



Abby Bauer

Will heat detection technology work for you?

There are many factors to consider before making an investment in heat detection.

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AN INVESTMENT that results in less labor and possibly more pregnant cows seems like a no-brainer. However, determining if automated heat detection technology is right for your farm is a little more complicated than that.

Many farm-specific and technology-specific factors influence the investment potential of one of these technologies. We wanted to explore some of those factors in a study conducted at the University of Kentucky. We focused on how three technology-specific factors would influence automated heat detection outcomes:

1. Technology start-up price or the initial total cost of the technology hardware and software, not including the individual animal monitoring devices — for our study, this was set at either \$5,000 or \$10,000.

2. Tag price or the cost of the individual animal monitoring device — for our study, this was set at either \$50 or \$100.

3. Heat detection rate of the automated heat detection technology — for our study, this was set at either 60 percent or 80 percent of eligible cows being alerted as in heat over a 21-day period.

Comparing four scenarios

Using the average market prices over 10 years (2006 to 2015) and reproductive costs representative of United States dairy herds, the eight different combinations of the above factors were evaluated in four different scenarios:

Scenario 1: A herd using 100 percent visual observation for heat detection that adopts 100 percent automated heat detection.

Scenario 2: A herd using 100 percent visual observation for heat detection that adopts 75 percent automated heat detection and 25 percent visual observation.

Scenario 3: A herd using 100 percent timed A.I. that adopts 100 percent automated heat detection.

Scenario 4: A herd using 100 percent timed A.I. that adopts 75 percent automated heat

detection and 25 percent timed A.I.

We assumed that herds using visual observation had a heat detection rate of 49 percent, and herds using timed A.I. used an ovsynch protocol with a 95 percent service rate. The measurement we used to evaluate investment profitability was net present value (NPV). If NPV is positive, the scenario is a good investment decision. If NPV is negative, the scenario is a bad investment decision.

We found that investment profitability differed greatly, depending on what reproductive management program was being used before adoption of automated heat detection. For herds that were using visual observation, investing in automated heat detection technology always resulted in a positive NPV with the payback period ranging from 1.6 to 4.1 years. In our example, the automated heat detection technology always improved heat detection rate and decreased labor costs compared to visual observation, contributing to the positive returns.

For farms with a higher visual observation heat detection rate or lower labor costs, investment in the technology might result in lower returns, potentially leading to a bad investment. In other words, if you are already doing a good job with heat detection and/or can accomplish high heat detection rates inexpensively (lower labor costs), then the technology

THE BENEFITS OF AUTOMATED HEAT DETECTION TECHNOLOGY vary from farm to farm, depending on the herd's current reproduction situation.

would not add as much value to your farm.

For herds that were using timed A.I. before investment, NPV was positive in about half of the scenarios. The scenarios where NPV was negative were those that included a high tag price (\$100). Payback period when transitioning from timed A.I. to automated heat detection ranged from three to more than 10 years.

Benefits of timed A.I. over automated heat detection include a higher service rate and reduced time to first insemination. On the other hand, benefits of automated heat detection over timed A.I. include reduced time between inseminations and reduced labor costs. Again, farm-specific adjustments to the assumptions used could easily change the outcome of the investment scenario.

Tag price influenced investment profitability the most followed by the technology start-up price. The technology's heat detection rate was the least important. The fact that tag price most influenced adoption success indicates that herd size and the number of tags purchased will have a big impact on investment results.

In our scenarios, we assumed the purchase of one tag per cow. If instead tags were moved among cows after pregnancy diagnosis, these costs would be greatly reduced (although more labor would be required).

More to think about

The outcome of investing in automated heat detection technology depends on many farm-specific and technology-specific factors. Some of the other factors you should consider include market cattle prices (which will influence the cost of days open), herd size, herd labor structure, expected lifetime of the investment, and other potential uses for the technology (calving detection, disease detection, and so forth).

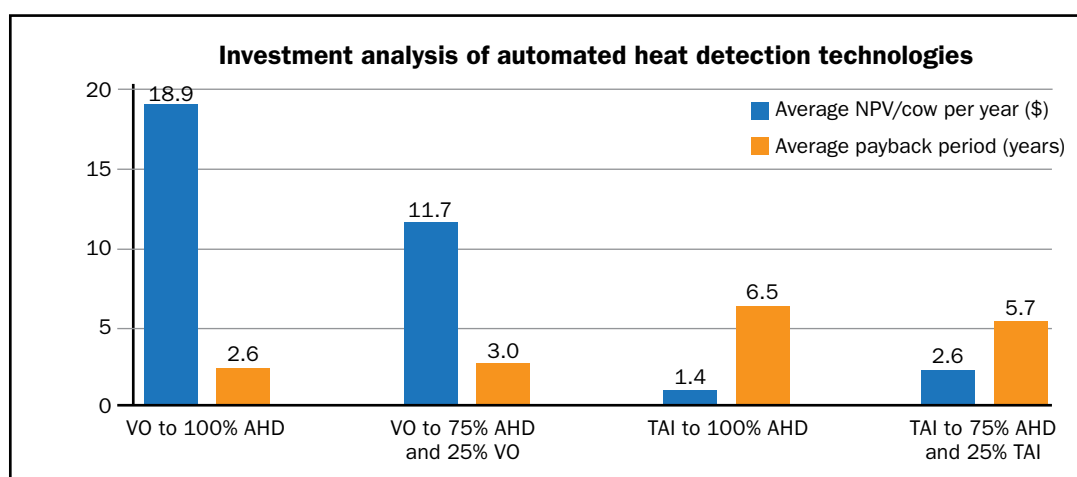
When trying to decide if this technology is right for you, think through the four components of a partial budget:

1. What costs will rise (semen use, technology costs, including service fees, data storage fees, and replacement straps, and so forth)?
2. What costs will be reduced (labor costs, reproductive culls, and so forth)?
3. What added benefits will you see (greater milk production, more calves for sale, and so forth)?
4. What benefits will be lost?

Tools have been developed to assist with determining the potential outcome of an automated heat detection technology investment. 🐄



To access and enter your own herd-specific information into the decision support tool created from this project, go to on.hoards.com/UKheatdetection.



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