Research on citizens' behavior in relation to the use of re-use centers and re-use points

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Abstract: *The article explores the attitudes and behavior of Czech consumers aged 18+ towards the adoption of secondhand goods within the framework of the circular economy. While the European Union's Circular economy action plan emphasizes sustainable production and consumption, consumer resistance to re-used goods remains a barrier. The exploratory study aims to identify the perception/attitude/relationship of the Czech population towards the purchase of used items. Detailed knowledge of the customer is an elementary base for the market of re-used products to grow. The research objective is divided into three partial objectives: identifying the main customer segments in secondhand markets, evaluating the reasons for and against purchasing re-used items, and assessing the perceived suitability of various product categories for secondhand trading. Conducted in June 2024, the research involved an online survey of 1,300 respondents across the Czech Republic. Ajzen's theory of planned behavior (TPB) was employed to structure the questionnaire, while data analysis utilized Pearson's χ^2-test of independence to examine relationships between categorical variables. In some instances, complementary methods were employed. The findings indicate that younger consumers and those actively employed are more inclined to purchase re-used goods, while older individuals and pensioners show higher reluctance. Cars, art, and books were viewed as highly suitable for secondhand markets, whereas casual footwear was ranked lower. The results also suggest that Czech consumers are generally open to the secondhand market and each product category has corresponding group of customers who find the product suitable to sell. This research contributes to the literature on the circular economy by highlighting how targeted business and marketing strategies can address consumer resistance, ultimately fostering sustainable consumption.*

Keywords: *Behavioral analyses, consumption patterns, environmental economics, marketing, product segments.*

JEL Classification: *Q53, Q56, O12, M31.*

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Introduction

The transition towards a sustainable future demands comprehensive strategies that address the complex nature of production and consumption. The European Union's new Circular Economy Action Plan represents a holistic framework aimed at fostering a cleaner and more competitive Europe (European Commission, 2020). This plan encompasses a series of interconnected initiatives designed to establish sustainable products, services, and business models as the norm. One aspect of this plan is the transformation of consumer habits to ensure that waste generation is minimized. By engaging economic actors, consumers, citizens, and civil society organizations, the plan seeks to create a collaborative effort towards sustainability and competitiveness, not only in Europe but globally.

However, the strategic policy of the European Union (EU) does not fully address the resistance of consumers towards circular economy (CE) objectives, particularly regarding re-used goods. Therefore, one of the challenges to fulfill this plan is to understand the relationship between purchase of new and re-used products and the conditions under which the consumer is willing to buy secondhand products and use them.

Despite the benefits, several barriers impede consumer acceptance of reused products. These include concerns about product quality and performance, risk aversion, lack of ownership, low value offer and access, hygiene, and social stigma associated with using secondhand goods (Camacho-Otero et al., 2017). But the overall change to circular economy also includes the consumer integration into process of the change. Studies of positive attitudes, driven by environmental consciousness and cost savings, show that consumers who perceive reused products as environmentally friendly and economically beneficial are more likely to engage in re-use behaviors (Camacho-Otero et al., 2017; Edbring et al., 2016). Based on theoretical background this research is divided into three objectives:

RO1: Identify the key customers of secondhand stores and find correlations between customer categories and product categories.

RO2: Evaluate the significance of reasons for and against purchasing used items.

RO3: Identify the suitability of different types of products for trading in the secondhand market and the shortcomings of used items as perceived by potential customers.

This research aims to explore whether, within the context of the CE, consumers in the Czech Republic are willing to adopt secondhand products, and if not, to identify the barriers that hinder their acceptance. Furthermore, this paper seeks to investigate potential strategies to enhance consumer openness and willingness to embrace re-used products, thereby supporting the broader goals of the CE.

1 Theoretical background

1.1 Re-use within circular economy

The concept of the CE encompasses various models, starting from the 3R approach (reduce, re-use, recycle) to the more expanded 4R model (reduce, re-use, recycle, recovery), and extending to the waste management pyramid. The waste management hierarchy is used also within EU bodies to prevent the waste in following order: prevention, preparing to use, recycling, other recovery and disposal (Directive 2008/98/EC, 2018). It must be noted that CE models include re-use as a strategy to extend the product lifecycle.

Despite these numerous frameworks, there is no unified definition, leading to what Kirchherr et al. (2017) describe as "circular economy babble." Moreover, many of these frameworks fail to adequately incorporate the role of the consumer and societal systems in the transition from a linear to a circular economy (Haberl et al., 2019).

Dolderer et al. (2021) argue that neoclassical economic theory struggles to address the ecological and social challenges of the 21st century, which might contribute to the lack of consensus on CE concepts. Some researchers assert that it is impossible to sustain economic growth while achieving environmental objectives, as economic growth is often linked to polluting activities (Fischer-Kowalski & Haberl, 2015; Haller, 2020). This suggests that maintaining current economic growth is a complex issue, and part of the solution for integrating a circular economy involves focusing on the consumer and changing their purchasing behavior.

The household resource consumption may be classified into six domains in which consumer goods (ICT/AV equipment, furniture, clothes, sports/entertainment, paper/stationery and other) create approximately 20% of all

lifestyles total carbon footprints per capita per year in average in Finland (Lettenmeier et al., 2019). According to the Prosperity and Financial Health Index the level of the living environment in the Czech Republic (Czechia) has slightly improved year-on-year, the Czechia is currently ranked 22nd, while Finland is ranked 9th (Europe in Dates, 2023). Results show that Czechia still has work ahead to achieve an improvement.

EU bodies identified the key product value chains qualified for coordinated actions to address sustainability challenges and enhance markets for circular products. These value chains are electronics and ICT, batteries and vehicles, packaging, plastics, textiles, construction and buildings, food, water, and nutrients (EC, 2020). Based on the cross-correlation of the household consumption domains and the identified value chains the fields identified for re-use include consumer goods such as ICT/AV equipment, furniture, clothes, and sports/entertainment items, as well as packaging, textiles, and food-related products. These products constitute the basis for the development of the re-used market.

