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ORIGINAL ARTICLE

Do not waste "Pickers": exploring the intention to join waste picker cooperatives

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Abstract
The objective of this study is to investigate the intention of waste pickers to participate in waste picker cooperatives. According to research, cooperatives improve waste pickers' quality of life. However, it is unclear how waste pickers perceive and interpret what is provided to them and if these advantages affect their attitudes and intentions. We provide a unique theoretical model that explains waste pickers' intentions to join cooperatives by incorporating the theory of planned behavior. A total of 112 waste pickers, consisting of both Turkish individuals and immigrants, were included in the data collection process. The data were analyzed using partial least squares structural equation modeling, utilizing multi-group analysis by including social exclusion and nationality as moderators. One of the most striking findings is that pickers' feeling of control over their planned action does not affect their intention to join cooperatives without an attitude. To clarify, waste pickers must initially develop a positive attitude towards perceiving the joining behavior as effortless. Our research also shows that socially excluded people trust and value cooperatives more, regardless of their nationality. This pioneering study on waste pickers' willingness to join cooperatives and other novel findings will benefit scholars and policymakers.

Keywords Waste management · Waste pickers · Cooperatives · Participation intention

Introduction

During the Industrial Revolution, the amount and volume of garbage surged enormously and "waste" gained commercial value as producers developed a strong demand for inexpensive raw materials. In the 1950s, people started to become more aware of the environment, and in the 1970s, the idea of "sustainable development" made garbage recycling an important business [1]. Accordingly, acceptance grew for the idea that all processes, from collection to disposal and separation to recycling, should be rebuilt simultaneously and on a large scale. Thus, particularly in developed nations, the field of "recycling" emerged as a new profit-driven sector, and efforts to achieve a zero-waste system with the use of high technology in recycling and the source-separation of waste gained speed [2]. However, this structure cannot be used in developing and undeveloped countries due to rising waste generation, high waste collection management costs, and poorly understood waste management factors [3]. In this situation, a dual structure of "formal-informal" is observed in the recycling sector, and "waste pickers" (WPs) in the informal field [4] play a crucial role in the collection, transportation, and classification of waste [5]. Nevertheless, as mentioned by [6], WPs are frequently viewed as an issue by towns, and waste collection is regarded as a method of employment that must be eradicated.

The literature, on the other hand, repeatedly mentions the potential benefits of properly organized WPs, considering developing and undeveloped countries. WPs can boost recycling rates [7], reduce social transfer expenditures by contributing to the alleviation of extreme poverty, and increase recycling rates [6]. In addition, WPs can contribute to public health and safety [8] as well as environmental sustainability [9]. They can contribute to waste management [10], which is one of the largest expense items for municipalities, by extending the life of landfills, thereby reducing the municipalities' waste transportation costs. It is known that a process of informal recycling, facilitated by WPs, effectively completes the formal process. Instead of

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prohibiting waste collection, it is necessary to understand the origins of this dual structure that has formed in the field of recycling and explore the possibility of integrating these systems. Cooperatives are seen as one of the best ways to help WPs fit into the waste management system [11].

Many studies support waste picker cooperatives (WPC) and the possible benefits and advantages of the relevant cooperatives are highlighted. Accordingly, membership in the cooperative enhances the members' social, economic, and political conditions [12, 13], as cooperatives have the ability to generate revenue, reduce poverty, and preserve resources [70]. In such regard, cooperatives are acknowledged as a method of formalizing the large population of informal garbage collectors in developing nations [71]. However, our comprehension and level of knowledge regarding the attitudes and intentions of WPs toward their membership in cooperatives, as well as its determinants, are extremely limited in light of the existing literature, pointing out an important research gap. Since WPCs contribute to the efficiency of informal WPs and thus provide many benefits, it is important to understand the attitudes and intentions of WPs at the point of joining these cooperatives. To our knowledge, there is no study examining the intentions of WPs to join WPCs.

For the purpose of investigating the target behavior and its formation, some theories can provide valuable frameworks and guide the construction of effective and replicable results [14]. The Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) are two of the most widely employed theories for identifying the cognitive antecedents of behavior. TRA views "*behavioral intention*" as the most significant explanation of will-based conduct [15]. The person's attitude and the subjective norms associated with the behavior determine behavioral intention [16, 17]. [32] developed TPB by adding the "*perceived behavioral control*" (PBC) variable to the initial TRA model due to the initial theory's inability to demonstrate a clear situation in terms of effective prediction of behavior in cases where control will be reduced [17]. Within the confines of the original concept, TPB addresses behavior in circumstances where there is insufficient or diminished will control [18].

