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Perceived social welfare as a driver of green products consumption: Evidences from an integrated multi-trophic aquaculture production

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ABSTRACT

This study investigated consumers' perceptions of green products derived from a circular economy production, by shedding light on the role of perceived social welfare. Furthermore, the paper considered two moderators: perceptual variables on green products and psychological variables on the environment. The analysis was performed in the aquaculture sector—specifically referring to Integrated Multi-Trophic Aquaculture (IMTA) production as a research setting. Respondents received a structured questionnaire containing scales that measured perceived social welfare, environmentalism, green product's perception (in terms of price, quality and usefulness), purchase intention, and word-of-mouth. The results revealed an inverse relationship between perceived social welfare and the behavioral variables. Consumers were more attracted to and focused on the green product's usefulness than its price and quality. Moreover, the study found that environmentalism (in terms of environmental concern and perceived consumer effectiveness) moderate the effect of perceived social welfare on dependent variables. By exploring the role of perceived social welfare as a regressor, this study improves our understanding of consumers' behavior toward green products.

1. Introduction

Modern industries have positively contributed to the development of the world economy, but have also caused serious problems in terms of pollution and environmental damages, thereby endangering life quality in terms of health, livability, and welfare (Basakha and Kamal, 2018). In recent years, consumers have become increasingly aware of and concerned about the environment; consequently, both countries and institutions have begun to promote socially responsible actions. For example, the European Commission has launched the European Green Deal, a roadmap for making the EU's economy sustainable by turning climate and environmental challenges into new opportunities (European Commission, 2019). One suggestion in this regard involves encouraging consumers to consume more "green products". These are products (tangible or intangible) that use technological and scientific status to

minimize their environmental impact (directly and indirectly) during their full life-cycle (Sdrolia and Zarotiadis, 2019). From a business perspective, companies have shifted toward innovative production systems, in line with the concept of circular economy – a closed-loop regenerative system that minimizes the resources used in input, waste, and energy leakage through design, maintenance, remanufacturing, and recycling (Geissdoerfer et al., 2017). This is done using cyclic material flows, cascade energy flows, and renewable energy sources (Korhonen et al., 2018).

One particularly important industry that is grappling with these changes is aquaculture, which provides over 50% of products of aquatic origin (World Bank, 2013). According to forecasts, the world will expect 261 million tons of aquatic products by 2030 and, to meet this demand, the industry will have to triple its production. Although aquaculture activities tend to have less negative environmental impact than those of

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fishing, the effects still represent a real threat for marine and coastal ecosystems (Ilhan and Rafet, 2017). One method of harmonizing the development of this growing industrial sector with the achievement of environmental quality objectives involves the use of specific Integrated Multi-Trophic Aquaculture (IMTA), which is a system of polyculture. The production of seafood products (usually fish) carried out under monoculture conditions could be replaced by the IMTA, where different species are cultivated. In this way, some invertebrates and macroalgae could recycle the waste substances deriving from the culture of vertebrates. This new vision led to the development of a circular economy production, in which waste from a production process is used as raw material in the production system for another production process.

Despite the growing interest among public and private institutions toward these concepts and their applications, many challenges remain unresolved. It is not clear if consumers have a clear understanding about the nature and consequences of green products or the circular economy that gives rise to innovative productions (Nagaraju and Thejaswini, 2014). The present study aims to investigate whether and how a different perception of social welfare, green products and green behavior influences the antecedents of consuming ecological products or products deriving from circular economy production. To this end, we considered as a research setting IMTA-derived products. We analyzed consumers' perceptions toward these products in the aquaculture sector and, specifically, in reference to IMTA production. The study was conducted in Southern Italy, in the Mar Grande of Taranto (Northern Ionian Sea). Based on the current literature, we considered the influence of social welfare, environmental concern and perceived effectiveness on consumers' purchase intention and word-of-mouth, alongside the influence of the consumers' perception of green products' value in terms of usefulness, price and quality. Our decision to consider both purchase intention and word-of-mouth as behavioral variables is linked to findings that consumers are willing to recommend a product based on its environmental image, environmental functionality, eco-friendly characteristics and environmental performance (Molinari et al., 2008; Smith, 2010).

Our results has shed light on the role of perceived social welfare toward the impact of circular economy production of green products on perceived social welfare. Furthermore, our research extends current knowledge on consumers behavior and green marketing, by showing how consumers of green products, are only interested in the usefulness of the product, and are not influenced by price or quality. Therefore, a consumer will buy a green product for the benefit related to consumption and impacts on the environment, rather than the price or quality. Our study has also operational implications. Findings suggest that tourism marketing managers should consider consumers' perception toward green products, when developing strategies based on sustainable productions, and should emphasize communication programs. The article is organized as follows. The follow section discusses the relevant literature on circular economics practices, particularly focusing on the aquaculture sector, and the theoretical background about green consumptions. Then, we describe the methodology we implemented in the empirical study, describing the obtained results. Finally, we discuss our findings and delineate the related theoretical and practical implications for marketers and companies, along with limitations and directions for future research. Each section describes not only the main findings of extant research.

2. Theoretical framework

2.1. Circular economy productions and green product consumption

Previous studies have blended the concepts of circular economy and industrial symbiosis, as both aim to minimize production waste and reduce the environmental impact on the community in the hopes of bolstering social welfare (Baldassarre et al., 2019; Chertow and Ehrenfeld, 2012; Notarnicola et al., 2016). Other scholars refer to concepts

inspired by clean production (Stevenson and Evans, 2004), which is also related to the concept of zero emissions (Pauli, 2017). The circular economy is, in general, an economy built by production-consumption systems that maximize the service produced by the material used. This is accomplished by using cyclical material flows, reusing processing waste, and adopting renewable energy sources.

