Behavioral Drivers for Grazing Practices in Dairy Farming

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Outline

1 Introduction

- “Grazing” has gained increased attention
- Favored by society
- Considered a key concept for the conservation of pastures
  (Plachter and Hampicke 2010)
- Economic feasibility depends on the individual farm
  (Knaus 2016; Thomet et al. 2011)
- Still: the share of grazing cows has been decreasing (Reijs et al. 2013)

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1 Introduction

- Gap between societal demands and farm reality
- Behavioral attitudes and beliefs also influence decision making behavior (Willock et al. 1999)
- Aim: Study the impact of individual beliefs on the usage of grazing practices
- Using the Technology Acceptance Model (TAM)

2 The Model

Technology acceptance model

- Introduced by Davis and others (Davis 1989; Davis et al. 1989)
- Studies the relationships between latent constructs
- Origin: Information systems research

Applications in Agriculture

- Precision farming (Adrian et al. 2005; Rezaei-Moghaddam and Salehi 2010)
- Information systems in pork production (Arens et al. 2012)
- Soil management tools (Flett et al. 2004)
- Grazing-related management practices (Kelly et al. 2015; McDonald et al. 2016)

2 The Model

Technology acceptance model: Constructs

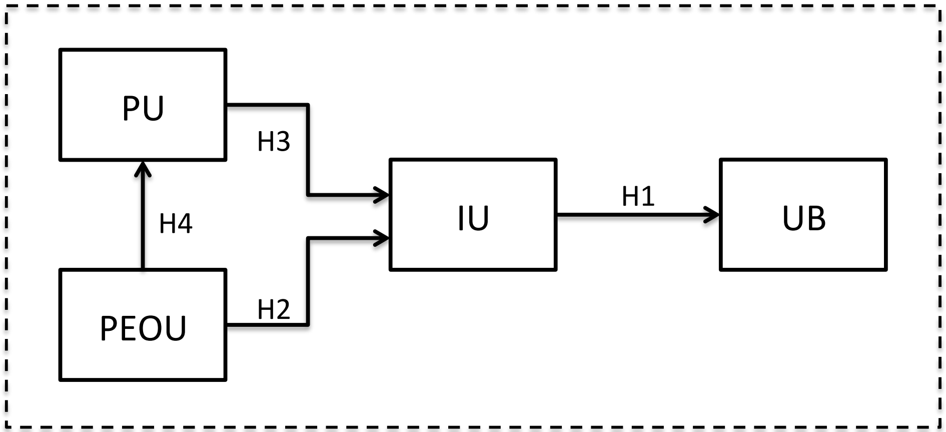
- The perceived ease of use (PEOU)
- The perceived usefulness (PU)
- The intention to use (IU)
- The actual usage behavior (UB)

2 The Model

Extensions

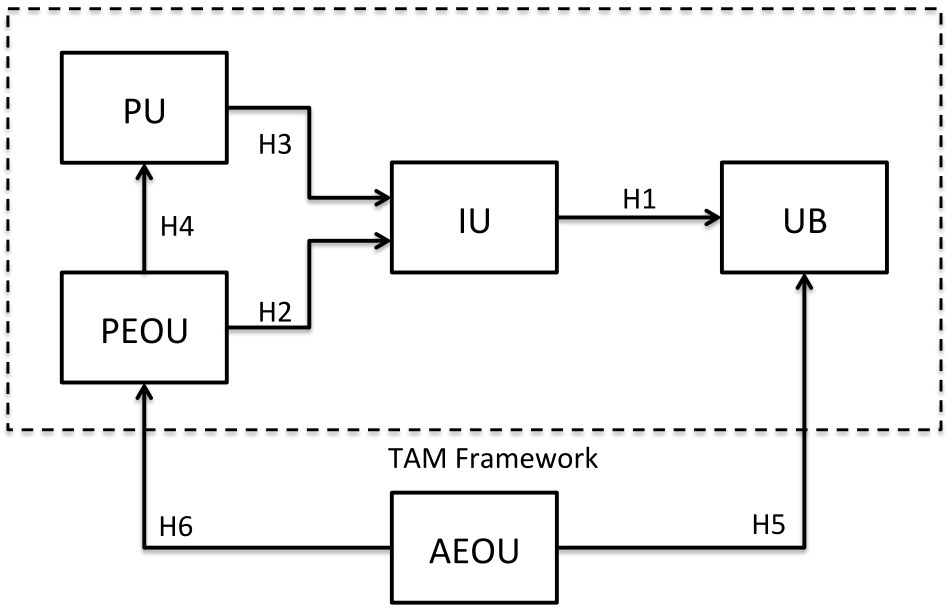
- The on-farms condition (actual ease of use, AEOU)
- The perceived output quality (POQ) (Venkatesh and Davis 2000)
- The subjective norm (SN) (Venkatesh and Davis 2000)
- The farmers age (AGE) (Marangunić and Granić 2015)

