BUYBACK CIRCULAR ECONOMY BUSINESS MODEL ADAPTATION POSSIBILITY IN THE E-COMMERCE & TRANSPORTATION SECTORS, FUELED BY COVID-19

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Abstract

Today's world is at crossroads. The environmental problems are setting the boundaries for businesses, technology, consumerism and society alike. Dealing with these issues make some industries' futures convergent. The subject of this study is such a common future of three industries: the logistics sector, the e-commerce and the circular economy. COVID-19 changed the landscape of every industry, however, for all these, in the good way. E-commerce has made significant adaptation boom, doubling its already impressive growth. As a result, almost all people have either used or heard of some e-commerce solutions. The bonds with the couriers even gave a personal touch to it. However, the question arises about the waste from e-commerce, and the possible utilization of this new channel between firms and customers. The aim of this research is to explore the landscape in a survey research in the context of Hungarian respondents. The snowball sampling method resulted in conclusions amongst the 18-25 age group. They have experience in using reverse logistics services, and would also trust such an initiative in a wider context. The responses also show the boundaries of possible different customer segments, based on preferred compensation or motivation and recollection methods.

Keywords: *circular economy, buyback model, reverse logistics, e-commerce, logistics, green supply chain management, business models, recycling*

1. INTRODUCTION

The circular economy is a very popular system-wide solution for the optimal use of our planet's resources. The topic is perceived as one of today's hottest solutions for ways to move to a more sustainable world. Increasing the life cycle of materials is key to the optimal use of resources. According to the Global Footprint Network (2019), humankind used resources of 1.6 times of what Earth reproduces in one year. In practice, this means that the Earth can recover the amount of consumed resources in 1 year in 1.6 years, or 19.2 months. It is necessary to extract as much value or, in the worst case, energy, as possible from the materials we use.

The COVID-19 epidemic has completely transformed consumption and shopping habits, with e-commerce skyrocketing its growth to 20-25% last year (GKI Digital, 2020) However, with the increasing exposure and habitual adaptation of e-commerce, the question about the handling of the packaging materials – and any other materials gotten by any means of e-commerce – after the order has been delivered remains a practical problem to be solved.

The transportation industry was responsible for 30% of the EU's CO_2 emission in 2019, of which, 72% was in the road transport segment (EP, 2019) A report by BCG (2020a) subject matter experts recommends engaging in ecosystems and partnerships as part of the supply chain sustainability strategy to reduce the sector's environmental footprint. Besides this recommendation, a number of key initiatives and policies for achieving a more sustainable, green logistic network have been published. The most relevant ones for this study are the reverse logistics and green supply chain management, as they are fit for applicability with e-commerce solutions.

In the intersection of these 3 elements, this research attempts to present a new possibility, which is the collection of waste from increased e-commerce through logistics service providers from whom consumers take their orders. This C2B customer channel can be a new, sustainable model for logistics companies and can make waste collection convenient for households. The solution meets the needs of the Earth, of the logistics providers, and of the households as well.

The next chapter of the study present the theoretical background of the three sub-themes: circular economy, logistics and e-commerce, the second chapter presents the research question, propositions and methodology, then the third chapter discusses the results and conclusions.

2. THEORETICAL BACKGROUND

2.1 Circular economy and its relevance

In order to fully understand the drivers of the circular economy adaptation, a look at the linear economy, the system it improves is analyzed. The linear economy is based on the take-make-consume-dispose model. According to EP (2021), this model relies on a large amount of cheap, easily accessible material and energy. Also part of this model is obsolescence, when a product with a limited lifespan is designed to continuously encourage customers to make new purchases. The model poses two main problems and obstacles to long-term and sustainable economic growth:

1. The first problem is the ***garbage***, which could return to the economy as a valuable raw material or energy source. According to the World Resource Institute (WRI, 2020; Moss, 2020) and the Circularity Gap Reporting Initiative (2020), humankind will use more than 100 billion tons of raw materials annually increasing from 2017, with more than 60% ending up in the garbage without recycling. The storage of this waste binds valuable resources (land, ecological destruction),
2. The second problem is ***finality***. According to Global Footprint Network (2019) - as mentioned in the introduction – humankind is still using too many resources relative to our Earth's capabilities. According to a 2020 report by the Circularity Gap Reporting Initiative, only 8.6% of the world was based on a circular economy. Putting these data together and the garbage problem, it follows that our Earth will not be able to serve our resource needs indefinitely, so it is necessary to extract the most value from the raw material that ends up in garbage, to reduce the demand for new raw materials to be included in the resource loop.

However, as a result of the two challenges above, the ***biggest challenge of*** the linear economy is ***not to be found in the present but in the future***. FAO (2013), the UN (2019) and PwC (2020) all agree that by 2050 there will be at least 9 billion people on Earth. According to PwC (2020), by 2030, 35% the Earth's population will need more food, 40% more water and 50% more energy. Our planet cannot meet our current resource needs either (Global Footprint Network, 2019), so the linear economy is clearly unsustainable for the coming decades.

After highlighting the bottlenecks of the linear economy, the circular economy can also be looked at. According to EP (2021), the circular economy is a model of production and consumption that involves the sharing, leasing, reuse, repair, refurbishment, and recycling of existing materials and products. In this way, the life cycle of the products is extended. In practice, this includes minimizing waste. When a product reaches the end of its life, its materials are kept in the resource cycle, as long as possible. These can be used productively over and over again, creating added value and requiring less new raw materials in the resource loop. The circular approach to sustainability therefore requires a paradigm shift from both producers and consumers. It is necessary to design products in a long but at least reusable way, to use them as long as possible and then to reuse the raw materials as much as possible. The circular economy is making the 4R model the main elements of Reduce Reuse, Recycle and Recover.

