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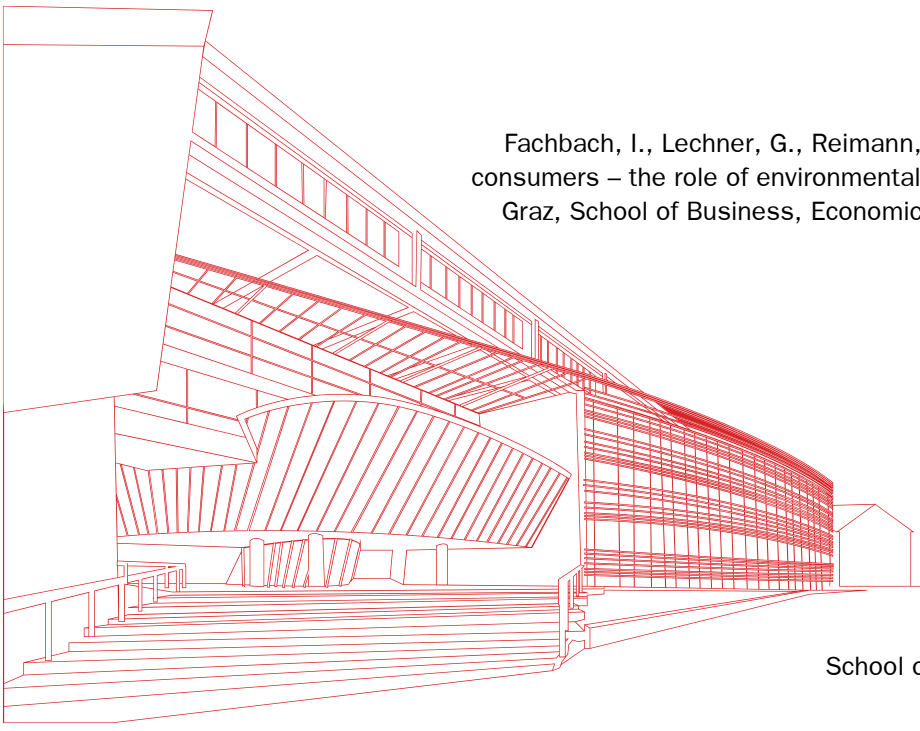
Exploring the repair intention of consumers – the role of environmental, social and economic drivers

Ines Fachbach, Gernot Lechner, Marc Reimann

Working Paper 2021-05
September 14, 2021



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Abstract

Repair is a central component of a circular economy to extend the operational phase of products. Yet, the number of repair service providers as well as demand for repair have declined over the last decades, while more products than ever before were sold. Thus, for a successful transition from a linear to a circular economy the demand for repair services must be boosted to promote repair business. A starting point to achieve this goal is to increase knowledge about the decision-making process of consumers related to repair. This is the aim of this study: we investigate consumers' intention (1) to make use of repair service providers, (2) to self-repair broken items, and (3) to use repair service providers incorporated in a repair network. An extensive literature research revealed a comprehensive set of influencing factors concerning repair decisions covering environmental, social, and economic aspects. Based on these insights, a quantitative online survey was designed, and distributed in Styria, Austria. By means of a structural equation model the acquired data of 900 respondents was analysed. The results emphasise the trade-off between acting environmentally friendly and economic aspects like repair cost and time, but also highlight the effect of government intervention–in the form of setting up a network and financial support for repair–on shaping this trade-off. Furthermore, past behaviour is found to strongly drive repair intention. Finally, disparities between urban and rural areas, as well as in the maximum accepted prices and times for repair of different product types were identified. As a result our research not only contributes to scientific literature by shedding light on the role of repair networks for repair decisions, and the trade-off between environmental, social and economic aspects. It is also relevant for supporting repair companies' decision making, as well as public authorities interested in promoting repair.

Keywords: repair, circular economy, repair network, sustainable decision-making, repair demand

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Abstract

Repair is a central component of a circular economy to extend the operational phase of products. Yet, the number of repair service providers as well as demand for repair have declined over the last decades, while more products than ever before were sold. Thus, for a successful transition from a linear to a circular economy the demand for repair services must be boosted to promote repair business. A starting point to achieve this goal is to increase knowledge about the decision-making process of consumers related to repair. This is the aim of this study: we investigate consumers' intention (1) to make use of repair service providers, (2) to self-repair broken items, and (3) to use repair service providers incorporated in a repair network. An extensive literature research revealed a comprehensive set of influencing factors concerning repair decisions covering environmental, social, and economic aspects. Based on these insights, a quantitative online survey was designed, and distributed in Styria, Austria. By means of a structural equation model the acquired data of 900 respondents was analysed. The results emphasise the trade-off between acting environmentally-friendly and economic aspects like repair cost and time, but also highlight the effect of government intervention—in the form of setting up a network and financial support for repair—on shaping this trade-off. Furthermore, past behaviour is found to strongly drive repair intention. Finally, disparities between urban and rural areas, as well as in the maximum accepted prices and times for repair of different product types were identified. As a result our research not only contributes to scientific literature by shedding light on the role of repair networks for repair decisions, and the trade-off between environmental, social and economic aspects. It is also relevant for supporting repair companies' decision making, as well as public authorities interested in promoting repair.

Keywords: `Repair`, `Circular Economy`, `Repair Network`, `Sustainable Decision-Making`, `Repair Demand`

1. Introduction

Repair is a key factor for transforming the linear economy to a circular economy. Repair is considered to create local added value and to be beneficial for the environment (Stahel, 2016). It can be economically profitable for individuals (see, e.g., Brusselaers et al., 2019), and may boost social inclusion through, e.g., training long-term unemployed persons or improved accessibility to second-hand products for disadvantaged individuals (Lechner and Reimann, 2015; Zacho et al., 2018). Furthermore, even though determining the impact of repair on environment and thus, resource-efficiency is a complex analysis which requires the consideration of a plethora of parameters, extending the usage-phase by repairing and reusing is generally performing better than product replacement (cf. Boldoczki et al., 2020; Bovea et al., 2020). In spite of all these potential positive effects, the number of repair service providers as well as the demand for repair services have decreased over the last few decades (McCollough, 2010; Sabbaghi et al., 2017). According to a survey from the European Commission only a share of 64% of EU-28 consumers actually repaired products (European Commission, 2018).

Manifold strategies with the objective to promote repair are considered at various levels to upend this development. The European Union introduced new regulations concerning sustainable product design, aiming for longer-lasting easier-to-repair products (European Commission, 2016). As the various movements dealing with the so-called 'Right to Repair' point out, such measures should pave the way for easier repair by increasing accessibility to spare parts and related information (e.g., iFixit, 2021; Right to Repair Europe, 2021). In France, the recent introduction of the repairability index forces manufacturers of electric and electronic equipment to evaluate their products[1], e.g., in terms of documentation, availability and price of spare parts, or disassembly

[1] https://www.indicereparabilite.fr/wp-content/uploads/2021/01/210107_Instructions-manual-repairability-index.pdf

and required tools, and provide the score to customers. Other administrative, economic, or informative policy instruments to promote repair have already been implemented, e.g., reduction of value added tax for selected repair services in Sweden, or supporting the establishment of reuse parks promoting repair activities in Spain (Dalhammar, 2019).

An approach targeting to strengthen suppliers can be observed in the city of Graz, in Austria. The city administration initiated and operates a repair network covering diverse sectors. Membership is linked with strict quality standards. Regular exchange between the repair service providers facilitates the safeguarding of high-quality repair services as well as sharing of experiences and information, repair collaboration, and increased visibility of repair (GRAZ repariert, 2021; Lechner et al., 2021). Also, the city of Graz introduced a scheme which funds repairing electrical and electronic equipment. For obtaining this funding, customers must be residents of Graz, and the repair service provider needs to be a member of the repair network (Stadtportal der Landeshauptstadt Graz, 2021; Lechner et al., 2021).

While all of these initiatives aim at revitalising repair, an important aspect is to improve understanding of the demand-side, i.e., the decision-making process of consumers with respect to repair. Until a short while ago, activities related to repair were not often in focus of research and thus, remain under-researched (Rosa et al., 2019). Existing studies discussed influencing factors of the repair decision like barriers (Laitala et al., 2021; Tecchio et al., 2019), economic considerations (Cooper et al., 2017; McCollough, 2010; Wieser and Tröger, 2018) or attitudes, experiences and public perceptions (Rogers et al., 2021; Sabbaghi et al., 2016). In addition, research indicates that environmental aspects affect decision-making related to 'green consumption' (cf. Hansla et al., 2008; Kautish and Sharma, 2020), and social factors like peer groups have a significant effect on individual's (un)sustainable decisions (Lazaric et al., 2020). Very recently, a growing number of studies tackle the demand for repair (e.g., Jaeger-Erben et al., 2021; Laitala et al., 2021; Rogers et al., 2021). However, all of these studies focus on specific economic, environmental, or social aspects but

do not provide a comprehensive examination of their impact on decision-making. Thus, we summarise this finding as a research gap:

Research Gap 1: While there are studies dealing with certain aspects affecting decision-making related to repair, the interplay of economic, environmental, and social aspects has not been investigated.

Beyond that, most studies focus on professional repair service providers by examining different aspects of the repair decision (see, e.g., McCollough, 2010; Pérez-Belis et al., 2017; Sabbaghi and Behdad, 2018), and some studies deal with do-it-yourself (DIY) movements (Laitala et al., 2021; Raihanian Mashhadi et al., 2016). While this is certainly a differentiation worthwhile to consider in our study, none of these studies included the context of repair decision-making into investigation: the repair network in Graz suggests that the accessibility to repair services is relatively easy, and that the public funding scheme attracts customers by financial incentives (Lechner et al., 2021). Thus, in comparison with the rest of Styria, Graz is privileged concerning repair. We hypothesise that respective decision-making can be context-specific and thus, the intention to repair might vary in an urbanised area like Graz and the rest of Styria regarding composition as well as magnitude of influence of economic, environmental, and social aspects.

Research Gap 2: While the differentiation between types of repair (consumption of a repair service or DIY) is addressed in literature, the potentially diverse decision-making in different contexts—shaped, e.g., by repair accessibility or financial incentives—have not yet been explored.

In summary, to the best of our knowledge the trade-off between environmental, economic and social drivers and their importance with respect to repair has not been investigated, neither for repair services, DIY repairs, or depending on the context. Based on the findings of existing studies it remains unclear what actually determines the repair decision: hence, it is important to evaluate the repair decision-making-process of consumers to investigate the underlying concepts and mechanisms related to repair demand. Summarising these findings, the following research questions state our research interest:

Research questions: What environmental, economic, and social drivers are

relevant for decision-making of consumers concerning their intention to repair? How and to what extent does the repair context impact the repair intention?