2 The Model



TAM Framework

2 The Model



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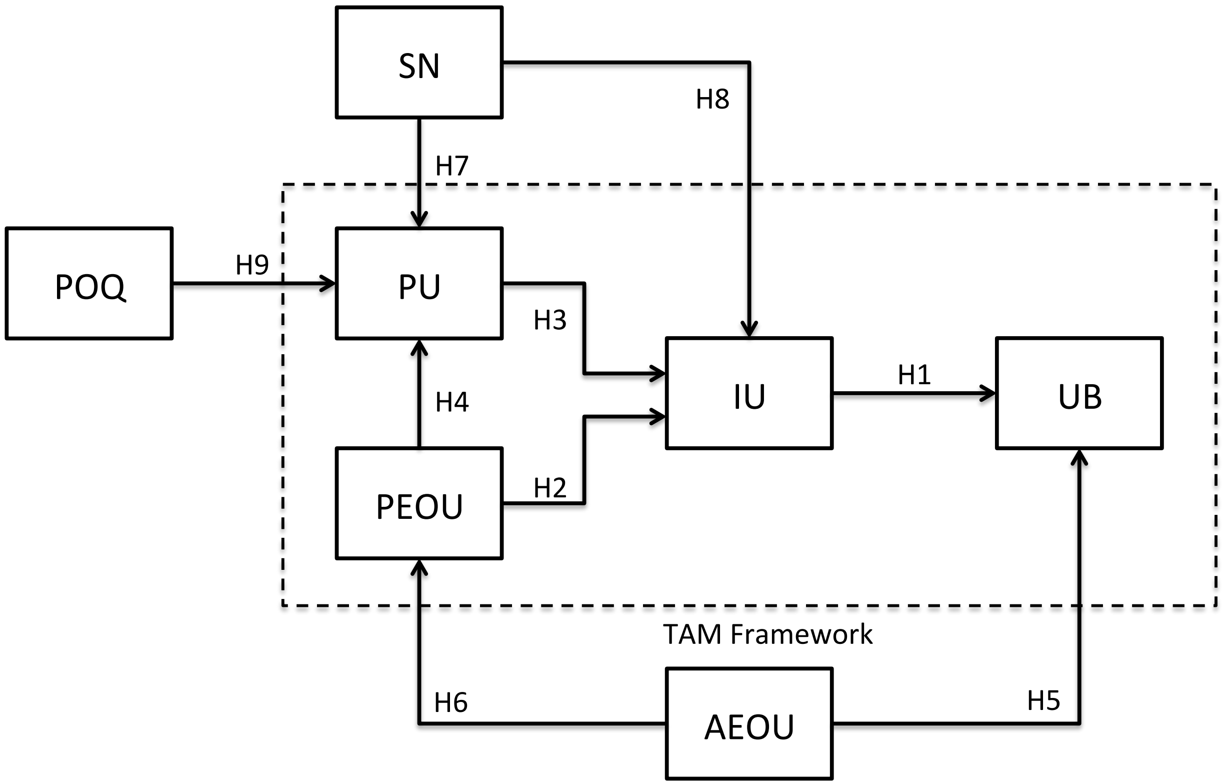
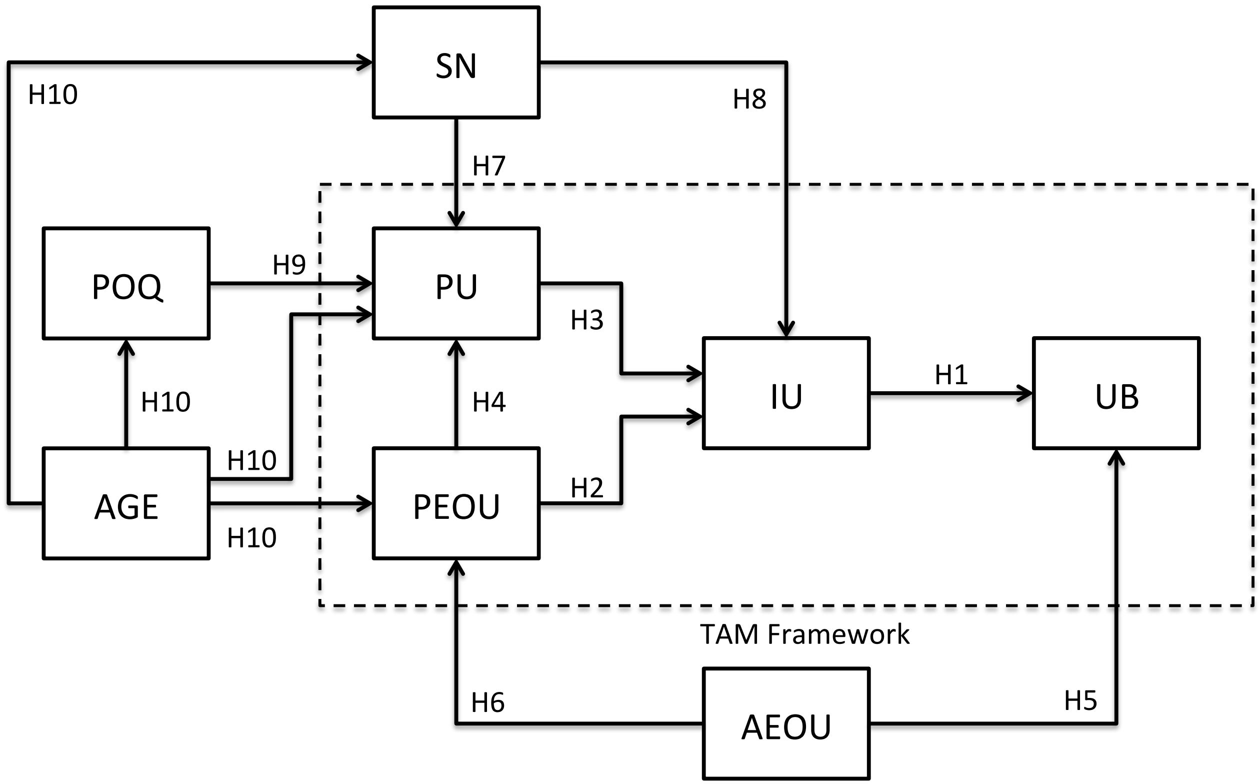


