

# Sustainable Consumerism via Self-regulation

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**Abstract**—We are living in a world of vast information. The means of the Internet allow access to diverse sources of information, with social media and Internet of Things technologies significantly expanding the informational ecosystem. With the use of social media it is easy for ‘like-minded’ people to group up and initiate movements. One way to articulate such movements is via political consumerism. Users group together and boycott or buycot (boost purchases) for certain products with a concrete collective goal in mind. If however the collective goal is vague and abstract, as in the case of sustainability, this bottom-up strategy may lose its popularity and attraction. In this paper we introduce a new concept of how individual consumers can follow their own understanding of sustainability, while at the same time benefiting from collective and participatory actions. We discuss how the means of ICT can be used to develop political consumerism further to transform individual policies into collective statements.

**Index Terms**—Self-regulation, social self-organization, techno-socio-economic system, data analysis

## I. INTRODUCTION

We are living in a world of vast piles of information. The means of the Internet allow access to diverse sources of information, with social media and Internet of Things technologies significantly expanding the informational ecosystem. This new era comes with various implications by the systematic data-driven approaches that are applied in several techno-socio-economic systems. Take for instance predictions for stock markets, or obtaining pictures on user groups and even individual user behavior. At the individual level, users can design their news environment and select news boards, feeds and blogs. They can capture their interest on almost any topic, create specific forums and build up networks of similar interests. At a collective level these individual users create political movements, new trends and social phenomena.

A prime example for the power of self-organization in a social context is political consumerism. People of similar political view boycott or buycot (boosting purchases) of specific products in order to make a statement [1]. These initiatives may appear spontaneously, they are “citizen prompted, citizen-created action involving people taking charge of matters that they themselves deem important in a variety of arenas” [2]. These initiatives are “bottom-up grassroots engagement rather than mobilization within rigid organizational structures.” [3]. Combining the political concerns with market actions is often also based on ethical considerations and referred to as political consumerism [4]. Political consumerism has happened since decades. Its arising, however, is still consider to be spontaneous, despite the fact that social media can be subject of

manipulation and propaganda [5], [6]. In the past, boycotts and buycotts were predominantly directed against companies, countries or policies of a country [1].

The political consumerism presents two facets of self-regulation. First, the consumption is self-regulating as it is an element within the understanding of supply and demand in market economy [7]. Second, consumers regulate themselves in regard to their collective political view. If this collective view has a compact and clear perspective, consumers can deduce their own purchasing rules rather easily. If however, the collective view is vague, deductions might vary, and so will the actions of the individual consumers. In this situation no feeling of community is created and the collective motion is less likely to be effective.

In this paper, we present a new concept, which develops the method of political consumerism further. It allows the creation of a community feeling for a topic that is by definition vague and imprecise, the sustainable consumerism<sup>1</sup>. We elevate political consumerism to an ICT-enabled techno-socio-economic system. We use data mining and data analysis techniques to aggregate the piles of product information and present it to the user in an understandable and simple format. Together with hardware installments and a smart phone application we develop a new consumer-centric platform. Our novel concept allows the individuals to (i) follow a personalized and conscious understanding of sustainable consumerism, (ii) find ‘like-minded’ people within aware consumers and (iii) reach out retailers with their concerns and create awareness among people outside a movement.

To achieve this level of self-regulation among consumers, we design and develop a platform with a decision support engine and a communication unit. On the individual level, we empower consumers by condensing the piles of information on products to comprehensive data, relating these data to the user’s privacy-preserved preferences and show consumers the social binding and collective purchasing power they create by following the concept. On a collective level, we study how this empowerment changes the way consumers purchase. Within field tests on the supermarket shop floors, we observe the collective consumption behavior over months. We analyze how consumption patterns change and if they reflect the intrinsic motivation of consumers in regard to the environment and sustainability at large.

<sup>1</sup>Section II-B here can be compared with [8]

## II. CONSUMER BEHAVIOR PATTERNS

We develop a new concept and platform for political consumerism in regards to sustainable consumption. Political consumerism is a very broad concept. For our pilot implementation we focus on the consumerism within the supermarket and address food products. If the findings and platform results are promising, we intend to generalize the approach to other products and sectors. We justify the demand for this concept on the following observations in society.

### A. Consumer trends in society

The willingness among consumers to address environmental concerns with their purchases is given. Roughly one third of all consumers participating in a representative poll indicate that the products impact onto the environment is significant [9]. The same poll also shows that the impact on the environment is not the only important aspect for consumers. The quality of a product and its price are even more important. However, environmental concerns do play a role.

