

What drives farmers' intention to use AI-based technology?

Supervision: Anna Massfeller, Daniel Hermann, Hugo Storm

Background

The advancement of artificial intelligence (AI) technologies has the potential to improve farming efficiency globally, with decision support tools (DSTs) representing a particularly promising application. However, evidence from medical and financial domains reveals a user reluctance to accept AI-based recommendations, even when they outperform human alternatives. This is a phenomenon known as “algorithm aversion” (AA). Algorithm aversion is not yet studied in the agricultural domain. To improve the understanding farmers' decision-making towards AI-based technologies and derive recommendations for technology development and policy makers, this phenomenon warrants research from agricultural economists.

Thesis ideas

Several theses with different focuses and methodologies are possible:

1) Literature search (Bachelor or Master)

Reasons for farmers' “algorithm aversion” based on [Mahmud et al. \(2022\) What influences algorithmic decision-making? A systematic literature review on algorithm aversion](#)

- Update review by searching for recent publications on algorithm aversion and potentially new reasons for algorithm aversion in general
- Extend review by searching for potential reasons in the agricultural domain

2) Empirical work (Master) based on existing data from online survey (autumn 2024) with German Crop farmers on their intention to use AI-based tools and their algorithm aversion combining an economic experiment and the unified theory of use and acceptance of technology (UTAUT) (Venkatesh, 2003)

Option A:

- The UTAUT-based part can be analyzed in more detail following the established approach of a partial least squares structural equation model (PLS-SEM)
- The idea is to identify in how far latent constructs like Algorithm Aversion, Performance Expectancy, Effort Expectancy and Social Influence explain the farmers' intention to use AI-based tools

Option B:

- Quantitative analysis of farmers ranking of different options for advice (Human advisor, AI-tool or combination of both for different crop management decisions)
- The idea is to identify which factors explain the ranking decision

In both cases experience in programming language and quantitative methods/ econometrics is beneficial.

3) Own ideas on AI and farmers' decision making or in any of the directions are welcome. These are no fixed research questions but rather ideas/ starting points that can be further developed/ combined.

Starting Literature for empirical work

Dietvorst, B.J., J.P. Simmons, and C. Massey. 2015. “Algorithm aversion: people erroneously avoid algorithms after seeing them err.” *Journal of experimental psychology. General* 144(1):114–126.

Mahmud, H., A.K.M.N. Islam, S.I. Ahmed, and K. Smolander. 2022. “What influences algorithmic decision-making? A systematic literature review on algorithm aversion.” *Technological forecasting and social change* 175:121390.

Venkatesh, V., M.G. Morris, G.B. Davis, and F.D. Davis. 2003. “User Acceptance of Information Technology: Toward a Unified View.” *The Mississippi quarterly* 27(3):425–478.

Hair et al. (2021) [Partial Least Squares Structural Equation Modeling \(PLS-SEM\) Using R](#)

Notes

German skills might be needed (e.g. understanding the survey etc.). Continuous supervision is intended to give students the opportunity to develop further skills and methods of scientific work and to deepen their content-related knowledge. The results of the work make a valuable contribution to an actual research project and may result in co-authorship of a publication as part of the project. Master theses must be written in English, Bachelor theses could be written in German. If you are interested or have further questions, please send a short email to anna.massfeller@ilr.uni-bonn.de (please mention study program, planned time frame for writing the thesis, topic idea/ preference).

Anna Massfeller
Data Science in Agricultural Economics Group
Doctoral Researcher at Cluster of Excellence PhenoRob
Institute for Food and Resource Economics
Universität Bonn
Meckenheimer Allee 174
53115 Bonn
Tel. 0228/ 73 60833