Laidlaw Reflective Report

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Title of Scholarship Project:	Using techniques from Economics, Psychology, and Neuroscience to Identify "Low Hanging Fruit" for sustainability.

Research Summary:

The rapid expansion of humanity means that we are consuming resources at a higher rate than their replenishment, exceeding planetary boundaries causing the ongoing climate crisis. One way to address this resource imbalance is to move away from the traditional take-make-dispose model to a circular economy where resources are kept in circulation for longer either by prolonging their usage or recycling them to create more products.

While the concept of circular economies has gained momentum in different business and societal settings, the consumer perspective has been under researched. Our research aims to fill this gap by looking at current consumer preferences towards behavioral changes that are needed to facilitate circularity.

We used mixed model methods, more quantitative, for our research. We used a Discrete Choice Modelling Experiment to understand consumer preferences. Consumers were presented with 10 randomized choice cards, each offering two mutually exclusive alternatives with varying levels for each behavioral change (i.e. buying 0%, 25% or 50% of clothing bought second-hand.) Each alternative also included a hypothetical monetary saving, which served as a measure of participants' willingness to accept (WTA) these behavioral changes. The experiment aimed to reveal subconscious preferences by determining the amount of money consumers require save in order to adopt each behavioral change.

To calculate the environmental benefit of each of these behavioral changes, we used secondary data to calculate the CO2e emissions using the following equations:

1. Repairing Electronics Group:

$$E_s = \frac{E_p}{Y} - \frac{E_p}{Y + (Y \times r \times L)}$$

E_s	CO2e emissions saved through repair/year (in kg CO2e)
E_p	CO2e emissions from production per electronic (in kg CO2e/unit)
Y	average years of use per unit
r	percentage of phones that are repairable (expressed as a decimal)
L	lifespan extension indicated in the survey as percentage of Y(expressed as a decimal)

2. Buying Second-Hand Group:

$$E_s = (P_s - P_c) \times E_u \times Q_y \times D$$

E_s	CO2e emissions saved through buying second-hand per person
P_s	percentage of units bought second-hand listed in survey (either 50% or 25%)
P_c	current percentage of units already bought second-hand
E_u	CO2e emissions associated with a single unit from cradle-to-grave
Q_y	units bought per year, per person
D	displacement rate (expressed as a decimal)

The Carbon Emissions one would save by implementing each of these choices to be the y-axis of our graph, and the Monetary Savings on the x-axis. We then got our low-hanging fruit (Fig.1) i.e. the environmental benefit is relatively higher than the WTA cost.

Our findings suggested than only two of the behavioral changes- Buying 50% of your furniture second hand and Buying 50% of your clothes secondhand fall under the shaded low-hanging fruit area (Fig 1.0)