The political conviction to address environmental concerns via purchases is present. However, significant amount of consumers cannot estimate the impact of a product. More than 40% of all consumers participating in representative polls indicate that they know little about the environmental impact of the product they buy and use. Governments and institutions are addressing this issue and have introduced a significant amount of product labels. However, more than 50% of all consumers participating in representative poll indicate the labels are unclear, and for 91% of consumers the information is unclear for some products [9]. This lack of knowledge regarding labels is however not restricted to environmental concerns. For instance, recognition and knowledge of the correct meaning of four common public information logos among European consumers is strikingly low. Only 3% of consumers recognized and understood all four [10]. Regarding the number of labeling schemes available in the different countries, Spain has around 180 different labeling schemes [11]. This indicates the level of confusion among consumers. On the contrary, consumer experiments show, that up to 90% of all consumers choose products with labels if the price is the same [9].

### B. The potential for self-regulatory sustainable consumption

Sustainable consumption is described by OECD as follows: "The use of services and related products, which respond to basic needs and bring a better quality of life while 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." [8]

This statement suggests that consequences of our actions are disputable and no objective collective understanding of sustainable consumption can be given. The context of the "future generation" for example does not indicate if it refers to a world-wide aspect or a country-wide aspect, which comes apparent if one refers to standards of living in developed or less developed countries. For every individual the notion of

sustainable consumption may be different, and no collective overall understanding might be found. On the contrary, certain actions of individuals might fit together, even though their understanding of sustainable consumption differs.

These subjective notions of sustainable consumption indicate why current forms of political consumerism are inadequate. The underlying principle of political consumerism is the collective agreement to one single policy. Especially when addressing sustainable consumerism this single policy is hard to find, if ever existing.

However, one of the main actors for sustainable consumption is the individual consumer. Integrating sustainable consumption into everyday behavior patterns is one of the key topics for governments aiming at long term sustainability.

A promising way towards sustainable consumption is the theory of "ecological citizenship" [12], which is also supported empirically [13]. An ecological citizen feels responsible for the environment, and takes action in private and public affairs. She or he avoids unfair actions, for example, by considering effects onto common goods in the everyday purchases and modifying consumption patterns if necessary. The environmental footprint initiatives, e.g. [14], give a good example of how such considerations can be made. The footprint visualizes how many earths it would need if everybody followed a given lifestyle. The voluntarily purchasing decision with the aim of sustainable consumption is hence a paradigmatic example of self-regulation in society.

An example of ecological citizenship is given by the empirical study of Seyfang [13]: A local organic network, named Eostre Organics (EO), was studied. EO provided a local market for organic products and specifically includes small producers. Consumer could go to the market, interact with the producers, get local and organic products on a narrow variety as in the supermarket. EO also offered educational farm visits. Survey results indicate that 75% of respondents shopped at EO because they considered organic food as safer, more nutritious, tastier or better to eat. 70.5% of respondents shopped at EO because of environmental protection reasons. 65.2% of respondents shopped at EO because of a desire to support the local economy and community. Within the study, the author concludes that consumers could trust the product qualities through the interactions with the producers. Consumers considered other consumers as part of their community. Overall food was considered a mechanism for community-building, consumers considered their everyday consumption decision as being deeply political. Finally, EO has an influence on developing informed, educated communities around food through education, outreach, literature, farm visits and web sites. According to the author, these findings have implications on establishing an "alternative sustainable consumption through a personal commitment to global environmental and social justice.

## III. TOWARDS A SELF-REGULATORY CONSUMER SYSTEM

This section introduces a self-regulation framework for sustainable consumers. It also introduces the technical concept behind the framework realization and discusses its implications on the social dynamics between the involved actors.

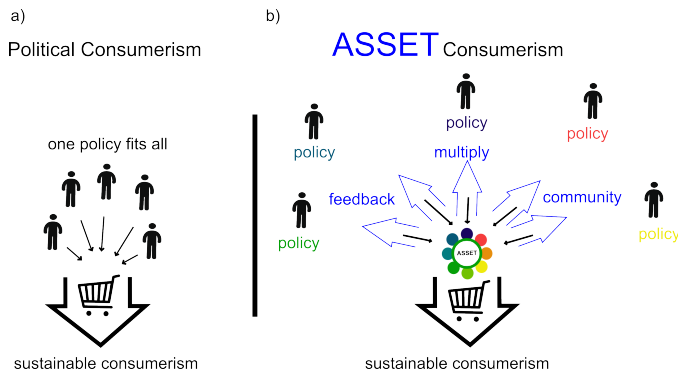


Fig. 1. Strategies for collective consumerism. a) Classical political consumerism: Consumers collectively follow one prescribed policy when shopping. b) Consumers follow their own policy. The understanding of a political movement comes with the feedback of the ASSET pilot platform [15].