The impacts of "*trust*" toward the cooperative and "*perceived benefit*" on the formation of WPs' attitudes towards joining the WPC are also investigated in this study. We also used the "*social exclusion index*" and "*nationality*" as moderators to check if the relationships explaining the joining intention changed among sub-groups. Social exclusion is a significant issue for WPs, as they are considered one of the disadvantaged groups because of the discrimination based on class, status, and identity [19]. According to Magni and Günther [20], cooperatives can reduce the sensation of social isolation and the condition itself, altering the attitudes and intentions of WPs towards joining the WPC. In addition, nationality is considered a cultural reflector, which may explain why different nationalities show different intentions towards joining cooperatives [21]. On the other hand, while cooperatives provide several opportunities for human and social development [12], it is predicted that the attitude and, consequently, the intention to join the cooperative will be influenced by the participant's sense of the benefit they get. Finally, trust has been found to be a strong explanatory factor in explaining the attitude toward cooperatives [22]. The TPB model has been extended to fit the field of waste management by adding these two variables and two moderators.

Türkiye has apprehended almost 2.3 million irregular migrants since 2014 as the Syrian crisis escalated. Over 3.1 million Syrians requested temporary protection in the country in July 2024 [69]. Moreover, migration is rising due to internal upheaval in neighboring countries. Considering such issues and the dominant role of migrants in waste collection, Türkiye provides convenient conditions for this research. The purpose of this study is to identify the factors affecting the joining intentions of WPs toward WPCs in Türkiye. Through the example of Gesikoop (Tepebaşı recyclable waste pickers social enterprise cooperative), established under the leadership of Eskişehir Tepebaşı Municipality (in Türkiye), what informal WPs expect from WPCs is questioned, and the factors facilitating the participating intentions to join the cooperative are investigated. Accordingly, this study seeks answers to the following research questions:

- RQ1: How does the model explain the intention of WPs regarding participation to WPCs?
- RQ2: How do WCP-trust and perceived benefit variables influence the formation of attitudes?
- RQ3: How do the relationships in the model change according to nationalities and the level of social exclusion perceptions?

To answer RQs, we utilize the PLS-SEM (Partial Least Squares-Structural Equation) method for analyzing the data. PLS-SEM is a great technique for analyzing prediction models [23]. While PLS-SEM simplifies the analysis and interpretation of complicated models for researchers [24], it is more favored over the covariance-based SEM method as the complexity of the model structure increases [25]. PLS-SEM is also a better method for handling small samples [25]. In addition, PLS-SEM is highly recommended for estimating moderation analyses [26]. As we delve into whether social inclusion and nationality influence relationships, it seems that the PLS-SEM approach fits well with our methodological structure. Therefore, we believe that this study contributes to waste management studies in terms of

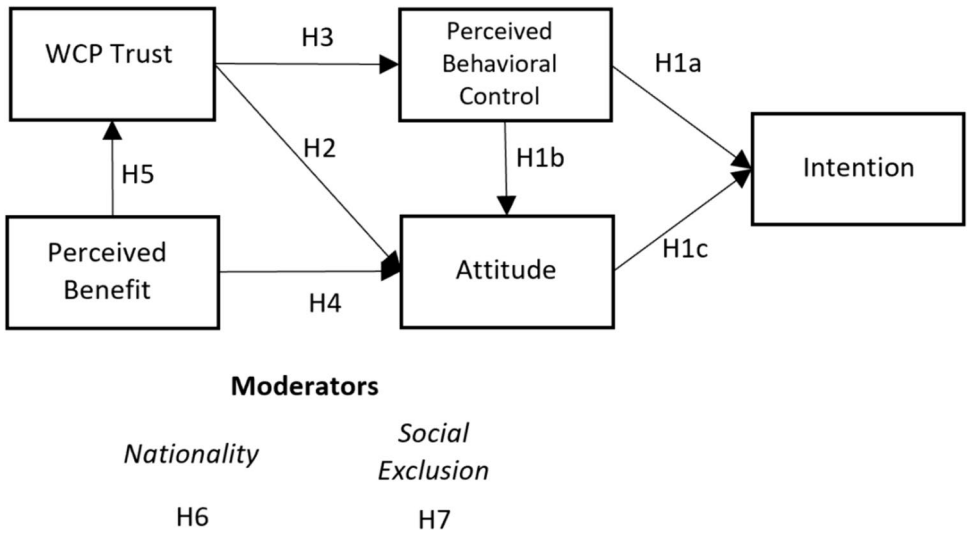

Fig. 1 WPC participation intention model

the methodology used. This study also contributes to the literature and practice, as it examines the intentions of WPs to join a WPC by integrating social exclusion index, trust, and perceived benefit from a TPB standpoint.

Literature and hypotheses

As previously indicated, the literature lacks attention regarding the attitudes and intentions of WPs towards WPC membership. Within the scope of the present study, the authors discuss that understanding the attitudes and intentions of WPs to join the cooperative will aid in observing the functionality of the cooperatives and identifying the hurdles to membership. To handle the scenario at hand, Fig. 1 depicts the theoretical model. Here, perceived behavioral control (PBC) and attitude (ATT) affect behavioral intention (BI), which also represents a mediation effect of ATT. Furthermore, we conceptualize that perceived benefit (PB) has an effect on WPC trust (WPC-TR), increasing PBC and ATT. The model[1]also seeks the direct effect of PB on ATT.