To our purpose, we consider as circular economy productions those aimed to sustainable development, and based on create innovative technologies or production methods, able to reduce the environmental impact of mariculture plants. Indeed, according to Redding et al. (1997), freshwater pisciculture wastewater is responsible for nutrient enrichment in receiving waters, which often causes localized problems for managing the freshwater environment. Consequently, scholars have suggested alternative systems that are consistent with the circular economy paradigm where untreated wastewater from a recirculation system used for fish rearing is filtered using different species of aquatic macrophytes. In this scenario, IMTA-based productions, have the potential to reduce the accumulation of organic waste in the environment and consequently make production activities sustainable (Sarà et al., 2007, 2009). Indeed, IMTA is aimed at bio-diversifying productions by introducing complementary species into a polyculture, which guarantees the sustainability of the entire ecosystem and improves economic productivity. Some extractive species can live by feeding on the wastes from the fish culture: macroalgae can extract inorganic nutrient substances, while suspension and deposit feeders can extract organic ones, which collectively decreases the pollution load in the surrounding waters. Thus, the goal of an IMTA is mainly to design ecologically balanced systems in terms of: i) *environmental sustainability* (in order to ensure better health for ecosystems); ii) *economic stability* (in order to make production more efficient by reducing costs and diversifying products, as well as considering parameters such as reducing risks and creating jobs in disadvantaged communities); iii) *social impact* (in order to produce better production management practices that satisfy regulatory governance systems and promote consumers satisfaction).

To understand sustainable development, it is necessary to link the study of sustainable production with that of green product consumption. Green consumption has been broadly defined, but research has mainly focused on consumer behaviors empirically linked to other activities in consumption or in routine activities (such as energy-saving, water-saving and so on) (Peattie, 2010). From this, scholars have arrived at a generally accepted definition of green consumption: namely, as consumption behaviors that are compatible with environmental protection for present and future generations, whereby consumers adopt environmentally friendly behaviors (such as the use of organic products, clean and renewable energy, and the purchase of goods produced by companies whose production does not impact the external environment) (Gilg et al., 2005).

The academic literature typically converged on variables related to consumers' attitudes, social pressures, context (Ajzen, 1991), and habits (Bentler and Speckart, 1979). These factors shape the intention to buy a specific good or service (Caprara et al., 1998), and may be classified according to a model of decision-making that has been widely substantiated by marketing and social psychology, such as the Theory of Planned Behavior (TPB) (Ajzen, 1991). The TPB model argues that the intention to engage in a certain behavior (such as green consumption), is determined by three main variables. Specifically, consumers' intention should be predicted by their attitudes, such as the personal disposition toward that behavior, whether positive or negative; the subjective norms such as the pressures, favorable or otherwise, that the subject feels from important individuals or groups; and finally the perceived behavioral control such as the sense of control over events external to the decision-maker. Furthermore, considering the TPB model, each of these three factors is determined, by individual beliefs (behavioral, normative, and control beliefs, respectively), expressed in terms of the subjective probability about the occurrence of certain events (respectively, the occurrence of advantages and disadvantages associated with

the behavior; of subjects who approve or disapprove its implementation, and of external circumstances that facilitate or inhibit it), to which an assessment of importance is attributed. According to the TPB (Ajzen, 1991), consumers' behaviors toward green products and brands might be explained by psychological effects and perceptions related to their purchase intentions. Perceived consumer effectiveness describes the extent to which a consumer might affect the external environment: high levels of effectiveness imply higher levels of green consumption (Ellen et al., 1991; Kinnear et al., 1974; Roberts, 1996). Self-efficacy – one's confidence in one's ability to succeed in specific situations or accomplish a task – refers, in this context, to consumers' confidence in their ability to contribute to environmental protection by consuming green products (Sparks and Shepherd, 1992). Social responsibility, which is correlated with subjective rules, refers to how morally responsible a consumer is in consumption (Tucker Jr., 1980). Scholars have also considered further effects deriving from the interaction of prices and quality (Mainieri et al., 1997; Schuhwerk and Lefkoff-Hagius, 1995). Gilg et al. (2005) examined how these variables influence lifestyles and can guide behaviors that are consistent with product characteristics. They demonstrated that consumers could “consume green” when they perceive that their purchases might have a positive impact on the environment. It is especially important to emphasize green products' benefits for the external environment when their prices are high. Such information about the products' characteristics can then stimulate their consumption.

It is worth noting here that ecological products satisfy a dual need: the intrinsic desire for the good itself, obtained through its consumption, and the extrinsic desire to participate in an ecological process of production-consumption—which may at least not worsen the current environmental situation, and ideally improve it (Kronrod et al., 2012; Nuttavuthisit and Thøgersen, 2017). However, the environmental benefits derived from green consumption are often accompanied by different levels of costs for consumers—such as extra time, incremental efforts or changes in consumption habits—that should be considered (White and Simpson, 2013). Indeed, consumers have to balance the environmental benefits of green products with their sacrifices in terms of costs and/or effort (Kronrod et al., 2012). Green products might have a higher price and lower quality than conventional products, despite their less negative impact on the environment (Griskevicius et al., 2011). Additionally, responsible attitudes require greater commitment in terms of time and work than traditional product consumption. Consider the case of recycling waste: although recycling reduces environmental damage and saves resources, the entire recycling process (including in-house collection, transport, storage, and placement of materials) requires that consumers expend more effort time and effort, especially if they have to change their habits.

2.2. Perceived social welfare, purchase intention and word-of-mouth

Social welfare occurs at the intersection of three stakeholders: the firm that produces the (desired) good and emits the (undesired) pollutant, the consumers who enjoy surplus from consuming said good and the surplus from government services (even if adversely affected by the pollutant emitted); and the regulators who set the tax/subsidy/rebate levels and collect tax revenue—part of which is spent on subsidy and rebate and the remaining is spent on services that benefit consumers (Krass et al., 2013).

Since 2010, the Italian National Institute of Statistics (ISTAT) has been developing a measurement of individual and social welfare built around fairness and sustainability. In 2011, the European Statistical System Committee indicated specific actions for the European Statistical System to implement recommendations on: multidimensional quality of life measurement; household perspective and distribution aspects of income, consumption and wealth; and environmental sustainability. During the same time, many initiatives were launched and developed, such as the Measuring National Well-being Program in the UK (Tinkler

and Hicks, 2011), the Measures of Australia's Progress (Australian Bureau of Statistics, 2013), and the Canadian Index of Wellbeing (Canadian Index of Wellbeing, 2012). The development of the Fair and Sustainable Well-Being Project (BES Project) by ISTAT in Italy follows this same trajectory (ISTAT, 2016). The project has established a scientific commission of experts from different domains attributable to social welfare in order to identify the most appropriate statistical indicators for measuring this construct. A total of 12 domains and 130 indicators were identified that can measure the aspects that directly influence human and environmental welfare. The BES also proposes synthetic indicators to measure the overall trend of the different dimensions of social welfare. The aggregation of the individual indicators permit to make up different dimensions into a single value. There are 9 composite indicators for each dimension: health; education and training; employment; quality of work; income; minimum economic conditions; social relationships; life satisfaction, and environment.

