RURAL ECONOMIES IN THE SPANISH REGION OF ARAGON: LOCAL INTENTION TO USE HIGH QUALITY SAFFRON IN COOKERY

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Introduction

- In Aragon, a large area of the territory is facing the problem of depopulation and the improvement of rural economies is a great challenge.

- There is a renewed interest in saffron as a sustainable high value agricultural product of social, cultural and economic importance.

- The development of the saffron activity in the rural area could contribute to unlock the rural potential for competitiveness and sustainability.

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Introduction

- Saffron was cultivated in several rural areas of Aragón. However, the cultivation of this crop suffered a progressive abandonment and a sharp decline because:

  - The saffron production is still highly labour intensive and the Spanish saffron is less competitive in the international markets than saffron produced in other countries.
  - Domestic consumption decreased which accentuates the decreasing of saffron cultivation.

- The promotion of saffron local consumption, mainly, **high quality saffron**, would help the **maintenance of the saffron activity in the rural economies** of Aragon.

Introduction and objectives

Some of the pre-requisites for the success of the saffron activity in rural areas are:

• To obtain, keep and produce a high quality saffron.

• To get that this quality saffron is recognized as scu by consumers or, at least, by local consumers (to increase local consumption).

Therefore, **the aim of this paper** is to analyse **local consumers' intention to use high quality saffron for culinary purposes** and **determine the factors** explaining this intention.

Theoretical framework

Based on Ajzen´s Theory of Planned Behaviour (TPB) social psychology model (Ajzen, 1991) the following model was defined:
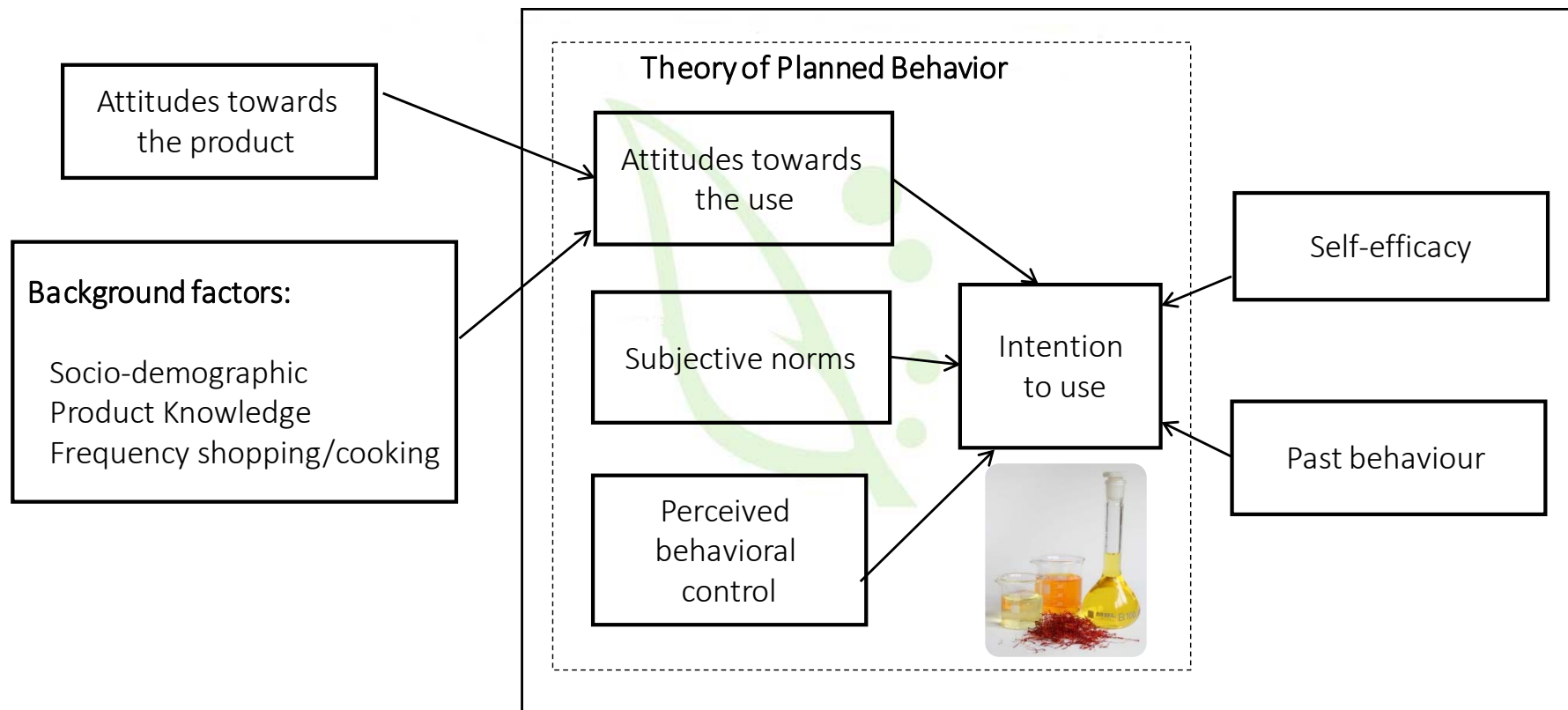
Methodology: data collection

