The Importance of Animal Welfare and Country of Origin in Consumer Preferences: A Cross-National Study

Rebecca Derstappen & Inken Christoph-Schulz

Ⓔ View supplementary material ↗

📅 Published online: 04 Apr 2024.

✎ Submit your article to this journal ↗

📊 Article views: 1

🔍 View related articles ↗

CrossMark View Crossmark data ↗

Routledge
Taylor & Francis Group

∂ OPEN ACCESS | Check for updates

The Importance of Animal Welfare and Country of Origin in Consumer Preferences: A Cross-National Study

Rebecca Derstappen and Inken Christoph-Schulz

Johann Heinrich von Thuenen Institute, Braunschweig, Germany

ABSTRACT

Livestock husbandry systems are controversially discussed in society, politics and science. Since exporting countries such as Germany, the Netherlands or Denmark produce pork under higher animal welfare standards, the question arises if it will be competitive on the international market. We used a factor and cluster analysis to identify consumer segments in Japan, South Korea, Italy and Poland and to determine the instruments necessary to make animal welfare more popular. Each study country revealed three consumer groups: One group is interested in animal welfare and meat quality attributes but prefers domestically produced pork. Another group is price sensitive and without expectations. Finally, a third group is interested in animal welfare and accepts imported products. To address consumers in this group, informational campaigns and target market-oriented strategies are necessary.

Introduction

Meat is a highly relevant protein source and therefore an integral part of diets in many cultures (Friedrichsen & Gärtner, 2020). However, against the background of sustainable consumption particularly ethical aspects, such as animal welfare or negative environmental effects of meat production, have gained importance with regards to meat intake in recent years (Clune, Crossin, & Verghese, 2017; Ruby, 2012; Willett et al., 2019). According to the WBAE (2020), four individual goals of a sustainable diet can be defined: health, society, animal welfare and the environment. The individual objectives can be implemented simultaneously, although there are also conflicts of interest in some cases. Thus, a transformation of livestock farming toward improved animal welfare standards could lead

to less meat consumption, which is of higher quality and more expensive (Parlasca & Qaim, 2022; WBAE, 2020). Overall, animal welfare is often mentioned as an important purchasing criterion for animal products (Heise & Theuvsen, 2017; Massaglia, Merlino, & Borra, 2018; Merlino, Borra, Girgenti, Dal Vecchio, & Massaglia, 2018). Therefore, "animal-friendly products are considered healthier, tastier, more hygienic, safer, acceptable, authentic, environmentally friendly, and traditional by consumers" (Alonso, González-Montaña, & Lomillos, 2020). Additionally, the country of origin is an important purchasing criterion (Aboah & Lees, 2020; Grunert, Sonntag, Glanz-Chanos, & Forum, 2018). In this context, a strong preference for domestically produced meat can be observed in many countries (Asante-Addo & Weible, 2020; Boimah & Weible, 2021; Dransfield et al., 2005; Sasaki, Motoyama, Watanabe, & Nakajima, 2022). However, what are the prospects for sustainably produced (and particularly animal-friendly) meat on the world market?

The interest in sustainable and questioning of conventional livestock production methods as well as the demands for improved animal welfare standards have intensified, not only in Germany but also in other European countries such as Denmark or the Netherlands. Citizens call for improved animal husbandry systems and focus on species-appropriate housing conditions. Specifically, European consumers ask for more space for the animals, additional manipulable material, outdoor access and the abandonment of non-curative interventions, such as tooth grinding, tail docking or anesthetic-free piglet castration (Busch & Spiller, 2020; Schütz, Busch, & Sonntag, 2020; Tomasevic et al., 2020). Governments and food retailing want to respond to the concerns of consumers and citizens, thus discuss various options on how to enforce higher national animal welfare standards. If higher animal welfare standards are mandatory in a country, it would lead to higher production costs for farmers (Deblitz et al., 2021). Consequently, either consumers would have to pay higher consumer prices or producers would need to be compensated for higher production costs in some other way (e.g., subsidy system) (KNW, 2020). Another option is that the retailers are responsible for compensating for higher costs incurred from improved animal welfare standards. Overall, political or industrial intervention seems necessary to support the social demands for higher animal welfare standards, as consumers have often indicated to be willing to pay a higher price for animal welfare but have not followed this aspiration in their purchasing behavior (Enneking, Kleine-Kalmer, Dauermann, & Volgt, 2019). This divergence between theoretical and actual purchasing behavior is called the consumer–citizen gap (Enneking et al., 2019).

These reflections on how to promote more "sustainable" or rather "animal welfare" meat focus mainly on national markets and rarely look at

possible consequences for the export business of major meat exporting countries. However, many countries, such as Germany, Denmark or the Netherlands, where animal welfare is highly debated, export large volumes of pork, and the export business is essential for the sector (Resource Trade, 2023). Our study addresses this research gap by examining the role of animal welfare and country of origin (COO) in consumer preferences across countries using German pork as an example.

Regarding pork, Germany was the third largest exporting country, after the United States and Spain, in 2020 and holds a share of 14% of the global pork trade (Resource Trade, 2023). Overall, 83.7% of the total German exports go to 16 countries (UN Comtrade, 2023). Based on these statistics, we selected four study countries: Italy and Poland because they are important European trading partners for Germany, as well as Japan and South Korea because they are important third markets. In addition, we chose to examine those two Asian markets more closely because they have free trade agreements with the European Union. In 2021 Germany exported 3,525 tons of pork to Italy and 1,661 tons of pork to Poland (EUROSTAT, 2022). In 2019 Germany delivered 347 tons to Japan and 946 tons to South Korea (EUROSTAT, 2022). Thus, Germany is a global player in the international pork trade. Germany holds both positions: It is a net importer, especially in terms of individual premium products, and it is a net exporter for pork overall. From a sustainability perspective, exporting non-demanded meat cuts helps to minimize food losses and waste and covers meat demand overseas.

The objective of this study was to link Germany's role as an exporting nation with efforts for higher animal welfare standards. We analyze the potential for exporting German pork produced under higher animal welfare standards by focusing on consumers of four important markets for the German pork industry, namely consumers in Japan, South Korea, Italy and Poland. This research aims to provide initial insights into consumers' attitudes and perceptions regarding (German) pork and to identify the relevance of animal welfare in these countries. We distinguish individual consumer groups by their interest in animal welfare. In this context, the relevance of COO is also considered to assess consumers' attitudes toward imported pork products. We will answer the following research questions:

1. Which consumer groups can be identified by focusing on animal welfare and the COO?
2. What are the differences between the countries in terms of the identified consumer groups?
3. How can the groups' interest in animal welfare be increased, and which instruments are necessary?

A principal component analysis (PCA) followed by a two-step cluster analysis (CA) was used to identify the relevance of animal welfare as well as COO, and to identify individual consumer segments in each meat market. We describe the consumer segments in detail using socio-demographic data.

To the best of our knowledge, our study is the first to compare four different markets considering the relevance of animal welfare regarding exported German pork products and providing ideas on whether and how exporters could market their products abroad if more animal welfare meat were enforced. Other authors have already studied consumer behavior and the role of animal welfare in Poland and Italy, and to some extent also in Japan and South Korea (Di Pasquale et al., 2016; Gołębiewska, Gębska, & Stefańczyk, 2018; Kitano, Mitsunari, & Yoshino, 2022; Lin-Schilstra, Backus, Snoek, & Mörlein, 2022). Despite this, and especially in Asian countries, animal welfare has hardly been addressed in detail, as it has not been considered an important topic for these markets. This paper therefore makes an important contribution to existing literature and adds to the general challenge of exporting nations competing with lower production standards in other countries, and assesses whether it makes sense to market higher standards that incur higher sales prices. In addition, a segmentation of individual consumer groups provides helpful indications for the pork industry and policy makers. These findings will help to develop target-oriented marketing strategies.