Regarding the environment indicator in particular, it considers natural capital that influences human well-being in multiple domains, both directly through resources and indirectly through services. In particular, this indicator measures: wastewater and waste treatment (dispersion of waste in the environment, separate collection of municipal waste), natural areas (availability of urban green, presence of protected areas), production of energy from renewable sources, and general satisfaction for environmental condition (in terms of air and water quality). The measurement methodology consists of a set of objective evaluation techniques such as censuses, environmental data processing, and the statistical analysis of company data.

Building on the model by Krass et al. (2013), in our study, we used ISTAT (2016) variables to construct the general indicator of the environmental dimension as a specific measure of perceived social welfare. This is because our interest is not in measuring the objective aspects of social welfare (Lin et al., 2016), but rather in how consumers' perception of it—in eco-compatible and environmental terms—shapes their behavior.

When companies implement green production-oriented strategies, there is a chance of bolstering environmental and social sustainability, which can then increase environmental benefits and social welfare (Huang et al., 2014). The literature highlights the specific relationship between industrialization and welfare (Midgley, 1986): Increases in welfare have always been related to economic development resulting from industrial development, which affects the economic, social and political spheres (Yeung, 2017). Nowadays, industries might still influence welfare and life-quality standards in their countries by playing an important role in economic development through sustainability, which refers to planned actions aimed at positively impacting the community in terms of three dimensions: social, economic, and environmental (Seuring and Müller, 2008; Elkington, 1998).

The production and consumption of green products can positively influence social welfare by satisfying consumers' needs in a way that does less harm to the external environment in line with the concept of sustainability (Zhang and Chui, 2019).

However, the concept of perceived social welfare, as a consequence of green product consumption, has not been completely explored. As demonstrated by Bateman et al. (2006), perceived social welfare influences people's willingness to pay for sustainable products, as a function of the distance of the production site (i.e., the greater the distance, the lower the purchase intention), and, for extension, the word-of-mouth, which is the spread of information or advice about green products directly between subjects or via social networks (Chen et al., 2014). According to Stone et al. (1995), consumers' environmental responsibility concerns their intentions to act in sustaining the environmental degradation, as consumers are not only led by their need satisfaction, but are also led by a societal-environmental wellness interest. Consequent, individuals' responses to feelings of moral obligation (i.e., the environmental degradation prevention) could be expected when people are positively influenced by values beyond their pure self-

interest (Stern and Dietz, 1994; Stern et al., 1999; Stern and Stern, 2007), together with environmental uncertainty (Zhao et al., 2018). To clarify this point, when individuals support environmental-related values, they are more aware of the negative environmental consequences of their behaviors, and they feel they can help reduce these problems by acting in favor of the environment (Steg, 2016). However, only individuals with high environmental concerns about negative impacts to all living creatures on the planet may rate the risks of environmental change as more serious and stressful, thus being more likely to react to them (Schultz, 2000). Consequently, these levels of stress and concern cause individuals to be more protective, by directly acting to protect the environment or spread good words about such campaigns (Molden et al., 2008; Reser et al., 2011). In other words, as long as environmental damage does not affect individuals' lives, regardless of their personal values toward the environment, they do not focus on green consumption behavior. That is, when consumers perceive a high social welfare and are not very concerned about the environment (because the damage does not affect their life), they will not, in the short-term, be induced to purchase and promote green products and, consequently, to spread their use. In particular Allen and Spialek (2018) showed that, regardless of environmental orientation, only those who buy food products belonging to companies that use communication policies aimed at highlighting the importance of solving ethical problems, ethical governance and proper nutrition based on ethical values are more likely to provide green word-of-mouth. We therefore believe that perceived social welfare alone does not compel consumers to buy green products and recommend them to other people. The reasons are also linked to the existence of typical external barriers to sustainable consumption such as: Price and/or availability of the product, or the practical feasibility of purchasing and managing sustainable products (Cassady et al., 2007; Gleim and Lawson, 2014; Steg and Vlek, 2009; Zsoka et al., 2013). Based on the above assumptions, we postulate that:

H1. Perceived social welfare negatively influences green products' purchase intention.

H2. Perceived social welfare negatively influences green products' word-of-mouth.

2.3. Environmental concern and perceived consumer effectiveness

Environmental concern refers to the degree of individuals' awareness about environmental problems and the perceived necessity of protecting the environment (Matthes et al., 2014). It also captures people's support for efforts to solve said problems or demonstrate the willingness to contribute personally to a solution (Dunlap and Jones, 2002). Environmental concern, or environmentalism, represents a strong behavioral determinant among consumers who prefer green products, and for consumer perceptions of environmental welfare in terms of quality of air and water, differentiated waste collection and dispersion, the availability of green or protected areas, energy production through renewable resources, and the availability of drinking water (Schuhwerk and Lefkoff-Hagius, 1995). Therefore, environmental concern influences consumption values and choice behavior (Lin and Huang, 2012).

Indeed, most research considers environmental concern as a direct or indirect antecedent of consumers' green purchasing intentions (Chen et al., 2015; Newton et al., 2015). For instance, some studies have found that environmental concerns moderates the relationship between corporate misconduct and consumer buying intentions (Zhang et al., 2018). Meanwhile, the COVID-19 crisis has shifted consumers' mentality by making them more sensitive to environmental issues (Xin et al., 2020). Consumers with more environmental concern tend to have more positive attitudes, which will likely increase behavioral intentions in terms of purchase and word-of-mouth (Cachero-Martinez, 2020; Hoang et al., 2019). The higher consumers' environmental consciousness, the greater their intention to spread positive word-of-mouth (Garcia de Leaniz et al., 2017).

In the food market, specifically, environmental concern is the awareness of environmental problems linked to the purchase of products that damage health. In this context, the concept of environmental concern overlaps with health awareness, creating an inclination to purchase organic products in order to solve environmental problems (Kapuge, 2016). In this vein, Asif et al. (2018) found that awareness moderates the intention to purchase organic foods, like those used in our study. Therefore, we posit that awareness positively influences the relationship between perceived social welfare and purchase intention. In other words, only the awareness of the environmental and health problems deriving from the consumption of conventional food products can transform that perceived social welfare into an intention to purchase (Gottschalk and Leistner, 2013) and recommend organic food.