A 2017 study by Kirchherr, Reike, and Hekkert examined 114 definitions from the circular economy literature. The research found three main dimensions to delineate the circular economy:

1. *Reduce, reuse, recycle*: of the above 4R models, only the first three were emphasized in the 114-element sample. One third of the definitions made a hierarchical distinction between the different types of waste and their recycling possibilities.
2. *Systems perspective (systems approach)* : The basis of the approach is that it is not company level, small changes are necessary to the business model circular economy, but also a number of stakeholders in a comprehensive systemic change.

3. *Economic prosperity (economic recovery)*: 114 definitions, nearly all the economic recovery is considered as a means of circular economy.

The circular economy is a tool that can be used extremely widely, but its exact and optimal use varies from industry to industry. The literature does not think in a uniform definition, but in components, fundamentals and theorems.

The basic premise of the circular economy is the 4R model (Kirchherr, Reike and Hekkert 2017) The elements of the model are:

- *Reduce*: by increasing efficiency, fewer resources or raw materials are involved in economic processes.
- *Reuse*: A product in good condition can be used by another person after the original owner of the product no longer uses it. In the case of reuse, the product is more or less able to fulfill its original function.
- *Recycle*: processing of raw materials to achieve the same or lower quality (possibly raw material into another product group)
- *Recover*: energy is recovered from the material and used for the production or heating of other products (most often by energy from incineration or other means)

Giannakitsidou, Giannikos, and Chondrou (2020) examined and paralleled the rankings of EU Member States in the environmental and circular economy between 2014 and 2017. The research drew three key conclusions, which also have opportunities for Hungary:

1. In most countries, there is no correlation between environmental and circular economy performance. There was a disparity in many countries.
2. The distinction between the West and the East seems to be disintegrating in terms of performance in both the environmental and circular economies. Of the old Member States, Spain and France perform worse in the standardized ranking than the new Member States, Poland and Slovenia.
3. The distinction between the north and the south does not seem to be breaking down, the performance of the northern countries is better than that of the countries to the south.

However, no disparity can be observed in Hungary's rankings. In the environmental ranking 14-12. ranks 12th in 2014 and 2017, and the circular economy ranks 12-11. seats in 2014 and 2017. The second and third conclusions provide many opportunities for Hungary to fill a favorable place in the standardized ranking.

According to Tóth-Szász and Baranyai (2020), logistics accounts for 70% of the cost of circular economic recycling systems. In the next section, I present the current situation and possible green directions of the logistics sector.

2.2 Logistics and its possible future green directions

The logistics sector is a crucial part of this research. Understanding the situation of logistics actors is key, as these firms play a central role in disseminating the buyback model examined in this paper. The subsection presents the sustainability challenges of the logistics sector, the possible future green directions of the sector, and the sector's encounter with the circular economy in the form of reverse logistics.

Transportation is one of the most polluting industries today. The 30% contribution to EU-wide CO_2 emissions already mentioned in the introduction is huge (EP, 2019) Road transportation accounts for 72% of this figure. BCG (2020b) estimates that in 2019, the sector would emit more than 4 gigatonnes of CO_2 worldwide, which could reach 7 gigatonnes by 2050.

According to the BCG (2020b) survey, 70% of logistics companies is not at all or only partially publish emission data, and only 23% of companies have quantified emission target number. Only half of the companies with emission targets were able to reduce their emissions.

The BCG (2020b) survey also showed an underestimation of targets. Companies plan to reduce emissions by an average of 30% by 2030, while achieving environmental goals (1.5 degree Celsius scenario) requires a 50% reduction by 2030 and 100% by 2050.

Lambrechts et al. (2019) also highlighted the importance of complex sustainability reporting for logistics companies across the enterprise, taking into account not only environmental impacts but also the situation and training of employees.

Research by BCG (2020b) also highlights the benefits for more environmentally conscious logistics companies:

- Revenue growth: in the case of contracts and public procurement, the output indicator can be an evaluation criterion, 70% of consumers are willing to pay a 5% premium for smaller emissions. In addition, employees working for environmentally conscious companies are more motivated, which improves work efficiency.
- Increasing profitability: the increase in profit is due to the reduction of costs. More environmentally conscious investments will cost less in the long run in terms of resources (fuel and bills) and operations (optimizing the vehicle fleet) Cost reductions also occur on the employee side, according to BCG, with improvements on both the selection and retention side in terms of employee quality and offer acceptance percentage, retention time. Profitability can be an alternative financing option for companies that can be linked to an emissions figure or other environmentally friendly indicator.
- Resistance and increase in goodwill: more environmentally conscious investments mean a more sustainable competitive position and greater operational resistance, which can mean less lost time and maintenance by reducing strategic and operational risks. Companies in a more sustainable competitive position can also communicate new elements of their brand to their consumers.

Green supply chain management (GSCM) evolved as a concept in the 1990s (Murphy et al., 1994; Drumwright, 1994) In the early stages of the concept, silo-like examples and sub-areas were identified, and GSCM was treated as a non-systemic approach (Harangozó et al., 2019)

According to Sarkis et al. (2011), the aim of GSCM is to ensure the flow of material and information, to improve competitiveness, flexibility and profitability in the short and long term through the improvement of environmental performance. The consideration of the interests of stakeholders and the importance of a long-term approach also appear in the literature (Ahi et al., 2013)

Following the system-wide approach to GSCM, several sub-areas have been identified, including (Hervani et al. 2005; Srivastava, 2007; Sarkis et al., 2011; Sezen and Cankaya, 2018):

- green procurement
- environmentally conscious production and material management
- green distribution
- environmentally friendly packaging
- green marketing
- green, reverse logistics (C2B - delivery of material from the customer to the company)
- waste management activities
- environmental performance assessment for supply chain actors

Areas are complemented by the incorporation of elements of the circular economy (Harangozó et al., 2019; Mosonyiné, 2011; Genovese et al., 2017)

In addition to the literature, there are 3 general tips for companies in the industry in the field of practice (BCG 2020b):

- Development of a low-carbon operating strategy,

- Development of a holistic carbon-resistant operating model,
- Honest communication and cooperation with all stakeholders.