2 The Model


SN
H10
H8
H7
POQ
H9
PU
H3
IU
H1
UB
H10
H4
H10
AGE
PEOU
H2
H10
TAM Framework
H6
AEOU
H5

3 Methodology

- Partial least squares – structural equation modeling
- Software "SmartPLS 3"
- Variance based approach
- Does not require normal-distributed data
- Allows smaller sample sizes
- Allows group comparisons (here: conventional and organic farmers)

4 Data

- Online Survey
- Surveyed in January 2016
- Sample of 334 West German dairy farmers

4 Data

Characteristics		Mean	SD	German mean
Gender	Female	10.18%		8.00%
Age	Years	45.81	10.69	n.a.
Farming as main income source	Yes	88.62%		48.43%
Farming system: Organic	Yes	19.46%		6.30%
Specialized dairy farm	Yes	43.11%		n.a.
Arable land	ha	46.08	54.25	54.48
Pasture land	ha	47.44	34.86	20.10
Thereof: Grazing land	ha	29.41	31.90	n.a.
University degree	Yes	17.96%		n.a.
Agricultural education	Yes	91.60%		n.a.
No. of Cows		80.17	75.38	58.00
Milk Yield	kg/year	7,884.30	1,549.08	7628.00
Grazing practices	Yes	74.85%		
Annual grazing period[a]	Days/year	171.67	51.87	
Daily pasture access[a]	Hours/day	11.41	5.95	

Source: Own calculations; BLE, 2016; Destatis, 2014; Gurrath, 2011; ; [a] only of farms conducting grazing practices

5 Results: Measurement Model

Calculated quality criteria

- Reflective measures
  - Factor loadings
  - Composite Reliability
  - Average Variance Extracted
  - Discriminant Validity (HTMT-Ratio)
- Formative measures
  - Variance inflation factors
  - Indicator weights
  - Indicator loadings
- The suggested thresholds were matched (Hair et al. 2014)

