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Tourism-Based Circular Economy in Salento (South Italy): A SWOT-ANP Analysis

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Abstract: This paper is aimed at eliciting, by means of a multi-level perspective, potential drivers and barriers of the tourism industry in order to generate valuable information for policy makers to improve policy strategies for an effective transition towards sustainability. A Strengths, Weaknesses, Opportunities and Threats–Analytic Network Process (SWOT-ANP) framework was employed to explore the potential development of a second-generation biorefinery in Salento (a touristic area located in the southeast of Italy in Apulia Region) able to integrate waste management, renewable energy and bio-products production based on resource circularity in the tourism industry. Results indicate that survey participants recognized a higher level of priority for the pressures coming from the overall external setting involving values, dominant practices, rules and technologies (landscape and regime) over the internal tourism industry dynamics (niche). Results also show that the top five ranked factors are mainly pertaining to weaknesses (excessive bureaucracy and lack of technology and infrastructure) and threats (social acceptability and lack of long-term planning by governments), which can concretely jeopardize the transition towards a greater sustainability in the investigated area. The analysis presented constitutes a valuable model for agenda setting in order to find adequate policy actions to promote the transition.

Keywords: tourism industry; Italy; circular economy; multi-level perspective; SWOT

1. Introduction

Tourism is one of the key sectors for the socio-economic development of many countries worldwide (Muñoz and Navia 2015). Touristic regions are characterized by waste abundancy, given their high population density. Specifically, the average amount of municipal solid waste (thereafter MSW) produced by each of about 500 million citizens of the European Union was equal to 477 kg per year in 2015 (EUROSTAT 2017). Against this background, promoting a more sustainable economy, where production is obtained with fewer inputs, less waste and less greenhouse gas emissions represents a fundamental step towards appropriate waste management (D'Adamo 2018). From a policy perspective, in January 2018, the European Commission adopted an ambitious Circular Economy Package (European Commission 2018) which includes, among others, legislative schemes to improve the diffusion of innovative technologies, increase energy efficiency, reduce the dependence on imported raw materials and provide economic opportunities and long-term profitability (Morone et al. 2019). The circular economy (CE) approach has the goal of making better use of resources/materials through reuse, recycling and recovery in order to minimize the energy and environmental impact of resource extraction and processing (Ardolino and Arena 2019). This goal is mainly pursued by redesigning the life cycle of the product, with the aim of having minimal input and minimal production of system waste (D'Amato et al. 2017).

Tourism is one of the fastest growing industries in the world and one of the most remarkable socio-economic phenomena of the current era, and it represents an important determinant of waste

generation (Arbulú et al. 2015). From a circular perspective, waste generated by the tourism industry can be, if properly managed, used as a resource for the city system and thus be a part of the urban processes able to optimize the rate of resource utilization (Girard and Nocca 2017). A way to approach part of the environmental pressure arising from tourism is the transition towards a holistic planning and design of integrated MSW processing activities by means of urban biorefineries, which are able to close the resource loop and increase resource efficiency (Satchatippavarn et al. 2016). Despite the agri-food sector still being the most predominant (Ronzon and M'Barek 2018), biorefining, i.e., the sustainable processing of biomass into a spectrum of marketable products and energy, is rapidly gaining ground and already represents an important part of the Italian bioeconomy (Intesa San Paolo 2018). In this framework, the biorefineries located at Gela (South Italy) and Porto Marghera (North Italy) represent a concrete example of a sustainable transition from fossil fuel to bio-based technologies, making possible the use of second-generation raw materials (e.g., palm oil, food waste, animal fats, etc.).

Biorefinery has emerged as a potential alternative to petroleum-based refinery, where biomass of non-edible waste is used as raw material and a range of products, such as biofuel, industrial biochemicals and biomaterials including commercially important biopolymers, are produced from a CE perspective (Clark and Deswarte 2015). However, an overall lack of social acceptability could be a significant barrier to the development of bioenergy-related industries (McGuire et al. 2017). For this transition to happen, it will require a joint effort by all concerned parties; it is not enough just to use biomass for industrial applications or to employ renewable resources and waste instead of fossil-based materials (Falcone 2018a). To meet this challenge, a transition must also take place from a socio-cultural point of view, stimulating local communities' awareness, enhancing dialogue among involved stakeholders, and benefitting from a proactive local policy making (Ehnert et al. 2018).

The environmental impacts of MSW production created pressures on public authorities to develop policy actions and strategies to deal with this concern (Lundmark and Stjernström 2009). The analysis of these strategies and their effect is particularly relevant for tourism destinations, since tourism inflows create an extra source of MSW and the attractiveness of a tourism destination can be disturbed by waste management (Arbulú et al. 2017). The limitation on land in certain tourism areas, the increasing costs of landfilling along with the necessity to safeguard the destination image have made waste management in touristic destinations particularly complex (Arbulú et al. 2016; Gómez et al. 2008).

