

An Assessment of the Applicability of Behavioral Economics' Tools to Policy Making Process Considering Sustainable Development Goals

Abeer Mohamed Ali Abd Elkhalek¹

¹ College of Management and Technology, Arab Academy for Science, Technology and Maritime Transport, Egypt

Correspondence: Abeer Mohamed Ali Abd Elkhalek, College of Management and Technology, Arab Academy for Science, Technology and Maritime Transport, Egypt. E-mail: abeer_abdelkhalek@yahoo.com

Received: July 30, 2020

Accepted: August 25, 2020

Online Published: September 18, 2020

doi:10.5539/ijef.v12n10p57

URL: <https://doi.org/10.5539/ijef.v12n10p57>

Abstract

Achieving sustainable development goals in a very dynamic and complicated world requires innovated solutions. As people are in the heart of the developmental process, understanding what motivates people and what drives their behaviors is a must for designing policies targeting the achievement of developmental goals. This paper aims to assess how the behavioral economics' tools may be applied to directing people's behaviors toward more sustainable activities and then contributing to achieve sustainable development goals. Using deductive qualitative approach, and a comparative analysis, the study explores and discusses to what extent insights and techniques from behavioral economics may affect and change policy making process and then public policies' outcomes specifically in the context of sustainable development disciplines. The results showed a vital role of behavioral economics tools in developing public policies in accordance to real behaviors of people which -in turn- help in achieving sustainable development goals. Moreover, it was concluded that changing humans' behaviors toward more sustainable patterns of life provides so many opportunities to strengthen the effectiveness of policies for sustainable development in both developed and developing countries. Using behavioral economics tools, policymakers can design more effective policies to achieve Sustainable Development Goals (SDGs).

Keywords: Behavioral Economics (BE), Behavior Insights (BI), Behavioral Economics Team (BET), Sustainable Development Goals (SDGs)

1. Introduction

Most of the work in environmental sciences focuses on environmental sustainability while much of development economics researches focuses on alleviating poverty and enhancing more justice in income distribution. Sustainability can be enhancement only if alleviating poverty and reducing income inequality -taking into account environmental considerations- are integrated with sustainable patterns of behavior in the society. Sustainable development is the one that meets the needs of the present without compromising the ability of future generations to meet their own needs. Sustainable development requires meeting the basic needs of all and extending to all the opportunity to fulfil their aspirations for a better life (Brundtland, 1987). The challenge of achieving sustainability is great and pressing. Major of on-going changes in earth systems could cause potentially large negative consequences for human well-being. How to reduce poverty and address rising inequality in the face of these environmental changes? This dilemma constitutes the basis of sustainable development. Strong arguments exist for devoting greater efforts to increase our understanding of the environmental, social, and economic dimensions of sustainable development, which require changes in human behavior and actions in relationship to sustainable development goals (Stephen et al., 2019).

Behavioral economics is the study of how psychological, social, cognitive, and emotional factors influence the behavior of individuals and institutions. The central idea of behavioral economics is that individuals do not always act as rationally as assumed in the models of neoclassical economics. Influenced by a long tradition of research in especially psychology, it is arguing that one needs to study the real-life psychological underpinnings of decision making to understand economic phenomena (Dirk & Julia, 2018). At the Rio +20 Summit in 2012, a new set of global goals was defined to take effect on the expiry of the previous UN Millennium Development Goals (MDGs). In September 2015, 193 Member States of the United Nations approved the 17 Sustainable Development Goals for the 2030 Agenda. The SDG framework promotes economic development, social

inclusion, and environmental protection in all nations of the world (Margherita et al., 2019). The Sustainable Development Goals are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate change, environmental degradation, peace, and justice. The 17 Goals are all interconnected, and to leave no one behind, it is important that we achieve them all by 2030.

Sustainable development is not just about sustainability in the sense of how to maintain the environment. Sustainable development is about how to simultaneously alleviate poverty/improve material standards of living and maintain or enhance vital natural capital necessary for future well-being (Stephen et al., 2019). So, there is an urgent need for policy makers to consider the interrelation between the economic, social, and environmental dimensions of sustainable development when targeting the achievement of its goals. Behavioral economics shows that real people suffer from all sorts of cognitive biases that prevent them from acting rationally. (Sent, 2004; Heukelom, 2014) offered empirical proof that actual decision making violates the basic ideas of the rationality assumed in economics.

This paper discusses some key behavioral insights that help to explain the challenges and opportunities of modifying human behavior's patterns toward sustainability and describes several effective examples of how behaviorally informed policies have been implemented in both developing and developed countries. This study also introduces important recommendations related to the mechanisms of shifting behavior in desirable directions and designing policies to achieve desirable outcomes by integrating economics with other disciplines in pursuit of sustainable development which includes three dimensions: economic, social and environmental dimension. A society cannot be sustainable unless it has incorporated social justice, economic welfare, as well as environmental protection, into its guiding principles (Fawad, 2019).