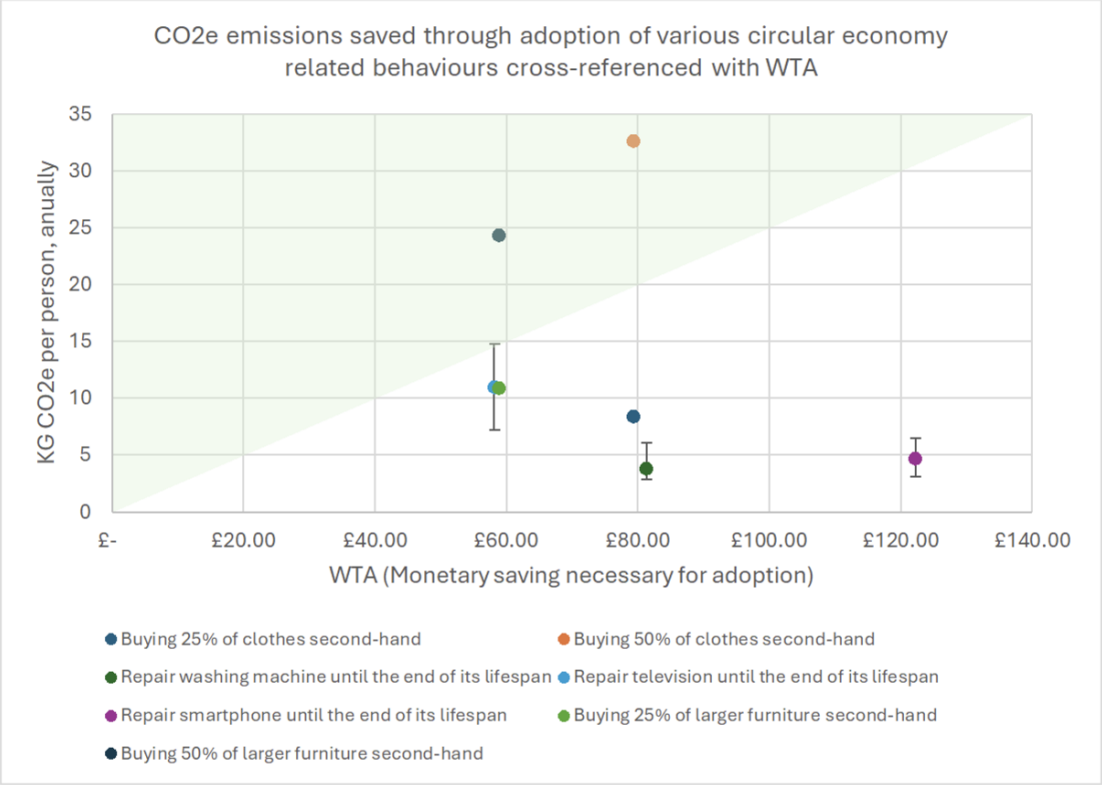

Fig 1.0 CO2e emissions saved through adopting circular economy related behaviors cross references with WTA.

Our results are undermined due to the short duration of our project. Our sample was relatively smaller, and we could not conduct any further analysis on the demographic information we collected. We used secondary data to calculate the environmental benefits, and at times had to make generalizing assumptions.

For our discussion, we looked at how environmentally beneficial is the secondhand clothing market. There is evidence to suggest that second-hand clothes are not mitigating the purchase of new ones. Furthermore, both current and newer business models used in the sector both in and of themselves create significant emissions. On the bright side, businesses like Vinted and De-pop use P2P platforms, significantly reducing their carbon footprints shows that there is progress towards addressing this issue.

We also briefly looked at hypothetical bias (HB) present in choice experiments, particularly the increased bias in willingness-to-accept (WTA) studies due to strategic behavior. Our research showed that HB is prevalent in both environmental and consumer economics studies, potentially paving the way for neuroeconomics, which integrates brain function into economic decision-making. Studies in this field suggest that understanding brain activity and personality traits could help mitigate HB and improve the design of choice experiments.

While we could not conduct further analysis, our research still sheds light on the consumer perspective towards adopting key behavioral changes that promotes a more circular living. Our research serves as a blueprint for a new approach to understanding consumer choices surrounding climate change solutions which can be amended based on the issues we experienced. Furthermore, it has raised new discussion points such as the role of neuroscience in choice experiments and the actual environmental benefit of second-hand markets.

Reflection on the Process of Research:

Our 6-week research started with an introductory team meeting with my supervisors Dr. David Williams, Dr, Romain Crastes dit Sourd, Dr. Neil Dundon virtually and my research partner Daan Vegter where we were introduced to the project. The project was quite different to what I expected, particularly more quantitative than what I thought it would be. It took me some time to wrap my head around the economics and DCE, but attending a conference on the topic helped me better understand the concept. The first 3 weeks of our research involved choosing our behavioral changes and understanding our research. While I enjoyed the creative freedom our supervisors provided us with, I felt a bit thrown into it with such a broad area to choose from. Looking back, having a more defined research question would have been more time suited. It was interesting for me to understand and help with the quantitative bits as it is not something I would do otherwise.

