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Reuse

The understudied circular economy strategy

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Reuse. The understudied circular economy strategy

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Samenvatting

Dit rapport behandelt de blinde vlekken in het huidige onderzoek naar het weinig bestudeerde circulaire fenomeen hergebruik en de verscheidenheid aan formele (d.w.z. opgenomen in onze economie via gereguleerde economische eenheden en beschermde werknemers) en informele (d.w.z. deel van een informele economie waarin transacties niet geregistreerd worden) kanalen waarlangs dit kan gebeuren. Het maakt deel uit van de onderzoekslijn over tewerkstelling en actoranalyse voor de circulaire economie van het Vlaamse Steunpunt Circulaire Economie.

De belangrijkste vragen die in dit rapport aan bod komen zijn welke hoeveelheid hergebruik momenteel in Vlaanderen gerealiseerd wordt, welke milieu-impact, sociale impact en economische impact hergebruik heeft, welke barrières en kansen voor hergebruik er nu en in de toekomst bestaan en welke actoren betrokken zijn in het "hergebruikslandschap" in Vlaanderen. Op basis van deze inzichten geven we beleidsaanbevelingen om het hergebruik in Vlaanderen te verhogen. Dit rapport is gebaseerd op bestaande literatuur, beschikbare gegevens, interviews en communicatie met actoren in het veld, en een surveystudie die werd uitgevoerd in het najaar van 2019. Op basis van de enquête brengen we de hoeveelheid hergebruik in Vlaanderen in kaart, en ontwikkelen we een nieuwe indicator voor het meten van hergebruik. Hieronder geven we de belangrijkste bevindingen van ons onderzoek weer.

- **Milieu-impact en circulariteit van hergebruik.** Hergebruik wordt meestal beschouwd als circulair, mede omdat een hergebruikt goed een nieuw goed kan vervangen, wat grondstoffen bespaart. De markt voor hergebruik kan echter ook leiden tot bepaalde "rebound" inkomenseffecten (d.w.z. dat consumenten meer spullen kunnen kopen met hetzelfde budget) en substitutie-effecten (d.w.z. dat er extra spullen worden gekocht in plaats van tweedehands spullen die de aankoop van een nieuw goed vervangen). Ten eerste kan het inkomenseffect van hergebruik negatieve milieueffecten hebben. Mensen zouden bereid kunnen zijn om extra spullen aan te schaffen. De markt voor hergebruik – die meestal een lage prijs en gemakkelijke toegang tot tweedehands spullen biedt – kan negatieve milieueffecten of sociale effecten hebben. Het is daarom belangrijk om deze nuance expliciet te adresseren door een vervangingspercentage (d.w.z. de mate waarin de aankoop van herbruikbare spullen de aankoop van nieuwe spullen verhindert) na te gaan. Onze studie bevestigde het fenomeen van de aankoop van "surplus spullen" bij Vlaamse burgers en berekende een gemiddeld vervangingspercentage van 28%. Belangrijk is dat hergebruik ook circulair is omdat het spullen weghoudt uit de afvalstroom, ongeacht het vervangingspercentage. Toch hebben prijseffecten, die de bereidheid van mensen om nieuwe spullen te kopen beïnvloeden (bv. rekening houdend met de prijs van het "doorverkopen" van herbruikbare spullen), ook een invloed op de circulariteit van hergebruik. In ons onderzoek werden hierover geen empirische gegevens verzameld.

- **Het in kaart brengen van hergebruikskanalen.** Hergebruik kan plaatsvinden via formele kanalen, die bestaan uit wettelijk geregistreerde bedrijven binnen het Vlaamse hergebruiksnetwerk *De Kringwinkels* en andere wettelijk geregistreerde winkels in de tweedehands detailhandel. Op die manier bieden formele hergebruikskanalen toegevoegde waarde aan ons economisch systeem, aangezien elke aankoop- of verkooptransactie het

BBP doet stijgen. Naast hergebruik via formele kanalen is het belangrijk om informele kanalen in kaart te brengen, die verwijzen naar informele transacties tussen individuen, zoals gratis donaties. Juist vanwege hun informele karakter is het moeilijk om die transacties te kwantificeren. Daarom heeft eerder onderzoek de meeste van deze informele kanalen buiten hun kwantificeringsinspanningen gelaten of deze transacties geschat aan de hand van enquêtes over het verwerven en afdanken van huishoudspullen.

- **De Vlaamse kringloopcentra versus andere hergebruikskanalen.** In dit rapport maken we een inventarisatie van alle mogelijke kanalen waarlangs spullen kunnen worden hergebruikt. Aan de hand van zowel kwalitatieve als kwantitatieve gegevens geven we een overzicht van de kanalen en geven we details over hoe ze momenteel worden gebruikt en, voor sommige kanalen, hoe ze in de loop der jaren zijn geëvolueerd. Voor elk hergebruikskanaal kwantificeren we het aantal transacties van hergebruikte spullen, het gewicht van de hergebruikte spullen (kg/cap) en het aantal spullen dat wordt hergebruikt. Zo krijgen we een gedetailleerd beeld van de rol die de erkende *Kringwinkels* spelen binnen de waaier van hergebruikskanalen. We suggereren dat onze schatting van de hoeveelheid hergebruik kan dienen als een meer uitgebreide hergebruiksindicator voor Vlaanderen, gezien de indicator die momenteel als overheidsdoelstelling wordt gebruikt, uitsluitend gebaseerd is op gegevens uit één bepaalde bron, namelijk *De Kringwinkels*.

- **Resultaten van ons onderzoek.** Uit onze studie blijkt dat het Vlaamse netwerk van hergebruikcentra *De Kringwinkels* in 2019 goed was voor 11% tot 19% (afhankelijk van de categorie van spullen) van het totale hergebruik. Op basis van het percentage van de kringloopcentra berekenden we de hoeveelheid hergebruik voor de vier belangrijkste productstromen per capita in Vlaanderen:
  1. Meubelen: **14,9 kg hergebruik/capita**
  2. Elektrische apparaten: **3,2 kg hergebruik/capita**
  3. Textiel: **3,7 kg hergebruik/capita**
  4. Huishoudspullen, vrije tijd, boeken, muziek en multimedia: **11,6 kg hergebruik/capita**
  - Som: 218 431 910 kg = **33,3 kg hergebruik/capita**

  Op basis van onze studiedata berekenen we dus 33,3 kg/capita in plaats van de Vlaamse hergebruiksindicator van 5,4 kg/capita die momenteel door de OVAM wordt gebruikt en gebaseerd is op de data van *De Kringwinkels*. **Deze berekening is zelfs conservatief** omdat we in onze studie geen vijfde 'restgroep' van spullen hebben geïncludeerd die alle mogelijke herbruikbare spullen omvat. Als we uitgaan van de veronderstelling dat het aandeel van deze categorie ten opzichte van het totale hergebruik voor alle kanalen vergelijkbaar is (d.w.z. deze categorie spullen omvat 1,3% van het totale hergebruik), dan kunnen we **voor het hergebruik van huishoudspullen een globale echte hergebruiksindicator schatten** op basis van deze geëxtrapoleerde gegevens van **33,8 kg/capita** in 2019.

- **Toekomstige schattingen van hergebruik.** We raden aan om onze meer uitgebreide indicator van hergebruik te gebruiken bij de schatting van het *totale* hergebruik in Vlaanderen. Hierbij – d.w.z. rekening houdend met de kg van verschillende andere hergebruikskanalen bovenop de kringloopcentra – zou deze indicator kunnen gebruikt worden voor meer nauwkeurige schattingen van hergebruik op basis van inzichten uit de kwantitatieve gegevens van onze enquête. Deze zouden gebruikt kunnen worden in een

breder kader dan datgene dat momenteel wordt gehanteerd voor de gegevens specifiek voor *De Kringwinkels*, d.w.z. breder dan het monitoren van hergebruik via dit netwerk. Ten eerste zouden deze meer uitgebreide schattingen een betere optie kunnen zijn voor vergelijkingen van hergebruik tussen landen, aangezien veel landen niet beschikken over een goed functionerend hergebruiksnetwerk en ook geen nauwkeurige gegevens verzamelen in hergebruikscentra zoals dat in Vlaanderen wel gebeurt. Het is dan ook niet verrassend dat de schaarse studies in andere landen tot nu toe hergebruik vastleggen op basis van andere kanalen (bv. via particuliere garageverkopen). Ten tweede kan het inzicht in de verdeling van de categorieën van de belangrijkste huishoudspullen tussen de belangrijkste hergebruikskanalen een basis vormen voor een vergelijking tussen de hergebruikskanalen. Dit zou schattingen mogelijk maken op basis van de veronderstelde groei of afname van specifieke hergebruikskanalen (bijvoorbeeld de veronderstelde groei van online hergebruik als gevolg van de huidige COVID-situatie).

- **Nieuwe indicator voor hergebruik die niet gebaseerd is op het gewicht van het hergebruik.** Een andere optie is het toevoegen van indicatoren op basis van iets anders dan gewicht. Met name omdat de levensduur van producten de kern lijkt te vormen van circulair hergebruik, kunnen sommige onderdelen van een hergebruiksindicator zich richten op de volgende pijlers die belangrijk zijn voor circulair hergebruik: het recht op reparatie, uitgebreide producentenverantwoordelijkheid, voorbereiding op hergebruik en een hergebruiksvergoeding. Factoren die verband houden met deze aspecten zouden het meten van circulair hergebruik kunnen verbeteren. Met name de kwaliteit van de instroom lijkt een belangrijke rol te spelen bij het potentieel voor hergebruik wat betreft de levensduur van het product. Het is duidelijk geworden dat een verminderde kwaliteit van bijvoorbeeld meubelen en textiel belangrijke barrières zijn voor hergebruik. Wij bevelen aan om de indicatoren voor hergebruik op basis van deze vier pijlers, die allemaal verband houden met de levensduur van spullen (d.w.z. recht op reparatie, EPR, voorbereiding voor hergebruik, hergebruiksvergoeding), verder te onderzoeken.

Executive Summary

This report addresses blind spots in current research about the understudied circular phenomenon of reuse and the variety of formal (i.e. included in our economy through regulated economic units and protected workers) and informal (i.e. part of an informal economy in which transactions do not get registered) channels through which it may occur. It is part of the research line on employment and actor analysis for the circular economy of the Flemish Circular Economy Policy Research Centre.

The most important questions addressed in this report are which amount of reuse is currently realised in Flanders, which environmental, social and economic impact reuse has, which barriers and opportunities for reuse exist now and in the future and which actors are involved in reuse in Flanders. Based on these insights, we provide policy recommendations to increase reuse in Flanders. This report is based on existing literature, and available data, interviews and communication with actors in the field, and a survey study that was conducted in the fall of 2019. Based on the results of the survey, we map reuse in Flanders and we develop a new indicator for measuring reuse. The most important findings of our study are presented below.

- **Environmental impact and circularity of reuse.** Reuse is mostly considered as circular, partly because a reused good can replace a new one, which saves raw materials. However, the reuse market might also induce some rebound income effects (i.e. consumers can buy more goods with the same budget) and substitution effects (i.e. additional goods are bought rather than second-hand goods that replace the acquirement of a new good). First, the income effect of reuse might have negative environmental impacts. People could have a willingness to acquire *additional* goods for the purpose of acquiring surplus goods. The reuse market – offering mostly low price and easy access of second-hand goods – can have negative environmental or social effects. It is therefore important to explicitly address this nuance by assessing the replacement rate (i.e. the extent to which the acquisition of reusable goods prevents the acquisition of new goods). Our study confirmed the acquisition of "surplus goods" in Flemish citizens and provided a calculation for a mean replacement rate of 28%. Importantly, reuse is also circular since it diverts goods from the waste stream, irrespective of the replacement rate. Yet, pricing effects affecting people's willingness to buy new goods (e.g. taking into account the price of reselling reusable goods) also affect circularity of reuse. We did not gather data about this in our survey study.

- **Mapping reuse channels.** Reuse may occur through *formal channels*, which are comprised of legally registered enterprises within the Flemish reuse network and of other legally registered shops in second-hand retail. By this means, formal reuse channels add value to our economic system since any buying or selling exchange increases GDP. In addition to reuse channeled through formal channels, it is important to map *informal channels*, which refer to informal transactions between individuals, including donations. Precisely because of their informal character, it is hard to quantify those transactions. Hence, earlier research has left most of these informal channels out of their quantification efforts or have estimated these transactions using surveys about acquiring and discarding household goods.

- **The Flemish reuse network versus other reuse channels.** In this report, we make an inventory of all possible channels through which products can be reused. Using both qualitative and quantitative data, we provide an overview of the channels and provide detail on how they are currently being used and, for some channels, how they have been evolving throughout the years. For each reuse channel, we quantify the number of transactions of reused goods, the weight of the goods reused (kg/cap) and the number of goods that are reused. By doing this, we get a detailed image of the role that accredited distribution centres play within the array of reuse channels. We propose that our estimate of the amount of reuse could serve as a more comprehensive reuse indicator for Flanders, as the indicator that is currently used as a governmental target is solely based on data from one particular source, i.e. accredited distribution centres.

- **Results of our survey study.** Our study reveals that in 2019, the Flemish network of reuse centres accounted for 11% to 19% (depending on the category of goods) of total reuse. Based on the share percentage of the reuse network, we calculated the amount of reuse for the four main product streams per capita in Flanders:
  1. Furniture: **14.9 kg reuse/capita**
  2. Electric appliances: **3.2 kg reuse/capita**
  3. Textile: **3.7 kg reuse/capita**
  4. Household goods, leisure, books, music and multimedia: **11.6 kg reuse/capita**
  - Sum: 218,431,910 kg = **33.3 kg reuse/capita**

  Hence, based on our survey data, we calculate 33.3 kg/capita instead of the Flemish reuse indicator of 5.4 kg/capita currently calculated by the reuse network and used by OVAM. **This calculation is even conservative** since we did not capture a fifth 'rest group' of goods comprising all possible reusable goods. If we follow the assumption that the share percentage of this category compared to the total reuse is similar for all channels compared to the reuse network (i.e. this category of goods comprises 1.3% of the total reuse), we can, **for the reuse of household goods, estimate an overall true reuse indicator** based on this extrapolated data of **33.8 kg/capita** in 2019.

- **Future estimations of reuse.** We recommend to use our more comprehensive indicator of reuse when estimating the *total* reuse in Flanders. When doing this – i.e. taking into account the kg from several other reuse channels above the reuse network – this indicator could be used for more accurate reuse estimations based on insights from quantitative citizen survey data. These might be used in a broader scope than the one that is currently tackled by the data provided for the reuse network specifically, i.e. broader than monitoring the reuse through the accredited reuse network. First, these more comprehensive estimations might be a better candidate for between-country comparisons of reuse, since many countries do not have a well-established reuse network neither do they accurately collect data in the accredited reuse centres they have established. Not surprisingly, scarce studies in other countries to date capture reuse based on other channels (e.g. car boot sales). Second, the understanding of the division of reuse of the main household good categories between the main reuse channels might provide a basis for comparison between the reuse channels. This would enable estimates based on the hypothesized growth or decline of specific reuse channels (e.g. the hypothesized growth of online reuse due to the current COVID situation).

- **New reuse indicator not based on weight of reuse.** Another option is to add indicators based on something else than weight. In particular, since product lifetime seems to lie at the core of *circular* reuse, some parts of a reuse indicator may want to focus on the following pillars important for circular reuse: the right to repair, extended producer responsibility, preparation for reuse and a reuse fee. Factors related to these aspects might improve the measurement of circular reuse. In particular, the *quality of inflow* seems to play a major role in the potential for reuse in terms of product lifetime. It has become clear that lowered quality of e.g. furniture and textile are important barriers for reuse. We recommend that indicators for reuse based on these four pillars all related with *lifetime* of goods (i.e. right to repair, EPR, preparation for reuse, reuse fee) should be further explored.

List of Acronyms

CE = Circular Economy
E(E)A = Electric (and Electronic) Appliances
LCA = Life Cycle Assessment
OCMW = Public Centre for Social Welfare
OVAM = Public Waste Agency of Flanders
Vlarema = Flemish Regulations regarding the environmental permit
VVSG = Association of Flemish Cities and Municipalities

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Reuse in Flanders: The understudied circular economy strategy

1. Introduction

1.1. Reuse, the understudied circular economy strategy

While reuse is considered an important action within circular economy – which aims to encourage the maintenance, repair and reuse of products (Belgium.be, 2019) – studies on reuse form a considerable gap in the literature. This is surprising, since reuse is often mentioned as one of the main three main actions to enhance a circular economy (i.e. reuse, reduse, recycle; Ellen McArthur Foundation, 2013; Kirchherr, Reike, & Hekkert, 2017; Willeghems & Bachus, 2018). Yet, the activities that fall under reuse and the effects that these activities have on the environment and the economy are seldom studied. Some exceptions include studies on the reuse of particular categories of goods, such as clothing (e.g. Botticello, 2012; Farrant, Olsen, & Wangel, 2010), books (e.g. Thomas, 2011) or electric appliances (e.g. Truttmann & Rechberger, 2006). Hence, reuse as a circular action and thus, the circularity of reuse, remains understudied.

Probably, one of the reasons for this gap is that reuse is mostly established in informal, hard-to measure "markets" in which it is difficult to obtain data (e.g. Castellani et al., 2015; Gregson et al., 2013). Indeed, earlier research on reuse in Flanders is mostly limited to data obtained from the sector of the established certified social enterprise reuse centres[1]. This indicates the lack of detailed data on reuse realised through other reuse channels, such as second-hand fairs, within-family donations, or second-hand websites (Komosie, 2018). Moreover, the growing number of informal channels through which individuals may discard or acquire reusable goods will have an important share in the total amount of reuse. Hence, mapping these informal channels is of utter importance when studying reuse.

This report addresses these blind spots in current research – i.e. the understudied circular phenomenon of reuse and the variety of formal and informal channels through which it may occur – and is part of the research line on employment and actor analysis for the circular economy of the Flemish Circular Economy Policy Research Centre.

[1] Locally branded as '*Kringwinkels*', which are governmentally accredited and subsidised second-hand shops operating areas throughout Flanders.

1.2. Objectives and research questions

The main aim of this research is to investigate the circular economy strategy of *reuse*, defined as "any operation by which products or components that are not waste are used again for the same purpose for which they were conceived" (European Commission, 2008, p. 312/10). The case of reuse was chosen for two reasons. First, the re-use case is the one that meets a well-defined policy need and is a very concrete case. Second, this case is a good opportunity to delve deeper in the issues of the changing landscape in the social economy, which was already touched upon in the 2018 research papers of the research line (see Willeghems & Bachus, 2018a; 2018b).

Our first research question addresses how reuse in Flanders[2] is organised and estimates the magnitude of this reuse:

RQ 1. What is the magnitude of the reuse in Flanders?

Our second research question considers the circularity of reuse:

RQ 2. What is the impact of reuse?
- *RQ 2A. How circular or environmentally friendly is reuse?*
- *RQ 2B. What is the social and economic impact of reuse?*

Our third research question is how reuse can be increased from the current 5 kg reuse/capita policy target to the 2022 policy target of 7 kg reuse/capita. In addition to this estimate we will study how reuse in general – through various reuse exchange channels – in Flanders could be increased. Therefore, our third research question is twofold:

RQ 3. How can reuse in Flanders be increased?
- *RQ 3A. How can reuse in Flanders through the social enterprise reuse network be increased from 5 kg to 7 kg per capita?*
- *RQ 3B. How can reuse in Flanders in general be increased?*

Our fourth research question addresses the effects of a potential future increase of reuse in Flanders. In the light of the main focus of our research line, we will address the effects on employment and on interactions between actors in the field relevant for reuse (i.e. the private sector, the reuse centres and municipalities). Hence, also our fourth research question is twofold:

RQ 4. What are the effects of a potential increase of reuse in Flanders?
- *RQ 4A. How will a potential increase of reuse in Flanders affect employment?*
- *RQ 4B. How will a potential increase of reuse in Flanders affect interactions between the different actors in the field?*

[2] Flanders is the largest of the three subnational regions in federal Belgium, with a population of 6 million. It is located in the north of the country, and it holds many policy competences that belong to the national government in most countries, including environmental and economic policy.

1.3. Methodology

To answer our first three research questions, we will map the reuse field in Flanders, estimate the total reuse and address circularity in terms of environmental friendliness. Specifically, we will make an inventory of all possible channels through which goods can be reused (see §1.4.3). Using both qualitative and quantitative data, we will provide an overview of the channels as well as provide detail on how they are currently being used and, for some channels, how they have been evolving throughout the years. For each reuse channel, we will quantify the weight of the goods reused (kg/cap) and the number of goods that are reused. By doing this, we aim to get a detailed image of the role that accredited reuse centres play within the array of reuse channels. The estimate of the amount or reuse could serve as a new reuse indicator for Flanders, as it is more comprehensive than the reuse indicator that is used as a governmental target, which is solely based on data from one particular source, i.e. accredited reuse centres. We will identify barriers and opportunities for reuse for each channel separately, as well as in general by identifying both bottlenecks or problems and possibilities that may shed light on successful interventions in the future. Based on the inventory, the amount of reuse and the current and future barriers and opportunities, we will present policy recommendations to increase reuse in Flanders.

To answer our fourth research question, we will map the present employment in the reuse sector in Flanders based on existing quantitative employment data in sectors that involve reuse. We will also address bottlenecks and opportunities concerning employment in the reuse field. Furthermore, we will map current governance agreements and relations between actors and their concomitant barriers and opportunities.

This report consists of seven sections. After the introduction (Section 1), Section 2 provides an overview of the definitions used and of the scope of the reuse and employment concepts in this report. Section 3 gives an inventory of the present reuse field in Flanders, including our quantitative analysis based on a survey taken from Flemish citizens in the fall of 2019. Section 4 provides an overview of the barriers and opportunities for reuse. Section 5 addresses the current employment related with reuse. In Section 6, we identify the possibilities for interactions between actors in the reuse field. Finally, in Section 7, we describe the impact of our findings and provide policy recommendations addressing the research questions.

1.4. Definitions and scope

1.4.1. Circular economy

According to the national website of Belgium.be, the circular economy is defined as “an economic and industrial system which aims at keeping products, their components and materials in circulation as long as possible within the system, while ensuring the quality of their use” (Belgium.be, 2019). In addition, it is said that moving from a linear to a circular economy “will enable [us] to save money, achieve a more efficient use of resources, generate jobs and

reduce the impact of production and consumption on the environment". Given our policy focus and given that we aim to examine exactly the latter assumptions in our research questions, this definition guides our focus. However, we more explicitly define the circular economy as "an industrial system that is restorative or regenerative by intention and design" (Ellen McArthur Foundation, 2013, p. 7). This definition is developed by the Ellen McArthur Foundation, an internationally acklowledged think-thank that cooperates with companies and education to fasten the transition towards a circular economy.

To date, there is no agreement on one single definition of "the circular economy" since different fields have generated their own interpretations of the same concepts (Ghisellini, Cialani, & Ulgiati, 2016; Kirchherr, Reike, & Hekkert, 2017). However, what is mainly agreed upon is that the circular economy generally encompasses three main actions or principles: reduction, reuse and recycling (e.g. Ghisellini et al., 2016), where reduction is seen as the most environmentally benign management of goods, followed by reuse and finally recycling (Thomas, 2011). Hence, this hierarchy also reiterates a commitment to the waste hierarchy (Lane et al., 2009). Under this overarching 3R principle fall several other circular activities, such as repair (i.e. restoring something damaged, faulty, or worn to a good condition; Oxford Dictionary) or remanufacturing (i.e. reusing parts) can be classified (see Willeghems & Bachus, 2008). Circularity prioritises reduce (including repair), reuse and remanufacturing of goods and/or components over material recycling, since these maintain good value and have more environmental benefits (Gorissen, Vrancken, & Manshoven, 2016).

Important to note, however, is that circular, environmental and social aspects of the circular economy may not align per se and that, depending on the focus, certain features of the circular economy may be preferred above others in terms of whether these features benefit either circular aspects (i.e. the fact that goods, their components and materials are kept in circulation as long as possible within the system), environmental aspects (i.e. impact on the environment) and/or social aspects (i.e. societal effects such as employment).

1.4.2. Reuse

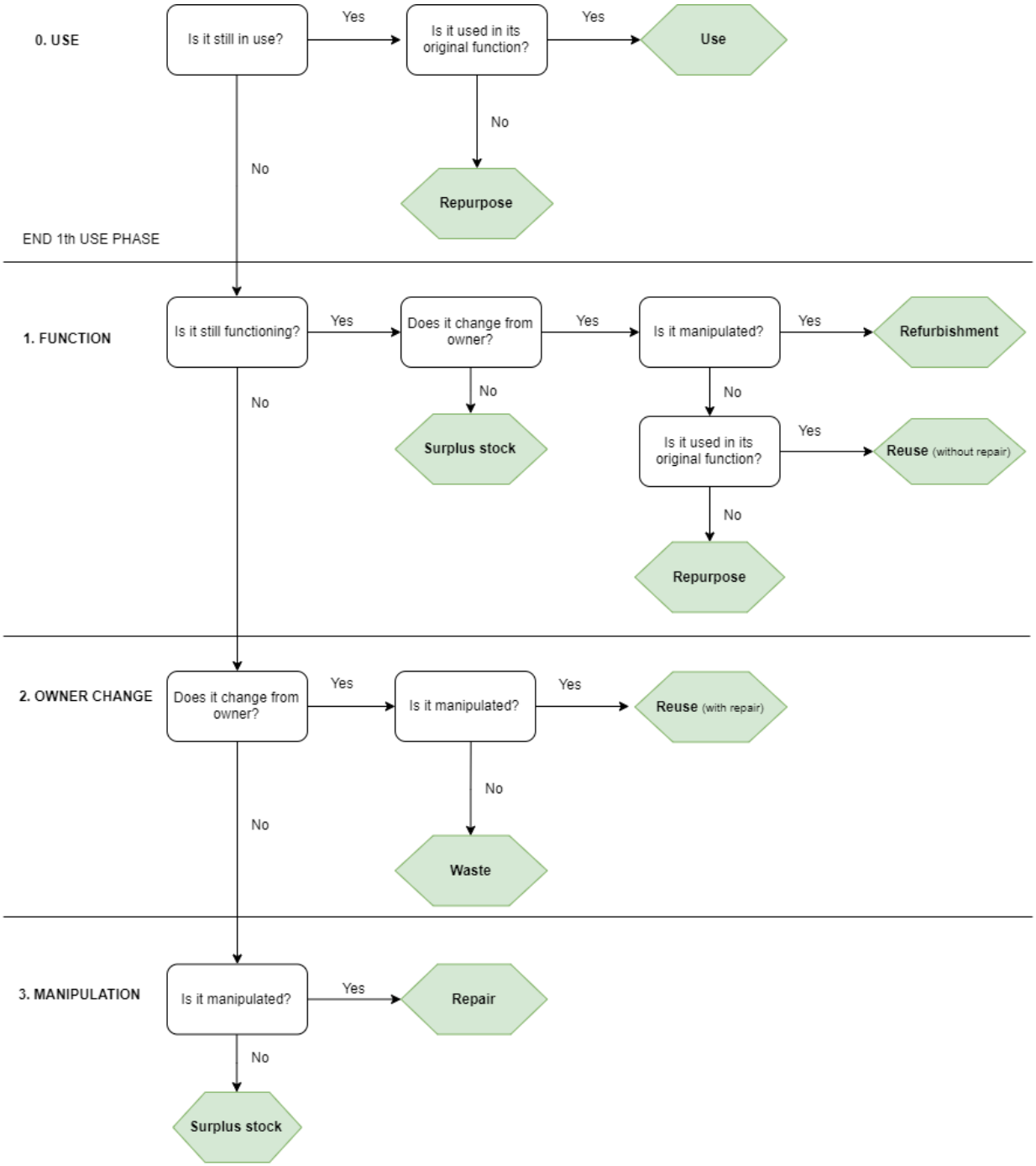
In its definition of a circular economy, Belgium.be describes a circular economy to "promote the maintenance, repair and reuse of products" and to encourage "products which are designed differently, with the aim of repairing, and fully or partially reusing their components at the end of their life" (Belgium.be, 2019). According to the Ellen McArthur Foundation, reuse is defined as "the use of a product again for the same purpose in its original form or with little enhancement or change" (Ellen McArthur Foundation, 2013). Others adopt similar definitions; for instance, according to the European Union Waste Framework Directive (EU WFD), reuse is defined as "any operation by which products or components that are not waste are used again for the same purpose for which they were conceived" (Castellani, Sala & Mirabella, 2015). Other studies on reuse do not explicitly define reuse, but refer to it as purchases of used goods (Lane, Horne & Bicknell, 2009).

Although these definitions seem apprehensive, first, it is not exactly clear what constitutes "again". Second, whereas some definitions include the reuse of a "product", others include the reuse of "components". It is therefore important to explain what exactly comprises "again" in

the definition of reuse and whether the reuse of a whole product or rather reusing only some components is considered as reuse. For instance, Gregson and colleagues (Gregson, Crang, Laws, Fleetwood, & Holmes, 2013) make a distinction between the reuse of products within households and between households, the former which they consider reuse and the latter which they call "reuse exchange". Hence, their conceptualisation of reuse is understood as "the invocation to hold onto and care about our things, by repairing them and/or finding new uses for them" (Gregson et al., 2013, p. 97). Interestingly, in other research on circular economy (Ellen MacArthur Foundation; Willeghems & Bachus, 2018), to repair a product maintaining its original use (i.e. repair) or to use a product again but for different purposes (i.e. repurposing) is not regarded as reuse. According to the Ellen MacArthur Foundation (2013), maintaining or prolonging lifespan does not fall under reuse and neither does reusing something again for a different purpose. Hence, within-household reuse may not fall under reuse under their definition.

In Figure 1 (see next page), we provide an overview of what we consider to fall under the main circular actions (i.e., repurpose, refurbishment, reuse) as well as non-circular actions (i.e. waste, surplus stock). Moreover, we include repair as an additional option which can serve as a lever or a in some cases (i.e. in the case of malfunctioning) a precondition for reuse to occur. Importantly, some nuances are nearly not possible to take into account when presenting a circular action flowchart. For instance, if a product is used for another than the original function, while it is still functioning, this should be considered repurposing. It is very likely that what constitutes a 'function' will also fluctuate over time. In particular, products can serve a certain function, e.g. act as daily clothing, yet they may also include other functions, e.g. act as clothing for workings around the house. Disentangling what constitutes a 'functioning product' and identifying the tipping point where a product is not functioning anymore, is a difficult task to make and will depend on consumers' individual decisions on how to use certain products. These decisions and by which factors they are affected, are not included in the visualization in Figure 1. Interestingly, applied to refurbishment, it may also be possible that components that are still functional, will be replaced. It can then be discussed whether functionality is either *restored* or more functionality is *added* up to the original function. Adding functionality (e.g. replacing less storage with more storage in a cell phone) may increase value. This value creation stays out of the scope of our research.

Figure 1. Flowchart of circular and non-circular actions



1.4.2.1. Within versus between-household reuse

We conceptualise the reuse of a good when this good is transferred from one household to another. By this means, we do not include shared or passed-on within-household consumption in our scope but rather focus on donating or selling and receiving[3] or buying (or swapping) household goods, which comprise any consumer goods (excluding consumables) in and around

[3] Throughout the report, we will use both 'receiving' or 'receiving for free' when referring to receiving second-hand goods free of charge.

the house, except for cars and other motorised vehicles, houses or buildings. Whereas one may argue that it is also reuse when goods are used again by members from the same household, we consider an "owner" as an entity entitled to discard or acquire goods. Hence, we do not consider the user but rather the decision maker on discard and acquisition of goods as the owner. On a household level, we consider goods circulating between household members to remain in their first user phase, and not as part of reuse. We include both citizens, who make unpaid transactions, and consumers, who make paid transactions, and include both formal and informal transactions. For reasons of clarity, we will use the term "consumers" in the report to refer to both citizens and consumers. If circular actions such as reuse of goods will increase, informal exchanges of second-hand goods might grow together with formal exchanges in the traditional retail sector (Gregson, Longstaff, & Crewe, 1997; Guiot & Roux, 2010; Hibbert, Horne, & Tagg, 2005). Moreover, consumer retail expectations may change towards circular expectations, which traditional channels cannot satisfy (Guiot et al., 2010). This will likely lead to the growth of alternative, informal exchange channels.

Importantly, the question on whether to include within-household reuse in a definition of reuse is also likely to depend on the effects one is finally interested in: environmental effects, economic effects or both. For instance, if creating employment opportunities (from additional activities related to reuse) rather than waste prevention is the focus, within-household reuse may be irrelevant. However, the number of unpaid and paid transactions and/or the time that people invest in these transactions may be important for modelling both environmental and economic effects. Since these issues have their own separate literature strand (e.g. Browning & Gortz, 2012; De Vries, 2013; Kramer et al., 2009; Pullinger, 2014), we refrain from further investigating within- versus between-household reuse. Moreover, we include both paid and unpaid transactions since one of our aims is to calculate total reuse in Flanders.

1.4.2.2. Reuse amount: kilogram, pieces and/or transactions

We will calculate several reuse indicators. Moreover, depending on the final interest (i.e. economic value, environmental value, social value), several dimensions might be of interest. Since waste and circular economy policy is often driven by the estimated weights of goods, a first option is to estimate the amount of reuse in kg. The current reuse target as set by the Flemish government and as used by the official reuse centres is provided in kg (European Environment Agency, 2016; also see the Implementation plan for household waste and similar industrial waste by OVAM, 2016; 2019). This aligns with a material efficiency perspective given the environmental benefits of reusing rather than additionally producing these goods. Therefore, the weight of reused goods could then be compared to the annually generated household waste, for which data are available. This was done by earlier research that quantitatively estimated the amount of reuse on the second-hand market in the UK as 180 kilotons, which represents 0.1% compared to the annually generated non-hazardous household waste (Gregson et al., 2013). A second option to study reuse is to consider the number of pieces that are reused. Such a measure may provide information other than a material efficiency indicator and may, for instance, indicate consumer awareness and/or behaviour concerning specific types of low-weight household goods (e.g. textile and clothing). Consumer behaviour may be important to identify barriers and opportunities for reuse now and in the future. Third, the number of reuse transactions may provide information on the time and/or the intensity individuals allocate to reusing goods.

