The importance of data science in the poultry industry

The poultry industry has evolved into a modern state; it has gone from traditional farming systems without measurements of traceability to a digital and automated system where a large amount of data is generated.

In this sense, livestock farmers, feedmills, slaughterhouses, hatcheries and all departments of a poultry company are becoming more and more adept at capturing data. But true value is generated from the information that can be obtained from the analysis of these data.

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Data science is a powerful tool to extract knowledge or insights in a way that allows companies to understand what has happened, why it has happened and what decision they should take.

Successful poultry farm management depends on making assertive decisions at the right time, and data play a key role in facilitating this. The use of Big Data has the potential to transform poultry businesses.

The poultry industry is moving towards a 4.0 model of innovation

With modern technology playing an increasing role in the day-to-day management of farms, how can poultry production 4.0 profit from data science?

There are a lot of questions that are widely asked in poultry production such as:

- What risk factors should I manage in the hatchery to obtain better quality day-old chicks?

Fig. 1. The use of Big Data has the potential to transform poultry businesses.

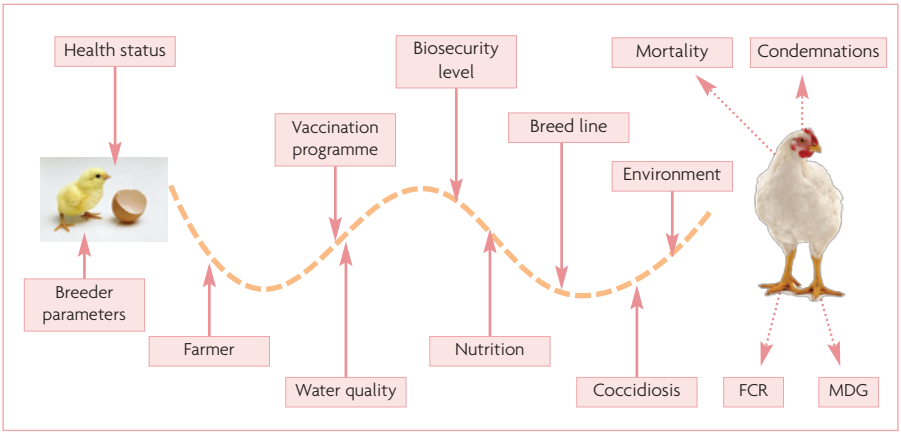

Fig. 2. Data science indicates response paths.

- What is the most efficient IBD vaccine for my company?
- What is the best ventilation system on the broiler farm?

However, data are hardly ever analysed to answer these questions.

Data analysts have an important role in adding certainty to decisions. They go from perception to knowledge to show what are the possible areas of improvement to boost efficiency.

But the objective of applying data science in a company, or specifically a hatchery, is not to find all the answers. What data science does is to indicate response paths, since some paths are more assertive than others.

And, when finding paths, there are many variables that must be taken into account, some more important than others, but all of them influence the result when they are related to each other.

For example: breeder parameters (farm of origin, age, health status), vaccination programme, breed, coccidiosis pressure, water quality.

Sometimes they may be associated with each other, such as breeder age, Gumboro vaccination programme and coccidiosis status; or ventilation type and biosecurity level. Sometimes a variable may act in an isolated way, such as breed line. The only way to correctly understand these interactions is by studying the historical data of the farm, because:

- In each environment the variables interact in a different way.
- The temporal aspect has an impact on these interactions.

Hatcheries play a central role

In all poultry companies, hatcheries play a vital role in connecting the poultry production chain. They are the key link between breeder farms and broiler farms. They receive the eggs from different breeder farms, with different laying dates, coming from breeders of various ages, genetic lines, and vaccine protocols.

These eggs are incubated in various setters and hatchers. After all, the hatcheries will produce chicks that will be sent to different broiler farms.

Depending on the hatchery performance or the quality of these day-old-chicks, differences are expected in the productive performance, with an impact on company profits.

There is a great opportunity for data science to detect areas of improvement in the hatchery.

By doing tailored data analysis it is possible to improve day-to-day decision-making and to boost profit drivers. Company decisions will be more assertive.

But to achieve this goal it is key to have good data traceability, meaning good quality

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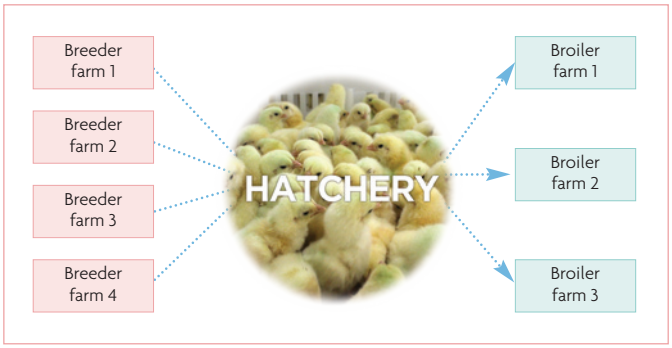

Fig. 3. Hatcheries play a central role.

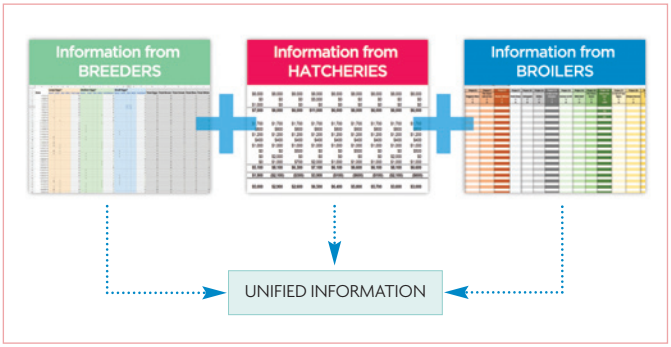

Fig. 4. It is important to link data for maximum information.

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information in the chain. There are differences in data collection at breeder farms, hatcheries, and broiler farms, but what is important is to link data in a way that allows the maximum information possible to be extracted.

These databases are often not in the same structure, and it may be difficult to connect them. Data scientists have the tools to facilitate this process.

By doing this, it is possible to analyse the factors from the breeder and from the hatchery, studying even the association between them, that might impact hatching or broiler performance.

The focus of the analysis will always depend on the company.

Value added for the company

It is paramount to have a view of the production as a whole interconnected process.

This global vision can only be achieved through data science since:

- A lot of data is generated every day in hatcheries, but most is not used. This is either due to lack of time or resources or because it requires programming skills to connect all the files.
- Data analysis is important not only in helping to discover areas of improvement, but also in monitoring performance over time and being able to predict deviations in results, and thus prevent them.
- It is important to analyse the hatchery parameters, taking into account previous and subsequent information. This more general view is highly valuable for finding areas of improvement (scientific knowledge applied to a company's concerns and questions).

In poultry companies, a lot of data is generated, which, when analysed properly, allows the identification of critical points or areas of improvement in the production process.

Hiprastats is a data science service available to Hipra customers who want to overcome the challenge of Animal Production 4.0: understanding the relationship of multiple factors in order to invest resources exactly where it makes a difference to animal health. ■