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DRIVERS OF THE CONSUMPTION OF PLANT-BASED FOOD. INSIGHTS FROM THE PERSPECTIVE OF THE THEORY OF CONSUMPTION VALUES

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Purpose: Sustainable consumption and organic, healthier food are gaining increasing public attention. The discussion builds a more conscious and responsible society. With these matters on the table, corporations feel consumer pressure to reduce the food industry's environmental footprint. The article aims to analyse the determinants of the purchase intent of plant-based food. It poses five research questions.
Design/methodology/approach: The objective was achieved through a literature review concerning the values that affect the purchase intent of plant-based food and through empirical research. The research involved a survey of 208 respondents from Poland. The data were analysed through structural equation modelling with PLS-SEM in R-Studio. We validated the scales for measuring consumption values of plant-based food and built a model to explain the purchase intent.
Findings: According to the model, the primary driver of the intent is emotional value. Other statistically significant factors are epistemic and conditional values.
Practical implications: The results can be useful to future investors in the plant-based food market and those already present in this sector.
Originality/value: The novelty of the research lies in the identification of the values driving the purchase intent of plant-based food that consumers find the most important.
Keywords: sustainability, sustainable development, sustainable consumption, plant-based food, theory of consumption values, PLS-SEM.
Category of the paper: Research paper.

Introduction

The article investigates the values that drive consumers when purchasing plant-based food and the impact these values have on the purchase intent of plant-based food (PBF). Plant-based food is one of the fastest-growing markets in Poland and internationally (Adamczyk et al., 2022; Laassal, Kallas, 2019; Yang, Dharmasena, 2020; Schiano et al., 2020). The plant-based diet is

discussed in the media in numerous contexts: as a type of sustainable consumption, a lifestyle trend, a healthier substitute for a meat-based diet, or an expression of care for the life and welfare of livestock. The increasing interest in sustainable development significantly drives the demand for low carbon footprint products, fuelling the growth and popularity of the PBF industry as an alternative to meat products (Schiano et al., 2020; Peano et al., 2019; Verain et al., 2012). Therefore, it is so important to improve our understanding of the sector.

Many researchers investigated the demand side of PBF (Adamczyk et al., 2022; Laassal, Kallas, 2019), (Yang, Dharmasena, 2020; Schiano et al., 2020; Peano et al., 2019; Verain et al., 2012; Laila et al., 2021; Ribeiro et al., 2019; Schiano et al., 2022; McCarthy et al., 2017). Their research shows that consumers are driven to choose PBF by its nutritional value, health impact, price, and environmental considerations connected with sustainable development. We intend to verify their results in the context of the theory of consumption values to identify those attributes that play pivotal roles in consumer choices in the Polish market. To the best of our knowledge, no research employing the theory of consumption values has been conducted in Poland to date. Indeed, insights into the PBF market the theory can offer could be useful to many stakeholders, including PBF manufacturers, organisations advocating climate change adaptation, and consumers. Hence, we set to answer the following research questions:

RQ 1. What observable variables measure constructs of the theory of consumption values for PBF?

RQ 2. Do these constructs exhibit acceptable validity and reliability levels?

RQ 3. Which of the constructs significantly affect the purchase intent of PBF?

RQ 4. Do sociodemographic variables affect the purchase intent of PBF?

RQ 5. Do sociodemographic variables affect the consumption values of PBF?

The first question was addressed through a literature review focused on the theory of consumption values. We investigated functional value, social value, emotional value, epistemic value, and conditional value. We sought to answer research questions two through five with a survey of only consumers who actively purchased PBF in Poland from time to time. The survey sample is 208 people. The collected data were analysed using 1) structural equation modelling with PLS-SEM and 2) the Kruskal-Wallis tests and Conover's post-hoc tests.

The article is structured into five sections: 1) literature background for the empirical research, 2) methodology of the empirical research, 3) research results, 4) discussion, and 5) summary.

1. Literature review

1.1. Food consumption from the perspective of sustainable development

The notion of sustainable development covers a multitude of social, economic, and environmental aspects. It has become particularly popular in recent decades thanks to improved environmental and social awareness. Many organisations, governments, and enterprises attach growing weight to compliance with sustainable development principles. Its importance was further boosted by the growing concerns regarding environmental issues, such as climate change, loss of biodiversity, and degradation of ecosystems. Sustainable development is believed to respond to these challenges as a tool for fostering harmony between people and the planet. The idea has become integral to many development strategies, public policies, and business plans all over the world. The idea behind sustainable development has been aptly defined in the 1987 Report of the World Commission on Environment and Development: Our Common Future as development that 'meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland, 1987).

Environmental protection is among the critical pillars of sustainable development policy. One of the top environmental challenges today is food, especially reducing food waste, improving food quality and availability, and mitigating the environmental impact of food production. Statistics on food systems reveal the significance of food for environmental protection. Food systems are responsible for about 60% of the global biodiversity loss on land and the overfishing of 33% of the commercial fish population (Westhoek et al., 2016). What is more, according to FAO, IFAD, UNICEF, WFP, and WHO publications from 2018-2019, one-third of global food is wasted between the point of production and point of consumption, while about 11% of the global population suffers from malnutrition and 39% is overweight or obese (WHO, 2024). According to the United Nations Convention on Biological Diversity (COP, 2010), the vision of 'living in harmony with nature' by 2050 requires us to address the issues of food production and consumption (COP, 2010). It states that the protection of biological diversity and sustainable consumption should be included in policies, strategies, and practices of key public and private organisations that affect biological diversity or rely on it, both locally and globally.

When addressing the issue of sustainable consumption of food, one has to consider the dietary behaviour of individual consumers and their interest in the environmental consequences of their diets. Today, the importance of a plant-based diet and limiting animal product intake to reduce the adverse environmental impact of food production is often emphasised. Greenhouse gas emissions from agriculture amounted to 22% of the total global emissions already in 2007, a result comparable to industrial emissions and higher than transport emissions. It is mostly animal production, including animal transport and feed production, that causes nearly 80% of the agricultural emissions (McMichael et al., 2007). Therefore, dietary decisions may be more

consequential for the environment than commuting or household energy decisions. Moreover, the livestock sector is the primary consumer of such natural resources as land and water, covering about 35% of the total farming area and about 20% of blue water for feed production today. Furthermore, the livestock sector is estimated to consume the equivalent of 11,900 km³ of fresh water a year or about 10% of the estimated global annual water flow (111,000 km³). Moreover, according to estimates for 2010, 2290 km³ of green water and 370 km³ of blue water were used in feed production on fields (FAO, 2019). Green water footprint is the volume of water found in plants or upper layers of soil. It also includes water evaporating from plants (evapotranspiration). Blue water footprint measures the consumption of fresh surface or underground water. (Świat wody, 2020) In 2015, researchers calculated the environmental cost of producing 1 kg of protein in various plant and animal products. The results showed that producing 1 kg of beef protein required 18 times more land, 10 times more water, 9 times more fuel, 12 times more fertiliser, and 10 times more pesticides than producing the same amount of red bean protein (Sabaté et al., 2015). In light of the above and considering the protection of natural resources, increased consumption of meat, especially red meat and animal products, should be avoided because its production involves overexploitation of natural resources, which flies in the face of sustainable development.