In order to investigate these questions and to fill the identified research gaps we examine what (environmental, social and economic) drivers are relevant for the intention to repair and thus, the motivation for repairing products, using a quantitative online survey. The survey is based on established factors obtained by literature research. Furthermore, we integrate context-specific indicators like residence or eligibility for funded repair into our research approach. As a research novelty, we refine the intention to repair by differentiating between three different scenarios: (1) the intention to use a repair service provider (what we denote as *RIa* in the rest of the article); (2) the intention to self-repair a broken product in a do-it-yourself (DIY) manner (*RIb*); and (3) the intention to use a repair service offered by a company which is part of a repair network, accounting for the context of Graz (*RIc*). By structural equation modelling we transform the data of 900 participants into a network of constructs. Results confirm insights from other studies, as for example the observation that women are more likely to utilise a repair service provider than men. Our key findings highlight that the integration of economic, environmental, and social drivers is crucial to understand decision-making related to repair, specifically in different contexts. First, while for general repair intention environmental reasons were the major driving force, economic factors decisively shape the intention to use a company within the repair network. One explanation for this could be the existence of the associated financial support offered to consumers. Second, the social network of close friends and family plays a major role in shaping repair intentions, specifically when considering self-repair. Third, habits, or more general, past behaviour as well as trust in the repair service provider turn out to have a strong effect on consumers' repair intention. Thus, our results suggest that a key to a sustainable change towards more repair could be achieved by nudging consumers to take up repair in the first place. The most promising vehicle to do so seem to be financial incentives. To support the formation of habitual behaviour, enabling trust—through e.g. quality safeguards—is key.

The remainder of the paper is structured as follows: in Section 2, we develop the underlying theoretical framework of the study which is well-founded on state-of-the-art literature, and propose hypotheses. Section 3 provides an overview of the methodology. The results of the survey are presented in Section 4, followed by a discussion of the results in Section 5. We conclude the study with a summary, and discuss limitations and future research opportunities in Section 6.

2. Theoretical framework and hypothesis development

In order to evaluate the influence of environmental, social and economic drivers on repair decision-making in the diverse contexts *RIa/RIb/RIc*, we establish a theoretical framework rooted in existing research. For this purpose, we first identify constructs representing the three determinants. These determinants depend on the perception of individuals, i.e., whether individuals perceive repairing as environmentally-friendly, economically reasonable, and / or socially accepted. Following this, on the basis of the theoretical framework we hypothesise related effects which can subsequently be tested. In summary, in hypotheses (*H1, H2, H3*, each split into sub-hypotheses *a, b, c*) we propose that the environmental, social and economic drivers influence the three different repair intentions (*RIa, RIb, RIc*).

2.1. Environmental, economic, and social drivers concerning the intention to repair

Environmental considerations loom large regarding repair: specifically in comparison to purchasing new products, repairing is assumed to be beneficial for the environment and resource-saving since the life of products is extended and waste is avoided (Boldoczki et al., 2020; Pini et al., 2019; Stahel, 2016). Also, repairing is viewed as being less harmful to the environment than recycling as no secondary production stage is required (McCollough, 2009). Likewise, in comparison to remanufacturing and refurbishment it is in general the least environmentally harmful option to reuse an item (King et al., 2006). In order to investigate the environmental driver (EnvD), we root the theoretical framework on insights obtained from the Value-Belief-Norm-theory for pro-environmental behaviour (Stern et al., 1999): the theory states that awareness of consequences ('beliefs') are a determinant of behaviour. Hence, items regarding the awareness of consequences of inaction are included in the study. These items refer to the degree that a person is mindful of the (environmental) consequences of not repairing. Thus, this approach reflects the perception of individuals whether

repairing is environmentally-friendly, what in turn facilitates to investigate the effect of potential environmental considerations on the repair decision. Supported by the fact that similar effects have been shown in various contexts related to research on green consumers (cf. Fornara et al., 2016; Steg et al., 2005), we propose that awareness of environmental consequences influences the intention to repair.

> *H1a/H1b/H1c*: The environmental driver (EnvD) 'Awareness of environmental consequences of inaction' influences *RIa/RIb/RIc*.

Second, there is evidence that economic considerations drive the repair decision. Repairing can be economically rewarding if it costs less than replacing the product, therefore the replacement price is considered as an important aspect (King et al., 2006; McCollough, 2009). Compared with this, if the overall costs related to repairing a product are considered as being excessive, economic aspects may act as a main barrier regarding repair (Tecchio et al., 2019). To broaden the perspective, the expectation that a repair will be completed for a reasonable cost fairly quickly and accurately (Chang et al., 2013) and the expectation of the additional useful product life after repairing a product (McCollough, 2010) were identified in literature to influence the repair decision. In this study we consider the economic driver (EcoD) by incorporating the (economic) attitude towards repair. For this purpose, we evaluate the attitude of individuals whether repairing is rewarding (or a waste of money), useful (or a waste of time) and sensible. Especially since there is strong indication in scientific literature that repair/replacement price (King et al., 2006; McCollough, 2009) and the repair time (McCollough, 2007) are main influencing factors of the repair decision, we assume that there exists a direct effect of economic considerations on the repair intention.

> *H2a/H2b/H2c*: The economic driver (EcoD) 'Economic attitude towards repair' influences *RIa/RIb/RIc*.

Third, there are also social drivers (SocD) which are related to social norms in the context of repairs. Normative influence is a key factor of several social-psychological models related to behavioural decision-making (Passafaro et al., 2019). For instance, social norms are determinants of waste-prevention-behaviour (Corsini et al., 2018). According to Wirtz and Lovelock (2015, p. 6) *'intangibility, heterogeneity (variability of quality), inseparability of production and consumption and perishability of output'* are frequently cited characteristics of services (including repair services) which pose distinct marketing challenges. It is this uncertainty about quality variability we focus on: an important influencing factor of the repair decision is the trust in repair service provider (McCollough, 2010). One way for individuals to evaluate that trust (and hence aiming to decrease heterogeneity of output) is by making use of experiences and opinions of social groups (cf. Lazaric et al., 2020). Hence, due to the heterogeneity of output consumers might approach relevant peer groups whether to repair a product or not. In addition, repair can evoke a sense of shame due to lack of care or lack of financial capacities (Gregson et al., 2009), what emphasises that activities and opinions related to repairs of relevant social groups can be a driver. According to our described findings we hypothesise that social norms can drive the intention to repair. We address social norms by assessing the influence of relevant peer groups (Ajzen, 1991).

H3a/H3b/H3c: The social driver (SocD) 'Social norm' influences *RIa/RIb/RIc*.

2.2. Refining the theoretical framework using control variables

In order to obtain a more differentiated view of repair intentions, we consider seven control variables in the study. These variables are primarily related to socio-demographic characteristics, as socio-demographic aspects are crucial for activities in the context of circular economy (Kuah and Wang, 2020).

Age can positively correlate with repair (McCollough, 2010) and was therefore taken into consideration as control variable. According to literature, profes-

sional repair services are more likely hired by women (Rogers et al., 2021; Rosner and Ames, 2014). Therefore, the respondent's *gender* is considered as control variable as well. Furthermore, the role of *income* of consumers is evaluated: consumers seem to more likely replace their product instead of repairing it with increasing income (McCollough, 2007). Related, but somewhat contrary to this, Rogers et al. found that affordability is not a driving influencing factor if *education* is assumed as a proxy for income (Rogers et al., 2021). McCollough (2010) applied education as a proxy for environmental awareness and observed a positive effect of education, too. Also spatial accessibility of repair service providers is essential: since the travel distance to repair service providers and thus, the accessible infrastructure influences decision-making (Gerner and Bryant, 1980), differences depending on the *residence*—e.g., rural or urban areas—might occur. In addition, considering the city of Graz exclusively the local residents can receive a repair funding (Lechner et al., 2021). One conclusion of Sabbaghi et al. (2016) is that—besides the usefulness of repair information—the complexity of repair is relevant. Specifically for DIY repair, lack of skills required has been identified as a major barrier (Pérez-Belis et al., 2017; Sabbaghi and Behdad, 2018). In general, perceiving repair activities as not feasible or very difficult can be an unsurmountable barrier (Tecchio et al., 2019). Hence, the *perceived difficulty of repair activities* is incorporated in the study. Finally, Jaeger-Erben et al. (2021) tackled the impact of *past repair behaviour* and emphasised its importance. Sabbaghi et al. (2017) could cluster types of consumer electronics based on the unsuccessful repair experiences of respondents. Hence, also repair experiences in terms of past behaviour (PB) are considered in this study as a control variable. Again, it is differentiated between the frequency of using repair services (PBa), DIY repairs (PBb) and making use of a repair network (Pbc).

2.3. Additional aspects related to repair intention

Complementing the structural model described above, several additional aspects are taken into account. On the one hand, they can quantitatively benchmark the situation in Graz against results from previous studies. For example,

it had been found that consumers are willing to pay between 19% and 30% of the purchase price for a product repair (Adler and Hlavacek, 1976; European Commission, 2018; McCollough, 2007). Thus, we added the *maximum accepted repair price* (in percent of the purchase price) into our analysis. Similarly, *maximum accepted repair time* (in days), waiting time (McCollough, 2007), as well as *travel time* (Gerner and Bryant, 1980; McCollough, 2007) to the repair office were also included.

On the other hand, these should help to provide a richer insight into the shaping of consumer intentions for repair. We complement the environmental driver with *environmental concern* of individuals in order to contrast the perceived awareness of environmental consequences of inaction—which is directly related to repair—with the more general environmental concern. Even though environmental concern was identified as an influencing factor of the repair decision (McCollough, 2010), repair is not necessarily perceived as being environmentally sound even for individuals with a high environmental concern.

Contributing to the understanding of social aspects, *recommendations of social groups* are evaluated to reveal information sources utilised by consumers for supporting their repair decisions. Furthermore, since changing fashions or the loss of status (Cooper et al., 2017) are presumed to be barriers of repair, the *attitude toward new (fashionable) products* is integrated in this study. Finally, *trust in the repair service provider* (McCollough, 2010) has been discussed in literature to be important within the repair decision and is therefore included.

2.4. Resultant theoretical framework

In Figure 1, the theoretical framework including environmental, economic, and social drivers is shown. As argued above, the seven control variables as well as the additional aspects are introduced to facilitate a deeper understanding of factors influencing decision-making related to repair.