1.2 The role of customer in the circular economy

The socio-technical view emphasizes that change in consumption behavior arises from the interaction between daily actions and broader societal structures, rather than from individual decisions alone. Thus, understanding and altering consumption patterns requires focusing on the social and material contexts that shape consumer behavior, rather than merely attributing overconsumption to individual choices (Mylan et al., 2016). Therefore, the transition to a CE requires cooperation and coordination across multiple spheres of influence, including government policies, business practices (particularly within supply chains), societal norms, and ultimately consumer acceptance and action (Hazen et al., 2017).

The push-pull-mooring theory of migration (PPM) posits that individuals are compelled to change behavior due to negative macro-level push factors, such as increased housing costs, scarcity of essential resources such as electricity or fuel, oppressive conditions, epidemics, and natural disasters. Concurrently, they are attracted by positive macro-level pull factors, which include better living conditions, improved employment prospects, superior product performance, groundbreaking technologies, or governmental incentives and tax breaks, such as those for alternative-powered vehicles. However, the micro-level ground factors, encompassing personal, social, and cultural values, play an intensifying role in consumer's intention to migrate towards remanufactured products (Hazen et al., 2017).

While this perspective highlights the role of market offerings and infrastructures, it alone does not address the underlying concern that economic growth is linked to increased pollution. This view belongs to a group of opinions where consumers are often portrayed as passive (Wurster & Schulze, 2020) and their passive acceptance is considered crucial for the continuity of the CE (Hobson, 2021; Mylan et al., 2016). However, the CE encompasses more than just the delivery of new services or products; it involves extending product lifecycles through re-use, as emphasized in the new publication related to the implementation and further development of European Union (EU) waste legislation (EC, 2024). The perspective of simple "consumer acceptance" overlooks the significant socio-economic transformations that the CE aims to bring to society (Hobson, 2021). Instead, consumers should be actively involved, shaping market offerings and contributing to broader sustainability goals. This active involvement is essential for realizing the full potential of the CE in the fields of long use of products as well as the re-use or recycling.

In the concept of a CE, there is a crucial role for all stakeholders, including manufacturers, authorities, local communities, and consumers. During the transformative phase of both economics and society to CE, it is essential for consumers to actively participate in extending product lifecycles through re-use or prolonged use, thereby reducing overconsumption, and resisting the continuous demand for supposedly improved products that sometimes offer insignificant innovations. But to achieve so, one must firstly understand the positive attitudes but also the barriers which prevent consumer from accepting once re-used product and focus the offer on the acceptable products and build the environmental awareness slowly based on the positive experience.

1.3 The barriers in acceptance of re-used products

Social norms and cultural factors significantly impact consumer behavior towards re-used

products (Ertz et al., 2021). In societies where sustainability is a valued norm, consumers are more likely to adopt re-used items (Camacho-Otero et al., 2017; Edbring et al., 2016), but in cultures with strong preferences for new products, promoting re-use requires substantial efforts to change deep-rooted consumption patterns (Bianchi & Birtwistle, 2012). Despite obvious efforts from the EU bodies, researchers point out the lack of sufficient awareness of the environmental advantages associated with re-used, repaired, and refurbished products (Abbey et al., 2017; Camilleri et al., 2023).

Studies have shown that, despite being aware of environmental problems and intending to address them, consumers often do not choose sustainable options and are unwilling to pay higher prices for sustainable products or logistics (Schleiden & Neiberger, 2020) and are driven by hedonistic motives (Tascioglu et al., 2019) or price (Bianchi & Gonzalez, 2021).

Secondhand products are an option, particularly when price and environmental value align. However, not all consumers have such strongly developed environmental values and have different barriers to adopt secondhand products. These include concerns about product quality and performance, risk aversion, lack of ownership, unidimensional value offering, and access, hygiene, and social stigma associated with using secondhand goods (Camacho-Otero et al., 2017).

Consumer willingness to pay for re-used products decreases when there is a perceived risk that these products may be of lower quality, either functionally or cosmetically. In this context, factors such as durability, features, performance, and usability are critical determinants of perceived quality (Abbey et al., 2017). Although re-used goods are often sold at lower prices, the savings are frequently not seen as sufficient to offset the perceived reduction in quality (Sheoran & Kumar, 2022).

Hazen et al. (2012) identified a significant relationship between consumer perceptions of ambiguity (arising from insufficient product information) and their willingness to pay for refurbished items. Tolerance for ambiguity was shown to influence perceptions of quality, which, in turn, affected price sensitivity. To address these concerns, Guiot and Roux (2010) advocated for greater consistency in seller claims and enhanced quality assurances, including the provision of detailed technical documentation. This call for clarity was further supported by Watson et al. (2017) who highlighted a general lack of consumer awareness regarding warranty periods and consumer protection rights, thus further impeding the uptake of refurbished goods. To overcome these barriers, targeted interventions are required. Quality assurance certifications, alongside well-orchestrated awareness campaigns, are essential in reshaping consumer perceptions (Khor & Hazen, 2017; Mugge et al., 2017; Watson et al., 2017). Moreover, companies are encouraged to enhance transparency by sharing the "story" of the product (emphasizing its prior use and the recycling processes it has undergone) thereby making the item more appealing to environmentally conscious consumers (Kamleitner et al., 2019).

In the realm of secondhand clothing, Sheoran and Kumar (2022) specified that concerns over cleanliness and safety play a significant role in deterring purchases, particularly within fashion and personal items, where consumers may associate used goods with poor hygiene or a diminished social status. Other barriers include the absence of size labels, limited sizing options, disorganized store layouts, and the unavailability of fashionable items, which often reflect outdated styles, thus making secondhand products less attractive compared to new ones (Farrant et al., 2010).

On the other hand, psychological ownership, as described by Etzioni (1991) and further elaborated by many influential authors in the field of psychology, sociology, economics, product design and others (Baxter et al., 2015; Kumar, 2021; Lee & Suh, 2015; Pierce et al., 2001) and possession of "property" become extensions of the self, embedding a sense of "mine" deeply within an individual's identity. This ownership provides emotional self-determination and control over one's environment, which are critical components of modern consumer behavior.