A 2017-2018 study shows that changes in consumer dietary behaviour may entail health and environmental benefits that cannot be achieved solely through production process improvements (Clark, Tilman, 2017).

Table 1.
Environmental impact of food

Food type	Environmental impact
Plant-based food	Minimal impact
Eggs, dairy products, poultry, fishing excluding trawling[1], and aquaculture without water recirculation[2]	Medium impact
Ruminant meat	Very high impact (a hundred times more than PBF)

Source: original work based on (Clark, Tilman, 2017).

1.2. Plant-based food market in Poland

There are many factors behind the purchase intent of PBF. The first point of interest, however, is the sector and its consumers. Various communities followed plant-based diets already in Antiquity. Pythagoras, an appreciated Ancient Greek philosopher, promoted the benefits of the vegetarian diet in his teaching, believing animal slaughter immoral. Therefore,

[1] **Trawling** involves pulling a large, heavily weighted net on the sea floor and catching all bottom-dwelling organisms. (WWF, 2019).

[2] **Aquaculture without recirculation** means keeping fish in an enclosed environment on land or on a vessel where no water needs to be recirculated and no permanent energy source is necessary to stabilise the aquaculture environment. | Commission Regulation (EC) No 710/2009 of 5 August 2009 amending Regulation (EC) No 889/2008 laying down detailed rules for the implementation of Council Regulation (EC) No 834/2007, as regards laying down detailed rules on organic aquaculture animal and seaweed production.

his followers' diet, the Pythagorean Diet, was mainly based on bread, honey, and vegetables. Religions also affected the spread of plant-based diets by influencing the values of believers to a large extent. Jainism and Buddhism stand firm by the *ahimsa* principle, which means non-violence towards all living beings. Therefore, many believers practice vegetarianism or even veganism. Various cultures and periods saw many different types of plant-based diets. They are sometimes driven by beliefs, ethics, or health considerations (Clem, Barthel, 2021). Although new drivers of decisions to reduce animal product consumption are revealed from time to time, many of those discussed above remain relevant.

The sector of PBF as a substitute for animal products is certainly new and growing. Manufacturers invent new production methods, marketing strategies, substitute ideas, and packaging designs to outcompete each other. The sustainable development policy is also important to the plant-based diet trend. Consumers often indicate sustainability as a reason to reduce their animal product intake. The sales of PBF and plant-based substitutes of dairy products grew in Poland by 46.9% in the last three years alone. Increasingly more people buy PBF. The last five years saw a real revolution in this regard, according to GFK Institute data. In 2018, only 11.5% of households in Poland consumed PBF. In 2023, the number reached 31.7% (GFK 2023). Moreover, meat product sales declined by 7.5% in volume over the last three years, while plant substitutes grew by 30% for dairy products and over 60% for meat products. This means that not only did established PBF consumers buy more of these products, but new ones joined them while meat consumption declined. Furthermore, the plant-based meat substitute market in Poland was worth PLN 729 million [USD 188 million] in 2022, and GFI expects it to grow (GFI 2023).

The key to building effective marketing strategies for the sector is understanding the values and behaviour of PBF consumers. First, let us define plant-based food because the notion is very extensive. Therefore, for research purposes, we define PBF as substitutes for milk, cheese, meat, yoghurt, sweets, and eggs of plant origin. Examples of these products are shown in Table 2.

Table 2.
Plant-based food

Animal product	**Plant-based alternative**
cow's milk	oat milk, coconut milk, soy milk, almond milk, hazelnut milk
cheese	tofu, cheese substitutes from yeast flakes, nuts, cereals, and other plant- and mushroom-based products that imitate cheese consistency or flavour
butter	plant-oil-based butters, vegetable spreads, olive oil, coconut oil, tahini
eggs	mixes (such as vEGGs), aquafaba
meat	seitan, tofu, soy granules, tempeh, pre-mixed substitutes based on legumes, fungi, other vegetables, and cereals
sweets	sweets without milk powder, eggs, honey, or cream
yoghurt	coconut and soy yoghurt, plant- and seed-based mousse

Source: original research.

1.3. Development of hypotheses based on the theory of consumption values

The theoretical foundation for the empirical research is Jagdish N. Sheth, Bruce I. Newman, and Barbara L. Gross's theory of consumption values (Sheth, Newman, Gross, 1991). It identifies five primary values that affect the purchase intent. Identification of the values that drive consumers helps find the underlying motivation to purchase specific products and pinpoint customer preferences regarding the brand, the type of products they find interesting, and the impact of the manufacturer's climate policy on consumer decisions. The values are 1) functional value, 2) social value, 3) emotional value, 4) epistemic value, and 5) conditional value.

Functional value is mostly based on usability features such as quality, price, health properties, and the production process's environmental footprint. Functional value is one of the primary consumer drivers. The issues of quality, price, or environmental responsibility are very often discussed considering food purchase. Price determines the act of purchase and its volume. It also significantly impacts the buyer in the context of PBF. Plant-based alternatives are usually more expensive than traditional animal-based products. This is mainly because they target a relatively small market, which entails limited availability (Bryant, 2019). This leads to consumers looking for ways and stores where they can buy the same product cheaper or create their own substitutes for products of animal origin. On the other hand, the sector looks promising. As the public grows more interested in such products, their prices can be expected to drop in the coming years, leading to a new wave of consumers. Another component value of functionality is quality. Already in 1980, M.E. Porter considered it an important determinant of purchase. Quality components of food are nutritional value, certificates, health qualities, level of processing, taste, and texture. Plant-based food has much to offer regarding quality as a healthier alternative. Evidence from prospective cohort studies indicates that a high intake of mainly PBF, such as fruit and vegetables, nuts, and whole-grain products, is correlated with a lower risk of cardiovascular diseases. The protective effect of these foods can probably be linked to many advantageous nutrients, including mono- and polyunsaturated fatty acids, Omega-3 fatty acids, antioxidant vitamins, minerals, phytochemicals, fibre, and plant protein (Patel et al., 2017). In contrast, a ten-year study (2010–2020) demonstrated that consuming fatty meat increases the risk of cardiovascular diseases and neoplasms (González et al., 2020). Functional value covers environmental impact as well. According to a PayPal survey, 70% of Poles try to buy products that are environmentally friendly or come from environmentally friendly sources (SCF, 2022). But what does ‘environmentally friendly food’ mean? The characteristic primarily covers the production process's environmental footprint, distance and type of transport (often disregarded and yet of profound importance), and packaging. The good news regarding product packaging is the strong preference for green packaging among Polish consumers. According to half of the respondents in a survey by Farma Świętokrzyska, the need for reduced use of food packaging made of plastic film and other

environmentally hostile materials is an important transition in the food market (Farma Świętokrzyska, 2021). This survey is yet another proof of the importance of functionality when making PBF purchase decisions. Therefore, we pose the following research hypothesis:

H 3.1: The functional value of PBF significantly positively drives the intent to purchase these products.