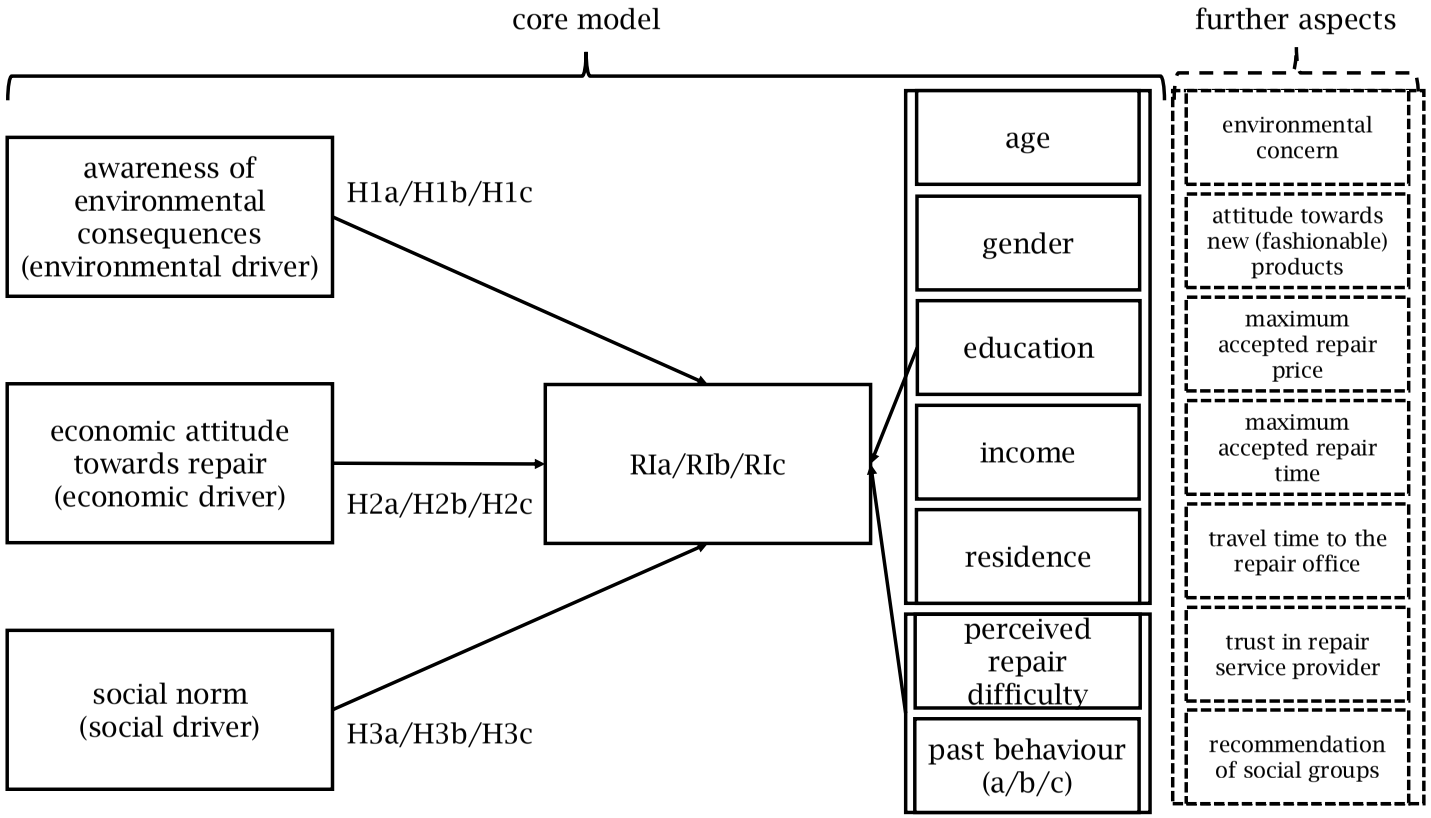

Figure 1: Theoretical Framework

3. Methodology

In this section, we clarify the scope and context of the study, detail survey development, and provide insights into applied methods used for data analysis.

3.1. Scope and context of study

As described in Section 1, the specific situation in Styria (Austria) facilitates to integrate different contexts in the study. The location of the University in Graz as well as the collaboration with the local repair network allows to obtain precise information about regional repair initiatives and organisations, easing interpretation of results. Thus, we decided to design a questionnaire survey including specific characteristics—as for example the awareness of the local repair network—and distribute the survey across the whole of Styria. Despite this restriction to a single region, the basic outcomes can also be transferred to other regions with similar contexts, norms, and values. This is specifically true since the study does not focus exclusively on repair networks but is primarily dedicated to the decision-making process concerning repairs in general, i.e., the effect of environmental, economic, and social drivers on the intention to repair in different contexts.

3.2. Survey development

The questionnaire survey was developed with the objective to investigate the constructs of the theoretical framework presented in Section 2, thus being able to answer the research questions. The items of the questionnaire mainly employ a five-point Likert scale, one indicates strong disagreement concerning repairs and five a positive view. Beyond this, different scales were used and the order of questions was mixed to avoid common method bias (cf. Podsakoff et al., 2003). Most items were adapted from literature, for a detailed description and further information please refer to Table A.7 and Table A.8 in the Appendix. For the evaluation of maximum accepted repair costs/time, references were made to

different product categories[2]. This approach emphasises that the focus is not on one single product category but on several different ones. Measuring the *perceived difficulty of repair activities* is incorporated in the study in the following way: we examine whether respondents categorise statements like 'make the brewing group (coffee machine) functional again', 'replace the bicycle chain' or 'replacement of a smartphone display' as simple repair / medium repair / difficult repair / no repair. Items which target at the evaluation of past behaviour were added to the survey: participants are questioned about the frequency of (1) using repair services (PBa), (2) DIY repairs (PBb), and (3) making use of a repair network (Pbc).

Finally, items to survey major assumptions in terms of guarantee/warranty and emotional aspects were included. First, as we assume that most individuals would decide to repair if there is a guarantee/warranty—what would impede the investigation of the trade-off between environmental, social and economic drivers—we ask for the willingness to repair products under guarantee/warranty. Second, concerning repair reasons like sentimentality or nostalgia (Page, 2014) it was assumed that respondents with an emotional attachment to their products get these products mended anyway. This was reflected by the question whether respondents do / partly / don't repair due to emotional reasons.

The study was launched with the pre-test (n = 20) of the survey questions between the 1st and 26th of April 2020. The online questionnaire was spread (in German language) through the market research agency Marketagent.com between the 3rd and 13th of August 2020[3]. Styrian citizens older than eighteen years were addressed to participate in the questionnaire. The study does not focus on a specific product type or consumer group—e.g., with certain repair

[2]Categories cover: daily domestic appliances, electronic equipment, jewellery, bicycle, musical instrument, cell phone, furniture and articles of clothing. These product categories are motivated by the product categories which are promoted on the webpage of GRAZ repariert (`https://grazrepariert.at/`).

[3]Note that the quantitative online survey was carried out in the scope of a Master Thesis Fachbach (2020).

knowledge—but aims to reflect the variety of Styrian citizens. Thus, apart from a requested variety of participants regarding age, gender and education, potential respondents were randomly chosen from the panel by Marketagent.com.

3.3. Applied methods for data analysis

Unless otherwise stated all analyses were conducted applying SPSS 26 and Amos 27 software packages. Initially, extensive data plausibility checks facilitated to overview the data quality. Apart from descriptive statistics, general validity checks (e.g., missing values, invalid data) and respective data cleaning ensured a meaningful dataset. As a result, only respondents who fully completed the survey were included. In some cases, respondents did not respond to certain items. These values were filled by data imputation: using Random Forest-based imputation implemented in *R*'s mice-package (van Buuren and Groothuis-Oudshoorn, 2011) we tackled the problem of missing data. Applying different imputation methods (as the method integrated in AMOS, deletion, mean imputation, etc.) did not change the general structure of results.

After obtaining a complete dataset, confirmatory factor analysis helped to test reliability and validity of data through factor loadings, t-values, composite reliability, and average variance extracted (AVE). Cronbach's α uncovers internal consistency among grouped items. An additional exploratory factor analysis allowed to analyse data for common method bias, using Harman's one factor test in SPSS and the single-method-factor approach in AMOS. Structural equation modelling was applied to test the hypotheses given in Section 2: using the structural model, the impact of environmental, economic, and social drivers on *RIa/RIb/RIc* were investigated and assessed with Goodness-of-fit indices.

Finally, *k*-means clustering was applied to cluster participants according to the control variable *perceived difficulty of repair activities*. Descriptive statistics and statistical tests for comparing means were used for additional analysis based on control variables.

4. Modelling and results

We start with a description of the sample to obtain a general understanding of the respondents, followed by the results from the exploratory/confirmatory factor analysis. Finally, we present the results from our structural equation model.

4.1. Sample description

In total 1,170 respondents participated in this study, from which 270 respondents completed the survey only partially. Hence, there is a total of n=900 valid responses.

Concerning awareness of the repair network, 164 respondents (18.2%) know *GRAZ repariert*. In addition, 8.3% of all respondents stated that they had visited the associated webpage before, and 8% had already gotten a product mended via the repair network. In order to assess the repair intention in different contexts, participants have to be aware of the repair options: since not every respondent knew the repair network *GRAZ repariert*, the dataset was split into two samples. One sample exclusively contains respondents who are not aware of the repair network (n=736). Thus, analyses are constrained to repair intentions *RIa* and *RIb*. The second dataset includes respondents who know *GRAZ repariert* (n=164). Using this dataset, all three repair intentions (*RIa, RIb, RIc*) are considered for analyses.

The overview of all socio-demographic control variables—using the split datasets—is provided in Table 1. It turns out that in general the control variables are well-distributed among the attributes. However, there is an overproportional share of respondents with a residence in Graz, but these residents are significantly more aware of the repair network than others. We interpret this expected result as a positive signal concerning data accuracy, as the focus of the repair network is on Graz.