1.4.2.3. Repurposing, repair, maintenance and preparation for reuse

When considering transactions between individuals, it is difficult to quantify when a good will be used for its original purpose and when it will be used for a different purpose. Therefore, goods may be "repurposed" in between transactions. Repurposing is "the identification of a new use for a product that can no longer be used in its original form" (Coughlan, Fitzpatrick, & McMahon, 2018) and is therefore by definition different from reuse, which considers using a product again for the same purpose. Therefore, it is important to pay attention to the role of repurposing when mapping established formal and informal reuse channels.

Furthermore, repair is important to consider when mapping reuse exchange channels. Repair does not fall under the definition of reuse since it concerns a manipulation of a damaged good or damaged component of a good *before* it can be reused. Note that we refer to a physical manipulation and do not refer to so-called preparation for reuse, including the performance of quality checks or cleaning, which we do include in our scope. Similarly, we also include maintenance in our scope since we consider this as inherent to the (re)use phase. On the contrary, repair relates to remanufacturing, which is "the rebuilding of a product to specifications of the original manufactured product using a combination of reused, repaired and new parts" (Johnson & McCarthy, 2014) and refurbishment, which is "the process of returning a product to good working condition by replacing or repairing major components that are faulty or close to failure, and making cosmetic changes to update the appearance of a product" (Ellen MacArthur Foundation, 2013, p. 25). Moreover, if a product that is reused has first been repaired, this may according to some definitions be considered as remanufacturing rather than reuse (e.g. Tecchio, 2016). Therefore, depending on whether components of reused good are replaced first (i.e. whether and which parts of the original product are reused and repaired), reused products can be considered as reused (nothing replaced) or repaired. Within the category of reused products, products may either be considered as being fully reused (nothing repaired or replaced; same purpose) or repurposed (nothing repaired or replaced; different function). Within the category of repaired products, different types of repair may occur, including remanufacturing (some components replaced by new components; same function) and other forms of repair (e.g. components repaired rather than replaced).

Building on the above, we position reuse in this report excluding repurposing and repair and including preparation for reuse (e.g. performing a quality check, cleaning…). In this regard, there is need for special attention for EE): before these appliances can be sold second-hand, criteria for reuse versus waste must be applied. Addressing these criteria asks for actions such as testing the functions and components, but also repair or replacing spare parts without repair. The accredited reuse centres handling EEA follow the specific environmental criteria before selling the EEA as second-hand products under warranty. Other products received at the reuse centres are checked upon quality an condition in order to select for sale in the shops. It is important to note that in both the literature and current policy measures and data availability, it is hard to exclude reused items that are being repurposed by their second owner and whether preparation for reuse takes place in channels other than the accredited reuse distribution centres (e.g. transactions between individuals). Since repair can be considered as a potential (but not always as a necessary) precondition for reuse – either before or after it changes from owner – it is not always possible to track down whether repair has occurred or will occur in the future when goods change from owner and are included in reuse calculations.

As can be seen from our flowchart on the main circular actions (see Figure 1 on page 6), and in line with other research (e.g. Quantis, 2018), circular economy focusses on everything between the use and the end-of-life phase. In the end-of-life phase, products or their components are either remanufactured, recycled or become waste, which is what a circular economy aims to prevent. We will not focus on these phases after the end-of-life. Hence, the use and reuse of a product starts from the beginning of the first occupation phase and ends at the end of the last in-use occupation phase. In addition, we consider repair not as a circular action but rather as a potential precondition for reuse to occur. Hence, we posit that repair and reuse are dependent upon each other and, contrary to earlier research (e.g. Ellen McArthur Foundation, 2013; (Kirchherr, Reike, & Hekkert, 2017), do not consider them as independent circular actions. In particular, it seems that the main circular actions up until now involve around three main dimensions which will determine the circular action. In Figure 2 below, we provide an overview of the three main dimensions which determine the circular action – which may imply a combination of actions if repair is considered circular. As can be seen from the figure, the earlier flowchart determining the circular action involved (see Figure 1 on page 6) is a nuance for the overview in **Fout! Verwijzingsbron niet gevonden.**.

Figure 2. Positioning reuse in relation to associated circular actions

		Same owner	Owner change
No manipulation	Original function	Use	Reuse
	Other function	Repurpose	Repurpose
Manipulation	Original function	Repair	Reuse (with repair)
	Other function	Repair + repurpose	Repurpose (with repair)

1.4.3. Reuse typologies and reuse channels

Since products can change from owner in a variety of ways, reuse can occur through various reuse channels. First, both *discarding and acquisition channels* are important since for reuse to be able to occur, consumers need to discard their used goods and thereafter other consumers need to acquire these second-hand goods (Paden & Stell, 2005). When quantifying reuse, it is therefore important to get information about both discarding (i.e. selling or donating) and acquisition (i.e. buying or receiving) channels (Guiot & Roux, 2010; Hibbert et al., 2005). Second, in their product distribution channel model, Paden and Stell (2005) distinguished between *direct and indirect channels* through which individuals can exchange goods. For instance, reuse may occur directly from one consumer discarding a good to another acquiring consumer, or reuse may occur indirectly from one consumer discarding a good to a third party (e.g. a second-hand shop), where the product may get acquired by another consumer. Third, reuse channels may either be *formal or informal*. Many reuse channels involve informal consumer-to-consumer transactions, yet research has shown the importance of both formal and informal channels for the circulation of second-hand goods (e.g. Guiot & Roux, 2010; Hibbert et al., 2005; Lane, Horne, & Bicknell, 2009). Indeed, also in Flanders, multiple formal and informal reuse channels are present. For instance, *Netwerk Bewust Verbruiken*, i.e. "Network Conscious Consumption", a non-profit actor in the field of sustainable consumption, provides an overview of various channels through which individuals may buy, get, sell or donate second-hand goods. This allows us to distinguish six reuse channels which are included in the analysis throughout this report:

- Formal channels:
    1. The Flemish reuse network
    2. Private (physical) second-hand shops
- Informal channels:
    3. Online platform websites supporting reuse transactions (e.g. *2dehands* and *eBay*)
    4. Second-hand fairs
    5. Family and friends
    6. "For free initiatives", charities and good causes

1.4.4. Social enterprise reuse network

In Flanders, there is a network of reuse centres accredited by the OVAM (Public Waste Agency of Flanders) consisting of mostly social economy companies, i.e. the social enterprise reuse network *De Kringwinkels* with second-hand shops operating whole Flanders. In 2005, the Flemish Government established the criteria for accreditation and subsidising of the reuse centres. Examples include that the operating area needs to contain at least 75.000 inhabitants, a shop needs to remain open for at least thirty hours a week, the total shop floor of the reuse centre shall measure at least 400 m² and correspond to an equivalent of at least 1m² per 200 inhabitants within the assigned operating area, etc. In 2018, this network was comprised of 145 shops, implying one second-hand shop for every 45,441 citizens (total number of citizens in Flanders on 1 January 2018: 6,552,967) who collected 12,7 kg goods per capita and successfully resold 5,4 kg per capita (i.e. reuse per capita), good for a reduction of 34,377 ton CO^2. With a revenue of 289 million EUR for the whole sector (i.e. the social enterprise reuse network comprising of customised organisations and the reuse centres), of which 57% or around 164 and a half million EUR revenue from own activities and 40% or almost 114 million EUR subsidized, they offered employment to 10,032 employees. The reuse centres – which are represented by *Herw!n* – offered employment to 5,311 employees (4395 FTE), of which the majority distanced from the labour market (i.e. custom employees and Article 60 employees[4]).

Reuse shops part of this Flemish reuse network are thus more than second-hand shops. First, they offer employment and training to people who have a hard time finding a job on the labour market. Moreover, they pay attention for the environment since one of their main activities is to pick up and resell reusable household goods so they don't end up on the landfill. With reusable is meant that the goods are still in a good state and someone else should still be able to use it. Hence, individuals who have household goods that are still too good to throw away and do not know what to do with them, can bring them to one of the reuse shops or call their free pick-up service. This network is different from other reuse-related businesses since their main purpose lies in product-reuse, social employment, sustainable and environmental activities and offering consumer goods at low prices for the needed. Moreover, they are embedded in the waste and material policy and in local governance bodies. This network has its own specific operation management, purpose and operating area. Therefore, throughout the current study, we place much emphasis on this actor.

[4] Article 60 employees are employees who have a special temporary work contract as per articles 60 /61 and concern internal employment at the Public Centre for Social Welfare (in Dutch: OCMW). In particular, Article 61 is a special contract between the OCMW and a (non-profit) organization for which the federal government contributes to the budget. No social contributions are required.

1.4.5. Scope of the analysis

First, we delineate which goods – products, components or materials – we include. From a waste avoidance perspective, one way to delineate reuse is to focus on the total amount of *materials* that are reused instead of becoming waste. However, according to the definition of reuse, individuals need a particular function of a good. We therefore focus on *functional goods* that are used again by another owner at the end of the first utilisation phase. We do not include the reuse of materials or components of goods since these do not provide a functional service in themselves. We are aware of the overlap between goods and components since some goods may serve as components for other goods (e.g. a bicycle tire is needed for a functioning bicycle). Yet, in these cases, we consider the component (e.g. bicycle tire) to function as a functional good in itself. Whereas reuse may also be applied to 'non-catalytic' biological goods, such as water (e.g. when water is used as a cooling medium in certain technologies), we focus on technical materials and exclude biological materials.

Second, we demarcate which type of goods we include. Rather than capturing all existing goods, we focus on one particular type of goods: household goods (i.e. any goods in and around the house, except for cars and other motorized vehicles, houses or building goods). Specific categories of goods are often studied separately since some types of goods are positioned in different markets. For instance, goods for building purposes get increased attention since these materials are costly and possibilities for reuse develop quickly. Also houses are an example of particular goods that fall in a specific category since the housing market is influenced by public policies to stimulate acquisition, rent or renovation. Other examples include the car market, which includes a vast market for (re)selling second-hand cars, which is influenced by the policy of company cars. Therefore, we narrow down our scope to household goods which comprise any goods in and around the house, except for cars and other motorised vehicles, houses and building materials. This focus is in line with earlier studies on reuse, for instance research on routes of reused goods (e.g. Lane et al., 2009; Gregson et al., 2013) and national research on the second-hand shopping behaviour of individuals in Flanders (e.g. press communication *Troc*, *2dehands* & *De Kringwinkels*, 2017). In addition, this scope is in line with the current policy targets on the reuse of household goods, which can easily be measured through existing data of the accredited social enterprise network reuse centres (OVAM, 2016; 2019).

Third, since we have change of ownership as a prerequisite for reuse, we determine which parties are involved in this study. We narrow our scope down to household goods that are transferred from business to consumers (e.g. second-hand retail sector to individuals) or from consumers to consumers (i.e. individuals to individuals). Therefore, in line with Castellani et al. (2015), we include both the formal second-hand activity sector and the informal second-hand channels. The former includes the social enterprise reuse network, and the latter includes car boot sales, flea markets, charity shops, vintage and antique shops, online selling, donations and other niche markets. We will extend upon these niche markets later in this report. Hence, we study the second-hand sector and the formal and informal household sector and exclude other sectors such as the construction sector and the car sector.

2. Mapping Reuse in Flanders

2.1. Background

We will map the current formal and informal channels through which goods may change from owner and will therefore mainly focus on individual's behaviours and exchange channels through which reuse can "flow". We will do this using available information from data reports and interviews with actors in the field. In Flanders, *Netwerk Bewust Verbruiken*, a non-profit actor for sustainable consumption, provides an overview of channels through which consumers may buy, get, sell or donate second-hand goods. They list four main categories: (1) second-hand shops and auction houses, (2) online selling and reselling, (3) second-hand fairs and (4) good causes. These categories align with those addressed by other research in the UK (Gregson et al., 2013) and in the US (Fortuna & Diyamandoglu, 2017). A difference is that Gregson and colleagues (2003) refer to an additional category concerning furniture reuse networks, which are not present in Belgium. However, this category greatly overlaps with our Flemish reuse network, in which furniture accounts for 41.1% of the total reuse and for 18.6% of the revenue. Hence, based on the available literature on these reuse channels (e.g. Gregson et al., 2013) and communication with actors (e.g. *Herw!n*, the umbrella organisation for social enterprises in Flanders), we will map the current reuse channels encompassing several discarding and acquisition channels of reusable goods. We distinguish the following channels: (1) the social enterprise reuse network, (2) the private sector (i.e. second-hand retail), (3) online channels, (4) jumble sales and second-hand fairs, (5) "for-free" and swapping channels and (6) niche channels. Finally, we will dedicate some attention to channels including sharing possibilities.

For each channel, we will provide detailed information on the way in which consumers use these channels through providing available information on the number and/or the weight of exchanged goods. Mapping these channels is a critical first step when studying opportunities for and barriers of reuse in Flanders. Note that we do not adopt a direct policy approach, since a focus on the production side is difficult when capturing reuse. Therefore, we adopt a consumption perspective since this may help us to map reuse. Looking at household practices and provisioning is one manner to approach the reuse using a consumption perspective.

Importantly, as described earlier in this report, critical conditions for reuse to occur require the discarding of a reusable good by one individual and the acquisition of this good by someone else. Hence, in what follows, we will provide – where possible – details on both sides and will indicate potential problems for closing this "reuse loop" from discard to acquisition. Readers should keep in mind that **the number of discarded goods does not per se indicates a measure of the reuse that is currently into place since a gap exists in what is discarded vs. what is acquired**. On the contrary, *acquired goods* can be considered reuse and will indicate the magnitude of reuse. Of course, one limitation of this focus is that we do not know whether acquired goods are effectively used by users. This limitation is already into place in current conceptualisations of reuse (i.e. the governmental target based on the number of sold goods through the reuse network). To determine such a reuse measure, data on individuals' actual *use behaviour* would be required. In this study, we refrain from such an approach.

2.2. Reuse exchange channels

2.2.1. Formal channels

Reuse may occur through formal channels, i.e. channels delivering registered economic activities and protected employment relationships (Chen, 2007). These channels consist of legally registered enterprises within the reuse network and of other legally registered shops in second-hand retail. Formal reuse channels add value to our economic system since any buying or selling exchange increases GDP.

2.2.1.1. Social enterprise reuse network

At the end of the 1980s, a number of local government actors started cooperating with social and environmental organizations to increase reuse and develop employment in the social economy. In 1994, the Flemish waste agency OVAM added a centralized approach to these initiatives. A collaboration agreement was reached that led to a network of reuse centres that covered all the 308 Flemish municipalities.[5] The 27 Flemish reuse centres are non-profit social enterprises that collect and repair reusable goods for resale as second-hand goods in a chain of local shops (Gorissen, Manshoven, & Vrancken, 2014). In addition, they offer employment for vulnerable groups and low-skilled staff, and provide quality goods at low prices for low-income households. Besides its important role for the circular economy due to its focus on two main circular actions (i.e. repair and reuse), this network plays an important role in the local social economy and in the circular economy (see also §3.2). Moreover, the federal government has lowered VAT from 21% to 6% for reuse centres that are accredited as a social-economy organisation, on the condition that goods are received for free (OVAM, 2015) (see also agreement between the reuse network and the Federal Public Service of Economy). The reuse centres receive subsidies for employing low-skilled staff, and additionally, the OVAM pays them a small subsidy for the role they play in the municipal waste and circular economy policies.

The reuse network is subdivided in 27 reuse centres each covering a particular area, so all Flemish municipalities are served by exactly one reuse centre. Each reuse centre consists of one or more reuse shops. Moreover, the network is embedded in the Flemish waste policy (Komosie & RREUSE, 2019) and policy targets are formulated, based on the amount of reuse channeled through this established reuse network. Specifically, the government grants a tonnage fee to the reuse network (e.g. in 2017, this allowance covered 5% of the total revenues of the reuse network). Moreover, the Flemish government sets specific targets for the reuse network. As such, in 2015, the set targets of 5kg of reused household goods per capita was reached. By 2022, the target is 7kg of reused goods per capita and an average of 50% reuse on collected household goods (not possible for all types of goods). There is no governmental employment target, although the sector itself aims at providing an additional 2000 jobs for vulnerable groups. Currently, Flanders is the only region/country in Europe with specific reuse targets (EEA, 2019). Possible EU targets may be set by the end of 2024 following revision of the EU Waste Framework Directive Context (EU WFD).

[5] See also this brochure from OVAM (in Dutch)

This reuse network is a well-documented sector since it keeps data on its reuse activities (i.e. collection, repair, selling and waste disposal of reusable goods in kg and in transactions) and on its employment, as this became a prerequisite for accreditation by the OVAM from 2005 onwards. Hence, numbers of kilogram and of pieces of reusable goods as well as numbers of employees and FTE are readily available. No other reuse channel in the world has similar obligations to and/or support by thewaste agency. The obligations of the reuse network are related with the prevention of household waste, as stipulated in the implementation plan for household waste and similar industrial waste (OVAM, 2016; 2019) which also addresses reuse. Therefore, this channel allows to distinguish between what is collected and is still reusable versus what is effectively reused (or, at least, sold for reuse), which has been suggested before (Matsumoto et al., 2012). Although the Flemish reuse centres have little activities related to repair as such, some quick repair fixes to collected goods are sometimes done before reselling them (i.e. preparation for reuse). It is important to note that we do not include repair in the scope of our study. Therefore, repair is equally not included in the other reuse channels.

In addition to the quantitative data on the Flemish reuse network, some qualitative data is available on the evolution of this network and itsactivities throughout the years. We will combine the available quantitative and qualitative data from the literature with insights obtained through personal contacts with the umbrella organisation of the reuse centres, *Herw!n*. This combination of methodologies will allow us to map the network's past and current evolutions in a detailed way, and identify barriers and opportunities for reuse in this network.

In **Fout! Verwijzingsbron niet gevonden.**, we provide an overview of the categories of household goods collected and resold by the reuse network. We differentiate between the potential for reuse (i.e. through numbers of collected reusable goods) and actual reuse (i.e. through successful resale of these goods in the shops).. As can be seen in the table, the largest streams in terms of number of kg of reuse are, in descending order, furniture (41.1%), the combined category of small household goods, leisure, books, music and multimedia (35%), textile (10.6%) and electric appliances (EEA; 6.5%). The rest category of a very diverse type of goods (including machines using gas but also vehicles and do-it-yourself goods) covers slightly more than the EEA category, but is considered separately since it does not capture one particular type of goods. In terms of environmental impact, 1 kg of actualised reuse would translate into 1 kg CO^2 saved (Accenture, 2014).

Table 1. Overview of streams (i.e. categories of goods) concerning revenue, inflow and reuse from the Flemish reuse centres in 2018

Category	Revenue (EUR)	% Rev.	Inflow (ton)	% Inflow	Reuse (ton)	R./capita (kg)	% R.	R./inf. (%)
Furniture	10,326,734.90	18.6	23,098.40	28.5	14,561.80	2.22	41.1	63
EEA	4,076,114.90	7.3	17,721.1	21.8	2,315.70	0.35	6.5	13.1
Textile	19,804,915.90	35.6	14,843.80	18.3	3,763.40	0.57	10.6	25.4
Household+	20,323,829.90	36.5	24,191.60	29.8	14,345.10	2.19	40.5	59.3
Undefined	1,112,221.00	3	1,207.50	1.6	453.4	0.07	1.3	34.8
Total	55,643,816.60		81,162.40		35,440.30			40.2

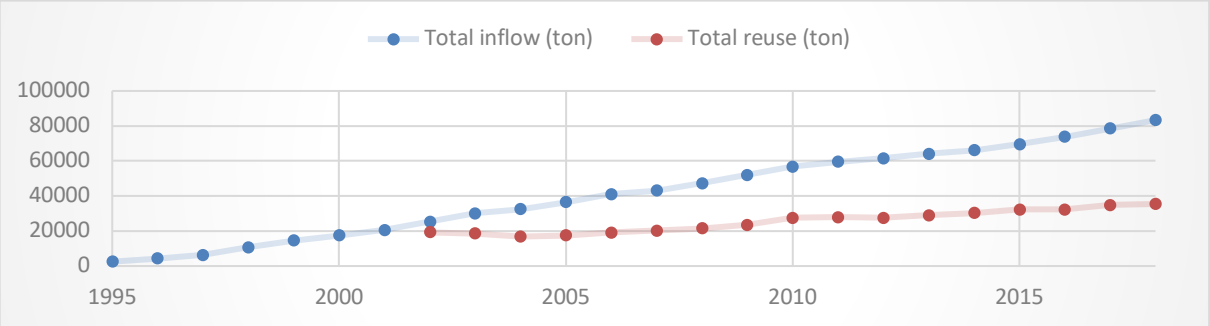
Note: EEA = all electrical appliances ; Household+ = combination of the categories small household goods, leisure and do-it-yourself, books, music and multimedia ; Undefined = rest category including options not covered by the previous categories

In what follows, we present the available data from the reuse network about reuse, employment and store revenue, with 2018 as the last year of available data. A full table is available in Appendix 3. Data were obtained by the reuse network itself and is available through the annual reports that can be found online on their website. Important to note when reading the numbers provided in Appendix (based on personal communication with *Herw!n*):

- Theoretically, a reuse percentage above 100% could be possible in the case that shops use stock they have accumulated the year before. Practically, this almost never happens. Therefore, data providing own calculations based on this ad hoc data from 1994 to 2001 – presented in light grey in the table – should be approached with caution. In particular, there was no legislative framework as there is today, including lower reporting obligations towards the OVAM and the local governments.
- The **decreasing yearly reuse percentage** – i.e. the percentage of what is successfully resold – can be explained by several factors. First, since goods get **less qualitatively designed**, more collection is needed to gain a similar amount of qualitative goods. Second, in 1999, the sector composed a **revision label for electric appliances**: externally by gaining access to the number of appliances from the *Recupel*[6] circuit, internally by organising trainings and sharing knowledge about repair of electric appliances. This lead to an increase of repair by the reuse shops of electric appliances from 2000.
- Considering this reuse percentage, it is important to note that **repair – especially for EEA – has a negative impact on the reuse percentage**. Moreover, the ratio between inflow of damaged EEA compared to repaired EEA is approximately four to one. As large EEA is very heavy, repair theoretically negatively affects the reuse percentage.

Based on the above, two main indicators for reuse can be considered: first, the total reuse or the reuse per capita (which is not sensitive to the number of collection and/or repair) and the reuse percentage (which is sensitive). Additionally, it should be noted that one of the activities of the reuse network includes repair and in the available reuse data, this repair is included. In particular, if damaged goods are collected by the network, repaired and successfully resold, these data include repair. However, in our scope and in the other reuse channels that will follow in the next sections, repair is not included. In Figure 3, we present the evolution of the amount of reuse in terms of the collection (i.e. inflow) and the sales of reusable goods (i.e. reuse) by the reuse network from 1995 to 2018 (i.e. the year span from which data are available). In Figure 4 (see next page), we present the evolution of the reuse as expressed in kg per capita.

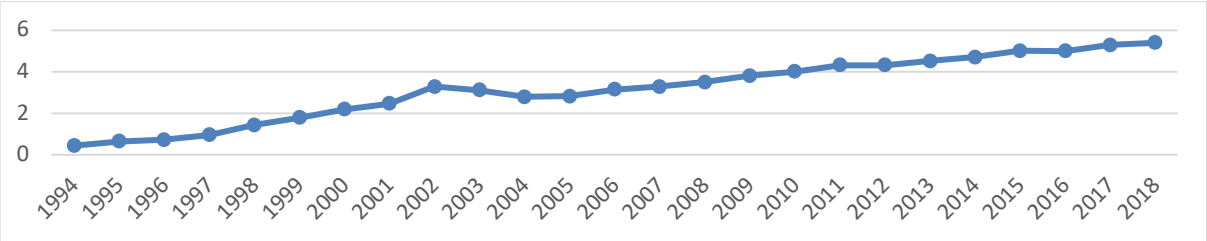
Figure 3. Inflow and total reuse through the reuse network from 1994 to 2018



Source: personal communication with Herw!n

[6] *Recupel* organises the collection and processing of discarded EEA in Belgium. Each manufacturer that brings EEA onto the Belgian market is legally in charge of the collection and processing of the discarded appliances.

Figure 4. Evolution of reuse (kg/capita)



Source: personal communication with Herw!n

To put the above findings in perspective, in **Fout! Verwijzingsbron niet gevonden.** we provide the numbers of collected goods and the number of reused goods according to the 2018 report of RREUSE from 850 social enterprises from 27 members across 25 European countries and the US. Numbers are rounded to 500 and presented in tonnes. For reasons of comparability, we provide the estimate for an average country in brackets (i.e. divided by 25). Importantly, these countries vary in terms of inhabitants, making a direct comparison of these numbers difficult. Moreover, in countries other than Belgium, not all reuse networks are included in the official numbers. In that sense, reuse data in these countries are likely an underestimation of the collected data and comparison with Flanders is not advised. In this sense, Flanders is quite unique since it succeeds in collecting data from the whole reuse social network as compared to other countries or regions that take part in the overarching RREUSE network.

Table 2. Comparison of the number of collected and reused goods between the Flemish reuse network and the RREUSE social enterprise network in 2018 (tonnes)

	Flemish reuse network		RREUSE study	
	Inflow	Reuse	Inflow	Reuse
1. Furniture	23,000	14,500	200,000 (8,000)	80,000 (3,200)
2. EEA	17,500	2,500	290,000 (11,600)	20,000 (800)
3. Textile	15,000	4,000	260,000 (10,400)	20,000 (800)
4. Books & records	7,000	2,000	16,000 (640)	5,500 (220)

Note: the presented four categories are not exactly the same as the categories before (i.e. "books and records" does not align with the category of household+ from the reuse network), which is due to limitations of the data obtained through the RREUSE social network across 27 members

Barriers

Some barriers can be inferred from the existing literature on reuse centres. We make a distinction between barriers on the micro level and barriers on the macro level. On the micro level, **individual differences** in success between individual reuse shops in Flanders are observed. Moreover, reuse centres are more successful than shops given their infrastructure (i.e. various physical locations, storage capacity, parking space…). In a research report from 2018, using data from 2016, the umbrella organisation *Komosie* (currently *Herw!n*) listed factors impacting the success of individual reuse shops and, hence, barriers for reuse. For instance, differences between municipalities and their reuse centres amount up toa8 kg of actual reuse per capita. From a local study conducted by *KOMOSIE* (currently *Herw!n*) on local differences between the reuse centres in 2018, based on data obtained in 2016, several factors can be listed. In **Fout! Verwijzingsbron niet gevonden.** on the next page, we give an overview of the most important ones. For a detailed overview, we refer to the study, which can be downloaded here (in Dutch).

Recommendations based on these factors are the following:

- Reuse centres should **focus (even more) on the inflow/collection** of goods. Whereas this already is the focus, it is important to know that several factors are highly correlated with a higher inflow. Relevant factors include the presence of shops in municipalities, bulky waste policies, collaboration with the intermunicipality and communication with potential donors. The inflow of goods could be increased (1) increasing or highlighting the presence of sale points, (2) collaborating with the intermunicipal waste agency, e.g. through making arrangements regarding bulky waste streams, and (3) Improving communication towards consumers to increase their willingness to donate goods. Preferably, these three recommendations are implemented simultaneously.
- Reuse centres need to have **enough operational capacity** (employees & infrastructure). Hence, what is needed are needed: financial resources and inflow of diverse employee profiles.
- There is a need for more **sensitisation and communication** about reuse.

Table 3. Factors correlating with the reuse success rate of reuse centres

Factor	Correlates	Specification
Inflow/capita	- Presence of sales point (i.e. reuse shop) in municipality - Population density - Bulky waste policy - Collaboration with inter-municipality - Communication with potential donors	- Reuse bins in waste park
Resources	- Number of employees - Shopping experience	- Contingent of target audience - Availability of other customised employees (e.g. Article 60) - Capacity shortages (reverse) - Financial resources for supporting profiles - Magnitude and accessibility (e.g. parking space) of reuse shop - Financial resources in the long term
Local communication about reuse	- Frequency of communication and diversity in communication channels - Local promotion campaigns - Collaboration with local press - Communication by intermunicipalities - Focus on donors: donors are potential buyers	
Other	Positive attitude of local actors towards reuse centres	- Municipality, inter-municipality and social partners

On the macro level, recent research has shown that recent reorientations on the national and international level have impacted the playing field and working conditions of the reuse centres in Flanders (Gorissen, Vrancken, & Manshoven, 2016).

- First, reorientations have to do with reduced subsidies from the government and changing paradigms such as waste-free design methods and companies taking back and/or recycling their goods. The rise of a recycling focus may cause a tension between the recycling of materials and the reuse of goods. From a circularity perspective, such paradigms are positive. However, from a social enterprise perspective, it is important to consider these

paradigms and think about new roles for the reuse centres. Moreover, reuse centres may need to consider to respond to these changing societal dynamics while at the same time creating added value (Gorissen et al., 2016). Barriers for reuse centres to create added value include, first, that they are dependent on subsidies, which limits their space for long-term planning and change management.

- Second, they compete for key resources with other actors. For instance, goods are dispersed through other channels (e.g. giving away for free and other informal exchanges).
- Third, the reuse centres are encountering a notable decrease in the quality of inflow in recent years, which entails a lower reuse percentage (see Appendix 2).

As we will expand in the following paragraphs, there are several opportunities for the reuse network if it succeeds in adhering to potential new roles. However, there are still other barriers present. First, based on the barriers above, the feasibility of such an adherence is questioned. Second, the sense of urgency of a paradigm shift for the reuse network differs between actors. Third, a lack of trust between actors further complicates this issue (Gorissen et al., 2016).

Opportunities

An important aspect is that the reuse network is incorporated in the Flemish waste policy at the level of municipalities and inter-municipal bodies, many of which that have an agreement with the reuse centres. In particular, the reuse centres are allowed to do a first reusability check of the discarded goods deposited at the recycling park (or sometimes even a separate space for reusable goods is reserved at the waste park). Since 42.7% of the non-selective collected bulky waste in Flanders is furniture[7], an example private actor is ***REFURN***, who proactively wants to contribute to an economic and ecologically interesting solution for this problem. Moreover, they study eco-design of unfurnished furniture and the co-creation of new circular business models. *REFURN* is a collaboration between two leading furniture companies and *WOOD.be* as a knowledge centre for the wood and furniture industry. All in all, since its incorporation in the Flemish waste policy, there are several opportunities for reuse through the reuse network.

First, opportunities for more reuse through the reuse network can be found on the level of the **inflow of goods**. There is a strong correlation between inflow of goods and the total amount of reuse. The assumption is that the more high-quality goods can be collected, the more can be resold for reuse. Policy measures may want to enhance collection of reusable goods so the net number of potential for reuse is increased. An example from an earlier study is the collection, dismantling and sorting of bulky waste, which may increase the options for repair (Gorissen et al., 2016). A side note to this opportunity is the fact that many reuse centres do not ressell everything they collect (personal communication with OVAM, 2019). Reasons for this are local differences in supply and demand, a lack of structural solutions for flow between reuse centres, reduced quality of inflow, difficulties to conduct the selection at the moment of arrival of goods etc. In 2018, inflow of potential goods for reuse was 12kg/capita. whereas the effective reuse realised was 5kg per capita. Hence, there is a gap between what is offered for reuse and what is actually reused. However, according to *Herw!n*, there is a big correlation between the ratio of inflow and the ratio of reuse. These numbers therefore deserve some further attention.

[7] Retrieved from https://vlaanderen-circulair.be/nl/doeners-in-vlaanderen/detail/refurn, 28 September 2020

First, it is important to note that goods accepted in the first phase (i.e. when the consumer offers them to the reuse shop) might not pass the more thorough quality check in the second phase. Therefore, the number of collected reusable goods is best considered as the number of *potentially* reusable goods. The ratio in the data between inflow and reuse are therefore somewhat misleading. Second, some reusable goods do not get resold because e.g. they are old-fashioned, or because they get broken during the handling in the reuse centre. These two mechanisms are almost unavoidable in the economic environment in which the reuse network exists and, hence, the number of "actually reusable" goods is substantially lower than the number of potentially reusable goods currently presented in the data. Two opportunities for addressing these issues are the potential of focusing more on repair activities (yet these activities are time-intensive) or focusing on textile collection practices other than clothing bins where no quality check is conducted (yet the reuse network almost cannot ignore this market aspect given the many other market players who make use of these practices and, hence, the loss of this product stream when this collection mode would be ignored).

Second, reuse shops seem to flourish where **reuse shops and local government** (i.e. city, intermunicipal body) **succeed to collaborate and communicate well**. A tonnage fee is recorded in governance agreements with a combination of a fee per kg, per inhabitant and per kg reuse. Since a tonnage fee reduces residual waste, municipalities could consider increasing them. Moreover, some recycling parks provide training for their employees with a focus on reuse while others do not. Finally, the presence of Article 60 employees correlates with increased reuse. The number of these employees may be increased through local governmental incentives to allocate these employees to reuse centres.

Third, an earlier study has relatedly suggested that new roles for the reuse centres and new management agreements between these centres and municipalities are needed to safeguard their continuation (Gorissen et al., 2016) and to create new types of value creation. For instance, municipalities could shift from subsidies to a compensation for the environmental and social impact (Gorissen et al., 2016). This may increase the human resources in the reuse network and increase the environmental impact. Yet, the reuse network should then be able to provide fully transparent accounting, and this system may increase insecurity due to the uncertain prospects of an retrospective compensation compared to a priori subsidies (Gorissen et al., 2016). Important to note is that local subsidies are often limited and dependent on decisions and politics of local governments. Moreover, a collaboration between the private and the social economy is sometimes possible, yet because of local politics and conditions not for all reuse centres.
In the case of these new roles for reuse centres as material and social matchmakers, reuse centres may create new activities (e.g. bulky waste collection) and build partnerships around the collection of for instance waste textiles. Moreover, functioning as a material match may enhance strategic networking such as exploring funding options at the Flemish innovation agency. A new organisation structure could facilitate cooperation between the social economy and private companies (Gorissen et al., 2016).