Materials and methods

The online survey was conducted in July 2022 and administered by a contracted market research institute, which professionally translated the questionnaire from English into the respective national languages. The translated questionnaires were cross-checked by native speakers. To ensure heterogeneity, quotas were set for gender, age, regional origin, employment status and educational level. These quotas allowed the total population of each country to be covered representatively, with a maximum deviation of 6%. We set a sample size of 700 participants for each study country. Various statements were measured based on a 7-point Likert scale. Additionally, participants were allowed to select "I don't know" to avoid dishonest answers. Participants who selected "I don't know" were excluded from further analyses. To improve data quality, attention check questions were included in the questionnaire. If participants answered the attention check questions wrong twice, they were excluded. After data cleaning, 490 participants remained in Italy, 419 in Poland, 440 in Japan and 469 in South Korea. Table 1 shows the demographic distribution of the final data sets.

Table 1. Sample characteristics.

	Italy		Poland		Japan		South Korea	
Sample size n	490		419		440		469	
	Absolute	Relative (in %)	Absolute	Relative (in %)	Absolute	Relative (in %)	Absolute	Relative (in %)
Gender								
Male	253	51.6	227	54.2	220	50	253	53.9
Female	235	48	190	45.3	219	49.8	216	46.1
Non-binary	2	0.4	2	0.5	1	0.2	0	0
Employment								
Employed	307	62.7	304	72.6	274	62.3	235	50.1
Unemployed	183	37.3	115	27.4	166	37.7	234	49.9
Education level[a]								
Basic	187	38.2	46	11	0	0	41	8.7
Medium	203	41.4	250	59.7	214	48.6	179	38.2
High	100	20.4	123	29.3	226	51.4	249	53.1
Age								
20–29	74	15.1	73	17.4	78	17.7	76	16.2
30–39	87	17.8	82	19.6	69	15.7	86	18.3
40–49	111	22.7	88	21	106	24.1	121	25.8
50–59	132	26.9	83	19.8	93	21.1	111	23.7
60–69	86	17.6	93	22.2	94	21.4	75	16
Number of persons in one household								
Single	33	6.7	29	6.9	95	21.6	48	10.2
2–4 people	423	86.3	354	84.5	331	75.2	396	84.4
5 and more people	34	6.9	36	8.6	14	3.2	25	5.3
Annual household income[b]								
Less than average income	119	24.3	192	45.8	108	24.4	41	8.7
Average income	142	29	142	33.9	65	14.8	67	14.3
More than average income	229	46.7	85	20.3	267	60.7	361	77
Owner of pets								
Owner of pets	307	62.7	293	69.9	118	26.8	144	30.7
No pets	183	37.3	126	30.1	322	73.2	325	69.3

[a]Basic: primary education, junior high school, 9 years of school; Medium: upper secondary education, senior high school, 10 and more years of school; High: college or university education.
[b]Average income: 20,800–25,400 EUR (Italy)/82,300–100,600 PLN (Poland)/3,290,000–3,660,000 YEN (Japan)/26,100,000–32,000,000 WON (South Korea).
Source: own calculation.

In addition to socio-demographic data, participants were asked about their pork consumption patterns. Furthermore, the questionnaire contained seven item batteries covering consumption habits, importance of COO, knowledge regarding pig production practices, relevance of animal welfare, animal welfare as a meat quality attribute, Germany as a COO, as well as the relevance of labels and the procurement of information. The statements were taken from the literature and from the study of Derstappen and Christoph-Schulz (2023). Due to our research focus, this paper examines only four of the seven item batteries in detail (importance of COO, relevance of animal welfare, animal welfare as a meat quality attribute and Germany as a COO). Since the topic of animal welfare is not yet well established in the study countries, the participants were given information about the animal

welfare concept and criteria of higher animal welfare standards in the middle of the online survey. Using the statements of the four item batteries, two factor analyses were conducted for each study country, one including the items shown before the informational input and one considering the items presented after additional information treatment.

Using IBM SPSS Statistics 25, a PCA with promax rotation with a level of four was performed. A Kaiser-Meyer-Olkin coefficient of above 0.8 and a significant Bartlett test verified the suitability of the dataset for a factor analysis. In addition, MSA values were used to confirm the suitability of the factor analysis, with values ranging from 0.562 to 0.958 among all four study countries (compare Appendix A1–A4). Cronbach's alpha was used to determine the reliability of the individual factors. The extracted factors were then incorporated into a two-step CA. First, using a hierarchical clustering technique according to Ward's method, a subsample of 109 cases was used to determine the total number of clusters. Based on the dendrogram, we identified three clusters for each study country. K-means clustering was conducted considering the total cleaned sample of each study country. The identified clusters were described and verified using a discriminant analysis and cross-tabulations using the p-value and Cramer's V. Group differences can be analyzed within the framework of the discriminant analysis. Thus, the discriminant analysis is considered a structure-checking method. We used cross-tabulations to describe the clusters in more detail. In this context, the socio-demographic data were grouped to generate nominal scaled variables.

Results

This chapter describes the PCA and CA results for each study country: Italy, Japan, South Korea and Poland. The individual factor loadings are summarized in Tables A1–A4 (Appendix). The factor loadings were used as cluster variables during the CA. Factors relating to animal welfare and COO were primarily integrated into the CA to describe the clusters based on these characteristics and to show how domestic consumers perceive foreign pork. In addition, the findings of the discriminant analysis and a detailed description of the cluster groups based on socio-demographic and other descriptive data are presented below.

Factor analysis

Based on the PCA, five to six factors were identified for each of the four study countries as presented in Table 2. Cronbach's alpha was above 0.6 for almost every factor and therefore reliable (Hair, Black, Babin, & Anderson, 2019). Although the Cronbach's alpha value for factor 2 ("Imports are cheaper and of lower quality") in Poland was 0.510 and therefore not

within the acceptable range, we still decided to incorporate this factor in the further analyses as we followed an explorative approach and this factor allows a more detailed description of the clusters.

Overall, six factors could be identified for Japan and South Koreas as well as five factors for Italy and Poland. The factors are very similar across the study countries. Thus, it was possible to identify a factor for each study country that indicates a strong consumer preference for domestic pork (factor 1). Items that indicate that the country of origin plays an important role in out-of-home or at-home consumption, but also statements that refer to the positive aspects of domestic pork (e.g., short delivery distance, support of local community and reduced negative environmental impacts), are summarized under this factor. In addition, a factor referring to animal welfare and especially the impact of the husbandry system on meat quality, taste and human health could be identified (Japan, South Korea and Poland = factor 3; Italy = factor 2). Therefore, especially in Italy and Poland this factor also included statements that suggest a WTP a premium price. Factor 4 in Japan, factor 5 in South Korea and factor 3 in Italy also emphasize the importance of animal welfare as this factor summarizes all the statements relating to animal protection and the understanding and relevance of animal welfare. Furthermore, the factor "accept German pork" could be identified for each study country. Especially in Japan and South Korea this factor includes statements about the good reputation of German products, whereas in Italy and Poland this factor consists mainly of statements referring to the conditions under which Italian and Polish

Table 2. Identified factors for the respective study countries.

