

A new approach to sustainability? The idea of basic income as a solution to automation-driven job displacement and the potential impact on environmentally conscious consumer spending among university students in Groningen, the Netherlands

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Thesis summary

The content of this thesis focused on the potential effects of a basic income policy as a solution to automation-driven job displacement on consumption patterns and the degree of sustainability of these patterns. The central question to be answered here is: *To what extent would basic income be a suitable approach in realising the conception of a sustainable city?* This research studied the effects of existing welfare policies in the Netherlands on consumption expenditure and behaviour, particularly among university students in the city of Groningen. A mixed-methods approach was employed, whereby secondary data on consumption trends and disposable income were quantitatively analysed, and primary data on consumption behaviour were collected through interviews with students. Relationships were found between (unsustainable) consumption expenditure and disposable income, while there were variations in the predicted effects of a basic income on consumption behaviour among the students interviewed, with no significant changes to spending habits as a result. No conclusive evidence of a positive effect of a basic income policy on sustainable consumption was found, therefore further research on the subject needs to be done.

Introduction

Background

Rapid development of technology in recent decades has shaped and will continue to shape society in the coming years. One of these developments is automation and artificial intelligence (AI) (Hall et al., 2019; Lawhon & McCreary, 2020; Yang, 2018). Today, as a result, we are increasingly seeing the implementation of AI in our everyday lives. Examples of this include self-service kiosks in supermarkets, the experimentation of self-driving cars on the road, intelligent functions on smartphones, and smart home appliances (Yang, 2018). Arguably, the biggest impact that smart technology will have is on the labour market. As time goes on, technology will start to replace manual labour, leading to a major displacement of jobs. This is currently the case for manufacturing jobs, as more and more manufacturing plants are transitioning to an automated workforce due to incentives provided by the market (i.e. reduced labour costs and higher productivity), but will eventually affect all sectors of the economy, including retail and transport, in the long run (Yang, 2018). Scholars and academics around the world have acknowledged that this is a plausible scenario that will have major societal consequences, particularly on the labour market (Hall et al., 2019; Lawhon & McCreary, 2020; MacNeill & Vibert, 2019; Yang, 2018). The current debate surrounding automation pertains to finding solutions to this problem, most prominently the implementation of a basic income policy as a way to cushion the negative effects of job displacement due to automation, among other things such as closing the income inequality gap and eradicating poverty (Hall et al., 2019).

Research problem

The debate about basic income has raised questions about whether or not it will actually contribute to achieving the outcome it presupposes, or whether there will be unintended consequences as a result. One major concern with basic income is that it will lead to a lack of will among individuals, particularly those who are unemployed, to find work (Hall et al., 2019). Another concern is the funding mechanism that will finance such a policy and whether it is financially viable or not. Proposed funding mechanisms range from the implementation of a value-added tax (VAT) on goods and services to the creation of common wealth funds. Other concerns include whether the implementation of a basic income policy would lead to the consolidation of existing social welfare programs that a considerable proportion of the population rely on. Several pilot projects concerning the impact of basic income have been implemented around the world with varying degrees of success. One concern that is rarely emphasised in the basic income debate is the issue of sustainability (Hall et al., 2019; MacNeill & Vibert, 2019). The research of both Hall et al. and MacNeill & Vibert theorise that basic income will lead to an increase in aggregate demand and consumerism, as a result of people having more disposable income. This, according to Hall et al. and MacNeill & Vibert, would have negative implications on sustainability as cities and countries worldwide strive to meet the Sustainable Development Goals as laid out by the United Nations, especially with regards to Sustainable Development Goal 12, which is to “ensure sustainable consumption

and production patterns” (United Nations, n.d.), making the subject of this research ever more relevant in today’s society.

This research examined the consumption patterns of benefit recipients to see whether these consumption patterns contribute to (un)sustainable growth and whether basic income is an appropriate policy in not only solving the problems that automation would bring but also tackling environmental challenges. The case study for this research is on benefit recipients in the Netherlands and to what extent their consumption habits differ from those that do not receive any benefits. Since there is no basic income policy in the Netherlands, an alternative approach is taken by investigating the effects of other welfare policies on people’s consumption patterns. Many of the existing welfare policies in the Netherlands are to a certain extent comparable to basic income policy, as they ensure a guaranteed level of income for those that are in need of it. Of course, certain conditions apply in order to receive these benefits, but because this research is mainly concerned with the effects of these policies on consumption, the bureaucratic aspects of these policies can be neglected. For the purpose of this research, two groups of benefit recipients are used as samples, namely recipients of income insurance benefits and students, with a particular focus on students in the city of Groningen as the main sample group for a more in-depth analysis of consumption behaviour. The reasons for this choice of sampling are explained in more detail in the methodology section of this thesis. Given the specified focus of this case study, the main research question is therefore: *To what extent does basic income influence an individual’s consumption pattern that is perceived to be unsustainable, particularly among university students in the city of Groningen, the Netherlands?* In addition, two sub-research questions have arisen from the main research question, one qualitative and one quantitative. The first sub-research question, *“what type(s) of consumption pattern(s) is/are considered to be ‘unsustainable’?”*, aims to investigate the qualitative aspect of this research, while the second sub-research question, *“what is/are the difference(s) in consumer spending, if any, between benefit recipients and non-benefit recipients?”*, aims to investigate the quantitative aspect of this research.

Thesis structure

The following section discusses the theoretical framework in which the analysis is based on. Theories and concepts related to the topic of this thesis, such as basic income, sustainable consumption, and the smart city are introduced and discussed. A conceptual model showing the various connections and linkages between the aforementioned theories and concepts is also included in the following section together with the hypothesis of this research, in which an educated guess of the research outcome is made based on the theories discussed in the theoretical framework. After that, the methodology of this research is explained. The method of data collection, the types of data collected, the operationalisation strategy, and the method of data analysis are discussed. Furthermore, ethical considerations relating to the collection of data are reflected upon. Following the methodology, the results of the data analysis are presented. This section is split into two parts: First, the results of the quantitative data analysis are presented, in which general trends in consumption are discussed together with trends in household disposable income as a starting point for the analysis, followed by a statistical analysis of these trends to determine correlations. The

second part of the results section discusses the results of the qualitative data analysis, in which individual consumption behaviour is analysed based on interviews. Finally, conclusions of the research are discussed, together with policy implications and recommendations for future research.

Theoretical framework

The article written by D'Auria et al. (2018) introduces the debate into how cities in the modern age of digitalisation and technology should be conceptualised. According to the article, there are two conceptions of the modern city that are currently being debated by urban scholars: The "smart city" and the "sustainable city". The article highlights various definitions of the smart city. Because the concept of a smart city is relatively new and still emerging, there is no fixed definition for a smart city. However, the article generally describes the smart city as "an evolution of the 'digital city'", which adds human features of city life to a city which has been shaped by technological features (D'Auria et al., 2018). In other words, a smart city is one that utilises both technology and human capital. A sustainable city evolves further from the smart city, taking social equity and sustainable development into account. The authors of the article view the concept of the sustainable city as "an approach and a philosophy to modern cities", while the smart city concept is viewed as "setting the guidelines of a transforming city" (D'Auria et al., 2018). The two conceptions of the modern city are undoubtedly interconnected, but the presumption that technology is the main driving force behind the evolution of the modern city raises some questions, especially with regards to sustainability.