Social value linked to PBF can be defined as the impact of the purchase on the response of the people around the consumer. Social value is consistent with the assumption of humans as social creatures, a belief dating back to Aristotle in Ancient Greece. Human beings are moulded by their surroundings, including cultural, familial, and demographic aspects, from birth. Throughout life, people learn many models through norms, upbringing, and surrounding culture while pursuing acceptance in line with Maslow's hierarchy of needs. One's food philosophy is often linked to being part of a social group following the same diet. The reason for this can be a similar worldview and sensitivity to the fate of lesser creatures. Social value also reflects how their friends and family perceive consumer decisions to purchase PBF. Researchers noted that negative reactions in the family make dietary changes much more difficult. In the context of relationships between plant-based diet consumers and omnivores, 'the dinner table can bring back warm and positive memories, but it can also foster division and become a battlefield of family dramas' (Simons et al., 2021). Studies on plant-based diets show that perceptions of meat eaters and non-meat eaters differ significantly. A vegetarian or vegan can be viewed as more virtuous but also less masculine. Moreover, studies on differences between sexes in the context of plant-based diets show that women demonstrate a higher level of empathy towards animals, consistent with the social role of caregivers assigned mainly to women. This may account for why men tend to be less willing to accept vegetarian/vegan diets or limit meat intake (Simons et al., 2021). Social value is strongly linked to the culture and traditions the consumer lives by. Western urban societies exhibit a positive trend towards larger volumes of purchased PBF. In contrast, in more traditionally minded environments, rural and small-town areas, PBF is less prevalent (Melo Pizzardo, 2020; Mocarska, 2021). Both social acceptance and availability of these products outside highly urbanised sites are lower. Therefore, we pose the following research hypothesis:

H 3.2: The social value of PBF significantly positively drives the intent to purchase these products.

Emotional value describes the impact of the purchase on the buyer's mood. It is particularly relevant in the case of PBF because the decision to follow a plant-based diet is often driven by moral considerations and feelings towards animals and the environment. A growing number of publications investigate the empathy of vegans and people reducing meat intake. They show that emotional value is highly relevant to the purchase of PBF. When asked about their reasons for following this philosophy, non-meat eaters often mention animal welfare, water savings, reduced GHG emissions, and health (Mocarska, 2021). Buyer satisfaction is another emotional aspect of purchasing PBF. When making a righteous decision, a person on a plant-based diet

feels better about themself and is free of the guilt some of them experience when eating animal products (Erlandsson, Jungstrand, Västfjäll, 2016). People following specific diets are not the only ones who experience feelings when buying PBF. When faced with the ethical aspects of meat production, even regular consumers voice concerns about the well-being of farm animals and criticise traditional meat production systems (Hartmann, Siegrist, 2020). Reactions of the group stem from care and empathy towards animals that are killed for their pleasure. A 2022 study by Ha-Won Jang and Meehee Cho confirms a relationship between the dual concern theory and intent to purchase plant-based alternatives, revealing that both the expected positive outcome and empathic concern drove the intent to buy plant-based substitutes. It confirmed that Korean consumers' empathy and emotions significantly affect the purchase of plant-based products (Jang, Cho, 2022). Although the study was conducted in a remote country, both Korean and Polish traditional cuisines abound in meat dishes. Therefore, the cultural dimension of food can be considered similar in both cases. Considering the above, we propose the following research hypothesis:

H 3.3: The emotional value of PBF significantly positively drives the intent to purchase these products.

Epistemic value concerns the urge to collect information and expand knowledge on a specific topic. It involves curiousness and interest in a specific problem. In the case of food products, it is embodied in checking the list of ingredients and researching the manufacturer. Consumers of PBF can be considered very thorough in this regard. The most restrictive sub-group are vegans (Mocarska, 2021). Still, they are not the only ones continuously expanding their knowledge about plant-based diets and their products. The general public also grows more interested in plant-based diets. According to Google Trends, such keywords as ‘plant-based’, ‘vegan’, or ‘plant-based protein’ are gaining in popularity all over the world. In Poland, it is reflected through an increase in searches for such keywords as ‘*weganizm*’ [veganism], ‘*wegetarianizm*’ [vegetarianism], or ‘*substytut mięsa*’ [meat substitute]. In addition to product insights, consumers often seek more details about the manufacturers. Beyond any doubt, providing positive information about one's product is a beneficial manufacturer tactic. Modern society strives for information, so by making accessible information about featured products, the manufacturer improves brand trust among prospective consumers. Hence, the popularity of such strategies as CSR and ESG has increased in recent years. Companies establish departments dedicated to building and implementing their internal sustainable development policies. It is not merely a marketing act but a value they want to stand for. Organisations with superior corporate social responsibility reputations usually have better key performance indicators than their competitors (Orlitzky, Schmidt, Rynes, 2003). These results may be due to increased consumer interest, driving demand. In light of these insights, we propose the following research hypothesis:

H 3.4: The epistemic value of PBF significantly positively drives the intent to purchase these products.

Conditional value is the perceived utility of a product acquired under specific conditions. Important variables of conditional value are time, different financial or market perspectives, or projection of a vision promoting a decision. This value encompasses such drivers as the time when the product is popular, the time when a specific diet makes sense in terms of health, and similar variable circumstances (Ramayah, Abidur Rahman, Ching Ling, 2018). It is often easier to identify the actual leading factor shaping consumption values in research. As regards plant-based diets, these factors often boil down to verification of the manufacturer and how they manage the business: its proposals, environmental and employee policies, product portfolio, and special offers. The conditional value of PBF often covers the price of substitutes and trust in the manufacturer's policy. A manufacturer who does not stop at offering PBF but makes an additional effort to continuously advocate similar values is perceived as more trustworthy. Vegans pose extraordinarily many conditions regarding product ingredients even though their choice is particularly limited by the dietary principles they follow. Sometimes, manufacturers dishonestly advertise their products as vegan even though they use honey, milk powder, or insect-derived colouring. And vice versa, although a product is vegan, they fail to label it as such, making it harder for vegans to identify and buy a suitable product. Manufacturers should pay particular attention to this value to properly respond to PBF consumers' needs. Based on the information above, we pose the following research hypothesis:

H 3.5: The conditional value of PBF significantly positively drives the intent to purchase these products.

Sociodemographic variables include numerous dimensions that can split a group regarding the intent or values. The most important aspects for PBF consumers are dominated by food philosophy, age, education, residence, and duration of the diet. Considering the above, we propose the following hypotheses:

H 4.1: Sociodemographic variables affect the purchase intent of PBF.

H 5.1: Sociodemographic variables affect the consumption values of PBF.

1.4. Research model

We developed the research models visualised in Figures 1 and 2 to answer the third, fourth and fifth research questions.