Similarly, consumers' perception of the environmental effectiveness of their actions, called perceived consumer effectiveness, is influenced by their ability to imagine the environmental impact of their actions on the society (Kinnear et al., 1974). Indeed, perceived consumer effectiveness is a domain-specific belief that an individual's efforts can make a difference in solving a problem. In the context of environmental issues, perceived consumer effectiveness is a measure of consumers' belief in their ability to contribute to reducing environmental problems (Ellen et al., 1991).

Studies reveal that individuals who believe that their pro-environment action (e.g., purchasing a green product) can make a positive difference to the environment are more likely to form a favorable attitude toward that behavior (Jaiswal and Kant, 2018; Kang et al., 2013). Perceived consumer effectiveness is one of the determining factors behind the behavior of environmentally conscious consumers.

Several studies have shown that this construct is a strong predictor of different types of "green and ecological" behavior (Lee and Holden, 1999) and therefore could be used to predict the intention to purchase eco-friendly products (i.e., organic products, green products, and sustainable products) (Verhoef, 2005; Vermeir and Verbeke, 2006). In particular, some studies highlight the moderating role of this construct in improving the relationship between attitudes and behavioral intentions (Higuera-Castillo et al., 2019). Consequently, we argue that a high level of perceived consumer effectiveness should transform perceived social welfare into an intention to purchase green products and engage in positive word-of-mouth.

Against this background, we hypothesize that:

H3. Environmental concern positively moderates the effect of perceived social welfare on purchase intention and word-of-mouth.

H4. Perceived consumer effectiveness positively moderates the effect of perceived social welfare on purchase intention and word-of-mouth.

2.4. The perceived higher price, lower quality, and usefulness of green products

Advances in environmental health awareness has led to more ecological and pro-environmental products (Chen, 2001). Nevertheless, consumers' buying behavior does not necessarily align with this ideological trend. Although consumers may possess concern for the environment, they remain ambivalent about such purchases due to a lack of complete satisfaction toward green products. On the one hand, consumers prefer to buy green products because they do not harm or negatively impact the external environment, which produces emotional benefits such as "feeling proud". On the other hand, consumers are cautious about green products' higher costs or potential lower quality (Chang, 2011). It is less that these products are of a lower quality, and more that consumers are often unaware of the rigorous production standards used to create green products (Chan, 2001). Further studies (Cheung and To, 2019; Jaiswal and Kant, 2018) have shown that the quality of the green product does not moderates either the relationship between attitude toward environmental issues and green purchasing behavior, or the relationship between information and green shopping

behavior. Studies suggest that green purchasing intention is guided more by factors such as one’s attitude toward green products, environmental concern, and the perceived usefulness of the product. However, if not the declared quality, how the consumer perceives the green product could modify the influence that the perceived social welfare has on the purchase intention. [Chang \(2011\)](#), in fact, states that these types of products are perceived by consumers as lower quality and more expensive than normal products. Furthermore, it is stated that consumers have different beliefs regarding the usefulness of green products in reducing threats to the environment.

Since despite the poor quality, consumers are willing to spend a higher price for the purchase of green products ([Chan, 1999](#); [Chang, 2011](#); [Lee and Holden, 1999](#)), it leads us to think that the perceived lower quality and, therefore, the perceived higher price, do not affect purchase intent. This is because their intent is to adopt a behavior that does not harm the environment ([Chang, 2011](#)). In fact, according to [Cheung and To \(2019\)](#), producers of green products should focus on transparency and credibility to help consumers better understand their products’ characteristics and usefulness.

In line with the extant literature, we hypothesize the following:

H5. The perceived usefulness of green product positively moderates the effect of perceived social welfare on purchase intention and word-of-mouth positively and more significantly than perceived higher price and perceived lower quality.

Summarizing, our hypothesis and the related conceptual framework is proposed in the figure below ([Fig. 1](#)).

3. Method

3.1. Setting

To test the model described above and schematized in [Fig. 1](#), we developed a structured questionnaire that contained scales capable of measuring the variables involved. For our research setting, we considered the IMTA circular economy production proposed in the Remedialife Project. Currently in progress, the project addresses a confined area of the Mar Grande of Taranto where wastes tend to accumulate. Due to its strategic location in the center of the Mediterranean Sea and its two seas (also called “Mar Grande” and a natural internal basin also called “Mar Piccolo”), the City of Taranto represents a crucial point for economic and social development of the Ionian area. Indeed, its environmental resources render it a fertile ground for maritime applications. The project is based on an innovative IMTA system that uses a set of bioremediators, such as stress-resistant invertebrates (polychaetes,

sponges, and mussels) and macroalgae. The proximity of these organisms to fishes’ breeding cages guarantees their growth in the absence of further additions of food. Bioremediators subtract both organic (bacteria, toxic phytoplankton, and organic substance) and inorganic (nitrogen and phosphorus salts) wastes. In addition to the fish biomass, each production cycle produces mussels polychaetes, macroalgae and sponges: This non-edible biomass represent a potential commercial value to companies, as they can be used in several fields such as the extraction of bioactive compounds, the production of fertilizers and/or, the fishing (bait) and aquariology sectors.

3.2. Questionnaire

The questionnaire, reported in the Appendix, was divided into three main sections. The first one, briefly described the Remedialife Project setting in order to screen for people’s awareness or knowledge of the project. To protect respondent anonymity and reduce evaluation apprehension, the questionnaire ensured that responses would remain anonymous and that there were no right or wrong answers ([Podsakoff et al., 2003](#)). The second section featured the items of the construct measurement scales, measured on Likert scales from 1 to 7 (1 = “completely disagreed” and 7 = “completely agreed”). The measured constructs were: environmental concern (4 items; [Schuhwerk and Lefkoff-Hagius, 1995](#)); perceived consumer effectiveness (2 items; [Ellen et al., 1991](#)), product value perception (8 items; [Chang, 2011](#)) including perceived higher price (3 items), perceived lower quality (2 items), and perceived usefulness of green product (3 items); world-of-mouth (3 items; [Carroll and Ahuvia, 2006](#)); purchase intention (2 items; [Ajzen, 1991](#)); and perceived social welfare (9 items; [ISTAT, 2016](#)). The final section collected socio-demographic data related to gender, employment, age, education level, and marital status.