Perceived behavioral control, attitude, and intention

Behavioral intention is the degree to which an individual intends to do a particular behavior. At this point, attitude is defined as the person's positive or negative feelings toward the target behavior to be performed [27]. In addition, a person's attitude toward an activity is also impacted by that person's salient beliefs and assessments regarding the outcomes of the behavior to be performed [16]. Beliefs represent the likelihood that the desired behavior will result in a positive or negative consequence [17]. Lastly, perceived behavioral control refers to the individual's impression of the difficulty or ease of completing the pertinent behavior [28].

According to TPB, attitude is one of the most influential criteria in determining the intention of a target behavior. Studies in the disciplines of waste management and recycling reveal that the attitude of a person positively affects the intention towards the target behavior, such as recycling [29] and waste sorting [30]. Furthermore, studies on the intention to engage in various cooperatives have found that attitude positively affects the intention to join cooperatives [31–33].

Perceived behavioral control is the perceived ease of completing the target behavior, which is largely based on past experiences and some impediments [28]. Developing the intention to join a cooperative might be influenced by views about one's abilities to face and overcome all potential hurdles along the path to participation [33]. In this study, perceived behavioral control can be viewed in terms of the difficulty of cooperative membership. Perceived behavioral control is likely to have an effect on a certain behavior if the candidate participant has adequate resources and opportunity [34]. We, therefore, suggest that perceived behavioral control is a crucial component in explaining the participation intentions of WPs. However, in the WPCs context, the effect of perceived behavioral control on behavioral intention might not be enough by itself. We believe that in Türkiye, WPs lack information related to the benefits and advantages of joining a WPC. Therefore, attitude comes to the fore, and

[1] The subjective norms variable was excluded from the model due to the absence of construct reliability (Crombach' Alpha = 0.680) and discriminant validity.

WPs might first need to develop positive attitude towards cooperatives. We, thus, propose that perceived behavioral control will be effective on behavioral intention through the effect of attitude. Accordingly, the corresponding hypotheses are as follows:

H1: Attitude mediates the effect of perceived behavioral control on behavioral intention.

H1a: Perceived behavioral control positively affects the behavioral intention to join WPCs.

H1b: Perceived behavioral control positively affects the attitude towards intention to join WPCs.

H1c: Attitude positively affects the behavioral intention to join WPCs.

WPC-trust, perceived behavioral control, and attitude

Trust emerges as an important concept, especially in an environment where there is uncertainty in terms of both social and economic interaction. Theoretically, Gefen, Karahanna, and Straub [35] define trust as an expectation that other parties chosen to trust will not act opportunistically by taking advantage of a particular situation. However, it is seen that the literature on the intention to join cooperatives or waste management remains silent when examining the possible positive or negative impact of WPC-trust on attitude. In one available study, trust is explained as an effective factor in shaping the attitudes and perceptions of WPs towards trade unions [22]. From a different context, Agag and El-Masry [31] provide that trust has a direct and positive influence on attitudes toward joining online travel communities. Furthermore, if the cooperative is able to fulfill its obligations and deliver concrete outputs, it is possible to expect that WPs could develop positive WPC-trust [36] and generate an attitude towards participating in the cooperative in return.

We also assume that WPC-trust will enhance perceived behavioral control, as the WPs will feel that they have resources and opportunity [34] in terms of joining the cooperative. In addition, WPC-trust may explain the circumstances in which WPs do not have control over their development, such as their intention to join the cooperative [18]. Since a high level of perceived control increases a person's tolerance, there is a strengthening of the intention to perform the action [34], making perceived behavioral control have an indirect effect on intention. In addition, perceived behavioral control for a specific action will be greater when an individual possesses more resources and opportunities. Perceived behavioral control, therefore, represents actual control and contributes to the prediction of the relevant behavior [34]. The corresponding hypotheses are as follows:

H2: WPC-trust positively affects the perceived behavioral control.

H3: WPC-trust positively affects the attitude towards intention to join WPCs.

Perceived benefit, WPC-trust, and attitude

In general, cooperatives aim to sidestep middlemen to pay cooperative members greater prices. It is intended that WPs will earn more and enjoy a higher standard of living as a result of the cooperatives' involvement [10]. In addition, cooperatives actively promote social inclusion and provide chances for human and social growth [12]. Because cooperatives can minimize social division, they offer WPs guaranteed salaries and many protection benefits [37].

Most studies indicate that cooperative membership improves the members' social, economic, and political circumstances [12, 13]. For example, Medina [38] argues that cooperatives will have many benefits for the WPs and the general society. These benefits are based on not leaving WPs to their fate by providing an income level above the minimum wage, supporting the improvement of physical infrastructure [5], and reducing negative public perception [39]. Furthermore, Lino and Ismail [40] stress the necessity for states and local governments to enact a range of legal measures to encourage and support WPCs and note that these cooperatives can produce funding for concerns such as the social inclusion of WPs. Marello and Helwege [41] assert that WPCs can offer advantages in terms of occupational safety, the formation of social networks, and environmental consciousness.