There is a strong relationship between reverse logistics and the circular economy in terms of the technical side of the solution (material flow) (Prieto-Sandoval et al., 2018), and both concepts are identified with sustainability (Merli et al., 2018) In reverse logistics, trust and persuasion of all stakeholders are important (Julianelli et al., 2020; Batista et al., 2018) The organization of the reverse logistics network also has a separate literature. The topic is interesting because the return of materials also has CO_2 emissions, so there is a theoretical maximum of the distance between the product and the recycling plants that decompose it. Sathish and Jayaprakash (2017) identify three main actors in the reverse logistics supply chain: the dismantling plant, the recycling plant, and the manufacturing plant where the material is reused. For example, Dutta et al (2020) have developed an optimized reverse logistics model for the Indian e-commerce industry that takes into account environmental, social and economic aspects, necessitated by the growing market size. Lao (2018), on the other hand, built a reverse logistics model applicable in cities.

In addition to the circular economy, a number of studies link reverse logistics to e-commerce, and the latter area will be examined independently in the next section.

2.3 E-commerce and the COVID-19 pandemic

E-commerce is a complex, interdisciplinary field. According to Laudon and Traver (2020), no single academic field or article can deeply examine all complex components at once. The authors have identified the following process: first, a technological change is created that companies begin to incorporate because of its potential profit-increasing effect. Consumers encounter these new changes when they shop, resulting in social, societal, political, and habitual and behavioral challenges / thoughts to which society as a whole must respond, or accept or reject new changes. The authors identified e-commerce as a cross-section of three areas: technology, business, and society.

E-commerce is primarily an industry evolving through technological advances (Chaffey, Hemphill, and Edmundson-Bird, 2020), which has evolved through information storage and display and general IT solutions over the past 50 years. The Internet and the web are central to e-commerce, but other technologies have also contributed to its development, such as cloud computing, the proliferation of desktops, laptops, tablets, mobile phones, databases and data mining. The technology enables infrastructure and operational frameworks for e-commerce.

The technology infrastructure is made interesting to consumers by business players through applications and other solutions. Stores adapt these technologies primarily due to innovation and high returns (Almtiri and Miah, 2020)

As society (consumers) become acquainted with the new solutions offered by the business community, change takes place. Approximately 3.8 billion people worldwide used the Internet in 2020, many of whom are also involved in e-commerce (Laudon and Traver, 2020) The framework of e-commerce is shaped by local and international regulatory bodies, competition authorities, governments and the EU. In the current situation, the new solutions have triggered social debates / changes related to consumers' private browsing and the use of their data, but in some countries equal access, availability and illegal download of content are the main problems (Wu et al., 2021)

The E- commerce Europe 2021 report identified the following changes over the past year (E- commerce Europe, 2021):

- Considering the limitations of the country, 94.7% - in could hold open a traditional store, but only 36.8% of the total distribution, which - in was no more telling change hours, only 15.8% of the products sold in the essential shops could hold open And in 42.1%, shops could only sell essential products and had to close the customer areas for products that did not fall into this category.
- The online store 100% of the cases - in to continue operating

- Restrictions on traditional shops resulted in a significant increase in online store turnover, with 66.74% of respondents saying a slight increase in turnover, with 22.2% saying that 11.1% of respondents said that the issue could not be interpreted (these are the countries where no restrictions have been introduced on the opening hours of shops)
- According to 63.2% of respondents, the diversion of consumers to the online channel had the same positive effect on the turnover of home delivery shops as on the stores operating entirely online.
- In 18 of the 19 countries surveyed (excluding Greece), e-commerce has had a positive impact on public opinion.
- By 2021, 42.1% of respondents are very optimistic about the state of e-commerce and the remaining 57.9% are more optimistic than not.

Similar trends have been identified in OECD (2020) and Searchnode (2020) reports.

The e-commerce gain presented in the previous section is further accelerated by COVID. According to GKI (2020), e-commerce in the first quarter of last year was 21.4% higher than in the previous year, and a record near-record growth of 34-35% was estimated for the second quarter

3. PROBLEM DEFINITION AND RESEARCH METHODOLOGY

The basic question of my research is at the intersection of these 3 presented topics. Humankind is producing more and more garbage on our planet, using too many resources. Logistics is one of the most polluting industries today. According to the BCG (2020b) report, logistics companies should double their emissions reduction targets. The reverse logistics of the green supply chain, helping reduce the emission numbers. The solution is largely related to the concept of a local, circular economy.

The convenience and wider range of available products value propositions of e-commerce have so far shown double-digit growth. The pandemic, on the other hand, has brought unprecedented growth potential to the sector, as households 'digital capabilities and affinity have evolved, and most people have heard of various e-commerce companies, or even tried them. Households order more, thus creating two effects: more frequent contact with the couriers and their companies, hence, a new customer channel, and an increase in the amount of waste from packaging. The vision of the logistics and e-commerce sectors at this point may conflict with the concept of a circular economy, where the courier collects garbage from previous orders or end-of-life products.

The research questions of the research focus on Hungarian households, due to data collection reasons:

1. Do the respondents consider environmental protection important and are they familiar with the concept of the circular economy?
2. Is the reverse logistics channel (C2B) considered as a potential waste return channel?
3. What incentives do households need to send recyclable materials through this channel?