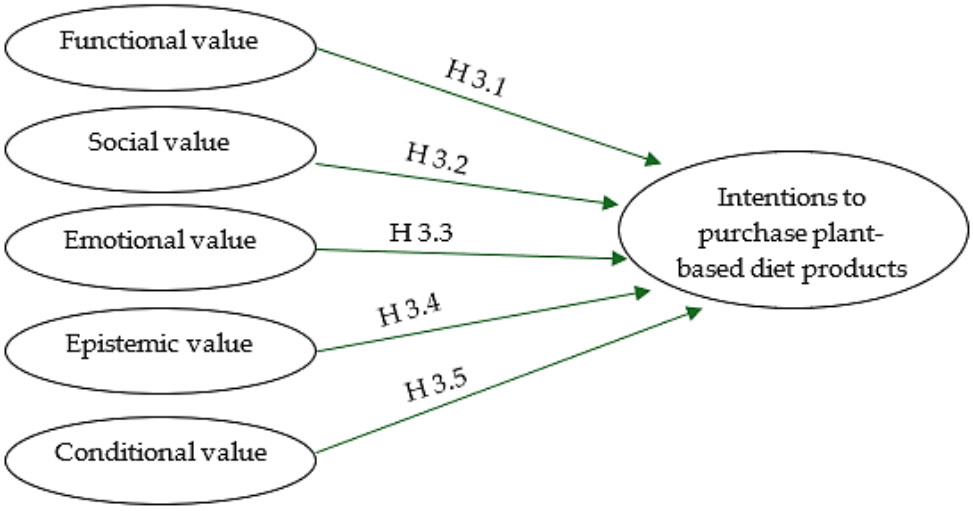

Figure 1. Research model addressing the third research question.

Source: original research.

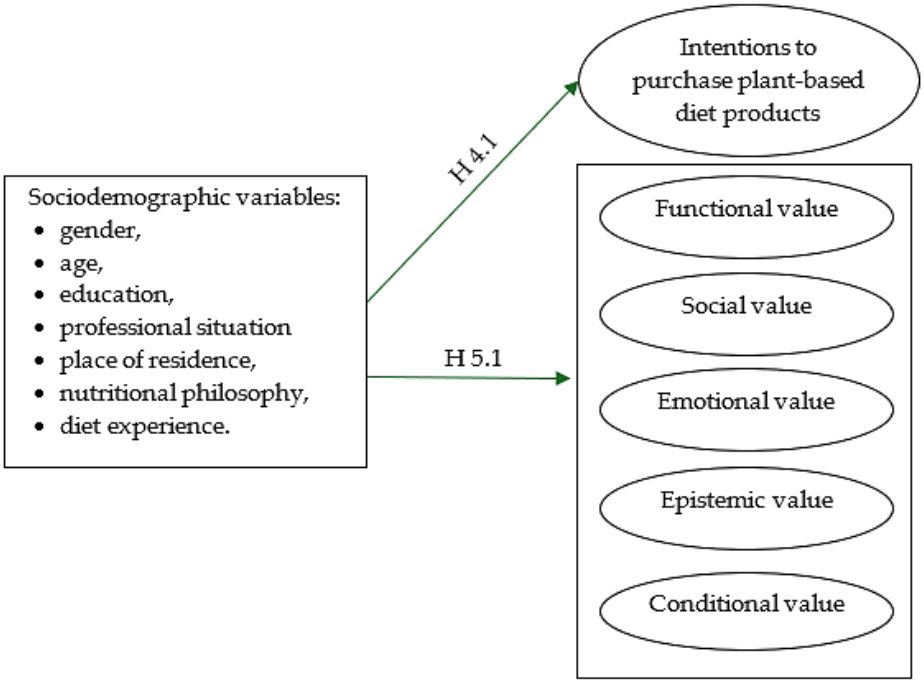

Figure 2. Research model addressing the fourth and fifth research questions.

Source: original research.

2. Materials and Methods

2.1. Data collection and data analysis

We followed the research procedure shown in Figure 3 to resolve the research problem. First, we reviewed the literature to build the research model and questionnaire we then

employed in the survey. The questionnaire contained 42 self-assessment questions: seven demographic questions and 35 questions concerning the variables. The survey was administered from December 2023 to January 2024 on 208 respondents.

The collected data were then analysed in R-Studio. The primary analytical method was structural equation modelling with PLS-SEM (Hair et al., 2019; Hair, 2014; Hair, Ringle, Sarstedt, 2011). The impact of the demographic data on the constructs and intent was investigated with the Kruskal-Wallis test. It extends the Mann-Whitney U test. It is a nonparametric equivalent of one-way ANOVA. It detects differences in distribution positions. It assumes no prior arrangement of k populations from which the samples were drawn. The Kruskal-Wallis test compares sums of ranks instead of means or variances. Therefore, the value of the median in all groups is relevant to reporting its results, not means.