2. Material and Methods

To achieve the main objective of this study, the methodology used is descriptive in nature because it mostly explores the applicability of BE tools to policy making process regarding each dimension of sustainable development (economic, social and environmental dimensions) considering countries' experiences. The empirical study depends on a combination of inductive and deductive approach to draw a complete picture about how policy makers can use BI and BE tools to improve and innovate new effective policies to achieve SDGs. This study analyses the existing evidence regarding the role, limitations and the varying degree of success of BE tools in designing public policies. It also builds on literature analysis of the existing body of knowledge on integrating BE and BI in different policy context to explore potential avenues for employing behavioural science in policy making process through changing the behavior of individuals, where specific and concrete behavioural choices are targeted.

3. Results

3.1 BE Tools and Economic Dimension of Sustainable Development

The core question at the heart of sustainable development is how to allocate the finite resources of the planet to meet “the needs of the present, without compromising the ability of future generations to meet their own needs”. Focusing on SDGs, specifically goal 1 (End poverty) and goal 12 (Ensure sustainable consumption and production patterns), data collected showed that: (UNDP, 2020)

- 10% of world's population live in extreme poverty.
- 1.3 billion people live in multidimensional poverty.
- 1.3 billion tonnes of food are wasted every year, while almost 2 billion people go hungry or undernourished.
- The food sector accounts for around 22% of total greenhouse gas emissions, largely from the conversion of forests into farmland.
- Only 3% of the world's water is drinkable, and humans are using it faster than nature can replenish it.
- 20% of the world's final energy consumption in 2013 was from renewable sources.
- If people worldwide switched to energy efficient light bulbs the world would save US\$ 120 billion annually.

Sustainable patterns of consumption and production means doing more and better with less by improving resource efficiency and promoting sustainable lifestyles. Sustainable consumption and production can also contribute substantially to poverty alleviation and the transition towards low-carbon and green economies

(Saugato & Sendhil, 2014).

Moving to more sustainable patterns of consumption and production is crucial to the future of the world, and policymakers have been concerned of this fact for periods. At the 1994 Oslo Conference, participants called for “minimizing the use of natural resources and toxic materials, as well as the emissions of waste and pollutants over the life cycle of the service or product so as not to jeopardize the needs of future generations” (UNEP, 2017).

Achieving sustainability in that context requires sustainable use of natural resources and some kind of change in consumption patterns as it is a crucial part of the challenge. While efforts are being made by many organizations to influence the way goods and resources are produced, priced, and distributed, production is only one side of the equation. People consume what is produced; producers supply what they believe consumers demand. Thus, adopting both supply and demand sides for sustainable goods and services in our marketplaces is necessary. Incorporating a more demand-oriented and consumer-focused approach in policy and governance frameworks is critical to encouraging more sustainable consumption patterns in practice. Individual behavior plays a significant role in consumption. The billions of small decisions that people all over the world make each day have momentous impacts, but there are opportunities everywhere to shift consumers towards more sustainable choices (UNEP, 2017).

Attempts to shift human behavior—whether at the individual, household, or aggregate scale—can result in limited or unexpected results. Policymakers have many tools to affect behavior, including regulations and industry standards; economic incentives, such as taxes, subsidies, and other price changes; and education and information, such as environmental labels on products, and outreach and marketing campaigns. While all these tools are essential for changing consumption patterns, a well understanding of consumers’ behavior is also important. Policy attempts do not always result in the supposed consequence. For instance, raising the price of energy to reduce demand is not always effective. Many policy levers rely on the premise that consumers rationally assess the costs and benefits of all available alternatives and make decisions appropriately. But as behavioural sciences show, consumers’ decisions and actions are often disposed to present bias, which causes individuals to overweight direct costs and benefits, contributing to outcomes like delay and ineffective use of resources, and policy failures. On the other hand, Policy makers meet substantial political challenges when pursue restricting or forbidding particular goods with extreme ecological impact, eliminate household subsidies or charge for natural resources that are critical to human life (UNDP, 2017).

Behavior economics, draws on main improvements in the study of decision-making to better understand the complications of personal behavior. Employing findings from this area to public policy and programme design offers new and possibly effective chances to affect consumer choice and increase impact. Furthermore, behavioural involvements are often cost-effective and/or easily integrated into existing policies and programmes, once the effort to understand and design for the context has happened. In terms of achieving sustainable consumption, behavioural interventions may promote more effective use of vital resources like energy and water and aim to shift consumers towards choices that have reduced impact on the environment. Evidence from behavioral and experimental economics suggests that people care about the welfare of others (Charness & Rabin, 2002), they are affected by their short-term feelings (Loewenstein & Lerner, 2003), and they resort to heuristics when faced with a complex choice environment among others (Gabaix et al., 2006). Behavioral economists proposed to nudge and wink people to make better choices for them and the society around the globe. Behavioral economics concentrates less on organizations, especially markets and their disappointments, but on failures in decision making. Policy is therefore less disposed to regulate the market, but rather the behavior of individuals on markets. The application of behavioral economics to business sector economic analysis is a cutting-edge method to secure the power of real-world related economics (Dirk & Julia, 2018).