The premise of the smart city concept implies that technology plays a huge role in shaping modern society. This includes the role in which AI and automation has in various sectors of the economy. This has major consequences on the labour force, as AI and automation is thought to displace a large percentage of the workforce in the years to come (Hall et al., 2019). Without a human labour force contributing to the economy, and therefore to the development of the smart city, the human aspect of the smart city essentially disappears, rendering the concept of the smart city almost obsolete. As both humans and technology are imperative in the evolution of cities, the main question here is "how can human life thrive in the city without compromising technological progress and innovation at the expense of market incentives?". The article by Hall et al. (2019) talks about basic income as a solution to this problem. The idea of a basic income as a response to increasing automation is gaining popularity among scholars as it addresses, among other things, income inequality. However, the article focuses on the consequences of basic income on sustainability, particularly pointing to the fact that basic income would drive consumption in an unsustainable way as a result of higher levels of disposable income in the hands of individuals receiving basic income. Unless a basic income policy adopts environmental provisions, implementing basic income as a strategy to curb the negative effects of technologically evolving cities may have major implications in the evolution of smart cities to sustainable cities, bringing into question whether the goals of a sustainable city can be achieved through implementing a basic income policy.

The article by Hall et al. (2019) has established a link between basic income and sustainability. Although it is not quite clear as to the extent in which basic income will have negative impacts on the environment, it does address the issues of social inequity and income inequality, which are major contributing factors in achieving the goals of a sustainable city. Therefore, the central question of my research would be: *To what extent would basic income be a suitable approach in realising the conception of a sustainable city?* Smart cities require smart decisions. The question is, is a basic income policy one of them?

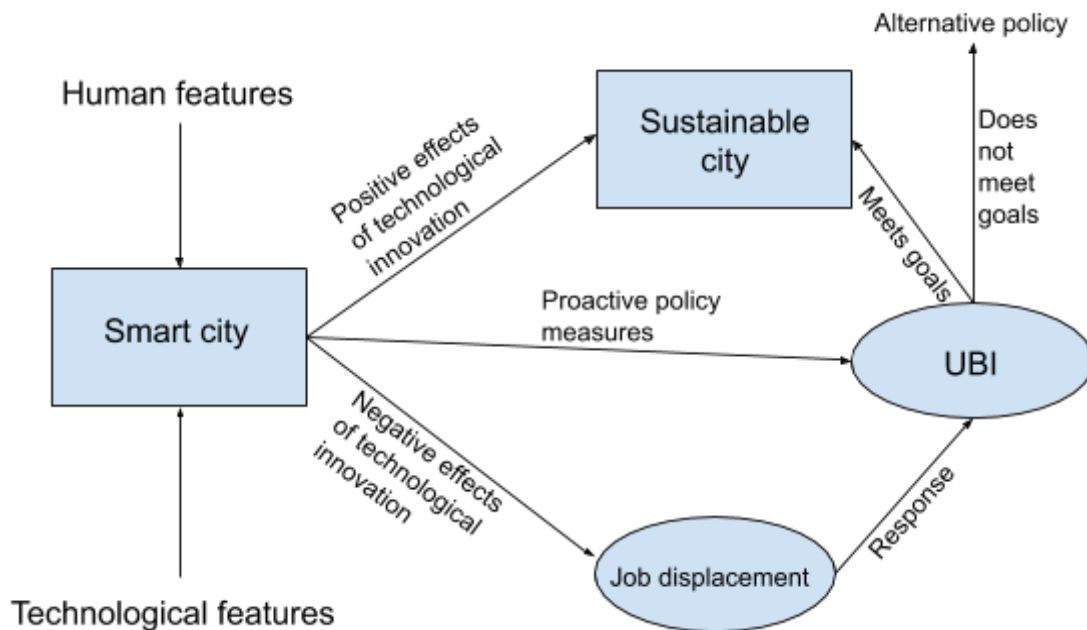


Figure 1. Conceptual framework linking concepts and theories about sustainability and (universal) basic income.

The conceptual framework above highlights the main concepts from the two articles used in this research, and how they are linked with one another. The smart city and the sustainable city concepts have been defined previously, while universal basic income (UBI) can be defined as a guaranteed minimum income that each citizen of a country receives from the country's government on a monthly or annual basis, and job displacement refers to job loss due to automation.

The theory of rational behaviour in economics shows that when individuals have higher amounts of disposable income, they have higher purchasing power and therefore they are more likely to spend more on non-essential (luxury) goods and services. It assumes that individuals (consumers) are rational decision makers and therefore would spend more when they receive more money, resulting in an overall increase in demand. Many luxury goods, such as cars and steaks, are considered to be unsustainable in both the production of that good (slaughtering cows to produce beef) and the consumption of that good (carbon emissions released from cars).

Following this theory on rational behaviour, together with the theories of Hall et al. and MacNeill & Vibert on the effect of basic income on aggregate demand, this research hypothesizes that a basic income policy would lead to an increase in the demand and consumption of luxury goods, and as a reaction to the forces of the market, this would eventually lead to an increase in the production of these goods, thereby stimulating unsustainable economic growth. In short, basic income would cause unsustainable consumerism and production in the long run.

Methodology

Given the nature of the main research question and the sub-research questions, this research entailed a mixed-method approach as the most appropriate method for this research. Quantitative and qualitative methods were both used in this research, as both of these methods individually contribute to answering specific aspects of the research question that could not be answered if only one of these methods were used. Due to the lack of data on basic income in general and its effect on consumption expenditure in particular, a quantitative approach is used as an indication of the potential effects that a basic income policy may have on consumer spending. This is done by collecting secondary data on consumer expenditure and disposable income in the Netherlands from open-source data, such as the Dutch Central Statistics Bureau (CBS), The World Bank and Eurostat. Datasets that were used include final consumption expenditure, domestic consumption expenditure, mean disposable income of households, mean disposable income of income insurance benefit recipients, mean disposable income of employed individuals, mean expenditure of income insurance benefit recipients and mean expenditure of employed individuals. This is followed by a quantitative data analysis, in which the data were analysed statistically by using software such as SPSS as a means to do so. General trends in consumption expenditure and disposable income were first analysed and then were compared against each other by using correlations to determine whether there are relationships between each of the datasets. Particularly, relationships between household disposable income and consumption expenditure, income insurance benefit recipient disposable income and consumption expenditure, and employed individual disposable income and consumption expenditure were investigated.

Since the quantitative data used in this research is only meant to be indicative of the potential effects of basic income on consumption habits by looking at the effects of the existing income insurance benefit on consumption expenditure in the Netherlands, a qualitative approach was also used to further understand individual consumption behaviour of those receiving assistance from the government. This was done through in-depth interviews with university students studying at the University of Groningen that receive a form of assistance from either the government or a third party (such as family members). The reason why students were used as a sample for this research is because many students in the Netherlands receive financial assistance from the government. This assistance may come in the form of grants, loans, or travel subsidies. Many students also receive allowances from relatives, and even though this does not classify as government assistance, the idea and the act of receiving unconditional money from a third party is very much

comparable to a basic income. Therefore, the effect that these sources of income may have on individual consumption habits would give a deeper insight into the actual effects of basic income on sustainable consumption. Three randomly chosen students were interviewed over Skype during the month of May, 2020, in which they were asked about their current spending habits, their sources of income, special considerations in spending (such as the environment), and how their spending habits would change, if at all, if they received a basic income (see appendix for full list of questions). Once the interviews were conducted, the data was qualitatively analysed using Atlas.ti by examining the frequencies of codes used in the analysis and by grouping relevant codes together to better understand specific behaviours and actions and its relation to personal considerations and source of income.