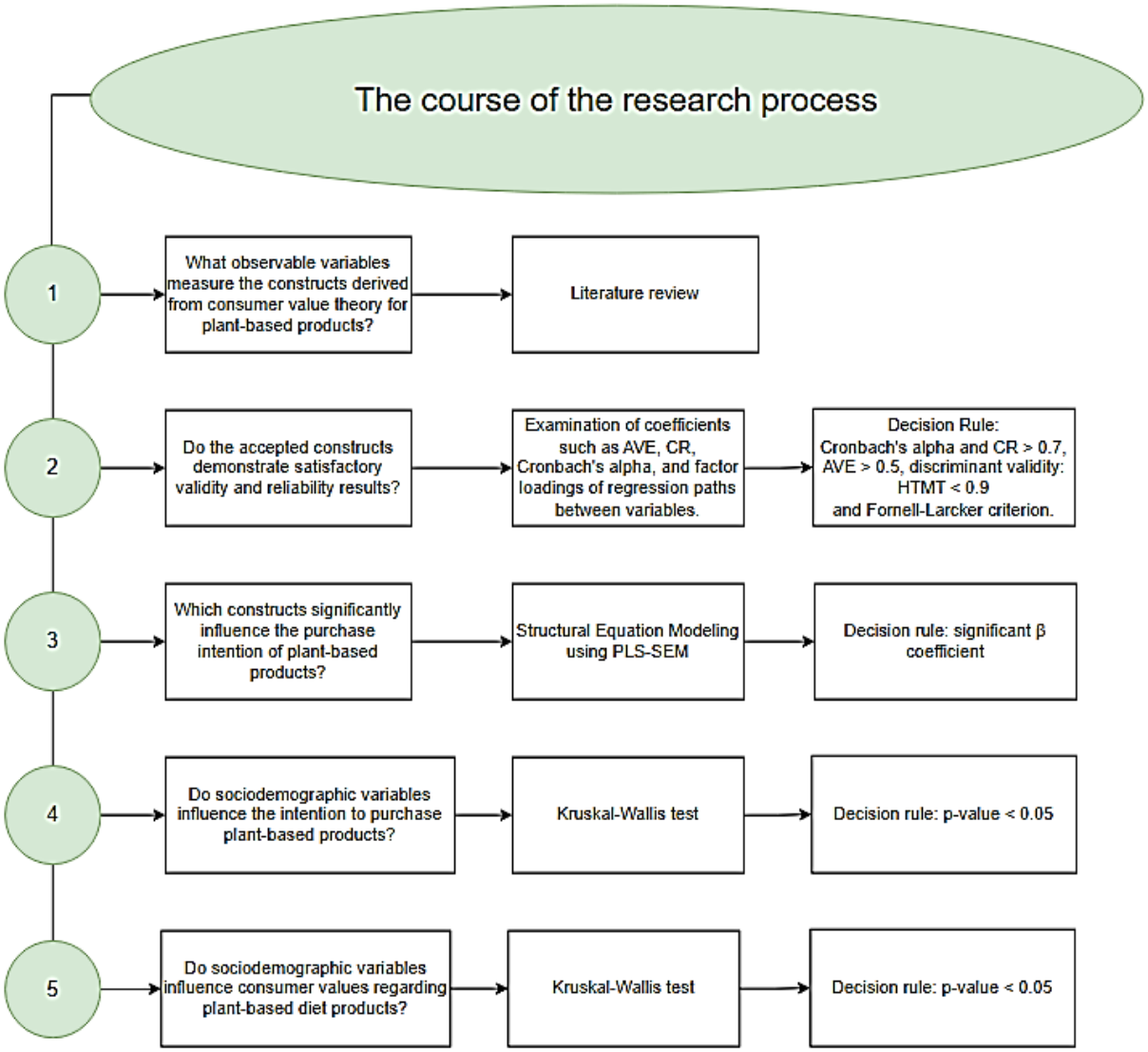

Figure 3. Research process diagram.

Source: original research.

2.2. Questionnaire structure

The measuring tool for the study is a questionnaire. The survey was anonymous to ensure complete confidentiality of the answers. All components measuring the investigated variables (Table 3) were assessed on a five-point Likert scale ranging from 'Completely disagree (1)' to 'Completely agree (5)'. Apart from the standard demographic questions, the profiling part asked about food philosophy and diet duration to further classify the consumers during the analytical step.

Table 3.
Questionnaire used in the research

Construct	Item	Statement
Functional value	F1	Plant-based food maintains high quality.
	F2	The production of plant-based food consumes less water than the production of meat products.
	F3	Plant-based food has better packaging than products of animal origin (less plastics, recyclable packaging).
	F4	Plant-based food is priced adequately.
	F5	Plant-based food entails a lower risk of cardiovascular diseases than meat-based products.
	F6	Plant-based food usually has a high Nutri-Score rating (A or B).
	F7	The production of plant-based food is more environmentally friendly than that of animal-based food.
Social value	S1	Buying plant-based food does not make me feel socially excluded.
	S2	Buying plant-based food improves my image.
	S3	Buying plant-based food impresses my friends and family.
	S4	The public approves buying plant-based food.
	S5	My social circle comprehends buying plant-based food.
	S6	Buying plant-based food makes me feel like part of a group that follows the same diet.
Emotional value	E1	Buying plant-based food makes me feel I am doing something good.
	E2	Buying plant-based food makes me feel I am doing what is morally right.
	E3	Buying plant-based food makes me feel a better person.
	E4	Buying plant-based food makes me feel I am saving animal lives.
	E5	Buying plant-based food makes me feel I am saving the planet.
	E6	I feel my decision to buy plant-based food matters for environmental protection.
Epistemic value	EP1	Before I buy plant-based food, I check the ingredients and nutritional value of the product.
	EP2	Before I buy plant-based food, I compare it to other similar products of the same kind.
	EP3	I am willing to acquire information about new plant-based food or its upgrades.
	EP4	I am willing to look for new information about plant-based food.
	EP5	Before I buy plant-based food, I research how it is produced.
	EP6	Before I buy plant-based food, I research how it is obtained.
Conditional value	C1	I would buy more plant-based food if the price were lower.
	C2	I would buy more plant-based food if it was discounted more often.
	C3	I would buy more plant-based food if I knew its manufacturers had mature climate policies.
	C4	I would buy more plant-based food if I knew it was produced in compliance with organic production principles.
	C5	I would buy more plant-based food if I were sure it was vegan. (Some manufacturers promote products with casein, Omega 3 acids, EPA, and DHA of animal origin as plant-based, for example).

	C6	I would buy more plant-based food if the manufacturers no longer marketed animal-based products.
Intent to purchase plant-based foods	I1	I buy more and more plant-based food.
	I2	I often consider buying more plant-based food.
	I3	I would like to try new plant-based food.
	I4	I regularly buy plant-based food.

Source: original research.

2.3. Research sample

The survey covered 208 respondents. They were conveniently sampled: we specifically asked people who bought plant-based food to participate and only their responses were analysed. They were filtered with screening questions about food philosophy. The data were collected on social media and Internet forums for the target groups. The sample profile is shown in Figure 4.

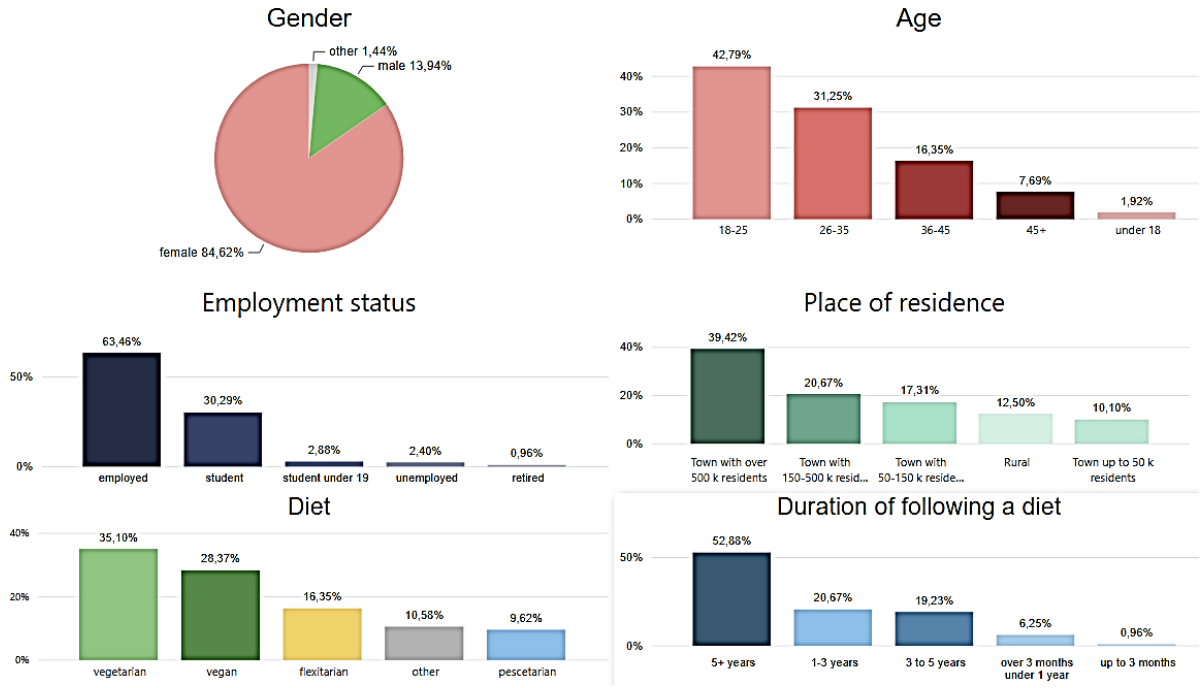

Figure 4. Profile of the sample.

Source: original research.