Behaviourally informed policy tools can help individuals better assess costs and benefits and act on their preferences, improving the efficiency of government interventions. The behavioral perspective on decision making indicates that apparently small and low-cost policy. Changes in behaviours may also have a huge effect on the accomplishment of development targets concerning the reduction of poverty. Using many policy tools, policy makers can help people make better decisions, which in turn reduce poverty. Those tools include framing, anchoring, simplification, reminders, and commitment devices. The evidence shows that while policy makers may not be able to solve individuals’ behavioral restrictions, a psychologically informed understanding of decision making can help them to recognize those constraints and design policy to account for them and improve the match between intended and actual effects of public policies. For instance, behavioral economics has provided new answers and new approaches to important questions in many areas of economics such as the questions about why the poor stay poor (Banerjee & Mullainathan, 2008). It has furthered our understanding of

the nature of poverty by showing how poverty is as much about psychological and cognitive scarcity as about financial and material deprivation, which are the focus of traditional economic theorizing about poverty (Bertrand et al., 2004)

3.2 BE Tools and Social Dimension of Sustainable Development

If a socioeconomic environment leads to a reduction in well-being, it is an indication that it needs to be changed through social policy regulation and economic improvements. Thus, psychology can also be applicable to sustainable development by helping to shape social policies that foster mental health and well-being in both developed and developing countries. Focusing on SDGs, specifically ending hunger and improving nutrition (goal 2) and achieving gender equality (goal 6), the available data showed that: (UNDP, 2017)

- The number of hungry persons is about 821 million in 2017, 63% out of them are in Asia.
- About 151 million children under five, 22%, are stunted.
- More than 1 in 8 adults is overweight.
- 1 in 3 women of reproductive age is anemic.
- 750 million girls all over the world were married before the age of 18.
- In many countries, husbands can legally prevent their wives from working; in 39 countries, daughters and sons do not have equal inheritance rights; and 49 countries lack laws protecting women from domestic violence.
- 20% of women have suffered from physical and/or sexual violence by an intimate partner within the last year, and 49 countries have no laws that protect women from such violence.
- Only 52 percent of women married or in a union freely make their own decisions about sexual relations, contraceptive use and health care.
- Globally, women are just 13 percent of agricultural land holders.
- Women in Northern Africa hold less than one in five paid jobs in the non-agricultural sector. The proportion of women in paid employment outside the agriculture sector has increased from 35 percent in 1990 to 41 percent in 2015.

Empirical evidence proved that changing human's behavior and society's norms is a must for achieving social sustainability. For example, it was proved that the large gender gap in educational fulfilment between girls and boys in India is in part due to the belief that there are few economic outcomes from educating girls, whose core social role is thought to be restricted to housework. That opinion is confusing as they encourage pulling girls out of school, which in turn means that their economic opportunities in fact remain limited. To solve this problem, Jensen (2012), founded that providing villagers a precise information about the availability of jobs for girls with high-school degrees and how to get such jobs causes young girls to stay in school longer, makes them more likely to search for waged work, and leads to them marrying later. Another way in which psychology is relevant, is its application to fix some of the fall-out of unsustainable development e.g., disaster relief and psychological resilience building in the wake of natural disasters brought about by man-made climate change, or conflict reduction through nonviolent communication, trauma interventions and peace building in the wake of conflicts between ethnic groups or over extraction of resources. Psychology can be relevant as an indicator of unsustainable development. Health is at the centre of sustainable development and a society is unsustainable if its economic and social systems and institutions are compromising mental as well as physical health. (Fawad, 2019).

Revealing the possibility of behavioral solutions needs to take a systematic approach to identifying fundamental problems, evaluating the potential impact of behavioral economics approaches, and translating these insights into improvements in programs. This can only be achieved by making some deep-seated changes in the way we go about applying behavioral insights in development. This means that governments need to be open to involving behavioral experts when programs are first designed as well as to experimenting on existing programs.

3.3 BE Tools and Environmental Dimension of Sustainable Development

The environmental sciences have recorded large and annoying changes in planet systems, from climate change and loss of biodiversity, to changes in hydrological and nutrient cycles and exhaustion of natural resources. These global environmental changes have large negative effects for future human life and create doubts about whether the world is on a sustainable path or is "consuming too much" by diminishing essential natural capital. The increased scale of economic activity and the consequent increasing impacts on a limited earth arises from

both major demographic changes-including population growth, shifts in age structure, urbanization, and spatial redistributions through migration and rising per capita income and shifts in consumption patterns (Sergey et al., 2014). Sustainable development is a balance struck among eco-system health, economics and improved social wellbeing and justice to prevent the exhaustion of the resources necessary for the continuation of life on the earth. It is about achieving and maintaining ecological balance through an understanding of how the environmental, economic, social, cultural and political factors interact (Shohel & Howes, 2011).