We administered the questionnaire creating a link by the survey software SurveyMonkey. It was shared online (on the site <https://remedialife.eu>) and distributed personally by trained interviewers in public places (e.g., university campuses, city centers) for a period of 2 months (from Monday to Saturday, from 10 am to 18 pm) in the province of Lecce, Bari, and Taranto, where the project has greater social impact ([Sudman, 1980](#)).

3.3. Sample

We received a total of $N = 600$ questionnaires. Of these, 46 participants were removed for failing an attention check within the questionnaire (“If you are reading this question, please select answer 5”). The final sample of $N = 554$ participants consisted of 48% men and 32.0%

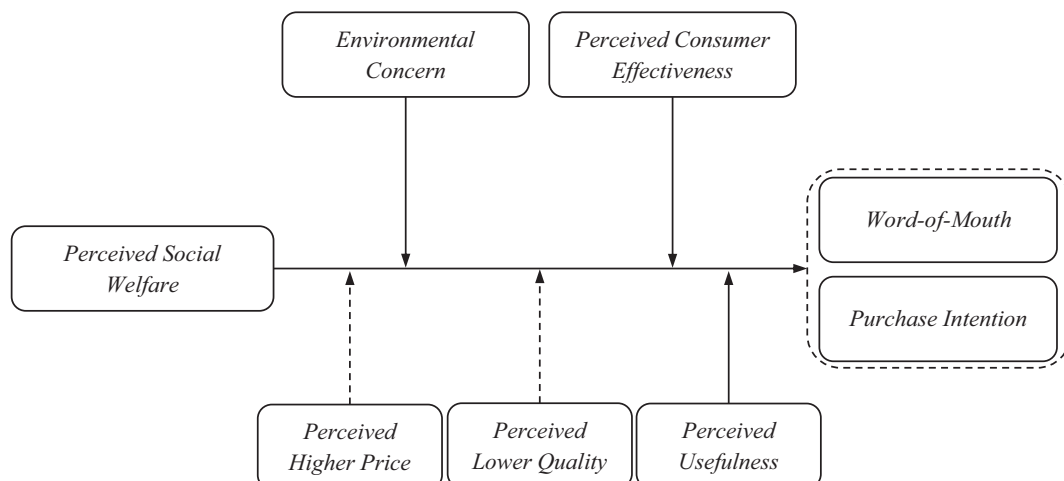


Fig. 1. The proposed conceptual framework.

women; 67% had a lower level of education than university and 33% had an equal or higher level. Meanwhile, 68% of the sample was single, while 32% were married or cohabiting. The age of the participants ranged between 12 and 69 years ($M = 29.2$, $SD = 10.5$). In terms of employment status, 44% of the sample were students, while 52% had different work activities (professional, employee, self-employed worker, other), and the remaining 4% were unemployed. Finally, with reference to the RemediaLife Project, 85.2% of the participants were unaware of its existence.

3.4. Statistical approach

Firstly, to verify the assumption of multivariate normality (Cain et al., 2017), Mardia's test (Mardia, 1970) for the multivariate skewness and kurtosis have been assessed in SPSS (DeCarlo, 1997). After, to evaluate the threat of Common Method Variance (CMV), Harmon's one-factor test (Podsakoff et al., 2003) has been conducted.

Following the guidelines recommended by Hair et al. (2010), confirmatory factor analysis (CFA) and reliability analysis using Cronbach's α were performed to assess construct validity and reliability. The CFA was also used to evaluate the validity of the measurement model.

Measurement models with composite indicators are able to model conceptual variables, such as perceived social welfare, for which elements are combined to form a new variable (Henseler et al., 2016). Composite indicators offer a way to conveniently summarize the data and can be used to measure the property to which the focal concept refers, such as attitudes, perceptions, and behavioral intentions (Rigdon, 2012; Sarstedt et al., 2016). As specified in Sarstedt et al. (2016), path analysis entails no bias when estimating data from a composite model population. For these reasons, the hypotheses were then tested using path analysis. Finally, the analysis also considered the potential moderating role of consumers' perception of a green product's usefulness, price, and quality. The analysis was performed by creating product terms, multiplying together the predictor and moderator variables (Frazier et al., 2004; Cohen et al., 2003).

Two application software were used to perform the data analysis, i. e., SPSS and AMOS version 24 (IBM Corporation, New York, NY, USA). The goodness-of-fit (GOF) of the measurement and the model was examined using commonly-applied fit indices including χ^2/df (chi-square to degree-of-freedom ratio), GFI (goodness-of-fit index), AGFI (adjusted goodness-of-fit index), CFI (comparative fit index), TLI (Tucker and Lewis index) and RMSEA (root mean square error of approximation).

4. Results

4.1. Multivariate normality and CMV

The first results, regards the distribution of data. The Mardia's test returned a Mardia's multivariate skewness of $b = 0.03$ ($p = .002$) and a Mardia's multivariate kurtosis of $b = 76.56$ ($p = .017$). This permits to assume that the data was multivariate normal (Cain et al., 2017). Hermon's one-factor test revealed that the single factor accounts for 20.3% of variance explained for the sample, which reveals no CMV bias in this study (Podsakoff et al., 2003).

4.2. Measurement model, construct validity and reliability

To assess the measurement model fit, all constructs in the research model, were subjected to CFA using maximum likelihood estimation. The process of evaluating the measurement model resulted in the deletion of items based on the criteria such as large standardized residuals, modification indices, or factor loadings less than 0.40 (Byrne, 2010; Hair et al., 2010). Before deleting an item, the item and the construct to which it belonged were evaluated to ensure that the loss would not jeopardize the integrity of the construct. Only one item (PP3) has been

deleted since factor loading was less than 0.40.

As presented in Table 1, the resultant statistics were all above the suggested level ($\chi^2/df = 4.447$, $p < .001$; GFI = 0.920; AGFI = 0.876; IFI = 0.892; CFI = 0.891; TLI = 0.872; RMSEA = 0.079). These indices revealed a good model approximation to the sample data.