Fourth, the **contact with other local actors** (i.e. other second-hand, making or repair initiatives) enhances reuse in the sense that initiatives besides the reuse centres seem to enhance rather than impede the success of reuse shops. Collaboration with other initiatives, such as repair cafés or makerspaces, may increase reuse. Available data on low performing reuse centres showed

no correlation between the sales concept on the reuse success rate. Reuse centres could rethink their sales concept, potentially by partnering with other organisations. Available data also showed a correlation between the frequency of local actions and the reuse success. Combining these insights, partnering with other initiatives and local actors to broaden sales concepts and organise local events – and effectively communicating about these events – are likely to function as a driver for reuse.

Fifth, **sensitising the general public and knowledge-sharing** may help reuse centres to reach their potential. However, it should be noted that the reverse causation may take place and that once reuse shops succeed in bringing their goods to their audience, their message gets heard and sensitisation will more easily take place, and so forth. An asset of the reuse network is that they may increase the engagement of potential donors (and buyers) by sharing information about what happens with the goods that are donated to the reuse network, including goods that do not get sold.

Sixth, opportunities for the reuse network may concern **governmental policy**. Concerning taxes, to incentivise donors, the government could think of a system to make goods donated to the reuse centre deductible from taxes, which is an existing practice in The Netherlands. Additionally, the government may shift its focus from recycling policies towards a focus on the growth of the reuse network. An important question on this matter is to ask whether a reuse fee (i.e. money that is paid to the government for the service the government has provided) may be a solution if costs for the government to increase reuse would be high.

2.2.1.2. Private second-hand retail sector

The formal private sector in second-hand retail includes retail shops who (re)sell second-hand goods. Unlike the subsidised reuse network, these private companies do not have data reporting obligations regarding their inflow and outflow of goods. As a result, estimating the reuse realised through these channels would require recruitment of as many as possible individual shops willing to share their data. Since it would be difficult to follow such a data strategy[8], we refrained from estimating the total reuse exchanged through this channel. However, we did estimate the number of individual shops and the number of jobs they represent (see §3.2). The number of shops may give an indication of the presence of this reuse channel in Flanders.

We searched for an indication of this number using the *Belfirst* database (Bureau Van Dijck, 2006). According to the NACE-BEL 2008 (i.e. the Belgian statistical classification of economic activities in the EU), the economic activity of 'retail sale of antiques and second-hand goods' corresponds to NACE group 4779. Hence, for finding this number of shops, we base ourselves on reuse as demarcated by the official NACE codes of companies and define which circular companies we consider to have a reuse component based on their NACE-BEL 2008 code. The data show that the number of *registered* shops with this NACE code has increased from 984

[8] We contacted several important market players on the second-hand market (i.e. *Vinted* and *2dehands.be*) in the autumn of 2019, yet, our request for exchanging data and/or a collaboration remained unanswered.

shops in 2015 to 1213 shops in 2018 (with a number of 1190 in 2016 and 1229 in 2017)[9]. Important drawbacks of this method include that, first, it does not allow to track down many important circular niches related to reuse present within companies and, second, that some companies that do not comprise any reuse could be included in this analysis (e.g. building companies may position themselves in this group without (re)using second-hand goods).

An important limitation or challenge when mapping the formal private retail sector is that it does not have a direct link with waste policies. This makes it harder for policy recommendations to tap into this channel and for researchers to find data since keeping this data is not incentivized for the private sector. Opportunities for reuse could lie in governmental follow-up for second-hand shops by incentivizing the reporting of data. Second, there are many small companies without available data using the NACE classification[10]. In addition, some companies may only contribute partly to the second-hand retail since they may combine their second-hand activity with other activities. Third and last, the accessibility for data from the larger companies in the private sector is difficult. As our approached confirmed, large private companies are not keen on sharing company data.

Barriers and opportunities

Barriers and opportunities for reuse in the private sector concern factors that drive or inhibit customers to buy second-hand goods in private second-hand stores. There is an existing and growing literature strand about second-hand consumers' (Mitchell & Montgomery, 2010), behaviours and motivations (Ferraro, Sands & Brace-Govan, 2016; Guioet & Roux, 2010), their evaluations and attitudes of second-hand stores and these effects on for instance shopping frequency in second-hand stores (Darley, 1999). Research findings in this area largely align with findings presented above regarding shopping frequency – which might be correlated with magnitude of reuse – at shops of the reuse network. Moreover, store image, positive attitudes, fashionability and the perception of quality (of goods) are correlated with shopping behaviour and frequency and distance travelled to second-hand stores (Darley, 1999; Ferraro et al., 2016). Environmental beliefs and attitudes are also correlated with second-hand shopping behaviours (Seo & Kim, 2019; Guioet & Roux, 2010). However, thrift-shopping in second-hand stores is not typically linked with environmentally oriented attitudes (Guioet & Roux, 2010). In addition, several types of motivations for buying second-hand can be distinguished, including critical motivations (i.e. distancing from the current system of production and consumption; ethics and ecology), economic motivations (i.e. low and fair prices) (Guiot & Roux, 2010). Indeed, second-hand shopping behaviours can be considered thrifty (i.e. practices of savvy consumption), green (i.e. ecologically-oriented) or frugal. These insights align with the results from an earlier survey study in Flanders of 1100 consumers in 2015, in which 81% of the respondents indicated to buy second-hand because of the cheaper price, 41% because they liked browsing through second-hand goods, 34% because it is more sustainable than buying new goods and 30% because they like finding something original (published by Statista Research Department, 2017; original research by De Kringwinkel, 2dehands, Troc and Cash Converters, 2016).

[9] We deleted 20 entries since these concerned reuse centres from the social enterprise reuse network. Moreover, we deleted five organisations after closer inspection. These organisations had more than 100 employees and concerned four regional centres for general wellbeing at work or reintegration centres for people distanced from the labour market and one organisation in the recycling industry.

[10] A new website www.tweedehands-info.be provides an overview of second-hand shops by region in Flanders

Based on the existing literature, the following factors could serve as barriers and opportunities for second-hand retail stores:

- Obtaining a supply-demand match: visibility of the "right goods" to the "right buyers"
- Assurance of quality: quality checks and perception of quality availability in stores
- Store image: general pleasantness of shopping in the store
- General attitude towards second-hand stores: buying second-hand as a culturally accepted practice.

2.2.2. Informal channels

We define informal channels as those channels that are part of an informal economy (Chen, 2007), i.e. exchange channels in which the transactions of goods do not get registered and are neither governmentally taxed nor monitored. These informal channels are part of an informal economy, the latter which has proved to be a useful concept to policymakers and researchers because of the reality it captures (Chen, 2007).

In addition to reuse channeled through formal channels (i.e. the reuse network and the private second-hand retail sector), it is important to map informal channels since the latter take into account goods that are reused before they are formally collected for reselling and goods that are in circulation in informal transactions between individuals, including donations (Gregson et al., 2013). Due to the variety of informal exchange possibilities, it is hard to quantify these transactions. Hence, earlier research has left many of these channels out of their quantifications (Gregson et al., 2013) or have estimated them using surveys about discarding (Fortuna & Diyamandoglu, 2017; Lane et al., 2009) and acquiring (Lane et al., 2009) household goods.

In Flanders, no earlier studies have been conducted to estimate the number of online transactions. One marketing research study in 2016 – conducted by the reuse network and large private actors including the biggest online second-hand website – indicated that 47% of second-hand buyers buy reusable household goods online and the same percentage do this using a second-hand store (either a physical or a reuse network second-hand shop) (De Kringwinkel, 2dehands, Troc and Cash Converters, 2016) and 37% do this on a garage sale.

2.2.2.1. Online platform websites

According to an earlier marketing research study, 47% of second-hand buyers do this online (De Kringwinkel, 2dehands, Troc.com and Cash Converters, 2016). Moreover, in 2016 online channels were the most popular for **selling** second-hand goods with 68% of resellers using this channel, followed by flea markets (28%), family or friends (28%), and second-hand stores (10%). One study conducted in 2009 in Melbourne also showed online channels to be the most popular (i.e. used by 25% of respondents) for reselling household goods and – after the second-hand shop (61%) – the second-most popular (32%) for acquiring second-hand household goods (Lane et al., 2009). International research has indicated the online network to be the fastest growing segment of online shopping in general (Fernando et al., 2018; Padmavathy, Swapana & Paul, 2019), which has become convenient and popular among the users over the past years owing to the cost-effective availability of internet or data (Turban et al., 2017).

Online transactions of household goods mainly occur through **advertisement websites by large players in this sector,** which in Belgium are the advertisement website *2dehands* and the mobile phone app *Vinted* with over 700,000 users. We contacted *2dehands* on 17 October 2019 and *Vinted* on 16 September 2019 for collaboration in this study, yet our calls remained unanswered. As retrieved from the website *2dehands.be*[11], the number of visitors to this website increases daily with an average number of 700,000 daily visitors with around 60,000 new ads every day. Since July 2013, *2dehands* is part of *eBay* with the headquarters in Amsterdam. The main challenge of accessing information about online transactions in this reuse channel twofold. First, private companies are not easily willing to share data, and second, there is no information about transactions that turn out to be successful, indicating reuse. Other Belgian initiatives concern *koopjeskrant.be*, *aanbod.be*, *velt.be* and *stukot.stumarkt.be*. An important *international* player on the market in Flanders is the auction website *eBay*.

Another large part of online transactions happen through **Facebook groups**, as illustrated by the large number of Facebook groups focusing on buying, selling, receiving or donating second-hand goods. In particular, in December 2019, there were 94 Facebook groups in Dutch focused on second-hand acquisition or discarding (i.e. 'second-hand' was either in their group name or their description; groups focusing on cars were excluded), with total of 67,670 posts a day (M = 720; *SD* = 953; range: [3-4400]). Of course, we do not have information on to which extent posts lead to transactions. Yet, these numbers indicate the important role of social media groups in reuse behaviours. Moreover, in 2017, Facebook has expanded its *Facebook Marketplace* to Belgium, allowing consumers to create 2nd hand ads more easily through their website.

Last, online **groups dedicated to receiving and/or donating goods for free** are gaining popularity. "Freecycling" (i.e. giving away things) is often done online. The website of the Freecycle Network, a non-profit organisation that is made up of 5,323 groups with 9,160,055 members globally, indicated 15 advertisements in Flanders for freecycled goods. Yet, this initiative is growing mainly in so-called *GIFT* Facebook groups that serve as online communities for thousands of members. Three big Flemish cities, i.e. Gent, Leuven and Mechelen, have Facebook groups with 47,140, 34,064 and 9,572 members for exchanging free goods. In addition, a much smaller give-away website (online-weggeefwinkel.be) indicated an 329 ads. Also nowadays *Hoplr*, a social media application for neighbourhoods, is getting more popular. Through this app, for example, neighbours informally exchange goods.

Barriers and opportunities

Barriers and opportunities for online channels occur through its key factor: convenience (i.e. easy access). Hence, the main strength of online reuse is also its main weakness: fraud. Indeed, scam issues have been reported by *Vinted* and *2dehands* has taken measures against fraud, including two-step verification and safe payment and sending options.

2.2.2.2. Second-hand fairs

Second-hand fairs are another informal reuse channel. In Flanders, second-hand fairs are often organized by local organisations and can be found, for instance, through online platforms (e.g.

[11] Retrieved from http://help.2dehands.be/HelpContentList?tab=X2dehands_be&cate=Over_ons_be, 6 April 2020

www.rommelmarkten.be, www.wattedoen.be/rommelmarkten, www.uitinvlaanderen.be or www.rommelmarktengids.com). No research has been done yet on quantifying the number of such organised sales and fairs.

Yet, one type of second-hand fair is well-known and organised at a larger scale, i.e. the family union *Gezinsbond* second-hand fairs for children's clothes and toys ('babybeurs'), which celebrated their 30th anniversary in 2019 and which keep data on the number of organised fairs. These fairs are very successful and consist of around 850 yearly local initiatives, with a peak of 950 initiatives in 2016 (personal communication with *De Gezinsbond*). In 2018, 817 fairs were organised, with 23% in the province of Antwerp, 11% in Limburg, 26% in East-Flanders, 18% in Flemish Brabant and Brussels and 23% in West-Flanders. Since the organisation of these fairs is local, there is no data available on turnover or number of transactions. Moreover, the most successful formula of these fairs is the so-called "table formula", at which sellers can put all their second-hand goods on a table, sell what they can, and take home what is left. This makes it difficult for the organisation to centrally make an inventory of transactions and/or resold goods. The other two formulas include the "coat rack formula" where goods are sorted by type and age by the organisation – and buyers buy their share when they have collected all coat racks – and the "garage sale formula" where sellers sell their goods at home – mostly in in their garage and/or garden.

In the summer of 2019, *Gezinsbond* organised a survey in collaboration with *2dehands* about second-hand purchases by young parents. In a sample of 292 Flemish expecting parents or parents with a child up to four years old, 73% had bought baby goods second-hand. Interestingly, around 40% already took into account reselling these goods when buying baby goods, for instance through buying higher quality goods, picking neutral or unisex colours and/or choosing well-known brands. This underscores the importance of pricing effects (see later in this report), in particular the resale value of second-hand goods. The same study showed that parents on average spend 2600 EUR on baby goods and save around 750 EUR or 29% by buying second-hand (personal communication with *Gezinsbond*).

Research from OIVO (Research and Information Centre of Consumer Organisations; now BV-OECO since 2015) in 2010 investigated the popularity of second-hand fairs with 631 Belgians and showed a growing interest in second-hand fairs, with a visitor number increase of 40% between 2008 (with 23% of Belgians visiting) and 2010 (with 32% of Belgians visiting), with the biggest increase in Wallonia (+17%) and Brussels (+16%). In addition, their results showed that Flemish people tend to visit second-hand fairs less often (+3%) compared to the Belgian average (+9%). On average, Belgians visited second-hand fairs 8 times a year in 2008 compared to 7 times in 2007 and spend on average 63 EUR per visit. Interestingly, only one third of visitors has the intention to really buy something.

Barriers and opportunities

An important question for reuse through second-hand sales and fairs is why they are so popular. An earlier study in the UK quantitatively estimated a number of 50-60 000 tonnes per annum of exchanged goods at second-hand fairs, yet based on qualitative analysis they emphasised that second-hand fairs are not associated with waste prevention but rather with surplus of household goods (Gregson et al., 2013). Moreover, it emphasised the difference between social

values related with thrift and the environmental values that underpin reuse, which is also mentioned in other research (e.g., Evans, 2011). Therefore, policy goals for increasing reuse – and not just thrift – might best be achieved by working with consumer culture (Gregson et al., 2013; Cruz-Cárdenas & Patricio Arévalo-Chávez, 2017; Steffen, 2017).

2.2.2.3. Family and friends

Informal transactions between family or friends constitute another reuse channel. To our knowledge, there are no Flemish studies on the reuse that occurs within these transactions.

2.2.2.4. "For-free" initiatives, charities and good causes

Another informal channel consists of several donation initiatives. For instance, donation to or receiving for free from charities – including clothing bins – and many other "giving" initiatives take place in Flanders, including "give-away" shops, fairs and even festivals. Importantly, many of these initiatives also include swapping goods. Whereas swapping is actually not receiving or donating for free, it seems to be blended in many "for-free" initiatives (however, it is also mentioned together with sharing initiatives in an overview by *Netwerk Bewust Verbruiken*). Moreover, swapping can be considered an integral part of reuse since two goods at the same time change from owner, and both sides of the "trade" can be considered a reuse action. It is important to note that swapping can occur many other channels. On the overarching website of give-away shops, a non-exhaustive overview is given of give-away shops in Flanders, with 25 shops spread over Flanders (1 in West-Flanders, 8 in East-Flanders, 9 in Antwerp, 4 in Flemish-Brabant and 3 in Limburg). At least four other shops are identified using the website of *Netwerk Bewust Verbruiken*, leading to a conservative number of 29 give-away shops in Flanders.

A well-known and growing initiative are the so-called "Share-fairs" from the organisation *Ferm* (former *KVLV* before 2020) – a women's network that aims to connect and engage citizens through educational and recreational activities – in which donating and sharing in a relaxing atmosphere is key. At such fairs, people can donate goods and time. The organisation keeps data on the number of share-fairs that are organised yearly, with a first initiative in 2014.

To map these fairs, we used publicly available data about the share fairs and combined this with a request to the organisation for more information. In 2018, 988 boxes – an estimate of 8 tonnes of goods – changed owner, with the following items: books (145 boxes), toys (80 boxes), kitchen goods (60 boxes), flower arranging material (53 boxes), various goods (49 boxes), creative material (41 boxes), small accessories (28 boxes) and clothing (20 boxes). Initially, in the first year of share-fairs in 2014, they were organised on a fixed day. Throughout the years, the initiatives started to become present throughout the whole year at multiple times. Moreover, 229 initiatives took place in the first edition in 2014, followed by 147 initiatives in 2015, 160 initiatives in 2016, 180 initiatives in 2017, 167 initiatives in 2018 and 63 initiatives in 2019. According to the organization, the drop in the number in 2019 has to do with a decreased financial support from the organisation and local initiatives did not get promotion material such as tents or flags when organising a share-fair. Therefore, initiatives did not always report the organization of a share-fair since they did not get any additional win from reporting it.

We gathered further information about the evolution of these share-fairs and the problems and opportunities associated with these fairs through short telephone interviews with main responsible persons for share-fairs. Using publicly available information on the Ferm website and with the agreement of the organization, we contacted 16 responsible persons for shaire-fairs with a focus on donation initiatives (i.e. not focused on swapping, baking or sharing time) organised in the second half of 2019 (i.e. from June 2019). We succeeded in interviewing 13 out of 16 people. Each participant was explained about the research setup at the beginning of the conversation and provided an informed consent via email afterwards. We asked open questions about the following:

1. The general way of working at a share-fair (i.e. How does it work?)
2. The types of people that donate and receive
3. The type of goods that are donated, received or exchanged
4. The problems occurring with respect to distributing goods or with people receiving them
5. The evolution of the initiatives throughout the years
6. The collaboration with other local organisations

Based on their answers and on personal communication with the organisation, we collected the following information:

1. In general, the success of share-fairs is related with their bottom-up structure. The willingness of organisation members to organise them depends on the individuals. Several formulas exist, with possibilities of bringing goods to a collection point beforehand and bringing goods on the spot. Several formulas for left-over goods (i.e. after the event) exist, including the collection of goods by their owners, discarding goods to the recycling park (by organisation members), discarding goods to the social reuse network or another good cause. Mostly, a quality check is done upon collection, however this is not always possible for a large amount of collected goods.
2. All types of people donate and receive goods. Yet, mostly young people are familiar and comfortable with the concept and older people tend to give more and younger people receive more. It is mentioned that tailored communication in neighbourhoods with lower social classes largely increases presence of this target group on the share-fairs.
3. All types of goods are exchanged. Many initiatives focus on one particular type to avoid a too large collection of goods and lack of possibility to store these goods. Moreover, it is regularly mentioned that switching type of goods each year allows for households to exchange all types of goods over the years.
4. In general, hardly any problems are reported.It seldom occurs that people want to come and “take it all”, yet organisation members approach these people and ask them questions. It happened around four times on approximately 900 fairs that suspicious buyers arrived with a van and collected everything, which was impressive for the organising members. With respect to remaining items, sometimes donators have to come and collect what is left afterwards. One fair was confronted with a a visit of an inspector from the government department of economics; the inspector was not aware of the existence of the share-fairs. This issue was eventually solved by the board of the organization. Besides problems, some drivers were mentioned, including the strategic location (i.e. stream of passengers) and a timely announcement of the share-fair.
5. As more and more people became familiar with the attractive concept, enabling vulnerable families to receive good-quality goods for free, the grew rapidly in the first couple of year. There is a general perception of a growing success of the initiatives,

however success partly depends on external factors (i.e. the weather and a strategic location to increase the stream of visitors, e.g. next to a school or in collaboration with another event).

6. Some initiatives are grounded in collaboration with other organisations, mainly to increase the visitor numbers and for using a designated space. Since share-fairs are non-profit initiatives, many other local organisations are happy to provide a free location for a share-fair. Good communication with other initiatives (e.g. *Gezinsbond* fairs) is also mentioned as an important factor for success and positive networking.

Good causes and clothing bins

Apart from the social enterprise reuse network, known charity organisations include the *OCMW* (Public Centre for Social Welfare), *Moeders voor Moeders*, *Poverello* and *Spullenhulp*. Clothing and textile are believed to take up the largest share of goods that are reused through these channels. A recent study conducted by the clothing company *Labfresh* – based on *Eurostat* data of 2016 (i.e. Eurostat 2016, Generation of waste by waste category) – showed that Belgians yearly donate 16.7 kg per capita to a good cause, mainly through clothing bins (Labfresh, 2016). It should be noted however that many providers of clothing bins that supposedly offer clothing for a good cause, actually are commercial companies who sell goods at market conditions abroad.

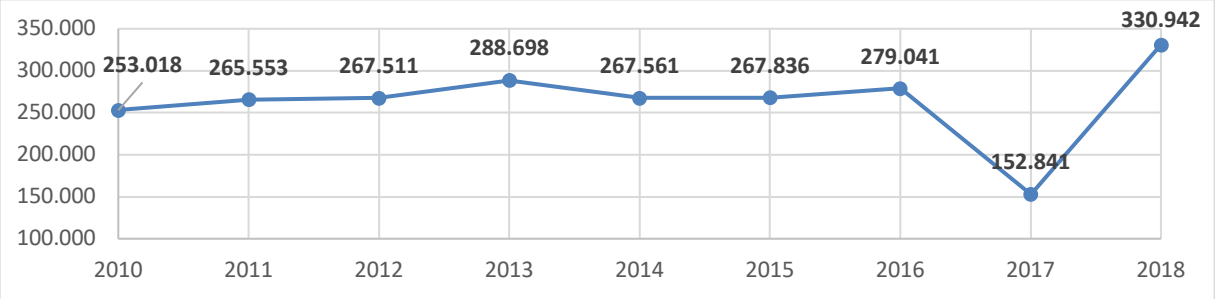
An important aspect of good causes and clothing bins is data on the export of goods. For textile, information on the export of textile is available from the United Nations Commodity Trade Statistics Database. One could argue that export is an indicator for the amount of textile that is partly "sustainably thrown away" since export to other countries includes a small share for reuse and a bigger share for recycling. Yet, important side notes from stakeholders indicate that reuse through clothing bins is not always sustainable (personal communication with OVAM; see also this article in the Belgian newspaper *De Tijd*). Organisations collecting textile in clothing bins sell a share of these collected textile to buyers. Mainly foreign collectors, who export textile to afterwards distribute it locally to local networks and families in the country of origin, enhance reuse through export.

Individuals or organizations who want to collect textile on the one hand need a registration at the OVAM and on the other hand need a permission from the local government conform the stipulations of the police regulations. All registered textile collectors can be found in an online 'collectors' database selecting 'textile' as waste category. The result is an exhaustive list which can be sorted through the "from" date, in this way you can see the number of registrations each year. When registering, many collectors check all waste streams, including textile. The ones who solely collect textile are a minority, and only those ones report the collected textile amounts to the OVAM. Whether a company is non-profit or private is not checked or registered by the OVAM. However, the OVAM does know the collectors and the processors (and the way of processing) of the collected textile. For the reuse network, the main basis for collection is reuse. For other collectors, there are multiple bases, i.e. both recycling and reuse, even if it concerns waste collectors. In export, the basis is not always clear and therefore the OVAM checks the certifications, permissions and processing methods in the reporting of the yearly numbers. Hence, not all clothes that are discarded in clothing bins are reused again since streams get recycled. In addition, with the available data from clothing bins, it is important to note that

there is no unambiguous definition of what constitutes reuse. For some, reuse refers to recycling; for some, reuse refers to export (e.g. to be reused in middle or low-income countries) and still others define reuse like we do in this study.

An important aspect of the collection system is that local governments allow the local collection by certified collectors, yet the collectors need to pay for the stream they collect. Because of the special VAT-regulation in the reuse network, it cannot pay for these streams. It is only through specific clauses and local governance arrangements that a share of the collection can be assigned to the social economy. In Figure 5, we provide a graph showing the number of tonnes of textile that gets exported (using data from The United Nations Commodity Trade Statistics Database) in Belgium with 331 tonnes exported in 2018. Assuming that the data for 2017 are likely to be unreliable, we see a growing tendency of textile export throughout the last years.

Figure 5. Number of textile exported in Belgium (expressed in kilograms)



2.2.2.5. Niche initiatives and sharing

Other informal channels include niche (e.g. renting or borrowing) and sharing initiatives, such as bike libraries. It is important to note that these initiatives fall out of the scope of our definition of reuse, because there is no change of ownership. Moreover, repair initiatives may function as a niche-channel for reuse; yet repair is as such not considered a form of reuse within the reuse framework (see § 1.4.2.3). Repair is starting to get a more prominent place in Flanders, with for instance Repair cafés (i.e. non-profit initiatives where consumers can bring their broken goods to be repaired for free) being mentioned on the municipal waste collection calendar (e.g. in the city of Leuven). Cities and municipalities are now exploring whether local networks of citizen initiatives, businesses, schools and governments can collaborate to boost repair.

Other channels concern the sharing of goods. Sharing between households relates to reuse in the sense that within the first use phase of a good already, the good can get shared with more users compared to when the good would only have one owner (and user). Hence, use differs frown ownership in this regard, and thus sharing cannot be considered reuse. Moreover, it has different net environmental and economic effects (Frenken & Schor, 2017; Horbach, Rennings & Sommerfeld, 2015).

An important requirement for sharing goods is the quality of shared goods. Just as with the quality of reused goods, the quality of the (shared) good appears to be a key requirement for the environmental sustainability of sharing business models (Botticello, 2012; Daunorienė, Drakšaitė, Snieška, & Valodkienė, 2015).

2.3. Survey study

To address the current blind spots in the research on reuse, mapping informal reuse channels is important. Moreover, if reuse predominantly occurs through informal channels, an analysis of the formal channels alone – such as using data from the social enterprise reuse networks as done by some earlier studies (e.g. RREUSE, 2019) – will provide only a small part of the picture. Previous research on reuse has identified these shortcomings. For instance, Gregson et al. (2013) identified the difficulty of quantifying the variety of ways to exchange goods and the amount of reuse that occurs through these channels. They therefore did not include these channels in their own quantification of reuse and only measured reuse through car boot sales and garage sales. Moreover, they argue that the reuse of goods that are (re-)sold on markets, sold between individuals or that are donated are already in place in our (circular) economy and are not possible to quantify (Gregson et al., 2013). Indeed, many reuse channels are informal and do not involve market transactions (Lane et al., 2009), making it difficult to collect information. Earlier studies using surveys among households showed the importance of both formal and informal channels for the circulation of second-hand goods (e.g. Fortuna & Diyamandoglu, 2017; Lane et al., 2009).

The difficulty to quantify reuse is further complicated by the continuously rising number of activities that lead to reuse (Castellani et al., 2015; Guiot & Roux, 2010; Han, 2013). Such activities include garage sales, charity shops, vintage shops, specialist second-hand retail chains, online selling (e.g. 2dehands.be) and auctions (e.g., *eBay*), as well as manufacturing and wholesale and retail activities involving reused goods (Castellani et al., 2015; Gregson et al. 2013; Paden & Stell, 2005). Hence, the formats for good redistribution (i.e. reuse exchange possibilities) are emerging and evolving, creating various options including both informal and formal economies for consumers' discarding of goods (Paden & Stell, 2005).

Recent research has aimed to provide an insight in the various ways through which reuse can occur and has mapped formal and informal acquisition and discarding channels of second-hand goods in the UK (Fortuna & Diyamandoglu, 2017). In line with this research, we conducted a study in which we map the existing reuse channels in Flanders, and quantify the amounts of reuse that pass through these channels. Using available data from the social enterprise reuse network and newly collected information on the ratio between channels of this reuse network and other channels, we are able to estimate the amount of reuse for each channel and, finally, a general reuse indicator in Flanders broader than the one that is currently used based on data from the reuse network alone. More insights in the acquisition and discarding channels of second-hand or reusable goods could allow for a more efficient recovery of reusable goods, which can be explored to increase reuse (Fortuna & Diyamandoglu, 2017).

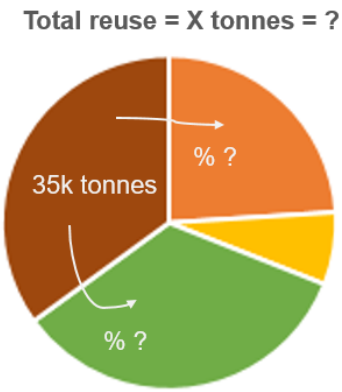
2.3.1. Materials and methods

With additional financial support from the Public Waste Agency of Flanders (OVAM), in the fall of 2019, a 15-minute online survey study was conducted with 1,500 Flemish respondents, representative in terms of gender, age, and education level. The survey was distributed by the Flemish research company *iVox*. Preregistered respondents receive invitations to selected

surveys and are incentivized for participating. Surveys are posted on the website and distributed via email along with a short description, the estimated length of time to execute the task, and the compensation to perform the task. The option to target a sample representative for Flanders motivated the selection of this platform to perform the surveys. The target population for the study was Flemish adult citizens. The survey was distributed between 8 and 18 November 2020. Participation in the survey was voluntary and participants provided full data for all survey questions. The questionnaire used in this study is available in Appendix 1.

To estimate the magnitude of reuse in Flanders, we first asked respondents to indicate, per category of household goods they **bought** second-hand last year (i.e. respondents answered the question 'in the past year' when filling out the survey in November 2019), the share of these goods that werebought through the Flemish reuse network versus through other reuse channels (e.g. 10% through the reuse network, 80% through online sales and 10% through other channels). We similarly asked this for the household goods they (freely) **received** last year. Second, again within each category of second-hand household goods, we asked respondents the **ratio between the goods bought or received**. Combining this twofold information (i.e. share of each buying and each receiving channel and the ratio between bought and received – both per category of goods), we obtained the necessary numbers from which we could extrapolate the data from the reuse network channel to the other channels. By this means, we were able to assign a number of kilograms of second-hand goods that were bought or received, (1) in total, (2) per channel, and (3), per category of goods. We visualise our method in Figure 6. Visualisation of our extrapolation method to estimate the reuse over all channelsFigure 6. In the figure, the available data from the reuse network (e.g. 35 tonnes) is given in the brown pie, which represents the reuse through the channel of the reuse network. In order to estimate the total reuse over all channels, thus, it is necessary to obtain the share (in percentage) of each reuse channel compared to the total amount of reuse. This is done both for goods that were bought and for goods that were received last year – with buying and receiving channels to comprise various channels, see below. For ease of interpretation, we asked this for each category of goods separately.

Figure 6. Visualisation of our extrapolation method to estimate the reuse over all channels



Importantly, at the beginning of the survey, we indicated that the survey questions were about the "buying, selling, receiving and donating of second-hand goods, as defined by all the goods in and around the house, including electric bicycles and appliances, leisure items, goods in the garden…" and that "houses, cars and other motorized vehicles fell out of the scope of the

questions of this survey". In this way, we scoped the household goods in this study down to the same scope as the household goods as sold and resold by the social enterprise network.

2.3.2. Description of the sample

In Appendix 1, we provide an overview of the demographic characteristics of the sample. The sample was representative for the Flemish population in terms of gender (49.1% men), age (27.1% at maximum 34 years old, 36.5% between 35 and 54 years old and 36.4% older than 55 years) and education level at three levels: higher secondary education degree or lower (61.7%), higher education Bachelor (22.7%) and higher education Master or higher (15.6%). Almost all (98.3%) of the respondents had Dutch as their mother tongue and the majority of the sample worked at least part-time (58.9%), with the second biggest group of respondents being pensioners (24.9%). Most of the respondents had no children living at home (63.9%), approximately one third had one or two children (30.6%) and a minority had three to five children (5.6%).

2.3.3. Survey results

Besides demographic data from respondents, we gathered three main other categories of data from respondents. First, we asked respondents about their **reuse behaviour and actions**, reuse channels and additional information on reused and reusable goods. We included both reuse actions from the previous year and, for those respondents that indicated not to have taken part in reuse actions the previous year or that household good category, information about the share of second-hand goods in their household and the channels through which these were acquired. Second, we asked respondents about their **motivations for (not) acquiring or discarding second-hand goods**. Third and last, we gathered additional information on respondents' **environmental attitudes and behaviours** that were found relevant for reuse behaviour in earlier studies. Below, for each category, we will include the measures we used and provide the most important descriptives and results.

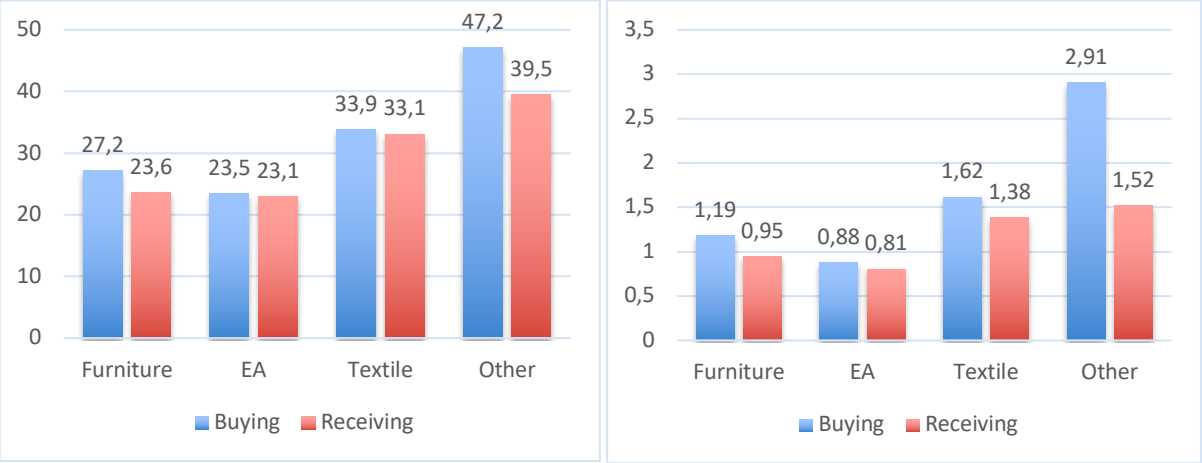
2.3.3.1. Discarding and acquisition behaviour and channels

Reuse flow: reuse behaviour of the previous year

We asked respondents to which extent, during the last year, they **bought** and to which extent they **received** (for free) second-hand household goods in one of the following categories: (1) furniture, (2) electrical appliances and electronics, (3) textile and (4) small household goods, leisure, books, music and multimedia. We used these categories based on the available data from the Flemish reuse network since these categories are found to constitute the bulk of household goods sold through the reuse centre network. In particular, in 2018, the main six categories sold by the Flemish reuse network were, in percentage of the total number of kg sold by the reuse network that year: furniture (41.1%), leisure (16.4%), small household goods (12.7%), textile (10.6%), EEA (6.5%), books, music and multimedia (5.9%). We grouped these categories into four main categories, taking together small household goods, leisure, books, music and multimedia into one category. This was decided to reduce respondent fatigue.