The abovementioned study proves that convincing consumers about the benefits of a purchase requires more than a simple appeal to the value of the environment. For environmental behavior (like re-use), motivation is often lacking, requiring interventions to first generate motivation and then focus on implementation (Ajzen & Schmidt, 2020) to encourage adoption of these sustainable practices. Change in attitude, subjective norm, or perceived behavioral

control can only be expected if the intervention effectively alters the overall set of behavioral, normative, or control beliefs (Ajzen & Schmidt, 2020). One model for such interventions is the typology of interventions in proximal physical micro-environments (TIPPME) introduced by Hollands et al. (2017), which outlines six intervention types designed to modify either the properties or placement of objects or stimuli within sensory-perceptible physical micro-environments. Placement can be adjusted by altering the availability and position of objects, while properties can be modified in terms of functionality, presentation, size, and available information (Marteau et al., 2020). This change requires a complex understanding of customer perception of the re-used products purchase.

2 Research methodology

The research was conducted in June 2024 through an online survey targeting a representative sample of 1,300 respondents across the Czech Republic. The sampling (set by the Laboratory for the study of human behavior) reflects the overall population distribution, with quotas based on gender, age, education, income levels, size of place of residence, and economic activity (sometimes referred to as profession). These demographic variables were chosen to ensure a comprehensive analysis of the secondhand market and to capture key consumer segments.

The study employed Ajzen's theory of planned behavior (TPB) to frame the design of the questionnaire.

Ajzen's (1991) theoretical background, as expanded with Fishbein and Ajzen (2010), provides a comprehensive view of the theory of values from multiple perspectives, offering a robust foundation for understanding decision-making processes. Specifically, the theory of planned behavior (TPB) was selected for this study due to its well-established framework for exploring the determinants of behavioral intentions and actions. TPB identifies three core constructs that influence behavior: attitudes toward the behavior, subjective norms, and perceived behavioral control.

This framework is particularly relevant to the study as it aligns with the research objective of examining Czech consumers' attitudes and behaviors toward re-used goods. By structuring the questionnaire around TPB constructs, the study captures the psychological and social factors influencing consumer decision-making, offering insights into the drivers and barriers within the context of the circular economy.

Responses were collected using a 7-point Likert scale to mitigate the ceiling effect, as per Fishbein and Ajzen's (2010) guidelines. The survey aimed to answer three main research objectives, each with a set of specific questions. The research was meant to be exploratory, so there are no hypotheses tested.

Ajzen's TPB is commonly applied to test hypotheses related to its constructs; however, as this research is exploratory, we employed methods designed to uncover deeper insights and identify patterns rather than test predefined hypotheses. Therefore, data analysis was conducted using Pearson's χ^2-test of independence, which is apt for assessing the relationships between two categorical variables. This test was selected because it allows for the exploration of associations between demographic characteristics (such as gender, age, education, income) and behaviors related to secondhand purchases. The χ^2-test compares observed frequencies of responses within categories against expected frequencies derived under the assumption of independence between the variables. This method's capability to handle both nominal and ordinal variables enabled comprehensive insights into consumer behavior across various demographic segments. Employing this statistical test was crucial to effectively answer the research questions and identify statistically significant patterns in the data. For the final analysis, although many results showed significance at the 0.1 and 0.05 levels, it was decided to focus exclusively on those with a significance level of 0.01. This stricter threshold was applied to minimize the risk of false positives, ensuring that only the most robust relationships were considered. By excluding results with higher *p*-values (0.1 and 0.05), the analysis aimed to reduce the likelihood of interpreting relationships that may have occurred by chance. Additionally, the fact that all results were initially tested across the 0.1, 0.05, and 0.01 significance levels further validates the toughness of the findings, as it confirms that the chosen results met the most stringent criteria, ensuring greater confidence in the conclusions. In some instances, it was necessary to employ alternative methods. These included the use of graphical visualizations or mean correlation analysis, mostly in the form of a matrix.

This approach enhances the credibility of the analysis, confirming that the observed associations, whether between customer categories and their secondhand purchasing behavior or product suitability, are statistically robust and reliable and align with the explanatory method of the research.

3 Results and discussion

3.1 Results

To facilitate better orientation in the overall research and the data, which are quite extensive, the results are divided into three objectives and each of these is further segmented by the questions that were considered within each objective.

RO1: Identify key customer segments of secondhand stores and examine correlations between customer categories (such as gender, age, education, income) and product categories. The research objective is answered via a set of three research questions.

RQ1.1: Are there significant differences in purchasing secondhand items based on gender, age, place of residence, education, income, and economic activity?

Pearson's chi-square analysis did not find a significant correlation between gender, size of place of residence, education and income level and purchases of secondhand items. The respondents were answering the question of whether they buy used products. Significant correlations were found regarding age and economic activity related variables implying significant trends regarding the purchase of secondhand items (Tab. 1).

RQ1.2: Can specific activities be identified through which different population segments contribute to charitable causes via secondhand stores?

The matrix of Pearsons chi-square reveals specific preferences for engaging in charitable activities through secondhand stores, with notable trends showing that gender, age, and profession play the crucial role (Tab. 2).

In case of willingness based on the "good cause" appeal, the variables seem to play more significant role than in shopping behavior. To explain phenomena was used means comparison in matrix.

The matrix categorizes questions and corresponding variables into different percentile ranges. The variables without significance at a higher or lower level are not listed for clarity (Tab. 3). A simple look at the Tab. 3 indicates that a good cause is a strong motivator for women and parents at the maternity leave category.

The best option for every category is selling or donating items to such shops. The other option, shopping within walking distance, follows with a significant difference. The higher the distance or the bigger the effort, the significantly lower the desire to purchase for good cause. On the other hand, men rather donate money than travel or actively participate. Women prefer activities, even traveling or active participation over donating money. An interesting phenomenon is the behavior of people with the highest incomes who fall into lower categories in nearly all categories (except for doing nothing). The trend of social help does not seem to be important to them.

Tab. 1: Significance in purchasing behavior

	TC	Level of significance		
		0.1	0.05	0.01
Economic activity	23.924	9.236^{x}	11.070^{x}	15.086^{x}
Monthly income	5.031	12.017^{-}	14.067^{-}	18.475^{-}
Size of place of residence	13.347	13.362^{-}	15.507^{-}	20.090^{-}
Age	67.694	15.987^{x}	18.307^{x}	23.209^{x}
Education	5.854	10.645^{-}	12.592^{-}	16.812^{-}
Gender	8.771	4.605^{x}	5.991^{x}	9.210^{-}

Note: TC – tested criterion; the "x" represents significance found at particular level; the "–" represents no significance found at particular level.