In line with the research questions, the following Propositions were formulated:

1. The majority of respondents consider the protection of the environment important, are informed about it at least several times a week, and are familiar with the concept of the circular economy.
2. About half of the respondents had already sent back goods to companies, and most of them would be open (values 4 and 5 on a 5-item Likert scale) to use such a channel.
3. Environmental protection and monetary rewards are the main incentives, the coupon being the least attractive form of incentive for households to deliver recyclable materials through the sewer. Respondents motivated by environmental protection would mainly take the waste to be returned to collection points, respondents motivated by cash benefits would dispose of the waste to be returned mainly by courier service, and the preferred form of payment per piece and per kg / other mass unit is different.

In order to examine the questions, it is especially important to select the appropriate research methodology and structure. This research is exploratory, which is used when the researcher is new to the topic, and for finding appropriate research methods that can be applied in subsequent studies (Babbie, 2020) Although the circular economy, logistics and e-commerce fields have a very wide literature, the research carried out at the intersection of the three fields was not found in the literature review process. As Babbie (2020) mentions, exploratory research can be particularly useful in cases where there is no mature theoretical background on the topic. Exploratory research can reveal important variables or raise topics suitable for further research (Babbie, 2020)

In exploratory research, we can choose a number of methods that follow a non-hierarchical structure (Yin, 2017) Available methods include experiment, survey, literature / archive processing, indicator analysis, and case study. Since the main research questions are how much, what, how to type questions, and recent or present questions, the most ideal methods based on Yin (2017) are experiment, survey, or case study, however, since behavioral impact is not required in research results, so survey and case study may be the two ideal methods.

Both methods have both advantages and disadvantages, the case study results in an analytical (qualitative) rather than a statistical (quantitative) generalization (Yin, 2017), which would help to understand the causes and drivers of the results. The advantage of the survey is that it can reach a wider range of consumers, making it possible to collect data from a larger sample than when using the case study. An interview or a questionnaire survey is also possible within the survey. The interview also results in a limited number of samples, which, like the case studies, would help to understand the root causes. The disadvantages of the questionnaire research are the inflexibility of the questionnaire and the lack of quality control of the answers. Since the aim of the research is large consumer sampling, the method of the research is therefore quantitative questionnaire research.

Sampling follows snowball sampling, which is not a random sampling method. During snowball sampling, the researcher finds individuals / groups with direct access, depending on the unit of measurement of the research, sends them a questionnaire, and asks them to recommend relevant respondents from their own circle of acquaintances (forwards the questionnaire to their friends in the online world) Its advantage is that it enables greater sampling by utilizing the connections provided by the social network, and it can be said that it is fast, the disadvantage is the lack of the composition and quality control of the answers and the respondents.

The questionnaire is based on sections corresponding to the research questions and begins with the recording of demographic data. The first stage assesses the environmental habits and thinking of the respondents, including the importance of environmental protection, the need to choose between environmental protection and economic growth, and the frequency of information on environmental issues. The second part examines the return habits of the respondents. In this section, the respondents' previous experience of returning the goods, the method of return and satisfaction with it, and the possibility of returning recyclable materials are assessed. The third part of the filling recycling investigate habits, including selective waste collection for recycling motivating factors, and the way of returning the recycled products. The fourth part examines the amount of waste experienced by the fillers during the COVID-19 epidemic.

The questionnaire data collection took place for 4 weeks, during which time the researcher published it on Facebook in groups or directly to acquaintances. In accordance with the sampling method, the questionnaire was requested to be forwarded, either to the respondents' acquaintances or to their parents, to anyone to whom the research topic may be relevant. During the questionnaire data collection, 124 questionnaire replies were received.

4. RESULTS OF THE RESEARCH

4.1 Demographic profile of respondents

The questionnaire received 124 responses during the data collection process. Their gender, age, place of living and occupation can be seen on the figure below:

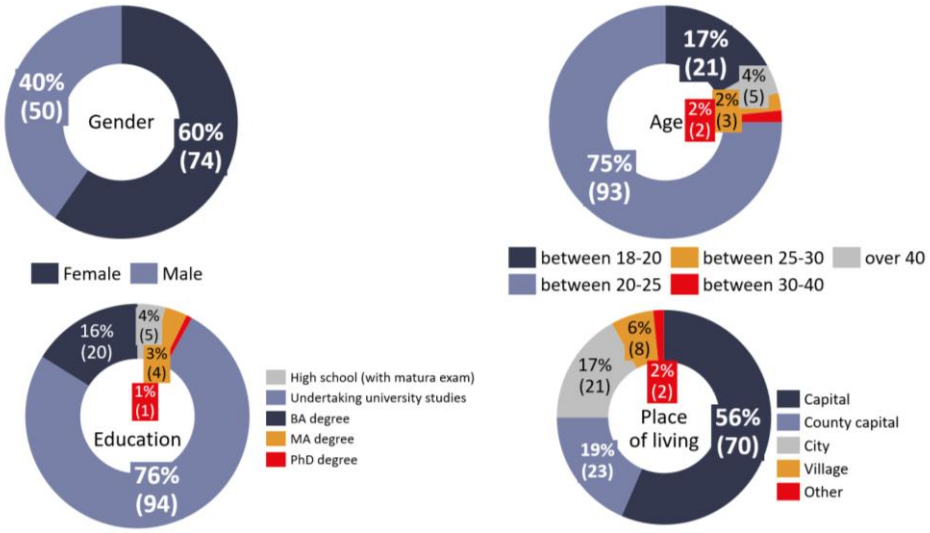


Figure 1: Demographic composition of respondents. Source: author's composition based on the gathered data

4.2 Summary of Section "Environmental Awareness Issues"

The first section answers the first research question. The first question of the section examined the frequency of contact with environmental news among respondents:

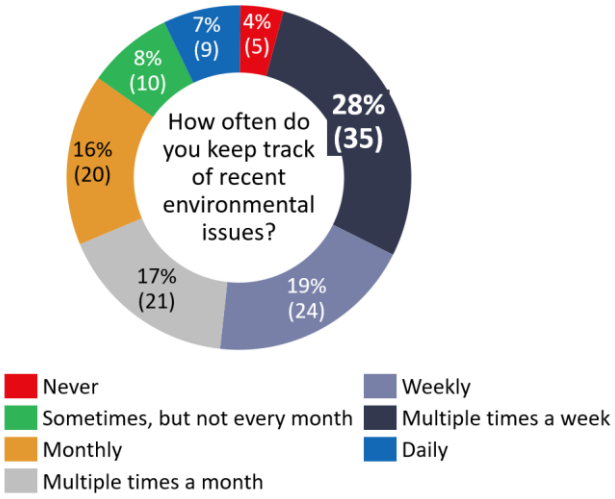


Figure 2: Environmental information seeking behavior by respondents. Source: author's composition based on the gathered data

55.3% of respondents are informed about environmental issues at least several times a week.

