

PROSPECTS FOR SUSTAINABLE FUTURE: MAPPING SUSTAINABLE BEHAVIORS ACCORDING TO THEIR PERCEPTIONS

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Abstract

One of the most important challenges faced by the contemporary societies is mainstreaming sustainable behaviors (SBs), i.e. introducing sustainable consumption rules into everyday consumers' life. It is claimed to be the core prerequisite of implementing green economy proclaimed by such an international body like World Bank and United Nations already around 2012. Unfortunately, one cannot expect that the change of consumers' habits from unsustainable to sustainable ones is an immediate and easygoing process. On the contrary, it may probably take a long time and face many obstacles. We believe that analysis of data collected in countries like Poland (which has not yet achieved the high level of living standard characteristic of Western Europe, although for the past several decades has been heavily striving to catch up with them) let to reveal the whole picture of the complex nature of sustainable behaviors. Consequently, investigating prospects for developing sustainable consumption in such societies may considerably expand our knowledge of this process and thus speed the changes up. Furthermore, the most of objective factors that hinder or enforce the process of SBs adaptation has been already addressed in the literature. However, psychological determinants the primary of which is peoples' perception of sustainable behaviors in terms of their difficulty and effectiveness is still poorly recognized and thus more challenging to investigate. In consequence the aim of this paper is twofold. Firstly, we want to identify how consumers perceive the wide range of SBs. Secondly, we strive to determine the differences in the perception of particular behaviors. To achieve assumed goals, we utilized a model of sustainable behaviors that marks out a whole set of SBs being observed in Polish conditions. To map sustainable behaviors and thus to create their perception matrix we used two psychological variables namely perceived consumer effectiveness (PCE) and perceived difficulty (PD). Our data was drawn from a nation-wide online survey which was conducted in 2016 on a sample of 1112 adult Poles.

Keywords: sustainable consumption, consumer behavior, perceived consumer effectiveness, perceived difficulty, perception matrix

Introduction

A conviction that individuals can contribute significantly to achieving long-term sustainability goals by adopting sustainable behavior patterns constitute one of the main assumptions of sustainable consumption (SC). Thus, it should not be surprising that researchers seek to explain which behaviors can be identified as sustainable ones, how often do consumers undertake them in their everyday life as well as to uncover what makes consumers to behave in sustainable way and what stops them from behaving such. In the field of consumer behavior, it led to numerous attempts of both describing patterns of SBs and indicating factors that underlie them. To answer the mentioned questions different authors were employing different conceptual approaches and most empirical investigations was focused only on chosen types of sustainable behaviors. So far only a few researchers like McDonald and Oates (2006) or Papaoikonomou (2013) have considered a broader range of SBs and noticed the necessity of undertaking such conceptual solution. Their holistic approach is thus charting a new direction of scientific search which we decided to apply also in our investigations. In terms of researching motivational factors underlying environmental behaviors Steg and Vlek (2009, p. 311) identified three research paths namely perceived costs and benefits, moral and normative concerns, and affective premises. In the course of further deliberations, they also evidenced the significance of contextual factors like the availability of recycling facilities, the quality of public transportation or the market supply of goods. Following this line of thinking, Onel and Mukherjee (2015) indicated the theories reflecting every approach mentioned above. So, the good example of cost/benefit approach is Ajzen's theory of planned behavior (TPB) (Ajzen, 1985; Ajzen, 2011; de Leeuw et al., 2015). It is widely employed by scholars who assume reasonable, purposive nature of pro-environmental (Moser, 2015; Johnstone and Tan, 2015) and ethical (Shaw and Shiu, 2002; Chatzidakis et al., 2007; Chatzidakis et al., 2016) behaviors. Moral and normative approach is reflected e.g. by value-belief-norm (VBN) theory of environmentalism (Stern et al., 1999; Stern 1999). In turn, the thought representing affective and symbolic background of sustainable behaviors focuses on consumers' emotions (Gregory-Smith et al., 2013; Antonetti and Maklan, 2015) and draws from achievements of neuroscience (Menzel, 2013). There are also numerous efforts that simultaneously incorporate motivational factors of various nature and aim at explaining SBs in a more complex way (Grob, 1995; Onel and Mukherjee, 2015). In fact, along with the development of research investigations, finding an exhaustive and unequivocal explanation of sustainable behavior mechanism has become even harder since empirical studies revealed the discrepancy between consumers' positive attitudes toward sustainability and their further, unsustainable behaviors. This phenomenon, called by Boulstridge and Carrigan (2000) "attitude-behavior gap", shed a new light on the problem of sustainable behavior prerequisites.