The sample is relatively young and dominated by women, mostly from cities and usually with a university degree. The largest group were vegetarian, and most respondents had followed the diet for over five years. Apparently, the profile of the sample indeed reflects the popular associations. The prevalent image of people who buy PBF brings to mind usually younger women from a city (Adamczyk et al., 2023). Our sample consists primarily of economically active people with easy access to PBF. As regards food philosophy, the most numerous group were vegetarians (who do not eat meat or any products manufactured through animal slaughter). The second-largest group were vegans (who do not eat any products that are entirely or partially of animal origin). The third group was flexitarians (who focus on plant-based food but occasionally include meat or other products of animal origin in their diet). The least numerous

group were pescatarians (who eat mainly PBF but also include seafood, fish, and products of animal origin in their menu). The question about food philosophy offered the option ‘other’. Those who chose it were asked to provide details of their diet. The most common answer among ‘other’ food philosophies was the omnivore diet. These people buy PBF most often out of curiosity or for the taste. Some respondents were vegetarians on their path to becoming vegans or limiting or excluding dairy products but still eating eggs or honey. Another group were people following the halal diet. Apart from pork, the halal diet excludes meat of such animals as dogs, wild boars, pests (such as rats), birds of prey with talons, carnivores with talons and fangs (such as lions), and slaughter animals not killed as per Islamic law. PBF is a safe and interesting alternative for people on this diet, so their presence in the sample is worth noting. The least numerously represented food philosophies include macrobiotic, whole-food diets, and people who used to belong to some of the groups above.

3. Results

3.1. Validation of the measurement model

Constructs: functional value, social value, and conditional value yielded unsatisfactory validity and reliability results. Therefore, we removed some observable variables from the constructs, namely functional value, conditional value, and epistemic value. The social value construct failed to meet the validity and reliability criteria even after removing some of its observable variables, so we excluded it from the model entirely. What is more, the factor loadings for variables of this construct were typically rather low. This means the observable variables were improperly selected and unable to measure the social value construct. The validity and reliability of the functional value construct were significantly hindered by variables related to the adequacy of PBF pricing, the Nutri-Score rating, and product packaging. Low factor loadings for these observable variables were probably caused by a relatively broad array of available PBF products. In the case of conditional values, the disturbing variables were those related to manufacturers who decided to introduce animal-based products to the market and manufacturers who falsely advertised their products as vegan or organic production methods. Low loadings for these questions are linked to the significant differentiation of the respondents regarding their diets and the time they would need to verify whether the food meets their conditions. Furthermore, time was also probably a factor reducing the results of some variables for epistemic value connected with an active search for information about the manufacturer's activities or product quality. Table 4 shows the model following revisions due to the issues discussed above.

Table 4.
Indicator reliability, convergent reliability, internal consistency

Construct	Indicator	Factor loading	AVE >0.5	CR >0.7	Cronbach's α >0.7
Purchase intent of PBF	I1	0.886	0.647	0.879	0.816
	I2	0.826			
	I3	0.723			
	I4	0.774			
Functional value	F1	0.710	0.561	0.836	0.746
	F2	0.722			
	F5	0.809			
	F7	0.749			
Emotional value	E1	0.894	0.764	0.951	0.938
	E2	0.893			
	E3	0.817			
	E4	0.887			
	E5	0.902			
	E6	0.850			
Epistemic value	EP1	0.651	0.633	0.870	0.813
	EP2	0.634			
	EP3	0.918			
	EP4	0.930			
Conditional value	C1	0.813	0.647	0.879	0.816
	C2	0.865			
	C3	0.730			

Source: original research.

We tested discriminant validity with two criteria: the Fornell-Larcker criterion (Table 5) and the HTMT criterion (Table 6).

Table 5.
Discriminant validity: the Fornell–Larcker criterion

	F	E	EP	C	I
F	**0.749**				
E	0.675	**0.874**			
EP	0.272	0.325	**0.796**		
C	0.238	0.317	0.218	**0.805**	
I	0.449	0.535	0.468	0.358	**0.804**

Source: original research.

The model satisfies the Fornell-Larcker criterion because the mean variance extracted for each construct is greater than the squared correlation between the construct and the other constructs in the model.

Table 6.
Discriminant validity: the Heterotrait-Monotrait Criterion

	F	E	EP	C
E	0.801			
EP	0.341	0.322		
C	0.292	0.359	0.257	
I	0.547	0.604	0.468	0.457

Source: original research.

HTMT is the ratio of average heterotrait-heteromethod correlations to the average monotrait-heteromethod correlations. The heterotrait-heteromethod correlations are correlations between different constructs, and monotrait-heteromethod correlations are correlations between indicators within the same construct. The HTMT value for all the investigated constructs was < 0.90. Therefore, the discriminant validity can be considered acceptable.

3.2. Identification of consumption values driving purchase intent of PBF

Having validated the measurement scales (analysed the measurement model), we proceeded to analyse the structural model. We determined the significance of paths between the constructs using bootstrap with 1000 samples. This way, we tested the significance of each construct by calculating the t-statistic and confidence intervals. The results are shown in Figure 5 and Table 7. R2 for the purchase intent of PBF was 0.417, so the model explains 41.7% of the purchase intent of PBF variance variability. Figure 5 also includes results for β path coefficients. They help assess the strength and direction of relationships between independent variables (predictors) and the dependent variable. The highest β coefficient was identified for the epistemic value and emotional value constructs, while the lowest was found for the functional value construct. The four investigated predictors were significant, although the result for functional value was controversial because its t-statistic did not exceed 1.96. Therefore, we have confirmed three hypotheses, H 3.3, H 3.4, and H 3.5, and consider H 3.1 questionable. Hypothesis H 3.2 was not verified because of the poor results of validity and reliability revealed during measurement model verification.