A total of 65.2% of the sample participated in at least one reuse activity (buying, selling, receiving for free, or donating) for at least one of the main household good categories in the past year. A visual overview of the reuse activities per category is given in Figure 7. It can be noted that the numbers for receiving and buying are somewhat similar with respect to **number of participants in these activities**. Looking at these numbers separately for buying or receiving, 56.1% of our sample at least bought something second-hand last year and 49.9% received something second-hand for free. These numbers suggest, first, a growth of buying second-hand since a study conducted in 2017 in Belgium indicated that 34% of Belgians had bought something second-hand the last year (press communication *Troc*, *2dehands* & *De Kringwinkels*, 2017). Second, these numbers suggest that approximately half of Flemish citizens reuse through receiving goods for free. Moreover, if we look at respondents who indicated on a 0 to 10 scale to which extent they participated in buying/receiving second-hand goods in each of the categories, ranging from 0 ('Not at all') to 10 ('To a great extent'), the means were also similar in each category (Figure 7).

Figure 7. (a) Percentage of respondents (N = 1500) who participated in reuse activities in the past year and (b) mean values for buying and receiving (for free) goods for each category



Note: The category 'other' was described as 'small household goods, leisure, books, music and multimedia'.

For respondents who indicated to have participated in buying or selling second-hand goods in the past year, we asked respondents to **indicate the extent to which acquired second-hand goods in the previous year were either bought or received**. Respondents who either bought or received second-hand goods indicated that 35.7% of these goods are received for free, compared to 64.3% that are bought (with 38.2% for furniture, 32.2% for EA, 37.5% for textile and 34.9 for the rest category).

In addition, we tested whether demographic differences occurred concerning respondents' acquisition and discarding behaviours. Therefore, in Table 4, we provide an overview of the demographic differences of reuse behaviours. We conducted one-way ANOVA analyses using post-hoc bonferroni comparisons to check for significant differences between buying and receiving behaviours. For **age categories**, almost all differences were significant, except for buying second-hand goods in the electrical appliances category and in the rest category, which both did not differ between the youngest age group (<= 34 years) and the middle age group (35–54 years). All other differences in Table 4 are significant and indicate a steep downward

tendency of older respondents to participate in reuse behaviours. Moreover, additional ANOVA analyses confirm age-specific differences ($p < 0.01$) of reuse behaviours, with 80.4% of young respondents participating in reuse, compared to 70.4% of middle-aged respondents and 48.6 of older respondents. For **gender**, we found significant differences with a smaller tendency with women to buy electrical appliances ($p < 0.05$) but a higher tendency to buy textile ($p < 0.01$) and other ($p < 0.05$) second-hand. In addition, women receive more textile and goods in the rest category (both $p < 0.05$) second-hand compared to men. Moreover, all in all, 68% of the women were involved in reuse behaviours the previous year compared to 62% of men, which differed significantly ($p < 0.01$). For **education level**, we did not find any differences between the five levels of education nor when collapsing education categories in the three categories representative for Flanders. For **income category** dichotomized between the three lowest and the three highest income categories, we also did not find any differences.

We conducted additional analyses on the link between income category and reuse, which indicated that people in the lowest income group (< 999 EUR/month) received more electrical appliances for free compared with other income groups ($p < .05$) except for people in the third income group (between 2000 and 2999 EUR). Although not significant, descriptives indicate a trend of lower income groups taking part in more reuse behaviours than higher income groups. We provided a visualization of these descriptives in Appendix 4. Interestingly, when dichotomizing "income group" (0 = lowest income category; 1 = three highest income categories) and "reuse" (0 = no reuse behaviour in the past year; 1 = reuse behaviour in the past year), it seemed that there were significantly more respondents of the three highest income categories who had shown reuse behaviour the past year (70.1%) compared to the lowest income categories (63.7%) ($F(1,1173 = 5.44, p < .05$).

Finally, we asked respondents who indicated to have bought second-hand goods in at least one category whether they bought more, less or a similar number of second-hand goods the past year compared to the year before. From the 880 respondents who bought second-hand, 31.7% indicated to have bought at least the same number or more goods, 22.6% indicated to have bought less, and 45.7% indicated to experience no difference in behaviour compared to the year before.

Table 4. Descriptives of acquisition (i.e. buying and receiving for free) the previous year*

		Age			Gender		Education		
		< 34	35-54	55+	M	F	Higher sec.	Bachelor	Master or up
Buying	Furniture	1.77	1.35	0.59	1.07	1.30	1.18	1.21	1.16
	EA	1.18	1.00	0.53	1.00	0.77	0.92	0.87	0.74
	Textile	2.24	1.79	0.97	1.26	1.97	1.58	1.80	1.51
	Other	2.90	2.47	1.46	2.04	2.40	2.11	2.37	2.43
Receiving	Furniture	1.42	1.05	0.49	0.87	1.02	1.00	0.93	0.78
	EA	1.22	0.87	0.45	0.83	0.79	0.84	0.78	0.74
	Textile	1.96	1.54	0.79	1.14	1.63	1.33	1.44	1.50
	Other	1.96	1.54	0.79	1.36	1.69	1.42	1.70	1.67
% reuse behaviour		80.4%	70.4%	48.6%	61.9%	68.5%	62.0%	68.8%	72.5%

*Note: means are calculated on a 0-10 scale, indicating that **numbers can be directly compared with each other**. % of reuse is calculated within groups and consists of buying or receiving second-hand goods. Significant between-group differences are marked in grey ($p < .05$ or $p < .01$). The category 'other' was described to respondents as 'small household goods, leisure, books, music and multimedia'.*

** To facilitate answering in respondents, respondents were asked to think about their reuse behaviour in the past year. Respondents were surveyed in November 2019.*

Reuse flow channels

We assessed reuse flow channels by asking respondents who indicated to have **bought** second-hand goods for each category to indicate the proportion that came from one of the following reuse channels, defined as following to respondents:

(1) Flemish reuse network (by the OVAM accredited reuse centres where you can bring goods or have goods being picked up or where you can buy second-hand)
(2) Private second-hand or antique shops (e.g. *Troc*, *Ecoshop*, local shops…)
(3) Online (advertisement sites such as *2dehands*, auction sites such as *eBay*, *Facebook* groups such as junk shops, smartphone apps such as *Vinted*, etc.)
(4) Jungle sales or second-hand fairs
(5) Friends or family
(6) Other

We based these categories on earlier research conducted in the UK (e.g. Gregson et al., 2003; Fortuna & Diyamandoglu, 2017) and on browsing through available internet websites of the Flemish organisation *Netwerk Bewust Verbruiken*, offering an overview of channels through which individuals may acquire second-hand goods.

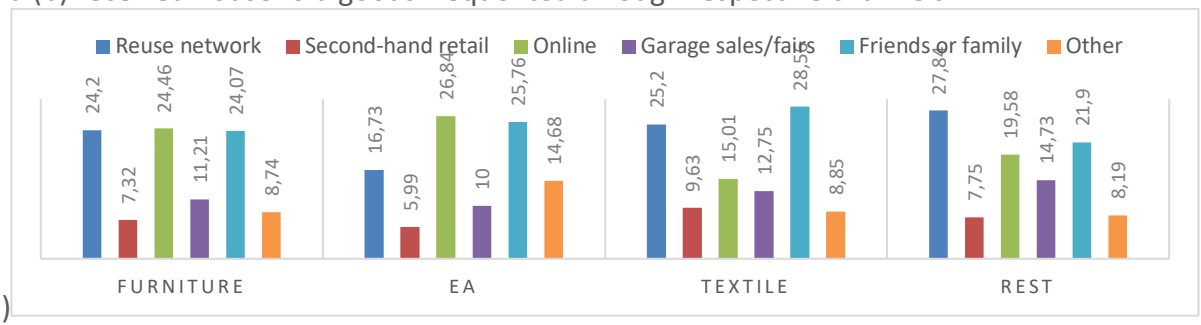
Similarly, we assessed the proportion of channels frequented for the second-hand items that respondents *received* for free during the past year and provided respondents, again based on earlier research and existing websites, with the following categories to choose from:

(1) Associations or good causes (e.g. give-away shops, *OCMW*, welfare[12], good causes…)
(2) Online (advertisement sites such as *2dehands*, *Facebook* groups such as *GIFT*, etc.)
(3) Jungle sales or second-hand fairs
(4) Friends or family
(5) Other

In Figure 8, we provide an overview of the buying (/ receiving) channels frequented by respondents. Moreover, we asked respondents to indicate, of the total amount of second-hand goods they acquired (/ received) second-hand, which proportions were obtained through the mentioned channels. Respondents could provide a percentage between 0 and 100 for each channel, and percentages had to sum up to 100%.

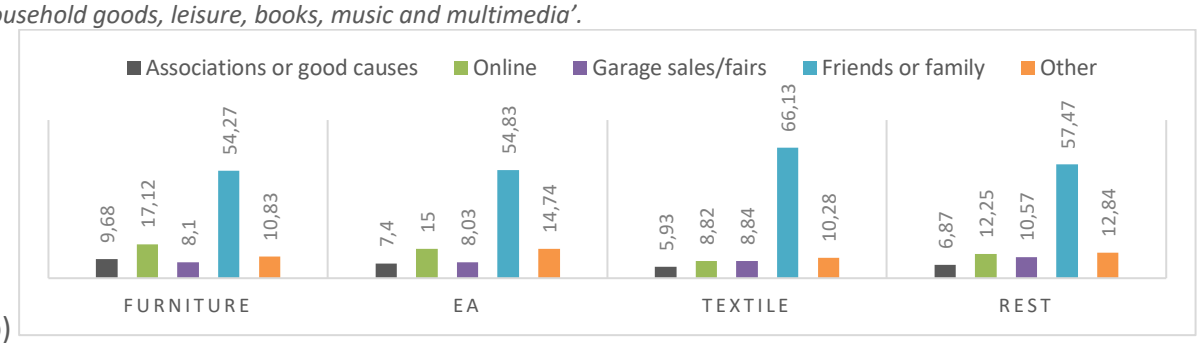
[12] In Dutch: “welzijnszorg”

Figure 8. Proportion of (a) bought household goods frequented through respective channels and (b) received household goods frequented through respective channels



(a)

Note: $n_{furniture}$ = 407, n_{EA} = 352, $n_{textile}$ = 508, n_{rest}= 708. The category 'other' was described to respondents as 'small household goods, leisure, books, music and multimedia'.

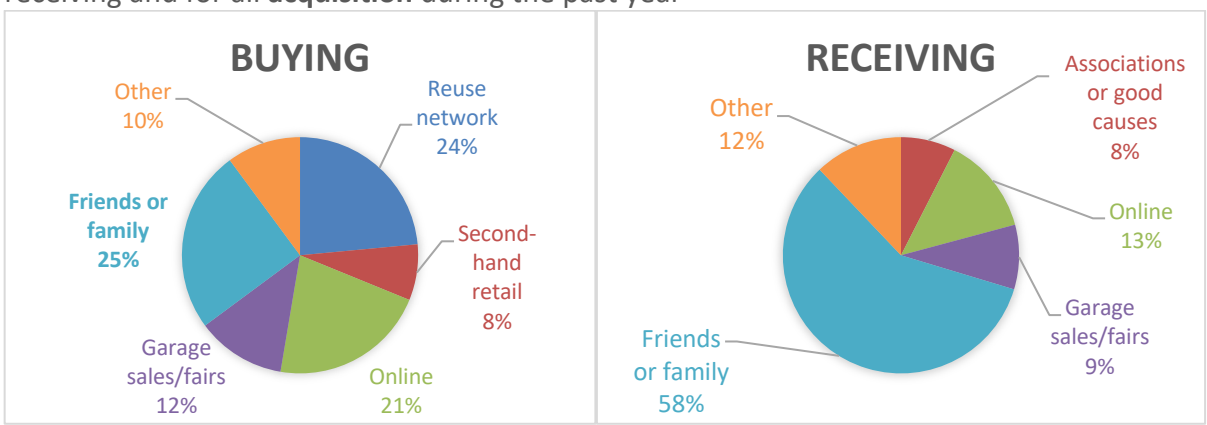


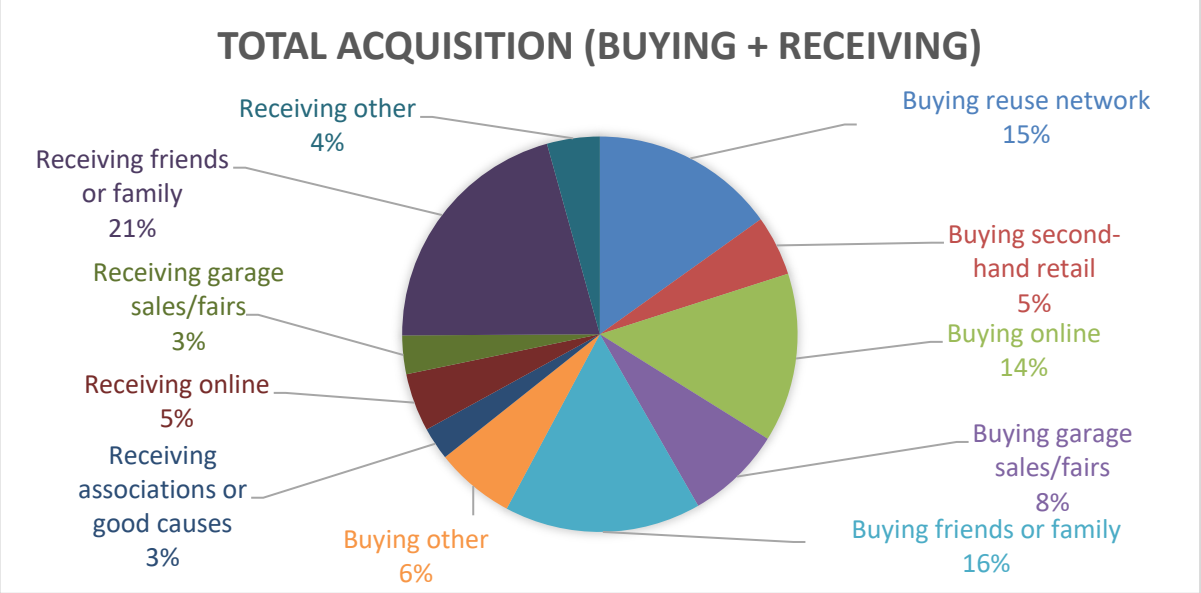
(b)

Note: $n_{furniture}$ = 355, n_{EA} = 346, $n_{textile}$ = 496, n_{rest}= 592. The category 'other' was described to respondents as 'small household goods, leisure, books, music and multimedia'.

Combining these data for all good categories, we were able to calculate the proportions of the channels frequented and the amount of reuse occurring through these channels, both for buying and receiving. Finally, using the available bought versus received ratio for each category, we calculated the total amount of reuse (Figure 9). The percentage of goods that were received compared to newly bought, were the following: 38.2% for furniture, 34.9% for EA, 37.5% for textile and 32.2% for the rest category.

Figure 9. Overview of channels, for all categories of goods combined, frequented for buying, receiving and for all **acquisition** during the past year





Reuse stock: information on the extent of reuse in the stocked household goods

We also obtained data on the **extent to which respondents owned certain types of household goods second-hand**. Moreover, respondents indicated to possess the following household goods and indicated the extent to which the goods in these categories were second-hand: (1) furniture, (2) electrical appliances and electronics, (3) baby goods (except for textile and toys), (4) textile, (5) toys, (6) small household goods, (7) leisure, books, music and multimedia, (8) garden goods and do-it-yourself. Overall, **18.7% of these household goods were second-hand** compared to newly bought. Moreover, we gathered characteristics on **the replacement rate of bought or received second-hand goods**. Specifically, for each of the eight categories of goods listed above, respondents could indicate whether they sometimes buy or receive these goods second-hand. If so, we asked respondents to indicate to which extent buying or receiving second-hand goods in each category replaced the purchase of new goods in this category, in line with an earlier measure to capture a replacement rate (Castellani et al., 2014). The answer scale ranged from 0 ("There is no influence on the number of goods I newly buy in this category") to 10 ("As a result, I do not buy any more new goods in this category"). Overall, the **mean** replacement rate **was 2.8, indicating that second-hand items, either bought or received, replace newly bought items only for 28% of the goods**. In Table 5**,** we provide an overview of the numbers of each category of goods.

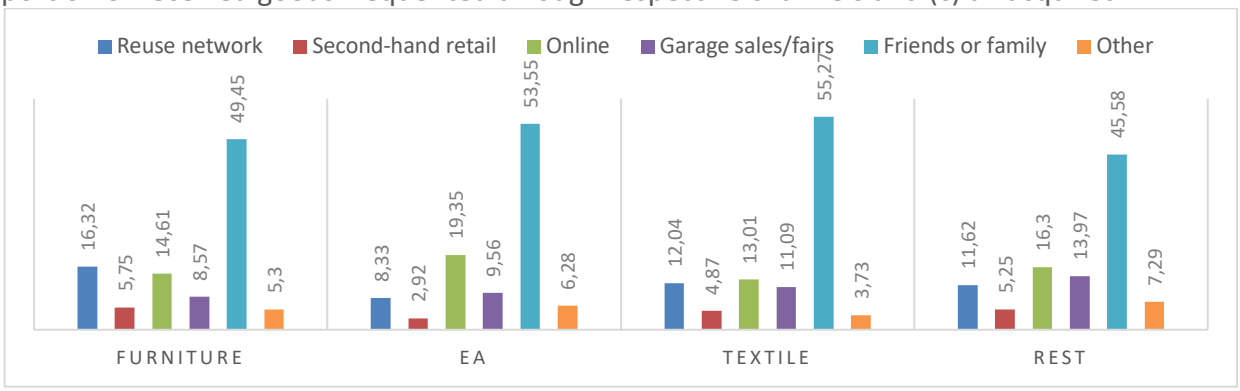
Table 5. Second-hand rate (%) and replacement rate (on a 0-10 scale) for each good category

	Furniture	EA	Textile	Baby	Household	Leisure &	Toys	Garden/DIY
% second-hand	18.2	9.9	14.7	20.1	19.9	13.9	19.8	12.1
0-10 replacement	2.91	2.14	2.60	3.16	2.73	2.85	3.29	2.64

Additionally, for each category of goods, for respondents who indicated not to have participated in buying or receiving second-hand goods last year but did indicate to possess second-hand goods, we asked for the division of the channels frequented in having obtained these household goods. Using the same bought/received ratio from the respondents who had participated in reuse behaviours the previous year, we similarly calculated the proportion of reuse channels for receiving second-hand goods, which we provide in Figure 10. Please note

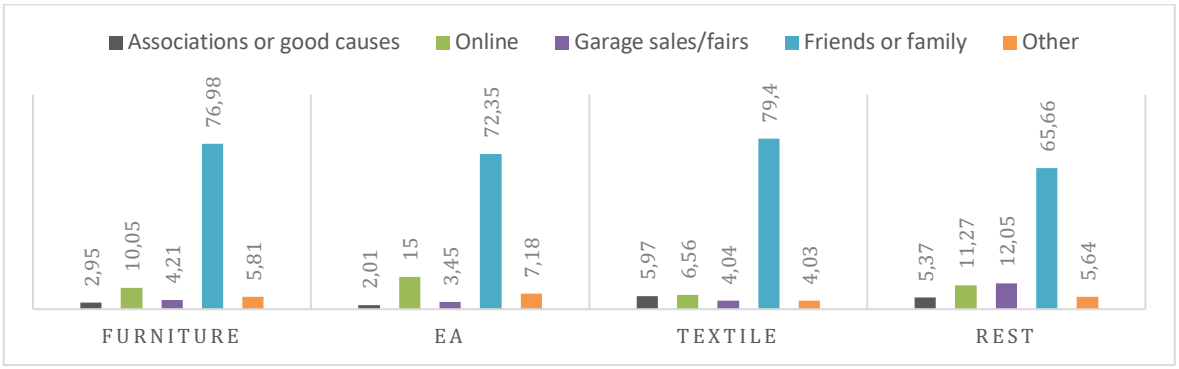
that sample sizes ranged between 138 and 273. Therefore, results should be interpreted with caution. In Table 6, we provide an overview of the breakdown of the reuse channels.

Figure 10. (a) Proportion of bought goods frequented through respective channels and (b) proportion of received goods frequented through respective channels and (c) all acquired



(a)

Note: $n_{furniture}$ = 216, n_{EA} = 138, $n_{textile}$ = 146, n_{rest}= 148. The category 'other' was described to respondents as 'small household goods, leisure, books, music and multimedia'.



(b)

Note: $n_{furniture}$ = 273, n_{EA} = 139, $n_{textile}$ = 160, n_{rest}= 195. The category 'other' was described to respondents as 'small household goods, leisure, books, music and multimedia'.

(c)

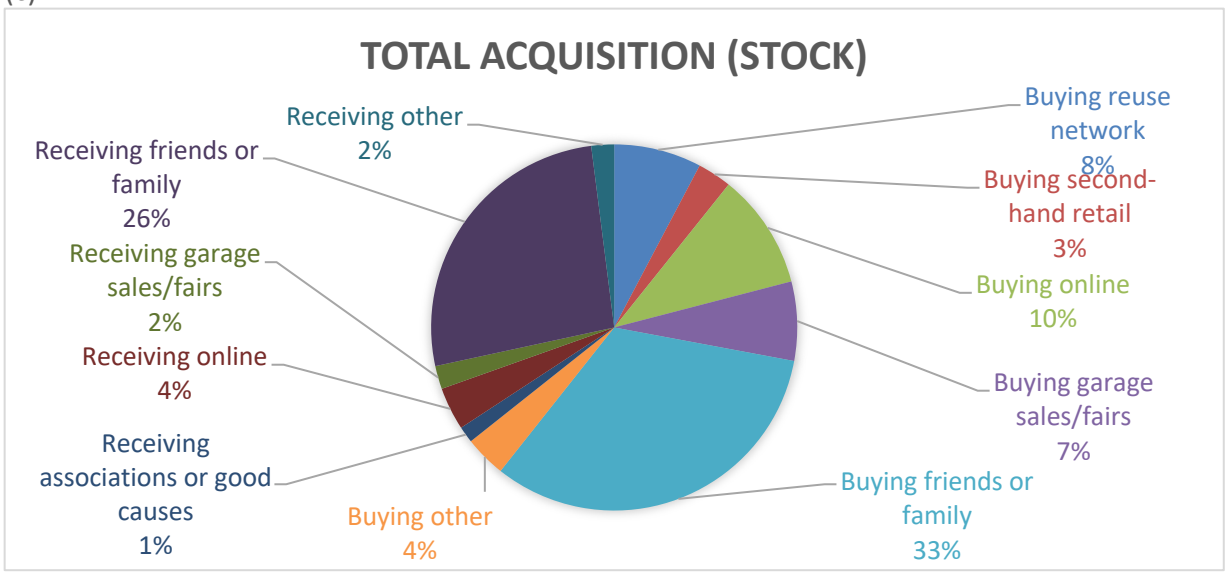


Table 6. Overview of frequented reuse channels for each product category and for buying and receiving for free separately (in %)

	Last year (flow)				Possessions (stock)			
	Furniture	EEA	Textile	Other	Furniture	EEA	Textile	Other
Buying								
Reuse network	24.2	16.7	25.2	27.8	16.3	8.3	12.0	11.6
Second-hand retail	7.3	6.0	9.6	7.8	5.8	2.9	4.9	5.3
Online	24.5	26.8	15.0	19.6	14.6	19.4	13.0	16.3
Garage sales/fairs	11.2	10.0	12.8	14.7	8.6	9.6	11.1	14.0
Friends or family	24.1	25.8	28.6	21.9	49.5	53.6	55.3	45.6
Other	8.7	14.7	8.9	8.2	5.3	6.3	3.7	7.3
Receiving for free								
Associations/causes	9.7	7.4	5.9	6.9	2.95	2.01	5.97	5.37
Online	17.1	15.0	8.8	12.3	10.05	15	6.56	11.27
Garage sales/fairs	8.1	8.0	8.8	10.6	4.21	3.45	4.04	12.05
Friends or family	54.3	54.8	66.1	57.5	76.98	72.35	79.4	65.66
Other	10.8	14.7	10.3	12.8	5.81	7.18	4.03	5.64

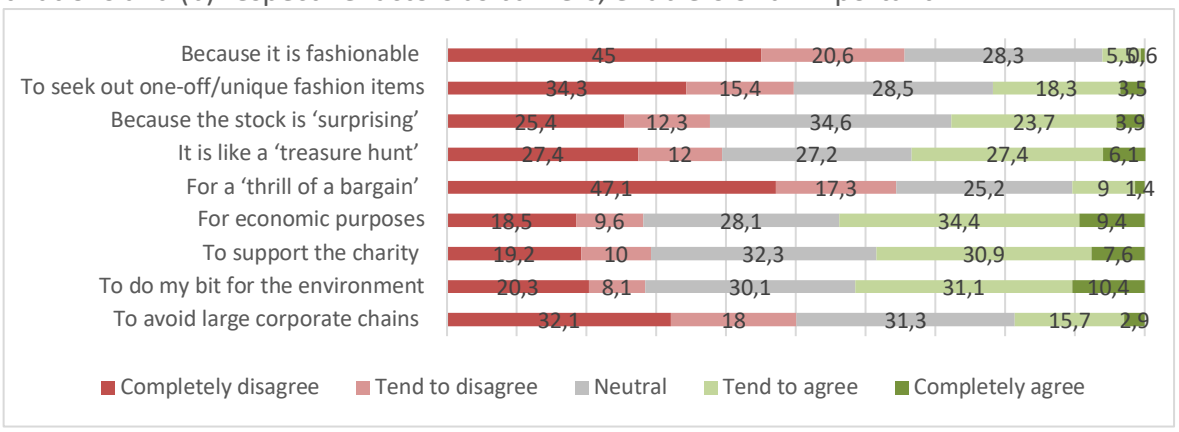
Note: The category 'other' was described as 'small household goods, leisure, books, music and multimedia'.

2.3.3.2. Motivations for (not) reusing

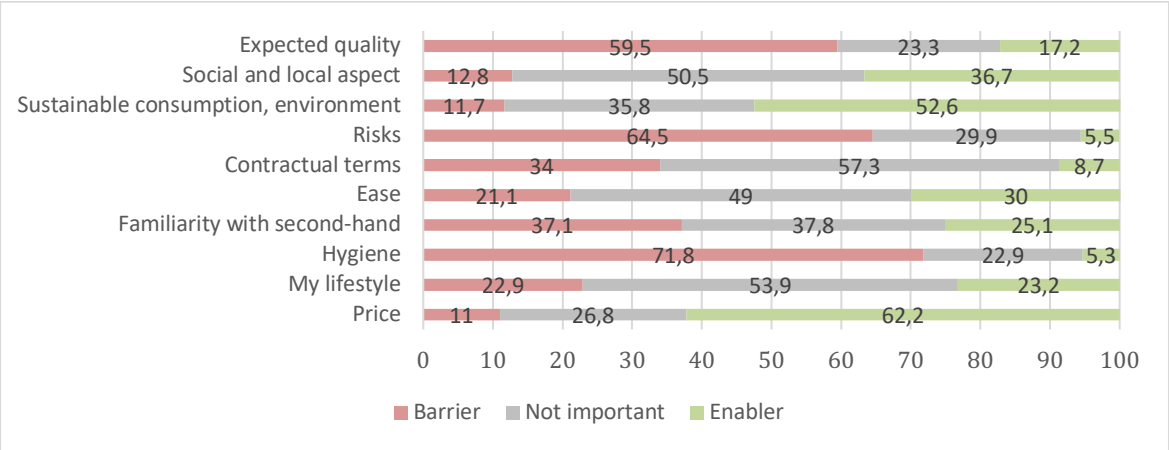
We asked respondents about their motivations for buying or would-buying second-hand. Moreover, we used scales available from previous research (Ferraro et al., 2016; Guiot et al., 2010): critical motivations (i.e., avoiding large corporate chains, doing one's bit for the environment, supporting charity), economic motivations (i.e. for economic purposes, for the thrill of a bargain), recreational motivations (i.e. treasure hunting, surprising stock, unique fashion items) and fashion motivation (i.e. fashionability). Moreover, based on earlier work on consumers' attitudes towards second-hand items (Carmen, 2019), we assessed barriers and enablers for second-hand shopping in our sample. An overview of these motivations and of barriers, enablers and unimportant factors in our sample is presented in Figure 11.

Figure 5. Overview of the percentage of respondents (N = 1500) indicating (a) respective motivations and (b) respective factors as barriers, enablers or unimportant

(a)



(b)



To understand **which factors contribute to critical (including environmental), economic and recreational motivations** for (would-)buying second-hand, we ran separate linear regressions to predict these respective motivations based on gender, age, income, education level, recycling and waste avoidance behaviour and environmentally friendly attitudes.[13] Multi-collinearity was checked for all predictors by tolerance analysis. These variables significantly predicted critical motivations ($F(6, 1158) = 72.65$, $p < .01$, $R^2 = .26$), economic motivations ($F(6, 1158) = 21.39$, $p < .01$, $R^2 = .10$) and recreational motivations ($F(6, 1158) = 23.80$, $p < .01$, $R^2 = .11$).[14] In particular, **critical motivations** were explained by gender ($\beta = 0.06$, $p < .05$), age ($\beta = -0.11$, $p < 0.01$), recycling and waste avoidance behaviour ($\beta = 0.20$; $p < 0.01$) and environmentally friendly attitudes ($\beta = 0.38$, $p < 0.01$) but not by income ($\beta = -0.03$; $p = 0.24$) nor education level ($\beta = -0.01$; $p = 0.70$). **Economic motivations** were explained by age ($\beta = -0.21$, $p < 0.01$), income ($\beta = -0.07$; $p < 0.05$), education level ($\beta = -0.06$; $p < 0.05$), recycling and waste avoidance behaviour ($\beta = 0.19$; $p < 0.01$) and environmentally friendly attitudes ($\beta = 0.13$, $p < 0.01$) but not by gender ($\beta = -0.05$; $p = 0.07$). Finally, **recreational motivations** were explained by gender ($\beta = 0.06$, $p < 0.05$), age ($\beta = -0.18$, $p < 0.01$), education level ($\beta = -0.09$; $p < 0.05$), recycling and waste avoidance behaviour ($\beta = 0.20$; $p < 0.01$) and environmentally friendly attitudes ($\beta = 0.12$, $p < 0.01$) but not by income ($\beta = 0.01$; $p = 0.87$).

Moreover, since financial factors were identified as potentially contributing to second-hand buying or receiving, we asked respondents who indicated to buy or receive second-hand goods (n = 811; i.e. based on acquisition and discarding questions to assess reuse flow) to indicate their agreement with the following statement: “"If I would buy new, I would have difficulties to make ends meet at the end of the month”. Results indicated that 35% completely disagreed, 33.5% tended to disagree, **14.6% tended to agree and 8.7% completely agreed** (8.3% indicated to not have an opinion). All in all, this indicates that no less than 23.3%, almost one fourth of all respondents, confirm that price plays a crucial role when buying second-hand.

We also asked respondents how they perceived second-hand shops. In particular, in line with earlier research (Castellani et al., 2014), we listed several possibilities respondents could tick (multiple responses were possible). Results showed that 21.9% of respondents considered a

[13] Gender (0 = man, 1 = woman), income (0 = income < 2999 EU; 1 = income > 3000 EUR) and education level were coded dichotomous (0 = secondary education at highest; 1 = higher studies).

[14] All of the predictors’ tolerance were above the cut-off of 0.10 (ranging between 0.69 and 0.94), suggesting that there is no risk of multi-collinearity (Tabachnick & Fidell, 2001), allowing regression analysis.

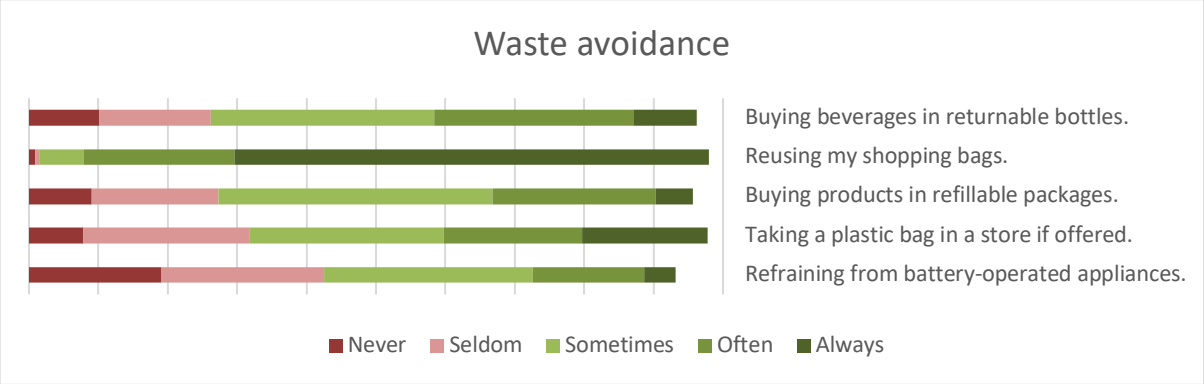
second-hand shop as “a way to find the clothes you need at a cheaper price”; 14.9% considered it as “a place where you can have a chance to find clothes you like and that fit you”; 24.8% considered it as a “a place to find additional things” and 28.7% as “a place where you can find additional things you would not have bought otherwise”. Interestingly, 42.3% indicated none of the options above. In this light, these numbers show that one fifth is motivated by the cheaper price of products and more than one fourth buy additional things – which one would not buy otherwise – in second-hand shops.