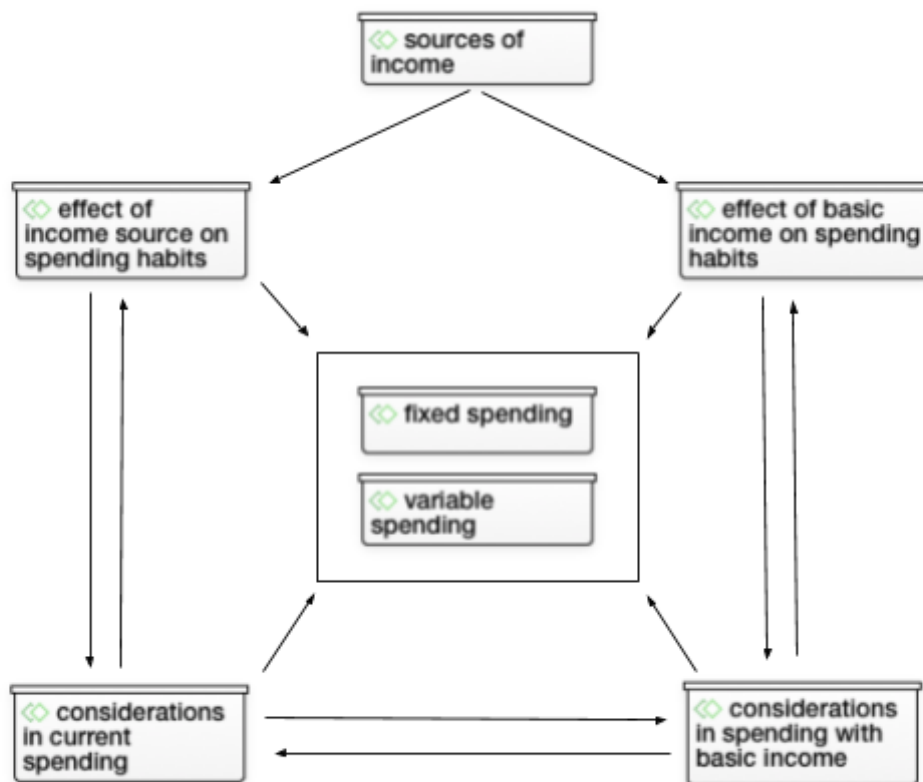


Figure 2. Relationships between code groups.

Results

Trends in consumption and disposable income

To gain insight into the potential effects of a basic income policy on the sustainability of consumption habits, an analysis has been done on the current trends in consumption patterns and its relation to disposable income and existing welfare benefits. Trends in final consumption expenditure will first be examined as a general starting point for this analysis. According to the World Bank (2020), the final consumption expenditure is defined as “the sum of household final consumption expenditure (private consumption) and general government final consumption expenditure (general government consumption)”. In addition, household expenditure is defined as “the amount of final consumption expenditure made by resident households to meet their everyday needs, such as food, clothing, housing (rent), energy, transport, durable goods (notably cars), health costs, leisure, and miscellaneous services” (OECD, 2020). This definition is relevant because it has major implications on sustainability, which is dependent on the type of goods and services spent on (i.e. goods and services that have negative effects on the environment versus goods and services that have little to no effect on the environment). From a general point of view, consumption expenditure in the Netherlands had gradually increased since the late 1960s, as shown in figure 3. This trend continued until around 2008, when consumption expenditure began to slow down and fluctuate around the same level during the period between 2008 and 2018. As a result, a slight downward trend in consumption expenditure can be seen during that time period. The reasons for this downward trend can be attributed to a variety of factors, such as the global financial crisis in 2008. However, the specific reasons for this downward trend will not be examined in detail, as the focus of this research is primarily concerned with the sustainability aspect of consumption and its relationship with welfare policies. The graph shows that the current value in final consumption expenditure in the Netherlands is estimated at around 600 billion USD.

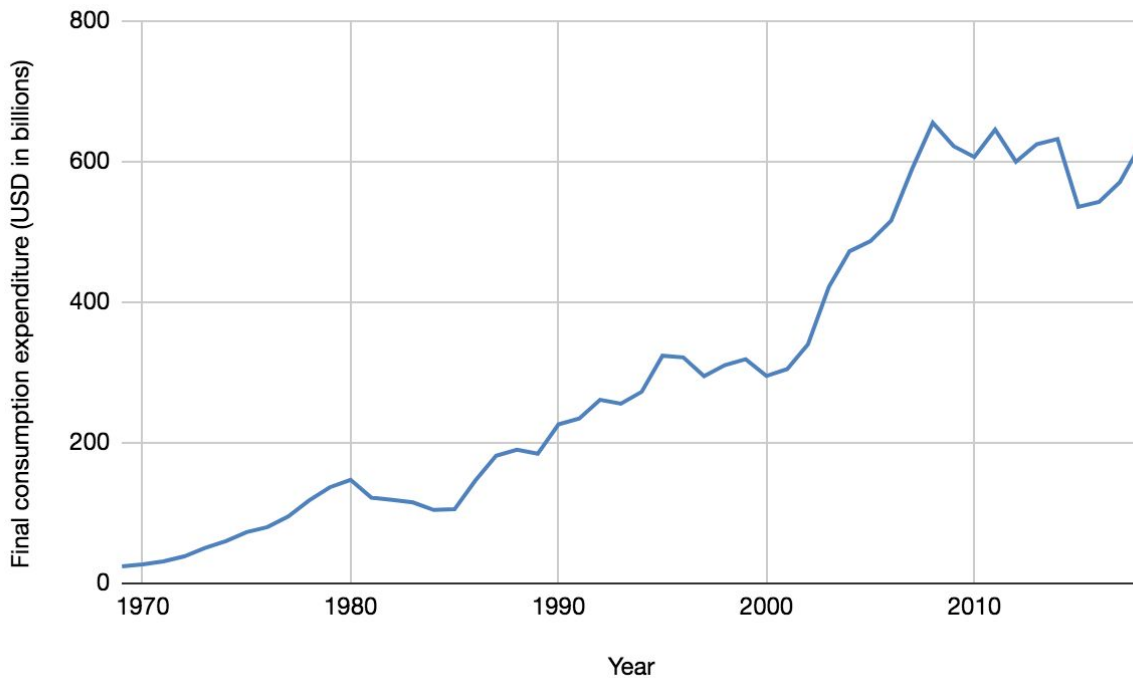


Figure 3. Final consumption expenditure in the Netherlands between 1969 and 2018 (The World Bank, 2020).