Source: own

Tab. 2: Correlation of variances to the willingness to contribute to good case

Question/variable	Gender	Age 18–64 and 65+	Age	Size of place of residence	Education	Income level	Economic activity
If I knew that shops with re-used items were contributing to a good cause, I would be willing to do							
Shop at a secondhand shop within walking distance	x	x	x				x
Shop at a secondhand shop within 30 km	x	x	x				x
Shop in a secondhand shop over 30 km away	x	x	x	x	x		x
Donate unwanted items to such a shop	x						x
Sell unwanted items to such a shop	x						x
Donate a sum of money to such a shop	x	x	x				x
Actively participate in the running of the shop		x	x				
Nothing							

Note: The "x" represents significance found at 0.01 level.

Source: own

RQ1.3: Can connections be specified between customer categories and the types of products they prefer to purchase?

The analysis examines the purchasing behavior of 1,018 respondents who indicated that they shop at secondhand stores regularly or occasionally. This subset of the original sample was selected after excluding 22% of the total respondents who do not shop at secondhand stores at all.

The Pearson's chi-square test results (Tab. 4) underscore that there are statistically significant differences between the groups for most product categories. Each demographic category exhibits distinct purchasing patterns, suggesting that demographic factors significantly influence secondhand purchase most of the products, except for art.

The following matrix of product groups and individual variables provides an overview of the groups that purchase products the most, highlighted in green (percentile ≥75%), and the least, highlighted in red (percentile ≤25%). Based on Tab. 5, it is evident that the mean purchases significantly differ across the categories. Tab. 5 is organized according to the means calculated based on participant responses on a 7-point scale, where 7 indicates the most frequent purchase and 1 indicates never.

The product matrix reveals that cars are the best commodity to sell, and the best customer is an entrepreneur or customer with a high income with residence in place up to 5,000 citizens and in age between 35–54 years. However, it should be noted that only three categories fall below the statistical deviation from the group average, appearing unsuitable for car sales, namely people from cities with over 100,000 inhabitants, pensioners, and the age group 65+.

Categories such as books, workshop tools, sports equipment, art, household appliances, and pet supplies exhibit very small standard deviations, indicating minimal overall differences in the mean responses. This suggests that these categories are generally consistent in terms of purchasing behavior. On the other hand, casual clothing, games and toys, children's clothing, and equipment show a deviation of 0.4, reflecting greater variability in purchasing behavior.

The most variable category is footwear with a standard deviation of 0.5. It is primarily purchased by parents on maternity leave, students, individuals with lower incomes and education levels, and young people aged 18–34. In contrast, the lower percentiles for footwear

Tab. 3: Comparison of means in questions related to contribution to good cause

Question	Gender		Age	Size of place of residence (number of of inhabitants)			Education		Economic activity			Monthly income	
	Woman	Man	65+	1,001–5,000	5,001–20,000	20,001–100,000	Basic incl. incomplete	University degree	Pensioner	Maternity/parental leave	Student	Up to EUR 642	Over EUR 1,604
Shop at a secondhand shop within walking distance	4.54	4.00	4.27	4.25	4.24	4.24	4.20	4.25	4.28	4.36	4.28	4.28	4.24
Shop at a secondhand shop within 30 km	3.87	3.42	3.64	3.63	3.62	3.62	3.57	3.63	3.65	3.74	3.66	3.65	3.63
Shop in a secondhand shop over 30 km away	3.31	2.98	3.14	3.13	3.13	3.12	3.08	3.14	3.14	3.23	3.16	3.14	3.13
Donate unwanted items to such a shop	5.09	4.47	4.78	4.77	4.77	4.76	4.74	4.78	4.79	4.88	4.79	4.79	4.76
Sell unwanted items to such a shop	5.02	4.56	4.80	4.80	4.80	4.80	4.78	4.79	4.80	4.88	4.80	4.81	4.79
Donate a sum of money to such a shop	3.00	3.99	2.84	2.83	2.83	2.83	2.80	2.84	2.84	2.94	2.86	2.84	2.83
Actively participate in the running of the shop	3.26	2.92	3.08	3.08	3.07	3.07	3.05	3.08	3.08	3.19	3.09	3.09	3.08
Nothing	2.97	3.27	3.13	3.14	3.14	3.14	3.13	3.13	3.12	3.09	3.10	3.12	3.14

Note: Values represent mean responses on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Coloring is applied row-wise to highlight relative positions of the means. A green box indicates that the mean is positioned in the sector with the highest agreement percentile (≥75%) and red indicates the lower agreement percentile (≤25%). Green shades indicate higher mean values (closer to strong agreement); red shades indicate lower mean values (closer to disagreement) in the row.

Source: own

Tab. 4: Pearson's chi-square results – Part 1

Question/variable	Gender	Age 18–64 and 65+	Age	Size of place of residence	Education	Income level	Economic activity
I personally buy							
Personal electronics (e.g., computers, mobile phones, notebooks)		x	x				x
Household appliances	x	x	x		x		
Household supplies		x			x		x
Home textiles		x	x		x		x
Clothing (casual)	x					x	x
Children's clothing	x	x	x	x			
Children's equipment		x	x	x			x

Tab. 4: Pearson's chi-square results – Part 2

Question/variable	Gender	Age 18–64 and 65+	Age	Size of place of residence	Education	Income level	Economic activity
I personally buy							
Specialised expensive clothing (e.g., sports, special occasion clothing)	x	x	x				x
Books, CDs, DVDs					x		
Footwear	x	x					x
Specialised expensive footwear (e.g., sports)		x	x				x
Sports equipment and tools		x	x				x
Games and toys	x	x	x				x
Furniture		x	x				x
Car	x	x	x	x			
Sanitary ceramics		x	x	x			x
Workshop tools	x			x	x		
Decoration and home accessories	x	x	x			x	
Gifts for family		x	x		x		x
Pet supplies		x	x				x
Art							

Note: The "x" represents significance found at 0.01 level.

Source: own

purchases include pensioners, entrepreneurs, high-income groups, individuals aged 55+, and, surprisingly, residents of towns with populations between 5,001 and 20,000.