As our scientific interest focuses on Polish consumers' SBs, it was not possible to refer to or directly utilize any existing inquiries because of two reasons. On the one hand, studies on sustainable consumption among Poles are not developed enough to allow for drawing any general conclusions, to become a benchmark or to suggest directions for further research. On the other hand, neither Polish economy nor Polish society have reached the development level of Western countries. As a result, economic conditions, Polish consumers' behaviors and habits, and particularly their attitudes and beliefs are incomparable to those of Western consumers. Hence, it would not be justifiable to directly adopt foreign research results as a reference point, especially the studies conducted in much richer countries. These are the reasons why to assess the popularity of sustainable behaviors among Poles and to recognize the way they perceive such behaviors, we decided to adopt the holistic approach as reported at the beginning of this section and to utilize SBs

model which we created accordingly. In this paper we focus on two variables recognized as prerequisites of consumers' sustainable actions, i.e. perceived consumer effectiveness (PCE) and perceived difficulty (PD) of SBs. Since both were included in the research conducted under the TPB assumptions, they represent the aforementioned cost/benefit approach.

Theoretical background

Sustainable consumption and sustainable behaviors

Sustainable consumption (SC) concept emerged at the United Nations Conference on Environment and Development (widely known as Rio Summit or Earth Summit) organized in Rio de Janeiro in 1992. It was a direct consequence of decoupling consumption and production issues within discussions on sustainable development (Schrader and Thøgersen, 2011, pp. 3-8; Sedlacko et al., 2012, pp. 20–42). Crucial recommendations concerning SC were depicted in one of the final conference documents called Agenda 21. Entirely devoted to consumption issues, fourth chapter of this document encompassed the statement that “special attention should be paid to the demand for natural resources generated by unsustainable consumption and to the efficient use of those resources consistent with the goal of minimizing depletion and reducing pollution. [...] Action is needed to meet the following broad objectives:

- a. To promote patterns of consumption and production that reduce environmental stress and will meet the basic needs of humanity;
- b. To develop a better understanding of the role of consumption and how to bring about more sustainable consumption patterns” (Agenda 21, 1992, pp. 18-19).

Although the significance of implementing sustainability into consumption sphere was clearly shown in the discussions, participants of Rio Summit did not provide any exact definition of sustainable consumption. It was conceptualized a bit later, during two UN gatherings in Oslo respectively in 1994 and 1995. At the first of them, called Oslo Symposium on Sustainable Consumption it was agreed that sustainable consumption should be defined as “the use of services and related products, which respond to basic needs and bring a better quality of life while minimizing the use of natural resources and toxic materials as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations” (Norwegian Ministry of the Environment, 1994). During the second meeting called The Oslo Ministerial Roundtable on Sustainable Production and Consumption (also known as The Nordic Roundtable) this initial working definition was supplemented by a statement that “sustainable consumption is an umbrella term that brings together a number of key issues, such as meeting needs, enhancing the quality of life, improving resource efficiency, increasing the use of renewable energy sources, minimizing waste, taking a life cycle perspective and taking into account the equity dimension” (Oslo Roundtable on Sustainable Production and Consumption, 1995).

This so-called Oslo definition has immediately gained a huge popularity among both policy settlers and scholars. Somewhat in the shade of it the alternative approach toward SC was developed by Opschoor. At the beginning of 1990s, while striving for estimating the maximum threshold value of resources exploitation that would guarantee their long-lasting accessibility, he introduced the notion of environmental space (ES) (Opschoor and Reijnders, 1991, pp. 8-27). Subsequently ES concept has been elaborated by Spangenberg (2002, p. 297) who acknowledged that environmental space mirrors a certain range of consumption possibilities which are restricted by environment capacity to recreate natural resources from the top (so called “ceiling”), and by the minimum

resource accessibility that permits leading a dignified life in a given society from the bottom (so called “floor”). Accordingly, SC includes all the free choices being made within available environmental space i.e. in between the borders of social and environmental sustainability (Spangenberg, 2014, s. 63). In consequence the lack of sustainability in consumption can be noticed not only in well developed countries in which the phenomenon of hyperconsumption aroused already in 60. XX century. Also developing countries struggle with unsustainability. In their case it occurs in a form of underconsumption which according to Sethia and Srinivas may currently concern even 2/3 of the world population (Sheth et al., 2011, p. 25). In this paper we adopt Spangenberg’s way of defining SC and assume that in consumption sphere sustainability is not restricted to a single life style. Quite the reverse, SC includes different kinds of consumers’ lifestyles within the limits of environmental space and manifests itself by different behaviors which can be define as sustainable ones.

Along with the evolution of SC two different approaches regarding the proper way of achieving it have been developed. They are described as weak and strong SC. Supporters of the first approach posit that to achieve the aims of sustainable consumption, we need only to improve the economic processes efficacy. This condition should be fulfilled by searching for technological innovations and launching them as quickly as possible to make them available for consumers (Lorek and Fuchs, 2013, p. 37). From this perspective supply is the main source of incentives leading to more sustainable consumption and there is no room for consumers’ own effort to consciously change and in particular decline their own consumption for the sake of gaining sustainability (Laperche et al., 2012, p. 75). This approach is in fact neglecting the problem of hyperconsumption, and as such is not sufficient to achieve and maintain SC, especially in well developed countries (Fuchs and Lorek, 2005, p. 261; Cohen, 2011, p. 177). By contrast, authors who support the strong approach state against introducing changes in consumption patterns without reducing the quantity of resources in use, i.e. introducing solely qualitative changes not accompanied by appropriate quantitative ones. Fully agreeing with this point of view we need to highlight that the most evident arguments against weak SC are commonly noticed rebound effects. These effects manifest by the situation in which gains derived from the increased production and products efficiency lead to the increased scale of their use which in turn naturally brings the decline of these gains, neutralizes them or even (in the most extreme cases) creates costs that exceed the initial gains (Di Giulio et al., 2014, p. 57; O’Rourke and Lollo, 2015, p. 241). Additionally, rebound effects may be observed directly, e.g. when a hybrid car owner uses it more frequently than they would use the regular car, or indirectly, when the same consumer decides to spend the extra money saved on gasoline to fly more frequently. In each case, despite using innovative technology (hybrid car), the general pollution will probably stay the same or even increase. First because of more intense usage, second because airplanes pollute the environment more than cars.