One of my other key takeaways was evaluating the credibility of our resources and cross-referencing different company reports. Our supervisors were very communicative and helped us navigate all our findings, but since our research period collided with annual leave and other commitment durations, we sometimes had a slower feedback loop. While we started off with a timeline, we did not do very well in practice as things like ethical approvals caused us delays that weren't in our control. Working on the qualitative bits, like building the survey using Qualtrics is an essential skill I learnt and is something I will use in future research. Analyzing different company reports and cross-referencing them with academic literature helped enhance my critical thinking skills and evaluate the credibility in the calculations. However, in hindsight I wish we could have incorporated more qualitative aspects like semi-structured interviews with consumers regarding their choices or second-hand clothing businesses would have been very interesting to analyze. It is very important to realize that time was our greatest limiting factor and thus we could not conduct any analysis on the NEP scale responses either. We looked at hypothetical bias on a very surface level but could not dig deeper into other factors like cost and accessibility or green nudges which influence consumer behavioral decisions.

End of the day, this research project taught me the importance of time management,

better critical thinking skills, finding and evaluating available resources, and understanding academic literature better. It was rewarding to see our results after all the work that we put into the project, but at the same time shed light on the magnitude of environmental degradation and how little these initiatives help the on-going climate crisis.

Taking these reflections into the future, What's next?

As an Environment and Business student, a huge part of my coursework includes academic literature on tools businesses can use to be more sustainable in their operations. Through this project, I was able to look at the consumer perspective to different sustainability initiatives. The concept of Circular Economies has always been my interest and to study it in this setting is something I would have not thought of otherwise.

At the beginning of our research period, I was not intrigued by quantitative methods but now see myself being more open and shifting from purely qualitative to more mixed methods. This would definitely help not only in my final year dissertation but also in my career where I hope to be at the forefront of policies and projects that involve sustainability and circularity. My long-term goal has always been to find an equitable balance between economic growth and the environment, and this project helped me build the foundation for the journey ahead.

While I don't see myself in academia and much rather prefer the intricate corporate workings of sustainability, I have a newfound appreciation for academics and the work that goes behind finding innovative pathways towards sustainability, some of which are not incorporated into practice. I would stand at this intersection of using the wealth of academic literature to help formulate corporate policies to accelerate environmental regeneration.

Concluding Remarks

I express my gratitude to the Laidlaw Foundation for this paid research opportunity. I have not only gained invaluable research and leadership skills but have also had the chance to work with another scholar, Daan Vegter, to learn from our different areas of expertise.

I am very thankful for our supervisors, Dr. David and Dr. Romain, who despite their other commitments were very responsive and encouraging throughout the 6-week period. They gave us freedom and guidance in equal measures which helped us take away so much more from this project.

And to Matt and Becky, who have been very supportive since the beginning of my Laidlaw journey- a huge thank you!

Supervisor Comments

Please comment on your scholar's research period, what you consider to be your scholars' strengths and which leadership attributes you feel your scholar has demonstrated and is particularly skilled in. You could also identify areas which your scholar can develop further.

I think Aditi's report sums things up really well: this was an ambitious project and, in retrospect, probably too ambitious for a six-week project given the slow turnaround on ethical approval. We were extremely impressed with Aditi's energy and enthusiasm for tackling the project, but agree that it was maybe not hugely suited to her more qualitative skillset. But having said that, she produced some really impressive results in a very short amount of time, so she shouldn't be too hard on her quants skills!

In terms of particular skills, I do think that Aditi's willingness to throw herself into something and work in a team is particularly impressive. Her and Daan made a good team and got a remarkable amount of work done.

For developing leadership skills going forwards, I wonder if there is a balance to be struck between being self-motivated and self-directed, and in making the most of the expertise and experience that is available. Aditi did an admirable job of getting on with things herself, but given that she has more of a qualitative skillset, she could perhaps of come and seen her supervisors (particularly me) more often. I would probably recommend being a bit "pushier" and requesting more meetings and more input from people if that is helpful and needed. Obviously this is a tricky balance to strike, but if you have an open conversation at the beginning of a project about how communication will work, then you should be able to get to a situation where a) you get the input you need, b) other team members feel comfortable and confident to tell you if they don't have time to talk.

Signature of Scholar  Date: 17th December 2024

Signature of Project Leader Date: 17th December 2024