Factor	Japan	South Korea	Italy	Poland
(1)	Preference for COO and especially domestic pork (α = 0.910)	Preference for COO and especially domestic pork (α = 0.879)	Preference for COO and especially domestic pork (α = 0.886)	Pro domestic pork (α = 0.917)
(2)	Positive perception towards domestic pork (α = 0.791)	Cheap imported pork required (α = 0.745)	Meat attributes are linked to husbandry system and WTP is given (α = 0.910)	Imports are cheaper and of lower quality (α = 0.510)
(3)	Meat quality and animals' well-being is linked to husbandry system (α = 0.913)	Quality and taste are linked to husbandry system (α = 0.899)	Pro animal welfare (α = 0.914)	Interested in animal welfare with a given WTP and a link to meat quality (α = 0.914)
(4)	Pro animal welfare and WTP given (α = 0.878)	Accept German pork (α = 0.875)	Accept German pork (α = 0.823)	Reject German pork (α = 0.822)
(5)	Accept German pork (α = 0.833)	Pro animal welfare and WTP given (α = 0.850)	Reject German pork (α = 0.698)	Accept German pork (α = 0.799)
(6)	Agree with conventional husbandry system (α = 0.754)	Agree with conventional husbandry system (α = 0.770)		

Notes. α = Cronbach's alpha; COO = country of origin; WTP = willingness to pay.
Source: own compilation.

consumers would try German pork. Here, particularly good quality and a cheaper price compared to domestically produced pork are mentioned. In this context, factor 2 in Poland and South Korea must also be considered which indicate that imported pork should be cheaper and is often associated with lower quality. In the end, factor 6 could be identified for Japan and South Korea. This factor ("Agree with conventional husbandry system") is characterized by statements indicating that pigs in conventional husbandry systems feel comfortable and can show their natural innate behavior. The fifth factor ("Reject German pork") for Poland and Italy describes items indicating that consumers have never bought German pork and never intend to do so.

Cluster analysis (CA)

The defined factors were then incorporated into a two-step CA to identify consumer segments (Figures 1–4). Overall, three consumer groups could be identified in each study country. Especially, the consumer segments in Japan and Italy are comparable, whereas the results for Poland and South Korea deviate in some parts.

Consumers assigned to the clusters "Animal welfare- and quality-interested local advocates" (Japan (25.7%) and Italy (43.7%)) and "Animal welfare- and quality-interested consumers" (South Korea (37.1) and Poland (50.6%)) are characterized by their above-average interest and positive attitude toward animal welfare. These consumers link improved husbandry conditions to meat quality, health benefits and better taste as well as animal well-being. Therefore, this cluster is willing to pay a premium price for better quality and improved husbandry conditions. Furthermore, this cluster has a strong preference for domestically produced pork. However, a particular aspect of this cluster in Poland is that, although it prefers domestic pork, it still has an above-average acceptance of German pork.

The second cluster that could be identified for each respective study country is the cluster "Price sensitive and without expectations". This cluster accounts for 44.8% of Japanese participants, 37.7% of Korean participants, 31% of Italian participants and 40.6% of Polish participants. Overall, almost all factor scores that explain this cluster in the four study countries are well below the total sample mean. This suggests that consumers assigned to this cluster are neither interested in animal welfare nor in the country of origin while purchasing pork. Instead, they seem to be price-oriented.

In contrast, 25.3% of Italian and 29.4% of Japanese consumers were assigned to the cluster of "Animal welfare receptive cosmopolitans" who are both interested in animal welfare and openminded toward German pork.

Additionally, two individual clusters were identified for South Korea and Poland. Cluster 3 in South Korea thus describes the so-called "Local
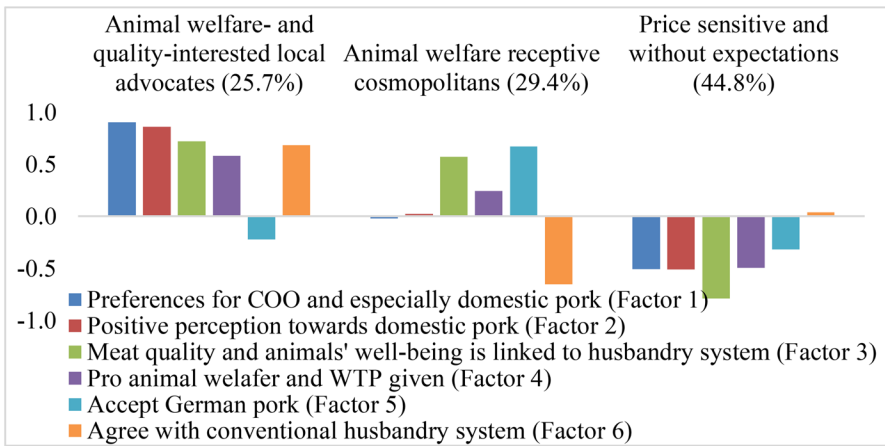
Figure 1. Cluster groups in Japan.
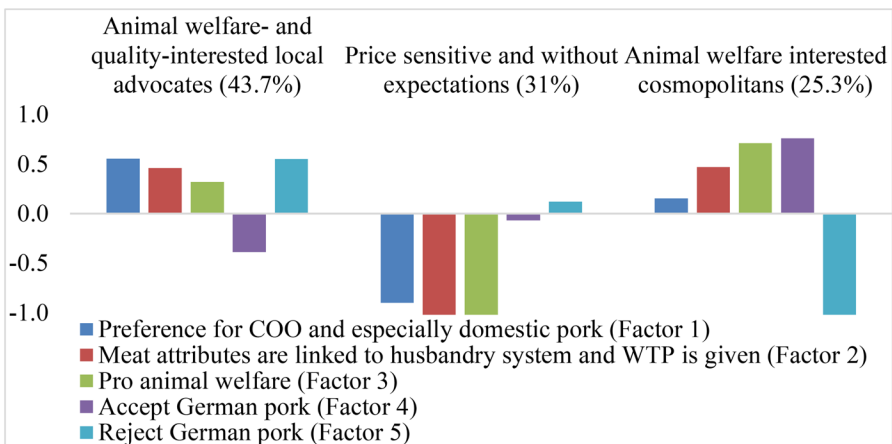*Source*: own compilation.

Figure 2. Cluster groups in Italy.
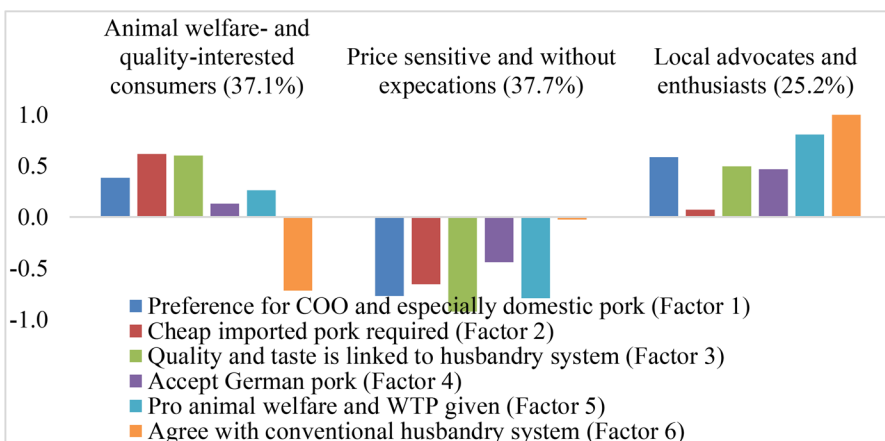*Source*: own compilation.

Figure 3. Cluster groups in South Korea.
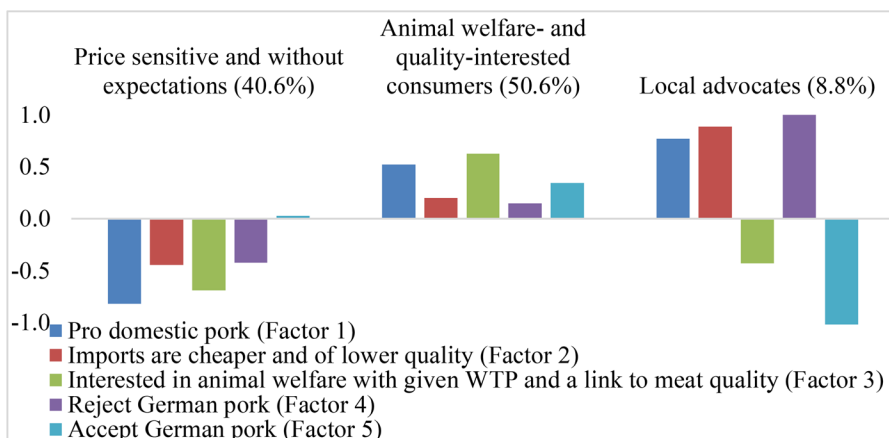*Source*: own compilation.