Zooming into the sustainability-related aspects of consumption, a good indicator in determining the extent in which overall consumption is based on the consumption of goods that are unsustainably sourced is by examining the trend in domestic material consumption (Figure 4). Eurostat (2020) defines domestic material consumption as “the annual quantity of raw materials extracted from the domestic territory of the focal economy, plus all physical imports minus all physical exports”. An important factor in determining domestic material consumption is material footprint, which is defined as “the quantity of material extraction that is required to meet the consumption of a country”, and it involves the extraction of biomass, fossil fuels, metal ores and non-metal ores (Ritchie et al., 2018). Obviously, the extraction of these raw materials have direct consequences on sustainability, which is why domestic material consumption is relevant for this analysis. As seen in figure 4, domestic material consumption in the Netherlands has been steadily increasing since the year 2000, with a current estimated value of around 4.5 EUR per kg of raw materials extracted. This increasing trend may substantially have a negative impact on the environment, as an increasing number of goods that are unsustainably sourced are being consumed by the general population.

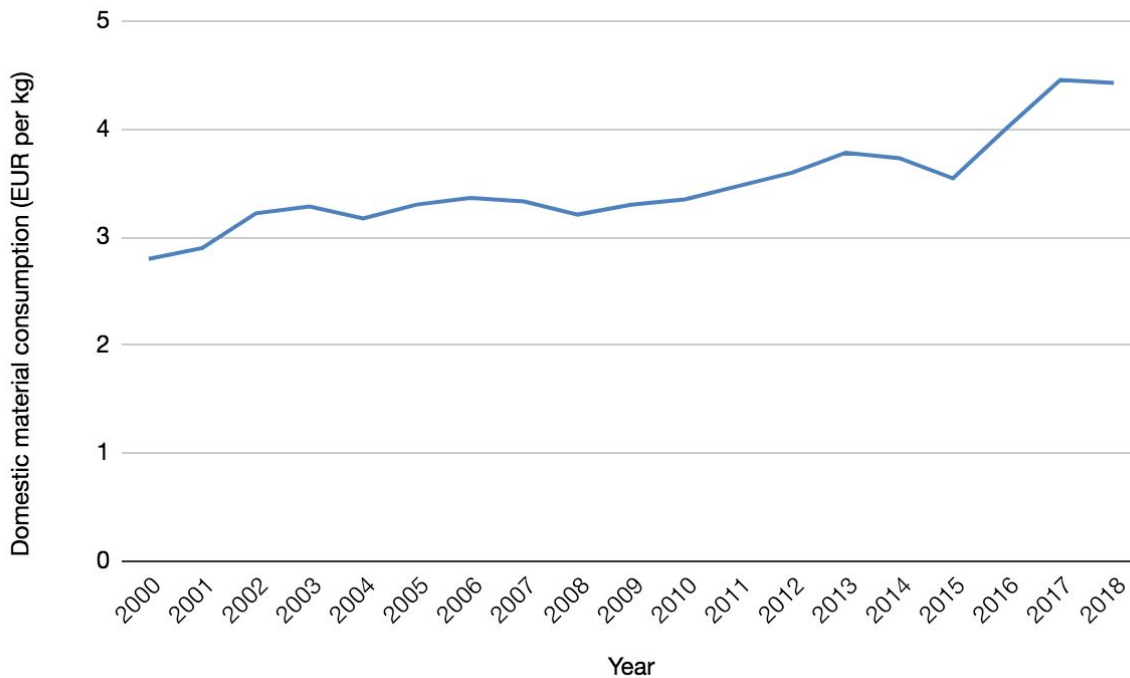


Figure 4. Domestic material consumption in the Netherlands between 2000 and 2018 (Eurostat, 2020).

Further examination of consumption trends in the Netherlands reveals differentiation in spending between specific categories of goods and services (Figure 5). These categories are divided between four groups: 1) Food, beverages, and tobacco (FBT); 2) Durable consumer goods (DCG), such as clothing and vehicles; 3) Other goods, such as fuel and energy; and 4) Services, such as housing and transportation. Each category includes products and/or services that are damaging to the environment, such as meat (FBT), non-electric vehicles (DCG), fossil fuels (other goods), and air travel (services). Therefore, the inclusion of these statistics in this analysis are relevant in order to understand the types of goods and services that consumers tend to spend on and to the extent at which the consumption of these goods and/or services have a negative impact on the overall environment. Figure 5 shows the distribution of these four categories relative to their respective shares in total domestic consumption in the Netherlands as of 2015. Total domestic consumption in this case refers to total consumer expenditure within the Netherlands itself, and therefore excludes the expenditure of Dutch consumers abroad (CBS, 2019). As seen in the graph, the majority of Dutch consumer spending is on services, with a share of 57.7% of total domestic consumption. Consumption of overall goods make up the remaining 42.3% of total domestic consumption, in which the shares between FBT consumption, DCG consumption, and the consumption of other goods are almost evenly split (14.9%, 14.8%, and 12.6% respectively).

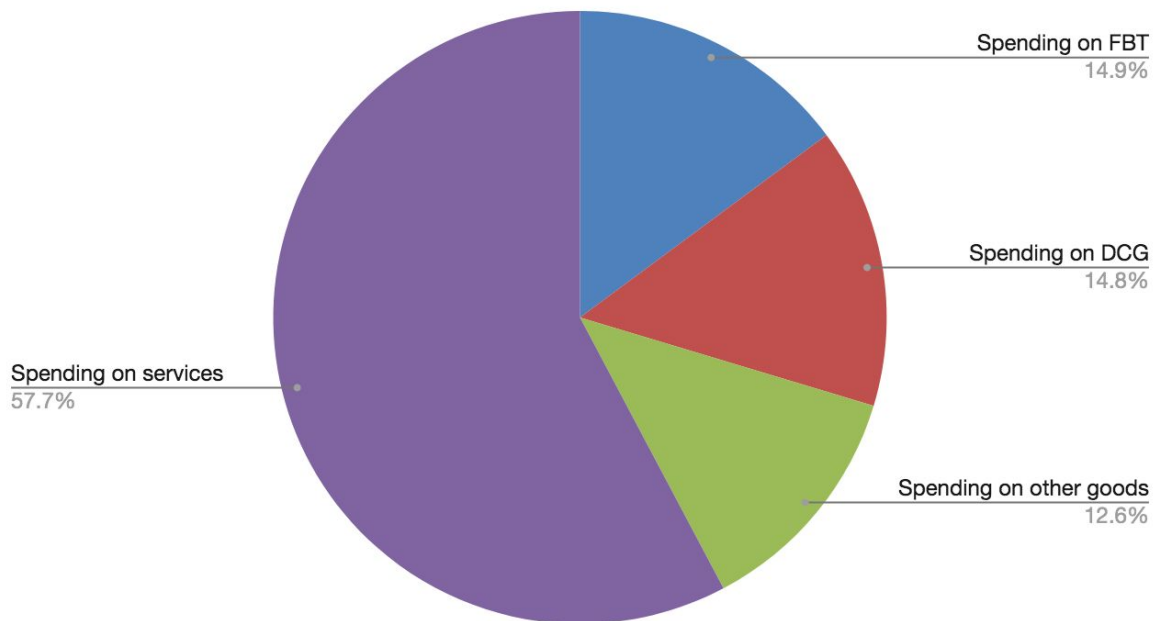


Figure 5. Distribution of consumer spending based on the types of goods and services relative to total domestic consumption in the Netherlands in 2015 (CBS, 2019).