Focusing on SDGs, specifically goal 7 (Ensure access to affordable, reliable, sustainable and modern energy) and goal 13 (Take urgent action to combat climate change and its impacts), available data showed that: (UNDP & IPCC, 2019):

- Energy is the major supplier to climate change as it produces more than 60% of greenhouse gases.
- One in 7 people still lacks electricity, and most of them live in rural areas of the developing world.
- More efficient energy standards could reduce building and industry electricity consumption by 14%.
- About 40% of the world's population depend on polluting and unhealthy fuels for cooking.
- 20% of power was produced through renewable sources.
- To restrict warming to 1.5 C, global net CO₂ emissions must decrease by 45% between 2010 and 2030, and reach net zero around 2050.
- Climate pledges under The Paris Agreement cover only one third of the emissions reductions needed to keep the world below 2 °C.
- Global emissions of carbon dioxide have increased by almost 50 percent since 1990.
- From 1880 to 2012, average global temperature increased by 0.85 °C. To put this into perspective, for each 1 degree of temperature increase, grain yields decline by about 5 percent. Maize, wheat and other major crops have experienced significant yield reductions at the global level of 40 megatons per year between 1981 and 2002 due to a warmer climate.
- Oceans have warmed, the amounts of snow and ice have diminished, and sea level has risen, from 1901 to 2010, the global average sea level rose by 19 cm as oceans expanded due to warming and ice melted. The Arctic's sea ice extent has shrunk in every successive decade since 1979, with 1.07 million km² of ice loss every decade
- Given current concentrations and on-going emissions of greenhouse gases, it is likely that by the end of this century, the increase in global temperature will exceed 1.5 °C compared to 1850 to 1900 for all but one scenario. The world's oceans will warm, and ice melt will continue. Average sea level rise is predicted as 24–30 cm by 2065 and 40-63 cm by 2100. Most aspects of climate change will persist for many centuries even if emissions are stopped.
- Global emissions of carbon dioxide have increased by almost 50 percent since 1990
- Emissions grew more quickly between 2000 and 2010 than in each of the three previous decades.

Balancing between economic growth and environmental considerations is more than challenging, but it is still possible through innovating new technologies, integrating climate change measures into national policies, strategies and planning, In addition, it could be done by targeting some changes in behaviours toward more sustainable patterns of consumption, production, and other aspects of life. For example, Norway has an independent organisation promoting and supporting the use of behavior insights in designing environmental policies. That organisation- called "GreeNudge"- has an obvious emphasis on sustainability and aims to initiate, fund and encourage research into behavioural change to alleviate climate change. Examples of projects include analysis of the recover effect of heat pumps, the reduction of food waste in restaurants, and an experiment to stimulate the sales of energy saving machines by adding information about total life cycle costs to the energy label (Kallbekken et al., 2013). GreeNudge (2013), has produced a report on the potential for nudging in Norway's climate policy. It presents nudging as an attractive policy instrument for climate policy because it does not involve force and thus reduces potential resistance. Compared to other climate policy mechanisms, it entails low risk, especially since measures are tested before implementation. Behavioural interventions are argued to be relatively quick and simple to implement and cost effective. As an example, the food waste reduction project delivered savings of 25000 NOK per ton of CO₂ mitigated. The report also emphasises the potential to combine climate policy measures with health benefits. Nudge might be a promising tool for advancing sustainable consumption because nudge tools do not restrict consumer choice (Sunstein, 2014). The three most

environmentally relevant areas of consumption, which together sum up to 75 – 80% of the life cycle environmental impacts in industrialised countries are housing (especially heating systems), transport (especially car use and air travel) and food and drink (especially meat and dairy) (EEA, 2013). These areas are also the ones where nudge researchers and practitioners see the largest potential (Stordalen & Kallbekken, 2014).

Energy use in the household is an area where behavior is not economically rational (people could save money if they saved energy, but they do not). It is also an area where psychologists and sociologists have been involved in developing policy advice since the energy crises. One of the important contributions of behavioural economics to energy efficiency policy is to counteract the economics-based reasoning, which argues that there cannot be an “energy efficiency gap” since people always behave rationally (Geller & Attali, 2005; Gillingham & Palmer, 2014).

In a study of the impact of an eight-month period of obligatory electricity saving in Brazil, evidence indicates that the policy led to a continued decrease in electricity use, with consumption 14% lower even 10 years after rationing ended. Household data on the ownership of appliances and on consumption habits indicate that a change in habits was the main reason for the decrease in consumption (Costa, 2012).

Another example comes from “O power”, a leading US provider of customer engagement and energy efficiency cloud services to utilities. O power provides households with

“Home Energy Reports” that consists of two parts: one containing suggestions on how to

reduce energy adapted to the household and the other using social comparison that compares the household to the 100 nearest houses of similar size. In an analysis of 78492 households separated into treatment (39217 households) and control (39275 households), those receiving the social comparison reduced electricity consumption by 2.0 %, on average. O power estimates that this would result in a reduction of over 450000 tonnes of CO₂-emission equivalent to USD 75 million in energy savings across the 15 million homes in the 6 countries they service (Allcott, 2011).

Hence, it would be best not to apply behavioral economics and behavioral insights as a separate policy area, but as an integrating and cross-cutting design element in policy making process. For instance, policy makers could work to include “green defaults” and require that applications be designed to enable and prompt sustainable behavior. If they were offered as defaults, users who do not want these features can then change them, but systems must be designed for sustainable behavior.