RO2: Evaluate the significance of reasons for and against purchasing used items. The research objective starts with the first research question:

RQ2.1: What are the main reasons why people buy secondhand items?

The correlation of reasons to purchase and the socio-demographic group show (Tab. 6) that motivations for buying secondhand items are not driven by cost but by social and personal connections, as well as ethical considerations.

Knowing the seller personally is a crucial motivator across education and income differentiated groups. Similarly, meeting people changes with age education level. Additionally, the social aspects of shopping and altruistic reasons like environmental concern and aiding disadvantaged groups also play significant roles, particularly among younger consumers and women, which is proven by previous answers to research questions. The location plays a crucial role based on age, gender, and the size of place of residence.

RQ2.2: What are the barriers that prevent people from purchasing used goods?

The analysis encompasses responses from all 1,300 participants addressing various concerns that hinder the purchase of secondhand goods (Tab. 7). The correlations indicated in the matrix primarily revolve around age and profession, suggesting specific trends within these groups.

The chi-square analysis reveals that differences in the perception of challenges related to purchasing secondhand items are primarily associated with age and profession. The most significant disparities across categories are observed in the issue of a lack of product information (service, warranty or information about origin), which varies not only by age and profession but also by education level.

Tab. 5: Pearson's chi-square results

I personally buy	Gender		Age						Size of place of residence (number of inhabitants)					Education				Monthly income			Economic activity				
	Man	Woman	18–24	25–34	35–44	45–54	55–64	65+	Up to 1,000	1,001–5,000	5,001–20,000	20,001–100,000	over 100,000	Basic incl. incomplete	Apprenticeship certificate	Secondary and higher vocational	University degree	Up to 642 EUR	EUR 642–1,604	Over 1,604 EUR	Student	Entrepreneur	Employee	Pensioner	Maternity/parental leave
Personal electronics	3.15	2.57	3.54	3.33	3.00	2.81	2.71	2.23	2.97	3.01	2.52	2.96	2.67	3.26	2.97	2.68	2.59	3.13	2.82	2.86	3.46	3.14	3.01	2.29	2.60
Household appliances	2.72	2.62	2.89	3.08	2.82	2.68	2.63	2.16	2.77	2.91	2.42	2.62	2.55	3.09	2.82	2.50	2.39	2.98	2.71	2.44	2.82	2.68	2.82	2.27	3.00
Household supplies	2.30	2.52	2.90	2.70	2.49	2.32	2.40	2.08	2.38	2.68	2.15	2.47	2.38	2.96	2.44	2.34	2.13	3.11	2.47	2.07	2.70	2.17	2.52	2.16	2.97
Home textiles	2.30	2.65	3.10	2.84	2.56	2.40	2.43	2.06	2.51	2.75	2.26	2.52	2.34	3.01	2.60	2.31	2.19	3.06	2.54	2.14	3.18	2.32	2.60	2.10	3.20
Clothing (casual)	2.73	4.12	4.31	3.77	3.41	3.34	3.20	3.28	3.45	3.73	3.42	3.33	3.39	3.93	3.39	3.52	3.14	4.23	3.57	2.92	4.49	3.32	3.45	3.32	4.31
Children's clothing	2.74	3.43	2.93	3.26	3.55	3.38	2.87	2.53	3.30	3.25	3.03	3.09	2.81	3.32	3.02	3.13	3.04	3.38	3.13	2.94	2.94	2.81	3.32	2.50	4.66
Children's equipment	2.80	3.18	3.06	3.35	3.32	3.11	2.81	2.46	3.17	3.10	2.88	3.12	2.70	3.17	2.90	3.01	3.03	3.21	3.00	2.96	2.79	2.69	3.20	2.47	4.51
Specialized expensive clothing	2.19	2.59	3.16	2.72	2.51	2.45	2.32	1.85	2.44	2.53	2.26	2.46	2.30	2.69	2.31	2.43	2.31	2.87	2.39	2.34	2.82	2.36	2.57	1.88	2.91
Books, CDs, DVDs	3.43	3.81	3.34	3.64	3.65	3.75	3.81	3.47	3.54	3.49	3.44	3.71	3.91	3.18	3.47	3.79	3.94	3.30	3.69	3.52	3.76	3.62	3.72	3.42	3.43
Footwear	1.95	2.33	3.16	2.81	2.26	1.99	1.73	1.65	2.15	2.27	1.92	2.28	2.09	2.54	2.25	1.99	1.98	3.25	2.15	1.88	3.30	1.78	2.31	1.70	2.86
Specialized expensive footwear)	1.98	2.15	2.83	2.52	2.17	2.00	1.96	1.54	2.05	2.13	1.99	2.27	1.92	2.43	2.10	2.03	1.83	2.64	2.09	1.87	2.58	1.82	2.28	1.58	2.46
Sports equipment and tools	2.79	2.76	2.99	3.02	3.06	2.79	2.65	2.33	2.89	2.99	2.58	2.87	2.51	3.00	2.71	2.77	2.73	3.02	2.77	2.73	2.76	2.68	2.96	2.33	3.03
Games and toys	2.91	3.23	3.38	3.34	3.45	3.22	2.92	2.42	3.19	3.12	2.98	3.13	2.93	3.38	3.05	3.10	2.87	3.60	3.08	2.95	3.42	2.83	3.27	2.52	4.34
Furniture	2.93	3.23	3.34	3.58	3.22	3.09	3.15	2.48	3.37	3.27	2.88	2.94	2.89	3.44	3.09	3.08	2.85	3.49	3.07	3.04	3.52	3.34	3.23	2.49	3.69
Car	4.03	3.74	3.73	4.13	4.15	4.30	3.69	3.22	4.25	4.14	3.94	3.71	3.34	3.80	3.83	3.93	3.92	3.87	3.72	4.40	3.79	4.44	4.03	3.24	4.03
Sanitary ceramics	2.00	2.03	2.45	2.29	2.14	1.88	2.04	1.67	1.99	2.27	1.80	2.16	1.86	2.69	2.10	1.80	1.77	2.49	2.05	1.80	2.30	1.84	2.14	1.73	2.23
Workshop tools	3.21	2.76	3.07	2.93	3.09	2.96	3.08	2.82	3.17	3.18	2.79	3.08	2.61	3.34	3.13	2.89	2.60	3.28	3.01	2.80	3.03	3.01	3.02	2.89	2.63
Decoration and home accessories	2.64	3.00	3.55	3.06	2.81	2.77	2.83	2.52	2.81	3.09	2.60	2.97	2.69	3.20	2.91	2.79	2.50	3.34	2.89	2.52	3.24	2.63	2.93	2.58	3.43
Gifts for family	2.23	2.11	2.96	2.66	2.29	1.99	2.01	1.70	2.07	2.40	2.01	2.25	2.12	2.62	2.19	2.08	1.96	2.64	2.22	1.91	2.85	2.06	2.29	1.82	2.49
Pet supplies	2.46	2.53	3.00	2.88	2.51	2.35	2.47	2.20	2.61	2.70	2.39	2.65	2.14	2.83	2.64	2.42	2.16	2.85	2.51	2.37	2.94	2.35	2.64	2.23	2.43
Art	2.87	2.67	3.06	2.63	2.64	2.82	3.13	2.61	2.84	3.00	2.50	2.62	2.80	2.91	2.68	2.68	2.95	2.81	2.76	2.77	2.97	2.97	2.80	2.58	2.54

