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D4.2 Comparison of policy instruments to reduce the environmental impact of food production and their effectiveness in terms of consumer acceptance

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1. Introduction

In order to effectively address the issues surrounding food production, food consumption, human and planetary health while also responding to the challenge of feeding the growing world population, it is important to reconsider modern diets and the conventional system of food production in favour of establishing more sustainable production and consumption patterns which reflect the principles of a circular economy. These principles broadly include the increased recyclability of resources and minimization of waste, including food waste (European Commission 2015).

Organic food production has long been considered an alternative to conventional production methods as its production relies on the use of organic (non-mineral) fertilizers and compliance with stricter animal welfare rules. This reliance on organic fertilizers contributes to recyclability of resources as organic farms apply animal manure to fertilize land (Government of Ireland 2019). To further support the development of organic food production, the European Commission has set an ambitious goal of increasing the area under organic cultivation to 25% by 2030 (European Commission 2020). While the objective of such a move is to increase the supply of organic food, it remains to be seen if this can be matched with a comparable increase in consumer demand. Consumer demand may reflect consumer expectations or preferences for various characteristics of food, including its environmental profile, price, as well as its origin and availability in the market etc. These preferences may also vary across different countries since the organic food market has developed at different rates across Europe.

The increased consumption of sustainably produced food is not sufficient without addressing the critical problem of household food waste. Recent estimates indicate that more than 20% of produced food is wasted in the EU and more than half of that amount comes directly from households (Stenmarck et al. 2016). The production of food requires the use of valuable and often limited resources, such as land, water, and energy. However, the true social cost of food waste may considerably exceed the direct or internal cost of its production since more negative external effects may typically emerge, such as environmental degradation or hunger (Katare et al. 2017).

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Therefore, to formulate policy instruments that are acceptable to consumers we first need to understand the behavioural motives behind the intentions among European consumers to purchase or consume organic food. Similarly, to prevent food waste from happening, new policy measures and interventions aiming to correct such profligate consumption habits might be necessary, which requires a thorough understanding of factors inducing food waste behaviour. Both of these behaviours can be primarily conceptualized in the form of personal attitudes, subjective (social) norms, behavioural controls, and moral considerations of the as outlined in the Theory of Planned Behaviour and the Norm Activation Model (Ajzen 1991; Schwarz 1977).

Many types of policy instruments are proposed to address sustainable consumption and to direct consumers in a desirable and sustainable trajectory. These instruments include regulatory, economic, communication and procedural policies (Wolff & Schönherr, 2011). Regulatory policies include those that often ban or limit use of products, while economic policies tend to focus on incentives or subsidies to positively encourage a particular behaviour. Communication policies have a focus on consumer education and information campaigns and labelling while procedural policies are very diverse and include instruments such as corporate social responsibly and infrastructure provision for sustainable activities (Wolff & Schönherr, 2011). These policies should be developed with evidence acquired from consumer behaviour and acceptance studies to increase successful outcomes of the proposed policies.

Overall, the main objective of this research report is to provide a systemic review of behavioural factors that influence purchasing and consumption of organic food as well as reduction in and recycling of household food waste in the EU with a view to providing evidence upon which policies can be formulated and based and the type of policy instruments most suited to the behaviour.

2. Understanding sustainable consumer behaviours: theory to evidence

In the published literature, many theories and frameworks have been proposed to explain and describe consumer behaviour supported by key behavioural constructs underlying both people's intentions to perform behaviours or the behaviour itself. The Theory of Planned Behaviour and the Norm Activation Model are frequently used accounting for much of the research literature in sustainable consumption and behaviours. In summary, multiple behavioural constructs from different theories are used to characterize sustainable behaviours such as purchasing of organic food or food waste. Personal attitudes, social norms, and behavioural control are shown to underlie the rational motives that maximize personal benefits or utilities, while moral norms appeal to the human desire of producing common good. While originally separate, these constructs are often applied in an integrated form to explain sustainable behaviour in a holistic way.

The Theory of Planned Behaviour (TPB) appears to be the most utilised in the studies reviewed. Figure 1 shows the summary of statistical effects of different constructs on organic food consumption and purchasing, drawing on studies from a range of European countries, including UK, Italy, Finland, Netherlands, Germany, Czech Republic, Croatia, Spain, Belgium, Denmark, Greece, Sweden, France, and Romania.