Given the generalised nature of the measures relating to final consumption expenditure and domestic material consumption, several factors may explain the reasons for these increasing trends. One of these factors may include an individual's disposable income. According to CBS (2019), disposable income is defined as "the gross income minus current transfers paid (like alimony payments to an ex-partner), income insurance premiums, health insurance premiums and tax on income and wealth". Gross income, in this case, is defined as "the sum of income from labour, income from self-employment, income from property, payments from the government and other receipts (like alimony payments by an ex-partner)" (CBS, 2019). As explicitly mentioned in the definition, payments from the government (i.e. welfare benefits) is a major aspect in determining the disposable income of an individual or a household, which makes the examination of disposable income in this analysis especially relevant, as consumption is directly influenced by income and therefore the extent in which welfare benefits have an influence on total expenditure can be analysed. Figure 6 shows the trend in the mean disposable income of all households in the Netherlands between the years 2011 and 2018. From the graph, it can be seen that the mean disposable income of households slowly increased in a consistent manner over the years, with a steady average of around 40,000 EUR between all the years.

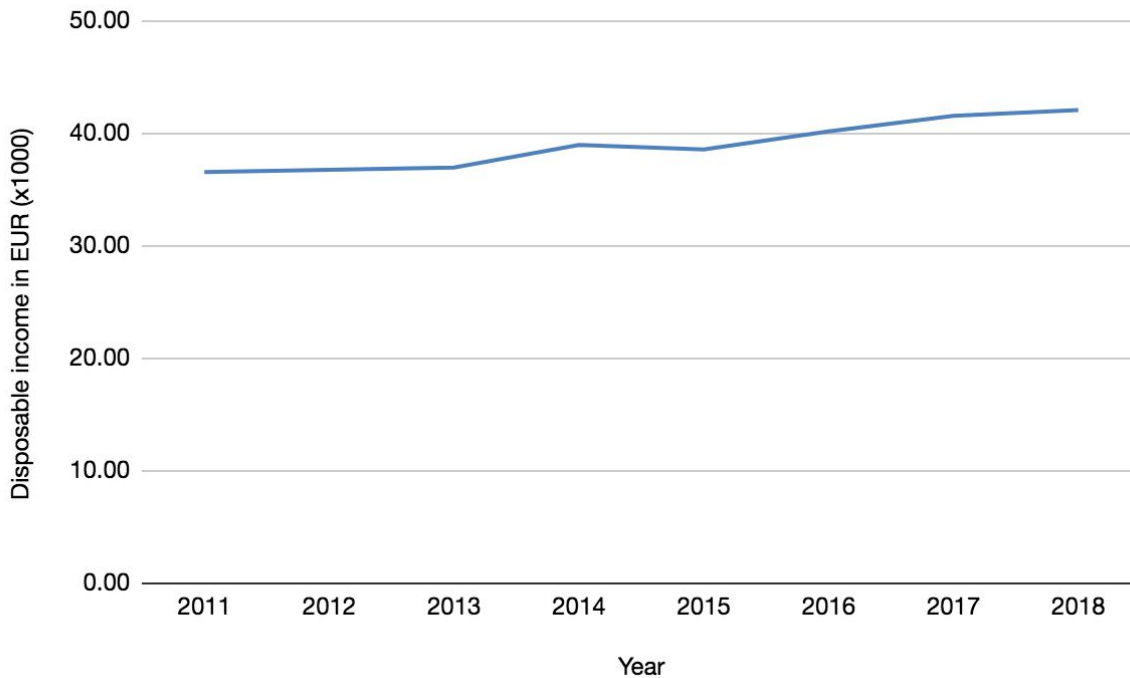


Figure 6. Mean disposable income of all households in the Netherlands between 2011 and 2018 (CBS, 2019).

Figure 7 shows the difference in the mean disposable income between recipients of income insurance benefits and employed individuals receiving salaries. Both show increasing trends in disposable income, but it is clear that individuals receiving salaries from work have a much higher disposable income than those receiving income insurance benefits. The effect that this difference has on spending is shown in figure 8, which shows the mean expenditure of each of the two groups for the year 2015. Individuals receiving salaries from work clearly spend more than individuals receiving income insurance benefits. This may be directly explained by the difference in disposable income between the two groups. Individuals with high disposable income tend to spend more than those with low disposable income. This is both theoretically correct, based on rational choice theory in economics, and makes logical sense. However, due to the fact that the only data on mean expenditure is from 2015, and therefore a lack of cases, a definitive relationship between expenditure and disposable income between the two groups cannot be determined statistically. There may be external factors involved, however it is still extremely likely that the differences in disposable income between benefit recipients and income earners are directly related to their respective expenditures. It is also worth noting that benefit recipients spent nearly all of their disposable income in 2015 (which is around 30,000 EUR for that year), while income earners had a substantial amount of their disposable income left over (more than 15,000 EUR that were not spent). This may mean that while income earners spend more than benefit recipients in absolute terms, benefit recipients spend a higher percentage of their disposable income (close to 100%) in comparison to income earners.

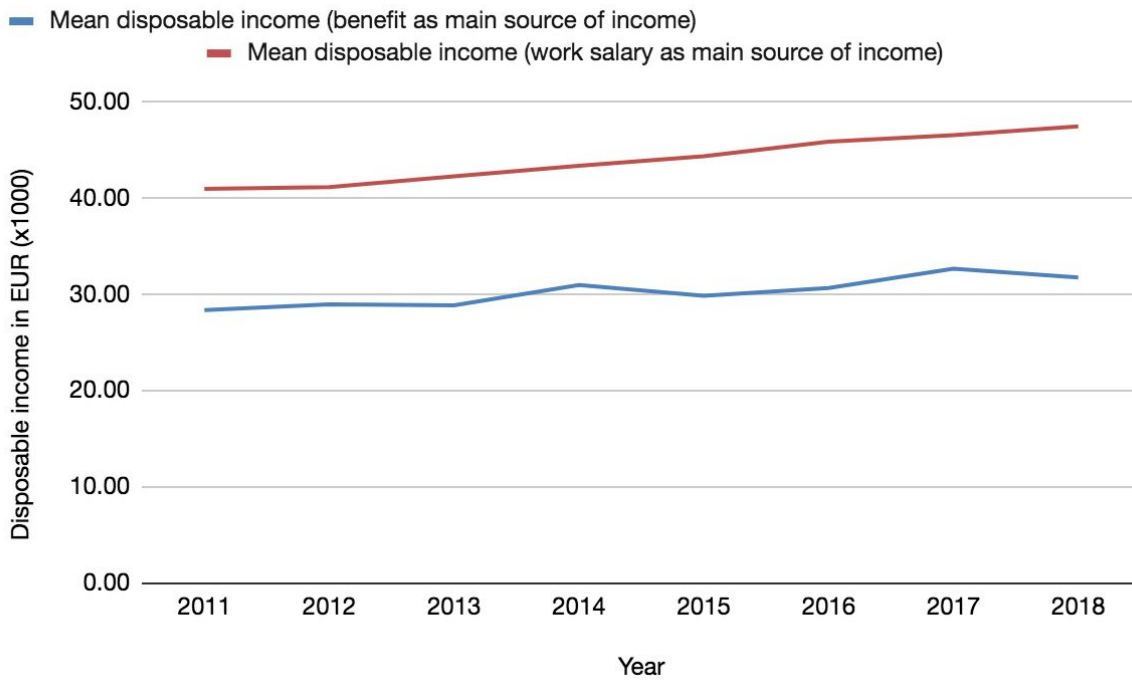


Figure 7. Difference in mean disposable income between benefit recipients and employed individuals (CBS, 2019).