The second question of the section researched the importance of environmental activity among the respondents on a Likert scale, where 1 represents "I do not consider it important" and 5 represents "I consider it very important":

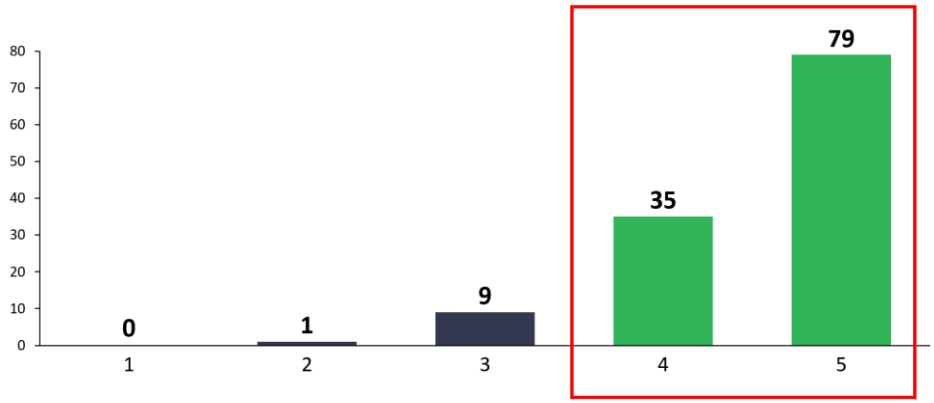


Figure 3: Deemed importance of environmental activity by respondents. 0 = I am not interested at all, 5 = environmental issues are crucial to be taken care of. Source: author's composition based on the gathered data

A total of 92.7% of respondents consider environmental protection to be more important than not (those in a more favorable direction than the average value), and more than twice as many consider it very important rather than more important. This shows that the issue of environmental protection is clearly important for respondents.

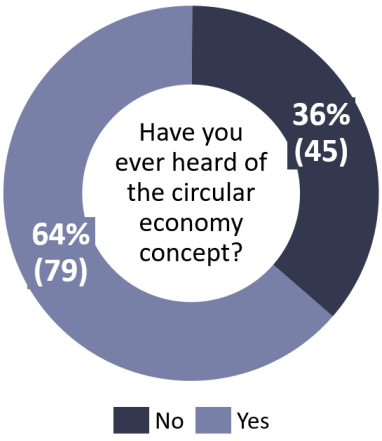


Figure 4: Awareness of the circular economy concept. Source: author's composition based on the gathered data

64% of respondents have already heard of the concept of a circular economy, so it is possible to advertise the collection channel as a circular solution to potential consumers.

From the first section of the questionnaire, all elements of the Proposition of the first research question were validated, the Proposition was correct.

Proposition: The majority of respondents consider environmental protection important, are informed about it at least several times a week, and are familiar with the concept of the circular economy. The Proposition was validated by research data.

Validated Proposition: 92.7% of respondents consider environmental protection important, 55.3% are informed about it at least several times a week, and 64% are familiar with the concept of circular economy.

4.3 Summary of the section "Return habits"

The section serves to examine the second research question. The first question of the section asked about the existence of previous return activity of the respondents.

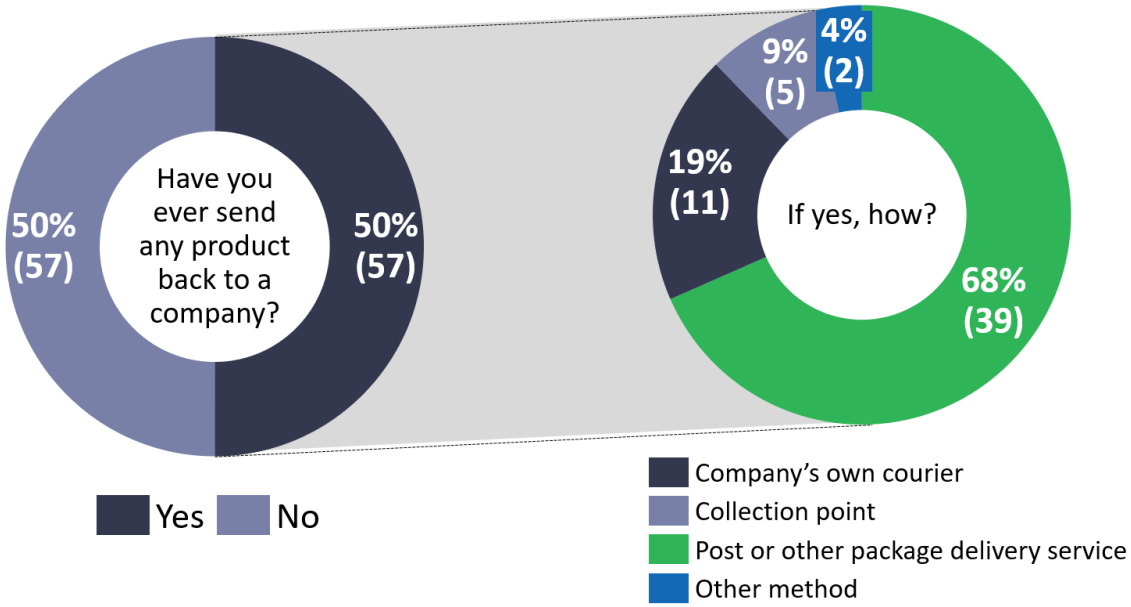


Figure 5: Previous experience in terms of reverse logistics activity in case of respondents. Source: author's composition based on the gathered data