Due to their poor earnings, low education levels, and lack of government support, WPs are disadvantaged [6]. They are also exposed to several health concerns, ranging from minor cuts to serious infections [42]. Cooperatives try to improve the working and living conditions of WPs in general [8, 13]. At the time of resolving these issues, it is crucial to comprehend the expectations and requirements of WPs. According to Navarrete-Hernández and Navarrete-Hernández [43], the government's provision of social assistance through cooperatives will increase WPs' performance, incomes, and working conditions, hence boosting their productivity. These benefits will also promote the economic and social integration of WPs [44], which can be viewed as a perceived benefit as participants will eventually believe that joining the cooperative will boost their performance [7, 45]. Therefore, the expectation of total benefit and the belief that their income will increase, which are both significant predictors of positive attitudes towards joining cooperatives [46], will also positively

shape the attitudes of WPs towards their participation in cooperatives. We also add that positive perception of benefit from joining the cooperative will affect the WPC-trust, as WPs' perception of not being deceived by the cooperative is enhanced. The corresponding hypotheses are as follows:

H4: Perceived benefit positively affects the WPC-trust.

H5: Perceived benefit positively affects the attitude towards intention to join WPCs.

Moderating effects of nationality and social exclusion

As an informal kind of occupation, waste collection is typically perceived as a task done by immigrants [47]. In this regard, Syrian and Afghan refugees have become dominant in waste collection due to the enormous immigration wave Türkiye has received in recent years. Similarly, the lowest caste and religious minority Muslims in India [38], Coptic Christians in Egypt [48], and largely indigenous people in Latin America are known to be involved in waste collection. These groups may not be the poorest in a city, but they are clearly the most disadvantaged, most vulnerable, and most marginalized social segments [49]. According to [50], culture is a collectively socially manufactured reality that differentiates persons belonging to one class from others. Thus, culture limits the extent and type of a given behavior among people and organizations [21]. Additionally, culture might be a crucial component in determining the attitudes and intentions of WPs from different countries to join cooperatives, since they may have different expectations as a result of diverse experiences. In one of the newest studies on this subject, Gorodzeisky and Richards [22] demonstrate that immigrant WPs have stronger faith in unions than domestic WPs, as the perception of unions in their countries is high. Finally, the related hypothesis is as follows:

H6: Waste pickers' nationalities moderate the relationships in the model.

Social exclusion is the discrimination of certain groups based on their class, status, identity, conditions, and disadvantages [19]. Although they play a crucial role in waste management [5], the potential benefits of informal WPs are overlooked because of the focus on their social status, such as being migrants and working informally, which makes them invisible to authorities and disconnected from the formal economy, leaving them vulnerable to a variety of dangers and social exclusion [51]. This exclusion causes social harassment [39], precarious housing situations [52], and denial of education and social mobility [51]. Excluding WPs deprives them of social rights and economic benefits from waste management [41]. By incorporating WPs into the formal system through cooperatives, it is feasible to secure numerous rights and raise living conditions [53].

In the literature, the concept of social exclusion can be observed in several research studies that examine the topic in its various dimensions. For instance, Bergen et al. [54] discussed four sub-dimensions of this idea: limited social participation (LSP), material deprivation (MD), inability to access basic social rights (SR), and lack of normative integration (LNI). Similarly, Aya [55] explores eight sub-dimensions of the linked phenomenon, and such dimensions are claimed to contribute to social exclusion [56]. While the literature presents important applications of bringing WPs into the formal system through cooperatives [20], it is understood that cooperatives both increase the skills of WPs and are effective in social participation in terms of social, economic, and political aspects [13]. Although the LSP, MD, SR, and LNI are dimensions of social exclusion, these characteristics may have beneficial effects on the creation of the attitude towards joining the cooperative since the promises of the cooperatives will come to the fore in order to address the deprivations listed. According to Colombijn and Morbidini [37], while the cooperative offers a fixed salary and several protective benefits to WPs, most crucially, social division is prevented. Therefore, we believe that being socially excluded will shape the relationships defined in our model. The relevant hypothesis is as follows:

H7: Waste pickers' beliefs that they are socially isolated will moderate the relationships in the model.