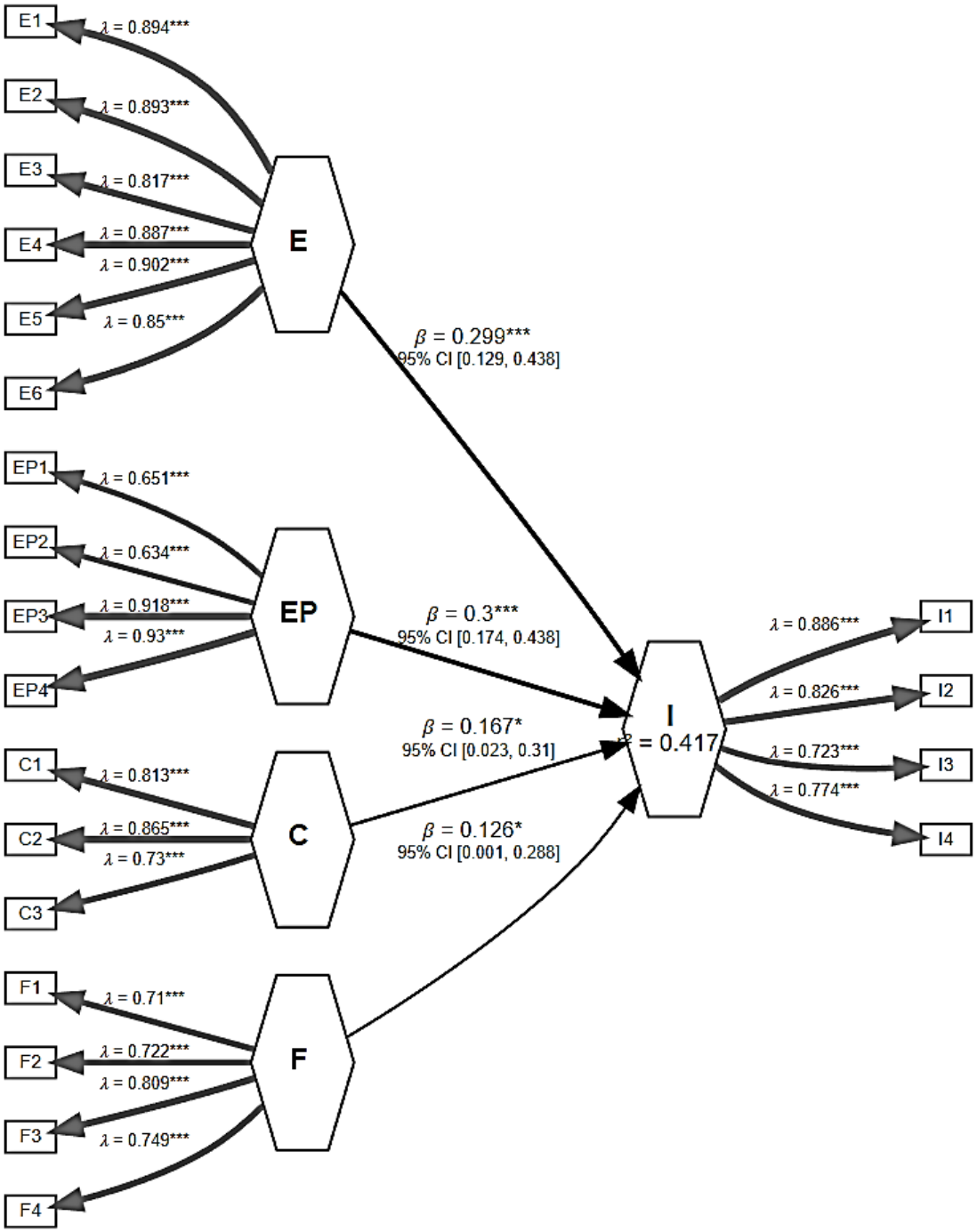

Figure 5. The influence of constructs on intent to use and actual behavior.

Source: original research.

Table 6.
Structural model assessment

	Original. Est.	Bootstrap Mean	Bootstrap SD	t Stat	2.5% CI	97.5% CI	Supported
H 3.1: F→I	0.126	0.143	0.074	1.696	0.001	0.288	Yes/No
H 3.3: E→I	0.299	0.282	0.077	3.865	0.129	0.438	Yes
H 3. 4: EP→I	0.300	0.304	0.067	4.456	0.174	0.438	Yes
H 3.5: C→I	0.167	0.170	0.074	2.264	0.023	0.310	Yes

Source: original research.

3.3. Analysis of the impact of categorical variables on the constructs

We investigated the impact of selected sociodemographic variables on the constructs with the Kruskal-Wallis test (Table 8). The test results show that hypothesis H 4.1 has been confirmed only partially. Food philosophy significantly affects the purchase intent of PBF. The test also partially confirmed hypothesis H 5.1. We have confirmed the impact of food philosophy regarding functional and emotional values. We have also confirmed that age influences emotional value. The other sociodemographic variables did not significantly impact the investigated constructs and purchase intent of PBF, or we refrained from investigating them because of group sizes that were too small.

Table 8.
Results of the Kruskal-Wallis test

Categorical variable	Construct	Chi^2	P-value
Food philosophy	I	26.088	< 0.001
	F	28.266	< 0.001
	E	20.252	< 0.001
Age	E	10.763	< 0.001

Source: original research.

We identified significantly different pairs in the Kruskal-Wallis test with post hoc Conover's test. It revealed that for the purchase intent of PBF, there are significant differences between pairs of the following groups: a) flexitarians and pescatarians, b) others and pescatarians, c) vegans and flexitarians, d) vegans and others, e) vegetarians and others, and f) vegetarians and flexitarians. The test results are shown in the Appendix (Table A1). Differences regarding the purchase intent of PBF between most of the pairs may stem from different degrees of investment into plant-based diets exhibited by the groups. Philosophies 'other' and 'flexitarian' are the most common ones, which may be due to their more relaxed attitudes towards restricting intake of products of animal origin. Conover's test for functional value (Appendix, Table A2) identified the following significantly different pairs: a) flexitarians and pescatarians, b) others and vegans, c) flexitarians and vegans, d) vegetarians and vegans, and e) vegetarians and flexitarians. Apparently, there are considerable differences between almost all pairs of food philosophies regarding functional value. This may be due to the diverse practical implementations of each group's philosophy. Conover's test for emotional value (Appendix, Table A3) identified significant differences between a) vegans and flexitarians, b) vegans and others, c) vegans and pescatarians, and d) vegans and vegetarians. Vegans are a remarkable group in this case, appearing in each pair. This is probably due to their profoundly emotional attitude towards their food philosophy. It is the most restrictive group, so their choices need to be firmly grounded in a value to allow them to stand by their beliefs. Clearly, it was emotional value for them. We presented the distribution of answers for the values vs food philosophy on a box plot (Figure 6). It clearly demonstrates that the 'other' philosophy group gave particularly diversified answers to the statements. Another interesting conclusion is that vegans, the most radical group, were also the most unanimous concerning nearly all values.

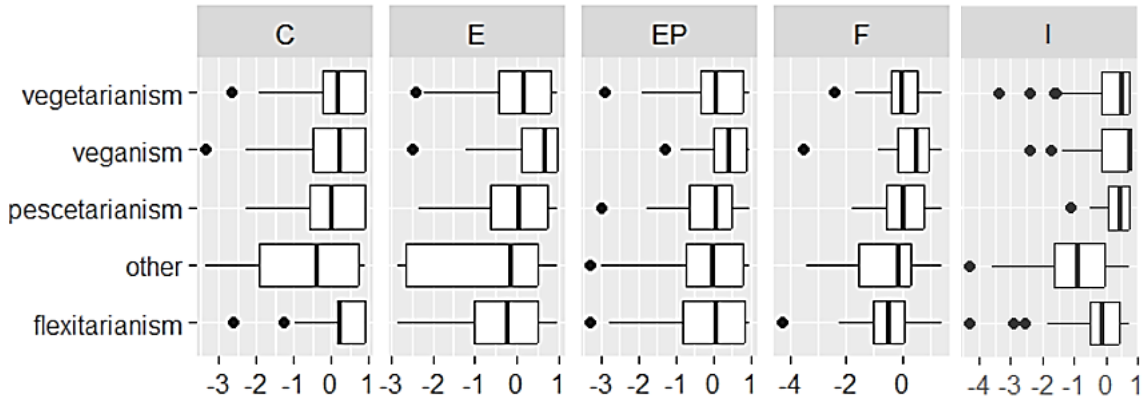

Figure 6. Impact of food philosophy on consumption values and purchase intent.