Note: The values are rounded to two decimal places, but calculations are based on the full figures. As a result, some identical numbers may not be labeled consistently. Values represent mean responses on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree). Coloring is applied row-wise to highlight relative positions of the means. A green box indicates that the mean is positioned in the sector with the highest agreement percentile (≥75%) and red indicates the lower agreement percentile (≤25%).

Source: own

Tab. 6: Pearson's correlation (the reason to buy re-used items)

Question/variable	Gender	Age 18–64 and 65+	Age	Size of place of residence	Education	Income level	Economic activity
I buy used things because of							
Low prices							
The owner or seller is a acquaintance					x	x	
The shop is close to my home	x	x		x			
I meet other people there			x		x		
No one else owns this item							
I like to collect "treasures" that I can only find in this type of shop							
I am interested in the environment	x						
I will help the disadvantaged	x						

Note: The "x" represents significance found at 0.01 level.

Source: own

Tab. 7: Barriers preventing the purchase of secondhand products

Question/variable	Gender	Age 18–64 and 65+	Age	Size of place of residence	Education	Income level	Economic activity
Buying used goods, it bothers me							
Obsolescence		x	x				
Lower product performance		x	x				
Lower product lifetime							
Lack of information about product features		x	x		x		x
Lack of information about the origin of the product		x	x				x
Lack of warranty		x	x				x
Lack of service and spare parts		x	x				x
Dirt		x	x				x
Limited range of products							x

Note: The "x" represents significance found at 0.01 level.

Source: own

RQ2.3: Can differences be identified in the added value between the observed variables (contributing to a good cause/environment)?

Data about the environment and "good cause" were already interpreted however in different context. Fig. 1 shows that the environmental appeal generally scores higher across most demographic segments compared to the appeal of helping disadvantaged persons, though the difference is marginal.

Environmental concerns and aiding disadvantaged individuals generally hold greater significance for women compared to men. The environmental appeal scores higher than the concern for helping the disadvantaged, with the largest difference observed in the 18–24 age group, students, and respondents with low income. Environmental considerations seem most important for women, individuals with incomes up to EUR 642, students, and parents on maternity leave, while being least significant for those with incomes over EUR 1,604.

Regarding the importance of helping disadvantaged individuals, it resonates most with women, people with basic or incomplete education, pensioners, and aged 65+, and parents on maternity leave. Interestingly, it is slightly less significant for residents of towns with populations up to 1,000. On the other end of the spectrum stand men, younger respondents aged 18–24, and those with the highest incomes.

RO3: Identify the suitability of different types of products for trading in the secondhand market and the shortcomings of used items as perceived by potential customers. The research objective starts with research question 3.1:

RQ3.1: Which types of used goods are considered most suitable for trading?

RQ3.1 is addressed by analyzing the mean scores assigned to different categories of goods. These scores reflect the perceived suitability of these items for trading in the secondhand market. Fig. 2 provides ranks of various types of used goods based on their mean scores, which indicate how suitable respondents perceive these items for trading.

Cars rank the highest with a mean score of 5.5 (the most suitable score was 7),

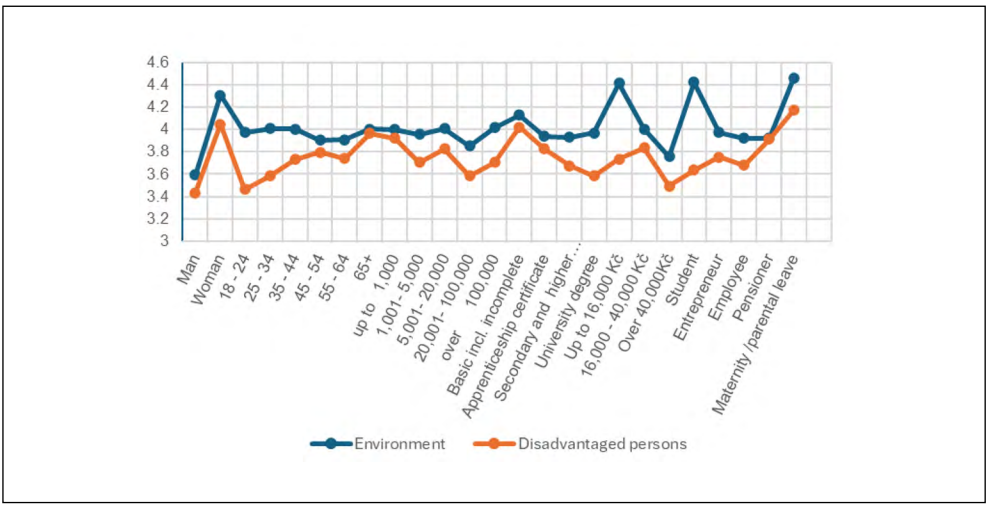
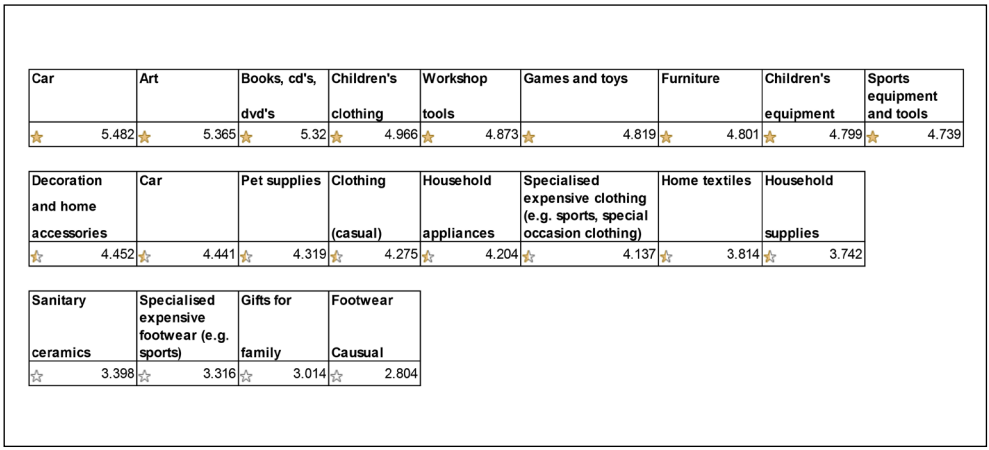