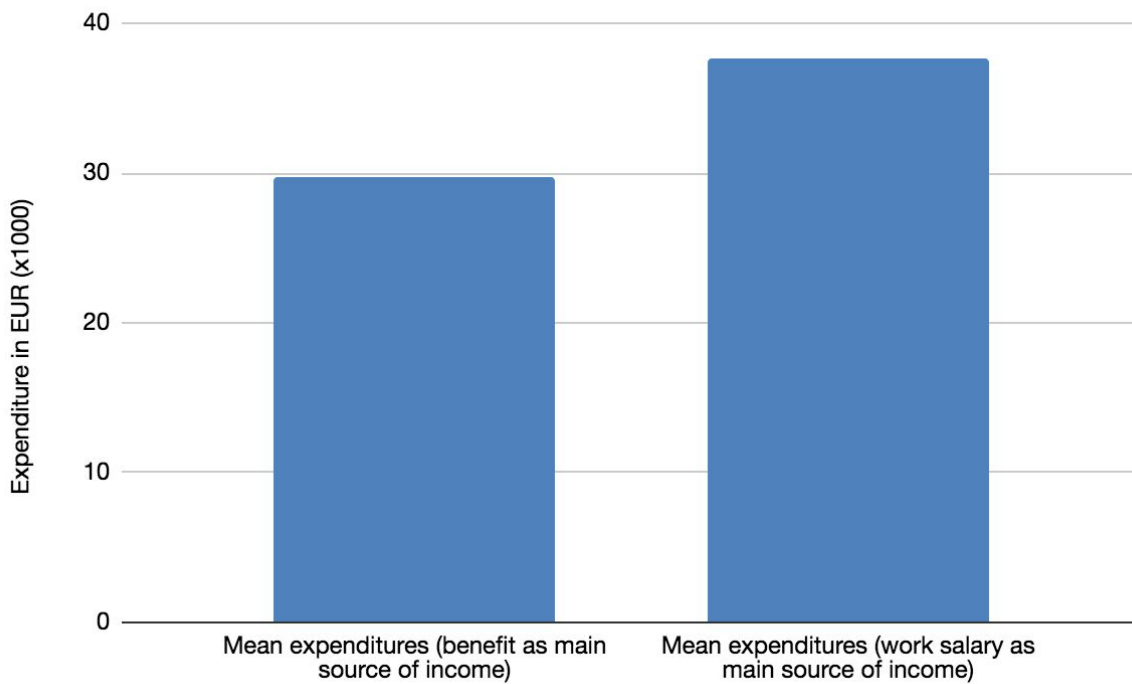


Figure 8. Mean expenditures of benefit recipients and employed individuals in 2015 (CBS, 2019).

Correlations between consumption and disposable income

To determine whether there is a relationship between disposable income and consumption expenditure, statistical testing was used to find potential correlations between the two variables. The Pearson Correlation Coefficient was used to determine a) whether or not there are linear relationships between the two variables, and b) the strength and direction of each relationship. Four different relationships between disposable income and consumption were investigated. First, a general relationship between the mean disposable income of all households in the Netherlands (Figure 6) and final consumption expenditure (Figure 3) was investigated. The results are shown in figure 9.

		Finalconsumptionexpenditure	Meandisposableincome total
Finalconsumptionexpenditure	Pearson Correlation	1	-,317
	Sig. (2-tailed)		,444
	N	50	8
Meandisposableincome total	Pearson Correlation	-,317	1
	Sig. (2-tailed)	,444	
	N	8	8

Figure 9. Correlation between mean disposable income of all households and final consumption expenditure.

The correlations table in figure 9 shows that there is no linear relationship between the overall mean disposable income of households and final consumption expenditure. This is derived from the p-value, or significance level, which is at 0.444 for this case. This value is larger than 0.05, which is the critical value in which the null hypothesis can be accepted or rejected based on the 95% confidence interval. Therefore, the null hypothesis cannot be rejected (i.e. there is no linear relationship between the two variables). In terms of the strength and the direction of this non-linear relationship, the two variables have a Pearson Correlation Coefficient of -0.317, therefore there is a weak and negative correlation between the two variables. This may be due to the fact that final consumption expenditure in the Netherlands was slightly decreasing between 2011 and 2018, which is the time period in which the mean disposable income of all households had measurements available. Nevertheless, it can be concluded that household disposable income has a weak and opposite relationship with overall consumption expenditure.

Next, the relationship between the mean disposable income of all households and domestic material consumption (Figure 4) was investigated. This is to determine whether or not household disposable income is correlated to the sustainability aspects of consumption. The results are shown in figure 10.

		Meandisposab leincome total	Domesticmat erialconsump tion
Meandisposableincomet otal	Pearson Correlation	1	,908**
	Sig. (2-tailed)		,002
	N	8	8
Domesticmaterialconsu mption	Pearson Correlation	,908**	1
	Sig. (2-tailed)	,002	
	N	8	19

** . Correlation is significant at the 0.01 level (2-tailed).

Figure 10. Correlation between mean disposable income of all households and domestic material consumption.

The table in figure 10 shows that there is a linear relationship between the overall mean disposable income of households and domestic material consumption. According to the results, the correlation is significant if the p-value is lower than 0.01. The p-value in this case is 0.002, therefore the test is statistically significant and the null hypothesis can be rejected (i.e. there is a linear relationship between the two variables). The Pearson Correlation Coefficient of the two variables is 0.908, meaning that there is a strong and positive correlation between the two. Therefore, it can be concluded that household disposable income is strongly connected to and has a positive relationship with the consumption of unsustainably-sourced products.

The third relationship investigated was between the mean disposable income of employed individuals receiving salaries as their main source of income (Figure 7) and domestic material consumption. This is to determine whether or not specific income groups (individuals receiving income from work in this case) and their disposable income is correlated to sustainability in consumption, and would serve as a basis for comparison to the disposable income of individuals receiving income insurance benefits as their main source of income and its relationship to sustainability in consumption. In other words, the group of individuals receiving income from work would act as the control group in the context of comparison between the two groups, as they are more representative of the general Dutch population. The results are shown in figure 11.

Correlations

		Domestic material consumption	Mean disposable income w/o benefits
Domestic material consumption	Pearson Correlation	1	,868**
	Sig. (2-tailed)		,005
	N	19	8
Mean disposable income w/o benefits	Pearson Correlation	,868**	1
	Sig. (2-tailed)	,005	
	N	8	8

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 11. Correlation between mean disposable income of employed individuals and domestic material consumption.

The table in figure 11 shows that there is a linear relationship between the mean disposable income of employed individuals and domestic material consumption. Just like the statistics in figure 10, the critical value is at 0.01. The p-value for this statistic is 0.005, therefore the test is statistically significant and the null hypothesis can be rejected. The Pearson Correlation Coefficient of the two variables is 0.868, indicating a strong and positive correlation between the two. Therefore, just as with overall household disposable income, the disposable income of employed individuals has a strong connection to and a positive relationship with the consumption of unsustainably-sourced products.