Figure 4. Cluster groups in Poland.
Source: own compilation.

advocates and enthusiasts" (25.2%). For this consumer group the COO plays an important role. They also value animal welfare positively and believe that farm animals need to be better protected. Still, this group agrees with the current conventional husbandry conditions. The study of Derstappen and Christoph-Schulz (2023) already indicated that animal welfare is of a rather low relevance in South Korea, which is primarily due to consumers' limited knowledge of pork production. Since South Korean consumers do not seem to be involved with pork production in their daily lives, they lack extensive knowledge about conventional husbandry systems and agree with them and at the same time support higher animal welfare standards as another husbandry system. "*Local advocates*" (cluster 3) form the smallest cluster, with 8.8% of all participants. Consumers of cluster 3 in Poland are interested in domestic products, which they value positively. Thus, associated consumers are not particularly open towards German pork. The issue of animal welfare is evaluated at an average level within cluster 3.

Discriminant analysis and cross-tabulations

Japan

The discriminant analysis indicated that 97% of the Japanese participants were classified correctly. The results of the cross-tabulations showed no significant difference between gender, employment, education, age group, number of persons per household, owner of pets, decreasing meat consumption or meat condition among the three clusters. Only household income differed significantly between the clusters. Accordingly, there is a statistical relationship between the cluster membership and the annual

household income. However, a Cramer's V of 0.117 indicated a rather weak correlation (Table 3). *Animal welfare- and quality-interested local advocates* tend to be female (55.8%) compared to the other two clusters, and the share of consumers owning a pet (30.1%) is the highest among all clusters. In addition, *animal welfare- and quality-interested local advocates* included the highest share of consumers that decreased their meat consumption over the last years (35.4%). *Animal welfare- and quality-interested local advocates* are characterized by an income significantly above average (66.4%), a middle age (52.2%) and medium household size of 2–4 persons (79.6%). *Animal welfare-receptive cosmopolitans* are more likely to be of young and middle age (32.3% and 40%). Gender is equally distributed in this cluster. This group also has a net income significantly above the total sample average (67.7%) and is characterized by consumers with a higher educational level. There is an increased share of male (53.8%) consumers among the *price sensitive and without expectations* who do not have pets (76.1%). These consumers are more likely to eat frozen pork (15.7%) compared to consumers in the other two clusters.

South Korea

Of the South Korean consumers, 97% were correctly assigned to the individual segments. Age group, annual household income, pet ownership and meat condition all differed significantly, but the correlations were rather weak, with Cramer's V between 0.103 and 0.144 (Table 3).

Animal welfare- and quality-interested consumers are dominated by the youngest (30.5%) and oldest (20.1%) age group. These households have an above-average income (79.3%). Furthermore, this group has a significant preference for fresh pork (92.5%) and owns pets (33.9%). The share of consumers indicating to decrease their meat consumption level (20.1%) is the highest among *animal welfare- and quality-interested consumers*. Furthermore, this group has the highest share of medium (38.5%) and high (55.2%) educational levels among participants. The cluster *Price sensitive and without expectations* is predominantly male (57.6%) and of young (41.8%) or middle (47.5%) age. It is more likely to prefer frozen pork (18.6%) and has the smallest proportion of consumers who indicated to have reduced their meat consumption (16.4%). Additionally, *price-sensitive and without expectations* have the lowest employment rate (46.9%). *Local advocates and enthusiasts* mainly include male consumers (63.7%). These consumers have a higher employment rate (56.8%) and educational level (middle to high, 89.8%) compared to *price-sensitive and without expectations*. *Local advocates and enthusiasts* are of middle age (53.5%). This segment is characterized by the highest proportion of households with an

Table 3. Profiles of clusters and relationships between the clusters in Japan, South Korea, Italy and Poland.

	Japan					South Korea				
	Frequency in percent (%)					Frequency in percent (%)				
Characteristics	Animal welfare- and quality-interested local advocates	Animal welfare-receptive cosmopolitans	Price sensitive and without expectations	p-values*	Cramer's V**	Animal welfare- and quality-interested consumers	Price sensitive and without expectations	Local advocates and enthusiasts	p-values*	Cramer's V**
Gender				0.397	0.068				0.074	0.105
Female	55.8	50.8	45.7			52.9	42.4	41.5		
Male	44.2	49.2	53.8			47.1	57.6	58.5		
Employed[a]	62.8	63.8	60.9	0.858	0.026	48.9	46.9	56.8	0.23	0.079
Education[a]				0.822	0.030				0.557	0.057
Low						6.3	10.2	10.2		
Medium	47.8	46.9	50.3			38.5	40.1	34.7		
High	52.2	53.1	49.7			55.2	49.7	55.1		
Age group[b]				0.159	0.116				0.043	0.103
Younger	28.3	32.3	37.1			30.5	41.8	29.74		
Middle	52.2	40	44.7			49.4	47.5	53.5		
Older	19.5	27.7	18.3			20.1	10.7	17.8		
Number of persons in one household				0.393	0.068				0.94	0.029
Single	15.9	21.5	24.9			10.9	10.2	9.3		
2–4 persons	79.6	76.2	72.1			83.9	83.6	86.4		
>4 persons	4.4	2.3	3.0			5.2	6.2	4.2		
P.a household income[c]				0.017	0.117				0.013	0.116
Less than average income	24.8	20	27.4			5.7	14.1	5.1		
Average income	8.8	12.3	19.8			14.9	15.8	11		
More than average income	66.4	67.7	52.8			79.3	70.1	83.9		
Owner of pets	30.1	28.5	23.9	0.433	0.062	33.9	22.6	38.1	0.009	0.141
Decreasing meat consumption	35.4	27.7	27.4	0.286	0.075	20.1	16.4	17.8	0.659	0.042
Meat condition				0.294	0.075				0.008	0.144
Fresh	89.4	89.2	84.3			92.5	81.4	87.3		
Frozen	10.6	10.8	15.7			7.5	18.6	12.7		

(Continued)

Table 3. Continued.

	Italy					Poland				
	Frequency in percent (%)					Frequency in percent (%)				
Characteristics	Animal welfare- and quality-interested local advocates	Animal welfare-receptive cosmopolitans	Price sensitive and without expectations	p-values*	Cramer's V**	Animal welfare- and quality-interested consumers	Price sensitive and without expectations	Local advocates and enthusiasts	p-values*	Cramer's V**
Gender				0.051	0.098				0.483	0.064
Female	53.7	38.8	49.2			42.9	47.2	45.9		
Male	45.8	61.2	50			55.9	52.8	54.1		
Employed	57.5	69.7	62.9	0.057	0.108	73.5	69.3	86.5	0.091	0.107
Education[a]				0.833	0.039				0.693	0.052
Low	38.3	38.2	37.9			12.4	9.4	13.5		
Medium	41.6	38.8	44.4			57.1	60.8	64.9		
High	20.1	23	17.7			30.6	29.7	21.6		
Age group[b]				0.002	0.131				0.413	0.099
Younger	31.3	37.5	29.8			41.8	35.4	24.3		
Middle	43.9	53.3	54.8			40	40.1	48.6		
Older	24.8	9.2	15.3			18.2	24.5	27		
Number of persons in one household				0.245	0.074				0.205	0.084
Single	7.9	7.2	4			8.8	6.1	2.7		
2–4 persons	85.5	88.2	85.5			80.6	87.7	83.8		
>4 persons	6.5	4.6	10.5			10.6	6.1	13.5		
P.a. household income				0.32	0.069				0.871	0.038
Less than average income	24.3	27.6	20.2			45.3	47.2	40.5		
Average income[c]	26.2	27.6	35.5			35.9	32.1	35.1		
More than average income	49.5	44.7	44.4			18.8	20.8	24.3		
Owner of pets	65.9	53.3	68.5	0.014	0.132	66.5	72.2	73	0.441	0.062
Decreasing meat consumption	49.1	39.5	45.2	0.192	0.082	40	46.2	29.7	0.128	0.099

*Chi-square by Pearson (significant α ≤ 5% ($p ≤ 0.05$)); **Cramer-V correlation: <0.2 extremely weak; 0.2–0.4 weak; 0.4–0.6 medium weak (Brosius, 2011).
[b]Younger = 20–39 years; middle = 40–59 years; Eldest = over 60 years.
Footnotes a) and c) see Table 1; Source: own calculation.

above-average income (83.9%) and a large share of consumers owning a pet (38.1%).