Methodology

Sample and data collection

The social enterprise cooperative GESİKOOP, which was established for the first time in Türkiye in 2020 as an organization model for WPs, has 32 members. With the aim of uniting WPs under one roof, GESİKOOP carries out its activities in partnership with a licensed recycling company and the Tepebaşı (in Eskişehir) municipality. The sample of the research consists of WPs operating in Eskişehir. According to the information received from the authorities, there are approximately 300 WPs in the city. Participants were informed about the purpose of the study, and the questionnaire was administered in accordance with the principles of confidentiality of personal data and voluntariness. The questionnaire was prepared both in Turkish and Arabic considering the number of migrant WPs and language deficiency, and translator support was received in case of problems due to dialect differences in Arabic during the application. GESİKOOP's waste collection facility requested the approval of pickers to participate in the study. An employee who is fluent in Arabic also assisted in the process of collecting data from the migrants. We

Table 1 Sample profile

	Türkiye	Afghanistan	Syria	Total	Percentage
N. of Participants					
–	37	60	15	112	100%
Gender					
Male	32	49	12	93	83%
Female	5	11	3	19	17%
Age					
18–21	3	7	0	10	10%
22–29	4	9	12	15	13%
30–37	13	24	7	44	39%
38–45	11	11	5	27	24%
46–53	4	7	0	11	10%
54 +	2	2	1	5	4%
Member of Coop					
Yes	6	0	0	6	5%
No	31	60	15	106	95%
Education					
None	8	17	11	36	32%
Primary school	17	32	3	52	47%
High school	10	6	1	17	15%
Bachelor's degree	2	5	0	7	6%

used GPower software to determine the minimum number of participants required for the sample. Following the Memon et al. [57]' guidelines for mediation and moderation models, we run the analysis with suggested parameters (effect size = 0.15, $\alpha = 0.05$, power = 0.80), resulting in at least 108 participants. Finally, data were collected from 121 participants.[2] After conducting box-plot analysis to determine outliers, we eliminated 8 surveys, leaving 112 final participants. The basic demographic characteristics of the participants are shown in Table 1 with cross-tabs.

Considering Table 1, it can be seen that 32% of the participants did not attend to school or could not get any formal education. 47% of the participants could finish primary school. While 83% of the participants are male, the largest group (39%) covers the range of 30–37 years old. There are only six Turkish participants who are members of the cooperative. Considering the other nations, there are no participants who are members of the cooperative.

Data analysis and data collection tools

For data analysis, this study adopts PLS-SEM approach. Although the number of serious criticisms against covariance-based (CB) SEM is increasing, this does not mean that PLS-SEM is a superior method. Even there are studies which critisize PLS-SEM approach for some reasons such as restricted use of cross loadings [58] and misuse of PLS leading incorrect conclusion [59]. However, it is seen that many studies in the literature emphasize a paradigm shift by making conceptual comparisons between PLS-SEM and CB-SEM. Sarstedt et al. [60] show that the biases produced by CB-SEM are much more severe than PLS-SEM if the method is applied to the wrong type of model. The biggest reason for this is that CB-SEM follows a common factor model, assuming that the scores observed from the indicators (item/statement) are functions of the structure itself and measurement error [61]. In contrast, PLS-SEM follows a composite model logic that uses total variance and represents constructs as linear combinations of their indicators. PLS-SEM also offers HTMT ratio which has been validated by many of the studies for convergent validity [60] as the best method, making the use of cross loading unnecessary. In fact, the important thing is that researchers can choose the method that best suits the model structure. Thus, even though both CB and PLS SEM can be used for testing and validating models, PLS-SEM is the best approach for this study, as PLS-SEM focuses on a meticulous approach to predicting and attaining significant levels of statistical power.

PLS-SEM method consists of testing the measurement and structural model stages. Measurement model analysis includes reliability, convergent validity, and discriminant validity. To assess reliability, composite reliability and Cronbach's Alpha values should be above the threshold value of 0.7, while AVE values of variables are expected to exceed 0.5 for convergent validity [62]. The HTMT ratio below 0.85 represents the discriminant validity of the model [63]. Multicollinearity is checked by examining VIF values of each item below the 3.3 [64] and is one of the analyses to assess structural model. After conducting R^2, predictive power, and path coefficient analayses, hypotheses are tested by bootstrapping method.

In order to explain behavioral intention of WPs towards joining to cooperatives, we created model which includes WPC-trust (WPC-TR), attitude (ATT), perceived behavioral control (PBC), perceived benefit (PB), and social inclusion index variables (LSP, MD, SR, and LNI). Finally, all related items, together with the source studies, are presented in electronic supplementary material.

[2] As this study was conducted as part of an Anadolu University scientific research project, the required ethics committee report from institution and other approvals were received from the relevant cooperative before data collection.

Table 2 Measurement model results

Variables	Items	Convergent Validity			Internal Consistency Reliability	
		Loadings	Indicator Reliability	AVE	Composite Reliability	Cronbach's Alpha
		> 0.7	> 0.5	> 0.5	0.6–0.9	0.6–0.9
WPC-TR	TR1	0.701	0.500	0.640	0.857	0.811
	TR2	0.877	0.769			
	TR3	0.895	0.801			
	TR4	0.707	0.500			
ATT	ATT1	0.712	0.507	0.618	0.866	0.794
	ATT3	0.763	0.582			
	ATT4	0.828	0.686			
	ATT5	0.834	0.696			
BI	BI1	0.767	0.588	0.744	0.973	0.834
	BI2	0.873	0.762			
	BI3	0.939	0.882			
PBC	PBC1	0.888	0.789	0.797	0.887	0.755
	PBC2	0.919	0.845			
PB	PB1	0.887	0.787	0.604	0.991	0.716
	PB2	0.903	0.815			
	PB3	0.895	0.801			