Construct validity was examined using convergent and discriminant validity (Byrne, 2010; Hair et al., 2010). Specifically, convergent validity was assessed based on usually conditions, i.e., standardized factor loadings values were above 0.50, construct reliability coefficients (CR) higher than the Average Variance Extracted (AVE) and CR above 0.70, and AVE above 0.50. As depicted in Table 2, the data demonstrated strong convergent validity. Additionally, Table 3 shows that the square root of the AVE of each measure was higher than its correlation coefficients with other constructs, indicating that discriminant validity is ensured (Fornell and Larcker, 1981). Furthermore, since almost all bivariate correlations between constructs were less than 0.70 there were not problems of multicollinearity (Grewal et al., 2004).

All scales exhibited adequate internal consistency. The Cronbach's α coefficient results ranged from 0.706 to 0.893 (Nunnally and Bernstein, 1994), meaning that the scales were reliable (see Table 2). Finally, CR coefficients are higher than 0.70, and AVE indices are higher than 0.50 (Table 3). This suggests a robust convergent validity of the measurement model (Fornell and Larcker, 1981; Hair et al., 2010). Indeed, the AVE for each variable are greater than the squared correlations between each variable and the others included in the model (Fornell and Larcker, 1981).

4.3. Hypotheses testing

As first result we can support H1 and H2 (see Table 4). There appeared to be a significant negative effect of perceived social welfare on the intention to purchase green products ($b = -0.305$; $SE = 0.032$, $p < .001$) and word-of-mouth ($b = -0.491$; $SE = 0.091$, $p = .003$).

Results of the moderation analysis show that environmental concern is of particular importance, as the construct is significant in moderating both relationships: between perceived social welfare and purchase intention ($b = 0.238$, $SE = 0.020$, $p = .001$) and perceived social welfare and word-of-mouth ($b = 0.508$, $SE = 0.029$, $p = .023$), confirming H3. Meanwhile, perceived consumer effectiveness of the green product significantly influences the relationship between perceived social welfare and purchase intention ($b = 0.145$, $SE = 0.009$, $p < .001$), but appeared to be marginally significant for the effect on word-of-mouth ($b = 0.355$, $SE = 0.036$, $p = .055$), partially supporting H4.

Perceived higher price and lower quality are not significant moderators of the relationship between perceived social welfare and behavioral variables, confirming H5 and H6. But, as predicted in H7, consumers' perception of a green product's perceived usefulness is a significant moderator of the relation between perceived social welfare

Table 1
Confirmatory Factor Analysis (CFA) fit statistics.

Fit indices	Measurements		Sources
	Model	Level	
Chi-square/df	4.447	< 5.000	Anderson and Gerbing (1988); Bentler and Bonett (1980); Byrne (2010); Fornell and Larcker (1981); Hair et al. (2010); Hoo (2008)
Goodness of Fit Index (GFI)	0.920	> 0.900	
Adjusted Goodness-of-Fit Index (AGFI)	0.876	> 0.800	
Comparative Fit Index (CFI)	0.891	> 0.800	
Tucker and Lewis index (TLI)	0.872	> 0.800	
Incremental Fit Index (IFI)	0.899	> 0.800	
Root Mean Square Error of Approximation (RMSEA)	0.079	< 0.080	

Table 2
Description of observed variables, factor loading, and Cronbach's α .

Code	Scale	M	SD	FL's	α
W	Perceived Social Welfare	4.05	1.31		0.862
	W1			0.767	
	W2			0.841	
	W3			0.778	
	W4			0.735	
	W5			0.720	
	W6			0.673	
	W7			0.628	
	W8			0.641	
WOM	Word-of-mouth	5.29	1.23		0.882
	WOM1			0.907	
	WOM2			0.874	
	WOM3			0.836	
PI	Purchase Intention	4.96	1.38		0.893
	PI1			0.918	
PP	Perceived Higher Price	4.78	1.32		0.774
	PP1			0.856	
PQ	Perceived Lower Quality	3.86	1.35		0.706
	PQ1			0.727	
PU	Perceived Usefulness	5.36	1.22		0.753
	PU1			0.875	
EC	Environmental Concern	5.54	1.24		0.742
	EC1			0.830	
	EC2			0.863	
PCE	Perceived Consumer Effectiveness	4.33	1.63		0.767
	PCE1			0.749	
	PCE2			0.728	

Notes: FL = Factor loadings; α = Cronbach's α .

and dependent variables, purchase intention ($b = 0.392$, $SE = 0.044$, $p = .049$) and word-of-mouth ($b = 0.293$, $SE = 0.065$, $p = .012$).

5. Discussion and implications

In this paper, we investigated the impact of perceived social welfare on consumers' behavior in terms of purchase intentions and word-of-mouth toward green products. Specifically, we conducted a quantitative research, through structured questionnaires, about integrated multi-trophic aquaculture as a production technique in a circular economy, while also measuring possible psychological and perception variables as moderators.

Our literature analysis highlighted a link between perceived social welfare and consumers' behavior toward green products, both in terms of purchase intent and word-of-mouth (Bateman et al., 2006). We also hypothesized that this direct effect would be influenced by perceptual consumer variables (Chang, 2011; Schuhwerk and Lefkoff-Hagius, 1995; Verhoef, 2005; Vermeir and Verbeke, 2006). In particular, the study

Table 3
Discriminant validity matrix, AVE, and CR coefficients.

	W	WOM	PI	PP	PQ	PU	EC	PCE	CR	AVE
W	<i>0.74</i>								0.92	0.55
WOM	0.01	<i>0.87</i>							0.91	0.76
PI	0.13	0.76	<i>0.90</i>						0.89	0.81
PP	0.32	0.12	-0.05	<i>0.84</i>					0.83	0.70
PQ	0.53	-0.17	0.06	0.32	<i>0.73</i>				0.71	0.54
PU	0.02	0.85	0.59	0.22	-0.18	<i>0.79</i>			0.83	0.62
EC	-0.17	0.76	0.61	0.19	-0.32	0.70	<i>0.95</i>		0.89	0.72
PCE	0.27	0.03	0.09	0.22	0.57	0.14	0.03	<i>0.74</i>	0.71	0.55

Notes: N = 554; CR = Construct Reliability coefficients; The AVE indices for each variable are reported in italics along the diagonal; EC = Environmental concern; PCE = perceived consumer effectiveness; PP, PQ, PU = Perceived higher price, lower quality, and usefulness of green product; PI = Purchase intention; WOM = Word-of-mouth.

evaluated how consumers can choose whether to buy or not buy a green product based on their product perception in terms of quality, usefulness and price. Furthermore, we evaluated how consumers' behaviors may be influenced by the perceived effectiveness of products' pro-environmental actions in a multi-cultural social context (Lee and Holden, 1999). However, perceived consumer effectiveness should be associated with another construct inherent to consumers' awareness of the environment namely environmental concern (Chang, 2011). Environmental concern should measure not only individuals' concern for the current state of the environment, but also, in behavioral terms, their willingness to do something (e.g., green consumption) in order to safeguard the environment (Schuhwerk and Lefkoff-Hagius, 1995).