Using this background, we perceive sustainable consumption as a broad concept that may manifest in consumers’ behavior through many different actions and activities. Antonides and van Raaij (2003, s. 24) define consumer behavior as a set of physical and mental actions of individuals and small groups (together with their motivations) which include considering, buying, using, maintaining and disposing of the product (consumption cycle) and household production (do-it-yourself), (rare) goods and services from the market, public and household sectors, enabling consumer to function and to achieve his/her goals, and thereby to attain satisfaction and prosperity, while taking into account the short-term and long-term effects as well as the individual and social consequences. Accordingly, the specific nature of sustainable consumer behavior is reflected in the

fact that the consequences of listed actions, evaluated on each stage of the consumption and household production cycle, favor sustainability in its all dimensions (environmental, social and economic one).

PCE and PD as perceptual incentives of sustainable behaviors

Following the idea of creating the sustainable behavior perception matrix initially put forward by Peattie (1999) and then expanded and improved by McDonald and Oates (2006), as matrix dimensions we decided to utilize perceived consumer effectiveness and perceived difficulty of SBs. First variable – perceived consumer effectiveness, was introduced by Kinnear et al. in the context of ecologically concerned consumers. They provided a definition in which PCE is described as “a measure of the extent to which a respondent believes that an individual consumer can be effective in pollution abatement” (Kinnear et al., 1974, p. 21). Further research in this field resulted in more general definitions applicable not only in case of pro-environmental behaviors but also in investigating premises of other sustainable behaviors. Accordingly, Ellen et al. stated that in broad terms PCE should be understood as “domain-specific belief that the efforts of an individual can make a difference in the solution to a problem” (Ellen et al., 1991, p. 103). The importance of perceived consumer effectiveness in influencing SBs has been empirically proofed and a significant body of research has concluded that PCE has had a potential to shape sustainable behaviors in both direct and indirect way (e.g. Roberts, 1996; Straughan and Roberts, 1999; Lee and Holden, 1999; Pandey and Sunaina, 2012; Jang et al., 2015, Heo and Muralidharan, 2017). Inspired by these insights we had reasons to assume that PCE level plays an important role also in case of Polish consumers. Second variable – perceived difficulty of sustainable behavior, did not get such a big research interest as the first one. Identified at the beginning of 1990s, PD concept was initially occurring mainly in psychological deliberations and, as a such, was combined rather with the overall mechanism of human behavior than their specific cases like sustainable behaviors. When analyzing Ajzen’s concept Trafimow et al. (2002) concluded that the variable known in TPB as perceived behavioral control (PBC) consisted in fact of two components one of which was named perceived difficulty. They defined PD as the extent to which individual perceives the difficulty of performing the behavior. Moreover, Ajzen himself put forward a similar assumption when he was describing the multidimensionality of PBC. Concerning the difficulty issue, he only used different name, i.e. self-efficacy (Ajzen, 2002, p. 676). Utilizing supplemented TPB to describe determinants of ethical consumer behaviors Chatzidakis et al. (2016) revealed that perceived difficulty (treated by them not as a component of PBC but as an independent variable) is a significant factor which allows to predict an intention. They concluded that the more difficult is given behavior the weaker is individual's intention to behave in this way. Their findings ascertained us that including PD in sustainable behavior perception matrix seems to be good conceptual solution also in case of Polish consumers.

Methodology

Sample characteristics and research assumptions

This paper shows selected outcomes of a broader research project on sustainable consumption and consumers’ knowledge. The research was conducted among Polish consumers during first two quarters of 2016. The data were collected using online survey. Although purposive sampling technique was applied at the first stage of the research (a link to the survey platform was sent by email to generate a snowball effect), the final set of responses was drawn at random from completed questionnaires (1472) to obtain a sample structure similar to the structure of the Polish Internet

users' population in terms of consumers' age and education level. Thus, we may treat the final sample of 1112 consumers as being obtained through the quota sampling procedure. Table 1 summarizes respondents' demographic profile.