Italy

According to the discriminant analysis, 95% of participants were correctly assigned to the clusters. The examination of the clusters based on cross-tabulations considering socio-demographic data provides more precise knowledge regarding cluster assignment. The variables gender, age group and pet ownership are significant, indicating a difference between the clusters regarding these variables. However, the correlation of these three variables is rather low according to Cramer's V, which is between 0.098 and 0.132 (Table 3).

Animal welfare- and quality-interested local advocates is a predominantly female cluster (53.7%). In addition, this group has the highest share of consumers who decreased their meat consumption over the last years (49.1%). *Animal welfare- and quality-interested local advocates* have the highest household income (49.5%). This cluster is further characterized by a middle age group (43.9%). In contrast, male consumers (61.2%) of *price-sensitive and without expectations* are of younger or middle age (80.8%). Additionally, the proportion of pet owners (53.3%) is significantly lower in this group compared to clusters 1 and 3. Nevertheless, the cluster *price sensitive and without expectations* is characterized by a high employment rate (69.7%). Consumers in this cluster have not yet reduced their meat consumption (60.5%). Gender is equally distributed within the cluster of *animal welfare-interested cosmopolitans*. Mainly middle-aged and older persons (70.1%) can be assigned to this cluster, while most consumers own a pet (68.5%). Furthermore, consumers in this cluster have average or slightly above-average incomes (35.5% and 44.4%). The educational level of *animal welfare-interested cosmopolitans* is predominantly basic (37.9%) or medium (44.4%).

Poland

The correct assignment rate of the discriminant analysis of Polish consumers was over 90%. We determined no significant differences among the clusters regarding all socio-demographic data and other descriptive variables (Table 3). Nevertheless, we can still describe the individual clusters. All clusters are dominated by male consumers with a medium education level. Consumers labeled as *price sensitive and without expectations* are less likely to be pet owners (33.5%) and of young and middle age (81.8%). In contrast, *animal welfare- and quality-interested consumers* have predominantly decreased their meat consumption (46.2%). Members of this group have a lower level of income compared to the average (47.2%),

which is inconsistent with similar clusters in the other study countries. 30.7% of them are unemployed. Most of the employed respondents (86.5%) and pet owners (73%) are assigned to cluster 3. *Local advocates* indicate that their meat consumption level has not decreased (70.3%). This group is also characterized by a middle (48.6%) or advanced (27%) age and low to average incomes (40.5% and 35.1%).

Additional descriptive analysis

Additional statements were evaluated descriptively to better understand the individual clusters and consumer attitudes in the study countries. Figure 5 shows the evaluation of the statement "I have never heard the term animal welfare". Overall, most participants in Poland, Italy and South Korea tended to disagree, disagree or totally disagree with this statement. Accordingly, the majority of consumers in these countries was already familiar with the term animal welfare. In contrast, 45.7% of Japanese participants tended to agree, agreed or totally agreed with this statement, indicating that they had never heard the term animal welfare. At the same time, 22.3% of the Japanese consumers indicated that they neither agreed nor disagreed with the statement. In South Korea, however, only a small proportion of consumers admitted that they had never heard of this the term (9.6%).

Figure 6 shows the response behavior toward the statement "I would like to be more informed about the condition under which pigs are farmed". According to the analysis, especially Italian and Polish participants were interested in gaining more information about the keeping conditions of pigs. 50% of Italian and 42.7% of Polish consumers agreed or totally agreed with this statement. The agreement among Japanese and South Korean consumers was slightly lower (e.g., 12.5% and 25.6%). Also, a large share of these consumers was indifferent toward this statement.
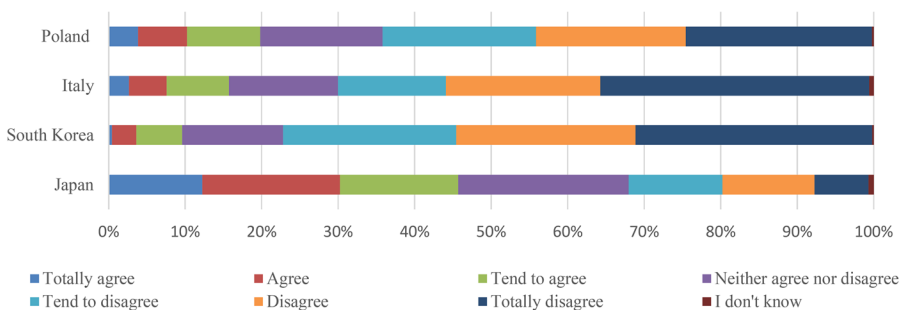

Figure 5. Descriptive analysis of statement "I have never heard the term animal welfare".
Source: own calculation.

Discussion

General discussion

The overall objective of this study was to identify and characterize individual consumer groups in Japan, South Korea, Italy and Poland by considering the relevance of animal welfare, COO and their pork purchasing behavior. In addition, we identified consumer groups that were particularly interested in animal welfare and imported pork. Since this is an explorative study with study countries that differ not only in geographical location but also with regard to cultural background, various results could be generated.

This means that in each study country, at least one consumer group seems to be receptive toward animal welfare. The share of animal welfare-interested consumers is the highest in Italy. This finding is confirmed by literature: Lin-Schilstra et al. (2022) showed that Italian consumers rated animal welfare as an important purchasing criterion, among others. These consumers were also confident about their knowledge of pork production (Lin-Schilstra et al., 2022). Pejman, Kallas, Dalmau, and Velarde (2019) were able to show that Italian consumers are concerned about animal well-being. Di Pasquale et al. (2016) defined a target group for animal welfare meat that is also willing to pay a premium price in Italy. The same was true for cluster 1 (*Animal welfare- and quality-interested local advocates*) and cluster 3 (*Animal welfare-interested cosmopolitans*) in Italy. In Japan, we found cluster 1 (*Animal welfare- and quality-interested local advocates* (25.7%)) and cluster 2 (*Animal welfare-receptive cosmopolitans* (29.4%)) interested in and receptive to animal welfare. Sonoda, Oishi, Chomei, and Hirooka (2018) already identified a consumer group in Japan interested in animal welfare. In our study, half of the Polish participants were interested in animal welfare. Gołębiewska et al. (2018) found that only a limited number of Polish consumers are aware of the animal welfare topic, which contradicts our results. The reason for this is primarily that
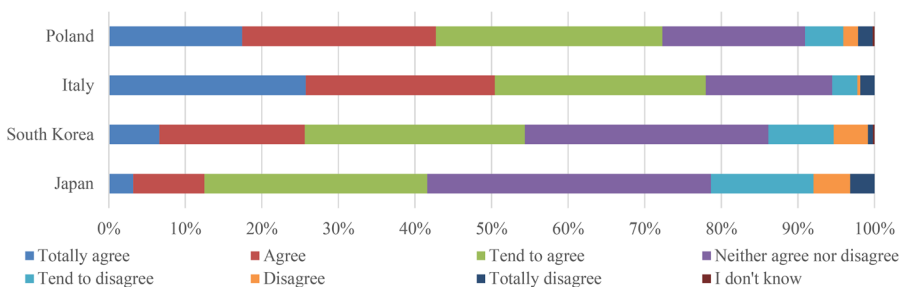

Figure 6. Descriptive analysis of statement "I would like to be more informed about the condition under which pigs are farmed".
Source: own calculation.