3. Baseline TPB model

The conventional TPB measures three constructs to determine intention and/or behaviour: attitude, subjective (social) norms, and behavioural control (PBC). In all of the reviewed studies, attitude was found to have a significant positive influence on intention (Scalco et al. 2017). Attitude is one of the most significant indicators of intention to purchase or consume organic food in many studies across Europe (Fleseriu et al., 2020; Tarkiainen & Sundqvist 2005; Vassallo et al. 2016; Vermeir & Verbeke, 2008).

Another construct of the baseline TPB that showed a consistent positive influence on either intention to purchase organic or organic consumption is subjective norm. For example, two studies involving consumption of organic fresh tomatoes and tomato sauce found a positive effect of subjective norm on the intention to buy these products in such countries as Denmark, Sweden, Italy, Finland, Spain, Germany, Greece, and the UK (Ruiz de Maya et al. 2011; Dean et al. 2012). Other studies also found that subjective norm induces the intention to buy organic milk (Carfora et al. 2019; Klöckner & Ohms 2009) as well as apples and pizza (Arvola et al. 2008; Dean et al. 2008). While it is considered an independent construct by the postulates of the classic TPB, subjective norm was previously also found to be correlated with both attitude and behavioural

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control, resulting in its role as a mediating factor between those constructs and the intention to buy organic food (Al-Swidi et al. 2014; Scalco et al. 2017).

Perceived behavioural control (PBC) differs from attitude and subjective norm in that it is measured as an influencer of both intention and behaviour directly. Interestingly, the reviewed studies have differing results in this regard. PBC has been shown to significantly influence both behaviour and intention (Vassallo et al. 2016; Zagata 2012), intention only (Lodorfos & Dennis 2008), behaviour only (Onwezen et al. 2014) or have no significant relationship (Arvola et al. 2008). Carfora et al. (2019) found PBC to have the greatest effect on organic milk buying behaviour than any other measured construct while other studies only found a weak relationship. (Dean et al. 2008; Ruiz de Maya et al. 2011; Scalco's et al. 2017).

4. Additional constructs and the extended TPB model

Moral norm is the most common additive construct, which likely stems from the recognised failure of TPB to measure the moral component of behaviour. NAM was used to successfully predict organic food consumption (Klöckner & Ohms 2009; Onwezen et al. 2013). In six studies and found moral norm to be a significant positive predictor of behavioural intentions related to organic food purchases. These studies cover multiple countries, including Czech Republic (Švecová & Odehnalová 2019), Netherlands (Onwezen et al. 2014), the UK (Dean et al. 2012), as well as France, Italy, and Finland (Guido et al. 2010; Arvola et al. 2008).

Self-identity, defined as a label people use to describe themselves, is another construct outside of the baseline TPB model that is often utilized to better explain consumer intentions and behaviour. Three studies were found which utilised the construct, all three found self-identity to be a significant positive predictor of intention. Additionally, one study also clearly showed its independent from moral norm role in the formation of behavioural intentions (Dean et al. 2012). Apart from Europe, the effectiveness of the construct was also compared, and its prediction capabilities verified globally too (Yazdanpanah & Forouzani 2015).

Apart from moral norm and self-identity, many other constructs could be found as predictors of behavioural intentions and consumption, such as environmental concerns and lifestyle in Romania and Czech Republic (Fleseriu et al. 2020; Švecová & Odehnalová 2019), different variations of trust in Italy (Carfora et al. 2019), or past behaviour in Italy and the UK (Carfora et al. 2019; Dean et al. 2012). While TPB and NAM are the two major frameworks used to study and explain consumer behaviour, other theories such as the Value-Belief-Norm theory and Attitude-Behaviour-Context theory were also applied (Zepeda & Deal 2009).
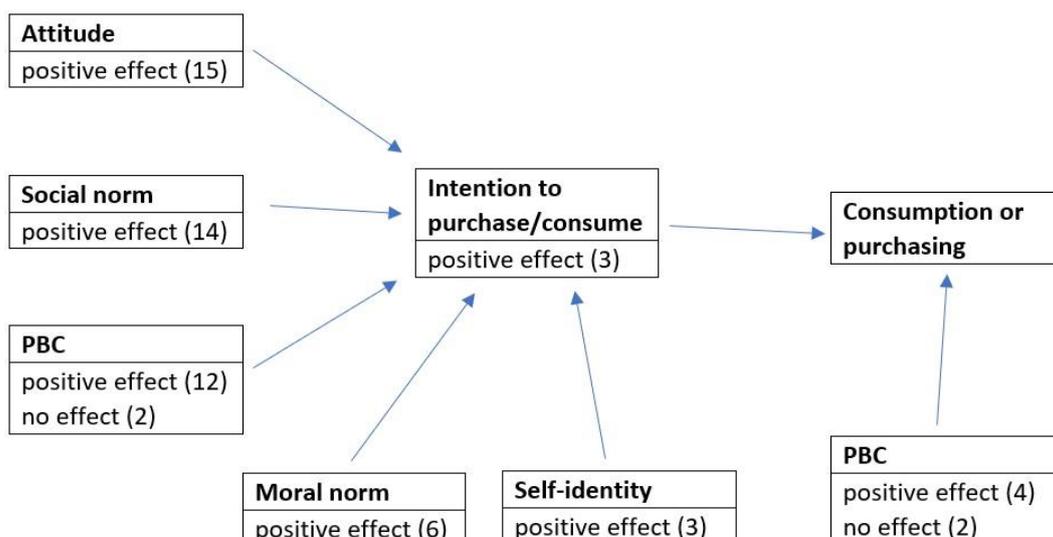