Table 1. Demographic profile of the respondents

Demographic features	Number (N)	Percent (%)
<i>Gender</i>		
Male	555	49.9
Female	557	50.1
<i>Age</i>		
from 18 to 29 years	407	36.6
from 30 to 39 years	327	29.4
from 40 to 49 years	201	18.1
50 years and older	177	15.9
<i>Education level</i>		
Elementary or vocational	189	17
Secondary or post-secondary	489	44
University education (bachelor degree, master degree and higher)	434	39
<i>Type of education</i>		
Economic	263	24
Other	835	76
<i>Financial status</i>		
Very bad and bad	82	7.5
Average	457	41.8
Good	496	45.4
Very good	58	5.3
<i>Household monthly income (in zloty)</i>		
Below 1.500	54	5.5
1.500 to 4.000	400	41
4.001 to 7.000	332	34.1
7.001 to 10.000	118	12.1
Over 10.000	71	7.3
<i>Number of people in the household</i>		
1 person	80	7.4
2 persons	229	21.3
3 persons	266	25.1
4 persons	270	25.1
5 or more persons	231	21.5

Source: Own calculations.

Considering our research problem and the goals of this paper we introduced the assumption that:

The individual perception of an impact that selected sustainable behaviors may have over the natural and social environment, i.e. perceived consumer effectiveness, and the individual perception of an effort which is needed to undertake selected SBs, i.e. perceived difficulty, may serve as criteria for classifying sustainable behaviors and creating sustainable behavior perception matrix.

Conceptual and empirical issues in modeling sustainable behaviors

Following the assumptions of strong sustainability, to measure the frequency of sustainable behaviors as well as to evaluate the level of their PCE and PD, we needed to introduce such a theoretical model which would properly reflect SBs diversity. Thus, we decided to utilize a

classification proposed by Rudnicki (2012, s. 11) differentiating consumer behaviors according to the place where they are realized. Accordingly, our initial, conceptual model of SBs encompasses behaviors divided into two groups – these which occur in the phase of acquiring products and services (market behaviors) and these connected with the phase of using and disposing of the products (household behaviors). Figure 1 reflects the further details of theoretical model.

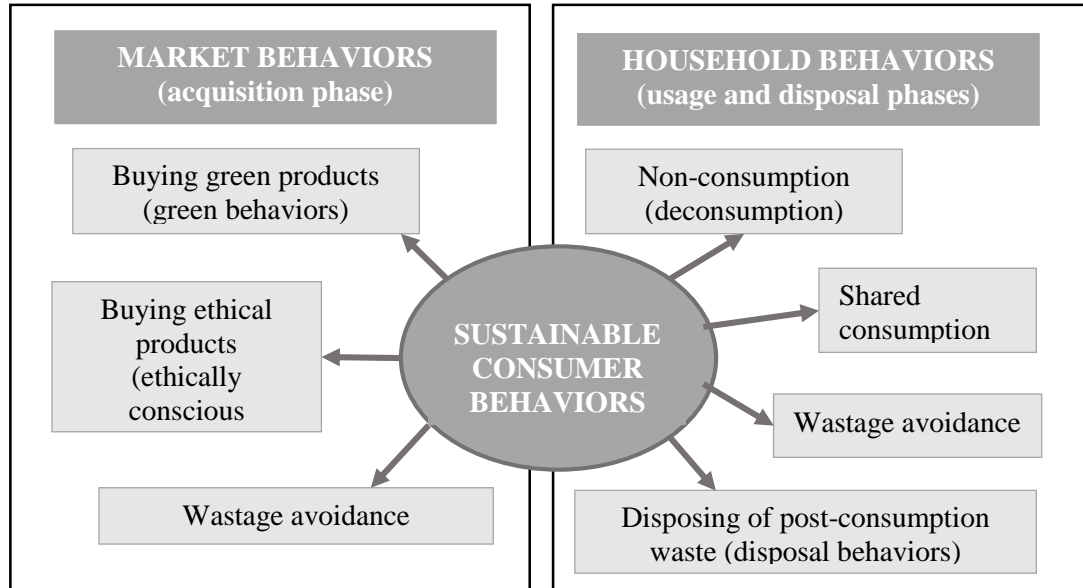


Figure 1. Theoretical model of sustainable consumer behaviors
Source: Own elaboration.

In the next step we operationalized the model by assigning certain behavioral representatives to each area indicated in it. Our set up of detailed sustainable behaviors was inspired by the one utilized by McDonald and Oates (2006) in their research concerning British consumers. In case of our study, the list of behaviors was pre-tested during qualitative research phase¹ and revised in the course of subsequent discussions between the authors. The great deal of attention must have been also paid to choosing criteria that have let to classify a behavior as a sustainable one. Instead of following Stern's suggestion on applying intent-oriented approach (2000, p. 408), we opted for adopting impact-oriented one. It means that not including consumers motivation we have focused on the results of particular behaviors by judging their consistency with SC goals. This approach caused that the set of sustainable behaviors analyzed in our study was not only broad and diversified but also encompassed activities that consumers may undertake possibly even without (conscious) intention to empower sustainability.

In consequence, the final list containing chosen SBs consisted of 22 statements. As they were first evaluated by respondents in terms of frequency with which they undertake given behavior we were able to transform theoretical model into empirical one, i.e. the one reflecting consumers' point of view and their real actions. To do so we utilized exploratory principal component analysis (PCA) with Varimax rotation. The responses were measured in 7-items frequency scale² and they were

¹ In-depth individual interviews conducted in September 2015 with 16 consumers living in the Upper Silesia area.