the participants in our study received a brief definition of the term animal welfare partway through the survey. This may have led to biases, since the study of Derstappen and Christoph-Schulz (2023) revealed that Polish consumers tended to state that they had not yet heard of the term animal welfare. In South Korea, cluster 1 (*Animal welfare- and quality-interested consumers* (37%)) with an above-average income seems to be interested in animal welfare. Derstappen and Christoph-Schulz (2023) showed that South Korean and Japanese participants had hardly heard of the concept of animal welfare before and had almost no knowledge of the current pig husbandry conditions. Nevertheless, they also showed that providing consumers with information about animal welfare increases awareness cross-nationally (Derstappen & Christoph-Schulz, 2023). This is in line with findings of this study, which shows that consumers, Italian consumers in particular, would like to be more informed about the husbandry conditions. This raises questions about how to reach these consumers most effectively. Mayfield, Bennett, Tranter, and Wooldridge (2007) showed that Italian consumers primarily use product labels as an information source and demand additional information about livestock husbandry systems. All in all, the importance of animal welfare might increase in the future, since the high presence of a topic in one country can increase the perception of this topic in other countries (Alonso et al., 2020). Also, international trade relations and changing market conditions might have an influence on the future relevance of animal welfare. Especially with economic growth and climate change, the interest in sustainable topics, such as animal welfare or environmental issues, come into focus (Harvey et al., 2013). Currently, however, this may still take some time. Particularly with increasing inflation worldwide, topics such as animal welfare and environmental protection seem to slip even further to the back of the agenda—even in Germany, where this topic has been present for years.

Besides the relevance of and interest in animal welfare, the COO played a decisive role for consumers' purchasing decisions in each study country. Therefore, especially domestically produced meat is preferred. This is also reflected by clusters for which factors referring to the importance of domestic origin are strongly pronounced. According to Sasaki et al. (2022), Japanese consumers prefer domestically produced meat. Kim and Boyd (2004) showed that domestic beef is preferred by a higher income class in South Korea. They suggested that specific marketing strategies and a meaningful communication of the benefits of animal welfare are necessary to grow the market potential of this product (Kim & Boyd, 2004). This was also a central finding of another study, which emphasized that a product differentiation and branding strategy are necessary to successfully export pork to South Korea (Kim, 2003). The sociological concept "consumer ethnocentrism" describes consumers' preference for local products (Ma,

Abdeljelil, & Hu, 2019; Shimp & Sharma, 1987), because it is considered unpatriotic to consume imported products, which would negatively impact the local economy (Shimp & Sharma, 1987). In addition, the "country of origin effect" describes the phenomenon that consumers often link the COO to positive product attributes, such as quality (Schnettler, Miranda, Lobos, Sepúlveda, & Denegri, 2011; Verlegh, Steenkamp, & Meulenberg, 2005). Several studies linked domestic products with higher quality and better taste (Asante-Addo & Weible, 2020; Boimah & Weible, 2021). Another study showed that locally produced meat is described as fresher compared to imported meat (Derstappen & Christoph-Schulz, 2023). These two aspects clearly show that the origin of meat products is an important criterion when purchasing meat and should consequently be considered in marketing campaigns. Nevertheless, the factor "Open towards German pork" has a positive connotation for some clusters. Other studies showed that especially German sausages or Iberico pork were mentioned by Japanese consumers and are usually marketed under the European certification systems "Protected Designation of Origin" or "Protected Geographical Indication" (Derstappen, Christoph-Schulz, & Banse, 2021; Derstappen & Christoph-Schulz, 2023). The preference for imported products among Italian consumers can also be confirmed by literature (Schjøll, 2017). This shows that although consumers generally prefer domestically produced meat, a group of consumers is open to imported products, especially German products. This suggests that German pork produced under higher animal welfare standards could be launched on the global market, at least for a certain group of consumers in specific countries. However, since animal welfare is not an important topic in any country of this study, the market share for pork produced under higher animal welfare standards is limited and can currently be described as a niche market. To transfer these results to other countries, further research is needed. In addition, it seems advisable to consider the marketing of pork produced under higher animal welfare standards as a premium or quality product.

There was a price-sensitive consumer group in every study country. This was most obvious for Asian countries and Poland, whereas in Italy the group of "*price sensitive and without expectations*" was 31%. Overall, this cluster can be considered the counterpart to the cluster "*Animal welfare- and quality-interested*" consumers. Across the study countries, this group is primarily characterized by young to middle-aged male consumers with a reduced meat consumption level and mostly without a pet. Animal welfare is less important for this consumer group. Lin-Schilstra et al. (2022) showed that South Korean consumers do not attribute great importance to the aspects animal and environmental friendliness and are not open to new or unfamiliar products. In Poland, the cluster "*price sensitive and without expectations*" is characterized by a low to medium income.

These consumers are not interested in the COO or animal welfare, similar to the study by Bereżnicka and Pawlonka (2018). The authors emphasized that the price is the most important criterion for consumers with a lower income, while quality, sensory values and health-promoting properties are relevant for consumers with a high income in Poland.

Marketing implications

To meet the different circumstances and to achieve the highest possible market prices, it is important to identify specific consumer characteristics not only for a company's production orientation but also for its marketing and educational strategies to reach consumers and meet market demands (Font-I-Furnols, Skrlep, & Aluwé, 2019). Consumer diversity is a key factor here (Sasaki, 2022). Therefore, we recommend various marketing instruments, such as product, price, distribution, and communication policies. In detail, this would mean for our study that animal welfare would have to be integrated as a quality aspect within the framework of the product policy. At the same time, it ought to be possible to derive a direct link to German animal welfare pork through certain brands or packaging. For price policy, it is necessary to adapt the price to consumer perceptions or to create a personal benefit of animal welfare that generates a higher price. Our consumer segmentation identified cosmopolitan consumers and those interested in animal welfare; these groups could be reached through targeted distribution channels, such as specialty stores. To complete the circle, appropriate communication policies are necessary. Accordingly, the implementation of educational or informational campaigns to communicate animal welfare benefits is recommended. Easily understandable and tangible information is necessary to explain the animal welfare concept and to reach all age groups, income classes and educational levels. Germany could take on a pioneering role (first-to-market) to introduce the topic of animal welfare in the export business, although cultural aspects in the respective countries should always be considered, as concepts and ideologies are not fully transferable. Agreeing on a uniform definition of animal welfare is challenging, as the term is understood in many different ways (Alonso et al., 2020). This makes the product's international competitiveness even more difficult. To promote animal welfare meat accordingly, product differentiation or a cost leadership strategy might be successful instruments to address a particular consumer group interested in animal welfare. As our study shows, every country has a consumer group interested in animal welfare and receptive to imported pork. Thus, the marketing strategy of cross-culture target groups could be pursued and would facilitate the development of a corporate strategy. Still, a targeted communication of animal welfare

as a product attribute with an added value could help to make animal welfare more tangible and would be consistent with Alonso et al. (2020) findings. Besides these criteria, it might be worth discussing animal welfare as an aspect of social sustainability and as a part of the sustainability triangle, which is also relevant cross-nationally.

Limitations and suggestions for further research

It should be noted that a response bias could have arisen through the provision of information. Several respondents stated being aware of the term animal welfare, as a definition of animal welfare had been provided to them before they were asked if they had heard the term animal welfare before. This response tendency does not correspond to findings of other studies and should therefore be critically examined in the course of future research (Derstappen & Christoph-Schulz, 2023). Moreover, there are cultural differences between the four study countries. This might have influenced the participants' response behavior. Japanese consumers, for example, tend to choose the middle range of the scales when feeling indifferent about a statement. Other studies explain this phenomenon with the fact that participants become aware that their perception deviates from reality at this point (Ermann, Graskemper, & Spiller, 2017). Some consumers do not want to deal too much with the conditions under which livestock are kept (Christoph-Schulz & Rovers, 2020). However, the low level of knowledge on the subject could also lead to a neutral attitude of the participants toward many statements. Altogether, this study contributes to the literature in English, leaving much room for further research.