The different categorisations of difficulty of various (repair) activities are shown in Figure 2. While for some statements (i.e., 'Sewing a button' and

Table 1: Sample description: socio-demographic aspects

		Repair network not known (n=736)		**Repair network known (n=164)**	
Control variables	*Attribute*	n	%	*n*	*%*
Gender	Male	370	50.30	76	46.30
	Female	366	49.70	88	53.70
Age	18-29	137	18.60	18	11.00
	30-39	124	16.80	34	20.70
	40-49	141	19.20	25	15.20
	50-59	154	20.90	42	25.60
	60+	180	24.50	45	27.50
Income	Very low	74	10.10	8	4.90
	Below average	131	17.80	30	18.30
	Average	380	51.60	85	51.80
	Above average	119	16.20	30	18.30
	Very high	32	4.30	11	6.70
Education	Compulsory School	47	6.40	7	4.30
	Apprenticeship	330	44.80	59	36.00
	A-Level	199	27.00	42	25.60
	University	160	21.80	56	34.10
Residence	Graz	272	37.00	105	64.00
	Rest of Styria	464	63.00	59	36.00

'Replacing a battery in a flashlight') there is extensive consensus about the elementariness of these repairs, the other statements provide a more complex view of repair for individuals.

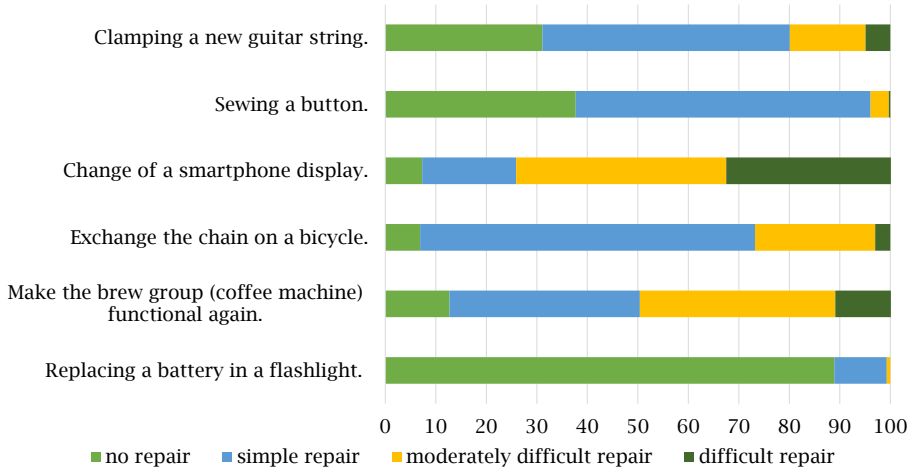

Figure 2: Categorisation of (repair) activities

In order to examine if certain groups of respondents assess these statements similarly and hence share a similar perception of difficulty concerning repair, a k-means cluster analysis was conducted: the analysis revealed that it is possible to cluster respondents in four different groups. These groups differ in terms of their interpretation of the difficulty of the stated activities. Based on these insights, an additional control variable *Perceived difficulty of repair*, consisting of four levels of difficulty ('Not / Less / More / Very difficult'), was introduced to differentiate between the clusters. Table 2 shows the summary of these clusters, including the observation that the minority of respondents belong to cluster 'Very difficult'.

In addition, the table also contains an indication of past behaviour: most of the respondents have at least once used a repair service or carried out a DIY repair by themselves. While a large share of respondents have self-repaired broken products very often (39.3%), the number of respondents using a repair service

very frequently is rather limited. Furthermore, even though 164 respondents are aware of *GRAZ repariert*, about three out of four have not yet used it.

Table 2: Sample description: perceived repair difficulty and past behaviour

		Repair network not known (n=736)		**Repair network known (n=164)**	
Control variables	*Attribute*	n	%	*n*	*%*
Perceived repair difficulty	Not difficult	166	22.60	45	27.40
	Less difficult	217	29.50	39	23.80
	More difficult	236	32.00	53	32.30
	Very difficult	117	15.90	27	16.50
PBa - using repair services	Never	25	3.40	6	3.60
	1-5x	308	41.80	66	40.20
	6-10x	213	28.90	47	28.70
	10-20x	100	13.60	19	11.60
	More than 20x	90	12.30	26	15.90
PBb - DIY repairs	Never	37	5.00	5	3.00
	1-5x	188	25.50	56	34.20
	6-10x	140	19.00	27	16.50
	10-20x	82	11.20	11	6.70
	More than 20x	289	39.30	65	39.60
PBc - make use of a repair network	Never	-	-	120	73.20
	1-5x	-	-	36	22.00
	6-10x	-	-	4	2.40
	10-20x	-	-	3	1.80
	More than 20x	-	-	1	0.60

Allowing for the research objective to include various contexts and their influence on different intentions to repair, we base our research on the split datasets, representing individuals who are / are not aware of the repair network. In total, we create five different model variations to be examined in the modelling phase:

1a Respondents are not aware of 'GRAZ repariert' (n=736), tested repair intention is *RIa*.

1b Respondents are not aware of 'GRAZ repariert' (n=736), tested repair intention is *RIb*.

2a Respondents are aware of 'GRAZ repariert' (n=164), tested repair intention is *RIa*.

2b Respondents are aware of 'GRAZ repariert' (n=164), tested repair intention is *RIb*.

2c Respondents are aware of 'GRAZ repariert' (n=164), tested repair intention is *RIc*.

4.2. Results related to the exploratory factor analysis

Exploratory factor analysis based on principal component analysis facilitates to investigate potential common method bias of the five model variations 1a/1b/2a/2b/2c. Promax rotation was chosen due to the intercorrelation of components (Weiber and Mühlhaus, 2014). The Kaiser-Meyer-Olkin-Measure was greater than the suggested value of 0.6 in all model variations (Kaiser and Rice, 1974) (1a: 0.84; 1b: 0.82; 2a: 0.80; 2b: 0.76; 2c: 0.71). Since neither a single factor was detected via exploratory factor analysis nor any general factor accounts for more than 50% of the variance (Podsakoff et al., 2003), we conclude that there is no common method bias. Considering the factor loadings of model variations 1b, 2b, and 2c, there are four distinct components (EnvD, EcoD, SocD, RIb/RIc) with factor loadings exceeding 0.7. In model variations 1a and 2a, there are three distinct components. The items of EnvD and RIa are allocated to the same component. However, the factor loadings differ (EnvD between 0.77 and 0.93 and RIa between 0.40 and 0.46) and both constructs can also be clearly distinguished based on content. Since CFA (see Section 4.3) proposes the reliability and validity of the constructs, too, also for model variations 1a and 2a all four constructs are clearly separated. Furthermore, in the Appendix (Table A.7 and Table A.8) Cronbach's α is provided: all values exceed 0.7, and most even 0.8. Hence, Cronbach's α is within the range proposed by literature, suggesting internal consistency (cf. Nunnally, 1978).

4.3. Results of the confirmatory factor analysis

To test reliability and validity of the data, a confirmatory factor analysis was conducted. Table 3 presents the respective results: since (1) almost all index

factor loadings are significant and at a minimum of 0.5[4], (2) composite reliability values exceed 0.7 and in most cases 0.8, and (3) average variance extracted (AVE) exceeds 0.5, data and measures are considered as being adequate (as indicated in Bagozzi and Yi, 1988; Fornell and Larcker, 1981). In addition, as the square root of AVE is larger than the correlations between the constructs, discriminant validity is successfully evaluated (cf. Fornell and Larcker, 1981; Hair et al., 2014). A common latent factor was introduced in the AMOS model to check the models on common method bias. By including a marker variable, a potential common variance can be reduced/controlled (Podsakoff et al., 2003).

4.4. Hypotheses analysis: results of the structural equation modelling

For analysing the proposed hypotheses we apply structural equation modelling using the AMOS module in SPSS. Again, the five different model variations (1a, 1b, 2a, 2b, 2c) are created to test the impact of the different drivers on repair intention in heterogeneous contexts.

4.4.1. Assessing the quality of the models

As stated above, we applied various methods for dealing with missing data, thereof the method implemented in AMOS and Random Forest (using R) for imputation of missing data which performed best. Even though the results of the method included in AMOS provide slightly superior results in terms of significance related to hypotheses compared with the imputation based on Random Forest, we opted for the latter due to the option to compare the models based on Goodness-of-Fit-indices.

In Table 4, various fit indices are provided as quality indicators related to the five different model variations obtained from structural equation modelling. The recommended values are in accordance with Kline (2011) and Tabachnick and Fidell (2007). It is obvious that the models based on the dataset where

[4]Even though the factor loadings of the second item of SocD in model variations 2a, 2b and 2c are 0.42/0.43 (and hence below 0.5), we decide to include the item in the model to make fair comparisons among models possible.

Table 3: Confirmatory factor analysis; Scale: 1='do not agree at all'; 5='totally agree'; [a] refers to *RIa*; [b] refers to *RIb*; [c] refers to *RIc*; (1) refers to 'Participants do not know the repair network (n=736)', (2) refers to 'Participants know the repair network (n=164)'; C.R.=Critical ratio

Construct		**Factor**				**Composite**		**Avg. variance**	
Item		**loading**		**C.R.**		**reliability**		**extracted**	
		(1)	(2)	(1)	(2)	(1)	(2)	(1)	(2)
EnvD	I1.1	0.83^{a} 0.83^{b}	0.84^{a} 0.83^{b} 0.83^{c}	-	-	$0.87^{a,b}$	$0.84^{a,b,c}$	$0.69^{a,b}$	$0.64^{a,b,c}$
	I1.2	0.79^{a} 0.78^{b}	0.79^{a} 0.79^{b} 0.80^{c}	23.32^{a} 23.12^{b}	10.68^{a} 10.38^{b} 10.41^{c}				
	I1.3	0.87^{a} 0.87^{b}	0.77^{a} 0.78^{b} 0.78^{c}	25.64^{a} 25.49^{b}	10.27^{a} 10.21^{b} 10.15^{c}				
EcoD	I2.1	$0.77^{a}0.77^{b}$	0.80^{a} 0.79^{b} 0.79^{c}	-	-	$0.84^{a,b}$	$0.82^{a,b,c}$	$0.65^{a,b}$	$0.61^{a,b,c}$
	I2.2	$0.73^{a}0.73^{b}$	0.64^{a} 0.64^{b} 0.64^{c}	19.70^{a} 19.68^{b}	8.16^{a} 8.11^{b} 8.08^{c}				
	I2.3	0.90^{a} 0.91^{b}	0.89^{a} 0.90^{b} 0.90^{c}	22.48^{a} 22.49^{b}	10.77^{a} 10.53^{b} 10.49^{c}				
SocD	I3.1	0.72^{a} 0.71^{b}	0.74^{a} 0.77^{b} 0.76^{c}	-	-	$0.76^{a,b}$	$0.74^{a,b,c}$	$0.52^{a,b}$	$0.50^{a,b,c}$
	I3.2	0.57^{a} 0.57^{b}	0.42^{a} 0.43^{b} 0.43^{c}	13.44^{a} 13.35^{b}	4.92^{a} 4.94^{b} 4.97^{c}				
	I3.3	0.84^{a} 0.85^{b}	0.89^{a} 0.86^{b} 0.86^{c}	15.68^{a} 15.30^{b}	6.31^{a} 6.63^{b} 6.51^{c}				
RIa	I4.1	0.78^{a}	0.74^{a}	-	-	0.73^{a}	0.78^{a}	0.57^{a}	0.64^{a}
	I4.2	0.74^{a}	0.86^{a}	14.51^{a}	7.70^{a}				
RIb	I4.3	0.80^{b}	0.63^{b}	-	-	0.80^{b}	0.76^{b}	0.66^{b}	0.62^{b}
	I4.4	0.83^{b}	0.92^{b}	14.48^{b}	4.02^{b}				
RIc	I4.5	-	0.85^{c}	-	-	-	0.83^{c}	-	0.70^{c}
	I4.6	-	0.83^{c}	-	3.16^{c}				

respondents are aware of *GRAZ repariert* are of inferior quality. Specifically, the Normed-Fit-indices (NFI) are not within the proposed range. However, as the sample size of the underlying dataset is less than 200, this index may underestimate the fit (Bentler, 1990). Furthermore, all other indices (χ^2/df, GFI, CFI, RMSEA) are close to or within the recommended range of values. Thus, we account the respective models as being sufficiently meaningful.