Figure 1. Key predictors of organic consumption and purchasing behaviour (parentheses contain the number of studies reporting the respective effects)

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5. Predictors of food waste behaviours

As with organic consumption and purchases, the reviewed studies of food waste behaviour are primarily based on TPB or NAM. Figure 2 shows the summary of statistical effects of different constructs on food waste behaviours, with the number of studies in parentheses.

6. Baseline TPB model

As in the organic food studies, attitude appears to be an important significant predictor of various intentions towards food waste. The study from Russells et al. (2017) did not report evidence of a significant impact of attitude on intention to reduce waste. While Fiore's et al. (2017) study showed positive correlation between moral attitudes and the intention not to waste food, no conclusion can be made about the causality of this effect.   Regarding subjective norm, seven studies reported the inclusion of this construct in their analyses and two studies found the positive impact of subjective norm on the intention to reduce food waste (Russell et al. 2017; Graham-Rowe et al. 2015). Additionally, Mondéjar-Jiménez et al. (2016) found that subjective norm stimulates what they call "positive behaviour towards food waste". In terms of the impact of behavioural control, three studies revealed its positive effect on the intention to reduce food waste (Russell et al. 2017; Mondéjar-Jiménez et al. 2016; Graham-Rowe et al. 2015), while two studies also found that behavioural control significantly affects food waste behaviour (Stancu et al. 2016; Mondéjar-Jiménez et al. 2016).

7. Additional constructs and the extended TPB model

Several additional constructs were put forward to better explain the variance in food waste intention and behaviour. The construct of moral norm featured with mixed results. For example, Visschers et al. (2016) found a significant positive effect of moral norm on the intention to avoid food waste, while no such effect was detected in Stancu's et al. (2016) study. Interestingly, Graham-Rowe et al. (2015) also initially included this construct in their model but eventually decided to leave it out due to the high correlation with two other constructs (self-identity and anticipated regret), which in this case supports the assumption of overlap between the constructs. Both self-identity and anticipated regret in turn were found to be significant positive predictors of the intention to reduce waste in that study. Similarly, self-identity was found to increase the intention to recycle food waste in the study by Reid et al. (2018).

Furthermore, two studies measured the effect of shopping and/or planning routines on food waste behaviour. Both Stancu et al. (2016) and Stefan et al. (2013) found that the propensity to purchase more food than necessary contributes to more waste, while Stefan et al. (2013) additionally found that careful planning significantly reduces food waste. In the correlational study by Fiore et al. (2017), planning and shopping routines were found to be negatively and positively correlated with food waste behaviour respectively. Apart from those mentioned earlier, other factors such as past behaviour (Reid et al. 2018; Russell et al. 2017), negative emotions (Russell et al. 2017), or perceived health risks (Visschers et al. 2016) may be important predictors of food waste intentions and behaviour, but more studies are necessary to derive any specific conclusions about their effects.
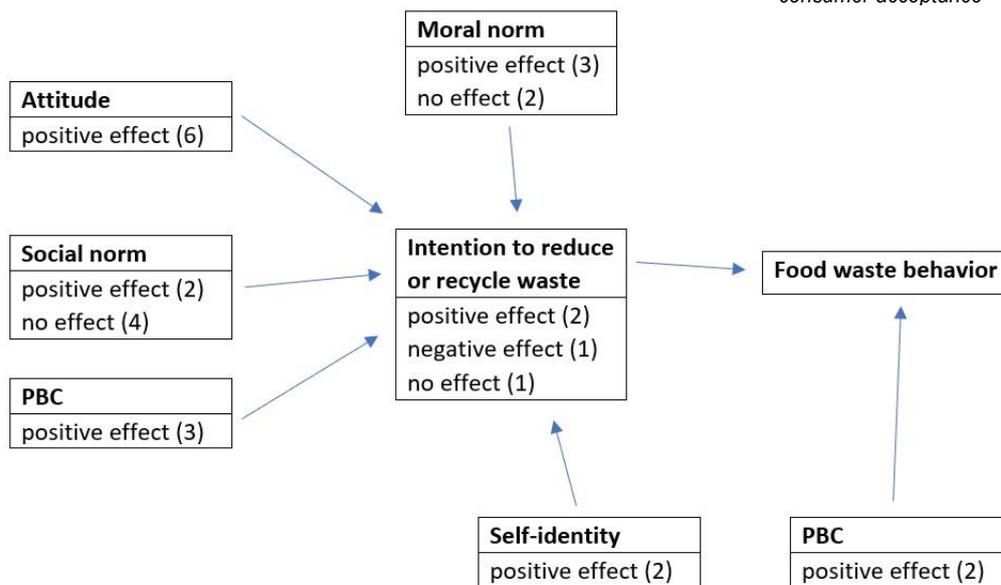
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Figure 2. Key predictors of food waste behaviour