² From 1 - never, to 7 – always/continuously.

meeting all the factor analysis requirements³. The applied procedures led to reduction of the initial 7 dimensions considered in the theoretical model (7 groups of SBs) to 5 dimensions reflecting 5 classes of SBs⁴. This five-factor solution accounts for 61.9% of the total variance. Obtained factor loadings are displayed in table 2. To keep the results clearer the loadings below 0.5 have not been disclosed.

Table 2. Factor loadings designating the five dimensions of the SBs

Variables	Component				
	1	2	3	4	5
10_Switching off the lights	0.820				
12_Limiting water usage	0.780				
15_Using the product until it stops working, even if earlier there are innovations (new products) available on the market	0.722				
4_Using own shopping bags (reusable) instead of buying new ones during each purchase	0.694				
20_Recycling	0.677				
6_Shopping with the list to avoid buying unnecessary items	0.609				
19_Intentional limitation of waste in the household	0.582				
3_Buying efficient appliances	0.580				
14_Repairing products instead of buying new ones	0.533				
11_Unplugging electronics when they are not used	0.505				
8_Buying fair trade products		0.802			
9_Buying traditional products/regional specialties		0.753			
7_Buying locally produced items		0.687			
5_Buying frugally packaged items		0.545			
17_Carpooling			0.683		
22_Buying and selling second hand items			0.620		
18_Using products together with other consumers			0.590		
21_Free passing the unwanted, own used items to the others			0.542		
1_Buying organic food and ecological cosmetics				0.864	
2_Buying green detergents				0.847	
13_Using public transportation or walking instead of driving by car					0.729
16_Upcycling					0.551

Extraction method: Principal Component Analysis.

Rotation method: Varimax. Rotation has reached convergence in 10 iterations.

Source: Own calculations.

Based on the magnitude of the factor loadings each dimension was given a descriptive label. Considering the original division into market and household behaviors, we obtained accordingly the following types of SBs:

1. Frugal/non-consumption behaviors (component 1) – the biggest (10 items) and the most popular group of activities taking place both on the market and in the household;

³ There is an adequate sample size – 1112 respondents, ratio of variables number to observations number exceeds 1:5, there are significant correlations between variables, the measure of KMO sample adequacy = 0,917, Bartlett's test for sphericity $\chi^2=9371,273$ (df=231, $p \leq 0,000$), the MSA (measure of sampling adequacy) for all individual variables exceeded the critical value of 0,5 (thus none of them needed to be excluded from further analysis).

⁴ Calculations resulted in five factors with eigenvalues higher than 1 was obtained.

2. Conscious buying (component 2) – comparatively small group (4 items) of relatively not much popular activities related solely to the acquisition phase;
3. Active behaviors involving social interactions (component 3) – comparatively small group (4 items) of not too frequent activities which may be observed both on the market and in the household;
4. Buying green products (component 4) – very small group (2 items) of rather unpopular activities related solely to the acquisition phase;
5. Active behaviors with no need of social interactions (component 5) – very small group (2 items) of rather unpopular activities related solely to the usage and disposal phase.

Empirically modified model of sustainable behaviors served as a starting point for the further analysis concerning the level of PCE and PD and became a framework for creating sustainable behavior perception matrix. Just like frequency of the SBs, both perceptual variables were measured on the 7-point scales⁵ which enabled their joint analysis. For classification purposes we calculated the mean PCE and PD value for each behavior listed in the model. On this basis we could create graphical presentation of the analysis outcomes in a form of four-field matrix respective quarters of which represented the following types of behaviors: difficult and effective, easy and effective, difficult and ineffective, easy and ineffective.

