, farmers are able to identify and predict animals for culling and those that are sick. If manual inputs into the system indicate that a cow is taking antibiotics, the robot will know to dump the milk / place it in an alternative container so that it doesn't go into the tank.

2. Observed difficulties and problems

The robotic milking machine works well for people who are data driven and seek to learn the exact output of milk from their cows, especially the quantity of milk in kgs given in an udder. However, farmers who have not used technology in the past find it challenging to lose the connection that they have with their animals, as the machine replaces the need for human interaction with the cows during the milking process.

Additionally, due to the age range of the farmers involved in the partnership, it was easier for the younger members of the partnership to become more familiar and engaged with the technology. For example, the oldest member of the partnership, a male in his 60's, did not have a smart phone prior to the installation of the Lely Robot on the farm.

Another difficulty that was evident in the first few days after the introduction of the robotic milking machine to the farm was that the farmers noticed that the older cows found it challenging to get used to the technology. Animals that had been used to grazing in the field for the farmer were used to the farmer gathering them to be milked. With the robot operating 24/7, the cow needs to present herself to the milking parlour to be milked. After a few days, the older cows became familiar with the technology and are now accustomed to it and present to the milking parlour up to 4-times a day.

The robotic milking machine is also supported by an application on a smartphone. The interface on the application is useful, and gathers a vast array of data, but some of this is not used or required in Ireland at present. For example, liquid yield is not a factor which is considered in Ireland at present but is quite common across the continent. Furthermore, the Irish Cattle Breeding Federation (ICBF) will not accept the data that is produced through the system, even though the system can provide readings over the long term. This means that farmers need to pay consultants to take readings spread throughout the day, and will not use the data from the system.

3. Potential risks

For the moment, the farmer is not worried about risks associated with the technology. The supplier has confirmed that no new hardware will be made available for the product and only software updates will be used going forward.

Part 4: Financing the investment in smart technologies

The Lely Astronaut A5 cost approximately €180,000 to install, with the TAMS grant offering up to €60,000. The reason for this difference is that the government of Ireland has deemed the reference cost of the machine to be €100,000, with TAMS supporting by 60%.

To cover the shortfall, the farming partnership used cash on hand and culled their herd to raise the capital required to purchase the robot.

It is not intended that the hardware for this robot will change, only that software upgrades will become available in the coming years.

Part 5: Future intentions towards smart technologies

The partnership were advised at the time of purchasing this robot, if they considered purchasing a second robot in the coming years, they would need to factor this into consideration at the time of purchasing the first.

The reason for this is that in order to install the robot, precise measurements need to be taken to ensure that there is sufficient room in the shed for the robot to maneuver. If a second robot were to be installed in the coming years, it would need to have sufficient space in the shed too.

Therefore, at the time of purchase, the farming partnership had already considered the purchase of a second robot and have made adjustments to their shed layout to factor the second robot.



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Part 6: Some photos#



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There is a device touching the back of the cow which provides an electric shock if the cow doesn't leave the pen after being milked.



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The robot has determined that one udder has no more milk remaining and has removed the cluster from this udder.

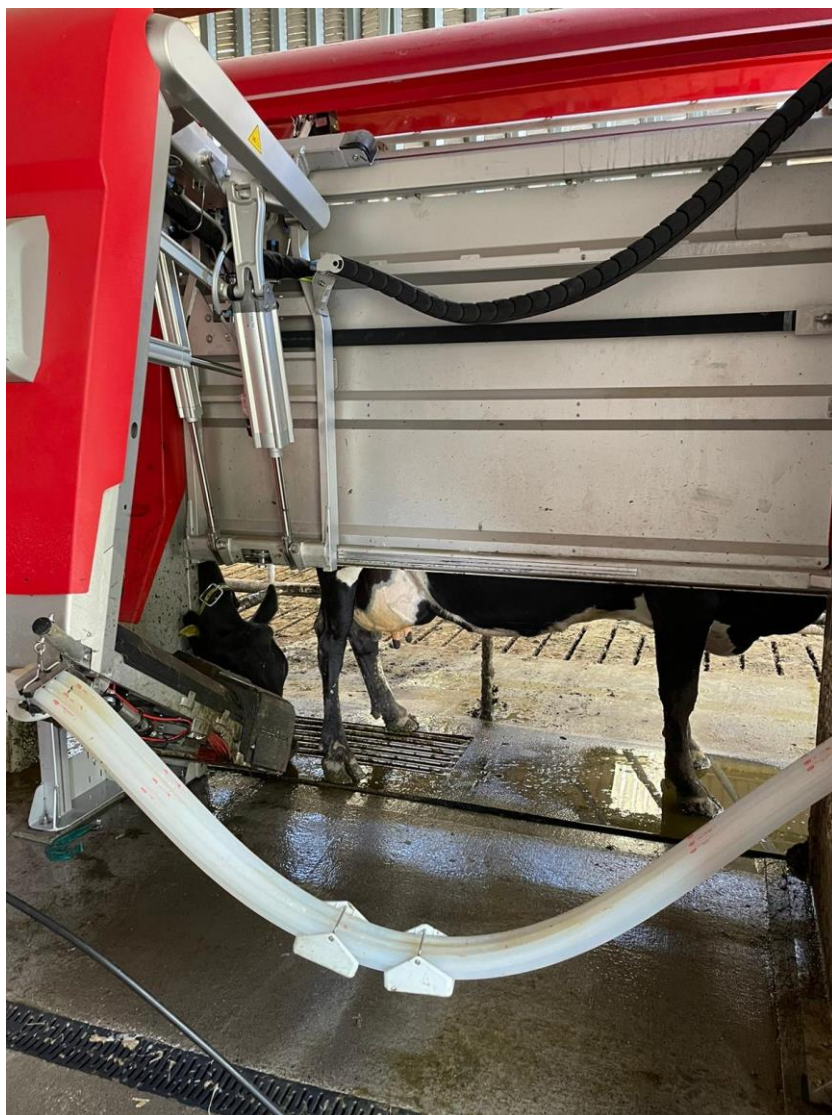


The red and white cylinders are used to clean the teat of the cow.





A cow with a collar.





Data provided from one cow. She has produced 8.2kg of milk



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Cows waiting to be milked



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The inside of the machine



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