Table 4: Goodness-of-fit indices: model variations 1a/1b/2a/2b/2c; GFI: Goodness-of-Fit Index; CFI: Comparative-Fit-Index; NFI: Normed-Fit-Index; RMSEA: Root Mean Square Error of Approximation

Fit indices	**Recommended value**	**Result value 1a/1b/2a/2b/2c**
χ^2**/df**	$2< \chi^2/df<5$	2.85/3.40/1.62/1.95/1.98
GFI	$\geq$0.9	0.95/0.94/0.88/0.86/0.86
CFI	$\geq$0.9	0.94/0.93/0.91/0.86/0.86
NFI	$\geq$0.9	0.91/0.90/0.79/0.75/0.76
RMSEA	$\leq$0.08	0.05/0.06/0.06/0.08/0.08

4.4.2. Results of the structural equation modelling

The results of hypotheses testing are outlined in Table 5. It turns out that for the dataset containing respondents who are not aware of the repair network all hypotheses can be accepted. Hence, although the path coefficients are at different levels, all drivers were identified as influencing factors concerning the different intentions to repair (1a/1b). Nevertheless, for both 1a and 1b the environmental driver has the highest influence. The analysis based on respondents who are aware of the repair network shows similarities: the structural patterns remain unchanged, as all drivers have a positive impact on the repair intention *RIa* and *RIb*. However, the respective level of significance holds only partially true. For none of the tested model variations (2a/2b/2c), all three drivers are significant factors. While in model 2a the environmental and the economic driver show significant loadings, the social driver is the only significant one in model 2b. Model 2c emphasises the impact of economic aspects, which is the only significant factor.

4.5. Findings related to control variables and group comparisons

Further analyses based on control variables and group comparisons refine the study results. Figure 3 summarises the results of the structural equation models including control variables and Table 6 provides an overview of further analyses.

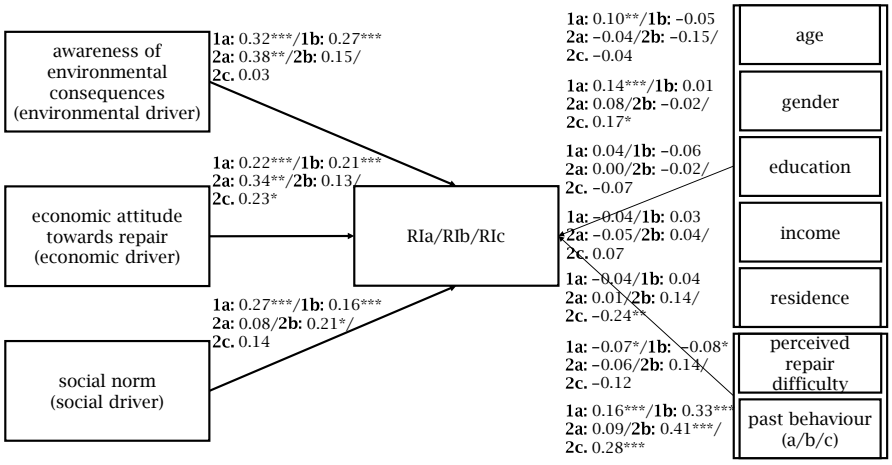

Figure 3: Structural equation model results

Interestingly, neither age, nor income or education provide (significant) conclusive results. Only for the general repair intention (1a) there is a significant positive correlation, which suggests that older respondents get products mended by repair service providers more often.

According to the analysis concerning gender (0=men, 1=women), women rather tend to make use of a repair service provider or a network compared with men. The positive correlation is significant for 1a and 2c and insignificant for 2a. Interestingly, in terms of self-repair a negligible correlation could be observed. Although no significant difference between men and women could be observed regarding the perceived repair difficulty (men mean=1.39; women mean=1.42; t-value: -0.35; Sig: n.s.), further analyses revealed two potential influencing factors: based on the surveyed trust in the repair service provider,

women (mean=3.83) have a significantly (t-value: -2.42; Sig:*) higher trust in repair service providers than men (mean=3.69). Additionally, female respondents have a significant higher environmental concern (men: mean=3.82; women: mean=4.04; t-value: -4.17; Sig:***).

Finally, the significant negative correlation for residence substantiates our study: as some respondents who are aware of *GRAZ repariert* are not residents in Graz (0=resident in Graz, 1=resident outside of Graz), they will less likely make use of the local repair network. This is emphasised by the surveyed travel time to the repair service providers: respondents who live in urban areas (mean=3.02) indicate a better accessibility of repair service providers than respondents who live in rural areas (n=2.79), expressed by a significant difference (t-value: 2.91; Sig:**).

Referring to the Section 2, we detail the results concerning respondents who are (or are not) aware of the repair network to obtain a deeper understanding of consumers in different contexts. For this purpose, certain comparisons of these groups—which are summarised in Table 6—provide more insights.

First, consumers who know the repair network have a higher environmental concern than respondents who are not aware of the network. On the contrary, no significant difference could be investigated regarding the attitude towards new (fashionable) products.

Detailing the insights regarding economic aspects reveals that the maximum accepted repair time is between four and nine days depending on the product type (see Table A.10 in the Appendix). Regarding the perception of travel time to the repair service providers no significant difference could be identified between groups (not) aware of the *GRAZ repariert*. In terms of cost, respondents who know the repair network of Graz accept higher maximum repair costs (21-35% of the purchase price depending on the product type) in comparison to respondents who do not know the repair network (18-31% of the purchase price depending on the product type).[5] These results are perfectly aligned with pre-

[5]For a product-specific breakdown we refer to Table A.9 in the Appendix.

vious studies, showing that consumers are willing to pay between 19% and 30% of the purchase price for a product repair (Adler and Hlavacek, 1976; European Commission, 2018; McCollough, 2007). Besides a validation aspect for our results, this suggests that the other findings of our study can be transferred—at least in the context of the economic perspective—to other European regions.

The further analysis concerning social aspects targets at peer groups and trust. Respondents were asked to categorise different social groups according to their impact on decision-making, i.e., whether they consider them as an important source of recommendation for their repair decision (see Table A.11 in the Appendix). No matter if respondents know the repair network of Graz or not, family, experts, and friends have the greatest influence, whereas social media and distant relatives are non-essential.

Additionally, the investigation of trust in repair service providers shows that there is a significant difference between both groups: respondents who do not know the repair network have a lower trust than respondents who know the repair network.

Table 5: Hypotheses results ($^{***}p \leq 0.001$, $^{**}p \leq 0.01$, $^{*}p \leq 0.05$, n.s.: not significant); S.E.=Approximate standard error; C.R.=Critical ratio

Hypothesis	**Patch coeff.**	**Path coeff.**	**S.E.**	**C.R.**	**p**	**Accept / Reject**
Repair network not known (n=736)						
Model 1a / RIa						
H1a	EnvD → RIa	0.32	0.05	6.27	***	Accept
H2a	EcoD → RIa	0.22	0.07	4.42	***	Accept
H3a	SocD → RIa	0.27	0.06	5.47	***	Accept
Model 1b / RIb						
H1b	EnvD → RIb	0.27	0.05	5.40	***	Accept
H2b	EcoD → RIb	0.21	0.08	4.32	***	Accept
H3b	SocD → RIb	0.16	0.06	3.47	***	Accept
Repair network known (n=164)						
Model 2a / RIa						
H1a	EnvD → RIa	0.38	0.12	3.02	**	Accept
H2a	EcoD → RIa	0.34	0.15	2.88	**	Accept
H3a	SocD → RIa	0.08	0.08	0.93	n.s.	Reject
Model 2b / RIb						
H1b	EnvD → RIb	0.15	0.13	1.20	n.s.	Reject
H2b	EcoD → RIb	0.13	0.16	1.08	n.s.	Reject
H3b	SocD → RIb	0.21	0.10	2.15	*	Accept
Model 2c / RIc						
H1c	EnvD → RIc	0.03	0.15	0.22	n.s.	Reject
H2c	EcoD → RIc	0.23	0.20	1.98	*	Accept
H3c	SocD → RIc	0.14	0.11	1.58	n.s.	Reject

Table 6: Group comparison of individuals who are (not) aware of *GRAZ repariert*

	Repair network not known	**Repair network known**	**t-value**	**p-value**
Environmental concern	3.90	4.07	2.50	*
Attitude towards new (fashionable) products	2.33	2.23	-1.33	n.s.
Max. accepted repair price	18-31% of purchase price	21-35% of purchase price	-	-
Max. accepted repair time	4-9 days	4-9 days	-	-
Travel time to repair service provider	2.86	3.01	1.46	n.s.
Trust in repair service provider	3.73	3.90	2.23	*
Recommendation of social groups (Top 3)	Family, experts, friends	Family, experts, friends	-	-