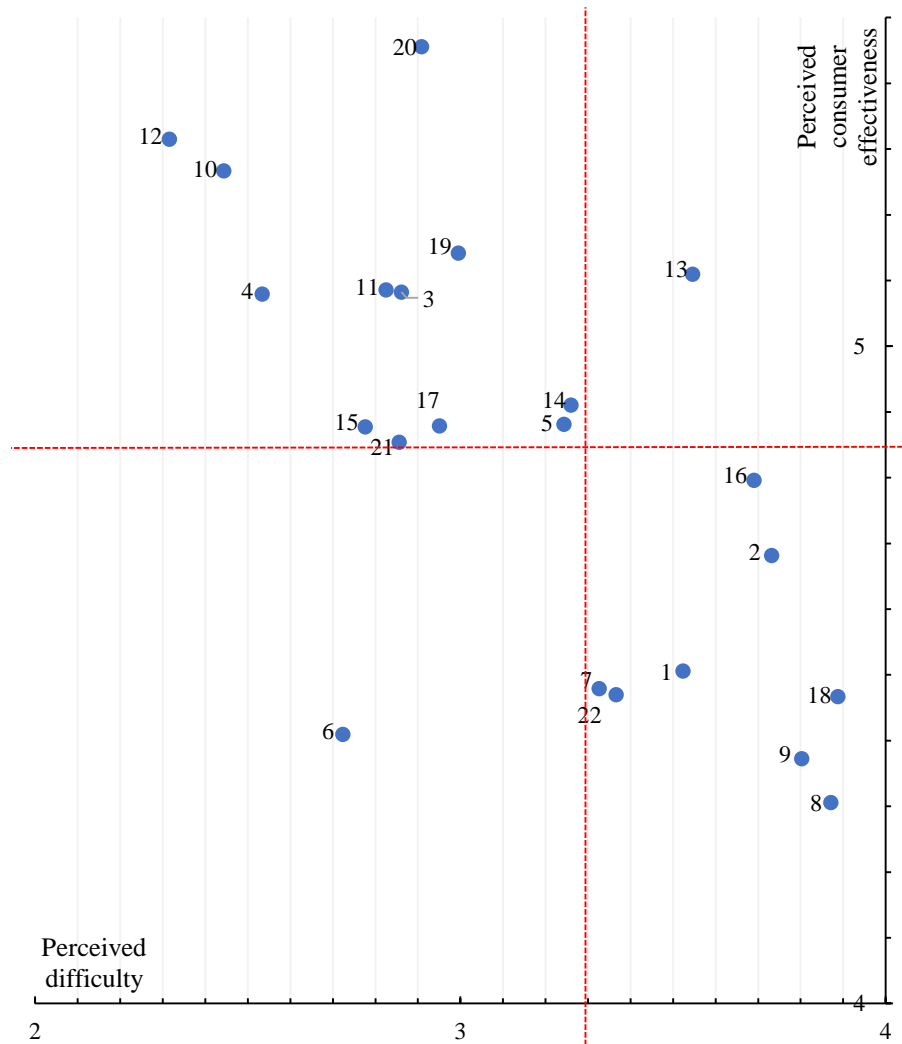
Empirical findings

Considering the attributes of measurement scales used in our study we initially decided to set an intersection point of matrix axes at the most obvious value of 4, representing the middle point of each scale. These absolute measures have let us to bracket all 22 behaviors into the same category, i.e. actions perceived as easy and effective. In terms of the prospects of mainstreaming sustainable consumption in Poland it might be interpreted as a promising sign. However, while analyzing our outcomes we must not ignore the possible impact of so-called social desirability bias⁶. Omitting it would lead to unreasonable simplification, and thus to overoptimistic conclusions. Hence, we decided to conduct the analysis of relative positions of the examined behaviors what seemed to be not only much more justified but also more interesting solution.

In this approach we focused solely on the 2nd quarter of the matrix. Instead of using natural central point of the scales as a point of axes intersection, we used mean values for each variable calculated for all 22 behaviors, amounting to 3.1 in case of PD and 4.9 in case of PCE. Such a solution enabled us to notice more subtle differences in perceiving sustainable behaviors and to distinguish the following groups of behaviors: very easy and very effective (PD below 3.1 and PCE above 4.9 scores), very easy and effective (PD below 3.1 and PCE equal or below 4.9 scores), easy and very effective (PD equal or above 3.1 and PCE above 4.9 scores), easy and effective (PD equal or above 3.1 and PCE equal or below 4.9). In consequence we can also use the names: behaviors with comparatively low level of PCE/PD and behaviors with comparatively high level of PCE/PD or the most/the least difficult/effective. Figure 2 reports the matrix which we ultimately obtained in effect the more detailed analysis.

⁵ In case of perceived consumer effectiveness 1 was indicating “lack of impact”, and 7 “very big impact”. In case of perceived difficulty 1 was indicating “lack of effort”, and 7 “very big effort”.

⁶ Since the issue of sustainable behaviors (as any socially desirable behaviors) is an object of the normative social influences, respondents might have been trying to present themselves as more sustainable consumers than they really are (Carrington, Neville and Whitwell, 2014, p. 2760; Antonetti and Maklan, 2014, p. 53; Caruana et al., 2016, p. 215).



The numbers identify subsequent SBs. Accordingly:

1. Buying organic food and ecological cosmetics;
2. Buying green detergents;
3. Buying efficient appliances e.g. TV set, dishwasher, refrigerator (A, A+, A++, A+++);
4. Using own shopping bags (reusable) instead of buying new ones during each shopping;
5. Buying frugally packaged items (bulk products, products in biodegradable or recyclable packages);
6. Shopping with the list to avoid buying unnecessary items;
7. Buying locally produced items;
8. Buying fair trade products;
9. Buying traditional products/regional specialties;
10. Switching off the lights (in the rooms that are not in use at the moment);
11. Unplugging electronics when they are not used (computers, TV sets and so on);
12. Limiting water usage e.g. turning off the faucet while tooth brushing;
13. Using public transportation or walking instead of driving a car;
14. Repairing products instead of buying new ones (e.g. mending apparels, repairing shoes, home or electronic equipment);
15. Using the product until it stops working, even if there are innovations (new products) available on the market;
16. Upcycling;
17. Carpooling;
18. Using products together with other consumers (e.g. using one lawn mower together with the neighbors);
19. Intentional limitation of waste in the household;
20. Recycling;

21. Passing the unwanted, own used items to others for free e.g. apparel, electronics, books, furniture;
22. Buying and selling second hand items.