- Data was obtained from an artefactual experiment with consumers in Aragon in 2016-2017.

- Population consisted of people living in Aragon older than 18 years.

- Participants were recruited via consumer associations, and public institutions (universities, technological centres, and town hall centres).

- A total of 18 sessions of around 12 participants were carried out.

- The final sample of 202 participants was stratified by age, gender and province of residence.

Methodology: data collection

• During the first part of the experiment, participants were asked to answer the questions of objective knowledge of saffron after having observed 5 small flasks containing:

– high quality saffron in filaments

– low quality saffron in filaments

– saffron in powder form

– safflower

– artificial food colorant

1. En primer lugar, observe detenidamente las muestras e indique que producto de la lista cree que es cada una de ellas (Marque con una X).
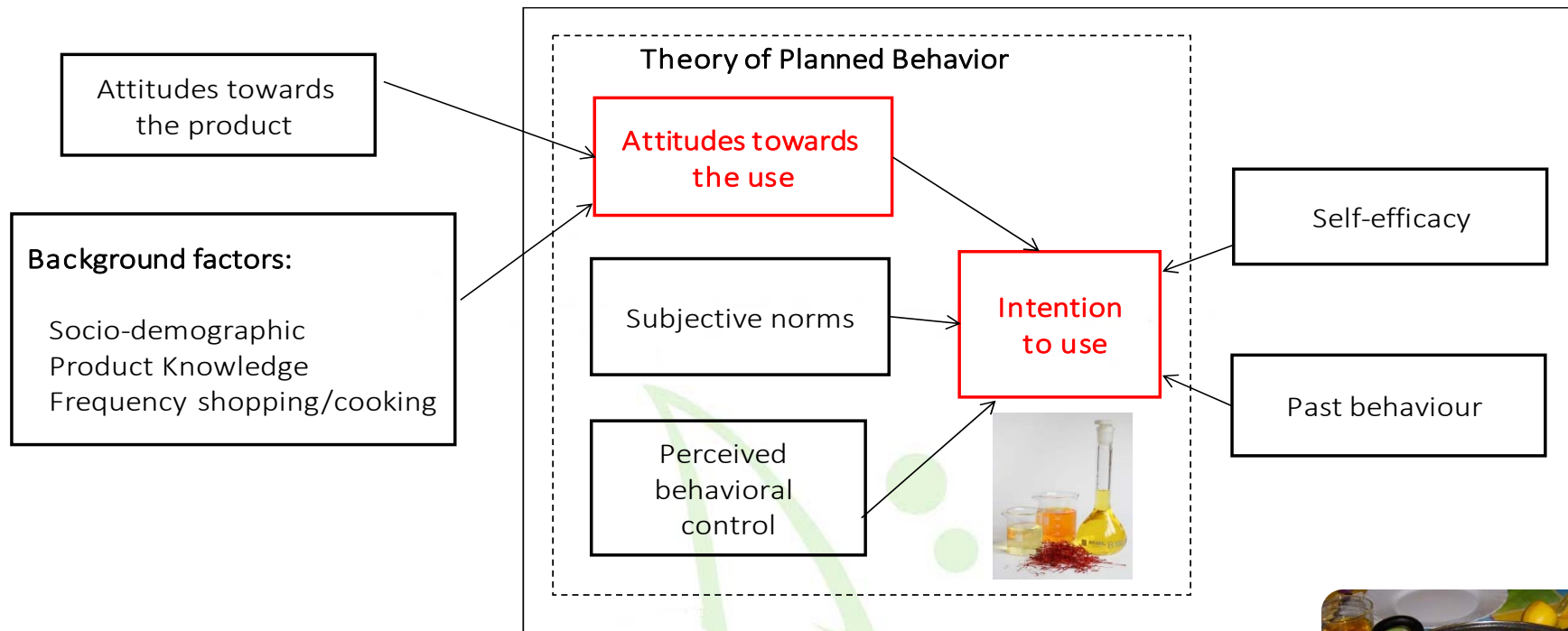
	Muestra 1	Muestra 2	Muestra 3	Muestra 4	Muestra 5
Cártamo / Alazor					
Azafrán					
Cúrcuma					
Curry					
Pimentón					
Colorante alimentario					
No lo sé					