5. Discussion

5.1. The impact of environmental, economic, and social drivers on the intention to repair

Previous research showed that environmental, economic, or social factors in relation to repairs are important (cf., e.g., McCollough, 2010; Sabbaghi et al., 2016; Tecchio et al., 2019). The results in Section 4 demonstrate that in diverse contexts (*RIa/RIb/RIc*) the intention to repair can be influenced differently by the drivers, i.e., the loadings of the drivers differ: the models with respondents who do not know the repair network revealed that all three drivers have a significant impact on the intention to use a repair service as well as on DIY repair. Yet, the environmental aspects seem to have the strongest effect. Looking at the smaller sample of respondents who are aware of the network *GRAZ repariert*, a more diverse picture can be observed. First, environmental considerations are still the strongest influencing factor for the intention to use a repair service provider in general. Second, the intention of self-repairers is mainly shaped by social norm. In contrast to that, economic factors drive the decision to have a company within the repair network perform the repair, while the relevance of environmental aspects almost completely disappears. This is interesting, since we found that respondents knowing *GRAZ repariert* not only have a higher willingness to pay for repair, but also show greater environmental concern. For self-repairers this may imply that their DIY capability defines a formative characteristic of their social network with respect to the operationalisation of their (high) environmental concern in terms of repair, which is in line with findings on the impact of social norms on pro-environmental behaviour in general (see, e.g., Farrow et al., 2017). For those respondents utilising *GRAZ repariert* one possible explanation is that the presence of economic incentives reduces impact of social/environmental aspects. This finding, in conjunction with the rising number of applications for funding (see Lechner et al., 2021), suggests that public funding is an effective way for policy-makers to promote repair service providers through direct economic interventions (cf. Dalhammar, 2019). Such an approach

is in turn expected to soften the issue of early replacement of (some types of) products—induced, e.g., by great labour cost for services and low prices of new goods—by improving price competitiveness of repair and thus, striving for making repair the economically best option (King et al., 2006; Tecchio et al., 2019; Wieser and Tröger, 2018).

Summarising these findings, our study emphasises that the impact of and interplay between environmental, economic, and social drivers for self-repairers and consumers of repair services may vary in different contexts, constituting a novelty in repair-related literature (cf. Jaeger-Erben et al., 2021). Hence, focusing exclusively on one of the three examined drivers might not be sufficient to promote both using repair services and self-repair. Expanding on this, taking a closer look at the control variables reveals indicators for a more differentiated strategy to influence the (self-)repair intention.

5.2. Using repair service providers and self-repair: commonalities and differences

The first observation concerns the usage of repair services: according to our study, women are more likely to use a repair service than men. Rogers et al. (2021) argue that this could be due to the fact that women have a higher trust in the repair service provider. This argumentation is supported by our study, as such a difference in trust could also be identified. Nevertheless, the observed higher environmental concern of women—a well-studied phenomenon (see, for example, Chan et al., 2019; Mueller and Mullenbach, 2018)—might also affect the intention to make use of repair services. Interestingly, no gender-related difference in the perception of repair difficulty could be found. As this is in contrast to former research which highlighted a diverse perception of males and females regarding repair skills (e.g., Rogers et al., 2021), more studies which include a refined set of potential impact factors are required to shed light on these findings.

In comparison, the residence has to be particularly considered with respect to the trade-off between consumption of repair services and DIY repair. In

urban areas the intention to use a repair service is higher while in rural areas an increased intention to DIY repair was identified. One explanation for this might be the travel time to the repair service provider based on the density of repair infrastructure, impacting the accessibility of repair services (cf. Gerner and Bryant, 1980; McCollough, 2007). Hence, citizens who live in urban areas have a lower travel time to the repair service provider and thus, face lower economic barriers than consumers who live in rural areas. Together with the greater choice of repair service providers in urban compared to rural areas, this may exclude large parts of the population from utilising repair services, thereby reducing demand. Potential solution approaches might alleviate these infrastructural problems, for example by bringing the repair services to customers, or easy and cost-efficient transport of broken products to repair service providers. Another strategy could target at enabling individuals to self-repair through repair cafes, where individuals repair products on their own under the guidance of experts.

The two aspects 'perceived repair difficulty' and 'past behaviour' contribute to promotion of repair in general. Concerning perceived repair difficulty, even though model 2b is an insignificant exception, the results show that an increased perceived difficulty decreases the intention to (self-)repair. This provides an indication that the feasibility barrier discussed in literature (Tecchio et al., 2019) actually exists. Information about repairability of products might contribute to reduce the barrier related to the perceived repair difficulty. As mentioned in the introduction, the repairability index recently introduced in France is a step in that direction.

In addition, the outcome that past behaviour has a significant impact on the intention to repair is important especially in terms of promoting repair: the effort should be on motivating consumers to repair at least once, then they are likely to repeat repair. Potential explanations for this effect are different for self-repair and consumption of repair services. On the one hand, according to literature on do-it-yourself activities, accomplishment, control, and enjoyment can lead to (hedonic) DIY motivation (Halassi et al., 2019; Wolf and McQuitty,

2011). Thus, in the case of self-repair, this effect might be caused by positive repair experiences, leading to self-efficacy and a positive repair connotation (cf. Lauren et al., 2016). On the other hand, regarding repair services the effect that service experiences impact trust in the service provider is known from various studies in different contexts (e.g., Ho and Wei, 2016; Suh et al., 2006).

Trust is also an important aspect related to the repair network: in our study there is evidence that respondents who know the repair network have a higher trust in the repair service provider. This trust might be affected by the network which tries to increase trust by introducing quality criteria for member companies (Lechner et al., 2021). Nevertheless, trust can also be increased by social groups, since it is easier to trust a (repair) service provider if relevant social groups also trust the service provider (cf. Suh et al., 2006). Most respondents mentioned that they know *GRAZ repariert* from the newspaper, acquaintances/friends/family, social media and/or television. On the contrary, for the actual (self-)repair behaviour, recommendations of families, experts, and friends are the most important ones. Social media, distant relatives/acquaintances, public authorities, blogs/forums, radio, TV, newspapers, club colleagues and internet sources are considered as not that important. Hence, even though people know the repair network from the classic media, the actual repair behaviour is mainly affected by word-of-mouth-communication with the close social network (friends, family), and experts. These findings are in line with research on social influence on sustainable consumption (Lazaric et al., 2020) and the impact of social norms on pro-environmental behaviour (see, e.g., Farrow et al., 2017).

6. Conclusion, limitations and further research

In this study we determined environmental, economic, and social drivers which are relevant for the repair intention of consumers. By means of a questionnaire we obtained data from Styrian citizens which facilitated to demonstrate that the impact of the investigated drivers also depends on the repair context. To the best of our knowledge, this is the first work investigating these effects. A variety of recommendations for policy-making as well as organisations dealing with repair can be deduced from our research. First, the focus on one aspect—e.g., environmental messages and appealing to green consumers—is not sufficient to efficiently boost repair in general, but all of the environmental, economic, and social drivers must be addressed. Nevertheless, depending on whether demand for repair services or self-repair should be promoted, the intensity of measures should be adapted. This is emphasised by the observation in the context of the repair network *GRAZ repariert*, where indications for the effectiveness of public funding of repairs could be identified: even decision-making of consumers with a high environmental concern is mainly driven by economic considerations. With regard to the plethora of considerations related to financial policy instruments to boost repair, this finding is particularly important.

Furthermore, the trade-off between repair service consumption and self-repair is crucially affected by the inferior accessibility to repair services in rural areas compared with urban areas, which also restricts the potential repair demand. This directly influences the emergence of a circular economy, as a successful transformation of the linear economy to a circular economy requires the contribution of as many individuals as possible. Two further findings are mainly relevant for repair service providers: besides the observation that maximum accepted prices/times for repair are in rather well-defined ranges, we found that word-of-mouth-communication through experts and the closer social network have a decisive influence on repair behaviour.

Of course, the study also has some limitations, which can be improved in future work. In terms of methodology, the use of paper-and-pencil questionnaires

instead of, or in addition to the online questionnaire reduces the risk to exclude digitally disadvantaged groups and thus, avoiding sampling bias. Also extending the research approach by actual behaviour seems to be worthwhile in order to examine a potential intention-behaviour-gap, well-known in the context of pro-environmental consumer behaviour (Grimmer and Miles, 2017). Qualitative research methods could be applied to investigate the underlying motivations of consumers when they are exposed to situations with a specific trade-off between the drivers, as for example if they perceive environmental and social drivers to be pro-repairing but economic determinants to be against repairing. In that context, qualitative research could help to determine why the intention to use the repair network is mostly driven by economic considerations whereas the intention to use a repair service in general is driven by all three drivers. Finally, even though the maximum accepted repair price is a good estimator for pricing repair, further analyses—i.e., conjoint analysis—would allow to determine a more precise willingness-to-pay for repair, conditioned on the framing of the decision situation.

References

W. R. Stahel, The circular economy, Nature 531 (2016) 435–438. doi:10.1038/531435a.

J. Brusselaers, E. Bracquene, J. Peeters, Y. Dams, Economic consequences of consumer repair strategies for electrical household devices, Journal of Enterprise Information Management 33 (2019) 747–767. doi:10.1108/JEIM-12-2018-0283.

G. Lechner, M. Reimann, Reprocessing and repairing white and brown goods - the R.U.S.Z case: An independent and non-profit business, Journal of Remanufacturing 5 (2015) 1–29. doi:10.1186/s13243-015-0012-9.

K. O. Zacho, M. Mosgaard, H. Riisgaard, Capturing uncaptured values — A Danish case study on municipal preparation for reuse and recycling of waste, Resources, Conservation and Recycling 136 (2018) 297–305. doi:10.1016/j.resconrec.2018.04.031.

S. Boldoczki, A. Thorenz, A. Tuma, The environmental impacts of preparation for reuse: A case study of WEEE reuse in Germany, Journal of Cleaner Production 252 (2020) 119736. doi:10.1016/j.jclepro.2019.119736.

M. D. Bovea, V. Ibáñez-Forés, V. Pérez-Belis, Repair vs. replacement: Selection of the best end-of-life scenario for small household electric and electronic equipment based on life cycle assessment, Journal of Environmental Management 254 (2020) 109679. doi:10.1016/j.jenvman.2019.109679.

J. McCollough, Consumer Discount Rates and the Decision to Repair or Replace a Durable Product: A Sustainable Consumption Issue, Journal of Economic Issues 44 (2010) 183–204. doi:10.2753/JEI0021-3624440109.

M. Sabbaghi, W. Cade, S. Behdad, A. M. Bisantz, The current status of the consumer electronics repair industry in the U.S.: A survey-based study, Resources, Conservation and Recycling 116 (2017) 137–151. doi:10.1016/j.resconrec.2016.09.013.