The vast majority of the 57 respondents who have already sent goods back to the company, 87%, gave back the goods through some kind of courier service (couriers outside the company marked in green and company couriers marked in dark blue) This means using the C2B client channel discussed earlier in this dissertation. Returning by courier service is important because it indicates that customers are familiar with the courier service's parcel delivery processes or how to collect their parcels. This channel can also be used for waste collection, the perception of which is going to be examined in the next figure (5 means „I find it an innovative solution, 1 means „I wouldn't use it at all"):

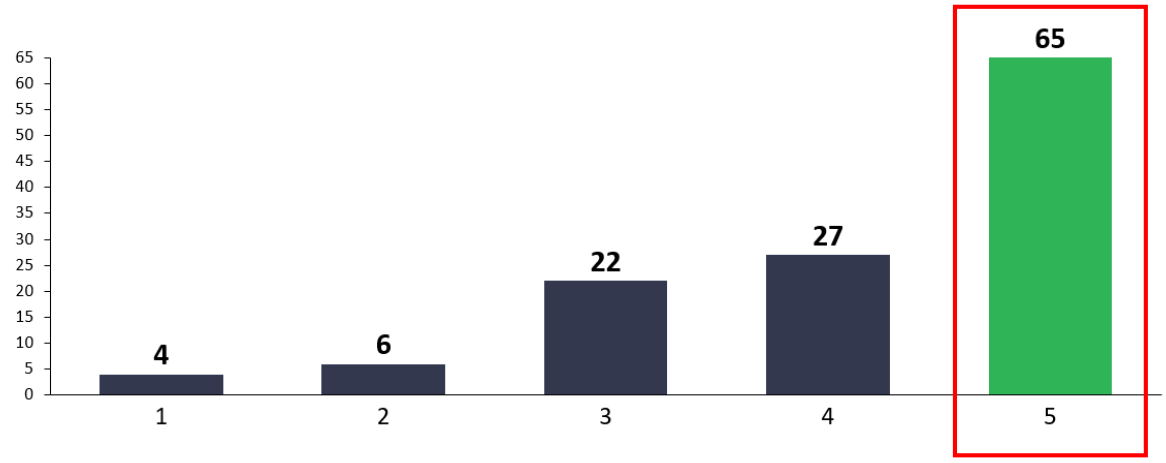


Figure 6: Satisfaction with the reverse logistics service amongst respondents. 1 = I have not sent back any product so far, 5 = It was a phenomenal experience. Source: author's composition based on the gathered data

53% of respondents view the solution in an innovative, pioneering way, while the remaining 37% are mainly divided between indifferent (value 3 on the scale) and more yes (value 4 on the scale) This question points out that the respondents (who came mainly from the 20-25 age group) are open to such a solution.

Proposition: About half of the respondents had already sent back goods to companies, and most of them would be open (values 4 and 5 of a 5-item Likert scale) to use such a channel. The Proposition was validated by research data.

Validated Proposition: 46% of respondents have been sent back goods companies, and 80.7% - uk would be open to make use of these channels.

4.4 Summary of the "Compensation preference" section

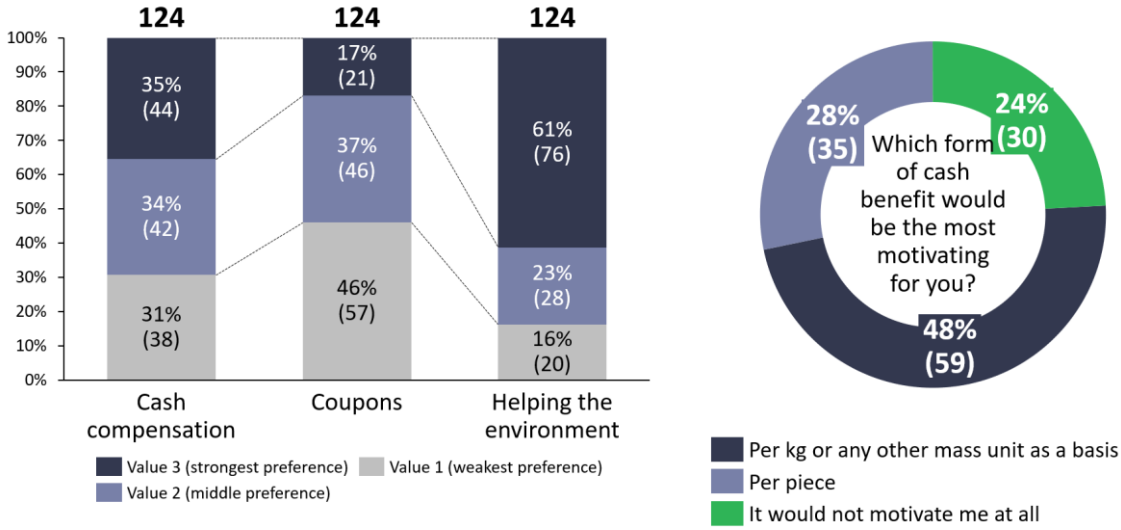


Figure 7: Compensation preference amongst respondents. Source: author's composition based on the gathered data

The answer was possible by giving a preference ranging from 1 to 3, where 1 is the weakest and 3 is the strongest preference for the given benefit. The motivation of the respondents is interestingly given by the environmental assistance (76 respondents made it in the highest order of preference), as opposed to the direct cash benefit (44 people) and the coupons (21 people)

Proposition 1: helping the environment and monetary reward are the main incentives, the coupon being the least attractive form of incentive. The Proposition was validated by research data.