### A. Framework

Individual consumers are the central entities in the socio-economic system of political consumerism. From the perspective of self-organization, we can interpret the sustainable consumerism as the emerging property originated from the actions of the local system entities, the consumers. To encourage the emergence of sustainable consumerism, we address the action of the local entities. As these entities are humans, our approach is to address the intrinsic motivation of each individual.

We provide to the consumer the capability to purchase according to his/her own belief and empower him/her to become an aware customer. Referring to Section II-A, consumers can then take product dimensions, such as environmental concerns, into consideration. We also increase the awareness among aware consumers in regards to their purchasing power and the community of ‘like-minded’ consumers. We address the details and the implications of this process in Section III-C, see Figure 1 for illustration.

From a technical perspective, we develop an ICT-enabled platform, which uses data mining and data analysis techniques together with hardware installments and a smart phone application.

### B. Technical concept

In order to perform the self-regulated decisions, users need to obtain condensed product information that focuses on the user preferences.

We develop the ASSET pilot platform, which we implement at the moment. It is designed such that users follow their own modular self-determined policy, instead of a predefined one. In this way, they can express their individual concerns, for instance, prioritizing the purchase of products that meet organic production or animal welfare over the local origin of the products. At each purchase, consumers get a notion to which extent each product fits to their personally composed policy. Depending on the situation and premium, consumers decide to which extent they support their personally composed policy, see Figure 2 for illustration. This functionality facilitates the decision-making process and emphasizes the empowerment of consumers.

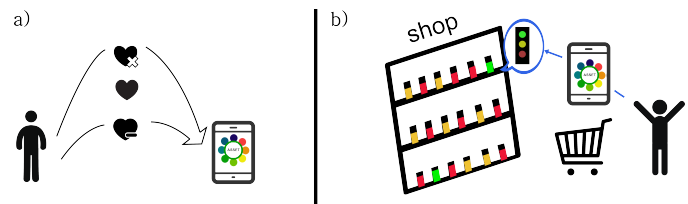


Fig. 2. The ASSET pilot platform from the individual perspective. a) A consumer states his personal policy in the ASSET application. b) Within the shop, the ASSET application informs the consumer about the related product properties [15].

The ASSET pilot platform consists of three parts: (i) the ASSET smart phone application, (ii) the localization system at the supermarket and (iii) the ASSET database system. The ASSET smart phone application acts as the personal user touch point of the ASSET pilot platform. Users provide input to the application that determines their political concerns and their preferences on various product and sustainability aspects, e.g. environment, quality, health, social. This information is processed in the phone in a privacy-preserving way using techniques [16]–[18] and mechanisms such as the nervousnet platform [19], [20]. The application informs the users on relevant product information, which assists users to choose the right products for them, according to their preferences. Additionally, the application links user to social media platforms and contributes to the development of a community among users by providing feedback. Finally the application allows a two-way interaction with the retailer.

The ASSET database system is the backbone of the ASSET pilot platform. It collects various kinds of product information from the database of the retailer, other open platforms, governmental databases and user forums. The aggregated data is frequently updated, characterized, classified and stored in the database.

### C. Social dynamics

Within the ASSET project, we generalize the local organic network approach, as referred to in Section II-B. We do so by enabling functionality that a local organic network has. We extend:

- the notion of communities to digital communities,
- the notion of consumer next to me to a consumer related to me,
- the physical location of a trusted market place to a combination of physical and virtual market place,
- the producers to retailers and production chains,
- the political focus of local and organic to individual concerns,
- the reduced, preselected product variety to broad supermarket varieties and finally
- the local markets to global markets.

In order to provide similar functionality as in the local organic network, we employ the ASSET pilot platform to:

- Enable the creation of a relationship between retailer and consumer via the personal addressing.

- Enable the formation of trust between retailer and consumer via presenting product information for the consumer.
- Be able to follow ones own political concern.
- Being able to trust product qualities, via collecting and processing product information by an independent institution.
- Maintaining an everyday shopping routine, by seamlessly integrating the product information.
- Create a community, and chat on the market, by utilizing social media, interaction and feedback.