European Commission, Behavioural Study on Consumers' Engagement in the Circular Economy. Report for Directorate-General for Justice and Consumers, Technical Report, European Commission, 2018. URL: https://ec.europa.eu/info/sites/info/files/ec_circular_economy_final_report_0.pdf.

European Commission, Sustainable product policy & ecodesign, https://ec.europa.eu/growth/industry/sustainability/product-policy-and-ecodesign_en, 2016.

iFixit, iFixit: The Free Repair Manual, https://www.ifixit.com/, last access on 14th May 2021.

Right to Repair Europe, Right to Repair Europe, https://repair.eu/, last access on 14th May 2021.

C. Dalhammar, It is never too late to give up, or is it? Revisiting policies for sustainable consumption, in: A Research Agenda for Sustainable Consumption Governance, Edward Elgar Publishing, Cheltenham, UK, 2019, pp. 137–155. URL: https://www.elgaronline.com/view/edcoll/9781788117807/9781788117807.00019.xml.

GRAZ repariert, GRAZ repariert - die Initiative für mehr Reparatur in Graz, https://grazrepariert.at/, last access on 14th May 2021.

G. Lechner, M. J. Wagner, A. Diaz Tena, C. Fleck, M. Reimann, Exploring a regional repair network with a public funding scheme for customer repairs: The 'GRAZ repariert'-case, Journal of Cleaner Production 288 (2021) 125588. doi:10.1016/j.jclepro.2020.125588.

Stadtportal der Landeshauptstadt Graz, Reparaturmaßnahmen - Förderung - Stadtportal der Landeshauptstadt Graz, https://www.graz.at/cms/beitrag/10224804/7882683/, last access on 14th May 2021.

P. Rosa, C. Sassanelli, S. Terzi, Towards Circular Business Models: A systematic literature review on classification frameworks and archetypes, Jour-

nal of Cleaner Production 236 (2019) 117696. doi:10.1016/j.jclepro.2019.117696.

K. Laitala, I. G. Klepp, V. Haugrønning, H. Throne-Holst, P. Strandbakken, Increasing repair of household appliances, mobile phones and clothing: Experiences from consumers and the repair industry, Journal of Cleaner Production 282 (2021) 125349. doi:10.1016/j.jclepro.2020.125349.

P. Tecchio, F. Ardente, F. Mathieux, Understanding lifetimes and failure modes of defective washing machines and dishwashers, Journal of Cleaner Production 215 (2019) 1112–1122. doi:10.1016/j.jclepro.2019.01.044.

S. J. G. Cooper, J. Giesekam, G. P. Hammond, J. B. Norman, A. Owen, J. G. Rogers, K. Scott, Thermodynamic insights and assessment of the 'circular economy', Journal of Cleaner Production 162 (2017) 1356–1367. doi:10.1016/j.jclepro.2017.06.169.

H. Wieser, N. Tröger, Exploring the inner loops of the circular economy: Replacement, repair, and reuse of mobile phones in Austria, Journal of Cleaner Production 172 (2018) 3042–3055. doi:10.1016/j.jclepro.2017.11.106.

H. Rogers, P. Deutz, T. Ramos, Repairing the circular economy: Public perception and participant profile of the repair economy in Hull, UK, Resources Conservation and Recycling 168 (2021) 105447. doi:10.1016/j.resconrec.2021.105447.

M. Sabbaghi, B. Esmaeilian, W. Cade, K. Wiens, S. Behdad, Business outcomes of product repairability: A survey-based study of consumer repair experiences, Resources, Conservation and Recycling 109 (2016) 114–122. doi:10.1016/j.resconrec.2016.02.014.

A. Hansla, A. Gamble, A. Juliusson, T. Gärling, The relationships between awareness of consequences, environmental concern, and value orientations, Journal of Environmental Psychology 28 (2008) 1–9. doi:10.1016/j.jenvp.2007.08.004.

P. Kautish, R. Sharma, Determinants of pro-environmental behavior and environmentally conscious consumer behavior: An empirical investigation from emerging market, Business Strategy & Development 3 (2020) 112–127. doi:10.1002/bsd2.82.

N. Lazaric, F. Le Guel, J. Belin, V. Oltra, S. Lavaud, A. Douai, Determinants of sustainable consumption in France: The importance of social influence and environmental values, Journal of Evolutionary Economics 30 (2020) 1337–1366. doi:10.1007/s00191-019-00654-7.

M. Jaeger-Erben, V. Frick, T. Hipp, Why do users (not) repair their devices? A study of the predictors of repair practices, Journal of Cleaner Production 286 (2021) 125382. doi:10.1016/j.jclepro.2020.125382.

V. Pérez-Belis, M. Braulio-Gonzalo, P. Juan, M. D. Bovea, Consumer attitude towards the repair and the second-hand purchase of small household electrical and electronic equipment. A Spanish case study, Journal of Cleaner Production 158 (2017) 261–275. doi:10.1016/j.jclepro.2017.04.143.

M. Sabbaghi, S. Behdad, Consumer decisions to repair mobile phones and manufacturer pricing policies: The concept of value leakage, Resources, Conservation and Recycling 133 (2018) 101–111. doi:10.1016/j.resconrec.2018.01.015.

A. Raihanian Mashhadi, B. Esmaeilian, W. Cade, K. Wiens, S. Behdad, Mining consumer experiences of repairing electronics: Product design insights and business lessons learned, Journal of Cleaner Production 137 (2016) 716–727. doi:10.1016/j.jclepro.2016.07.144.

M. Pini, F. Lolli, E. Balugani, R. Gamberini, P. Neri, B. Rimini, A. M. Ferrari, Preparation for reuse activity of waste electrical and electronic equipment: Environmental performance, cost externality and job creation, Journal of Cleaner Production 222 (2019) 77–89. doi:10.1016/j.jclepro.2019.03.004.

J. McCollough, Factors impacting the demand for repair services of household products: The disappearing repair trades and the throwaway society, International Journal of Consumer Studies 33 (2009) 619–626. doi:10.1111/j.1470-6431.2009.00793.x.

A. M. King, S. C. Burgess, W. Ijomah, C. A. McMahon, Reducing waste: Repair, recondition, remanufacture or recycle?, Sustainable Development 14 (2006) 257–267. doi:10.1002/sd.271.

P. C. Stern, T. Dietz, T. Abel, G. A. Guagnano, L. Kalof, A Value-Belief-Norm Theory of Support for Social Movements: The Case of Environmentalism, Human Ecology Review 6 (1999) 81–97. URL: http://www.jstor.org/stable/24707060, publisher: Society for Human Ecology.

F. Fornara, P. Pattitoni, M. Mura, E. Strazzera, Predicting intention to improve household energy efficiency: The role of value-belief-norm theory, normative and informational influence, and specific attitude, Journal of Environmental Psychology 45 (2016) 1–10. doi:10.1016/j.jenvp.2015.11.001.

L. Steg, L. Dreijerink, W. Abrahamse, Factors influencing the acceptability of energy policies: A test of VBN theory, Journal of Environmental Psychology 25 (2005) 415–425. doi:10.1016/j.jenvp.2005.08.003.

M.-Y. Chang, K. Chen, C. Pang, C.-M. Chen, D. C. Yen, A study on the effects of service convenience and service quality on maintenance revisit intentions, Computer Standards & Interfaces 35 (2013) 187–194. doi:10.1016/j.csi.2012.08.002.

J. McCollough, The effect of income growth on the mix of purchases between disposable goods and reusable goods, International Journal of Consumer Studies 31 (2007) 213–219. doi:10.1111/j.1470-6431.2006.00504.x.

P. Passafaro, S. Livi, A. Kosic, Local Norms and the Theory of Planned Behavior: Understanding the Effects of Spatial Proximity on Recycling Inten-

tions and Self-Reported Behavior, Frontiers in Psychology 10 (2019) 1–11. doi:10.3389/fpsyg.2019.00744.

F. Corsini, N. M. Gusmerotti, F. Testa, F. Iraldo, Exploring waste prevention behaviour through empirical research, Waste Management 79 (2018) 132–141. doi:10.1016/j.wasman.2018.07.037.

J. Wirtz, C. Lovelock, Services Marketing, World Scientific, 2015. doi:10.1142/y0001.

N. Gregson, A. Metcalfe, L. Crewe, Practices of Object Maintenance and Repair: How consumers attend to consumer objects within the home, Journal of Consumer Culture 9 (2009) 248–272. doi:10.1177/1469540509104376.

I. Ajzen, The Theory of Planned Behavior, Organizational Behavior and Human Decision Processes 50 (1991) 179–211. doi:10.1016/0749-5978(91)90020-T.

A. T. Kuah, P. Wang, Circular economy and consumer acceptance: An exploratory study in East and Southeast Asia, Journal of Cleaner Production 247 (2020) 119097. doi:10.1016/j.jclepro.2019.119097.

D. K. Rosner, M. Ames, Designing for Repair? Infrastructures and Materialities of Breakdown, in: Proceedings of the 17th ACM Conference on Computer Supported Cooperative Work & Social Computing, Association for Computing Machinery, New York, NY, USA, 2014, pp. 319–331. doi:10.1145/2531602.2531692.

J. L. Gerner, K. W. Bryant, The Demand for Repair Service During Warranty, The Journal of Business 53 (1980) 397–414. URL: https://www.jstor.org/stable/2352521?seq=1#metadata_info_tab_contents.

L. Adler, J. D. Hlavacek, The Relationship between Price and Repair Service for Consumer Durables, Journal of Marketing 40 (1976) 80–82. doi:10.1177/002224297604000213.

P. M. Podsakoff, S. B. MacKenzie, J.-Y. Lee, N. P. Podsakoff, Common method biases in behavioral research: A critical review of the literature and recommended remedies., The Journal of applied psychology 88 (2003) 879–903. doi:10.1037/0021-9010.88.5.879.

T. Page, Product attachment and replacement: Implications for sustainable design, Int. J. Sustainable Design 2 (2014) 265–282. doi:10.1504/IJSDES.2014.065057.

I. Fachbach, Exploration of the foundation of repair-decisions of Styrian citizens with an emphasis on the Repair Network "Graz repariert", Master's thesis, University of Graz, 2020.

S. van Buuren, K. Groothuis-Oudshoorn, Mice: Multivariate Imputation by Chained Equations in R, Journal of Statistical Software 45 (2011) 1–67.

R. Weiber, D. Mühlhaus, Strukturgleichungsmodellierung: Eine anwendungsorientierte Einführung in die Kausalanalyse mit Hilfe von AMOS, SmartPLS und SPSS, Springer-Lehrbuch, second ed., Gabler Verlag, 2014. doi:10.1007/978-3-642-35012-2.