Overall, this study could serve as a starting point, and the question of the relevance of animal welfare in the study countries could be monitored steadily over the next 20 years. At this point, the development of an international monitoring system could help to obtain a standardized data basis. In addition, further research is needed to better understand consumer preferences regarding animal welfare and the COO in the study countries. Here, the influence of the purchasing locations on the perception of animal welfare should also be examined, as well as which criteria are particularly important to consumers when they think about animal welfare. In this context, it would be interesting to see whether consumers already interested in pork produced under higher animal welfare standards would also be willing to pay a higher price, always keeping in mind the consumer–citizen gap. Moreover, detailed knowledge about individuals in the respective countries would be necessary to develop more specific marketing strategies. For this purpose, customer-specific data should be collected in future research to obtain information on purchasing behavior,

socio-demographic characteristics and the reactions of consumers to marketing instruments. In this way, the fundamental social acceptance of the issue of animal welfare could also be analyzed.

Conclusion

Against the background of striving for sustainable consumption on a global level, the topic of animal welfare also plays a central role. International trade is a key factor if we want to ensure food security for all people and at the same time avoid food production having a negative impact on health and the environment. Therefore, this paper combines the topics animal welfare and international trade in the form of "COO" contributing to the general challenge of exporting nations competing with lower production standards in other countries and whether or not it makes sense to market higher standards that incur higher sales prices. In this context, we identified and compared consumer segments in four study countries that are not only culturally but also geographically and economically diverse. Based on our results, three similar consumer groups in each study country could be identified: animal welfare-interested cosmopolitans who seem open to imported pork produced under higher animal welfare standards, price-sensitive consumers, and local advocates. This emphasizes that although marketing strategies should be tailored to the individual target markets, it will also be possible to use similar strategies to address similar groups cross-nationally. Nonetheless, it can be stated at this point that an issue (such as animal welfare) that is highly relevant in many countries cannot be transferred one-to-one to all countries in the world. Tradition, culture, economic conditions and political circumstances all have an influence on the relevance of subjects in a country. Therefore, the results are only partially transferable and should be reviewed in the context of further studies for other countries that have a high consumption of pork and are dependent on imports.

Disclosure statement

Funding

References

Aboah, J., & Lees, N. (2020). Consumers use if quality cues for meat purchase: Reseach trends and future pathways. *Meat Science*, *166*, 108142. doi:10.1016/j.meatsci.2020.108142

Alonso, M. E., González-Montaña, J. R., & Lomillos, J. M. (2020). Consumers' concerns and perceptions of farm animal welfare. *Animals: An Open Access Journal from MDPI*, *10*(3), 385. doi:10.3390/ani10030385

Asante-Addo, C., & Weible, D. (2020). Is there hope for domestically produced poultry meat? A choice experiment of consumers in Ghana. *Agribusiness*, *36*(2), 281–298. doi:10.1002/agr.21626

Bereżnicka, J., & Pawlonka, T. (2018). Meat consumption as an indicator of economic well-being—Case study of a developed and developing economy. *Acta Scientiarum Polonorum. Oeconomia*, *17*(2), 17–26. doi:10.22630/ASPE.2018.17.2.17

Boimah, M., & Weible, D. (2021). Assessing protectionism and its impact from consumers' perspective: The case of Senegal's poultry import ban. *World Food Policy*, *7*(1), 26–40. doi:10.1002/wfp2.12025

Brosius, F. (2011). *SPSS 19* (1st ed.). Heidelberg: MITP-Verlag.

Busch, G., & Spiller, A. (2020). *Warum wir eine Tierschutzsteuer brauchen – Die Bürger-Konsumenten-Lücke: Positionspapier* No. 2001. Göttingen: Georg-August-Universität Göttingen, Department für Agrarökonomie und Rurale Enwicklung (DARE).

Christoph-Schulz, I., & Rovers, A.-K. (2020). German citizens' perception of fattening pig husbandry—evidence from a mixed methods approach. *Agriculture*, *10*(8), 342. doi:10.3390/agriculture10080342

Clune, S., Crossin, E., & Verghese, K. (2017). Systematic review of greenhouse gas emissions for different fresh food categories. *Journal of Cleaner Production*, *140*, 766–783. doi:10.1016/j.jclepro.2016.04.082

Deblitz, C., Efken, J., Banse, M., Isermeyer, F., Rohlmann, C., & Tergast, H. (2021). *Politikfolgenabschätzung zu den Empfehlungen des Kompetenznetzwerks Nutztierhaltung* (Thünen Working Paper No. 173). Retrieved from https://literatur.thuenen.de/digbib_extern/dn063574.pdf.

Derstappen, R., & Christoph-Schulz, I. (2023). Identification of consumers' purchasing criteria and perception of animal welfare and country of origin – a cross-national study. *International Journal on Food System Dynamics*, *14*(1), 58–75. 10.18461/ijfsd.v14i1.E4.

Derstappen, R., Christoph-Schulz, I., & Banse, M. (2021). *An empirical analysis of the export potential of pork produced under higher animal welfare standards* (Thünen Working Paper No. 184). Braunschweig. Retrieved from https://literatur.thuenen.de/digbib_extern/dn064254.pdf.

Di Pasquale, J., Nannoni, E., Adinolfi, F., Del Duca, I., Capitanio, F., Sardi, L., … Martelli, G. (2016). A case-study on profiling Italian consumers of animal-friendly foods. *Italian Journal of Animal Science*, *15*(2), 294–302. doi:10.1080/1828051X.2016.1180963

Dransfield, E., Ngapo, T. M., Nielsen, N. A., Bredahl, L., Sjödén, P. O., Magnusson, M., … Nute, G. R. (2005). Consumer choice and suggested price for pork as influenced by its appearance, taste and information concerning country of origin and organic pig production. *Meat Science*, *69*(1), 61–70. doi:10.1016/j.meatsci.2004.06.006

Enneking, U., Kleine-Kalmer, R., Dauermann, A., & Volgt, R. (2019). *Kaufbereitschaft bei verpackten Schweinefleischprodukten im Lebensmitteleinzelhandel: Realexperiment und Kassenzonen-Befragung*. Hochschule Osnabrück, Bereich Agrar- und Lebensmittelmarketing Osnabrück, Germany.

Ermann, M., Graskemper, V., & Spiller, A. (2017). Die Wirkung von geführten Stallbesichtigungen auf Bürger - eine Fallstudie auf nordwestdeutschen

Schweinemastbestrieben. In W. Britz, S. Bröring, M. Hartmann, T. Heckelei, & K. Holm-Müller (Eds.), *Agrar- und Ernährungswirtschaft: Regional vernetzt und global erfolgreich* (pp. 45–56). Schriften der Gesellschaft für Wirtschafts- und Sozialwissenschaften ds Landbaues e.V. Band 52. Münster: Landwirtschaftsverlag.

EUROSTAT. (2022). *Eu Handel nach HS2,4,6 und CN8 seit 1988 Eu Handel nach HS2,4,6 und CN8 seit 1988*. Retrieved from https://ec.europa.eu/eurostat/de/data/database.

Font-I-Furnols, M., Skrlep, M., & Aluwé, M. (2019). Attitudes and beliefs of consumers towards pig welfare and pork quality. *IOP Conference Series: Earth and Environmental Science*, *333*(1), 012002. doi:10.1088/1755-1315/333/1/012002

Friedrichsen, J., & Gärtner, M. (2020). *Warum essen wir so viel Fleisch?* (DIW Roundup: Politik im Fokus). Berlin: Deutsches Institut für Wirtschaftsforschung (DIW).

Gołębiewska, B., Gębska, M., & Stefańczyk, J. (2018). Animal welfare as one of the criterion determining polish consumers' decisions regarding their purchase of meat. *Acta Scientiarum Polonorum. Oeconomia*, *17*(3), 13–21. doi:10.22630/ASPE.2018.17.3.33

Grunert, K. G., Sonntag, W. I., Glanz-Chanos, V., & Forum, S. (2018). Consumer interest in environmental impact, safety, health and animal welfare aspects of modern pig production: Results of a cross-national choice experiment. *Meat Science*, *137*, 123–129. doi:10.1016/j.meatsci.2017.11.022

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Andover, Hampshire: Cengage.