Last but not least, the relationship between the mean disposable income of individuals receiving income insurance benefits as their main source of income (Figure 7) and domestic material consumption. As mentioned previously, the purpose of this test is to examine whether or not there are differences between the two income groups in terms of the relationship between disposable income and sustainability in consumption, in which the result of this test would be compared against the result of the previous test (i.e. testing against the control group). Out of the four tests examining the various relationships between disposable income and consumption, this test is by far the most important and most relevant in achieving the goals of this research, which is to establish a relationship between welfare benefits and sustainable consumption. The result of this test may provide clarification on the extent in which a potential basic income policy may have a direct influence on consumption habits and the extent in which these consumption habits are considered to be sustainable. The results are shown in figure 12.

Correlations

		Domestic material consumption	Mean disposable income w benefits
Domestic material consumption	Pearson Correlation	1	,872**
	Sig. (2-tailed)		,005
	N	19	8
Mean disposable income w benefits	Pearson Correlation	,872**	1
	Sig. (2-tailed)	,005	
	N	8	8

** Correlation is significant at the 0.01 level (2-tailed).

Figure 12. Correlation between mean disposable income of benefit recipients and domestic material consumption.

The table in figure 12 shows that there is a linear relationship between the mean disposable income of benefit recipients and domestic material consumption. As seen in the previous two correlation tests, the correlation between the two variables is statistically significant if $p < 0.01$. In this case, the p-value is 0.005, therefore the correlation is statistically significant and the null hypothesis can be rejected. The Pearson Correlation Coefficient of the two variables is 0.872, which implies a strong and positive correlation between the two. Therefore, as with the previous two correlations, the disposable income of benefit recipients has a strong connection to and a positive relationship with the consumption of unsustainably-sourced products.

The difference between the two income groups in terms of their correlation between disposable income and sustainable consumption is that benefit recipients have a slightly stronger relationship with domestic material consumption than income earners (0.872 and 0.868 respectively). This may imply that benefit recipients have a larger degree of influence on the consumption of unsustainable products and they may be more likely to have consumption habits that are considered to be unsustainable. However, since the difference in correlation coefficients between the two groups is only very slight, the extent of this influence may not be significantly different from the other group and therefore the difference can be neglected.

Analysis of consumption behaviour

The quantitative analysis of secondary consumption and income data gave a good indication into the potential effects of a basic income policy on consumption patterns and to the extent in which these patterns would be considered beneficial for the environment. However, the sole reliance on existing quantitative data and the statistical analyses of the data is not enough to fully comprehend individual consumption behaviour, especially within the context of sustainability and social welfare. It is impossible to truly predict the effects of a basic income policy on sustainability and consumption without any concrete data on basic income

and sustainable consumption. Behaviour is subjective, which is why a qualitative approach was also taken in addition to the quantitative approach. Three interviews were conducted in order to gain insight into individual spending habits, the effect of income sources on spending habits, environmental considerations, and the potential effect of a basic income on future spending habits.

The first part of the interviews revolved around the current spending habits of each interview subject. The questions asked included giving an overview of monthly expenses, tendencies to buy certain products, and whether or not environmental considerations were taken into account when buying certain products. Right off the bat, a clear distinction can be made between fixed spending and variable spending. All the interview subjects mentioned that the majority of their monthly expenses are attributed to fixed costs. These include rent, insurances, tuition fees, phone subscriptions and bike rental. These are costs that are fixed each month and could not be easily changed, as the subjects have little to no control over these costs. These costs are service-based, such as housing and education, and therefore have little to no effect on the physical environment. The variable costs, on the other hand, are mostly tangible and therefore have a certain degree of impact on the environment. All the interview subjects attribute the majority of their variable spending on groceries. The types of grocery items that are spent on vary between subjects, but common items include meat and vegetables. Traditionally, vegetables are seen as sustainable food items, because the production and consumption of vegetables generally do not harm the environment. Meat, on the other hand, is seen as an unsustainable food item due to the harm on the environment as a result of meat production. When the question came to environmental considerations in consumption, all the interview subjects currently do not take environmental considerations into account when shopping. The most important consideration for them is price, as they tend to purchase products that have the lowest price, regardless of how sustainable the product is.

The second part of the interviews involved sources of income and the influence they have on current spending habits. As all the interview subjects are students and none of them are currently working, they do not earn any income. The main sources of income for them are student loans, which they would have to eventually pay back, and allowances from parents or other relatives. Even though student loans can technically be classified as a form of government assistance, it is not comparable to a basic income, as a basic income comes in the form of unconditional “free” cash, while a student loan is not “free” and usually comes with a set of conditions (e.g. you have to be a student in order to be entitled to a student loan). Allowances, on the other hand, can be comparable to a basic income, as they are usually given unconditionally by one’s own parents, even though they do not come directly from the government. When asked about the effect that their income streams have on their spending, the interview subjects said that changes in their income streams would not affect their spending habits, as they all tend to spend as little money as possible anyways. Their spending habits would only change if they receive additional income from work, or if they receive a basic income.

The third and final part of the interviews surround the topic of basic income. The interview subjects were asked about their spending habits if they received a basic income. The

responses were mixed, as some said they might try to buy more sustainable products with the extra income, while others won't change their spending habits at all. For some, receiving a basic income may even result in more unsustainable spending, such as by using the car more often and spending the money on petrol. For all subjects, environmental considerations in consumption might be taken into account, but only until a limited degree. According to the subjects, environmental considerations would not be a priority, as price will still be the main driver in deciding what products to buy. Therefore, even with a basic income, no significant changes in spending habits would be made.

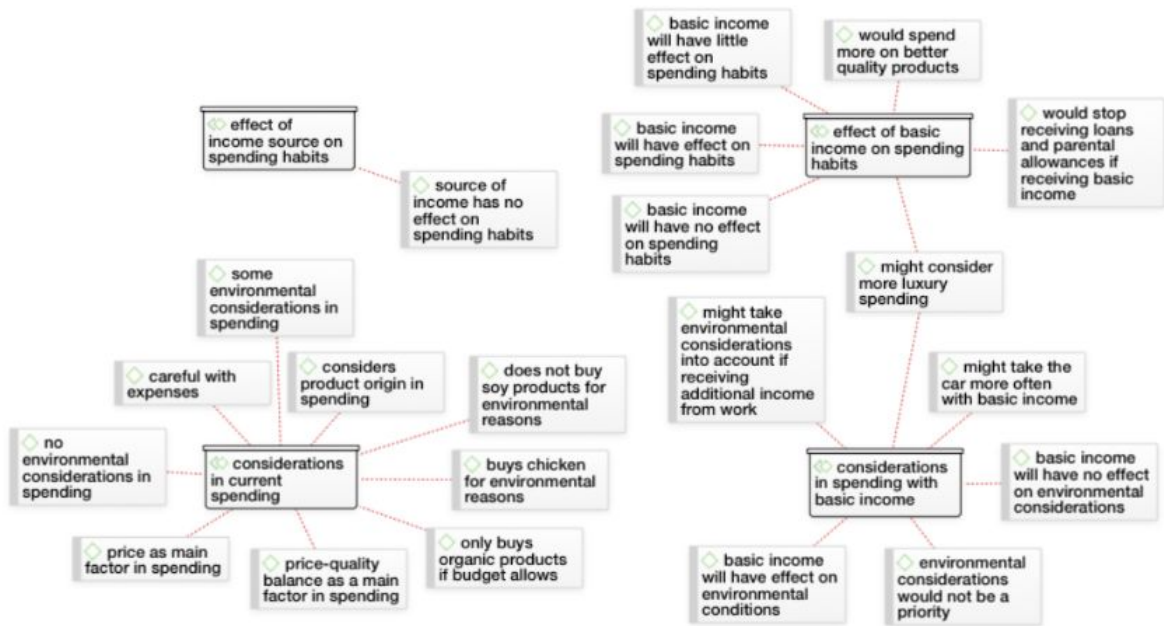


Figure 13. Network of codes from interview analysis grouped within topics relevant to research goals.