H. F. Kaiser, J. Rice, Little Jiffy, Mark IV, Journal of Educational and Psychological Measurement 34 (1974) 111–117. doi:10.1177/001316447403400115.

J. Nunnally, An Overview of Psychological Measurement, in: B. Wolman (Ed.), Clinical Diagnosis of Mental Disorders, Springer, Boston, MA, 1978. URL: https://doi.org/10.1007/978-1-4684-2490-4_4.

R. Bagozzi, Y. Yi, On the Evaluation of Structure Equation Models, Journal of the Academy of Marketing Science 16 (1988) 74–94. doi:10.1007/BF02723327.

C. Fornell, D. F. Larcker, Evaluating Structural Equation Models with Unobservable Variables and Measurement Error, Journal of Marketing Research 18 (1981) 39–50. doi:10.1177/002224378101800104.

J. Hair, Sarstedt Marko, Hopkins Lucas, G. Kuppelwieser Volker, Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research, European Business Review 26 (2014) 106–121. doi:10.1108/EBR-10-2013-0128.

R. Kline, Principles and Practice of Structural Equationn Modeling, 3 ed., Guilford Press, New York, NY, 2011.

B. Tabachnick, L. Fidell, Using multivariate statistics, Allyn & Bacon/Pearson Education, Boston, MA, 2007.

P. M. Bentler, Comparative fit indexes in structural models., Psychological bulletin 107 (1990) 238–246. doi:10.1037/0033-2909.107.2.238.

K. Farrow, G. Grolleau, L. Ibanez, Social Norms and Pro-environmental Behavior: A Review of the Evidence, Ecological Economics 140 (2017) 1–13. doi:10.1016/j.ecolecon.2017.04.017.

H.-W. Chan, V. Pong, K.-P. Tam, Cross-National Variation of Gender Differences in Environmental Concern: Testing the Sociocultural Hindrance Hypothesis, Environment and Behavior 51 (2019) 81–108. doi:10.1177/0013916517735149.

J. T. Mueller, L. E. Mullenbach, Looking for a White Male Effect in Generation Z: Race, Gender, and Political Effects on Environmental Concern and Ambivalence, Society & Natural Resources 31 (2018) 925–941. doi:10.1080/08941920.2018.1445331.

S. Halassi, J. Semeijn, N. Kiratli, From consumer to prosumer: A supply chain revolution in 3D printing, International Journal of Physical Distribution & Logistics Management 49 (2019) 200–216. doi:10.1108/IJPDLM-03-2018-0139.

M. Wolf, S. McQuitty, Understanding the do-it-yourself consumer: DIY motivations and outcomes, AMS Review 1 (2011) 154–170. doi:10.1007/s13162-011-0021-2.

N. Lauren, K. S. Fielding, L. Smith, W. R. Louis, You did, so you can and you will: Self-efficacy as a mediator of spillover from easy to more difficult pro-environmental behaviour, Journal of Environmental Psychology 48 (2016) 191–199. doi:10.1016/j.jenvp.2016.10.004.

C.-T. Ho, C.-L. Wei, Effects of outsourced service providers' experiences on perceived service quality: A signaling theory framework, Industrial Management & Data Systems 116 (2016) 1656–1677. doi:10.1108/IMDS-01-2016-0015.

J. Suh, S. Janda, S. Seo, Exploring the role of culture in trust development with service providers, Journal of Services Marketing 20 (2006) 265–273. doi:10.1108/08876040610674607.

M. Grimmer, M. P. Miles, With the best of intentions: A large sample test of the intention-behaviour gap in pro-environmental consumer behaviour, International Journal of Consumer Studies 41 (2017) 2–10. doi:10.1111/ijcs.12290.

M. Tonglet, P. S. Phillips, M. P. Bates, Determining the drivers for householder pro-environmental behaviour: Waste minimisation compared to recycling, Resources, Conservation and Recycling 42 (2004) 27–48. doi:10.1016/j.resconrec.2004.02.001.

A. P. Bortoleto, K. H. Kurisu, K. Hanaki, Model development for household waste prevention behaviour, Waste Management 32 (2012) 2195–2207. doi:10.1016/j.wasman.2012.05.037.

R. E. Goldsmith, S. J. Newell, Innovativeness and price sensitivity: Managerial, theoretical and methodological issues, Journal of Product & Brand Management 6 (1997) 163–174. doi:10.1108/10610429710175682.

Appendix A. Appendix

Table A.7: Description of variables; Scale: 1=do not agree at all; 5=totally agree; x: Spearman-Brown-coefficient (1) Participants do not know GRAZ repariert (n=736), (2) Participants know GRAZ repariert (n=164); [1]adapted from Corsini et al. (2018); [2]adapted from Tonglet et al. (2004); [3]adapted from Bortoleto et al. (2012); The original questionnaire was in German, hence the items in this table have been translated into English

Factor	**Item**		**Mean**		**Std. Dev.**		**Cronbach's α**	
			(1)	(2)	(1)	(2)	(1)	(2)
EnvD[1,2]	I1.1	Repairing is more environmentally friendly than buying a new product.	4.25	4.41	0.81	0.75	0.87	0.84
	I1.2	Repairing reduces the amount of waste that goes into landfill.						
	I1.3	Repairing allows saving natural resources.						
EcoD[1,2]	I2.1	Repairing is useful/a waste of time.	4.38	4.44	0.68	0.68	0.83	0.80
	I2.2	Repairing is rewarding/a waste of money.						
	I2.3	Repairing is sensible/not sensible.						
SocD[2,3]	I3.1	Friends, relative, people around me, are repairing their products/have their products repaired.	3.22	3.25	0.77	0.79	0.73	0.71
	I3.2	It is important to my friends, relative, people around me to repair their products/have their products repaired.						
	I3.3	Most people think I should repair/have my products repaired.						
RIa	I4.1	I will have my next broken product repaired (if repairing is possible).	3.75	3.95	0.89	0.84	0.73x	0.78x
	I4.2	I plan to have my broken products repaired on a regular basis (if repairing is possible).						
RIb	I4.3	I will repair my next broken product by myself (if repairing is possible).	3.88	3.73	0.95	1.00	0.80x	0.73x
	I4.4	I plan to repair my broken products by myself on a regular basis (if repairing is possible).						
RIc	I4.5	I will have my next broken product repaired in a company, which is part of the GRAZ repariert network (if repairing is possible).	-	3.23	-	1.07	-	0.83x
	I4.6	I plan to have my broken products repaired in a company, which is part of the GRAZ repariert network on a regular basis (if repairing is possible).						

Table A.8: Further items; [1]adapted from Chan et al. (2019); [2]adapted from Goldsmith and Newell (1997); The original questionnaire was in German, hence the items in this table have been translated into English

Factor	**Items**	**Mean**	**Std. Dev.**	**Cronbach's α**
Environmental concern[1]	I am concerned about climate. I am concerned about waste generation. I have to save the environment for future generation. Balance of nature is easily destroyed by human activities. I help the environment even if it cost me more money or takes more time.	3.93	0.80	0.86
Attitude toward new fashionable products[2]	In general, I am among the first in my circle of friends to buy a new fashion product when it appears. If I heard that a new fashion product was available in the store, I would be interested enough to buy it. I do not mind paying more to buy new fashion products. I prefer to own a new product sooner than later.	2.32	0.89	0.82
Trust in the repair service provider	I generally trust the mechanics and technicians who carry out the repairs.	3.76	0.88	-
Travel time to the repair office	I can as easily reach repair shops as shops, where I can buy new products.	2.88	1.18	-
Emotional	I repair my broken products because I care a lot about my products and I do not want to replace them.	3.70	1.04	-
Guarantee / warranty	If there is a guarantee / warranty on my broken product, then I will have my product repaired.	4.51	0.83	-

Table A.9: Maximum accepted repair price in % of the purchase price

Product type	**Repair network not known (n=736)**		**Repair network known (n=164)**					
			Styria		Graz (n=105)		Outside Graz (n=59)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Bicycle	29.32	19.41	33.17	21.20	34.30	21.26	31.15	21.12
Cell phone	26.29	18.28	27.31	18.57	27.44	18.59	27.08	18.70
Musical instrument	28.51	24.50	35.15	27.20	34.03	26.89	37.15	27.88
Home appliances	30.72	17.66	34.38	18.29	34.71	18.41	33.78	18.21
Electronic equipment for leisure time	29.94	17.42	34.11	20.03	33.19	20.00	35.75	20.16
Electronic equipment for the job	27.53	20.09	30.30	22.21	29.60	22.42	31.56	21.98
Furniture	24.54	20.22	26.64	19.76	27.13	19.44	25.76	20.47
Articles of clothing	17.72	18.11	21.16	19.76	21.24	19.61	21.02	20.18
Jewellery	29.64	23.42	34.06	25.36	33.17	24.39	35.64	27.16

Table A.10: Maximum accepted repair time in days

Product type	**Repair network not known (n=736)**		**Repair network known (n=164)**	
	Mean	SD	Mean	SD
Bicycle	5.01	11.04	5.11	8.37
Cell phone	4.21	5.68	4.16	4.71
Musical instrument	6.97	9.00	8.03	12.05
Home appliances	4.35	5.09	4.67	4.31
Electronic equipment for leisure time	5.79	14.16	5.57	4.43
Electronic equipment for the job	5.05	25.28	4.31	4.08
Furniture	8.51	22.18	8.33	7.19
Articles of clothing	6.23	25.89	5.62	4.70
Jewellery	9.01	34.31	8.91	12.34

Table A.11: Relevant repair recommendations of social groups/information sources; Scale: 1=information source is not important at all; 5=information source is very important

Product type	**Repair network not known (n=736)**		**Repair network known (n=164)**	
	Mean	SD	Mean	SD
Family	3.71	1.11	3.85	1.00
Experts	3.60	1.06	3.72	1.05
Friends	3.42	1.13	3.60	1.10
Colleagues	3.06	1.06	3.33	1.02
Internet sources	2.95	1.08	3.13	0.95
Club colleagues	2.74	1.08	2.98	1.09
Newspaper	2.67	1.06	2.96	1.04
TV	2.64	1.05	2.98	1.00
Radio	2.64	1.08	2.94	1.06
Blogs/forums	2.58	1.15	2.80	1.18
Ministry	2.49	1.11	2.84	1.10
Distant relatives / acquaintances	2.48	1.08	2.65	1.12
Social media	2.34	1.09	2.53	1.09