Harvey, D., Hubbards, C., Majewski, E., Malak-Rawlikowska, A., Hamulczuk, M., & Gebska, M. (2013, February, 18–22). Impacts of improved animal welfare standards on competitiveness of EU animal production. In U. Rickert & G. Schiefer (Eds.), *Proceedings of the 6th International European Forum on System Dynamics and Innovation in Food Networks*, Innsbruck-Igls. Bonn (pp. 251–274).

Heise, H., & Theuvsen, L. (2017). What do consumers think about farm animal welfare in modern agriculture? Attitudes and shopping behaviour. *International Food and Agribusiness Management Review*, *20*(3), 379–399. doi:10.22434/IFAMR2016.0115

Kim, R. B. (2003). Factors influencing consumer' decision to purchase beef: A South Korean case study. *Journal of International Food & Agribusiness Marketing*, *15*(1-2), 153–167. doi:10.1300/J047v15n01_08

Kim, R. B., & Boyd, M. S. (2004). Identification of niche market for Hanwoo beef: Understanding Korean consumer preference for beef using market segment analysis. *International Food and Agribusiness Management Review*, *7*(3), 46–64. 10.22004/ag.econ.8152.

Kitano, S., Mitsunari, Y., & Yoshino, A. (2022). The impact of information asymmetry on animal welfare-friendly consumption: Evidence from milk market in Japan. *Ecological Economics*, *191*, 107230. doi:10.1016/j.ecolecon.2021.107230

KNW. (2020). *Empfehlungen des Kompetenznetzwerks Nutztierhaltung*. Berlin. Retrieved from https://www.bmel.de/SharedDocs/Downloads/DE/_Tiere/Nutztiere/200211-empfehlung-kompetenznetzwerk-nutztierhaltung.pdf?__blob=publicationFile&v=2.

Lin-Schilstra, L., Backus, G., Snoek, H., & Mörlein, D. (2022). Consumers' view on pork: Consumption motives and production preferences in ten European Union and four non-European Union countries. *Meat Science*, *187*, 108736. doi:10.1016/j.meatsci.2022.108736

Ma, Q., Abdeljelil, H. M., & Hu, L. (2019). The influence of the consumer ethnocentrism and cultural familiarity on brand preference: Evidence of event-related potential (ERP). *Frontiers in Human Neuroscience*, *13*, 220. doi:10.3389/fnhum.2019.00220

Massaglia, S., Merlino, V. M., & Borra, D. (2018). Marketing strategies for animal welfare meat identification: Comparison of preferences between millennial and conventional

consumers. *In: Quality - Access to Success*, *19*(S1), 305–311. Retrieved from https://www.researchgate.net/publication/324168616_MARKETING_STRATEGIES_FOR_ANIMAL_WELFARE_MEAT_IDENTIFICATION_COMPARISON_OF_PREFERENCES_BETWEEN_MILLENNIAL_AND_CONVENTIONAL_CONSUMERS.

Mayfield, L. E., Bennett, R. M., Tranter, R. B., & Wooldridge, M. J. (2007). Consumption of welfare-friendly food products in Great Britain, Italy and Sweden, and how it may be influenced by consumer attitudes to, and behaviour towards, animal welfare attributes. *International Journal of Sociology of Food and Agriculture*, *15*(3), 59–73.

Merlino, V. M., Borra, D., Girgenti, V., Dal Vecchio, A., & Massaglia, S. (2018). Beef meat preferences of consumers from Northwest Italy: Analysis of choice attributes. *Meat Science*, *143*, 119–128. doi:10.1016/j.meatsci.2018.04.023

Parlasca, M. C., & Qaim, M. (2022). Meat consumption and sustainability. *Annual Review of Resource Economics*, *14*(1), 17–41. doi:10.1146/annurev-resource-111820-032340

Pejman, N., Kallas, Z., Dalmau, A., & Velarde, A. (2019). Should animal welfare regulations be more restrictive? A case study in eight European Union Countries. *Animals: An Open Access Journal from MDPI*, *9*(4), 195. doi:10.3390/ani9040195

Resource Trade. (2023, March 13). *ResourceTrade.Earth: Data.* Retrieved from https://resourcetrade.earth/?year=2020&category=80&units=weight&autozoom. ＝1

Ruby, M. B. (2012). Vegetarianism. A blossoming field of study. *Appetite*, *58*(1), 141–150. doi:10.1016/j.appet.2011.09.019

Sasaki, K. (2022). Diversity of Japanese consumers' requirements, sensory perceptions, and eating preferences for meat. *Animal Science Journal＝Nihon Chikusan Gakkaiho*, *93*(1), e13705. doi:10.1111/asj.13705

Sasaki, K., Motoyama, M., Watanabe, G., & Nakajima, I. (2022). Meat consumption and consumer attitudes in Japan: An overview. *Meat Science*, *192*, 108879. doi:10.1016/j.meatsci.2022.108879

Schjøll, A. (2017). Country-of-origin preferences for organic food. *Organic Agriculture*, *7*(3), 315–327. doi:10.1007/s13165-016-0159-1

Schnettler, B., Miranda, H., Lobos, G., Sepúlveda, J., & Denegri, M. (2011). A study of the relationship between degree of ethnocentrism and typologies of food purchase in supermarkets in central-southern Chile. *Appetite*, *56*(3), 704–712. doi:10.1016/j.appet.2011.02.007

Schütz, A., Busch, G., & Sonntag, W. I. (2020). Environmental enrichment in pig husbandry – Citizens' ratings of pictures showing housing elements using an online-survey. *Livestock Science*, *240*, 104218. doi:10.1016/j.livsci.2020.104218

Shimp, T., & Sharma, S. (1987). Consumer ethnocentrism. Construction and validation of the CETSCALE. *Journal of Marketing Research*, *24*(3), 280–289. doi:10.2307/3151638

Sonoda, Y., Oishi, K., Chomei, Y., & Hirooka, H. (2018). How do human values influence the beef preferences of consumer segments regarding animal welfare and environmentally friendly production? *Meat Science*, *146*, 75–86. doi:10.1016/j.meatsci.2018.07.030

Tomasevic, I., Bahelka, I., Čandek-Potokar, M., Čítek, J., Djekić, I., Djurkin Kušec, I., … Font-I-Furnols, M. (2020). Attitudes and beliefs of Eastern European consumers towards piglet castration and meat from castrated pigs. *Meat Science*, *160*, 107965. doi:10.1016/j.meatsci.2019.107965

UN Comtrade. (2023). *Pork trade. World integrated trade solution.* Retrieved from https://wits.worldbank.org/about_wits.html.

Verlegh, P. W., Steenkamp, J., B. E., & Meulenberg, M. T. - (2005). Country-of-origin effects in consumer processing of advertising claims. *International Journal of Research in Marketing*, *22*(2), 127–139. doi:10.1016/j.ijresmar.2004.05.003

WBAE. (2020). *Politik für eine nachhaltige Ernährung. Eine integrierte Ernährungspolitik entwickeln und faire Ernährungsumgebungen gestalten*. KURZFASSUNG. Retrieved from https://www.bmel.de/SharedDocs/Downloads/DE/_Ministerium/Beiraete/agrarpolitik/wbae-gutachten-nachhaltige-ernaehrung-kurzfassung.pdf?__blob=publicationFile&v=2.

Willett, W., Rockström, J., Loken, B., Springmann, M., Lang, T., Vermeulen, S., … Murray, C. J. L. (2019). Food in the anthropocene: The EAT-Lancet Commission on healthy diets from sustainable food systems. *Lancet (London, England)*, *393*(10170), 447–492. doi:10.1016/S0140-6736(18)31788-4