Table 3 HTMT ratio values

	PBC	PB	BI	WPC-TR	ATT
PBC					
PB	0.851				
BI	0.469	0.481			
WPC-TR	0.267	0.426	0.443		
ATT	0.821	0.749	0.488	0.631	

Findings

Measurement model

Table 2 provides measurement model assessment considering threshold values given previously. We had to remove ATT2 with factor loading 0.614 and PBC3 with factor loading 0.650, as they are below the threshold value of 0.7, even though Hair et al. [65] suggest that a range of 0.40–0.70 can be acceptable for newly developed models. However, since these two items pulled down Cronbach's Alpha value below the threshold value of 0.6, we decided to keep them out. After related adjustments, we achieved validity and reliability of the model.

To evaluate discriminant validity, the HTMT criterion proposed by Henseler et al. [63] was conducted, as it yields more reliable results compared to Fornell-larcker criterion and cross loadings [63]. As the ratio is accepted to fall below the 0.85 threshold, Table 3 proves that the model ensures discriminant validity.

Structural model

Before going to hypothesis testing, collinearity analysis must be done to evaluate structural model considering the VIF values. Since VIF values are less than 3.3, as

Table 4 Direct effects

Paths	Original sample	Sample mean	Bias	5.0%	95.0%	stdev	t statistics	p values
PBC—> BI	0.188	0.186	−0.002	−0.008	0.390	0.121	1.559	0.060
PBC—> ATT	0.432	0.431	−0.001	0.311	0.553	0.073	5.892	0.000***
PB—> WPC-TR	0.410	0.427	0.017	0.246	0.520	0.081	5.055	0.000***
PB—> ATT	0.236	0.240	0.004	0.069	0.377	0.094	2.507	0.006**
WPC-TR—> PBC	0.244	0.255	0.011	0.065	0.386	0.095	2.555	0.005**
WPC-TR—> ATT	0.300	0.298	−0.003	0.202	0.390	0.057	5.262	0.000***
ATT—> BI	0.327	0.335	0.008	0.079	0.531	0.137	2.392	0.008**

* $p < .05$, ** $p < .01$, *** $p < .001$

Table 5 MGA results based on social exclusion index

	Difference (index above- index below)	5.0% (index above)	95.0% (index above)	5.0%	95.0%	P value
PBC—> BI	0.113	−0.026	0.403	−0.578	0.710	0.430
PBC—> ATT	0.285	0.342	0.612	−0.683	0.588	0.176
PB—> WPC-TR	-0.473	0.123	0.521	0.722	0.896	0.001**
PB—> ATT	-0.719	−0.003	0.339	0.430	1.506	0.046*
WPC-TR—> PBC	-0.597	−0.075	0.298	0.447	0.904	0.001**
WPC-TR—> ATT	0.360	0.153	0.386	−0.831	0.232	0.076
ATT—> BI	-0.613	−0.009	0.508	−0.932	1.389	0.197

* $p < .05$, ** $p < .01$, *** $p < .001$

suggested by Diamantopoulos and Siguaw [64], the model does not have a collinearity problem. To examine R^2performance, we followed Chin [24]' classification in which R^2 values are accepted as weak (0.19), medium (0.33), and high (0.67). In our model, ATT gets the highest R^2 value (0.60), followed by BI (0.22), TR (0.17) and PBC (0.06). The value of BI as the main dependent variable appears to be relatively low. It means that PBC and ATT are not able to predict the BI. On the other hand, ATT, another important dependent variable, takes a high value, indicating that PB, WPC-TRUST and PBC explain good portion of ATT.

Table 4 shows the direct effects of the variables on each other together with confidence intervals bias corrected values and these are also the hypothesis test results obtained as a result of the bootstrap. The paths PBC—> ATT ($\beta = 0.432$; $p = 0.000$***), PB—> WPC-TRUST($\beta = 0.410$; $p = 0.000$***), PB—> ATT ($\beta = 0.236$; $p = 0.006$**), WPC-TRUST- > PBC ($\beta = 0.244$; $p = 0.005$**), WPC-TRUST- > ATT ($\beta = 0.300$; $p = 0.000$***), and ATT—> BI ($\beta = 0.327$; $p = 0.008$**) are significant. Therefore, H1b, H1c, H2, H3, H4, and H5 are accepted. However, H1a is rejected as PBC—> BI ($\beta = 0.188$; $p = 0.060$) is insignificant. However, since H1a is the sub-hypothesis of H1, which is the mediation hypothesis, it is necessary to continue interpretation. For mediation test, we followed the procedure recommended by [66]. According to authors, if indirect effect are significant, there is a mediation. Pls-sem software provides specific indirect effect to check mediation effect. Results show that the path PBC- > ATT—> BI ($\beta = 0.141$; $p = 0.006$**) is significant, meaning that there is full mediation [66]. In other words, ATT fully mediates the effect of PBC on BI. Therefore, H1 is also accepted.