Through a path analysis, we identified direct and moderating effects between these constructs. The results showed that consumers seem to have a particular interest in green products only when the perceived environmental welfare is not particularly high (as predicted in H1 and H2). In other words, when consumers perceive low environmental welfare, they are encouraged to support a green cause through the purchase of products that have less impact on the environment. Environmental sensitivity, together with a low perception of environmental welfare, activates behaviors, both in terms of purchase and word-of-mouth. Therefore, the desire to improve one's perceived welfare leads consumers to act in a pro-environment way, consuming products whose production does not affect the health of the surrounding environment. Furthermore, to reinforce the result, we investigated the positive effects of green product consumption (through the word-of-mouth). We found, on the contrary, that a situation of high perceived welfare does not increase consumers' intention to buy green products and to recommend them.

Table 4

Main effects of word-of-mouth and purchase intention on perceived social welfare, and moderator effects of environmentalism (in terms of environmental concern and perceived consumer effectiveness) and product perception (in terms of usefulness, price and quality) on perceived social welfare.

Main effects	b	SE	p
PSW \rightarrow WOM	-0.305	0.091	0.000
PSW \rightarrow PI	-0.491	0.032	0.003
Interaction terms:	b	SE	p
EC*PSW \rightarrow WOM	0.508	0.029	0.023
PCE*PSW \rightarrow WOM	0.355	0.036	0.055
PP*PSW \rightarrow WOM	0.487	0.112	0.234
PQ*PSW \rightarrow WOM	0.329	0.079	0.442
PU*PSW \rightarrow WOM	0.293	0.065	0.012
EC*PSW \rightarrow PI	0.238	0.020	0.001
PCE*PSW \rightarrow PI	0.145	0.009	0.000
PP*PSW \rightarrow PI	0.823	0.078	0.364
PQ*PSW \rightarrow PI	0.122	0.126	0.772
PU*PSW \rightarrow PI	0.392	0.044	0.049

Notes: N = 554; PSW = Perceived Social Welfare; EC = Environmental concern; PCE = perceived consumer effectiveness; PP, PQ, PU = Perceived higher price, lower quality, and usefulness of green product.

Meanwhile, the results on the moderator effects of environmental concern and perceived consumer effectiveness confirmed hypotheses H3 and H4. That is, environmental concern moderates the relationship between perceived social welfare and behavior in terms of purchase intention and word-of-mouth. In other words, people's concern for the environment activates both their intention to buy and word-of-mouth even when they experience a high perceived social welfare. However, while consumers' awareness of the environmental situation moderates the relationship between the welfare state and both dependent variables, consumers' perception about the effectiveness of their actions only significantly moderates their purchase intention and marginally the word-of-mouth. This result corroborates those related to the direct effects and confirms the predictive value of perceived consumer effectiveness on purchase intention. Thus, an environmentally conscious consumer tends to buy green products to a greater extent than those who are indifferent to the environmental situation (Schuhwerk and Lefkoff-Hagius, 1995). This positively moderates the dependence between perceived social welfare and behavioral variables.

Finally, we want to note that respondents' perception of the green product (in terms of usefulness, price, and quality) is in line with what is theoretically hypothesized. In fact, green consumers are only interested in the product's usefulness (confirming hypothesis H7) and are not influenced by either price or quality (confirming hypothesis H6 and H6). Consequently, our research results indicate that green products can leverage their lower environmental impact in order to justify their higher price positioning compared to conventional products, even with the same perceived quality. As a result, the premium price policies associated with green products do not seem to affect behavior. On the contrary, the perceived usefulness of the green product is the most important moderator of the relationship between perceived social welfare and spreading word-of-mouth. We believe that usefulness perception has less impact on consumers' purchase intention, especially when they do not perceive a balanced relationship between costs and benefits. In this case, the costs are associated with the sacrifices in terms of time rather than quality, for example, some eco-sustainable products often have limited availability, so procurement is more time consuming.

6. Conclusions

Sustainability today is an increasingly appreciated practice, and that can represent the right strategy to win in a market where competition is now ruthless. Indeed, being sustainable is an opportunity that first allows companies to differentiate themselves from their competitors.

Since the companies began to feel more involved in environmental dynamics, they began to change some of their behavior, and production strategies to better reflect the new interests of new concerned consumers (Polonsky, 2011). Adopting sustainable practices is a widespread but not yet fully adopted strategy, despite being green can be a way to present companies' offers on the market as being of greater value not only concerning the proposed products or services. Today, we are living in an era in which not only businesses evolve, but the same consumers who increasingly appreciate their efforts in the field of sustainability.

Be green today represents the necessary point of contact between the external environment and the company itself, to identify, anticipate and satisfy the needs of consumers in a profitable and at the same time sustainable way (Peattie and Charter, 2003). The implications of our study shed light on how green practices can represent growth and success opportunities for the company that adopts it when it has sustainable intentions and considers profit as a result and not as an ultimate goal; operate in a three-dimensional vision of equal importance: economic, environmental, social; and finally, have an environmental intent in implementing sustainable productions as a valuable alternative, and not attempting to exploit the green wave of this era as a mere opportunistic strategy for raising profits. The future wellness of present and future generations will depend on sustainable development all over the world: companies should leave them a not compromised environment, together

with guaranteeing their needs satisfaction. Marketers should thus focus their efforts on emphasizing the benefits of consuming green products in the immediate and future, communicating the products also concerning the positive effects of the production strategies implemented. Consumers will thus be guaranteed the satisfaction of a "double" need: an evident one, as the satisfaction of the need linked to the consumption of the purchased products; the other less evident, in terms of consumption of products deriving by sustainable productions, useful to safeguard the wellness of the environment in which they live.