8. Implications for policy instruments

Drawing on the results of organic consumption studies, it is worth emphasizing the important role of information campaigns to promote the outstanding qualities of organic food and specify its availability among many competing food options in the market. The most suitable policy instrument in this situation is communication. The objective of such communication campaigns would be to form stronger positive attitudes towards purchasing and consuming organic foods and make the choice of organic food more conventional rather than spontaneous. This is supported by this review's finding of a positive role played by personal attitudes in the formation of organic purchasing intentions. In the case of food waste, the provision of information via communication policy, can be used to form and develop negative attitudes towards food waste thus reducing the intention to waste. Regulatory or economic policy instruments also have a role to reduce the occurrence of food waste via additional tax on food waste generated both in domestic and commercial settings. The procedural policy instrument is also an appropriate one for the role of corporate responsibility within the restaurants and retailers domain to make commitments to minimise, reduce and recycle food waste. Examples of how the different policy instruments can be applied in the context of increasing organic food consumption and based on empirical research are outlined in Figure 3 below.
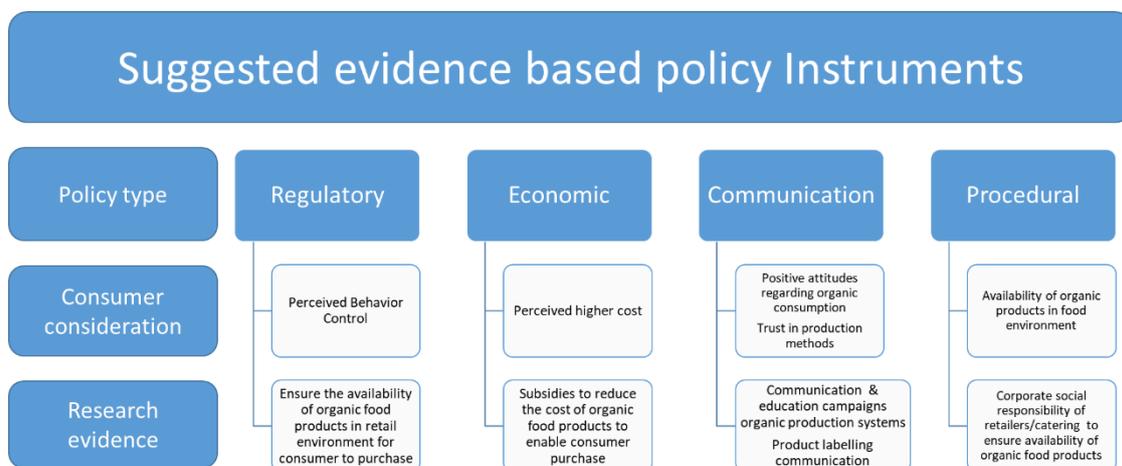

Figure 3. Policy instruments to increase organic food consumption

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9. Conclusion

This research review showed that certain behavioural constructs of the theory of planned behaviour and the norm activation model often affect the intentions of European consumers to purchase and consume organic food and generate food waste. The current evidence demonstrates that attitude, subjective norms, and to a lesser extent perceived behavioural control have a significant influence on organic food consumption decisions. Apart from the purely rational motives, other considerations like moral norm and self-identity may be also influential predictors of such decisions. Similarly, to the extent of the available limited evidence, personal attitudes may predict well consumer intentions to reduce or recycle food waste. Understanding these behavioural constructs can enhance the development of policy instruments that will be acceptable to consumers to increase organic consumption and to reduce food waste

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