Finally, we gathered some qualitative data on drivers and barriers in the sample of our respondents for buying or not buying second-hand. Interestingly, a lack of trust in the seller when buying second-hand seemed an important barrier for respondents, especially for older respondents. This affirms the problems of (online) second-hand selling, i.e. a lack of trust in sellers and a perception of low-quality goods). Moreover, this is in line with the emergence of measures against fraud from popular online second-hand websites or apps.

2.3.3.3. Environmental attitudes and behaviours

We gathered information about respondents’ recycling and waste avoidance behaviour, their shopping behaviour and their environmentally friendly attitudes. Earlier research has shown that recycling and waste avoidance behaviour are valid to capture green attitudes and behaviours’ (Kaiser et al., 2007) and may predict reuse behaviours (Carmen, 2019). Therefore, using existing recycling, waste avoidance and shopping behaviour scales (Kaiser et al., 2007), we asked respondents whether they participated in these behaviours (Figure 12). In addition, we gathered additional data regarding environmentally friendly attitudes using statements that were previously used by the Flanders Government Department of Environment. In particular, we polled respondents regarding their agreement with a list of environmental statements. We present these statements and the results in our sample in Appendix 5.

Figure 6. Participants’ waste avoidance, recycling and shopping behaviours (N =1500)



ANOVA analyses confirmed that the mean extent of showing waste avoidance behaviours (measured on a scale from 1 = Never to 5 = Always) significantly differed between respondents who indicated to have participated in reuse activities during the past year (M = 3.28) compared to those who did not (M = 3.14) ($p < 0.01$), whereas the mean recycling behaviours did not differ between these two groups (M = 4.17 in non-reusers versus M = 4.18 in reusers).

Moreover, to understand **which factors contribute to reuse behaviour in the past year** – the main variable in our study, we ran a linear regression to predict this behaviour from gender, age, income, education level, recycling and waste avoidance behaviour and environmentally friendly attitudes. Gender (0 = man, 1 = woman), income (0 = income < 2999 EUR; 1 = income > 3000 EUR) and education level (0 = secondary education at highest; 1 = higher studies) were coded dichotomous.[15] These variables significantly predicted reuse from the past year ($F(6, 1158) = 25.02$, $p < .01$, $R^2 = .34$). In particular, reuse behaviour was explained by age ($\beta = -0.33$, $p < 0.01$), education level ($\beta = -0.07$, $p < 0.05$), recycling and waste avoidance behaviour ($\beta = 0.10$; $p < 0.01$) and environmentally friendly attitudes ($\beta = 0.38$, $p < 0.01$) but not by gender ($\beta = 0.02$; $p = 0.46$) nor income ($\beta = -0.03$; $p = 0.30$). Importantly, we ran the same regressions for buying and receiving behaviour separately. These analyses showed similar results, indicating no difference in predictor variables for either reuse buying and reuse receiving behaviour.

[15] Multi-collinearity was checked for all predictors by tolerance analysis. All of the predictors' tolerance were above the cut-off of 0.10 (ranging between 0.69 and 0.94), suggesting that there is no risk for multi-collinearity (Tabachnick & Fidell, 2001).

2.3.4. Limitations

One limitation of our survey is that we did not gather information on the purpose of the second-hand goods or on the manipulation that might have been needed for proper functioning of the resold products. Therefore, repurposing, refurbishment and remanufacturing – which could be considered particular types of reuse – were possibly included in our survey study since respondents might have categorized these as reuse. While the scope of our conceptual framework was restricted to goods that are used again for the same purpose and without any manipulation (e.g. repair), we cannot claim with certainty that we obtained data fully in line with this definition. Yet, for other channels, such as the reuse network, repair may also come into place before products that are collected for reuse are resold at the reuse centres.

Second, in our design, we were not able to differentiate between how long a product lifetime is extended (without any further preparation for reuse), but rather how many times a product has changed owner. This limitation of our approach directly evolved from the manner in which policy targets for reuse are currently measured. Moreover, the amount of reused goods as channeled through the reuse centres uses the ratio between products that are discarded to the centres and afterwards successfully resold. Similarly, we calculated the amount of products that are successfully sold on the second-hand market (or other) while still usable. From a resource efficiency perspective – as touched upon in our literature study –policy targets may want to shift focus from this "number of times of changing owner" towards the maximally in-use product lifetime. In our current study, we did not take into account any preparations for reuse (e.g. repair). However, to increase maximum in-use efficiency, repair may need to get the similar amount of attention from policy measures as does reuse.

Third, whereas we described earlier that for reuse to occur, the loop of reuse should be closed (i.e. consumers should not only discard goods, but other consumers must also in turn acquire these goods), in the current study we decided to collect data for our estimations based on the discarding side. The reason is that if we would want to capture the full picture, we would also need to have detailed information on the many formal second-hand retail numbers of selling used goods. We experienced that it was not possible to obtain these data from the second-hand retail sector. This aligns with our scope in which we focus on both business-to-consumer and consumer-to-consumer actions. However, having a full picture of both the acquisition and the discarding side may provide even better estimates for the reuse in Flanders.

Fourth, we could have opted for another design and used household data rather than designing a new consumer survey. Earlier research has used such data, available from the government, to quantify the buying and selling of reused products in garage sales by quantifying these transaction at certain regions and extrapolating these numbers to other regions (Gregson et al., 2013). However, this type of data (i.e. consumption through alternative sites) is currently not available in Flanders.[16] Therefore, in line with earlier research (Lane et al., 2009), we decided to survey individuals about their reuse behaviours through formal and informal channels. In the

[16] We consulted the websites of *Statistiek Vlaanderen* and *StatBel* and did not find such data. *Statistiek Vlaanderen* confirmed that there is no data on this issue (personal communication, 24 September 2019) and pointed towards the *StatBel* household provisioning data. However, this does not include any measures for second-hand.

case that household data on second-hand goods would become available, future research may opt to use this data source as a basis for the analysis.

Last, when defining exchange channels, we did not specify towards respondents what was targeted with 'family or friends'. With this terminology, we aimed to target family or friends *outside* of the household. In Flanders, within-household family members are named differently (i.e. "gezin" or core family) than the terminology we used (i.e. "familie" or the broad family). However, we cannot rule out the possibility that some respondents did include within-household exchange when allocating their reuse of the family-and-friends reuse channel.

2.3.5. Practical contributions

First, our study is the first to provide an estimate of the reuse in Flanders comprising all possible reuse exchange channels. Second, by distinguishing between the four most important categories of second-hand household goods – based on which categories of goods are mostly sold for reuse in reuse centres – our numbers may indicate possibilities for reuse policy to target category-specific actions when aiming to increase reuse. For instance, depending on whether furniture, electrical appliances, textile or other goods are targeted, different exchange channels should be taken into account. Third, our results indicated that almost one fourth (i.e. 23.3%) of respondents indicated that they would have problems to make ends meet at the end of the month without buying second-hand goods. In terms of social impact, these numbers confirm the societal importance of reuse. Fourth, our survey study indicated a mean replacement rate of 28% (i.e. new goods are for 28% displaced with reused goods). If we would follow the assumption that the environmental impact of used goods is zero compared to new goods, this would indicate that the environmental benefit of reuse should be weighted with 28%. On a similar note, 29% of respondents considered a second-hand store as a place to find additional things they would not have bought otherwise. This indicates some caution when considering the environmental benefits of reuse – however, a side note is that consumers may also consider a regular shop as a place to buy additional things they would not have bought otherwise, increasing environmental impact even more. Last, our results could serve as a basis for the development of a new, more sensitive, reuse indicator in Flanders.

2.4. A new Flemish reuse indicator

In **Fout! Verwijzingsbron niet gevonden.** (see on page 43), we provided an overview of the data from the reuse network. As can be seen from this table, for an inhabitant number of 6,552,867 for Flanders (2018), total reuse (35,440,322 ton) equaled 5.4 kg reuse/capita. The breakdown of the main categories of the reuse network is as follows:

1. Furniture: 2.22 kg reuse/capita
2. EA: 0.35 kg reuse/capita
3. Textile: 0.57 kg reuse/capita
4. Small household goods, leisure, books & multimedia: 2.19 kg reuse/capita

5. Undefined 5th category: 0.07 kg reuse/capita[17]

➢ Total: 5.41 kg reuse/capita

However, results of our study yield the part of the reuse network only to count for 11% to 19% (depending on the category of goods) of total reuse. We therefore highlight the need to refine the reuse indicator currently used by the Flemish government. In particular, a multiplication is needed. Therefore, we calculated a multiplicator for each of the main product categories. Depending on whether we make a **calculation** based on our survey data or whether we make an **estimation** based on our survey data, extended with an estimation of a fifth product category which we did not capture in our survey, we can calculate a conservative indicator for reuse and estimate a true indicator for total reuse in Flanders.

2.4.1. Calculated conservative indicator

Based on the share percentage of the reuse network provided in **Fout! Verwijzingsbron niet gevonden.** (see next page), the respective multiplicators for the total amount of reuse measured in terms of weight can be calculated (multiplicator = 100/ percentage share of reuse network to total reuse). We then calculate the reuse per category as follows:

1. Furniture: 14,561,796.3 kg*6.68 = 97,319,605.34 kg = 14.85 kg/capita
2. EA: 2,315,662.4 kg *9.17 = 21,245,398.57 kg = 3.24 kg/capita
3. Textile: 3,763,390.6 kg *6.35 = 23,902,192.19 kg = 3.65 kg/capita
4. Small household: 14,345,079.3 kg *5.30 = 75,964,713.86 kg = 11.59 kg/capita

➢ Sum above: 218,431,910.0 kg = 33.33 kg/capita

Hence, based on our data, an estimate of 33.3 kg/capita is given instead of the currently used indicator of 5.4 kg/capita. Moreover, this estimate is conservative since we did not capture a fifth 'rest group' of goods comprising all possible reusable goods.

Table 7. Overview of the percentages accounted for by the reuse network (in bold and blue) of the total number of reuse for the respective category of goods.

TOTAL	**Buying**		**Receiving**	
Furniture	Reuse network	**14.96**		
	Second-hand retail	4.53	Associations/good causes	3.69
	Online	15.12	Online	6.53
	Garage sales/fairs	6.93	Garage sales/fairs	3.09
	Friends or family	14.88	Friends or family	20.71
	Other	5.40	Other	4.13
EA	Reuse network	**10.90**		
	Second-hand retail	3.90	Associations/good causes	2.58
	Online	17.49	Online	5.23
	Garage sales/fairs	6.52	Garage sales/fairs	2.80

[17] We did not capture this group since an estimation based on an undefined "other" category would be too difficult for respondents. This decision was made after piloting this to several individuals and discussion with researchers.

	Friends or family	16.78	Friends or family	19.11
	Other	9.56	Other	5.14
Textile	Reuse network	**15.74**		
	Second-hand retail	6.02	Associations/good causes	2.22
	Online	9.38	Online	3.31
	Garage sales/fairs	7.97	Garage sales/fairs	3.32
	Friends or family	17.84	Friends or family	24.81
	Other	5.53	Other	3.86
Rest	Reuse network	**18.88**		
	Second-hand retail	5.26	Associations/ good causes	2.21
	Online	13.28	Online	3.94
	Garage sales/fairs	9.99	Garage sales/fairs	3.40
	Friends or family	14.85	Friends or family	18.49
	Other	5.56	Other	4.13

Note: The category 'other' was described to respondents as 'small household goods, leisure, books, music and multimedia'.

2.4.2. Estimated true indicator

If we follow the assumption that the share percentage of this category compared to the total reuse is similar for all channels compared to the reuse network (i.e. comprising 1.3% of the total reuse; see **Fout! Verwijzingsbron niet gevonden.** on page 43), we can calculate an overall reuse indicator based on this extrapolated data:

- Undefined 5th category: 1.3% of the total reuse is channeled through an undefined fifth category, thus we need to increase the calculated conservative reuse indicator. If we follow the assumption that the percentage share of this category to total reuse is similar over all channels compared to that of reuse network and thus equals 1.3%, then the total kg reuse in all five categories equals:
  = total kg reuse in four categories / (1-0.013)
  = 218,431,910.0 kg / 0.987
  = 221,308,926.0 kg = **33.77 kg/capita**

We recommend to use our more elaborate capturing of reuse – i.e. new indicators of reuse in Flanders – when estimating the total reuse in Flanders. When capturing the total kg of reuse in Flanders more comprehensively – i.e. taking into account the kg from several other reuse channels above the reuse network – these numbers could be used for more comprehensive reuse estimations based on insights from consumer survey data. These might be used in a broader scope than the scope that is currently tackled by the data provided for the reuse network specifically. We provide some possibilities below.

- These more comprehensive estimations might be a candidate for between-country comparisons of reuse, since consumer survey data is easier to collect than in-depth data gathering per reuse channel. Conditions for comparability are (1) the organisation of similar surveys in all countries, and (2) the availability of detailed data for at least one reuse channel, similar to the data from the reuse network in Flanders.

- Repeated production of these survey data would allow to see the growth over time of the reuse phenomenon and its importance for the circular economy.

- Our reuse indicator provides an interesting comparison with the gross material footprint of Flemish consumption (RMC). In particular, our number of kg reuse per capita can be compared to the annual 19 tonnes/capita of material use (last available data from 2015; LNE, 2016). Relatedly, a comparison of our indicator with newly developed material footprint indicators could place the reuse phenomenon in Flanders into perspective.

3. Impact of Reuse

3.1. Environmental impact

The main aim of this research is to study the potential for reuse from a circular economy perspective, i.e. with a focus on the preservation of resources. Reuse is one of the circular strategies. Moreover, according to circularity principles, goods that are reused rather than thrown away will increase resource efficiency, which will reduce environmental impact. It should be noted that a 100% efficiency for each circular principle is not assumed (e.g., reuse is not always fully environmentally friendly just as recycling is not; i.e. both practices will have a certain environmental cost). Reuse is ranked quite high in the hierarchy of circular economy strategies. Interestingly, this ranking is established, first, by diverting goods from the waste stream and, second, by preventing new goods to be produced (e.g. Farrant et al., 2010). Hence, a part of the rationale assumes that goods that are reused will, to some extent, replace the acquisition of new goods and, in that sense, that reuse to some extent prevents new goods from entering the market. Surprisingly, this assumption is often neither explicitly addressed nor assessed in research on reuse. We therefore highlight the importance of the extent to which reused goods replace the acquisition of new goods when discussing or assessing environmental gains. Surely, from a resource efficiency perspective, not the magnitude of reuse – which in our case would be the estimated "reuse measure" – but rather the environmental (and economic) effects of the reuse is of interest. Thus, while reuse is commonly considered as high in the circular ranking, little research has been conducted identifying the boundary conditions for and the assessment of its environmental gains. Below, we will explain and add to the assessment of the environmental gains of reuse.

We argue that an important step when studying reuse *from an environmental gains perspective* is monitoring what is being replaced by reused goods. Moreover, if individuals acquire second-hand *additional* goods (e.g. because of the low price) and *extend* their stock of goods – leading to a surplus – more reuse will not reduce environmental impact. Indeed, Gregson and colleagues (2015) highlight individuals' willingness to acquire additional goods for the sole purpose of having a surplus of goods. This willingness is enhanced by the low price and easy access of second-hand goods.

Surely, to assess avoided impacts, the assumption is sometimes followed that the impact of extracting resources shall be allocated to the first use phase of a good and, hence, only reused goods that substitute new ones (Castellani et al., 2015). In particular, if reused goods do not replace new goods by means of preventing new goods to enter the market (i.e. "replacement" of new goods), the environmental impact of reused goods might *adds to* rather than *replaces* that of new goods, decreasing rather than increasing resource efficiency. Literature on second-hand goods points to mechanisms which indicate that reuse may increase rather than reduce environmental impacts (Farrant et al., 2010; Gregson et al., 2013; Lane et al., 2009) since it may increase throw-away consumption rather than sustainable consumption (Castellani et al., 2015; Evans, 2012). It is therefore important to evaluate these mechanisms since they often fall outside the standard LCA literature if reused goods do not replace potential new goods.

Research has studied these issues and has indicated these "rebound effects" of green policies and related consumer decisions (e.g., Murray, 2013, Sorrell, 2009) and on the reuse of second-hand goods (Castellani et al., 2015). Rebound effects are "effects where improvements in economic efficiency (providing a cheaper good or service) lead to either a direct rebound, increasing the demand for that good or service, or an indirect rebound, where the money saved is spent elsewhere in the economy (the Khazzoom–Brookes postulate), stimulating economic growth and resource use" (Cooper & Gutowski, 2015, p. 50). It has therefore been argued that minimal rebound effects should be included in policy evaluation (Murray, 2013). For instance, when resource efficient developments enter the market (e.g. more carbon efficient vehicles), their environmental impact is only lower if vehicle use is not increased (Murray, 2013; Sorrell, 2009). Similar mechanisms are at play for reuse (Castellani et al., 2015; Farrant et al., 2010). Moreover, lower income households are reported to be more prone to rebound effects (Murray, 2013), which indicates the importance of potential pricing effects (i.e. differences between used and new goods) when studying reuse and related rebound effects.

We extend these arguments and argue that such effects should also be taken into account when developing policy targets, such as an aim for increased reuse. In the current research, we will keep our focus on the policy reuse targets as defined by the government. These targets are based on the reuse of goods as measured through circulation of reused goods, e.g. through calculating the amount of goods that are collected and resold by reuse centres. However, we will challenge implicit assumptions concerning the replacement of new goods by used goods and address potential rebound effects, which consider the acquisition of additional (second-hand) goods that do not enough replace the acquisition of new goods (Berkhout, Muskens, and Velthuijsen, 2000; Zink & Geyer, 2017). For instance, reuse could induce rebound effects, such as increased purchase of goods due to a perceived wealth increase (i.e. consumers can buy *more* of them and, hence, additional goods are bought rather than goods that replace the acquisition of new good). Such an effect can be considered an income effect, which is "a change in level of consumption attributed to a perceived wealth increase" (Zink & Geyer, 2017, p. 595), causing negative environmental impacts.

Such rebound effects relating to the extent to which reused goods replace new goods (i.e. inhibit to some extent the acquisition of new goods) can be considered the main understudied rebound effect of reuse. When replacement rates are high, rebound effects are low. For example, when a consumer facing a demand purchases a second-hand good instead of a new good, the rebound effect can reasonably be regarded low. As can be seen in **Fout! Verwijzingsbron niet gevonden.**, at both the discarding and the acquisition side of the reuse loop, rebound effects could emerge. It can be noted that the higher the *replacement rate* of reused goods, the lower the rebound effect (column on the left). Hence, replacement and rebound act as communicating vessels. So, high rebound effects will occur if there is a limited replacement of the acquisition of new goods. Hence, only a portion of the total amount of reused goods – taking into account the replacement rate – should be considered as having increased resource efficiency.

The quantification of rebound effects is difficult since for such effects to be calculated, it would be needed to measure to which extent which reused items displace new ones. Earlier research attempted this and quantitatively estimated a replacement rate for items customers bought in a second-hand shop. Respondents were directly asked whether the bought item did replace the

purchase of a new one, either by totally substituting the acquisition of a new one, not substituting this or partially substituting this, indicating replacement rates from 100% to 0% (Castellani, Sala, & Mirabella 2015). Based on the answers, a replacement rate for each category of goods was calculated, with resulting numbers of a mean replacement rate of 34.6% for furniture, 47.3% for clothing, 7.5% for books and 84% for furniture accessories (Castellani et al., 2015). Other research has calculated such replacement rates based on categorizing consumer profiles (i.e. those who love wearing second-hand items and those who look for additional things in second-hand shops), indicating replacement rates between five percentiles (i.e. 100%, 67%, 0%, 33% or 0%). For instance, a replacement rate of 50% indicates that the acquisition of two second-hand goods replaces the acquisition of one new good, and a rate of 25% indicated that the acquisition of four second-hand goods replaces the acquisition of one new goods (i.e. this is worse in terms of environmental effects).

Table 8. Emergence of rebound effects

	High replacement rate = ↘ rebound	Low replacement rate = ↗ rebound
Acquisition side	Replacement of stock	Additional stock
Discarding side	Keep stock low	Use resources (i.e. space and/or money) for additional stock

Results from our own survey study indicated that with Flemish citizens, the acquisition of second-hand goods indeed does not always replace for the acquisition for new goods. In particular, our results showed a mean replacement rate of 28%, indicating that second-hand items only substitute the acquisition of new goods for 28%. As shown in Table 5 earlier (see on page 36), the replacement rate varied between 21% (for electric appliances) and 33% (for toys) depending on the category of goods.

When evaluating these mechanisms, it is important to take some relevant factors into account. First, not all second-hand goods have lower prices than new goods (e.g. commercial vintage shops that only accept high quality, expensive brands that are cheaper than new goods of the same brand, yet more expensive than new goods of other brands). Second, attitudes of consumers for buying second-hand should be taken into account, including a nuanced story about buying a surplus or replacing an older good, e.g. because this good was not working properly anymore. All in all, some actions and attitudes of consumers will prevent badly designed low-quality goods and avoid environmental impacts whereas others will not.

Importantly, 34.1% of the Belgian population who buy second-hand indicate to do this because of sustainability reasons (see online press publication by Gondola, 2019). Future research may benefit from studying rebound effects in more detail and uncover to which other domains these effects carry over. For instance, since these effects are more at play in low income households, there also may be social consequences of rebound effects. Moreover, recent psychological studies show beneficial effects of having “less stuff” on psychological wellbeing (e.g. Lloyd & Pennington, 2020). It seems however that being able to have less stuff – either by fully replacing the purchase of new goods by reused goods or getting rid of available stuff – is often not linked with frugality. Interviews with experts in the reuse centres indicate similar issues and point towards the competition not from other second-hand stores, but from cheaply manufactured

goods which are readily available. The link between reuse and consumption might therefore be a pathway worth further exploring when studying impacts of reuse. Striving towards a higher reuse score on a general reuse measure may still indicate that in general, people will have more stuff rather than less stuff, and this may have both environmental and economic effects. In what follows, we extend on some important factors affecting the environmental benefits of reuse.

3.1.1. Lifetime of goods

From a resource efficiency and circular economy perspective, what policy measures actually want to stimulate, is the extension of the lifetime of goods, with a maximal use efficiency of goods. In this light, it considers use (e.g. replacing the need to produce new goods to respond to this need for use) rather than mere ownership (e.g. when goods are stored as surplus). This maximal use of a good's potential lifetime is referred to as a maximally efficient occupation of a good that functions for its original purpose. It may therefore be important to keep in mind the distinction between "stocks" and "flows" of reuse goods.

Reuse stock includes goods that have once changed owner and were thus acquired second-hand but are not used anymore per se, limiting their potential of having a maximal in-use capacity. This type of reuse may be studied through studying the extent to which goods that are owned or used by consumers are reused goods and requires information on characteristics of individuals' second-hand goods at home (e.g. extent to which the goods are reused). Reuse flow includes goods that are reused again until their lifetime reaches the full potential (i.e. until the good loses its function). This type of reuse may be studied through studying the extent to which goods that are acquired by consumers are reused goods and requires information on the actions of consumers concerning their discarding and acquisition behaviour. Interestingly, current policy targets seem to focus solely on flows.

It is important to establish a viable market for recovered goods being at the end of the use phase with their current owners, but are still functional. This process will allow to achieve a maximal "in-use" efficiency for goods and hence, for reuse to occur as commonly as possible (Tam, Soulliere & Sawyer-Beaulieu, 2019). To establish such a market, first, there needs to be supply and demand for second-hand goods. Consumers should be willing to acquire second-hand goods and the market needs to be easily accessible. Second, goods need to be designed to last and persist for decades. For instance, the quality of goods should be sufficient for products to be reused for a longer period of time. Therefore, quality will increase the replacement ability of reused goods to replace new goods (Thomas 2011).

3.1.2. Pricing effects

Another important factor affecting rebound effects are pricing effects. First, the ratio between the price of new and the used goods is likely to have an impact on the replacement rate of reused goods. Moreover, the smaller the difference between the price of new and used goods, the higher the likelihood that second-hand goods replace new goods (Thomas, 2011). A good second-hand market lowers the net prices of first-use (i.e. new) goods, since consumers take into account the resale value of goods when buying them second-hand.

Second, the resale value of goods will affect whether goods are offered second-hand for reuse or not. This hence considers an effect on the **discarding side** of reuse. If a good is not offered for reuse in the first place, closing the reuse loop by another consumer through acquiring the good will not occur. Recent research on second-hand baby goods – the biggest category in the second-hand market – has shown that no less than 44% of parents take into account the potential resale value of baby goods when acquiring these goods (see online press publication by *2dehands*). Owning goods without using them but rather stocking them as surplus is likely to have a net negative environmental impact.

Third, pricing effects may also affect the **acquisition side** of reuse. Moreover, motivations to acquire second-hand goods have a vast literature strand. The two main motivations are price and quality of the second-hand goods. Therefore, motivations of consumers to buy second-hand are extremely important when studying acquisition channels of reuse. Research on second-hand goods has indicated that addressing consumers' attitudes and behaviours may be an important way to increase reuse. Indeed, in the case of the reuse network, the discarding channels seem to work fairly well – with more items being collected for reuse than what is possible to be sold – whereas the acquisition side could deserve further attention since not all collected goods get resold. Important to note is that other factors concerning the modalities and possibilities of the reuse centres also play an important role here. Recently, ***Atopia***, an initiative from the Circular Flanders project call of 2017, launched an initiative to put second-hand goods in a different light and to make them more attractive for consumers.

Fourth, pricing effects may affect reuse transactions from the beginning – before goods are used for the first time. As noted earlier, an important precondition for reuse of products to occur and for the lifetime of products to be extended as long as possible, the quality of inflow is important. Hence, if consumers want to prevent goods from becoming waste, this can mean spending more money rather than less in the first place, for instance when acquiring new goods for the first time (Evans, 2011). While this issue is a bit farther from pricing effects regarding either the discarding or the acquisition side of reuse or regarding important environmental rebound effects, the quality of inflow and the willingness of consumers to pay more for quality goods in the first phase may affect the possibility for reuse to occur.

Accordingly, the reuse network confirms that not other second-hand shops, but rather very cheap retail shops such as *Action* and *Primark* are their main competitors and consumers may prefer cheap new items above second-hand items. This is an important barrier for reuse. By keeping the quality of new items high enough, which translates in a higher price, consumers may be more willing to acquire second-hand goods, which then are cheaper than new items and still attain the desired quality standard. Moreover, the perceived value difference between new and used goods has indeed been found to affect consumers' willingness to buy second-hand goods (e.g. Jin, 2005). In our own survey study, as shown in Figure 11b (see page 38), 62% of respondents indicated that price functioned as an enabler for buying second-hand goods and no less than 60% of respondents indicated the expected quality as a barrier. These findings strengthen earlier insights from the literature that pricing effects – which are linked to expected quality of second-hand goods – are extremely important when considering opportunities for reuse.

3.1.3. Local versus global reuse

A last important factor that will affect whether reuse is environmentally friendly has to do with how local goods are reused. In particular, energy demands are negligible if goods can be reused locally, with a minimum of transportation. While most studies on reuse ignore transport impacts, these should be taken into account when considering the environmental impacts (Cooper & Gutowski, 2015). However, several assumptions can be made and it is not straightforwardly given that local reuse is always better. Moreover, local demand may differ from demand at another place, affecting the replacement rate (i.e. the extent to which these goods prevent the acquisition of a new good). Interestingly, results from our own survey study indicated that the social and local aspect was for half of the Flemish citizens unimportant in their decision to buy or would-buy second-hand, whereas sustainable consumption and the environment was unimportant only for only about one third of respondents. Moreover, the latter functions as an enabler for reuse for no less than 53% of respondents (see Figure 11b on page 38). This indicates that many individuals are not motivated to take the local aspects into account although they do take into account the sustainability factor. Therefore, the link between local reuse and environmental impacts could be made more salient for consumers.

Thus, there are some environmental trade-offs of reuse. Given the several factors affecting replacement rates, discarding and acquisition channels of reused goods, the true environmental impact of reuse becomes difficult to understand. By contrast, reuse might increase the consumer awareness regarding the value of materials and goods, which might add to the circular economy. Hence, we are probably not able to fully capture the above trade-offs when studying reuse. In this light, it might be an argument to take the above environmental risks into account without trying to fix them in advance, while simultaneously addressing the important nuance of the replacement rate. This can be done by assessing (the relationship between) the lifetime of goods, pricing effects and locality of reuse. A better understanding of these factors will enhance the optimization of the environmental gains of reuse. All in all, importantly, from a policy perspective, it should be noted that environmental impact is not the only factor affecting reuse policies. In addition, social impacts such as higher standards of living and longer product lifetime – coherent with a vision of a sustainable society and sustainable behaviours – and economic impacts such as a higher demands for better designed products evenly play a role. In what follows, we address the economic impact of reuse.

3.2. Economic impact

With regard to the economic impact of reuse, the most important factor is the employment that directly or indirectly results from reuse activities as well as the turnover from formalised reuse activities. Earlier in this report, we distinguished between formal and informal reuse channels, with formal channels referring to business transactions that are registered and some tax is being paid. In this regard, it is relatively easy to derive employment and turnover based on these formal channels. However, deriving formal employment and turnover from informal channels is not so easy. Moreover, mainly links with *formalised* reuse and employment are made to date. As such, in an interview with the European Commission, (2014) Walter Stahel noted that when reusable goods are getting reused rather than new goods are getting

manufactured, the energy consumption that is normally used for extracting and processing resources for new goods is replaced by labour, leading to job creation. Yet, this argument only holds for formalised processes that crystallise in jobs. Relatedly, based on data from reuse networks, *preparation for reuse* may provide another option to increase employment. In particular, 200,000 local jobs could be created if 1% of municipal waste in Europe was prepared for reuse (Park & Cherkow, 2014; RREUSE, 2015). Again, this argument is based on the formal reuse network channel alone and may not translate to informal reuse exchange channels.

Yet, important links between informal channels and employment exist. Moreover, the rise of physical events enhancing informal C-to-C transactions, such as second-hand fairs, indirectly relate and correlate with formal markets that benefit from these events, such as local shops providing beverages, food or other consumables for visitors. Since the links with employment are based on the specific reuse exchange channel, in what follows, for each channel separately we will list economic impacts. The main importance of mapping the reuse channels – even if only so for the amount of reuse that passes through these channels as addressed in Section 2 – is that having a general picture of these reuse channels and an evolution of these channels, we may be able to estimate in which areas jobs or the potential for formal jobs will shrink or grow.

Note that two alternative options to study the economic impact of informal channels exist. First, one may **derive the amount of employment from the amount of reuse** – as we calculated in Section 2 – through extrapolating the data we have on the number of employment and the amount of reuse from the reuse network to the data we have on the amount of reuse for the informal channels. In particular, we calculated the ratio of each reuse channel to the total amount of reuse and have employment data available for the reuse network. This would enable us to estimate the "potential employment" for each reuse channel. However, we believe that such a method would have problematic assumptions related to the comparison of other reuse channels compared to the social enterprise reuse network. Since this network is a particular type of actor (i.e. directly embedded in waste governance; governmentally accredited and subsidised; focused on providing jobs for people distanced from the labour market etc.), such an extrapolation would not provide any realistic information.

Second, one may **derive the amount of employment from the number of reuse-related transactions**. In this case, economic impacts may be calculated based on the amount of reuse-related transactions that occur between individuals (e.g. as calculated for advertisements on popular online platform websites such as *Facebook* or *Gift*). In this regard, it might be useful to study the time use of consumers that participate in reuse activities, in particular, study the amount of time consumers spend on such transactions. Potential economic impacts then may be derived from this time use. However, such an approach, which is commonly addressed for instance through time use surveys (see the Time Use Survey, 2013), would derive from the scope of this report and knows its own research We therefore refrain from such approaches and instead provide an overview of economic impacts for each channel separately.

An overarching note regarding the economic impact of reuse considers new competition and potentially declining profits for regular retail when consumers start to participate in reuse. Examining consumer discarding behaviour and the flow of used goods through various reuse exchange channels sheds light on the various ways by which reuse may be felt as a threat to the established formal economy, i.e. in the regular retail sector (Paden & Stell, 2005).

3.2.1. Social enterprise reuse network

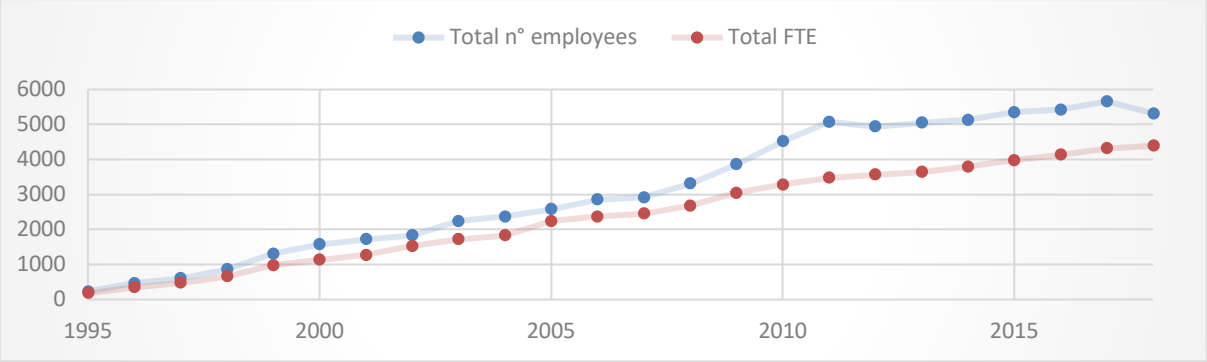
In 2018, the reuse sector consisted of 95 members – 77 of which are certified as a customised organisation (i.e. organisations with the core task of including target employees, i.e. at least 65% of employees should be distanced from the labour market). These members include 28 reuse centres or 148 reuse shops plus customised organisations. In total, the whole sector (reuse centres + customised organisations[18]) provides employment for 10,032 employees: 5,025 workers distanced from the labor market (44% of which +50 years), 1,882 overarching personnel, 1,150 employment care personnel, 1,414 Article 60 employees and 621 other functions (e.g. volunteers, former prisoners…). The employment specific for reuse activities (i.e. for the reuse centres and their activities) is less, with around half of the employees (5,311 target employees or 4395 FTE including volunteers) employed in the network's reuse-related activities. The total revenue of the whole sector, including activities from the social enterprises and sheltered employment involved in activities other than reuse (e.g. social and circular economy activities), is 289 million EUR, comprising gains from own activities (57%), subsidies (40%) and other (3%). Specifically for reuse activities, 55.5 million EUR is realised through the reuse shops. Compared to 2017, this is a growth of 7.3%. Moreover, the reuse network has 820,885 EUR on investments and adds 93 million EUR value of produced goods and services. It should be noted that staff absence rates were higher (15.5% for regular and 16.6% for employees distanced from the labour market) than the Flemish mean (5.5%). Finally, whereas a big share of the reuse sector is subsidised by the government, for reuse activities, a cost-benefit analysis from *Herw!n* shows an added value of 14,494 EUR for each additional yearly FTE, subdivided into 3,169 EUR for the government, 6492 EUR for the organisation and 4,832 EUR for the individual.