Fig. 1: Comparation environment vs. disadvantaged persons preference

Note: The x-axis represents the average mean of the responses (categories: gender, age – years, size of place of residence – number of inhabitants, education, monthly income, economic activity); Kč = CZK, exchange rate according to the Czech National Bank as of May 29, 2025: CZK 24.94 per EUR.

Source: own



Car	Art	Books, cd's, dvd's	Children's clothing	Workshop tools	Games and toys	Furniture	Children's equipment	Sports equipment and tools
5.482	5.365	5.32	4.966	4.873	4.819	4.801	4.799	4.739

Decoration and home accessories	Car	Pet supplies	Clothing (casual)	Household appliances	Specialised expensive clothing (e.g. sports, special occasion clothing)	Home textiles	Household supplies
4.452	4.441	4.319	4.275	4.204	4.137	3.814	3.742

Sanitary ceramics	Specialised expensive footwear (e.g. sports)	Gifts for family	Footwear Causual
3.398	3.316	3.014	2.804

Fig. 2: Perceived suitability of used product to trade

Note: The number in each box represents the average mean of the responses.

Source: own

suggesting they are considered the most suitable for trading in the used goods market. This could be due to the significant cost savings involved and the general acceptance of buying used cars as a practical option. Art and books, CDs, and DVDs score highly (5.3), indicating strong suitability. These items often have enduring value and can be appreciated by new owners without significant deterioration in quality. On the other hand, casual footwear has the lowest perceived suitability with a mean score of 2.8. This may reflect concerns about hygiene, fit, and wear specific to this category, making them less desirable as traded goods.

Respondents suggested, in an open question, a wide variety of other goods as suitable for trading: i) small electronics, though not specified, likely due to their practical utility and high demand; ii) items such as cosmetics, drugstore products, perfumes or wigs that might not suit one person but could still be desirable to others; iii) garden furniture, fishing gear, and collectibles (coins, stamps, knives) highlight niche markets where specific interests drive trading; iv) building materials and homemade products indicate a market for DIY (do it yourselves) enthusiasts and hobbyists, probably meant produced from old materials. This implies that the customer does not distinguish between re-use, recycle or rebuilt options but recognize them; and v) an interesting suggestion is medical supplies like crutches. Antiques and jewelry which were meant to be included in art prove that the market is segmented and almost any item can find a niche and a suitable buyer.

RQ3.2: What shortcomings do respondents perceive in used goods?

The analysis focuses on the shortcomings identified by consumers when purchasing used items. It looks like within the categories are not identified high deviation in answer distribution except one related to gender, two to broader age category, one to more segmented age category and last to place of residence (Tab. 8).

Age appears to be a significant factor in the experience of odors or the lack of information about a product's origin when shopping. Additionally, a notable gender difference is observed in responses regarding insufficient photos and descriptions on e-shops, which may reflect differing online shopping patterns between men and women. An interesting correlation exists between the size of the place of residence and the perception of products being unpleasant to touch. This correlation warrants further investigation based on the population structure of each region in Czechia.

Tab. 8: Experienced shortcomings when purchasing secondhand goods

Question/variable	Gender	Age	Size of place of residence	Education	Income level	Economic activity
I experience the following shortcomings when buying used items						
Low product quality						
Defects in the appearance of the product (e.g. paint, un-ironed or unwashed products)						
Product has an odor		x	x			
The product is unpleasant to the touch			x			
The product cannot be returned						
Short selection of used products						
The price does not correspond to the risk of buying second-hand						
Little information about where the product comes from			x			
Cannot pay by card						
The layout and general appearance of the shop						
Quality of service						
Insufficient information about the shop (opening hours, contacts, terms and conditions)		x				
Insufficient photos and descriptions on the e-shop	x					

Note: The "x" represents significance found at 0.01 level.

Source: own

3.2 Discussion

The results of the analysis on Czech consumers emphasize that consumer behavior is shaped by interactions between societal structures and individual actions (Mylan et al., 2016) and acceptance of re-used products is influenced by broader economic, cultural, and social factors (e.g., Hazen et al., 2017). The purchase of the re-used products at different levels and by different sociodemographic groups of Czech citizens points at variety reasons for or against the purchase and highlight the necessity to understand customers values and norms like the market with new products.

When promoting consumers active role in this process of building CE, the findings suggest that while consumers generally find some secondhand products suitable for sale, there are notable differences in the perception and preferences for products across demographic groups and periodicity in purchase. But the results revealed that each product has the potential to find an appropriate market and consumers.

This study further underscores the importance of understanding the barriers in consumer acceptance of re-used products. Concerns about product quality, hygiene, and insufficient information about the origin and warranties differ based on age and education level, in some cases by gender in purchases. Addressing these concerns through enhanced transparency, quality certifications, and awareness campaigns, as advocated by Mugge et al. (2017) and Watson et al. (2017), could reshape consumer perceptions and increase the adoption of secondhand goods. The lack

of consistent product information highlights the critical role of transparency in the digital environment. Mostly men, but not exclusively, search for information at e-shop webpages, looking for complete data and pictures of the product for purchase decision.