4. Discussion

4.1 How to Apply BI Tools to Policy Making Process

On the way to sustainability, there is an argent need to integrate and apply behavioural insights in policy making process. According to (OECD, 2019), it requires assembling some sort of permanent or temporary team, group or network includes practitioners to work extensively in the field. That team, group or network will need to encompass or be able to draw upon a variety of particular expertise, including intimate knowledge of policy processes and standard policy instruments, applied behavior insights, behavioural economics, cognitive and social psychology, experimental design and statistics Applying BI & BE tools to achieve sustainability is an empirical effort and takes time to identify policy problems, develop strategies, design, set up and run experiments, as well as implement on a larger scale and deliver advice on behavioural strategies for public policy.

The case study of (The UK Behavioural Insights Team, 2014) proved and support our findings. UKBIT has developed many valuable principles to practitioners to integrate into policy design and implementation to help people stick to their plans (which in turn can help in directing behaviours toward more sustainable patterns of life). To make desired changes in society's members' behaviours, the following principles must be clear to policy makers:

- **Make the targeted behaviour easy:** The world is complex and when any person must juggle multiple goals at once, even relatively small obstacles may become a reason for postponing acting. As a result, people tend to procrastinate leading to inertia and maintaining the status quo. “Make the best choice, the easy choice”, that is so called “Choice Architecture”.
- **Default effect by cognitive avoidance:** Changing the default is the most basic way of working with friction. For example, if people are automatically subscribed to a programme, one removes all obstacles to signing up. Simultaneously, of course, one also makes it more difficult for people to get around to unsubscribe. Use defaults so that the path of least resistance leads to the best option.

- **Framing and Priming:** The way that information is introduced and presented can have a significant impact on behavior. Framing refers to the fact that information can be presented in different ways, and that small changes in the display of messages or choices can drastically change the way they are perceived and the decisions that result. Priming refers to actions being influenced by unconscious cues that are seen or experienced before a decision or behavioral prompt.
- **Provide plans and feedback:** Some behaviour changes require that goal-directed behaviours to be continuously maintained over time. Highlight a specific piece of information to increase the chances that recipients will act on or respond to the information in a desired way. Similarly, providing ongoing feedback to people about their behavior can allow people to evaluate their own behavior and change it. Additionally, the transparency of providing regular feedback in the form of information on what is happening behind the scenes builds trust and improves satisfaction by reducing ambiguity. UKBIT found that using SMS feedback messages to recurring tax delinquents resulted in a 50% increase in payment rates as providing feedback helped people stick to a long-term goal and stay on track.
- **Implementation intentions:** A well-recognized way to succeed with a complex long-term goal is by breaking the complex goal down to simple actionable steps. Initiating as well as maintaining goal-directed behaviour can become much more likely by the making of concrete and specific action-plans, stipulating not only the goal but a context-specific plan for accomplishing that goal of the form: “When C arises, I will perform response A”. This type of conditional planning is referred to within the BI literature as implementation intention plans. This “if-then” structure has been shown to result in a higher tendency of succeeding with accomplishing one’s goals by predetermining a specific and desired goal-directed behaviour in response to a particular cue or future event (Gollwitzer & Brandstätter, 1997; Gollwitzer, 1999).
- **Create commitments (social expectations):** Social norms are the values, actions, and expectations of a society or culture and offer both implicit and explicit guides to behavior. Norms are often identified as descriptive norms (observation of what others do, providing information about what is “normal”) and injunctive norms (perceived behavior of what most people approve of, providing information on what one “should” do).
- **Manage “present bias”:** On a theoretical level, the “present bias” refers to the tendency of people to give stronger weight to payoffs that are closer to the present time when considering trade-offs between two future moments (O’Donoghue & Rabin, 1999). Practitioners may integrate this tendency into policy interventions by planning so that the tasks necessary for accomplishing a long-term goal are in the future when making a decision to pursue them and then put in place a commitment device that is hard to ignore when facing temptations. When applying BI to public policy, assume what effect size will be acceptable for developing a larger policy intervention upon given the expected costs and benefits potentially resulting from the intervention and then derive the number of participants needed to detect such an effect with an acceptable probability.
- **Simplify messages and processes to reduce cognitive requirements:** This prevents people from having to work too hard to determine their action steps and may keep them from the poorer decisions that result from cognitive load.
- **Design contextual cues to make the better choice automatic:** People react automatically to their environments, which can be designed to discourage or encourage definite behaviors.

4.2 Empirical Evidences and Case Studies

Many empirical evidences support the efficiency of using the above-mentioned principles to change behaviors toward more sustainable patterns of actions:

The Texas Department of Transportation (USA) sought to reduce littering on Texas roadways. They launched the “Don’t mess with Texas” campaign targeted at 18-35-year-old males who were known to be most likely to litter and created a slogan aimed at connecting with the social identity of the target group. The campaign has been credited with reducing litter on Texas highways by 72% between 1986 and 1990 (Texas Department of Transportation, n. d.; Texas Times, 2016).