Hence, the reuse network offers employment to vulnerable groups and unskilled personnel. By addressing local potential donors and buyers, the reuse shops are more than regular second-hand shops. Therefore, besides their important role for the circular economy due to their focus on two main circular actions (i.e. repair and reuse), they play an important role also in the local social economy. Importantly, the social employment is in synergy with the regular economy since it is calculated that there is around 12,000 EUR net return to government and society for reintegration of one unemployed person through working at a social enterprise (SST, 2015).

Available data from the network show a turnover of 55,643,816.6 EUR for the latest available year (2018) of the reuse network. Moreover, for their reuse activities, the reuse network provided jobs for 5311 employees (4394.75 FTE). In Figure 13 (see next page), the evolution of the employment as expressed in number of employees and in FTE is given. In 2018, 5.41 kg reuse per capita or a total number of 35,440 ton was realised, which was 43% of what they collected. Moreover, the reuse network provided jobs for 5311 employees (or 4394.75 FTE). As such, in 2015, the set targets of 5kg of reused household goods per capita through and 3,000 FTE people employed by the social enterprise reuse network were both reached.

[18] Tailor-made companies are companies that have the inclusion of target group employees as their core task. The economic activities are adjusted accordingly. In a customised company, at least 65 percent of the employees have a large distance to the labour market.

Figure 13. Evolution of employment expressed in number of employees and in full-time equivalents (FTE)



Source: personal communication with Herw!n

Importantly, the business model for the network is currently not strong enough to make it a success story for reuse *if based on own revenues* alone. The data show that 57% of the total revenues comes from own activities, complemented with 40% of subsidies. Of course, the sector provides a large number of jobs for targeted audiences such as employees distanced from the labour market. To quantify this economically, for this sector, probably measures other than the own revenues should be taken into account.

3.2.2. Private second-hand retail sector

The formal private sector in second-hand retail includes legally active retail shops who (re)sell second-hand goods. Since this category concerns private companies, material flow data are not publicly available and estimating employment in these channels would require recruitment of as many as possible individual shops willing to participate by sharing their data. We followed a different approach to make an estimation of the employment in this sector. In particular, we describe the development and characteristics of the second-hand goods retail trade. According to the NACE-BEL 2008 (i.e. the Belgian statistical classification of economic activities in the EU), this corresponds to NACE group 4779.

This analysis is based on reuse as demarcated by the official NACE codes of companies and define which circular companies we consider to have a reuse component based on their NACE-BEL 2008 code, in particular, companies in the industry section of code *4779: Retail sale of antiques and second-hand goods in store*. Following the method of Willeghems & Bachus (2018), we search for data on the number of companies and employees that are present within this demarcation and we use the Bel-First database for this purpose. Hence, this analysis allows us to get an idea of the **employment** related with companies in the formal sector in the reuse field, since we describe the employment features of companies with a reuse component. It should be noted that a first important drawback of this method is that it does not allow to track down many important circular niches related to reuse present within companies. For instance, companies indicating a main activity in retail trade but also reselling second-hand goods, are not included in this analysis. A second drawback is that some companies that do are not involved in reuse activities are included in this analysis. For instance, building companies may position themselves in this NACE group without (re)selling second-hand goods but solely using e.g. recycled materials.

The *Belfirst* database (Bureau Van Dijk, 2006) contains extensive information about companies in Belgium and Luxembourg, consisting of data regarding the companies' identity, and financial and economic data. Moreover, Bel-First contains information about those Belgian companies who have the obligation to report their annual accounts to the National Bank of Belgium (NBB) and about other economic entities such as self-employed or non-profit organizations. A disadvantage of the database, however, is that for companies included in Bel-First, not all the details of the annual accounts are automatically registered. This has consequences for data collection and analysis. The data that are obtained through Bel-First can hence be an underestimation of the actual data. That is why it is important to focus less on the absolute figures in the analysis that follows (because these are likely an underestimation), but rather to focus on the evolution of these figures over time. Included in the private sector is the retail sector that includes reused goods (i.e. second-hand stores), such as *Troc*, *Ecoshop*…

In Table 9 we provide an overview of the evolution of the number of second-hand shops registered in the NACE 4779 obtained through the *Belfirst* database. Our database search gave 1239 entries for Flanders (consulted at 13 February of 2020). We deleted 20 entries since these concerned reuse centres from the social enterprise reuse network. Moreover, we deleted five organisations after closer inspection. These organisations had more than 100 employees and considered four regional centres for general wellbeing work or reintegration centres for people distanced from the labour market and one organisation in the recycling industry. Since data were only available for a subsample of shops (n), we extrapolated the data for the total number of shops with setting the mean number of employees for companies without data to 1 and setting the mean FTE to 1. Hence, the estimates should be considered conservative.

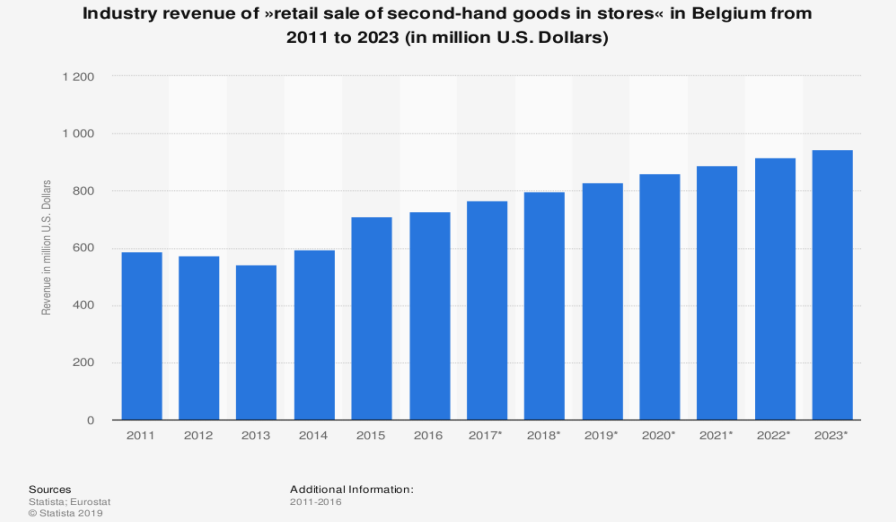
Table 9. Evolution of the registered second-hand retail shops (i.e. NACE 4779) from a subsample of shops (at the left) and extrapolated for the total number of shops in Flanders (at the right)

Year	N_{shops}	$M_{empl.}$	$Sum_{empl.}$	M_{FTE}	Sum_{FTE}	$M_{turn.}$	$Sum_{turn.}$	n	$EM_{empl.}$	$ESum_{empl}$	EM_{FTE}	$ESum_{FTE}$
2018	1213	5.38	1,291	2.98	1,291	3787.31	170,429	240	1.87	2264	1.87	2264
2017	1229	5.37	1,262	2.79	1,260	2976.57	148,829	235	1.84	2256	1.83	2254
2016	1190	5.20	1,149	2.04	1,146	2343.24	159,340	221	1.78	2118	1.78	2115
2015	984	5.47	1,181	1.34	1,174	2202.24	156,359	216	1.98	1949	1.97	1942
2014		5.19	1,080	1.25	1,076	1803.25	129,834	208				
2013		5.55	1,077	1.32	1,073	1541.96	114,105	194				
2012		5.07	1,020	1.28	1,016	1212.76	124,915	201				
2011		4.96	987	1.27	984	1125.05	121,505	199				
2010		4.9	937	1.27	933	1431.00	133,083	193				

Note: Data are only available for shops with available data (subsample n). N_{shops} = total number of shops in this year. M_{empl} = mean number of employees for n. Sum_{empl} = total number of employees for n. M_{FTE} = mean number of full-time equivalent employees for n. Sum_{FTE} = total number of full-time equivalent employees. M_{turn} = mean turnover for n. Sum_{turn} = total turnover for n. EM_{empl} = estimation of mean number of employees for N. $ESum_{empl}$ = estimation of total number of employees for N. EM_{FTE} = estimation of mean number of full-time equivalent employees for N. $ESum_{FTE}$ = estimation of total number of full-time equivalent employees for N.

This number is lower than numbers available from the UK, where in 2018 no less than 3943 second-hand shops were registered (using the European Nace Rev. 2 classification), with the number remaining more or less stable since 2010 ten years (*M* = 3897, *SD* = 48; UK Non-Financial Business Economy, 2019; through Statista). However, since the UK has more than 10 times the number of inhabitants, even this conservative estimate in Flanders seems quite high. Yet,

comparing other existing research on the Belgian revenues of the second-hand retail, the above turnover data are a gross underestimation. According to research from Statista using Eurostat data, the revenue data add up to 736.3 million EUR for 2018. We provide their figure below (Market Forecasts by Statista). Hence, the numbers in our study should be approached with some caution since they are likely an underestimation, as we noted before.



Source: Market Forecasts by Statista

As noted earlier in this report (i.e. when mapping the reuse in this sector in §2.2.1.2), it is likely that many second-hand shops are only small shops, decreasing the possibility to get economic or financial data for these companies. Hence, the availability of material flow data from the larger companies in the private sector is difficult. As our approached confirmed, large private companies are not keen on sharing company data.

3.2.3. Online platform websites

Unfortunately, concerning online platform website that enhance either business-to-consumer or consumer-to-consumer transactions, no formal data on the employment or revenue are publicly available. Importantly, there are two main categories of economic impacts: (1) economic impacts of the formal companies that own the platform websites (e.g. *eBay*, *Vinted*, *2dehands.be*…) and (2) the inferred or "potential" economic impacts of transactions that are informally made between consumers through these platform websites. To provide data on the former, we searched for employment and revenue data, but could only base our search on data that was made available on the website of the platforms themselves. In this respect, we found that around 300 employees are working in Europe for the platform app *Vinted*[19]. We did not find any information for *eBay* or *2dehands.be*. Concerning data on the second, i.e. potential economic impacts, probably the time that consumers spend on these websites and the money they "make" or "lose" from selling or buying second-hand goods, have an economic impact. The specific modelling of this impact, which would require a vast set of assumptions and covers many aspects, falls outside the scope of the current study.

[19] Retrieved from https://www.vinted.be/about on 6 April 2020

3.2.4. Second-hand fairs

Second-hand fairs offer direct and indirect employment. Through their organisation by formal organisations, such as *Gezinsbond*, some direct employment is involved. For instance, one employee (around 1 FTE) is responsible for the organisation, follow-up, logistics et cetera for the approximately 850 fairs that *Gezinsbond* is organising yearly. Results from our own survey study (see §2.3) showed second-hand fairs to account for 11% of all reuse exchange channels, but unfortunately these data do not indicate which of these fairs are formally organised – e.g. by *Gezinsbond* – and which are informally organised as garage sales. It is therefore difficult to provide estimates on the direct formal employment and the turnover within this channel.

In addition, fairs and garage sales additionally offer indirect employment and added value since they are often organised at certain squares or buildings and they attract many visitors. Local catering industries, the event sector and recreational businesses often profit from such events. More and more, new public spaces offer designated spaces for second-hand markets (e.g. the organisation *Hal 5* in Leuven). Often, second-hand fairs also offer space to small companies selling new goods or "makers" who sell their manufactured goods, increasing the added value.

3.2.5. "For free" initiatives, charities and good causes

Just as with second-hand fairs, fairs that are targeted at providing goods for free and organisations that collect goods to distribute them amongst the needed may provide both direct employment, through the management and organisation of initiatives by employees, and indirect employment, through attracting visitors at physical fairs and sales who may consume at local catering industries and partake in recreational activities from local businesses. From our telephone interviews with *Ferm* (see section 2.2.2.4), who organizes approximately between 63 and 229 for-free initiatives by means of so-called "share-fairs", many interviewed organizers pointed out that they organize these fairs in agreement with local businesses so visitors can combine visiting these fairs with local consumption.

3.3. Social impact

Apart from its environmental and economic gains, reuse-activities enhance important social gains. While these gains differ between the types of reuse exchange channels and the types of reuse activities involved, their social gains often are caused by the mechanism of charity, or making available goods at low prices for people in need (and/or offering employment to vulnerable groups in the case of the reuse network). Based on existing literature and the results of our own survey study (see section 2.4), we list the main topics related with the social impact of reuse below.

- ***Cheaper goods***. One of the goals of the social enterprise reuse network is to provide affordable good for those who need this. Indeed, financial factors have been identified as potentially contributing to second-hand buying or receiving (Gregson et al., 2013. Guiot et al., 2010; Hamilton, 2009), which is one of the main activities that the reuse network is

stimulating. In our survey study, we asked respondents who indicated to buy or receive second-hand goods to indicate their agreement with the following statement: "When I would buy new, I would have difficulties to make ends meet at the end of the month". Our results showed that **14.6% tended to agree and 8.7% completely agreed**. This indicates that no less than 23.3%, almost one fourth of respondents, confirm that financial factors play a **crucial role** when buying second-hand. Accordingly, 62.2% indicated that price plays an important role when buying second-hand goods. However, from this percentage, we do not know what exactly means the importance of price, i.e. whether it indicated that respondents otherwise would not be able to buy the goods. In another study on furniture reuse, **poverty alleviation through the possibility of offering cheaper goods** (and providing jobs for vulnerable groups) comes forward as a main factor for networks enhancing reuse (Cools & Oosterlynck, 2016). In our interviews with "for-free fairs" (i.e. so-called "share-airs") organisers from *Ferm*, many organisers indicate the importance of their events for vulnerable and underprivileged groups. Enhancing the "normality" of for-free activities – also for non-vulnerable groups – makes these initiatives functioning as an easy way-in to getting goods for free without getting stigmatized. Furthermore, organizations that actively collect reusable goods (for free) and freely redistribute them amongst the needed, provide a way for people to having access to goods they may need without having to search for themselves through unconventional and/or stigmatized methods (e.g. asking around, begging…).

- ***Equitable labour conditions and social wellbeing***. Since the reuse network accounts for 15% of the total reuse as shown by our survey study, reuse activities of this network increase equitable labour conditions and social wellbeing. Many employees working in this network would otherwise have a high chance of ending up in unemployment programmes which often are correlated with lower social wellbeing. By "placing people above profit", a social value system is signalled and activated through the network (Moreau et al., 2017). At the European level, the umbrella organisation for social enterprise networks active in reuse, repair and recycling ***RREUSE*** focusses on these social values of reuse as well.

- ***Recreational and value aspects***. As we pointed out in Section 2, many informal reuse exchange channels involve physical activities to enhance business-to-consumer or consumer-to-consumer transactions, such as local second-hand fairs or garage sales. Such activities contribute to consumers' feelings of being engaged in a social activity, e.g. with their family and/or friends, while selecting (or selling) reusable goods (Gregson et al., 2013). This recreational aspect is often related with social values (i.e. spending a day out with beloved ones) and should not be overlooked when studying reuse activities. Moreover, acquiring or possessing reusable goods as well as collecting surplus goods rather than making them accessible for reuse may function as a part of one's social identify signalling certain values (Gregson et al., 2003). These recreational and value aspects, while usually not put central in discourses of reuse, seem to play an important role in consumers' reuse behaviour. Moreover, while reuse has been considered to be based on frugality, environmental or thrift reasons (Evans, 2011), the important artefacts of social behaviours may complement these reasons for reuse behaviour.

4. Barriers and Opportunities

After having mapped the various reuse channels in Flanders and their respective contribution to the total reuse (§2) and having identified their impacts (§3), we now address several barriers and opportunities for reuse for each channel specifically and over the various channels. In the second section, we already listed channel-specific barriers and opportunities. In the current section, we make abstraction of important themes that translate in barriers and opportunities – across reuse exchange channels – for reuse in Flanders.

Importantly, on a more general level, barriers and opportunities for growing towards a more circular economy have been addressed earlier and often include the different places or steps in the value chain where barriers and/or opportunities may arise. These steps include **design**, **resources**, **production**, **logistics**, **distribution**, **use** and **end-of-life** (OVAM, 2018). In this regard, barriers and opportunities for reuse are positioned not only in the use and the end-of-life phase, but also apply to the steps before. As such, after the first use phase, logistics and (re)distribution come into play. In addition, since the lifetime of goods is inevitably linked with reuse (see also §3.1.1), the design stage is an important phase for reuse. Concerning resources for reuse, as already discussed, the type of resources may shift from material resources to human resources (European Commission, 2014), enabled by new business models (Ellen MacArthur Foundation, 2013). Only the production phase does not seem linked with reuse, unless the reuse of materials to produce new goods is considered. All in all, transitioning towards a circular economy is a challenge of **legislation**, **logistics**, **scaling** and **human behaviour**. Hence, barriers and opportunities lie in **product design**, **new business models**, **reverse cycle skills** (i.e. facilitating the recollection of goods after first use phase) and **cross-sector collaboration** (Ellen MacArthur Foundation, 2013).

According to a report from Circle Economy (2015) about the potential for high-value reuse, several barriers can be identified. We provide an overview of the barriers and the strategies to overcome these barriers below.

- Lack of **knowledge** to understand reuse opportunities and impacts
  - Put forward tools, guidelines and frameworks to educate municipalities, businesses and consumers
- **Technologies** enabling reuse not available or still in development
  - Incentives and support programmes for research and innovation concerning technological solutions for reuse
- **Market** dynamics (costs, taxes, incentives, vested interests…) do not facilitate reuse
  - Collaboration between ministries to enact new or modify existing legislation promoting reuse
- **Legal** regulations concerning end-of-life products and waste prevent optimal realisation of reuse
  - Promote public-private partnerships that encourage and sustain between-businesses cooperation around reuse
- **Consumer** culture
  - Create awareness programmes to shift consumers' mind-sets

While the Circle Economy report (2015) included types of reuse that fall out of the scope of the current paper (e.g. remanufacturing and recycling), most of the above barriers and strategies apply for reuse. However, we believe that in the specific case of (preparation for) reuse, the above guidelines are too vague to function as specific policy recommendations. Suggestions for circular actions moving up in hierarchy towards reuse have emphasized the importance of **identifying potential future actions** but also **compare currently established interventions with potential future actions** (Gregson et al., 2013). Therefore, in what follows, we list specific barriers and opportunities with regard to reuse complementing the above suggestions from Circle Economy (2015) and complementing the identified channel-specific barriers and opportunities we addressed in Section 2.

4.1. Barriers

4.1.1. Not closing the discard-acquisition gap

One barrier for reuse is the lack of viable markets for reused goods, translated in a lack of options where the exact demand of consumers can be addressed with an exact supply of particular goods. Modes of product redistribution for reuse require a closed discard-acquisition loop (Paden & Stell, 2005). In particular, it seems that in multiple exchange channels, the demand for particular goods is not matched with the supply of these goods. In the reuse network, this is translated in a greater collection of goods than the ability to successfully resell these goods. While the reuse network seeks options to close this "discard-acquisition gap", this gap is also present in other channels. Even in the case of initiatives where goods are given away for free, goods do not always seem to end up with new product owners and, hence, sometimes end up as waste.

A first reason for this gap entails the **unspecific circumstances under which goods are set up for reselling**. When consumers seek for specific goods, it is difficult to know where to look for them. For instance, when a consumer has a specific need for a winter jacket in a certain colour and size, going to a second-hand sale might not lead to purchasing such a jacket. This specificity of demand was brought forward as barrier for reuse in our qualitative open questions in our survey study. Our telephone interviews with organisers of second-hand "for-free" initiatives confirmed that most exchanges occur as a coincidence and not because consumers are actively looking for a particular good. This might also explain why 29% of respondents considered a second-hand store as "a place to find additional things they would not have bought otherwise". Specific platforms may aid in closing the discard-acquisition gap. For instance, at KU Leuven, there is an internal platform reusable goods .

University departments that have reusable goods to spare can offer them on this online platform for free, and other departments can claim and collect them for free. [20] For goods that stay unclaimed for too long, associations and charities are actively sought and contacted, and in the end virtually all goods end up being reused, while helping the poor. This good practice may inspire companies to keep their reusable goods within the circular strategy of reuse rather than to look for less circular strategies (e.g. recycling).

[20] Note that this strictly does not comply with reuse as we describe it in the current report, since there is no switch of ownership.

A second reason for occurring demand shortagesis the sometimes too low **quality of reusable goods on the 2nd hand market**. Indeed, reuse centres indicate that not 2nd hand shops are their main competititor, but rather the low quality of inflow which inhibits them from successfully reselling these goods. Indeed, product quality is one of the features that key actors in the reuse field refer to when indicating barriers for reuse. For instance, in the apparel sector, low quality will inhibit clothes from being resold and reused since consumers are reluctant to acquire low quality products. If the actual question is on the perceived product lifetime, low quality products will be perceived differently and will either not be acquired or will be acquired as a surplus to new products (Farrant et al., 2010).

Finally, as noted in our literature search, the **resale value** of products suitable for reuse is likely to affect whether these goods are offered for reuse in the first place. Only for goods that maintain a certain monetary value, a viable reuse market will exist. Unfortunately, a high resale value also lowers the price for buying new goods instead of reusable goods since consumers seem to actively take into account the (potential) future resale value when deciding their budget for acquiring new goods.

4.1.2. Design stage, cost of repair and product lifetime

Another important barrier for reuse is a design that complicates the options for reuse and – relatedly – repair in case (some) preparation for reuse is needed. Moreover, since the lifetime of goods is grounded in their quality, this aspect already comes in in the design stage. A **design** for prolonged use together with consumers' **willingness** for prolonged use are critical prerequisites for the transition towards more reuse. Correlated with the design is the cost of repair: if the cost of repair is too high, reuse is a less attractive option. Earlier research has emphasized to establish a viable market for reusable goods (Tam et al., 2019), in particular,, some goods will still have to be designed if they should be suitable for ending up in a reuse market, yet there are also the products manufactured one or two generations ago that need to establish a place in the reuse market.

An important question that still needs to be addressed in this respect is the question which place **innovative goods** can have in the reuse market. Certain innovative goods exist because of their newness; their innovativeness. It is difficult to think of a system in which both innovations and reuse of goods that "are already there" can be reconciled in a reuse system.

4.1.3. More reuse, more use

Importantly, with respect to the environmental impacts of reuse, an indirect barrier for reuse is the fact that enhanced reuse might enhance the acquisition of new goods. If the **replacement rate** of reused goods is low (i.e. they do not prevent the acquisition of new goods), an increase in reuse equals the increase in surplus goods and, hence, decreases waste prevention – the actual goal of the circular strategy of reuse. In this regard, increased reuse may just be one aspect of the "throwaway society" (Castellani et al., 2015; Evans, 2012). Efficient use of resources is the core of consumption strategies and policies (European Commission, 2011) and this barrier is important when thinking about increasing reuse from a sustainability perspective.

This issue also resonates with the earlier mentioned resale value of second-hand goods: if the second-hand market for reusable goods is good, this might increase the acquisition of new goods. Specifically, a good second-hand market lowers net prices of new goods since consumers take into account the resale value of goods when buying them.

Relatedly, **paradoxical rebound effects** may play a role when an increase in reuse leads to more rather than less consumption. Specifically, when consumers feel that they are "already doing their share" in sustainable actions because they reuse a lot of goods, they may feel entitled to or they may feel less guilty about using more resources in other ways, for instance by stocking their closets with new purchases. These effects may function as a barrier for increasing "environmentally beneficial reuse".

4.1.4. Increasing reuse, but not waste prevention

Given the various informal reuse channels, an important barrier is the link with policy, in particular waste management policies. In particular, the promotion of reuse requires waste management policies that address the various practices of acquiring and discarding goods (Fortuna & Diyamandoglu, 2017). While barriers related with waste management practices are evident in informal channels, opportunities may lie in addressing waste prevention through addressing consumers' attitudes and behaviours and studying which actors influence consumers' personal waste management strategies (e.g. Henzen & Pabian, 2020) since consumer culture is not the same as consumer waste behaviours (Gregson et al., 2013).

4.1.5. Global versus local reuse

In terms of environmental effects, reuse may not always be the best option, e.g. in the case of global reuse. Policy makers should be aware that local reuse sometimes places less pressure on the environment than global reuse. Hence, when aiming for an increase in local reuse, one may consider the possibilities that global reuse may be the "lesser of two evils" (i.e. global reuse versus goods becoming waste). Local bodies and actors may not suffice to maintain the full potential for reuse on a local level, as exemplified by the reuse network that does not successfully resells all goods they collect. The shortcoming of reusable goods becoming waste streams because they cannot be reused locally may ask for temporary solutions to provide options other than local reuse, e.g. global reuse.

4.1.6. Impact of COVID-19

While our study was conducted before the COVID-19 outbreak from March 2020, our results indicate some barriers that might come into play in a post-pandemic time. In particular, in our sample, 64.5% of respondents identified "risks" as a barrier for buying or would-buying second-hand and no less than 71.8% indicated hygiene as a barrier. Based on these data, one could argue that with the global landscape getting used to "a new reality", the circulation of reusable goods may encounter severe disadvantages and/or negative perceptions from the general public. However, the previous months (i.e. June-August 2020), the reuse network has

encountered the exact reverse, with an increase in buyers at their shops. It is hypothesized that the important aspect of price plays a central role in times of economic downturn, which can also be noticed in the increase in popularity in big, cheap retailers such as Primark after the first COVID outbreak. Unfortunately, in the long term, this shift towards reuse might be negative for reuse, since the collection of qualitative inflow in the future might be jeopardized. As long as goods are not developed in better quality, the success of reuse will be dependent on primary consumption. All in all, the impact of COVID-19 and potential time-lagged reverse effects (i.e. with short-term beneficial effects that reverse in the long term) should be studied in more detail.

4.2. Opportunities

4.2.1. Addressing the consumer perspective

Addressing the consumer perspective is addressing human behaviour to enhance reuse, i.e. **raising awareness and changing consumer mindsets** to make sure reuse will contribute to more sustainable consumption (Gregson et al., 2013). Important in this respect, social norm activation may actively enhance consumers' tendency to adopt discarding strategies allowing reuse of their goods rather than disposing their goods as waste (Henzen & Pabian, 2020). In this regard, important factors relating to changing human behaviour are factors such as taxation and price elasticity.

Other than monetary incentives or taxes, efforts for a **more positive framing of reuse activities** could aid in increasing reuse. An example includes Atopia, which includes the practice of framing materials and goods from reuse shops more positively and by this means making them more attractive for (new) consumers. This is done by means of stories – an important manner to make consumers more conscious about the goods and materials they use so they will treat and use them more sustainably.

Important, opportunities for reuse lie both in the "reconsumers" who are already taking part in reuse activities and **targeting new "reconsumers"** who are not (yet) convinced of or familiar with reuse. Our survey study showed that no less than 65% of respondents had partaken in some kind of reuse behaviour the past 12 months, indicating a "leftover potential" of 35% of consumers who could still be targeted. Focused targeting of these groups may considerably enhance the potential for reuse (Fortuna & Diyamandoglu, 2017).

Furthermore, **upscaling sustainable consumer lifestyles** may be key when aiming for an increase in reuse. Currently, many initiatives remain unrealized business opportunities which know some implementation challenges for individuals, policy makers and businesses. Accordingly, an earlier study suggested to bring policy in closer contact with consumer culture since otherwise, an increase in reuse through buying second-hand may generate more rather than less waste (i.e., if people throw away what they buy second-hand but don't really need) (Gregson et al., 2013). The development of solutions that address the need for sustainable living may comprise of or relate with the potential for reuse.

4.2.2. Product design for reuse

Earlier research has emphasized the importance of establishing viable markets for reusable goods (Tam, Soulliere, & Sawyer-Beaulieu, 2019). In this regard, opportunities for reuse lie in enhancing the design stage of new goods that enter the market and one day will become reusable goods. Important are product standards concerning product lifetime, for instance linked with the ease by which they can be repaired or prepared for reuse. Products need to be designed differently so that they can be **used longer and reused more efficiently** (Ellen MacArthur Foundation, 2019). This means that design for repair, design for disassembly and design for longevity should be promoted and should increase the market value of those products over time. With a focus on repair instead of number of owner changes, the reuse target focus may shift from *reusing more* (i.e. changing owner more frequently) to *using longer* (i.e. irrespective of the owner). Not only the quality of goods, but also the ease by which they can be repaired will increase their longevity. The European Commission has established new measures concerning product longevity which enter into force as of 2021.

Linked to product lifetime is the **monetary rest value of goods**. As long as goods still have a monetary value, there will be value in extending the product lifetime, increasing circularity. Currently, the OVAM is working on possibilities for consumer issues related to product standard (e.g. extended producer responsibility) and the availability of components to prepare and repair goods for reuse (i.e. either for repair and preparation for reuse including repair). It is questioned whether preparation for reuse can be measured in a European context, in particular the selection for reuse and necessary repair for reuse (i.e. two conditions for reuse). In addition, examples addressing increased product lifetime are incentives for reusing reusable goods by means of a **reuse fee**. This fee may take the shape of a financial deposit that is paid by the consumer when buying a new product and which can be recovered when reusing a product. Other forms of a reuse fee could be explored, such as a fee framed in extended producer responsibility. The fee paid to the producer of new goods, and the revenues are used to set up initiatives that enhance reuse. Relatedly, according to Moreau et al. (2017), there is an **important role for policy to create regulations** that guarantee the longevity of household items in the current age of planned obsolescence.

4.2.3. Preparation for reuse, repair and sharing

Currently, under the definition of the European Waste Framework Directive, 2008/98/EC, products are considered to be reused if they are reused without any preparation for reuse. Yet, preparation for reuse (e.g. cleaning, checking functionalities), repair and other means of “use” (e.g. sharing) may function as opportunities for increasing reuse of goods in terms of longevity.

As a conceptual discussion, we may want to shift away from the conceptualisation of reuse as “changing owner”. As described earlier, concerning environmental impact, policy measures may want to target longevity (i.e. product lifetime) rather than increasing the frequency that goods change owner – which is actually addressed in the current reuse targets (including the one in this report). When focusing on consumer actions of discarding or acquisition behaviour, an important side-note entails that the frequency by which goods change owner may not always correlate with the lifetime of these goods.

Repair creates a double win: increasing repair may increase both product lifetime with the first owner (i.e. first use phase) and the likelihood of successful transfer to a subsequent owner (i.e. total product lifetime). Goods mainly go out of use for two reasons: functional obsolescence or fashion obsolescence (King et al., McMahon, 2006). While fashion obsolescence can be addressed through the consumer perspective, functional obsolescence often requires preparation for reuse and/or repair. In addition, sharing may increase the effective product lifetime by allowing more "usages" before goods get discarded because of fashion obsolescence. Therefore, future trends in the circular economy entail the sharing economy, a performance economy, circular design for product lifetime extension and design for reuse, recycle, recover (3R-principle) (internal workshop of the Policy Research Centre for Circular Economy, 2018).

Concerning **sharing**, there is often a contamination with the terminology between exchanging (or trading) and sharing. Sharing can increase the longevity (i.e. amount of effective usages) because through sharing, goods can be used optimally. While sharing, just as repair, falls outside of the scope of our definition of reuse, interesting future potential for reuse may lie in the repair and sharing of reused goods. This is now explored in the reuse centre of Antwerp.

4.2.4. Roles for the reuse network and other channels

Conclusions from earlier studies on new roles for the reuse network are twofold. On the one hand, studies indicate the need for new roles for the network since their current business case does not seem strong enough to "survive" in the current economic climate (e.g. Gorissen et al., 2014; 2016). On the other hand, research has pointed to the crucial role of the network if a circular economy wants to succeed. Below, we address both rather contradictory views and stipulate the opportunities for the network in the future using both rationales (e.g. Moreau et al., 2017).

Following the first rationale, if the reuse network needs more support to expand, the question is whether this support is granted if it seems that reuse also occurs through many other informal channels. As we are the first study to map these channels and estimate the reuse quantities through these channels, we are unable to check the evolution of these informal channels over time. Following the second rationale, it is important to note that from both a social and an environmental perspective, it has been argued that social enterprise reuse networks are crucial to address the current material and energy throughput of the economy by means of reconsidering labour and business cases – entailing both social economy and the environment – through their way of operating (Moreau et al., 2017). It is argued that institutional conditions such as social enterprise reuse networks currently are important for the social and solidarity economy differentiating themselves from profitable activities.

In particular, the social reuse network proves a practical example that addresses the current shortcomings in the institutional conditions and highlights the economic efficiency of some important themes nowadays in society, such as environmental benefits of reuse (Moreau et al., 2017). In this respect, the social enterprise reuse network makes its value system explicit and strives for better labour conditions and participative decision making and aims for higher social

wellbeing. With respect to material use and the reuse of goods, societal decisions could be made about what should be reused regardless of the economic profit (Moreau et al., 2017).

Related to the global versus local reuse debate, the reuse network may think of addressing new options for non-local reuse by exporting to partners abroad. Furthermore, other initiatives may buffer for the need to export non-resold goods and/or of these goods becoming waste. Partnerships with local actors (e.g. immigration organizations or vulnerable group organizations) could offer a last resort for goods that do not get resold. In any case, just as with all other reuse channels, the reuse network may profit from **logistical collaboration with other companies** such as long-term relationships in the company network of stakeholders (customers, suppliers, horizontal collaborations) and from using the interaction with customers for discarding or maintenance of goods as selling techniques.