Source: original research.

In addition to the sociodemographic variable of food philosophy, Conover's tests also revealed significant differences in emotional value between age groups (Appendix, Table A4). These pairs include a) people aged 36 to 45 (Generation Y) and people aged 18 to 25 (Generation Z), b) people aged 36 to 45 and people aged over 45 (combined Generation X and Baby Boomers). This means that the emotional attitude of Generation Y is significantly different. The association is visualised in Figure 7.

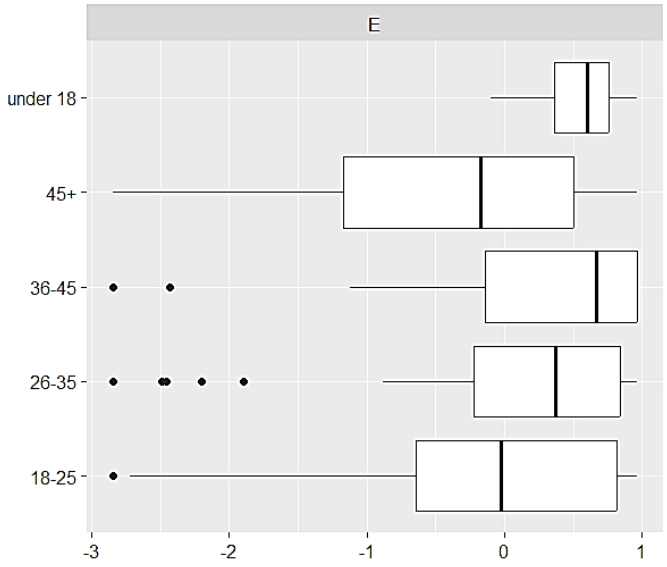

Figure 7. Impact of age on emotional value.

Source: original research.

4. Discussion

The results support conclusions regarding drivers of purchase intent of PBF in Poland. Four out of five scales measuring consumption values for PBF are valid and reliable. Social value was the only one for which we could not find appropriate statements for the

questionnaire to use as observable variables measuring this value. The observable variables with acceptable validity and reliability metrics for functional values were connected with the high quality of such products, better impact on the cardiovascular system, and environmental functionality of PBF, i.e. lower consumption of water and greater environment-friendliness. In contrast, emotional value was measured validly and reliably by all the observable variables we proposed. They concerned feelings related to saving Earth's environment, particularly animals, and a belief that one is doing what is morally right. Epistemic value was measured with variables concerning the willingness to check product ingredients, compare it with others, and search for information about PBF. Our results are consistent with (Schiano et al., 2020) regarding the three consumption values. Conditional value was measured mainly with pricing conditions and trust in the actual climate policy of the manufacturer.

Our research into the influence of individual consumption values on the purchase intent of PBF demonstrated that the greatest impact is exerted by epistemic value and emotional value. It means that Polish consumers exhibit significant curiosity and emotional attitudes towards PBF. We believe it to be cause by reports on animal welfare and climate crisis in the media. In this regard, our results are consistent with outcomes in (Schiano et al., 2020) but differ from those in (Adamczyk et al., 2022). Another important group of drivers of PBF purchase was conditional value. Our results confirm Polish consumers' sensitivity to the price of PBF. Functional value was the least relevant to the purchase intent of PBF. This is a surprising result because functional value usually affects purchase intent the most. It is probably because traditional food, especially dairy products, is considered healthy in Poland (cf. Adamczyk et al., 2022). It may be a significant barrier to PBF. Possibly, PBF will become more popular as the Polish population ages. We believe functional value of the products will grow more important.

Our investigation into the impact of sociodemographic variables on individual consumption values and purchase intent of PBF revealed that the most influential variable is food philosophy. The group the least willing to buy PBF were those defining themselves as ‘other’: the least attached to plant-based diets. The most significant differences in terms of functional value were found for vegans and then vegetarians. This means that these groups are the most discerning regarding functional value. Vegans were also the most outstanding in terms of emotional value, meaning they are the most sensitive to emotional values. Emotional value depended on age, and the most emotionally sensitive age group were Generation Y.

5. Conclusions

Practical implications

Our study of the impact of consumption values of plant-based food on the purchase intent of the food is dedicated to businesses manufacturing and selling plant-based products. By presenting the impact of individual consumption values on purchase intent, we offer empirical proof of how to shape marketing campaigns for such products in countries like Poland. Considering the current awareness of these societies, we recommend focusing on epistemic and emotional values and stimulating the market with conditional value focused on pricing. Communication targeting vegans and vegetarians should prioritise emotional and functional value.

Research limitations

The sample was relatively small with 208 respondents. As a result, the group is only slightly varied in terms of age and demographics. The present results could be corroborated by a repeated survey on a larger and more diversified sample. Another apparent limitation is the 'other' food philosophy option, which encompassed too extensive a spectrum of category variants, hindering conclusions. Future research should include more choices of food philosophies in the questionnaire.

Further research

Future analyses could investigate moderation, which is the impact of individual moderating variables, sociodemographic variables in this case, on the strength and direction of associations between two other variables, such as functional value and purchase intent. We could also build separate models for individual food philosophies and compare them. Another expansion of the study would be to invite respondents from various countries to investigate cultural differences.

Appendix

Table A1.
Results of Conover's test for purchase intent of plant-based food depending on food philosophy

Food philosophy	flexitarianism	other	pescatarianism	veganism
other	1.734 0.042			
pescatarianism	-2.186 0.015	-3.53 <0.001		
veganism	-3.087 0.001	-4.560 <0.001	-0.188 0.426	
vegetarianism	-2.714 0.004	-4.267 <0.001	0.208 0.418	0.578 0.282

Source: original research.

Table A2.
Results of Conover's test for functional value of plant-based food depending on food philosophy

Food philosophy	flexitarianism	other	pescatarianism	veganism
other	-0.435 0.332			
pescatarianism	-2.195 0.015*	-1.617 0.054		
veganism	-5.111 <0.001	-3.929 <0.001	-1.862 0.032	
vegetarianism	-2.821 0.003	-1.919 0.028	0.130 0.448	2.940 0.002

Source: original research.

Table A3.
Results of Conover's test for emotional value of plant-based food depending on food philosophy

Food philosophy	flexitarianism	other	pescatarianism	veganism
other	0.273 0.393			
pescatarianism	-0.988 0.016	-1.143 0.127		
veganism	-3.892 <0.001	-3.654 <0.001	-2.163 0.016	
vegetarianism	-1.943 0.003	-1.966 0.025	-0.495 0.311	2.483 0.007

Source: original research.

Table A4.
Results of Conover's test for emotional value of plant-based food depending on age

Age	18-25	26-35	36-45	45+
26-35	-1.564 0.060			
36-45	-2.570 0.005	-1.242 0.108		
45+	0.992 0.161	1.880 0.031	-2.598 0.005	
<18	-1.269 0.103	-0.764 0.022	-0.247 0.403	-1.643 0.051

Source: original research.

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