In Germany, two natural experiments examined how default settings may affect consumer choice in regards to energy consumption— an area in which consumer behaviour is notoriously immobile because of suppliers’ use of subscriptions, the lack of urgency in revising subscriptions and the high effort it takes to get an overview of the market and change supplier. First, in Schöna, Schwarzwald, approximately 2500 citizens established the green electricity company Elektrizitätswerke Schöna in the wake of Chernobyl. Being part of this company was the

default for all citizens. Recent reports note that opt-outs are marginally above 0% per year. Second, in Southern Germany, Energieas GmbH in 1999 substituted the former one-option model with a default system in which Option 1 was a green option that cost 23% more than the original model; Option 2 was the default intermediate green option that was 8% cheaper than the original model; and Option 3 was the least green option that was an additional 8% cheaper than Option 2. As a result, 94% of consumers choose Option 2, that is the intermediate green default option, while only 4.3% choose the cheapest option, Option 3, and the remaining 2% either choose Option 1 or to change energy supplier (Pichert & Katsikopoulos, 2008).

In one such experiment run with the UK Revenue and Customs authority, tax collection rates improved from 19% to 23% by directing letter recipients straight to a specific form they were required to complete rather than to the web page that included the form. In another experiment, streamlining and automating parts of the process for under-represented low-income groups applying for financial assistance led to an eight-percentage point increase in the university attendance of these groups (The Behavioral Insights Team, 2014). Conversely, when Denmark introduced an online “direct divorce” solution in 2013, it made getting a divorce within minutes easy and the number of divorces increased significantly. However, the number of people regretting their divorce shot up as well, as the number of cases where people asked for an annulment of their divorce increased to more than one out of ten. Laws were subsequently passed to make divorce a bit more difficult again. Thus, “make it easy” is not best understood in absolute terms but rather as a strategy of making the preferable course of action relatively easier when compared with non-preferable choices. When people have trouble self-regulating their response, as might be the case for some files of divorce, determination may be supported by making some choices a bit more difficult. In another example of this, deaths from paracetamol poisoning were observed to decrease by 43% after new legislation required larger portions to be sold in blister packs. As a result, 765 fewer people died between 1998 and 2009 (The Behavioral Insights Team, 2014).

In an experiment by Orbell, Hodgkins and Sheeran (1997), participants were first asked to indicate how strongly they intended to perform breast self-examination (BSE) during the next month. To create relevant implementation intentions, participants were then asked to write down where they would achieve BSE in the next month and at what time of the day. Of the participants who had reported strong intentions to perform BSE during the next month, 100% did so when they had been induced to form additional implementation intentions. If no additional implementation intentions were formed, however, the strong goal intention alone only produced 53% of goal completion. As an example of using feedback to change behavior, in 2017 the Australian Department of Health identified 6649 general practitioners (GPs) whose antibiotic prescribing rates were in the top 30% for their geographic region. Four different letters were prepared to test different behavioral insights, while a control group of 1338 did not receive a letter. The trial found the biggest impact was on the 1333 GPs whose letter from the chief medical officer contained a comparison with their peers as shown in a graphic depicting their scripts as a stack of red and white capsules. “I know that antimicrobial resistance is a complex issue that requires concerted efforts across general practice, hospitals, laboratories and animal health professionals”, the chief medical officer wrote. “However, there is clear evidence that reducing unnecessary prescribing can lower the incidence of antimicrobial resistance. The benefits of tackling this problem are relevant to every one of our patients”. The GPs who received that letter reduced their prescribing rate by 12.3% over the next 6 months (Australian Government Department of Health, 2018). Behavior insights experiment leveraging the power of social norms was aimed at passengers in minibuses in Kenya to reduce traffic deaths. In the experiment, researchers used stickers in buses to remind passengers of their right to a safe ride on public transportation and encouraging them to “heckle and chide” reckless drivers. The intervention was a remarkable success. In the buses randomly assigned to the treatment group, insurance claims involving injury or death fell by half, from 10% to 5% of claims. This was reflected in a survey of drivers, suggesting that passenger heckling played a role in improving safety (Habyarimana & Jack, 2011).

4.3 How to Shift Behaviors Toward Sustainability

Darnton (2008) offered practical application on “Designing policy interventions with behavioural insights” and develop one of the most popular models in UK, “The nine principles” model which draws on findings from behavioural modelling and prescribes an iterative cyclical process in policy development and application. According to that model, the process of moving from step to step is iterative, meaning that insights from later steps might imply revision of the earlier assumptions and steps. The circle represents the idea of “learning by doing” where the interventions are being continuously refined because of ongoing monitoring and evaluation.

The framework of the “nine principles” model involves the following nine steps for policy makers to achieve desirable changes in individuals' behaviour (Bonsall et al., 2009):

- 1) Identify the audience groups and the target behavior. If behavior is too complex it should be broken into simple behaviours or elements.
- 2) Identify relevant behavioural models including both individual and societal models and make a short list of the most prominent influencing factors.
- 3) Select the key influencing factors and use them to develop objectives for the intervention strategy/policy option.
- 4) Identify effective intervention techniques that have worked and were effective in the previous interventions that targeted specific influencing factors.
- 5) Engage the target audience for the intervention in better understanding their behavior and the influencing factors from the user/target audience perspective.
- 6) Develop a prototype intervention and evaluate it against relevant policy frameworks and assessment tools.
- 7) Pilot the intervention and monitor the results.
- 8) Evaluate impacts and processes against the objectives developed in step 3 linked to the factors influencing behavior.
- 9) Feedback the lessons learned to deepen understanding of the intervention and the target behavior.