4.2.5. Digitalisation

In the regular retail sector, digitalisation plays an important role in the future "shopping" experience of consumers (Reynolds & Sundström, 2014). In particular, digitalisation can be considered as radical and a potential disruption of the marketplace. Hence, this transformational change may significantly impact business models and retail formats (Reynolds & Sundström, 2014). Moreover, in the particular case of reuse in Flanders – with 19% of the total reuse on the acquisition side being channeled online – digitalisation may cause tremendous changes in the "reuse market". As it has been hypothesized that we are in the midst of a radical digital change (e.g. Reynolds & Sundström, 2014), following up on the opportunities for reuse channeled online may yield insights for the future. Since our current survey study can be considered as a baseline measurement, unfortunately we have no clear sight on the future increase of these channels, yet available data from anecdotal evidence, from the physical formal second-hand retail and from informal second-hand fairs do point towards an increase of social informal channels and online channels as compared to physical formal private second-hand shops. In this light, the Flemish reuse network is exploring opportunities for reuse by tapping into online possibilities for reselling goods (i.e. through their online shop). Furthermore, it deserves consideration to think of new business models addressing online channels.

Currently, the "online acquisition model" of newly produced goods yields that consumers can send back goods they do not like – often for free – whereas these mechanisms are not present in the second-hand market, which often applies to informal consumer transactions that do not have any benefit from including such a free returning policy in their business model. Future thinking exercises might address these issues on (free of charge) returning policies and tap into feasible constructions to expand the online (re)selling of second-hand goods. Interesting questions might include whether future collaborations with big players in the online second-hand market (e.g. *2dehands.be*) and other actors could be interesting. In particular, it could be studied whether these actors would either complement or compete with each other, or whether some actors may benefit from selling or donating their goods second-hand online. Subsequently, it might be questioned whether online shops *really* are the future and the market will or should evolve that way.

5. Reuse Actors

The results of this study have demonstrated that reuse is a circular economy strategy that is discussed by few, but practiced by many. Reuse has an important place in the consumption and discarding behaviours of at least two thirds of the **Flemish citizens** (referred to as 'consumers' in this report). Besides this citizen involvement, various **other actors** play a role in the realisation of the high levels of reuse observed in Flanders: the Flemish accredited reuse centres, private second-hand shops, web platforms, civil society organisations, second-hand fairs and other citizen-organised initiatives. Finally, various **government actors** on the Flemish and the (inter)municipal level play a facilitating and supporting role, driven by both environmental, social, and economic motivations.

Obviously, all these stakeholders do not work on their own islands. Many of them are interconnected through collaboration, support, logistical exchanges, value chain interdependencies and other. In this section, we provide an overview of the existing governance models, i.e. types of cooperation and actors involved. In line with earlier recommendations (e.g. Zeller et al., 2019), the collaboration between actors rather than valorising everything in one actor is crucial when addressing the potential for reuse in the circular economy.

5.1. Citizens

Much of the observed reuse in Flanders is established in (in)formal connections between citizens (in this report referred to as consumers) which inherently leads to difficulties in mapping these informal arrangements and/or interactions related with reuse. Our results indicate that at least two thirds of Flemish citizens are involved in reuse exchange, with 20% of the total reuse channeled through formal channels (i.e. the reuse network and the formal reuse shops) and 80% through informal channels involving various informal actors. In particular, our results showed that 37% of the total reuse on the demand side is channeled through family and friends. Given the informality of these networks, mapping their characteristics or "governance" agreements would be difficult. Yet, for policy makers, the awareness that more than one third of the total reuse is channeled through these potentially difficult-to-reach consumer networks may put the relative weight of other governance agreements in perspective if addressed solely from "reuse increase" perspective (i.e. not considering the social economical perspective).

5.2. Various actors

In this section, we explore existingrelations between the accredited reuse centres, private second-hand shops, web platforms, civil society organisations, second-hand fairs and other citizen-organised initiatives. As shown by our results, the reuse network's share is about 15% of the total reuse – i.e. the third biggest channel after family and friends and online platforms – making this formal channel an important actor. As addressed earlier, the reuse network is unique since it considers an area-covering, accredited network that not only addresses reuse,

but also plays a significant role in the social economy by providing jobs for precarious worker but also by providing affordable goods for the underprivileged. The network has plenty of settled arrangements with current reuse partners.

In particular, some reuse centres donate goods to local other non-profit initiatives. This is not always done in a structured or organised way. First, the network closely collaborates with the OCMW with whom they have arrangements and agreements regarding staff. The OCMW also refers vulnerable people to the reuse shops, where they can buy at special conditions. Second, the reuse network has contacts with *Samenlevingsopbouw* and other non-profit organisations targeted at poverty reduction. Third, since poverty alleviation is contained within the original mission and vision of the reuse network, other initiatives and local social organisations are often sprouted from the reuse network. Since it is assumed that the number of underprivileged citizens may grow due to the corona situation, the significance of the relations and arrangements between the reuse network and other actors may even grow.

Finally, some private companies have their own way of addressing reuse (e.g. *Miele*) whereas others more easily address refurbishment rather than reuse (e.g. *Veritas*, *Bel&Bo*). There are also links with repair cafes in this regard – even if it is just to provide material and space locally by the reuse network for the repair cafes or other repair initiatives.

5.3. Government actors

It can be noted that the interconnections between important actors in the reuse field include – but are not limited to – formal arrangements between institutions, e.g. between the reuse network and the government. While various reuse channels play a significant role in the established reuse, policy discussions are often confined to the relations between the formal reuse actors, such as between the reuse network and the (inter)municipalities.

Concerning the reuse network, the main governance agreement considers the OVAM, who is the policy partner of the Flemish reuse network. Since the start of the reuse network, the OVAM has been actively supporting the expansion of this sector. The reuse network is different from other actors because of its structural embeddedness in the Flemish waste policy. According to the information obtained from OVAM and the reuse network, several agreements add to its crucial and successful role in increasing reuse and enhancing social employment, including:

- Link with employment policy
- Close collaboration with the (inter)municipalities
- Pursuit of professionalization by ongoing monitoring and quality control
- Careful communication policy
- Structured umbrella organisation
- Commitment and personal endeavours of over 5,000 employees

The first two factors deserve some consideration (i.e. embeddedness in the waste policy and collaboration with municipalities). Early on, the reuse network profiled itself as a crucial actor in household waste collection and received a role in the municipal waste policy. These policies are agreements between the reuse network, municipalities and intermunicipal partnerships.

Municipalities remain responsible for bulky household waste collection; the reuse network's role contained the collecting, processing and selling of discarded but still usable goods. A federation of Flemish reuse centres was formed (KVK) in 1994, which objective was to provide the reuse network with "guidance in their further professionalisation by means of information exchange and assistance and by acting as their representative partner vis-à-vis the competent authorities" (OVAM, 2015, p. 9). Since then, OVAM annually subsidised the KVK with a grant of 25,000 EUR for at least 5 years. In 2008, the KVK changed its name to the Federation of Environmental Entrepreneurs in the Social Economy (KOMOSIE), with besides its focus on reuse activities and social employment also had a focus on energy saving and reduction of food waste. Next, further professionalisation and expansion of the reuse network took place through internal and external growth. Internally by optimizing the collection and the re-selling of reusable goods; externally by agreements concerning operating areas and agreements via model contracts with municipalities and obtaining financial support from start-up and investment bonuses. Furthermore, a uniform registration and reporting method of the results became necessary for accreditation by OVAM.

Accreditation by OVAM is based on the embodiment of the reuse network in sustainable product use and prevention of waste materials. The OVAM mainly accredits sustainability and social economy companies as reuse centres and accreditation is based on predetermined operating areas. Conditions for accreditation can be found in the decree of the Flemish government of 2005 (edited in the decree of 2016). The accreditation and functioning is anchored in *Vlarema* (Flemish Regulation for the sustainable management of Material Cycles and Waste). The actions and goals of the sector are captured in the *Implementation plan for household waste and similar industrial waste*.

Accredited reuse centres get annual operating subsidies from the OVAM based on the number of inhabitants and the number of kg of resold reusable goods in their operation area. Together with *Herw!n*, the current successor of the earlier *Komosie*, OVAM follows up on the evolution and functioning of the reuse network. Since 1995, reuse centres could conclude individual agreements with OVAM and they received subsidies of 12,446 EUR for four successive years if they participated in supporting the Flemish prevention and recycling policy and annual reporting towards OVAM. Survey methods in the reuse centres became computerised from 1998 and their operations were included for the first time in the Household Waste Implementation Plan (1997-2001) and the collection of goods further expanded through cooperative agreements with municipalities and start-up subsidies to start-up reuse centres. In mutual consultation, OVAM and the reuse network further developed the reuse activities of the reuse network through further financial support of 24,790 EUR the following four successive years for reuse centres meeting the accreditation conditions of OVAM. From then onwards, the reuse network became structurally embedded in the Flemish waste policy. Currently, the main subsidies of the reuse centres come from:

- The accreditation decretal attached to the 800,000 EUR from the Mina-fund[21]
- Funding from WSE
- Local governance agreements
- Compensation from *Recupel*

[21] Fund for Prevention and Remediation of the Environment and Nature, partly fed according to the principle 'the polluter pays' with revenues from environmental taxes and fines.

Interestingly, the collaboration between the OVAM and the reuse network is not a typical top-down governance but rather a co-regulation between the OVAM and the reuse network. Implementing accreditation criteria based upon emerging and changing and experiences from the reuse network, this agreement seems a success story of co-creation between the government and a private sector through negotiations rather than through imposed policy, bridging goals of both actors. This co-creation has led to a formal waste governance agreement, which was renewed in 2019 and is an agreement between *Herw!n*, OVAM and *Interafval*[22]. This new model focusses on possible compensations for services delivered by the reuse centres, support and communication and is used at three levels: municipal, intermunicipal (= uniform policy between municipalities) and supra-municipal (= through overarching organisations). Known agreements include:

- Agreed bulky waste policies and rules in recycling parks.
- Collaborations between some recycling parks and reuse shops. Some recycling agents got a training to maintain a "reuse reflex", indicating that they are trained to prevent, educate and intervene when citizens bring reusable goods to the waste park. Yet, these trainings are not (yet) structural.
- Collaborations with (inter)municipalities:
    - Reusable kitchen appliances are channeled through regional transfer stations (i.e. a type of intermediate actor in the reversed logistics chain). In particular, there are turning role systems (e.g. one transfer station from a particular EA seller, e.g. *Vandenborre*, between several reuse shops).
    - For brown goods, *Recupel* has its own targets (this is more difficult for *Herw!n*).
    - For textile and EA, for example *Vilvoorde Televil* was sometimes plundered. This is not surprising since these goods often also have enough monetary rest value. Future interventions might want to address this issue of monetary value when aiming for an increase in reuse.
    - Actions with the municipality around litter(ing).
    - Tonnage fees: less residual waste means lower costs for the municipality. This tonnage fee is mandatory for local governance structures anchored in Vlarema and is determined by the negotiations between the reuse centre and the local government. Sometimes other benefits and support are alsooffered. The magnitude of the funding depends on the municipality and the particular reuse centre and is shifted towards the resulting reuse from the collected goods to account for e.g. lower baseline budgets leading to lower collection possibilities. Important in the tonnage fee is the transparency and accuracy at the registration when reporting and invoicing to local governments. The OVAM aims for a fair distribution of financial support based on the costs and benefits of all parties involved.

Other important actor relations of the reuse network include the constitution of article-60 employees and the question what may constitute possible article-60 employees. Data show that reuse shops that score high on reuse have many of these profiles and are mostly located in big cities. Future possibilities for an increase in reuse may yield the expansion of article-60 employees to other municipalities.

[22] *Interafval* is the partnership between the Association of Flemish Cities and Municipalities VVSG, all Flemish waste intermunicipal companies and other local authorities responsible for local waste policy

5.4. Analysis

When aiming for an increase in reuse, it should be recommended to explore successful partnerships such as the one between the OVAM and the reuse network but also exploring potential successful other agreements that are not present at the moment. As we identified various reuse channels other than the reuse network, success stories from second-hand fairs may be approached rom a policy perspective. Opportunities for reuse to increase in the future may yield incentivizing collaborations between initiatives setting up second-hand events and the local economy in order to create added value from informal initiatives (i.e. by linking these initiatives with local event organisers, catering industry etc.). In doing so, it might be of interest to distinguish "direct" reuse transactions (e.g. between consumers) from "indirect" reuse transactions (e.g. with private second-hand shops, web platforms and/or reuse shops as intermediary mediums) to see how reuse may be facilitated. For instance, while using formal channels as compared to informal channels might add value in terms of employment and/or government revenues, for the sole purpose of increasing reuse, these channels might not always be the optimal choice. Only in those cases where intermediary mediums increase and facilitate reuse – e.g. by matching the supply side with the demand side; by providing easy-to-reach digital options for reaching reuse; by bringing together consumers in real-life initiatives – , or in those cases where the added value is re-invested in incentives for promoting or increasing reuse, the added value is of particular interest in a reuse-increase targeted view.

All in all, shifting from what cities and municipalities "should" do to what they "can" do might be an important way of approaching reuse and reuse agreements by the cities and municipalities. Examples include the city of Leuven who incorporates a repair calendar and explicitly mentions the reuse network on the waste calendar; or the city of Ghent who provides a considerable amount of space and detailed information about second-hand shops and initiatives in Ghent on its city promotion website *Visit Ghent*.

Finally, since various actors include private companies, the potential for an increase in reuse may lie in new circular business models. An interesting question to address is if the consumer perspective for reuse grows, what will the government and others do with this – i.e. will the various actors respond? Currently, reuse is manifested "against" regular retail (i.e. against producers and sellers). If new business models could grow towards systems that embody reuse in the business model (e.g. extended producer responsibility), the potential for reuse could really be addressed and further growth would become possible. Where current business models often rely upon the cascade of buying, throwing away and buying again, new business models would benefit from other ways of binding brands and consumers, e.g. by providing services rather than goods.

6. Policy Recommendations

6.1. Conclusion

The most important result of our study is that 65.2% of the Flemish population participated in at least one reuse activity (buying or selling) for at least one of the main household good categories the last year. Moreover, the way through which this reuse is channeled is not limited to the accredited reuse network, website platforms and/or private second-hand shops, but extends to a variety of multiple (in)formal channels. Combining available data on the number of kg of reuse channeled through the reuse network (in 2018) with collected survey data on consumer's reuse behavior (in 2018-2019), we were able to quantitatively estimate the share of each channel in the total reuse and estimate the number of kg passing through each channel. Remarkably, the sale through certified reuse centres makes up for around 1/6th of the total reuse in Flemish households through both formal and informal channels. Finally, our results indicated that the circularity of reuse depends on whether reuse prevents newly produced goods from entering the product stream. All in all, these results indicate a broad comprehension of reuse in Flanders – taking into account a variety of reuse channels – and indicate potential boundary conditions for reuse to be considered as a circular strategy.

6.2. Recommendations

6.2.1. New reuse indicator

One of the policy recommendations following from this report is the possibility to, in the long run, design a more comprehensive reuse indicator than the one that is currently used. The current indicator is a good pragmatic choice since it is based on data from the reuse network that is collected anyway for various purposes (i.e. to monitor the reuse network). However, with a share of (just) 16% of the reuse network compared to other channels, an indicator based on all reuse channels capture reuse in Flanders in a more comprehensive way. There are two main options to do so: first, by extending the current indicator based on kg reuse and based on the empirical findings of this study and, second, by using an indicator that is not based on kg but on another unit.

6.2.1.1 Extending the current indicator

The current reuse indicator ("pragmatic indicator") may serve as a proxy for the more comprehensive reuse indicator ("ideal indicator"). A condition for this approximation to be acceptable is de stability of the relative share of the reuse network compared to other channels (i.e. 16% in 2019). Repeating our survey in the near future, e.g. every two or three years, would allow to assess the stability of this percentage over time. Given the COVID-19 crisis in 2020, having a repeated measure of the relative share of the reuse network as well as gauging various important aspects related with the circularity of reuse (e.g. replacement rate) one year after

the previous measurement (i.e. in November 2020) might be of interest to elucidate the particular short-term impact of the COVID-19 crisis in 2020. In any case, the current reuse indicator should be considered as a baseline measurement and follow-up measurement is highly recommended.

In particular, in order to be used as a macro-level indicator for the circular economy in Flanders, the ideal frequency of repeating our survey would be every year. However, a cheaper yet scientifically acceptable approach would be to estimate the reuse indicator based on the annual indicator 'reuse per capita' realised by the Flemish reuse network. The indicator from the reuse shop network will then be extrapolated to all six reuse channels, using the extrapolation ratios from our survey. This proxy indicator encompasses the assumption that the distribution between the six channels does not change (much). In other words, if reuse through the network grows, we assume the other channels grow at the same pace. We recommend to maintain this assumption for a maximum of three to four years. After that period, the distribution between the reuse channels should be recalculated, and it will be possible to measure to what extent the distribution will have changed over the course of three (to four) years.

6.2.1.2 An indicator not based on weight

Another option to is to add indicators based on something else than weight (i.e. kg of reuse). In particular, since product lifetime seems to lie at the core of *circular* reuse, an alternative reuse indicator may want to shift away its focus from *reusing more* (i.e. changing owner more frequently) to *using longer* (i.e. irrespective of the owner). This could be done by broadening the focus to the following pillars important for circular reuse: the right to repair, extended producer responsibility or EPR, preparation for reuse and a reuse fee. While there are some pragmatic difficulties to address these pillars since they are hard to capture or measure, theoretically, important factors related to these aspects might improve the measurement of circular reuse. In particular, the *quality of inflow* seems to play a major role in the potential for reuse, e.g. the preparation for reuse and the lifetime of goods. It has become clear that lower quality of e.g. furniture and textile are important barriers for reuse.

Concerning these four pillars, prospection is being done and meetings are set (e.g. between OVAM and research institutes) on how these pillars can be addressed and implemented at the policy level. Yet, difficulties related with an indicator addressing longevity have to do with the important relationships between longevity and other forms of reuse than the reuse in the conceptual scope of this paper, e.g. within-household reuse, refurbishment, remanufacturing, design for longevity (i.e. design for reuse) and so on. Despite these difficulties, we recommend that indicators for reuse based on these four pillars all related with *lifetime* of goods (i.e. right to repair, EPR, preparation for reuse, reuse compensation) could be further explored.

6.2.2. The reuse network

Another recommendation is to take into account how the staff numbers of the reuse network (RN) affect the amount of reuse (and, hence, both the pragmatic and the ideal reuse indicator). In particular, the RN is facing a continuous shortage of staff. An important question is how much

reuse would increase in case the requested social economy 'slot' of staff would be "given" to the RN. The RN has made calculations on the total amount of reuse (for the reuse network) for various scenarios that might evolve in the future depending on whether the amount of reuse that channels through the RN stays stable, increases or decreases and on how the number of jobs will increase based on the 2022 OVAM target (personal communication Herwin, 2019). These calculations are made using data from 2019 and predictions are given for the following 10 years. It might be interesting to use the calculations to see how an increase in RN staff may add to the increase in reuse channeled through the RN. The most likely scenario includes a quick increase in FTE to 2022, and afterwards remaining constant. This would lead to a total amount of reuse of 41,888 ton in 2020, 44,293 ton in 2021 and 46,925 ton in 2022. Afterwards, reuse would stabilize with an estimate of 47,193 ton in 2023 and 49,108 ton in 2030. Important in the calculations of the current reuse indicator (i.e. the one covering *all* reuse channels) in the current report is that an increase in the staff of the RN could either increase or reduce the share of the reuse network as compared to other channels. If the RN succeeds to increase its total reuse percentage throughout the years, the question remains how this would impact the the share of reuse channelled through the RN as compared to the other channels. Therefore, in case certain aspects are incentivized differently the coming years, leading to an increase in FTE, a repeated measurement of the channel distribution is crucial to correctly identify potentially fluctuating shares of the reuse channels.

6.2.3. Policy instruments

While we did not explicitly study the use or the effectiveness of policy instruments to increase reuse, our results indicate the potential usefulness of certain instruments. Instruments could include standards aimed at increasing the longevity of goods, which would enable reuse after the first user has discarded the good for one reason or another. To measure such longevity, however, is challenging since the utility of goods may change over time. For instance, the need for specific goods may change, making older products less desirable (e.g. increasing expectations of smartphone capabilities). Another feature that impacts the longevity is the number of potential usages of a good. Whether a good gets reused efficiently, the actual number of usages should equal the potential maximal usages. If policy instruments address longevity, it should best be considered which factor is aimed for: (1) enabling goods to "live" longer (i.e. more **potential usages**) or (2) enabling goods to get reused more often (i.e. maximal **usage efficiency**). If instruments only address the first aspect without addressing the second, reusable goods may end up as waste anyway. Hence, it is important that after the first step in the reuse process (i.e. the discarding of a good by one consumer), other steps are facilitated.

Three types of policy instruments could be further explored: a reuse fee, legal instruments, and a materials tax. First, a **reuse fee**, comparable to the currently existing recycling fee in the framework of the extended producer responsibility, might fit in this approach. In this case, consumers pay a fee when buying a new good. The revenues of the fee go to a system that organises and facilitates reuse. Practically, in Flanders the revenues could go to the Flemish network of reuse centres. However, The results of our study indicate that currently only 15% of all reuse is realised by the reuse network. Consequently, a broader system could be designed that would facilitate a variety of reuse channels, including informal transactions between

consumers, flea markets, etc. Part of the budget could go to organisational costs (e.g. reuse centre staff), other spending could include subsidies for 2nd hand fairs, or awareness campaigns to persuade consumers to pass on their unused things instead of leaving them in a box on the attic. It should be noted that at the moment, Flanders is the only region/country in Europe with reuse targets (EEA, 2019). EU-wide targets may be set by the end of 2024 (i.e. following revision of the EU WFD), which could spur reuse internationally. This may allow for cross-country comparisons and, potentially, international collaborations to increase reuse.

Second, **legal instruments** such as product standards could play a role. Ideally, they would be linked with the main current barriers for reuse (i.e. hygiene, risks and expected quality) and/or address the core important aspect of reuse: the longevity of goods. Mandatory standards for the quality, longevity, repairability and/or hygiene standard of products may facilitate the passing of reusable goods to new consumers, hence facilitating both the potential for reuse (i.e. designing and maintaining products in order to attain a long lifespan) and the maximal (re)use efficiency (i.e. closing the discard-acquisition gap to fully use the available reuse options).

Third, according to the European Commission, "a sustainable taxation system not taxing renewable resources including human labour, but taxing non-renewable resources instead, would lead to a broad shift towards a regional circular economy" (2014). Consequently, a **tax on the use of (virgin) materials** could spur the circular economy by changing the relative prices of goods with a lower material impact. Both differentiated rates for existing consumer taxes (VAT) and specific material taxes could be used. To increase public and political acceptance, the taxes could be introduced as part of a budget-neutral tax shift. The tax shift could be confined to the circular economy goal, i.e. a higher tax on the use of virgin materials, combined with reduced (or negative) taxes on reuse or other circular economy strategies. However, the tax shift could also be broader, including a reduction of labour taxes or other distortionary taxes. It is worth noting that, although climate change mitigation and circular economy are not entirely the same challenge, a carbon tax would also significantly benefit the circular economy. As such, the circular economy tax shift could be part of a broader climate tax shift.

6.2.4. Addressing barriers with opportunities

When designing policy instruments, it is important to address the barriers for reuse that were identified in this study by addressing the opportunities that were identified. These barriers are six-fold (see §*4.1. Barriers* and §*4.2. Opportunities*). Policy instruments could be designed particularly to address one or each of these barriers. Below, we highlight for each barrier in which direction intended policy instruments may want to turn.

1. ***Not closing the discard-acquisition gap*.** Many potentially reusable goods get collected successfully (e.g. through the reuse network) yet are not effectively reused. This indicates a problem of enhancing the **maximal (re)use efficiency**. Policy instruments could focus on the consumer perspective to address this gap. For instance, there are existing initiatives in informal reuse exchange channels that consumers who hand in second-hand clothing get coupons, adapted to the estimated value of the goods they hand in, with which they can buy second-hand clothing handed in by others. A similar system in the reuse network might also stimulate reuse. Other options include a deposit

system – as in the existing ideas for reuse compensation – so that effectively reusing will hold a financial incentive for the consumers doing this and yield a financial cost for consumers who keep from it. Existing initiatives to close the discard-acquisition gap in the reuse network exist in a collaboration between reuse shops concerning the collection, repair and redistribution of EEA with the goal of having a "uniform" supply in each reuse shop. However, there are still many local differences between reuse shops on the supply side of goods and no performing system is there that covers this issue, e.g. by facilitating the exchange of goods between reuse shops and/or providing a clear overview of the available goods, e.g. through a website. While a 100% online system in the case of the reuse network will not work because of the social employment goals, the reuse network has been experimenting with offering goods online – especially since the COVID-19 crisis – which is mainly done by the larger centres who have a vast amount of goods but also more financial and human resources available.

2. ***Difficulties concerning the design and the cost of repair for product lifetime extension*.** In contrast to the first barrier, this barrier has to do with not meeting the **potential for reuse** for instance by means of design or by means of difficulties to successfully prepare or repair goods for reuse. Policy instruments may help overcome this barrier by mechanisms such as an extended producer responsibility, e.g. implying a type of financial reuse fee mechanism in which the producer is responsible for using the fee to provide opportunities for repair and/or reuse after the first usage phase of the product. Moreover, regulations concerning design, e.g. design for longevity and against planned obsolescence, address this barrier.

3. ***Parallel increases in use and in reuse*.** Our study highlighted problems that might occur when solely reuse and not circular reuse (i.e. environmentally sustainable reuse) is increased. In particular, an important feature of circular reuse addresses the replacement rate, or the extent to which reuse *inhibits* new goods from entering the product stream. If reuse is increased, a risk occurs that consumers are solely acquiring more goods, leading to a surplus of stock. Such increased reuse is not circular and sometimes even equals an increase in material use. Policy instruments may need to address consumer behaviour and/or incentivize discarding of goods by their first owner to a second owner when these goods are not used anymore (or not used that much) by their first owner. Relatedly, incentivizing new business models that tap into this issue (e.g. business models that facilitate that goods are being used with maximum efficiency, for instance by renting or sharing goods rather than selling them). In addition, concerning the replacement rate, our study showed that lower income households show higher rebound effects, suggesting that environmental policy directed at changing consumer behaviour might be most effective when targeted at low income households.

4. ***The lack of focus on waste prevention*.** The barrier of a lack of focus on waste prevention could be addressed by the opportunity of focusing on practices that come into place once goods are not functional anymore (i.e. "waste") and can undergo certain processes so they do not end up as waste but end up (again) as reusable goods ready for another life with a different consumer. These policy instruments include the preparation for reuse and the ease by which goods can be repaired.

5. ***The aspect of locality*.** Potential problems of global reuse versus local reuse might indicate that in some occasions, global reuse might be a less sustainable option than the option of local processing for recycling and/or waste processing. In this aspect, policy measures might need to use more sensitive measures to capture "reuse" in Flanders, e.g. by distinguishing global reuse (e.g. shipment to a new product owner in another country) from local reuse or maybe even other practices, such as repair or repurposing (e.g. repair in a local repair shop; repurposing the good locally). Keeping a narrow focus on reuse might prevent from the potential downsides from non-circular reuse (e.g. global reuse) as compared to circular other practices (e.g. local repurposing). For instance, shipping furniture that is old-fashioned in one place (but not in the other) around the world might create more environmental pressure than repurposing it (e.g. using it for pets; decomposing it in smaller pieces for different purposes).

6. ***The current presence of a pandemic*.** Finally, in this study, we identified important barriers directly related with the buying of second-hand products. In the top three of these barriers were hygiene, risks and expected quality. In particular, no less than 72% of respondents indicated that hygiene was an important barrier for second-hand buying or would buying. With 65% of respondents indicating risks as a barrier, this aspect was the second ranked barrier, which might also have something to do with health risks – however, in our open qualitative text boxes, probably mainly risks of meeting with unknown people would tap into this aspect. In third place, 60% of respondents indicated expected quality as a barrier for (would) buying second-hand. These insights are very important given the current global health issue of the COVID-19 pandemic. Since reuse exchange channels are neither formally monitored nor controlled, issues with hygiene (i.e. with the exchanged reusable goods themselves) or with "safe" distanced interactions (i.e. with the consumers involved in the reuse exchange) may pose health risks, either real risks or risks in the perception of consumers. Policy instruments in a "post pandemic" era might benefit from anticipating these earlier identified hygiene and safety barriers. Examples may include setting up appropriate reuse exchange networks – similar to the accredited reuse network – through which individual consumers can safely acquire and discard reusable goods.

Importantly, our study showed that 65% of Flemish citizens participated in at least one reuse activity the last year. Therefore, it deserves further consideration that policy instruments may not just aim to *broaden* reuse (i.e. increasing reuse by making more consumers do it) but also to *deepen* reuse (i.e. increasing reuse by making consumers who are already doing it, to do it even more or even better). Our study results showed the importance of specific age groups (i.e. 55+ year old consumers) and particular barriers (i.e. hygiene, expected quality, risks) which might add to targeted interventions or policy instruments related to these aspects.

Finally, our results show that the opportunities of the circular economy are not just limited to sustainable material impacts, but extend to the labour market as a whole. Moreover, our results show employment in the formal sectors of the formal reuse exchange channels but also point towards indirect employment as a result of the growing informal reuse exchange channels. Future research and policy instruments may benefit from not solely addressing the quantity of the employment related with reuse, but might also want to delve into the quality of work.

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Appendix

Appendix 1. Questionnaire of the conducted survey

Q1a

De volgende vragen gaan over het kopen, verkopen, krijgen en weggeven van tweedehandsspullen, waarmee we doelen op alle spullen in en rond het huis, inclusief elektrische fietsen en apparaten, vrijetijdsartikelen, tuingerief… Huizen, auto's en andere gemotoriseerde voertuigen vallen buiten de vragen van dit onderzoek

In welke mate heeft u het voorbije jaar volgende dingen gedaan?

*U kunt antwoorden met een score tussen 0 en 10, waarbij **0** betekent dat u* dat u deze dingen helemaal niet heeft gedaan *en **10** betekent dat* u deze dingen in zeer sterke mate heeft gedaan*. De tussenliggende scores dienen om uw antwoord te nuanceren.*

Helemaal niet				Gemiddeld						In zeer sterke mate
0	1	2	3	4	5	6	7	8	9	10
o	o	o	o	o	o	o	o	o	o	o

- **Tweedehandsspullen kopen in de categorie…**
  1. Meubelen (0 – 10)
  2. Elektrische apparaten en elektronica (0 – 10)
  3. Textiel (0 – 10)
  4. Huisraad, vrijetijd, boeken, muziek en multimedia (0 – 10)
- **Tweedehandsspullen krijgen in de categorie….**
  5. Meubelen (0 – 10)
  6. Elektrische apparaten en elektronica (0 – 10)
  7. Textiel (0 – 10)
  8. Huisraad, vrijetijd, boeken, muziek en multimedia (0 – 10)
- **9. Tweedehandsspullen verkopen** (0 – 10)
- **10. Tweedehandsspullen weggeven** (0 – 10)

Q1b

Van de tweedehandsspullen die u het voorbije jaar tweedehands kocht of kreeg, welk aandeel heeft u gekregen?

*U kunt antwoorden met een score tussen 0 en 100, waarbij **0** betekent dat u **alles tweedehands heeft gekocht** in deze categorie en **100** betekent dat u **alles heeft gekregen** in deze categorie. De tussenliggende scores dienen om uw antwoord te nuanceren.* Routing: skip this question if slider 1-8 are all 0. Filter: Only show category if slider (1-8) is not 0 in Q1a (for example if slider 1 is 0 and slider 5 is 3, this category needs to be shown. If they are both 0, they need to be filtered out)

Alles gekocht				Evenveel gekocht als gekregen						Alles gekregen
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	0	0	0	0	0	0	0	0	0	0

1. Meubelen (0 – 10)
2. Elektrische apparaten en elektronica (0 – 10)
3. Textiel (0 – 10)
4. Huisraad, vrijetijd, boeken, muziek en multimedia (0 – 10)

Q1c

Van de tweedehandsspullen die u het voorbije jaar tweedehands verkocht of weggaf, welk aandeel heeft u weggegeven?

*U kunt antwoorden met een score tussen 0 en 100, waarbij **0** betekent dat u **alles heeft verkocht** in deze categorie en **100** betekent dat u **alles heeft weggegeven** in deze categorie. De tussenliggende scores dienen om uw antwoord te nuanceren.* Routing: skip this question if slider 9-10 are both 0.

Van deze categorie tweedehandsspullen die ik het voorbije jaar verkocht of weggaf in onderstaande categorie, heb ik…

Alles verkocht				Evenveel verkocht als weggegeven						Alles weggegeven
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
0	0	0	0	0	0	0	0	0	0	0

1. Meubelen (0 – 10)
2. Elektrische apparaten en elektronica (0 – 10)
3. Textiel (0 – 10)
4. Huisraad, vrijetijd, boeken, muziek en multimedia (0 – 10)

Q2

Van de tweedehandsspullen in onderstaande categorieën die u het voorbije jaar kocht, welk percentage schat u dat er kwam van:

Indien de categorie niet van toepassing is, gelieve dan een 0 in te vullen.