Figure 2. Detailed sustainable behavior perception matrix

Source: Own calculations.

Sustainable behaviors perceived by respondents as the easiest and the most effective ones include 7 actions all of which represent frugal/non-consumption type of behaviors. The opposite group, so the behaviors assessed as the most difficult and the least effective ones according to our SBs model represents conscious buying, buying all types of green products, and additionally contains a few active behaviors involving social interactions as well as one active behavior not requiring such interactions. Perception of the remaining SBs is rather ambiguous. Repairing products instead of buying new ones (identified as an example of frugal/non-consumption behavior) and, first of all, using public transportation or walking instead of driving a car (representing active behaviors not requiring social interactions) turned out to be perceived as enormously influencing natural and social environment but simultaneously as the most difficult ones. In turn, such frugal/non-consumption behaviors like shopping with the list, using product until it stops working, as well as active behaviors involving social interactions like carpooling and passing the unwanted items to the others for free, were found as comparatively the easiest ones but also the least effective. Changing the way how these activities are seen by consumers and moving them to the group of the most effective and the easiest ones thus requires introducing changes in perception of one variable while maintaining perception of the other.

At the end, to complement the perception matrix, we wanted to shed new light on an overall SBs classification considering simultaneously all three researched aspects, i.e. their PCE, PD and frequency. To this end we used one of the non-hierarchical cluster analysis namely K-means method. We examined several solutions as far as the number of clusters is concerned and 4-cluster solution came up as the best option. Figure 3 shows the mean values of variables for each of them.

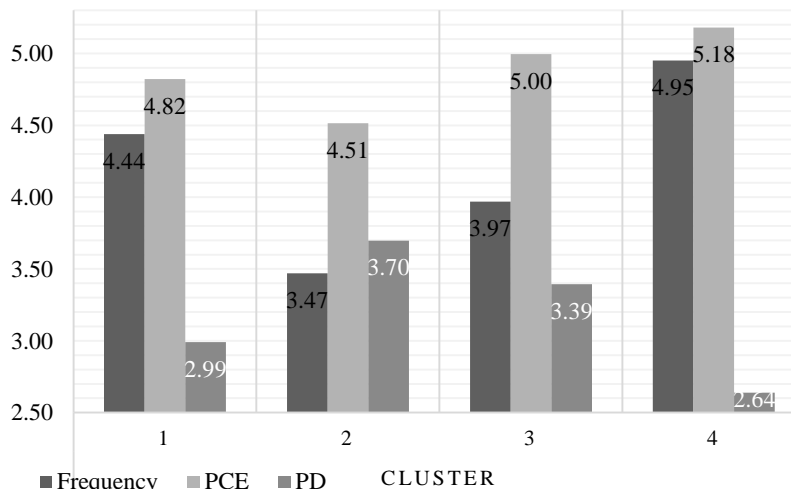


Figure 3. Cluster means for frequency, PCE and PD.

Source: Own calculations.

Deepened examination of cohorts description revealed that two of them, i.e. cluster 4 and cluster 2 remain in opposition, reflecting the division between “the most frequent, the easiest and the most effective behaviors” (cluster 4) and “the scarcest, the most difficult and the least effective behaviors” (cluster 2). Importantly, cluster 4 contains six behaviors corresponding with the

previously distinguished group of frugal/non-consumption behaviors. Cluster 2 includes seven highly diversified behaviors representing four out of five groups of SBs distinguished before, i.e. buying green products (2), conscious buying (2), active behaviors involving social interactions (2) and active behaviors with no need of social interactions (1). In turn cluster 1 comprises seven, also rather diverse activities which belong to three categories, i.e. frugal/non-consumption behaviors (remaining 4 out of 10), active behaviors involving social interactions (remaining 2 out of 4), and conscious buying (1). In terms of the composition, cluster 1 resembles cluster 4, however, in the former one there are significantly lower mean values of frequency and PCE, and higher mean value of PD. Thus, we decided to name this cluster “relatively frequent, easy and effective behaviors”. Finally, cluster 3 is an interesting combination of only two behaviors representing conscious buying and active behaviors with no need of social interactions. We named this cluster “relatively rare and difficult but highly effective behaviors”. Table 3 details the structure of each cluster.

Table 3. Sustainable behaviors classification concerning their average frequency, difficulty and effectiveness