It appears evident the impact of sustainable production green products, such as in circular economy productions, on perceived social welfare, and thus on behavioral responses as in purchase intentions and positive word-of-mouth.

The findings underscore that a combination of low perceived social welfare and environmental concern positively influence consumers' purchasing intentions and word-of-mouth. Consequently, companies might adopt marketing and communication strategies aimed at improving the brand image in ecological terms (i.e., referring to their innovative IMTA production methods, as in the analyzed case). Communication policies could bolster the consumption of green products by informing consumers about the dangers deriving from the use of conventional products and production. An effective technique could be comparative advertising, which is no longer prohibited in some countries such as Italy. These policies would increase the perceived consumer effectiveness by increasing their purchase intention. Furthermore, respondents in our study did not express interest in the price or quality of green products—only their usefulness in terms of environmental impact. This effect suggests that advertising campaigns should be geared more toward responsible communication—such as through information brochures or online campaigns that highlight the functional benefits of green products in terms of improving environmental conditions. Thus, consumers could be active participants in promoting environmental behavior when encouraged to provide suggestions, characteristics and opinions of the green products deemed most interesting (Olli et al., 2001). In this way, green products could even become a tool to improve one's social status (Karjalainen and Chatterjee, 2009). When consumers understand that the long-term benefits of consuming green products are greater than the environmental costs, they will be more likely to buy green products and disseminate information about a greener lifestyle (Huang et al., 2014). In order to increase the perceived utility of green products, such as those resulting from IMTA manufacturing, agents should improve access to products through distribution intermediaries specialized in the food sector.

In term of limitations, our study did not consider other types of green products that fall within a circular economy, even if they do not derive from IMTA production. Future research could investigate the underlying motivations for both purchasing green products and spreading word-of-mouth and whether said motivations moderate the relationship between perceived social welfare and behavioral responses.

In conclusion, consumption is being increasingly redefined by the challenges of global warming, pollution, and climate change. If precautionary measures are not taken to protect the external environment, countries may face economic consequences, while individuals may experience reductions in their life quality and social welfare (Stern and Stern, 2007). Understanding ecological behavior in green product consumption might be particularly important for stimulating consumers' awareness of and sensitivity toward green consumption and its positive impact on their satisfaction and social welfare. Governments and businesses should encourage behavior and actions aimed at green productions. On the one hand, businesses should actively implement green production that matches consumers' needs, which should improve their competitive advantage. On the other hand, governments can improve the total level of welfare by considering consumers' interests alongside the benefits to the environment.

Declaration of Competing Interest

None.

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Appendix

The scales considered in the study are:

● Environmental concern scale (Average, 7pt-Likert)

Source: [Schuhwerk and Lefkoff-Hagius, \(1995\)](#).

Items:

E1 - I am concerned about the environment. (Sono preoccupato per l'ambiente.)

E2 - The condition of the environment affects the quality of my life. (La condizione dell'ambiente influisce sulla qualità della mia vita.)

E3 - I am willing to make sacrifices to protect the environment. (Sono disposto a fare sacrifici per proteggere l'ambiente.)

E4 - My actions impact on the environment. (Le mie azioni hanno un impatto sull'ambiente.)

● Perceived Consumer Effectiveness (Average, 7pt-Likert)

Source: [Ellen et al., \(1991\)](#).

Items:

PCE1 - There is not much that any one individual can do about the environment. (Un solo individuo non può fare molto per l'ambiente)

PCE2 - The conservation efforts of one person are useless as long as other people refuse to conserve. (Gli sforzi di preservazione dell'ambiente di un solo individuo sono inutili se gli altri si rifiutano di preservarlo.)

● Product Value Perception (Average, 7pt-Likert)

Source: [Chang, \(2011\)](#).

Items:

Perceived Higher Price

PP1 - Green products are expensive. (I prodotti green sono costosi)

PP2 - Green products cost more than non-green products. (I prodotti green costano più dei prodotti non-green)

PP3 - Green products are cheaper than non-green products. (r) (I prodotti green sono più economici dei prodotti non-green.)

Perceived Lower Quality

PQ1 - Green products are of inferior quality. (I prodotti green sono di scarsa qualità.)

PQ2 - Green products do not perform as well as non-green products. (I prodotti green sono più efficaci di quelli non-green.)

Perceived Usefulness of Green Product

PU1 - Green products are good for the environment. (I prodotti green sono buoni per l'ambiente.)

PU2 - Green products cannot help slow the deterioration of the environment. (r) (I prodotti green non possono rallentare il deterioramento ambientale.)

PU3 - Green products can effectively reduce pollution. (I prodotti green possono effettivamente ridurre l'inquinamento.)

● WOM (Average, 7pt-Likert)

Source: [Carroll and Ahuvia, \(2006\)](#).

Items:

WOM1 - I would recommend green products to my friends. (Raccomanderei i prodotti green ai miei amici.)

WOM2 - I would talk positively of green products to others. (Parlerei positivamente dei prodotti green agli altri.)

WOM3 - I would try to spread the good-word about green products. (Spargerò la voce sulla buona qualità dei prodotti green.)

● Purchase Intention (Product, 7pt-Likert)

Source: [Ajzen, \(1991\)](#).

Items:

PI1 - How strong is your intention to buy green products the next time you go shopping? (Quanto è forte la sua intenzione di acquistare i prodotti green la prossima volta che andrà a fare shopping?)

PI2 - How likely is it that you will buy green products the next time you go shopping? (Quanto è probabile che acquisterà i prodotti green la prossima volta che andrà a fare shopping?)

● Perceived Social Welfare (Average, 7pt-Likert)

Source: [ISTAT, \(2016\)](#)

Items:

W1 - Wastewater treatment (Trattamento delle acque reflue)

W2 - Dispersion of waste in the environment (Dispersione dei rifiuti nell'ambiente)

W3 - Separate collection of municipal waste (Raccolta differenziata dei rifiuti urbani)

W4 - Availability of urban green (Disponibilità di verde urbano)

W5 - Presence of protected areas (Presenza di aree protette)

W6 - Production of energy from renewable sources (Produzione di energia da fonti rinnovabili)

W7 - Breathed air quality (Qualità dell'aria respirata)

W8 - Water quality (Qualità dell'acqua)

W9 - General satisfaction for environmental condition (Soddisfazione generale per le condizioni ambientali)

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