Notably, the study revealed that specific categories (namely 65+ and seniors) are more resistant to secondhand shopping than other groups. The students and younger consumers up to 34 represent a new wave of market behavior. It was found that the older the customers are, the less inclined they are to buy secondhand products. However, the younger generation entering the markets may bring about change.

Age and education were shown as important factors in the societal role of re-used centers, which may help in promoting the center itself and support the purchase in the point of sale. The significance of social and personal connections in motivating secondhand purchases was evident and it aligns with the findings of Ertz et al. (2021) and Camacho-Otero et al. (2017), who emphasized the importance of trust and personal relationships in the adoption of re-used products. This suggests potential strategies to engage demographics such as university-educated individuals and seniors, who typically purchase less in secondhand markets.

The research approved that environmental concerns motivate re-used purchases (Edbring et al., 2016) because the respondents showed higher levels of environmental engagement, although not equally across all consumer categories. A positive discovery is that distance does not deter the willingness of certain consumers to purchase secondhand items for a good cause. Categories such as women and parents on maternity leave claimed willingness to travel over 30 km for such purchases significantly more than others. On the other hand, men were more inclined to provide support by donating money, highlighting different opportunities for engagement across consumer groups.

Similarly, helping disadvantaged individuals, often employed in re-use centers, also influences consumer intention to buy. However, it was observed that in Czech culture, individuals with the highest incomes show the least interest in good cause motives, which presents an opportunity for improvement. Interestingly, environmental benefits were perceived as more important than helping disadvantaged individuals, particularly among younger respondents, students, and low-income groups. Helping disadvantaged individuals, however, remains a significant motivator for older consumers, parents on maternity leave, and those with lower education levels.

The secondhand purchase product matrix identified specific target groups more likely to purchase certain types of products. Based on the results it may be said that each product, at a certain performance level may find the appropriate consumer for purchase.

The study aimed to explore whether consumers in the Czech Republic are willing to adopt secondhand products within the CE, and to identify the barriers that hinder their acceptance. Additionally, the research sought to investigate strategies to increase consumer openness to re-used products to support the broader objectives of the CE. Addressing these issues, this study supports the CE's goal of promoting sustainability through extended product lifecycles and greater consumer participation in re-use.

The findings suggest that age and education level play a crucial role in segmenting the target group. In some cases, it is productive to focus on residents in towns with populations up to 5,000, as this group has shown potential as prospective consumers. These areas may include satellite communities of larger cities, where residents tend to be more environmentally conscious and choose to live closer to nature.

To overcome these challenges, strategies such as improved transparency (including "storytelling" about the product's history), quality assurances, and awareness campaigns are vital in reshaping perceptions. By engaging the citizens within walking distance or close to the re-used centers into different community events with focus on different values of the target group will help promote the re-use shop together with products offered.

The results highlight the need to professionalize the market for re-used products, with a focus on education, social inclusion, and providing alternatives to existing products, rather than solely emphasizing environmental benefits. The range of appeals should be varied and tailored to different segments based on their knowledge and preferences. There is also an opportunity for the involvement of local and state authorities and local and national businesses.

Conclusions

The CE offers a vital framework for addressing environmental challenges by promoting the re-use, recycling, and extended lifecycles of products. This study underscores the significant potential of the secondhand market as a significant component of the CE, capable of fostering sustainability and reducing waste.

The findings reveal that Czech consumers possess both the capacity and willingness to engage in the circular economy through the purchase of secondhand goods. However, a key barrier lies in the approach adopted by re-use centers. For the circular economy to evolve effectively, the re-use market should be treated with the same strategic mindset as markets for new goods. This includes recognizing the active role of consumers in selecting and purchasing re-used items and ensuring that these items are positioned as viable, desirable alternatives to new products.

Despite its potential, the secondhand market remains largely underestimated. Barriers such as concerns about product quality, hygiene, and insufficient information persist on one hand, while inadequate promotion and lack of professionalization of re-use centers hinder consumer engagement on the other. Addressing these challenges requires a shift in focus from assuming that re-used goods appeal to limited groups of customers to actively identifying and targeting specific customer segments for each product group. The study highlights that even items perceived as "least desirable" can find a potential market if strategies align with consumer preferences and needs. Providing clear and detailed product information such as its origin, prior use, and condition, alongside quality assurance measures like warranties or post-purchase services, can build consumer trust. Maintaining clean, organized environments and ensuring the hygiene of products are critical for overcoming psychological barriers.

To foster broader acceptance, re-use centers should offer tailored products and services that resonate with specific target groups, such as affordable children's items for families or sustainability workshops for younger consumers. The centers need to engage in transparency initiatives, including sharing the product's history or guarantees, to reshape consumer perceptions and encourage trust. And finally, involve local and national institutions to provide certifications, and quality standards, addressing consumer concerns and enhancing credibility.

The professionalization of the re-use market requires active support from local and national authorities. Targeted interventions, supported by law, can significantly reduce quality uncertainty, as originally proposed by Akerlof (1978). Legal frameworks that promote consistency in seller claims, offer quality assurances, and ensure consumer protection rights as emphasized by Guiot and Roux (2010) and Watson et al. (2017) are essential steps. Incorporating such measures, alongside consumer education and community engagement, will strengthen trust and sustainability within the secondhand economy.

By implementing these strategies, re-use centers and policymakers can transform the secondhand market into a fully integrated and professionalized component of the CE, unlocking its potential to drive sustainable consumption and reduce waste.

Together with practical implementation of CE objectives, this research contributes to the growing body of literature in the re-use field, providing valuable insights into consumer behavior and the specific motivators and barriers that shape purchasing decisions. It highlights the need for further research on strategies to engage diverse consumer segments and offers a foundation for future discussions on how to better integrate re-used goods into mainstream markets. Ultimately, fostering an inclusive approach that recognizes the diverse motivations and concerns of different customer groups will be crucial in achieving the full potential of the CE and driving meaningful progress toward a more sustainable future.

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