Routing: skip this question if slider 1-4 are all 0. Filter: Only show category if slider (1-4) is not 0 in Q1a

- **Meubelen**

	% Kringwinkels (door de OVAM erkende kringloopcentra, waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
	% Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
	% Online (zoekertjessites zoals 2dehands, veilingsites bijv. Ebay, Facebookgroepen bijv. junkshops, smartphone apps bijv. Vinted, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Elektrische apparaten en elektronica**

	% Kringwinkels (door de OVAM erkende kringloopcentra, waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
	% Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
	% Online (zoekertjessites zoals 2dehands, veilingsites bijv. Ebay, Facebookgroepen bijv. junkshops, smartphone apps bijv. Vinted, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Textiel**

	% Kringwinkels (door de OVAM erkende kringloopcentra, waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
	% Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
	% Online (zoekertjessites zoals 2dehands, veilingsites bijv. Ebay, Facebookgroepen bijv. junkshops, smartphone apps bijv. Vinted, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Huisraad, vrije tijd, boeken, muziek en multimedia**

	% Kringwinkels (door de OVAM erkende kringloopcentra, waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
	% Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
	% Online (zoekertjessites zoals 2dehands, veilingsites bijv. Ebay, Facebookgroepen bijv. junkshops, smartphone apps bijv. Vinted, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

Q3

Van de tweedehandsspullen in onderstaande categorieën die u het voorbije jaar kreeg, welk percentage schat u dat er kwam van: *Indien de categorie niet van toepassing is, gelieve dan een 0 in te vullen.*

Routing: skip this question if slider 5-8 are all 0. Filter: Only show categoryt if slider (5-8) is not 0 in Q1a

- **Meubelen**

	% Verenigingen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
	% Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Elektrische apparaten en elektronica**

	% Verenigingen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
	% Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Textiel**

	% Verenigingen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
	% Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Huisraad, vrije tijd, boeken, muziek en multimedia**

	% Verenigingen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
	% Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

Q4

Van alle spullen die u het voorbije jaar tweedehands verkocht, welk percentage schat u dat er ging naar:
Indien de categorie niet van toepassing is, gelieve dan een 0 in te vullen.
Type of question: Dropdown, meervoudig, som 100% Routing: skip this question if slider 9 is 0 in Q1a.

- ☐ % Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
- ☐ % Online (zoekertjessites zoals 2dehands, veilingsites zoals Ebay, Facebookgroepen, smartphone apps zoals Vinted, enzovoort)
- ☐ % Rommelmarkten of tweedehandsbeurzen
- ☐ % Vrienden of familie
- ☐ % Andere

Q5

Van alle spullen die u het voorbije jaar tweedehands weggaf, welk percentage schat u dat er ging naar:
Indien de categorie niet van toepassing is, gelieve dan een 0 in te vullen.
Type of question: Dropdown, meervoudig, som 100% Routing: skip this question if slider 10 is 0 in Q1a.

- ☐ % Kringwinkels (door de OVAM erkende kringloopcentra waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
- ☐ % Verenigingen, goede doelen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
- ☐ % Aan andere tweedehandswinkels dan de kringwinkels, of antiekzaken (bijv. lokale tweedehandszaken…)
- ☐ % Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
- ☐ % Rommelmarkten of tweedehandsbeurzen
- ☐ % Vrienden of familie
- ☐ % Andere

Q6

Deze vraag gaat over het kopen van tweedehandsspullen in het algemeen, ongeacht waar of op welke manier. Welke situatie is het meest op u van toepassing?
Routing: skip this question if slider 1-4 are all 0.

- ○ Ik heb het gevoel dat ik het voorbije jaar **minstens even veel of meer spullen tweedehands kocht** dan het jaar voordien
- ○ Ik heb het gevoel dat ik het voorbije jaar **minder spullen tweedehands kocht** dan het jaar voordien
- ○ Ik heb het gevoel dat er **geen verschil** is tussen mijn tweedehands koopgedrag het voorbije jaar en het jaar voordien

Q7

Gelieve voor elke categorie tweedehandsspullen hieronder een schatting te maken van het aandeel dat uw gezin tweedehands bezit.
*U kunt antwoorden met een score tussen 0 en 100, waarbij **0** betekent dat u **alles nieuw heeft gekocht** in deze categorie en **100** betekent dat u **alles tweedehands heeft gekocht** in deze categorie. De tussenliggende scores dienen om uw antwoord te nuanceren.*

Alles nieuw				Evenveel nieuw als tweedehands					Alles tweedehands		
0%	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%	Bezit ik niet

1. Meubelen
2. Elektrische apparaten en elektronica
3. Babyspullen (andere dan textiel en speelgoed)
4. Textiel
5. Speelgoed
6. Huisraad
7. Vrije tijd, boeken, muziek en multimedia
8. Tuingereedschap en doe-het-zelf artikelen

Q7.2

Van de tweedehandsspullen in onderstaande categorieën die u tweedehands kocht, welk percentage schat u dat er kwam van:

Indien de categorie niet van toepassing is, gelieve dan een 0 in te vullen.

Type of question: Dropdown, meervoudig, som 100%

Routing: Skip question if all categories are 0 in Q1A and 0 or 'bezit ik niet' in Q7

Filter: Show only the categories which are 0 in Q1A AND Q7 is not 0 or 'Bezit ik niet'

- **Meubelen**

	% Kringwinkels (door de OVAM erkende kringloopcentra, waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
	% Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
	% Online (zoekertjessites zoals 2dehands, veilingsites bijv. Ebay, Facebookgroepen bijv. junkshops, smartphone apps bijv. Vinted, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Elektrische apparaten en elektronica**

	% Kringwinkels (door de OVAM erkende kringloopcentra, waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
	% Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
	% Online (zoekertjessites zoals 2dehands, veilingsites bijv. Ebay, Facebookgroepen bijv. junkshops, smartphone apps bijv. Vinted, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Textiel**

	% Kringwinkels (door de OVAM erkende kringloopcentra, waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
	% Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
	% Online (zoekertjessites zoals 2dehands, veilingsites bijv. Ebay, Facebookgroepen bijv. junkshops, smartphone apps bijv. Vinted, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Huisraad, vrije tijd, boeken, muziek en multimedia**

	% Kringwinkels (door de OVAM erkende kringloopcentra, waar je spullen naartoe kan brengen/ gratis laten ophalen of tweedehands kan kopen)
	% Particuliere tweedehandswinkels of antiekzaken (bijv. Troc, Ecoshop, lokale tweedehandszaken…)
	% Online (zoekertjessites zoals 2dehands, veilingsites bijv. Ebay, Facebookgroepen bijv. junkshops, smartphone apps bijv. Vinted, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

Escape: **Ik heb deze spullen nog nooit tweedehands gekocht**

Q7.3

Van de tweedehandsspullen in onderstaande categorieën die u tweedehands kreeg, welk percentage schat u dat er kwam van:

Indien de categorie niet van toepassing is, gelieve dan een 0 in te vullen.

Type of question: Dropdown, meervoudig, som 100%

Routing: Skip question if all categories are 0 in Q1A and 0 or 'bezit ik niet' in Q7

Filter: Show only the categories which are 0 in Q1A AND Q7 is not 0 or 'Bezit ik niet'

- **Meubelen**

	% Verenigingen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
	% Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Elektrische apparaten en elektronica**

	% Verenigingen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
	% Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Textiel**

	% Verenigingen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
	% Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

- **Huisraad, vrije tijd, boeken, muziek en multimedia**

	% Verenigingen of sociale instanties (bijv. geefwinkels, OCMW, welzijnszorg, goede doelen…)
	% Online (zoekertjessites zoals 2dehands, Facebookgroepen zoals GIFT, enzovoort)
	% Rommelmarkten of tweedehandsbeurzen
	% Vrienden of familie
	% Andere

Escape: **Ik heb deze spullen nog nooit tweedehands gekregen**

Q8

In welke mate zorgt het kopen of krijgen van tweedhandsspullen ervoor dat u geen nieuwe spullen meer koopt? Gelieve dit voor elke categorie aan te geven.

*U kunt antwoorden met een score tussen 0 en 10, waarbij **0** betekent dat er **geen invloed** is op het aantal spullen dat u in deze categorie koopt en **10** betekent dat u **geen spullen meer koopt** in deze categorie. De tussenliggende scores dienen om uw antwoord te nuanceren.*

Type of question: matrix – 1 answer per row
Randomise: yes
Routing: none

Wanneer ik tweedehandsspullen koop of krijg in de categorie …

	… is er geen invloed op het aantal nieuwe spullen dat ik in deze categorie koop										… koop ik geen nieuwe spullen in deze categorie	
	0	1	2	3	4	5	6	7	8	9	10	Ik koop of krijg deze spullen nooit tweedehands.
Meubelen	o	o	o	o	o	o	o	o	o	o	o	o
Elektrische apparaten en elektronica	o	o	o	o	o	o	o	o	o	o	o	o
Babyspullen (andere dan textiel en speelgoed)	o	o	o	o	o	o	o	o	o	o	o	o
Textiel	o	o	o	o	o	o	o	o	o	o	o	o
Huisraad	o	o	o	o	o	o	o	o	o	o	o	o
Vrijetijd	o	o	o	o	o	o	o	o	o	o	o	o
Boeken, muziek en multimedia	o	o	o	o	o	o	o	o	o	o	o	o
Speelgoed	o	o	o	o	o	o	o	o	o	o	o	o
Tuingereedschap en doe-het-zelf artikelen	o	o	o	o	o	o	o	o	o	o	o	o

Q9

Gelieve aan te duiden welke factoren uw keuze met betreft het <u>kopen</u> van tweedehandsspullen beïnvloeden. Geef aan of de factoren u tegenhouden of net stimuleren om tweedehandsspullen te kopen.

Type of question: matrix – 1 answer per row.

	Dit houdt me tegen	Daarom zou ik het doen	Niet belangrijk bij mijn keuze
Kostprijs	o	o	o
Mijn levensstijl	o	o	o
Hygiëne	o	o	o
Vertrouwdheid met tweedehands	o	o	o
Gemak	o	o	o
Contractuele voorwaarden	o	o	o
Risico's	o	o	o
Duurzame consumptie, milieuvriendelijkheid	o	o	o
Sociaal en lokaal aspect	o	o	o
Verwachte kwaliteit	o	o	o

Q10

In welke mate gaat u akkoord met onderstaande stellingen?

Type of question: matrix – 1 answer per row

Ik koop tweedehands of zou tweedehands kopen…

	Helemaal niet akkoord	Eerder niet akkoord	Neutraal	Eerder wel akkoord	Helemaal akkoord
om grote bedrijfsketens te vermijden	o	o	o	o	o
om mijn deel voor het milieu te doen	o	o	o	o	o
om het goede doel te steunen	o	o	o	o	o
om economische redenen	o	o	o	o	o
voor de 'kick van het onderhandelen'	o	o	o	o	o
omdat het als een 'schattenjacht' is	o	o	o	o	o
omdat de spullen verrassend zijn	o	o	o	o	o
om unieke mode-items te vinden	o	o	o	o	o
omdat het in de mode is	o	o	o	o	o

Q11

Indien er nog andere redenen zijn die u tegenhouden om tweedehandsspullen te kopen of te gebruiken, kan u deze hieronder toevoegen:

Q12

Indien er nog andere redenen zijn die u aanzetten om tweedehandsspullen te kopen of te gebruiken, kan u deze hieronder toevoegen:

Q13

In welke mate gaat u akkoord met onderstaande uitspraak? "Wanneer ik spullen nieuw zou kopen, zou ik op het einde van de maand in de problemen komen om rond te komen."

Routing: Enkel indien niet 0 op alle categorieën 'kopen'

- o Helemaal niet akkoord
- o Eerder niet akkoord
- o Eerder wel akkoord
- o Helemaal akkoord
- o Geen mening

Q14

Gelieve aan te geven welke opties op u van toepassing zijn.

Ik zie een tweedehandswinkel als…

Meerdere antwoorden mogelijk.

☐ … een manier om de kleren die je nodig hebt aan een goedkopere prijs te vinden
☐ … een plaats waar je de kans hebt om kleren te vinden die je leuk vindt en die passen
☐ … een plaats om nog meer dingen te vinden
☐ … een plaats waar je nog meer dingen kan vinden die je anders niet zou gekocht hebben

- Geen van deze

Q15

Hoe vaak doet u volgende dingen?

	Nooit	Zelden	Soms	Vaak	Altijd	Weet ik niet
Gebruikt papier verzamelen en recycleren	o	o	o	o	o	o
Apparaten op batterijen vermijden	o	o	o	o	o	o
Lege glazen flessen (zonder statiegeld) naar de glascontainer brengen	o	o	o	o	o	o
Een plastiek zak aannemen in de winkel wanneer ik die aangeboden krijg	o	o	o	o	o	o
Recycleren/afval sorteren	o	o	o	o	o	o
Producten in navulbare verpakking kopen	o	o	o	o	o	o
Inpakpapier bijhouden om opnieuw te gebruiken	o	o	o	o	o	o
Mijn boodschappentassen hergebruiken	o	o	o	o	o	o
Om notities te maken papier gebruiken dat langs één ~~zijde~~ kant al eens gebruikt werd	o	o	o	o	o	o
Drank in statiegeldflessen kopen	o	o	o	o	o	o
Lege batterijen bij het restafval gooien	o	o	o	o	o	o

Q16

Deze vraag gaat over uw houding ten aanzien van milieu en milieuverantwoorde consumptie. U zal steeds twee uitspraken zien. Gelieve elke keer aan te geven in welke mate u akkoord bent met de uitspraak links of met de uitspraak rechts.

	<<	<	>	>>	
In vergelijking met een aantal jaren geleden, doe ik nu meer voor het milieu	o	o	o	o	In vergelijking met een aantal jaren geleden, doe ik nu minder voor het milieu.
Rekening houden met het milieu is belangrijk voor de toekomst en de volgende generaties.	o	o	o	o	Ik sta er niet echt bij stil wat de toekomst brengen zal.
Ik ben begaan met het milieu en de milieuproblematiek.	o	o	o	o	Het milieu en de problematiek errond laat me eerder koud.
Ik heb een milieuvriendelijke levensstijl.	o	o	o	o	Ik hou niet echt rekening met het milieu in mijn dagelijks leven.
Ik heb het gevoel dat wat ikzelf doe voor het milieu belangrijk is.	o	o	o	o	Ik heb het gevoel dat wat ik doe voor het milieu weinig tot geen bijdrage levert.
Er wordt voldoende gecommuniceerd omtrent milieuvriendelijke maatregelen die ikzelf in handen heb.	o	o	o	o	Ik weet niet welke milieuvriendelijke maatregelen er allemaal bestaan.
Ik denk vaak na over de invloed van mijn dagelijkse activiteiten op het milieu.	o	o	o	o	Ik zou wel willen meehelpen aan het milieu, maar soms vergeet ik het gewoon.
Ik vind het niet erg om meer te betalen voor milieuvriendelijke producten.	o	o	o	o	Ik koop enkel milieuvriendelijke producten als ze dezelfde prijs hebben of goedkoper zijn dan andere producten.
Milieuvriendelijke maatregelen zijn eerder betaalbaar.	o	o	o	o	Milieuvriendelijke maatregelen zijn eerder duur.
Milieuproblemen vind ik belangrijker dan andere maatschappelijke problemen.	o	o	o	o	Andere maatschappelijke problemen vind ik belangrijker dan milieuproblemen.
Ik vind het niet erg om een cadeau tweedehands te kopen.	o	o	o	o	Ik zou een cadeau niet tweedehands kopen.

Q17

In welke mate bent u akkoord met onderstaande uitspraken?

	Helemaal niet akkoord	Eerder niet akkoord	Neutraal	Eerder wel akkoord	Helemaal akkoord
Doorgaans shop ik het liefst telkens op dezelfde manier	O	O	O	O	O
Ik vind het leuk om te gaan shoppen	O	O	O	O	O
Ik ben steeds druk bezig	O	O	O	O	O
Het is belangrijk voor mij om de beste prijs voor een product te hebben	O	O	O	O	O
Doorgaans koop ik dezelfde merken	O	O	O	O	O
Ik neem de tijd wanneer ik aan het shoppen ben	O	O	O	O	O
Ik voel me in het algemeen onder tijdsdruk staan	O	O	O	O	O
Ik vergelijk de prijzen van producten vooraleer ik een keuze maak	O	O	O	O	O

Q18

Welke situatie is het meest van toepassing op u?

- Ik werk voltijds of deeltijds (betaalde arbeid)
- Ik werk niet en ben werkzoekend
- Ik werk niet vanwege arbeidsongeschiktheid, zwangerschapsverlof, loopbaanonderbreking...
- Ik ben huisvrouw/huisman
- Ik ben op (brug) pensioen
- Ik ben student
- Ik verricht voornamelijk vrijwilligerswerk
- Andere, namelijk:…

Q19

De gezinssituatie die het meest/vaakst bij mij past is:

- Alleenstaande
- Alleenstaande ouder met kind(eren)
- Nieuw samengesteld gezin met kind(eren)
- Samenwonend zonder kinderen
- Samenwonend met kind(eren)
- Inwonend bij ouders of familie
- Co-housing of samenwonend met vrienden
- Andere, namelijk:…

Q20

Hoeveel kinderen telt uw gezin? Hiermee bedoelen we uw biologische kinderen, kinderen van uw partner en/of andere kinderen die minstens de helft van de tijd in uw huis wonen. *Indien u geen kinderen heeft, dan vinkt u '0' aan. Antwoordopties: 0, 1, 2, 3, 4, 5, Meer dan 5*

Q21

Wat is de leeftijd van het jongste inwonende kind in uw gezin (in jaren)? Type of question (range 0-50)

Q22

Hoeveel bedroeg het gezamenlijk besteedbaar inkomen (euro) dat uw gezin vorige maand heeft ontvangen?
Onder dit netto-gezinsinkomen wordt het geheel van inkomens verstaan. Het kan gaan om arbeidsinkomens maar ook om de eventuele 'sociale uitkeringen' zoals kinderbijslag, uitkeringen voor ziekte, werkloosheid, invaliditeit, pensioen, handicap etc. of nog andere inkomsten zoals bijv. huurinkomsten. Minder dan €999 / Tussen €1000 en €1999 / Tussen €2000 en €2999 / Tussen €3000 en €3999 / Tussen €4000 en €4999 / Meer dan €4999 / Deze vraag beantwoord ik liever niet

Q23

Is Nederlands uw moedertaal? Ja/Nee

Appendix 2. Sample socio-demographics

Table. Socio-demographic characteristics of the sample (in %) (N = 1500)

Age	<=34	27.1
	35-54	36.5
	55+	36.4
Gender	Men	49.1
	Women	50.1
Highest diploma	Primary education or none	5.7
	Higher secondary education	56.0
	Higher education: Bachelor	22.7
	Higher education: Master	14.8
	Postgraduate	0.8
Work situation	Full-time/part-time	58.9
	Job seeker	1.8
	Not working (e.g. incapacitated/leave/career break)	5.6
	Househusband/housewife	3.4
	(Bridge) pension	24.9
	Student	3.3
	Other (e.g. volunteer worker)	2.0
Family situation	Single	19.1
	Single parent with child(ren)	4.2
	Blended family with child(ren)	2.6
	Living together without children	38.1
	Living together with child(ren)	25.6
	Living with parents/family	7.3
	Co-housing or living with friends	0.4
	Other	2.7
Children	No children	63.9
	1 child	14.9
	2 children	15.7
	3 children	4.4
	4 children	0.7
	5 children	0.5
Income	Less than 999 euro	1.2
	Between 1,000 and 1,999 euro	16.7
	Between 2,000 and 2,999 euro	21.2
	Between 3,000 and 3,999 euro	21.0
	Between 4,000 and 4,999 euro	12.9
	More than 4,999 euro	5.3
	No answer	21.6
Area	Antwerp	28.0
	Flemish Brabant	17.1
	West-Flanders	18.3
	East-Flanders	22.9
	Limburg	13.6

Appendix 3. Table with data obtained through reuse network

Numbers in light grey are own estimations and should be approached with caution, since data collection by the network until 2001 was not precise.

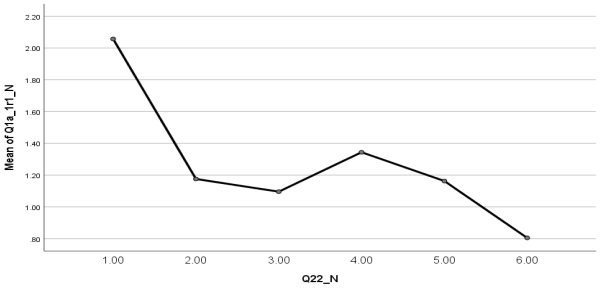
Year	Reuse (kg/capita)	Growth reuse (kg/capita)	Growth reuse (%)	Total inflow (ton)	Growth total inflow (ton)	Growth total inflow (%)	Total reuse (ton)	Growth total reuse (ton)	Growth total reuse (%)	Reuse percentage	Number of shops	Number of centres	Total n° employees	Growth total n° employees	Total FTE	Growth FTE	Total audience FTE	Growth total aud. FTE	Revenue (million euro)
1994	0.44						2573												
1995	0.64	0.20	45%	2501			3754	1182	31%	0%	20	18	233		180				1.09
1996	0.72	0.08	13%	4337	1836	73%	4234	480	11%	0%	35	26	466	100%	344	91%			2.21
1997	0.96	0.24	33%	6290	1953	45%	5663	1429	25%	0%	44	33	605	30%	472	37%			3.24
1998	1.44	0.48	50%	10,753	4463	71%	8514	2851	33%	0%	58	37	861	42%	657	39%			5.84
1999	1.79	0.35	24%	14,469	3716	35%	10,609	2095	20%	0%	74	39	1313	52%	977	49%			7.18
2000	2.19	0.40	22%	17,469	3000	21%	13,009	2400	18%	0%	81	39	1573	20%	1138	16%			9.51
2001	2.47	0.28	13%	20,598	3129	18%	14,703	1694	12%	0%	89	39	1716	9%	1276	12%			12.32
2002	3.28	0.81	33%	25,339	4741	23%	19,311	4608	24%	76%	93	39	1831	7%	1531	20%			14.22
2003	3.12	-0.16	-5%	30,066	4727	19%	18,582	-729	-4%	62%	97	40	2244	23%	1716	12%			15.21
2004	2.80	-0.32	-10%	32,516	2450	8%	16,837	-1745	-9%	52%	100	35	2372	6%	1831	7%			17.12
2005	2.82	0.02	1%	36,573	4057	12%	17,482	645	4%	48%	98	35	2583	9%	2244	23%			18.80
2006	3.15	0.33	12%	41,005	4432	12%	19,121	1640	9%	47%	99	33	2850	10%	2372	6%			20.90
2007	3.28	0.13	4%	43,022	2017	5%	20,257	1136	6%	47%	99	31	2919	2%	2456	4%	1301		23.00
2008	3.51	0.23	7%	47,218	4196	10%	21,570	1313	6%	46%	104	31	3312	13%	2678	9%	1422	9%	26.20
2009	3.81	0.30	9%	52,027	4809	10%	23,511	1941	9%	45%	107	31	3861	17%	3050	14%	1596	12%	28.48
2010	4.01	0.20	5%	56,828	4801	9%	27,574	4062	17%	49%	112	31	4522	17%	3288	8%	1693	6%	33.00
2011	4.32	0.31	8%	59,618	2790	5%	27,886	312	1%	47%	118	31	5076	12%	3480	6%	1753	4%	35.30
2012	4.32	0.00	0%	61,451	1833	3%	27,442	-444	-2%	45%	118	31	4941	-3%	3571	3%	1767	1%	38.40
2013	4.53	0.21	5%	64,115	2664	4%	29,031	1589	6%	45%	120	31	5045	2%	3643	2%	1757	-1%	42.60
2014	4.70	0.17	4%	66,026	1911	3%	30,212	1181	4%	46%	125	31	5132	2%	3797	4%	1865	6%	45.40
2015	5.02	0.32	7%	69,550	3524	5%	32,330	2118	7%	46%	128	31	5353	4%	3980	5%	1867	0%	45.80
2016	5.00	-0.02	0%	73,784	4234	6%	32,355	25	0%	44%	141	30	5426	1%	4137	4%	1879	1%	51.45
2017	5.30	0.30	6%	78,537	4753	6%	34,803	2448	8%	44%	147	30	5659	4%	4316	4%	1904	1%	54.40
2018	5.40	0.10	2%	83,338	4801	6%	35,440	637	2%	43%	145	28	5311	-6%	4395	2%	1987	4%	55.50

Appendix 4. Income groups and reuse

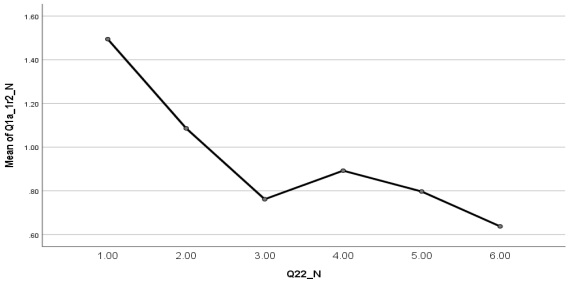
Reuse behaviours of last year over income groups. Measures are on a 1-10 scale. Income groups are defined as followed: 1 = < 999 EUR (*n* = 18); 2 = between 1000 EUR and 1999 EUR (*n* = 250); 3 = between 2000 EUR and 2999 EUR (*n* = 318); 4 = between 3000 EUR and 3999 EUR (*n* = 316); 5 = between 4000 EUR and 4999 EUR (*n* = 194); 6 = > 4999 EUR (*n* = 80). Note that Y-axes differ over visualisations and that differences are not (always) significant.

BUYING

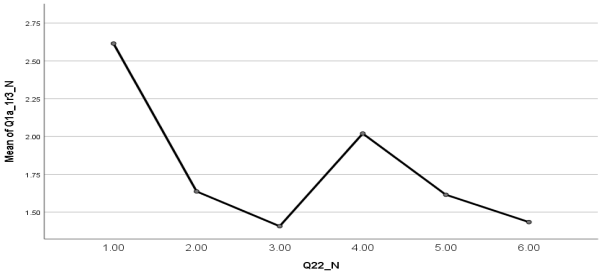
Furniture



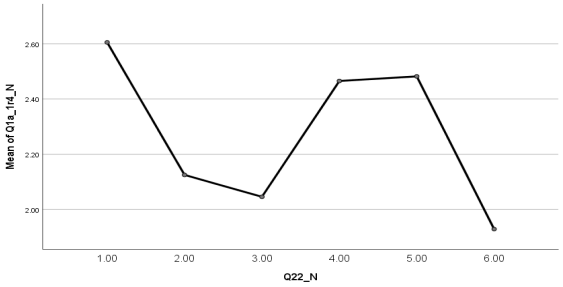
EA



Textile

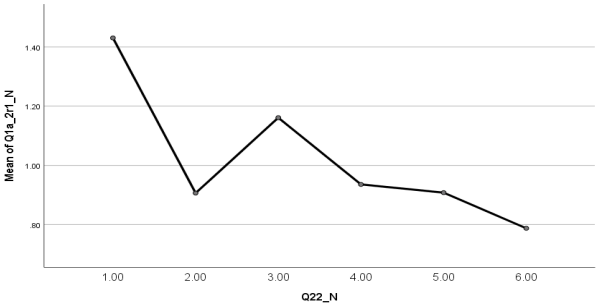


Rest



RECEIVING

Furniture



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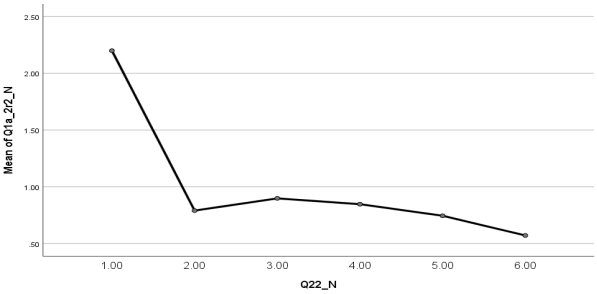

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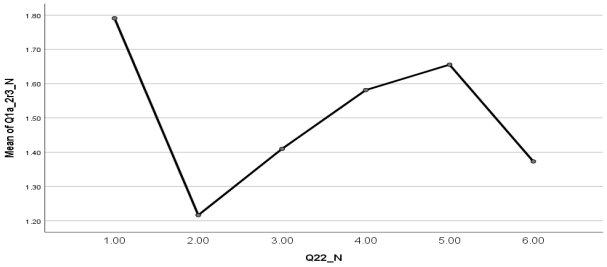

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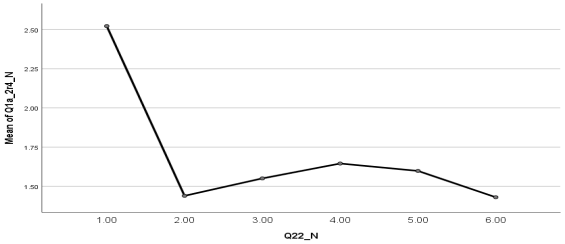

Appendix 5. Environmental attitudes: Comparison with LNE studies

Table. Results of agreement with environmental statements as conducted earlier by the Flemish Department of Environment (LNE)

Our study (2019)	**%**	%	
- In vergelijking met een aantal jaren geleden, doe ik nu meer voor het milieu	86.6	13.4	- In vergelijking met een aantal jaren geleden, doe ik nu minder voor het milieu.
- Rekening houden met het milieu is belangrijk voor de toekomst en de volgende generaties	80.1	19.9	- Ik sta er niet echt bij stil wat de toekomst brengen zal.
- Ik ben begaan met het milieu en de milieuproblematiek	79.2	20.9	- Het milieu en de problematiek errond laat me eerder koud.
- Ik heb een milieuvriendelijke levensstijl	72	28	- Ik hou niet echt rekening met het milieu in mijn dagelijks leven.
- Ik heb het gevoel dat wat ikzelf doe voor het milieu belangrijk is	69.3	30.7	- Ik heb het gevoel dat wat ik doe voor het milieu weinig tot geen bijdrage levert.
- Er wordt voldoende gecommuniceerd omtrent milieuvriendelijke maatregelen die ikzelf in handen heb	73.1	26.9	- Ik weet niet welke milieuvriendelijke maatregelen er allemaal bestaan.
- Ik denk vaak na over de invloed van mijn dagelijkse activiteiten op het milieu	58.8	41.2	- Ik zou wel willen meehelpen aan het milieu, maar soms vergeet ik het gewoon.
- Ik vind het niet erg om meer te betalen voor milieuvriendelijke producten	45.4	54.6	- Ik koop enkel milieuvriendelijke producten als ze dezelfde prijs hebben of goedkoper zijn dan andere producten.
- Milieuvriendelijke maatregelen zijn eerder betaalbaar	33.5	66.5	- Milieuvriendelijke maatregelen zijn eerder duur.
- Milieuproblemen vind ik belangrijker dan andere maatschappelijke problemen	47.5	52.5	- Andere maatschappelijke problemen vind ik belangrijker dan milieuproblemen.
- Ik vind het niet erg om een cadeau tweedehands te kopen	63.9	36.2	- Ik zou een cadeau niet tweedehands kopen.
Study conducted in 2017 by the Flemish government (N = 3048)			
- In vergelijking met een aantal jaren geleden, doe ik nu meer voor het milieu	92	8	- In vergelijking met een aantal jaren geleden, doe ik nu minder voor het milieu.
- Rekening houden met het milieu is belangrijk voor de toekomst en de volgende generaties	84	16	- Ik sta er niet echt bij stil wat de toekomst brengen zal.
- Ik ben begaan met het milieu en de milieuproblematiek	86	14	- Het milieu en de problematiek errond laat me eerder koud.
- Ik heb een milieuvriendelijke levensstijl	73	27	- Ik hou niet echt rekening met het milieu in mijn dagelijks leven.
- Ik heb het gevoel dat wat ikzelf doe voor het milieu belangrijk is	55	45	- Ik heb het gevoel dat wat ik doe voor het milieu weinig tot geen bijdrage levert.
- Er wordt voldoende gecommuniceerd omtrent milieuvriendelijke maatregelen die ikzelf in handen heb	63	37	- Ik weet niet welke milieuvriendelijke maatregelen er allemaal bestaan.
- Ik denk vaak na over de invloed van mijn dagelijkse activiteiten op het milieu	48	52	- Ik zou wel willen meehelpen aan het milieu, maar soms vergeet ik het gewoon.
- Ik vind het niet erg om meer te betalen voor milieuvriendelijke producten	31	69	- Ik koop enkel milieuvriendelijke producten als ze dezelfde prijs hebben of goedkoper zijn dan andere producten.
- Milieuvriendelijke maatregelen zijn eerder betaalbaar	28	72	- Milieuvriendelijke maatregelen zijn eerder duur.
- Milieuproblemen vind ik belangrijker dan andere maatschappelijke problemen	28	72	- Andere maatschappelijke problemen vind ik belangrijker dan milieuproblemen.
Study conducted in 2012 by the Flemish government (N = 1060)			
- In vergelijking met een aantal jaren geleden, doe ik nu meer voor het milieu	93	7	- In vergelijking met een aantal jaren geleden, doe ik nu minder voor het milieu.
- Rekening houden met het milieu is belangrijk voor de toekomst en de volgende generaties	81	19	- Ik sta er niet echt bij stil wat de toekomst brengen zal.
- Ik ben begaan met het milieu en de milieuproblematiek	80	20	- Het milieu en de problematiek errond laat me eerder koud.
- Ik heb een milieuvriendelijke levensstijl	70	30	- Ik hou niet echt rekening met het milieu in mijn dagelijks leven.
- Ik heb het gevoel dat wat ikzelf doe voor het milieu belangrijk is	59	41	- Ik heb het gevoel dat wat ik doe voor het milieu weinig tot geen bijdrage levert.
- Er wordt voldoende gecommuniceerd omtrent milieuvriendelijke maatregelen die ikzelf in handen heb	59	41	- Ik weet niet welke milieuvriendelijke maatregelen er allemaal bestaan.
- Ik denk vaak na over de invloed van mijn dagelijkse activiteiten op het milieu	44	56	- Ik zou wel willen meehelpen aan het milieu, maar soms vergeet ik het gewoon.
- Ik vind het niet erg om meer te betalen voor milieuvriendelijke producten	34	66	- Ik koop enkel milieuvriendelijke producten als ze dezelfde prijs hebben of goedkoper zijn dan andere producten.
- Milieuvriendelijke maatregelen zijn eerder betaalbaar	30	70	- Milieuvriendelijke maatregelen zijn eerder duur.
- Milieuproblemen vind ik belangrijker dan andere maatschappelijke problemen	27	73	- Andere maatschappelijke problemen vind ik belangrijker dan milieuproblemen.

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