5 Results: Structural Model

Hypothesis	Path	FULL		CONV		ORGAN		|Δ|[a]
		β	HS	β	HS	β	HS	
H1	IU → UB	0.655***	Yes	0.670***	Yes	0.411**	Yes	0.259***
H2	PEOU → IU	0.318***	Yes	0.324***	Yes	0.347***	Yes	0.023
H3	PU → IU	0.378***	Yes	0.363***	Yes	0.375***	Yes	0.012*
H4	PEOU → PU	0.487***	Yes	0.552***	Yes	0.323***	Yes	0.229**
H5	AEOU → UB	0.203***	Yes	0.174***	Yes	0.380***	Yes	0.207**
H6	AEOU → PEOU	0.541***	Yes	0.518***	Yes	0.497***	Yes	0.021
H7	SN → IU	0.242***	Yes	0.250***	Yes	-0.073	No	0.323***
H8	SN → PU	0.151***	Yes	0.133**	Yes	0.228**	Yes	0.095
H9	POQ → PU	0.251***	Yes	0.177***	Yes	0.359***	Yes	0.182
	AGE → IU	-0.081**		-0.091**		0.029		0.120
	AGE → POQ	0.025		0.000		0.064		0.064
H10	AGE → PEOU	0.050	partially	0.031	partially	0.146	No	0.114
	AGE → PU	-0.132***		-0.140***		-0.176		0.036
	AGE → SN	-0.072		-0.133**		0.173		0.306**

Source: own elaboration; [a]: absolute difference between CONV and ORGAN;
*:10%, **: 5%, ***:1%, based on bootstrapping results for β, on the PLS-MGA for |Δ|; HS: Hypothesis supported

6 Discussion

- Hypotheses of the TAM are supported
- AGE negatively influences the PU and IU
- Differences between conventional and organic farmers
- Mainly in the size of the effects
- The attitudinal beliefs are relatively more important in case of conventional farmers
- Especially the subjective norm

7 Summary and Conclusion

- Analyze behavioral drivers for the usage of grazing practices
- Structural equation model based on the TAM
- Key relationships of the TAM are supported
- Differences between conventional and organic farmers
- Given the results, conventional farmers may be more responsive to information campaigns or policy measures

THANK YOU FOR THE ATTENTION!

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5 Results I: Measurement Model

	λ/γ			CR			AVE		
	FULL	CONV	ORGAN	FULL	CONV	ORGAN	FULL	CONV	ORGAN
IU				0.881	0.881	0.725	0.652	0.651	0.468
IU1	0.904***	0.902***	0.832***						
IU2	0.696***	0.716***	0.004						
IU3	0.785***	0.769***	0.693***						
IU4	0.832***	0.828***	0.837***						
POQ				0.922	0.916	0.872	0.799	0.784	0.698
POQ1	0.833***	0.826***	0.668***						
POQ2	0.922***	0.917***	0.894***						
POQ3	0.922***	0.911***	0.921***						
PEOU				0.880	0.890	0.764	0.709	0.731	0.530
PEOU1	0.790***	0.822***	0.503***						
PEOU2	0.870***	0.873***	0.848***						
PEOU3	0.864***	0.869***	0.784***						
PU				0.900	0.902	0.811	0.692	0.697	0.524
PU1	0.833***	0.831***	0.801***						
PU2	0.754***	0.765***	0.527***						
PU3	0.879***	0.880***	0.812***						
PU4	0.857***	0.859***	0.720***						
SN				0.775	0.792	0.669	0.543	0.563	0.417
SN1	0.807***	0.805***	0.592**						
SN2	0.830***	0.822***	0.832***						
SN3	0.536***	0.605***	0.455						
AEOU				n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
AEOU1	0.347***	0.404***	0.295						
AEOU2	0.352***	0.122	0.568***						
AEOU3	0.626***	0.737***	0.627***						
UB				n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
UB1	0.546***	0.537***	0.454*						
UB1	0.282***	0.320***	0.410*						
UB3	0.364***	0.331***	0.567***						

Source: own elaboration; Notes: λ: loadings of reflective indicators; γ: weights of formative indicators; CR: composite reliability; AVE: average variance extracted; Significance test based on bootstrapping with 5000 runs; *: 10%; **: 5%; ***: 1%; the single item-construct AGE not displayed.