Future researches must be continued to explore new mechanisms to achieve sustainability using BI tools. Moreover, the policy implications- discussed in this study and others- require further analyses to be applied on various developed and developing countries, specifically in designing the long-term policies as the empirical and applied studies in that area is very limited. Expanding and adaptation of that valuable approach of shifting behaviours towards sustainability is critical to improve the accuracy and effectiveness of local and global sustainability targeting policies.

5. Conclusion

Needless to say, most of the environmental crisis and unsustainable aspects in the world are caused by people. So, people are the solution. Achieving sustainability requires changes in human behavior and actions in relationship to the economic, social, and environmental SDGs. Individuals follow their own self-interest which results in highly inefficient outcomes because individuals ignore external costs and benefits of their actions on others. Both standard and behavioral economics have much to offer in understanding what motivates individual and group behavior, how to structure incentives to shift behavior in desirable directions, and how to design policies and institutions to achieve desirable societal outcomes. Humans are a social species, but economics has long studied individual behavior in isolation but there is ample evidence from social science that social interactions influence individual choice. Human behavior is complex and changing or modifying it is more than challenging. So, policies that entail or imply behavioural change requires solid understanding of how people behave in different situations and contexts. Applications of behavioural science can be used to strengthen existing public policies and programmes and improving their outcomes. In terms of achieving sustainability, behavioral insights and behavioral economics tools can help in enhancing the effectiveness of environmental, social, and economic legislation and policy-based incentives, as well as increasing the impact of education and informational programmes to change the way individual choices affect the process of sustainability. This study concluded that behavior economics' tools are applicable to enhance sustainable development dimensions (environmental-economic and social dimension). The empirical evidence showed and proved the effectiveness of integrating behavioural insights and techniques in policy making designing and implementation and its positive impacts on policies' outcomes, specifically in the context of achieving sustainable development goals with more concentrating on goals 1, 2, 6, 7, 12, and 13. Using deductive qualitative approach, and a comparative analysis, the study discussed many important mechanisms to help practitioners and policy makers in employing behavioural insights to shift the general behavior in the society toward sustainability.

Funding: This research received no external funding

Conflicts of Interest: The author declares no conflict of interest.

References

- Allcott, H. (2011). Social Norms and Energy Conservation. *Journal of Public Economics*, 95(9-10), 1082-1095. <https://doi.org/10.1016/j.jpubeco.2011.03.003>
- Banerjee, A. V., & Sendhil, M. (2008). Limited Attention and Income Distribution. *American Economic Review*, 98(2), 489-493. <https://doi.org/10.1257/aer.98.2.489>