PLS-MGA

To check the moderation effects of nationality and SEI, we conducted MGA analysis. With this analysis, by dividing the sample into groups, it can be understood for which group the relationship between two variables is significant. Table 5 only presents social exclusion index results as we could not find any moderating effect of nationality on the whole model. Therefore, H6 is rejected. SEI is an index in which 80% of the median of the population average is cutoff line [67]. We calculated the cutoff line as 2.69 and evaluated the averages below that value as participants who feel socially excluded. Accordingly, considering SEI, PB—> WPC-trust ($\beta = -0.473$; $p = 0.001$**), PB—> ATT ($\beta = -0.719$; $p = 0.046$*), WPC-trust- > PBC ($\beta = -0.597$; $p = 0.001$**) paths are significant (out of 7 relationships) for those who feel social exclusion. Therefore, H7 is partially accepted.

PLS-predict

As in-sample prediction is likely to overestimate a model's predictive ability, the out-of-sample prediction method proposed by Shmueli et al. [68] is deemed useful for evaluating more robust results and the predictive potential of a construct. The root mean squared error (RMSE) or mean absolute error (MAE) for PLS indicators (dependent variable) must be less than that of LM (linear regression model), according to the predictive power assessment. If every difference is greater than zero, the predictive ability is deemed to be high [68]. Table 6 provides that our model constitutes high predictive power.

Table 6 The out-of-sample approach results

Indicators	Q^2 _predict	PLS MAE	LM MAE
BI1	0.046	0.680	0.707
BI2	0.057	0.744	0.791
BI3	0.112	0.690	0.694

Discussion

This study examines WPs' intention to join WPC through behavioral factors. The proposed model broadens our knowledge of participation behavior by including WPC-trust and perceived benefit, as well as TPB aspects of perceived behavioral control and attitude. We used the PLS-SEM approach to evaluate the model and perform MGA. The results of our study provide variety of contributions, increasing our general knowledge of WPs behaviours.

To answer RQ1, which seeks answer to explain the participation intention of WPs, PLS-SEM results should be examined. Accordingly, attitude is the most influential variable on intention (0.327), as predicted, and attitude is also heavily impacted by perceived behavioral control (0.432) compared to the impacts of perceived benefit (0.236) and TR (0.300). This study confirms the substantial association between TPB characteristics in the context of WPs' intention to participate in cooperatives. What is more noteworthy is that the effect of perceived behavioral control on behavioral intention is entirely dependent on attitude, since attitude completely mediates the relationship between perceived behavioral control and behavioral intention. This novel insight adds to common knowledge by demonstrating that to participate in cooperatives, WPs must first build favorable attitude toward intention. We believe that the effects of perceived benefit and WPC-trust on attitude can explain why this happens.

To the best of our knowledge, this study represents the first attempt to investigate the impact of WPC-trust and perceived benefit on attitude, utilizing the TPB as the theoretical lens to answer RQ2. The significance of trust as an important advocate of attitude has been recognized in several contexts [22, 31]. Therefore, it is expected that WPC-trust will have a positive impact on attitude if WPs believe that the offerings provided by cooperatives will fulfill their needs. Here, the positive and significant effect of perceived benefit on WPC-trust (0.410) makes more sense, as WPs perceive the cooperatives' offerings as beneficial, increasing their WPC-trust in return. Taking into account all these relationships discussed, it becomes apparent that WPC-trust and perceived benefit have a substantial impact on the generation of attitude, which, in turn, is anticipated to enhance individuals' intention to participate. The direct and significant effect of perceived benefit on attitude is relatively small (0.236), indicating perceived benefit is better working with the inclusion of WPC-trust into the relationship where attitude is generated.

Additional insights can be derived from the findings of MGA by recalling the content that has been previously addressed. Accordingly, the effects of perceived benefit on WPC-trust, perceived benefit on attitude, and WPC-trust on perceived behavioral control differ in favor of WPs who are actually socially excluded. Given these relationships, it is logical that social exclusion raises WPs' expectations of cooperatives' beneficial contributions to their lives. We recognize that they raise the anticipation of benefit, which raises the WPC-trust. Perceived benefit denotes that what cooperatives promise meets their demands. This notion enhances WPC-trust by convincing individuals that they will not be deceived. The positive impact of perceived benefit influences attitude, demonstrating that the journey to the intended behavior necessitates the collaboration of perceived benefit and attitude. Finally, WPC-trust, which is positively impacted by perceived benefit, raises the perceived behavioral control, implying that WPs' ultimate decision on whether to join a cooperative would be easy. They have already developed a favorable perception of perceived benefit, which has a positive effect on WPC-trust, and this gives them the impression of ease in making such a decision. In conclusion, this is the first study to justify such a relationship in the context of WPs by taking social exclusion into consideration. According to the discussion made so far, we also answered RQ3.