	buys chicken for environmental reasons Gr=1	fruits Gr=2	meat Gr=2	noodles Gr=1	pasta Gr=2	rice Gr=2	some environmental considerations in spending Gr=1	vegetables Gr=2
buys chicken for environmental reasons Gr=1	0	0	0	0	0	0	0	1
fruits Gr=2	0	0	0	0	0	0	0	1
meat Gr=2	0	0	0	0	0	0	0	1
noodles Gr=1	0	0	0	0	1	1	0	0
pasta Gr=2	0	0	0	1	1	1	0	0
rice Gr=2	0	0	0	1	1	1	0	0
some environmental considerations in spending Gr=1	1	0	0	0	0	0	0	0
vegetables Gr=2	0	1	1	0	0	0	0	0

Figure 14. Co-occurrence table of specific products.

Conclusion

This research studied the potential effects of a basic income policy as a solution to automation-driven job displacement on consumption patterns that have implications on sustainability. As the idea of basic income is becoming more widely discussed, the impact that it may have on sustainability is unfortunately not a major topic of concern, especially given that issues related to sustainability and climate change are increasingly becoming more important and relevant in the current political climate. Therefore, it is important to know the impacts that these kinds of policies would have on consumption behaviour at the individual level and whether or not these policies would contribute to more or less sustainable behaviour. The case study for this research was on benefit recipients in the Netherlands, with a particular concentration on students in the city of Groningen for deeper analysis of consumption behaviour. The research question was: *To what extent does basic income influence an individual's consumption pattern that is perceived to be unsustainable, particularly among university students in the city of Groningen, the Netherlands?* Methods used to answer this research question included both quantitative and qualitative approaches, where a quantitative approach was used to analyse general trends and to find relationships between expenditure and income, while a qualitative approach was used to gain a deeper understanding into individual consumption behaviour and how source of income may have an impact on it.

From the quantitative analysis, it is concluded that there is a positive relationship between consumption expenditure and disposable income. This finding is in line with the economic theory of rational behaviour as well as with the theories of Hall et al. and MacNeill & Vibert in which they hypothesise that higher levels of disposable income lead to higher levels of spending. More importantly, it is also found that higher levels of disposable income is correlated to higher levels of unsustainable consumption and production patterns. When it comes to differences in spending between benefit recipients and non-benefit recipients, it is found that the disposable income of benefit recipients have a slightly stronger relationship with unsustainable consumption spending than the disposable income of non-recipients, potentially implying that benefit recipients have a greater degree of influence on unsustainable consumption and production patterns than non-recipients. It is important to mention, however, that correlation does not equal causation. Therefore, while relationships have been found between disposable income and unsustainable consumer spending, no definitive conclusions can be derived from this.

As far as the results of the qualitative analysis go, mixed results were found with regards to predicting consumption behaviour with a basic income. Currently, none of the students interviewed receiving assistance take sustainability into major consideration when spending, and that is unlikely to change if they receive a basic income. That being said, it is also found that they are unlikely to spend more money if they receive a basic income. This contradicts the theory of rational behaviour in economics and the theories of Hall et al. and MacNeill & Vibert. The explanation for this is that individuals do not behave rationally in reality as there are external factors other than price and income involved in consumption, thereby making the theory of rational behaviour obsolete in this case. Because of the degree of subjectivity

related to individual consumer behaviour, and due to the fact that a sample of only three students were interviewed for this research, no hard conclusions can be made with regards to the effect of a basic income policy on individual consumer behaviour.

Given the lack of data and hard evidence that implementing a basic income policy would result in more sustainable consumption, it is impossible to determine at this moment whether a basic income policy can be considered as a “smart city” policy. The implication is that the degree of success that such a policy could achieve is possibly context-dependent, as the effects may differ between target groups and even between certain areas. Moreover, existing research on basic income itself as an effective solution against automation-driven job displacement also shows varying results, and at this point it is too early to come to a definitive conclusion of its actual effects as not enough research has been done on the subject. Therefore, it is recommended that more pilot projects need to be carried out in order to fully understand the true effects of a basic income policy on employment and societal well-being. In addition, future pilot projects should also study consumption patterns of individuals receiving a basic income to understand the actual effects that it has on sustainability by conducting surveys and interviews with test subjects, so as to reduce the need to rely on abstract data and hypothetical predictions when conducting future research on the subject.

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Appendix

Interview guide

Good morning/afternoon/evening. Thank you for taking the time to participate in this interview. Do you have any questions before we get started?

Part 1: Understanding current habits

I would first like to explain a little bit of what my research is about. I'm looking at how a basic income policy would affect consumption patterns and consumption behavior among consumers and whether they would be more sustainable or unsustainable with their spending. So to get to know this, I first want to ask you what are your current spending habits like? Give a rough overview of your daily/monthly expenses in terms of how much money you spend on certain things (such as rent, groceries, food, etc.).

What are some of the things you like to buy? What do you tend to spend more on (specific items such as clothes, milk, bread, etc.)? What are the reasons for these tendencies in spending (such as higher disposable income, necessary goods, etc.)?

Are there certain things you take into account when buying a product (such as environment, supply chain, etc.)? Why do these issues matter to you?

Part 2: Flows of income and government benefits

For this next part, I would like to ask about your flows of income and the amount you receive. This topic may be personal for you, so I first want to ask if you're comfortable with answering these types of questions. You don't have to if you don't want to. (If no, skip to part 3. If yes, proceed with questions).

First, I would like to know what are your current streams of income and how much do you receive each month (such as allowance from parents, job, benefits)?

Are you currently receiving any social assistance? If yes, what type of assistance is it and how much do you receive each month (such as DUO loans, rent subsidies, etc.)?

If receiving assistance: How does receiving assistance affect your spending? Do you spend more or less because of it? Would your spending habits be different if you didn't receive assistance? If yes, in what way?

Part 3: Anticipating spending habits with a basic income policy

This final part of the interview is about basic income. In a hypothetical situation, the government of your country implements a basic income program in which every citizen

receives a basic income (let's say 1000 euros a month) without any preconditions (so no income or employment requirement to receive it). If you received that money, would your spending habits change?

If yes, what would you spend it on? Would you spend more or less on certain goods? Would you spend on things that you could not afford previously?

With this extra money, would you consider (environmental, sustainable, supply chain) aspects in your spending? Why or why not? If you already consider these aspects in your spending, would the extra money change that? If yes, how so?

Part 4: Final remarks

We have reached the conclusion of the interview. Before we finish, is there anything else you would like to add?

Okay, thank you again for your time and have a good rest of your day/evening.