With regard to the cash benefit, the way of the cash benefit would not make any difference for 24% of the respondents, it would not have any motivating effect on their decisions. The remaining respondents, who would be motivated by the cash benefit, would prefer the cash benefit per kg or other unit of mass. This phenomenon shows that less frequently, these fillers want to deliver larger quantities. Another group of respondents who can be motivated by a cash benefit would prefer to choose a cash benefit on a piece-by-piece basis. This group would presumably return even a few pieces of product through the collection channel on a more frequent basis.

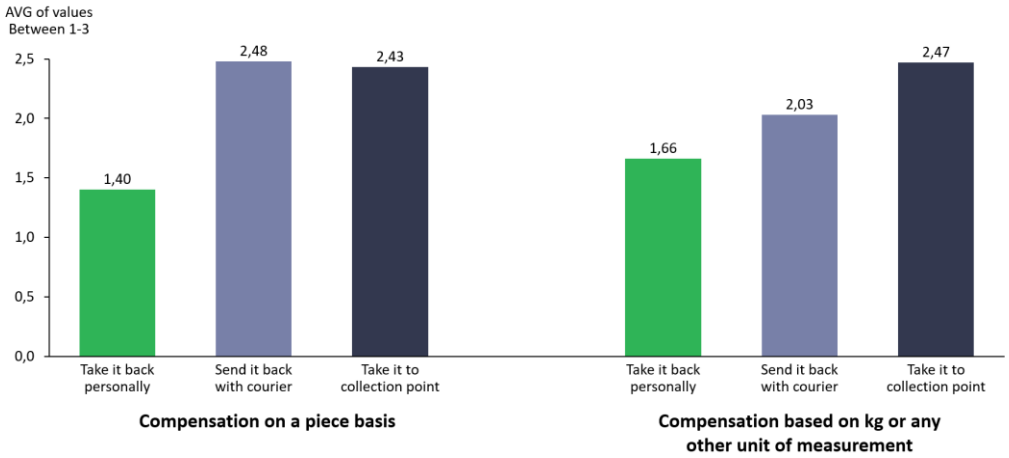


Figure 8: Overarching trends and connections of the preferred compensation and recollection methods (1/2) Source: author's composition based on the gathered data

The complex picture created by the combination of the unit of remuneration and the preferred method of posting reveals interesting phenomena.

A piece of remuneration preferring would give up most of their recyclable material by courier. The phenomenon is interesting because the average of dispatches at collection points was the highest among respondents (global average 2.50, see next section) Those who prefer to pay per piece would presumably give up smaller quantities, but with more frequent regularity, built into their life habits.

Those who prefer the kg / other weight unit would most often deliver recyclable materials at collection points. Presumably, this group would take larger quantities, but less frequently, to collection points.

Proposition: The most preferred method of sending the cash benefit per piece and the kg / other unit of mass benefit is different. The Proposition was validated by research data.

Validated Proposition: Those who prefer the piecemeal form of cash benefit prefer courier service, while those who choose the kg / other mass unit reward form prefer to deliver at collection points.

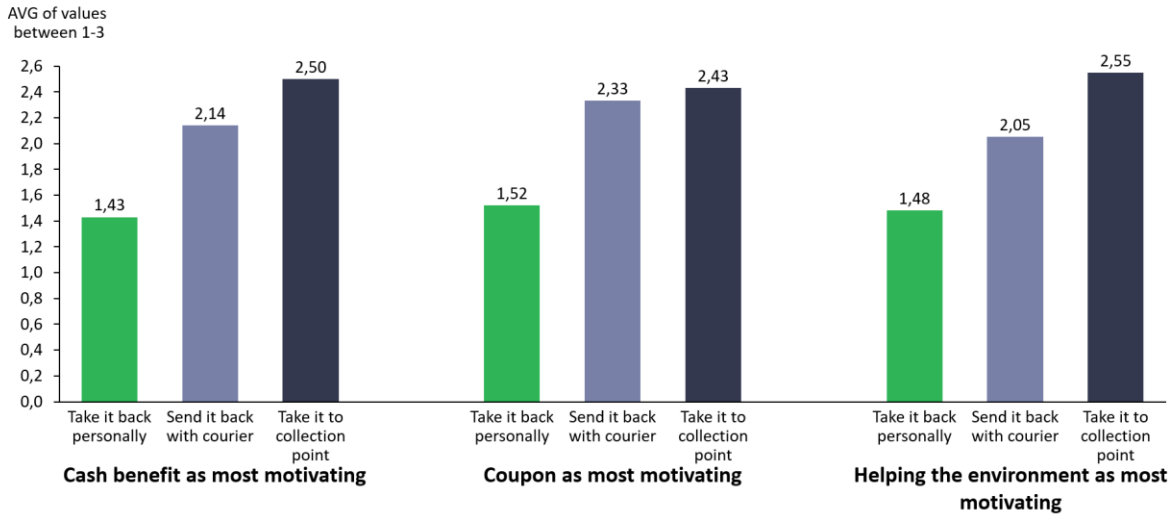


Figure 9: Overarching trends and connections of the preferred compensation and recollection methods (2/2) Source: author's composition based on the gathered data

By combining motivating factors and method of take-back, a complex picture can be analyzed about the fillers. Although dispatch to collection points is the most preferred factor in all three motivating categories (cash benefits, coupons, environmental assistance), there are differences within the groups.