Finally, it should be noted that this study is not able to find the moderating effect of nationality, even though more than half of the participants are immigrants. This might be explained by the notion that, considering their perception of cooperatives, there is no difference between local WPs and immigrants. This notion actually contradicts what Gorodzeisky and Richards [22] indicated. The authors discovered that immigrant WPs have more belief in cooperatives than domestic WPs since cooperatives are highly regarded in their home countries. However, the disparity in the findings between the research done in European countries and this particular study conducted in Türkiye can be attributed to Türkiye's and neighboring countries socio-economic and socio-demographic structures.

Theoretical implications

With the use of the TPB, we developed a unique model that incorporates PB and trust characteristics to explain WPs' willingness to participate in cooperatives. Because intention is an explanatory variable for the target behavior [34], we believe that our model contributes significantly to the waste management area in terms of understanding WPs behaviors. We used the PLS-SEM to close the research gap since we take a prediction-oriented approach [23]. Following that, we used PLS-SEM to validate specified connections and anticipate WPs' intentions. Using MGA, we discovered substantial differences in trust, attitudes, and perceived benefit between WPs who felt socially excluded versus the opposing group. Our model adds fresh and substantial

insights to the literature on WPs and waste management that are intended to help scholars better appreciate the relevance of understanding how individual pickers evaluate what cooperatives provide for them. Scholars might further examine the findings of our study by integrating them with diverse personal qualities, given the fresh insights presented. Finally, the TPB is consistent with the features of trust, benefit, and social exclusion, since they effectively explain the genesis of the primary phenomena. As a result, the link between personal preferences and social exclusion is clear, indicating the importance of a social benefit perspective when analyzing what WPs expect from a cooperative. Thus, we conclude that the perspective emphasizing WPs' social well-being improves the social behavior feature of participation intention.

Managerial and social implications

In order for WPs to indicate their intention to join WPCs, it is crucial that they develop a favorable attitude towards these cooperatives. We contend that waste pickers in Türkiye have a deficiency in their understanding of the diverse benefits and advantages that come with joining a cooperative. Such shortfall may arise from the apprehension that WPs have over the potential loss of social assistance provided by the municipality if they were to join a WPC. Another potential reason for WPs to be hesitant about joining the WPCs is the assumption of a fixed salary. Both WPCs and policymakers should offer training sessions to waste pickers, specifically aimed at elucidating the advantages and benefits of WPCs. Cooperative administrators should enhance their promotion and information dissemination endeavors significantly to proficiently elucidate and endorse their organization and the services it provides to waste pickers.

Policymakers must thoroughly understand the projected benefits that waste pickers are anticipated to receive by joining a WPC. In order to do this, policymakers and researchers who are interested must carry out a needs analysis of waste pickers. The operations conducted by WPCs must undergo a thorough evaluation and adjustment in order to effectively tackle the identified problematic areas. Moreover, there is a need to enhance procedures that guarantee enhanced participation of waste pickers in the decision-making process about the services and activities provided by WPCs. This has the potential to increase the appeal of WPCs to waste pickers who are not affiliated with cooperatives.

The analysis revealed that a significant proportion of waste pickers were individuals who had migrated from other regions. Migrants are at a higher risk of experiencing social exclusion compared to native workers, which can result in disparities in perceived benefits, trust, and attitudes. Therefore, it is reasonable to infer that migrant waste pickers would anticipate a greater degree of benefit from cooperatives. Therefore, it is recommended that migrant waste pickers get social integration and multiculturalism training in order to promote a peaceful working environment.

Limitations and future research

This study is not devoid of some limitations. Firstly, although it may be indicative of the overall condition in other cities, the level of participation is slightly low. This might be perceived as a limiting aspect in our interpretations of the results. Therefore, future research should attempt to include a broader demographic of WPs to introduce more diversity into the sample by gathering data from more than one city. As the number of WPs, including immigrants, grows, subsequent research will have the opportunity to analyze the differentiation effect of other demographic factors, such as gender, age, and nationality. Second, this study specifically examines a single theory, namely the Theory of planned behavior (TPB), which we assert to be very efficacious in elucidating intentions. However, our model may be incorporated by alternative theories such as Social Exchange Theory, Privacy Calculus Theory, and Social Network Theory, each having distinct antecedents. We are of the opinion that employing such methodologies can augment our comprehension of the phenomenon by exploring intricate social, advantageous, and economic elements.

According to the MGA results, for three relationships, group differences were found in terms of social exclusion. In the relationships PB—> WPC-TR; PB- > ATT; WPC-TR- > PBC, the effects are higher for those who feel socially excluded. However, the reasons for their feeling of social exclusion were not included within the scope of the study, and it remains important as a subject for future research. In addition, perceived benefit leads to more WPC-trust and more ATT, and more WPC-trust leads to more perceived behavioral control. Therefore, analyzing participants' benefit expectations is also an important future research topic, as it seems to trigger some chain of relationships.

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