User integration and feedback will be acquired via field tests that will be used to analyze and evaluate the concept of the ASSET consumerism. The fields tests can show the raising of awareness among consumers and retailers, as well as the effectiveness of community building.

#### D. Related work

There are several initiatives that provide consumer guidance: comparison platforms, e.g. [21], [22], databases of product certifiers, e.g. [23], smart phone applications on the phone, e.g. [24], [25], personalizable product rankings on the web, e.g. [26] and recommendation systems, e.g. [27]. All these initiatives provide valuable information for consumer, but at the same time face some shortcomings. Some do not cover all products in the store, are not available on the shop floor, or do not allow interactions among users or with the retailer. The ASSET platform is different, as its functionality guides right on the shop floor, and is integrated in the standard shopping routines. Consumers can interact with retailers, and the integration with the supermarket database allows updated information on all products.

#### IV. EVALUATING SELF-REGULATION WITHIN CONSUMERS

We demonstrate how the ASSET pilot platform enables collective awareness, harnesses network effects and contributes to sustainable consumption. In field tests we demonstrate how consumers who employ the ASSET pilot platform evolve the ASSET consumerism towards collective awareness among consumers and retailers/producers.

For the field tests the ASSET pilot platform is implemented in two supermarkets. Due to significant difference in citizen attitudes within Europe, we choose supermarkets in different countries (Estonia and Spain) to have a better representation of the average citizen.

The implementation includes the following actions:

- Mounting of the sensor network. The smart phone will estimate its position via a technologies such as the triangulation. We use bluetooth beacons, which will be mounted on the shelf of the supermarket. Second, we use the smart phone sensors, e.g. accelerometer and gyroscope, to improve the accuracy of the positioning.
- Establishment of a connection to the supermarket IT system. We implement a secure software interface to get up-to-date product information from the database of the retailer.
- Mounting of a WIFI.

- Development of the smart phone application. The application will be available on the Google application store.
- Attracting consumers. We encourage the general consumer to participate in the field tests. Especially for the second field test, we advertise the application in front of the store. We have personnel at the entrance who answer questions and facilitate the participation process. One of our partners has a “living lab” facility with test-users, who are personally invited to join the test. Loyalty card users are addressed and invited to participate. We motivate the participation with a remuneration after the field tests. The remuneration will be vouchers or discounts. Also the ASSET platform itself provides instant gratification for its users by design.

Two field test iterations are performed. The primarily goal of the first test is to ensure proper functionality of the ASSET pilot platform. Additionally, we obtain valuable user feedback on platform properties. These include feedback on the user interfaces, the localization system, the product information system, the usability, the interaction with social media, and the seamless integration into the shopping routines. The feedback is evaluated and the platform is improved.

The user feedback is obtained via direct and indirect means. We encourage the consumers to provide feedback via questionnaires. The questionnaires circle around the usability of the application. The indirect feedback addresses the way the application is used in the test scenarios.

The second field test lasts around three to four months, depending on the degree of integration and retailer policy restrictions. It focuses on the actions and interactions of the test users. We obtain direct and indirect feedback from users via feedback buttons, polls, the aggregation of usage patterns and social media data. Additionally, we obtain data on purchase changes of goods and direct feedback from the retailers. Via analyzing changes in usage patterns, purchase changes, social media data, and consumer dynamics, we demonstrate how the ASSET consumerism changes the decision-making of the individual, raises collective awareness and contributes to sustainability.

With this aggregated user feedback, we focus on two aspects. First, we measure if and how the individual decision making changes. We expect to get valuable insights by analyzing changes in preference setting of consumers, and the answers to dedicated poll questions. Second, we study if the awareness among consumers on their collective purchasing power increases. We also study our claim, that consumers contribute to sustainability because they have objective support in their decision making process.

#### V. CONCLUSION AND OUTLOOK

With the introduction of the ASSET pilot platform we face the “one policy fits all” problem of political consumerism. We give the consumers the ability to follow their own policies when purchasing, by providing objective and tailored product information. We focus on the grocery products in the shopping process of supermarkets. With this concept we build upon the intrinsic motivation of the individual consumer and at the

same time facilitate self-regulation among consumers towards a sustainable consumerism.

#### ACKNOWLEDGEMENTS

This project has received funding from the European Unions Horizon 2020 research and innovation programme under grant agreement No 688364 and by Linz Center of Mechatronics (LCM) in the framework of COMET-K2, This article reflects only the author’s view and the Commission is not responsible for any use that may be made of the information it contains.

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