• The questionnaire collected information on:

– variables of the theoretical model

– socio-demographics and personal characteristics

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Theoretical framework

Theory of Planned Behavior

Attitudes towards
the product

Background factors:

Socio-demographic
Product Knowledge
Frequency shopping/cooking

Attitudes towards
the use

Self-efficacy

Subjective norms

Intention
to use

Perceived
behavioral
control

Past behaviour

Intention to use : *"would you use this high quality saffron to cook at home?"* (1 = *no*, 2 = *probably no*, 3 = *I do not know*, 4 = *probably yes*, 5 = *yes*). *IU_SAFFRON.*

Attitudes towards the use: *"I believe that using saffron is good"*

on a Likert scale from 1 to 5, where 5 means the highest level of agreement. *ATT_USE_SAFFRON.*

Methodology: statistical analysis

An ordered bi-probit model was specified considering two endogenous variables:

- consumer's intention to use high quality saffron (*IU_SAFFRON**)

- attitudes towards the use of saffron (*ATT_USE_SAFFRON**)

which were discrete variables with five ordered levels (1, 2,…, 5)
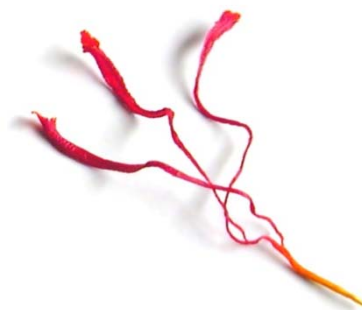
Methodology: statistical analysis

$$IU\_SAFFRON_i^* = \lambda ATT\_USE\_SAFFRON_i^* + \beta X_i + u_i \quad \forall i = 1, \ldots, n \ (1)$$

$$ATT\_USE\_SAFFRON_i^* = \mu Y_i + \xi_i \quad \forall i = 1, \ldots, n \ (2)$$

where λ, β and μ were parameters to estimate

X_i was a vector of all exogenous variables (1): subjective norms (*SNORM*), perceived behavioural control (*CONTROL*), self-efficacy (*ABILITY*), and past behaviour (*USE_SAFFRON*)

Y_i represented the exogenous variables (2): attitudes towards saffron and background factors

u_i and ξ_i were error terms normally distributed N(0, σ^2); and *n* was the number of participants.

Methodology: statistical analysis

IUi* and *ATT_USE_SAFFRON$_i$** were unobserved variables.

However, *IU* and *ATT_USE_SAFFRON*, the observed ordinal variables, took on values 1 through 5 according to the following scheme:

$$IU_i = j \iff \tau_{j-1} < IU_i^* \leq \tau_j$$

$$ATT\_USE\_SAFFRON_i = j \iff \delta_{j-1} < ATT\_USE\_SAFFRON_i^* \leq \delta_j$$

where *i* = 1, …, *n*; *j* = 1, …, 5; and τ and δ were unknown threshold parameters to be estimated with τ_1, and $\delta_1 = 0$, τ_1, and $\delta_1 = -\infty$, τ_5, and $\delta_5 = \infty$.