No*	Behaviors	Mean frequency	Mean PD	Mean PCE
Cluster 4 “the most frequent, the easiest and the most effective behaviors”		4.95	2.64	5.18
3	Buying efficient appliances	4.67	2.86	5.1
4	Using own shopping bags (reusable)	4.84	2.53	5.08
10	Switching off the lights	5.19	2.44	5.27
12	Limiting water usage	5.03	2.31	5.31
15	Using the product until it stops working	4.99	2.78	4.88
20	Recycling	4.97	2.91	5.46
Cluster 1 “relatively frequent, easy and effective behaviors”		4.44	2.99	4.82
6	Shopping with the list	4.65	2.72	4.41
7	Buying locally produced items	4.29	3.33	4.48
11	Unplugging electronics when they are not used	4.43	2.82	5.09
14	Repairing products instead of buying new ones	4.46	3.26	4.91
17	Carpooling	4.26	2.95	4.88
19	Intentional waste reduction	4.52	2.99	5.14
21	Passing used items to the others for free	4.45	2.86	4.85
Cluster 3 “relatively rare and difficult but highly effective behaviors”		3.97	3.39	5.00
5	Buying frugally packaged items	3.97	3.24	4.88
13	Using public transportation or walking instead of driving a car	3.97	3.55	5.11
Cluster 2 “the scarcest, the most difficult and the least effective behaviors”		3.48	3.7	4.51
1	Buying organic food and ecological cosmetics	3.45	3.52	4.5
2	Buying green detergents	3.1	3.73	4.68
8	Buying fair trade products	3.7	3.87	4.3
9	Buying traditional products/regional specialties	3.65	3.8	4.37
16	Upcycling	3.64	3.69	4.8
18	Shared consumption	3.13	3.89	4.47
22	Buying and selling second hand items	3.62	3.37	4.47

*The number corresponds with a given behavior position in the original scale.

Source: Own calculations.

Conclusions

Data collected during the research confirm the basic assumption of this paper. They prove that the PCE and PD level may be used as the criteria (dimensions) allowing for SBs classification and for creating SBs perception matrix. Although the analysis using middle points of the scales as the reference points did not offer a satisfying solution concerning this issue, once we used the relative approach with the reference points indicated by the mean values of the variables we were able to identify sufficiently different matrix quarters, and we also revealed slight but significant differences in the perception of the examined behaviors. Our most important achievement is showing that behaviors perceived by Poles as the easiest and the most effective ones all represent the category which we named frugal/non-consumption SBs. Accordingly, this type of behaviors should be treated as the most obviously perceived by Poles as sustainable one. Figure 4 presents perception matrix supplemented by the frequency means for every behavior.

<p>THE EASIEST AND THE MOST EFFECTIVE SBs</p> <ul style="list-style-type: none"> • Switching off the lights [5.19]* • Limiting water usage [5.03] • Recycling [4.97] • Using own shopping bags (reusable) [4.84] • Buying efficient appliances [4.67] • Intentionally limiting waste in the household [4.52] • Unplugging electronics when they are not used [4.43] 	<p>THE MOST DIFFICULT AND THE MOST EFFECTIVE SBs</p> <ul style="list-style-type: none"> • Repairing products instead of buying new ones [4.46] • Using public transportation or walking instead of driving by car classified [3.97]
<p>THE EASIEST AND THE LEAST EFFECTIVE SBs</p> <ul style="list-style-type: none"> • Using the product until it stops working [4.99] • Shopping with the list [4.65] • Carpooling [4.46] • Passing the unwanted used items to the others for free [4.45] 	<p>THE MOST DIFFICULT AND THE LEAST EFFECTIVE SBs</p> <ul style="list-style-type: none"> • Buying locally produced items [4.29] • Buying frugally packaged items [3.97] • Buying fair trade products [3.7] • Buying traditional products/regional specialties [3.65] • Upcycling [3.64] • Buying and selling second hand items [3.62] • Buying organic food and ecological cosmetics [3.45] • Using products together with other consumers [3.13] • Buying green detergents [3.1]

*mean frequency values

Figure 4. Sustainable behavior perception matrix supplemented by the frequency means
Source: Own elaboration.

Comparing the frequency of certain SBs with its position in the matrix it can be noticed that behaviors placed in second quarter emerge much more often than the ones placed in the fourth quarter. Nevertheless, this observation cannot serve as a base for formulating any general rule. Using cluster analyses to classify sustainable behaviors according to three variables – PD, PCE and frequency, we obtained groups of SBs which differ from the ones identified in perception matrix.

The main practical implications of our results refer to possibilities of achieving SC goals in Poland. Sustainable behaviors perception matrix may serve as a simple and convenient tool, ready to be used by public and private institutions responsible for developing sustainability policy and putting it into practice. The matrix can help to determine a way how certain sustainable behaviors are perceived and, if the study is repeated, to recognize the changes in their perception over time, also considering opinions of various consumer groups. Furthermore, the proposed set of SBs may be

complemented or changed adequately to changes in the scope and character of sustainable activities feasible in Polish conditions.

Although indicated flexibility of sustainable behaviors perception matrix increases its practical usefulness, it may also limit its cognitive and applicational value. The main limitations of this paper lay in some arbitrary decisions we made to create the matrix. Firstly, by introducing and operationalizing the model of sustainable behaviors we limited the scope of SBs. Secondly, the values of PD and PCE used as reference points were appointed arbitrary. Looking at the final matrix we can easily recognize that even slight changes in these assumptions in some cases might significantly change the interpretation of our findings.

Despite of the problems listed above the concept of sustainable consumer behavior matrix is worth of further development. Furthermore, by comparing the matrix with frequency of researched behaviors we found out that neither PD nor PCE influence SBs in a direct way. We are confident that this impact as well the more general problem of SBs stimulants appoints a promising direction for further research. Willingness of broadening the knowledge on this topic should also serve as a stimulus for conducting research in other countries, especially the well-developed ones.

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