Extended Abstract
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Paper/Poster Title	Technology acceptance of AI camera surveillance of German pig farmers

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Abstract	***200 words max***

Livestock farmers face a variety of challenges in their operations. Visual artificial intelligence (AI) monitoring systems are a much studied and offer a promising solution for some tasks on a farm, e.g. barn monitoring. However, such systems have two critical factors for implementation: visual monitoring and artificial intelligence, which may cause adaptation difficulties for users. This study investigated which behavioural factors of pig farmers influence the acceptance of AI monitoring systems on their own farms. For this purpose, a technology acceptance model (TAM) was developed and tested using PLS-SEM to identify factors that increase or decrease acceptance. A total of 186 pig farmers from Germany took part in the online survey. The analysis showed that the professional context, the personal attitude, and the attitude towards data ownership rights are the main determinants for technology acceptance. Overall, the behavioural factors examined in our study explain 74% of the variance in acceptance in relation to behavioural factors. In general, there is a high level of acceptance among respondents for the adaptation of such technology. In order to increase this, more emphasis should be placed on ease of use and secure handling of data rights.

Keywords	AI, TAM, Precision Livestock Farming, pig
JEL Code	Q160; Q330

Introduction *100 – 250 words*

Germany is one of the largest producers of pork in Europe. In recent years, the number of producing farmers has declined, while the tasks of meeting demand and meeting livestock needs have increased significantly. One solution to this problem is Precision Livestock Farming (PLF) systems that assist farmers in their work. Part of these systems are monitoring systems that observe animals using AI-based visual monitoring. Many of these systems combine a visual component with artificial intelligence interpretation that provides the farmer with recommendations for herd management. However, little research has been conducted on the adoption of such systems, despite their ongoing development. Consequently, little research attention has been paid to the drivers or barriers to adoption. However, understanding the drivers of acceptance is an important factor in the successful development of new systems and their commercialization in agriculture. In particular, the combination of visual monitoring by cameras with artificial intelligence needs to be further investigated in order to meet user requirements.

In order to gain insight into the acceptance or rejection of such AI camera systems in pig farming, this research created an extended technology acceptance model to investigate the behavioural economic factors. The results of this study can be used by research and development teams, stakeholders, and policy makers to take advantage of the opportunities for using AI camera systems in animal agriculture.

Methodology	***100 – 250 words***

For the study, an online survey was conducted using a panel to contact pig farmers. The questionnaire consisted of two parts. In the first part, respondents were asked about socio-demographic and farm-specific data. After this, participants were given a description of an AI camera systems to ensure a common understanding of the technology. In the second part, farmers were asked to rate several statements from “fully agree” to “disagree” representing each construct in the TAM, e.g. perceived ease of use, perceived usefulness. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used for statistical evaluation. This method is particularly useful when concepts such as acceptance are not observable and are measured indirectly through various indicators. Structural equation modelling uses path models to show the relationships between individual constructs, called latent variables. The path model visualizes these relationships and represents the hypotheses associated with these variables. Data analysis was performed using the statistical program R.

Results	***100 – 250 words***

The model tested the influence of a total of nine latent variables, consisting of thirty items, on the acceptance of AI camera systems. In addition, the influence of individual variables on other constructs within the model was tested. The explanatory power of the model is to be categorised as high with an R2 of 0.749, therefore the correlation of the selected variables can be confirmed. In addition, the predictive power of the model is significant, as shown by the comparison of the RMSE with those of a naive linear regression. Overall, the analysis showed that the ease of use (path coefficient: 0.276) and the personal attitude (0.398) towards AI monitoring systems in the barn are particularly decisive for the technology acceptance. The results of the model also confirmed the influence of job relevance (0.355) and personal innovativeness (0.101). It can also be deduced from the analysis that a high expectation of data ownership (-0.110) leads to lower acceptance of the use of AI camera systems. The risk of data misuse, the expected benefit and the perceived social norm of using such systems have no statistically significant impact on acceptance. In addition, several statistically significant influences were identified within the model. For example, the factors transparency (0.419), personal innovativeness (0.237), and risk of data misuse (-0.196) of AI systems influenced the construct perceived ease of use. It was also shown that professional relevance (0.833) has a strong influence on the expected use of AI camera systems.

Discussion and Conclusion	*100 – 250 words*

The development of PLF and the pressure to digitalize agriculture entail that research on the acceptance of such systems has become more necessary. The analysis indicates that *perceived ease of use* is one of the most influential factors in the adoption of AI camera systems. This factor exhibited a statistically significant and high effect on the variable acceptance. This is in line with the existing literature. It was also shown that self-assessment in the form of personal innovativeness and personal attitude are particularly important factors in the acceptance of AI camera systems. It follows that this construct serves to identify early adopters as drivers of innovation and is an important factor to consider in implementation processes. The survey data indicated no correlation between the expected risk of data misuse and the acceptance of AI camera technologies. A factor that is considered to be one of the most important in the context of targeted surveillance of humans cannot be confirmed with regard to camera surveillance of farm animals, especially pigs. For lessors, on the other hand, ownership of data is a relevant factor in the acceptance of implementing such systems in their operations. Based on the results, factors that need to be considered when implementing monitoring systems in livestock operations can be identified. Not only the features and functionality of the technology, but also the personal attitude and data rights management are crucial for a successful implementation. Ultimately, digitalization and increased productivity can only progress if new innovations are also used.