Methodology: statistical analysis

- This model was simultaneously estimated as a multivariate ordered probit model to account for the possible correlation between error terms (u_i and ξ_i).

- The two error terms (u_i and ξ_i) followed a multivariate normal distribution with mean zero and variance and covariance matrix Ω.

- Estimation was carried out using STATA 14.0.

- Maximum Likelihood Estimation was used.

Results: socio-demographic characteristics of the sample

	Sample N=202	Population
Gender*		
Female (1=female;0= otherwise)	51.5	50.9*
Age (average, standard deviation)	46.2 (20.4)	42.7*
de 18 a 44 años	43.5	42.6
de 45 a 54 años	15.8	19.2
más de 54 años	40.6	38.2
Household size (average, standard deviation)	3.0 (1.2)	2.5*
*Education level***		
Primary	23.8	17.0**
Secondary	48.0	50.0**
Higher (1=**hedu**;0= otherwise)	28.2	33.0**
Province of residence		
Huesca	18.3	17.0*
Teruel (1=Teruel; 0=otherwise)	12.4	11.0*
Zaragoza	69.3	72.0*
Household monthly net income		
Less than 1,500 €/month	22.8	Na
Between 1,501 and 2,500 €/month	21.8	Na
Between 2,501 and 3,500 €/month	18.3	Na
More than 3,500 €/month (1=**hinc**;0= otherwise)	10.4	Na
Do know/no response	26.7	Na

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Results: variables definition

Variable		Answers in the discrete scale (%)[a]					Mean ± SD (%)[b]
		1	2	3	4	5	
Endogenous	*IU_SAFFRON*	5.9	8.4	20.8	36.1	28.7	3.7 ± 1.14
	ATT_USE_SAFFRON	0.5	1.5	18.3	50.5	29.2	4.1 ± 0.76

IU_SAFFRON: "**would you use this high quality saffron to cook at home?**" (1 = *no*, 2 = *probably no*, 3 = *I do not know*, 4 = *probably yes*, 5 = *yes*).

ATT_USE_SAFFRON: "**I believe that using saffron is good**"

on a Likert scale from 1 to 5, where 5 means the highest level of agreement.

Results: variables definition

	Variable	Answers in the discrete scale (%)[a]					Mean ± SD (%)[b]
		1	**2**	**3**	**4**	**5**	
Exogenous	*SNORM*	4.0	4.9	50.0	32.2	8.9	3.4 ± 0.87
	CONTROL	2.5	18.8	16.3	38.6	23.8	3.6 ± 1.11
	ABILITY	27.2	41.1	18.3	11.4	2.0	2.2 ± 1.03
	USE_SAFFRON						59.9

SNORM: "most people who are important for me think that I should use saffron" on the mentioned Likert scale.

CONTROL: "whether I will eventually use saffron is entirely up to me" on the mentioned Likert scale.

ABILITY: "if I wanted to use saffron, I do not think I would ever be able to do so" on the mentioned Likert scale.

USE_SAFFRON) was measured by a dummy variable where 1 = participants use saffron for cooking at home, 0 otherwise.

Results: variables definition

Variable	Answers in the discrete scale (%)[a]					Mean ± SD (%)[b]
	1	2	3	4	5	
Attitudes towards saffron: EXPERT	23.8	47.5	14.4	10.4	4.0	2.2 ± 1.05
TYPICAL	2.5	7.4	12.9	47.0	30.2	3.9 ± 0.98
SUBSTITUTE	13.4	30.2	20.8	31.2	4.5	2.8 ± 1.14

Attitudes towards saffron were measured by three variables on the mentioned Likert scale:

EXPERT: "Saffron is an ingredient only for experts"

TYPICAL: "Saffron is a typical ingredient of the Spanish cuisine"
SUBSTITUTE: "Saffron is easily substituted for other products"

Results: variables definition

Variable	Answers in the discrete scale (%)[a]					Mean ± SD (%)[b]
	1	2	3	4	5	
Background factors*:						51.5
SHOPPER						58.4
COOKER						62.9
KNOW_SAFFRON						86.1

* Socio-demographic characteristics above.