- Beerbaum Dr., D., & Puauschunder, J. M. (2018). A Behavioral Economics Approach to Digitalization. *Proceedings of the 10th International RAIS Conference on Social Sciences and Humanities*.
- Beerbaum Dr., D., & Puauschunder, J. M. (2019). *A Behavioral Economics Approach to Sustainability Reporting*. <https://doi.org/10.2139/ssrn.3381607>
- Brundtland, G. H. (1987). Our common future—Call for action. *Environmental Conservation*, 14(4), 291-294. <https://doi.org/10.1017/S0376892900016805>
- Casini, M., Bastianoni, S., Gagliardi, F., Gigliotti, M., Riccaboni, A., & Betti, G. (2019). Sustainable Development Goals Indicators: A Methodological Proposal for a Multidimensional Fuzzy Index in the Mediterranean Area. *Sustainability*, 11, 1. <https://doi.org/10.3390/su11041198>
- Charness, G., & Matthew, R. (2002). Understanding Social Preferences with Simple Tests. *The Quarterly Journal of Economics*, 117(3), 817-869. <https://doi.org/10.1162/003355302760193904>
- Costa, F. (2012). *Can Rationing Affect Long Run Behavior? Evidence from Brazil*. Unpublished paper, EPGE Brazilian School of Economics and Finance, Latin America. <https://dx.doi.org/10.2139/ssrn.2028684>
- Daniel, P., & Konstantinos, V. K. (2008). Green defaults: Information presentation and pro-environmental behavior. *Journal of Environmental Psychology*, 28(1), 63-73. <https://doi.org/10.1016/j.jenvp.2007.09.004>
- Darnton, A. (2011). *Reference Report: An overview of behaviour change models and their uses*, Oxford University Press.
- Fawad, K. (2019). Behavior Economics is fast becoming relevant to develop sustainable Development Goals. *South Asia Journal*, 29. Retrieved from <http://southasiajournal.net>
- Gabaix, X., David, L., Guillermo, M., & Stephen, W. (2006). Costly Information Acquisition: Experimental Analysis of a Boundedly Rational Model. *American Economic Review*, 96(4), 1043-1068. <https://doi.org/10.1257/aer.96.4.1043>
- Geller, H., & Attali, S. (2005). *The experience with energy efficiency policies and programs in IEA countries*. Retrieved from <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.463.4039&rep=rep1&type=pdf>
- Gollwitzer, P. (1999). Implementation Intentions: Strong Effects of Simple Plans. *American Psychologist*, 54, 493-503. <https://doi.org/10.1037/0003-066X.54.7.493>
- Gollwitzer, P. M., & Brandstätter, V. (1997). Implementation intentions and effective goal pursuit. *Journal of Personality and Social Psychology*, 73(1), 186-199. <https://doi.org/10.1037/0022-3514.73.1.186>
- GreeNudge. (2013). *Potensialet for nudging i narks klimapolitikk* (p. 11). GreeNudge, Oslo.
- Habyarimana, J., ack, William, Heckle, & Chide. (2011). Results of a randomized road safety intervention in Kenya. *Journal of Public Economics*, 95(11), 1438-1446. <https://doi.org/10.1016/j.jpubeco.2011.06.008>
- Heukelom, F. (2014). *Behavioral Economics: A History* (p. 117). Nova York: Cambridge University Press. <https://doi.org/10.1017/CBO9781139600224>
- Jensen, R. (2012). Do Labor Market Opportunities Affect Young Women's Work and Family Decisions? Experimental Evidence from India. *Quarterly Journal of Economics*, 127(2), 753-792. <https://doi.org/10.1093/qje/qjs002>
- Kallbekken, S., & Sælen, H. (2013). Nudging' Hotel Guests to Reduce Food Waste as a Win–Win Environmental Measure. *Economics Letters*, 119, 325-327. <https://doi.org/10.1016/j.econlet.2013.03.019>
- Kenneth, G., & Karen, P. (2014). Bridging the Energy Efficiency Gap: Policy In sights from Economic Theory and Empirical Evidence. *Review of Environmental Economics and Policy*, 8(1), 18-38. <https://doi.org/10.1093/reep/ret021>
- Loewenstein, G., & Lerner, J. S. (2003). The Role of Affect in Decision Making, In R. Davidson, H. Goldsmith, & K. Scherer (Eds.), *Handbook of Affective Science* (pp. 619-642). Oxford, Oxford University Press.
- Marianne, B., Esther, D., & Sendhil, M. (2004). How Much Should We Trust Differences-In-Differences Estimates. *The Quarterly Journal of Economics*, 119, 249-75. <https://doi.org/10.1162/003355304772839588>
- O' Donoghue, T., & Matthew, R. (1999). Doing It Now or Later. *American Economic Review*, 89(1), 103-124. <https://doi.org/10.1016/j.jenvp.2007.09.004>
- OECD. (2019). *Tools and Ethics for Applied Behavioural Insights: The BASIC Toolkit*. <https://doi.org/10.1787/9ea76a8f-en>

- Orbell, S., Hodgkins, S., & Sheeran, P. (1997). Implementation Intentions and the Theory of Planned Behavior. *Personality and Social Psychology Bulletin*, 23(9), 945-954. <https://doi.org/10.1177/0146167297239004>
- Saugato, D., & Sendhil, M. (2014). Behavioral Design; A New Approach to Development Policy. *Review of Income and Wealth*, 60(1), 1-29. <https://doi.org/10.1111/roiw.12093>
- Sent, E. M. (2004). Behavioral Economics: How Psychology Made Its (Limited) Way Back into Economics. *History of Political Economy*, 36, 735-760. <https://doi.org/10.1215/00182702-36-4-735>
- Sergey, S. R., Todd, D. C., ... Nancy, N. R. (2014). Cost-effective targeting of conservation investments to reduce the northern Gulf of Mexico hypoxic zone. *PNAS*, 111(52), 18530-18535. <https://doi.org/10.1073/pnas.1405837111>
- Shohel, M. M. C., & Howes, A. J. (2011). Models of Education for Sustainable Development and Nonformal Primary Education in Bangladesh. *Journal of Education for Sustainable Development*, 5(1), 129-139. <https://doi.org/10.1177/097340821000500115>
- Stephen, P., Catherine, L. K., Simon, A. L., Stephen, R. C., ... Jane, L. (2019). Role of Economics in Analyzing the Environment and Sustainable Development. *PNAS*. 116(12), 5233-5238. <https://doi.org/10.1073/pnas.1901616116>
- Stordalen, G. A., & Steffen, K. (2014). *Grønne nudge for trippel vinn Sustainable United Nations Development Program 2020, Sustainable Development Goals*. Retrieved from <https://www.undp.org/content/undp/en/home/sustainable-development-goals.html>
- Sunstein, C. (2014). *Why Nudge? The Politics of Libertarian Paternalism* (pp. 1-195).
- The Intergovernmental Panel on Climate Change (IPCC). (2019). Retrieved from <https://www.ipcc.ch/data/>
- United Nations Environment Program (UNEP). (2017). *Consuming Differently, Consuming Sustainably: Behavioral Insights for Policy Making*. Retrieved from <https://sustainabledevelopment.un.org/content/documents/2404Behavioral%20Insights.pdf>

Copyrights

Copyright for this article is retained by the author(s), with first publication rights granted to the journal.

This is an open-access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).