Sending by courier service is the group with the highest average in the group motivated by the coupon allowance, which is almost worth handing over at the most popular collection points. This is probably because the courier can also deliver the coupon (either virtually or physically) to the resident who is sending the recyclable material. Although the cashier could also deliver the cash benefit for the materials to residents motivated by the cash benefit, among those fillers, sending by courier service is not as popular as among those motivated by the coupon. Of particular interest is the group of fillers motivated by environmental assistance, where the preference for dispatch by courier is the lowest, presumably due to their environmental awareness, as recyclable material involves transport and emissions.

Propositions:

Respondents motivated to help the environment would mainly take the waste they want to return to collection points. The Proposition was validated by research data.

Respondents motivated by the cash benefit would give up the waste to be returned mainly by courier service. The Proposition was not validated by the research data.

The next question measures confidence in the proper, effective recycling of materials sent for processing. The issue is important because if consumers do not trust proper processing, they will be reluctant to send recyclable materials. The question was completed by respondents on a 5-item Likert scale, where 1 means “I don’t trust it at all” and 5 means “I trust it completely”,

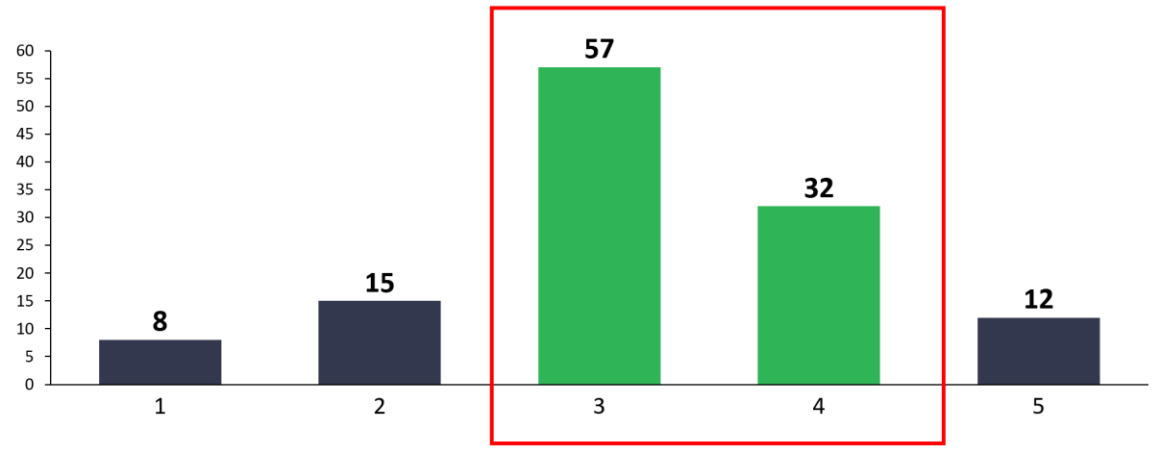


Figure 10: Felt trust about the true environmental friendliness of the treatment of collected resources with the model presented in the research. Source: author’s composition based on the gathered data

The opinion of the respondents is more positive than negative, as the majority of the respondents are to the right of the average value of 3. Most common, however, is indifference (value 3) or more trusting than not (value 4) A total of 92 respondents completed these two values, representing 74% of the total.

5. SUMMARY

Over the course of the research, the possible developments of the “ buyback ” model at the intersection of three border areas, the circular economy, logistics (supply chain management) and e-commerce were examined among Hungarian 18-25 years old respondents and their households. 124 questionnaires were received for the survey research, which mainly included the answers of students aged 20-25 who are

still pursuing higher education, mainly due to snowball sampling. To the research questions, the research data clearly provide the answer that the respondents would be open to a recyclable delivery channel based on a "buyback" model. The research questions outlined at the beginning of the research and the validated or non- validated Propositions were as follows:

1. Do Hungarian households consider environmental protection important and are they familiar with the concept of the circular economy?

Validated Proposition: 92.7% of respondents consider environmental protection important, 55.3% are informed about it at least several times a week, and 64% are familiar with the concept of circular economy.

2. Are the return of goods considered a potential waste return channel?

Validated Proposition: 46% of respondents have been sent back goods companies, and 80.7% - uk would be open to make use of these channels.

3. What incentive is needed for households to deliver recyclable materials through the sewer?

Proposition 1: helping the environment and monetary reward are the main incentives, the coupon being the least attractive form of incentive. The Proposition was validated by research data.

Proposition 2: Respondents motivated to help the environment would mainly take the waste they want to return to collection points. The Proposition was validated by research data.

Proposition 3: Respondents motivated by the cash benefit would give up the waste to be returned mainly by courier service. The Proposition was not validated by the research data.

Validated Proposition 4: Those who prefer the piece-by-piece form of cash benefit prefer courier service, while those who prefer the kg / other unit of mass reward form prefer to deliver at collection points.

LIMITATIONS OF THE RESEARCH

One of the limitations of the research is clearly the sampling and the majority of the respondents from a demographic group. Although the research is able to draw generalizable conclusions for the group of 20-25 year olds who are still in higher education, it does not provide an adequate answer to the research of the research question more broadly. For the introduction of the examined buyback model (a corporate decision), it is not enough to examine a slice of an age group in order to make a complete, well-founded business decision.

Another limitation of the research is the research methodology. The questionnaire collected the theoretical approach and answers of consumers, but its reliability and its deviation from practice (for example, would it really give up recyclable material in return for a financial benefit) cannot be checked. He could not rule out the possible bias of the filler either.

Another research direction may be the openness of courier services to this solution, which, comparing the results of this research with consumer data, may reveal an interesting business opportunity.

Infrastructure -interesting research can also be the network of collection points and their optimal location for collection. The topic may be important because respondents clearly considered delivery at the collection point to be the most attractive, but without the right infrastructure, the process cannot be more efficient. Further research on the consumer side can examine the reasons and drivers of individual responses, extend the age of the study to other demographic groups, and examine the change of consumers to the usual circular economy.

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