Frequency of shopping food *(SHOPPER):* 1 = participants do the shopping of food always or almost always, 0 = otherwise.
Frequency of cooking at home*(COOKER):* 1 = participants used to cook at home every day or almost every day, 0 = otherwise.
Objective saffron knowledge *(KNOW_SAFFRON):* 1 = respondents do identify saffron in filaments, 0 = otherwise.

Results: Estimations

	Coefficient	Estimates (t-ratio)[a]	Marginal effects (probability of response)				
			No	Probably no	I do not know	Probably yes	Yes
IU_SAFFRON							
ATT_USE_SAFFRON	λ	0.7825 (3.66**)	-0.1388	-0.0507	-0.0537	0.0022	0.2411
SNORMS	β_1	0.1398 (1.74*)	-0.0248	-0.0090	-0.0096	0.0004	0.0431
USE_SAFFRON	β_2	0.3010 (2.22**)	-0.0534	-0.0195	-0.0206	0.0008	0.0927
	Intercept	-2.5164 (-2.69**)					
	τ_2	0.4210 (3.73**)					
	τ_3	0.9961 (5.52**)					
	τ_4	1.7908 (6.44**)					
ATT_USE_SAFFRON							
TYPICAL	μ_1	0.1433 (2.16**)	-0.0016	-0.0043	-0.0328	-0.0078	0.0467
SUBSTITUTE	μ_2	-0.1309 (-1.95**)	0.0015	0.0039	0.0300	0.0071	-0.0426
COOKER	μ_3	0.3933 (2.93**)	-0.0045	-0.0119	-0.0902	-0.0214	0.1281
KNOW_SAFFRON	μ_4	0.3886 (2.04**)	-0.0045	-0.0117	-0.0891	-0.0211	0.1266
	Intercept	2.009 (3.94**)					
	δ_2	0.5736 (1.73*)					
	δ_3	1.9309 (5.18**)					
	δ_4	3.3689 (8.89**)					

Results: Estimations

- The intention to use high quality saffron was positively related to:
  - ➤ attitudes towards the use of saffron (*ATT_USE_SAFFRON*).
  - ➤ subjective norms (*SNORMS*).
  - ➤ past behaviour (*USE_SAFFRON*).

- However, neither the perceived behavioural control (*CONTROL*) nor the self-efficacy (*ABILITY*) explained this intention.

- The positive sign and statistical significance of coefficient estimates for *ATT_USE_SAFFRON*, *SNORM,* and *USE_SAFFRON* meant that people who believed that using saffron was good, that most people important for them thought that they should use saffron, and who used saffron for cooking at home, were more prone to use high quality saffron.

- The attitudes towards the use of saffron was positively related to:

  - Attitudes towards saffron: TYPICAL
  - Frequency of cooking (COOKER)
  - *Objective saffron knowledge* (*KNOW_SAFFRON*)

- However, the attitudes towards the use of saffron was negatively related to:

  - Attitudes towards saffron: SUBSTITUTE

Results: Marginal effects

•Marginal effects showed that attitudes towards the use of saffron (*ATT_USE_SAFFRON*) had the **strongest impact on the intention to use high quality saffron**, followed by past behaviour (*USE_SAFFRON*) and subjective norms (*SNORMS*).

•In other words, people who believed that using saffron was good were more likely to report that they would use a high quality saffron to cook at home.

Results: Marginal effects

• Cooking frequently (*COOKER*) and saffron knowledge (*KNOW_SAFFRON*) had **the strongest marginal effects on the attitudes towards the use of saffron**. These variables had marginal effects of the same magnitude.

•In particular, people who cooked every day or almost every day at home, and who was able to recognise saffron were more likely to believe that using saffron was good.

Implications of our results

The intention to use high quality saffron for culinary purposes in Aragón was mainly explained by the belief that using saffron was good, and also by the previous use of saffron, and the perceived social pressure to use it.

These factors and factors influencing them, such as frequency of cooking, and knowledge of the product should be considered in rural development strategies based on saffron.

**Thank you
for your attention**

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