The transformation of tourism toward sustainability requires a cross-disciplinary approach whose circular principles should include (Pan et al. 2018): (i) new models of production and consumption in order to minimize waste and convert wastes into valuable products, (ii) using biodegradable products for guests, (iii) creation of cultural values, such as conserving cultural heritage and traditional values, (iv) greening the tourism industry by creating conditions for enabling tourism operators to make long-term investments.

Building on these assumptions, this study tries to complement the recent interest towards tourism and circularity principles by investigating how local stakeholders would perceive and support fundamental changes in structures, cultures and practices for a sustainability transition towards an advanced biorefinery in Salento (a touristic area located in the southeast of Italy in Apulia Region) able to integrate renewable energy management and waste management in the industry. Sustainability transitions are long-standing, multi-dimensional, and essential transformation processes through which traditional socio-technical systems move towards new and more sustainable approaches of consumption and production (Loorbach and Rotmans 2010). The multi-level perspective (MLP) (Geels 2005), which considers the socio-technological system as characterized by three interacting layers (i.e., micro, meso and macro), is one of the main theoretical approaches to frame this change. However, there is a gap of research in understanding the actual dynamics with respect to the transition towards a tourism-based circular economy where smaller configurations (value-based and place-based) for sustainability might act as agents of change, enabling the transition process (Schäpke et al. 2017). With this in mind, the present study embraces a holistic approach, integrating the MLP with a Strengths, Weaknesses, Opportunities and Threats Analytic Network Process (SWOT-ANP) framework

to exploit local stakeholders' knowledge and perspectives in order to generate valuable information for policy makers and propose an agenda setting of policy actions to promote the transition. Therefore, the research question is the following:

RQ: *Identifying the weaknesses, strengths, opportunities, and threats characterizing the tourism industry in Salento in order to propose an agenda setting of policy actions relevant for the transition towards circularity.*

The remainder of the paper is organized as follow: Section 2 sets out the theoretical framework; Section 3 introduces the case study and the methods employed; Section 4 presents and discusses the main findings; Section 5 provides some concluding remarks.

2. Theoretical Framework

The assumptions underlying the neo-Schumpeterian evolutionary theory of technological change reflect the need for a comprehensive development of two interdependent sub-systems: the techno-economic and the socio-institutional (Pérez 2010). In this vein, technological change represents just one aspect to consider together with social and institutional transformations. For a transition to occur, actors involved at technological, social and institutional levels must look at the same direction and share a common vision of the future (Fischer and Newig 2016).

In this fashion, we should refer, alongside the technological dimension of an innovation path, to societal transition that embrace both changes from bottom-up (e.g., user practices) and top-down perspectives (e.g., regulatory and institutional). The topic concerning how to promote and steer a sustainability transition has gathered growing interest among scholars, practitioners, and policymakers (Frantzeskaki and Loorbach 2010; Smith et al. 2005). A sustainability transition refers to a fundamental transformation in the system configuration towards a more sustainable option (Geels 2002). It is characterized by long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption (Markard et al. 2012). Transitions towards sustainability succeed whenever there is a technological niche sufficiently developed coupled with adequate pressure arising from the landscape level (Lopolito et al. 2011). The MLP is one of the main conceptual approaches to frame this change. Essentially, in the MLP, transitions occur as a result of the interface between three different levels: landscape, regime and niches (Geels and Schot 2007). The landscape level embodies exogenous determinants including material and social infrastructure, politics, natural setting, etc. The regime represents a stable set of institutional rules, technical knowledge, and social interaction patterns shaping the fundamental configuration of technologies. Finally, the innovation niche can be conceived as a protected space where promising technologies are developed and experimented. Landscape factors could exert pressure on the incumbent regime and open windows of opportunities for niches to break through and conduce to radical shifts in socio-technical regimes (Geels 2011). A sustainable transition occurs from the interaction of the MLP levels, namely, when a sufficiently developed niche-innovation challenges the dominant regime which, in turn, undergoes an adequate amount of pressure from the landscape (Hansen and Nygaard 2014). However, opportunities for niche innovations to emerge and replace the current regime might be heavily hampered by external factors at the regime level and internal factors at the niche level (Falcone et al. 2019). Following the MLP, we build the analysis upon a combined SWOT-MLP framework to provide crucial theoretical perceptions for the transition under investigation. The main objective of SWOT analysis is to inspect internal and external system characteristics simultaneously, with the aim of supporting operational actions (Kurttila et al. 2000). SWOT analysis encompasses two main types of factors influencing the investigated system: internal factors (i.e., strengths and weaknesses) and external factors (i.e., opportunities and threats). Therefore, two conditions—one internal and one external—should be met for the transition towards circularity to succeed:

(i) the internal condition concerns the niche development (i.e., the second-generation biorefinery), whose strengths and weaknesses represent the extent to which the niche is effectively mature and thus ready for breakthrough;

(ii) the external condition can be assumed as a mix of regime and landscape pressures that act as opportunities and threats surrounding the tourism sector and support or hinder the transition. Within this operational framework, we can draw potential new strategies for an effective transition towards a tourism-based circular economy (see Figure 1).

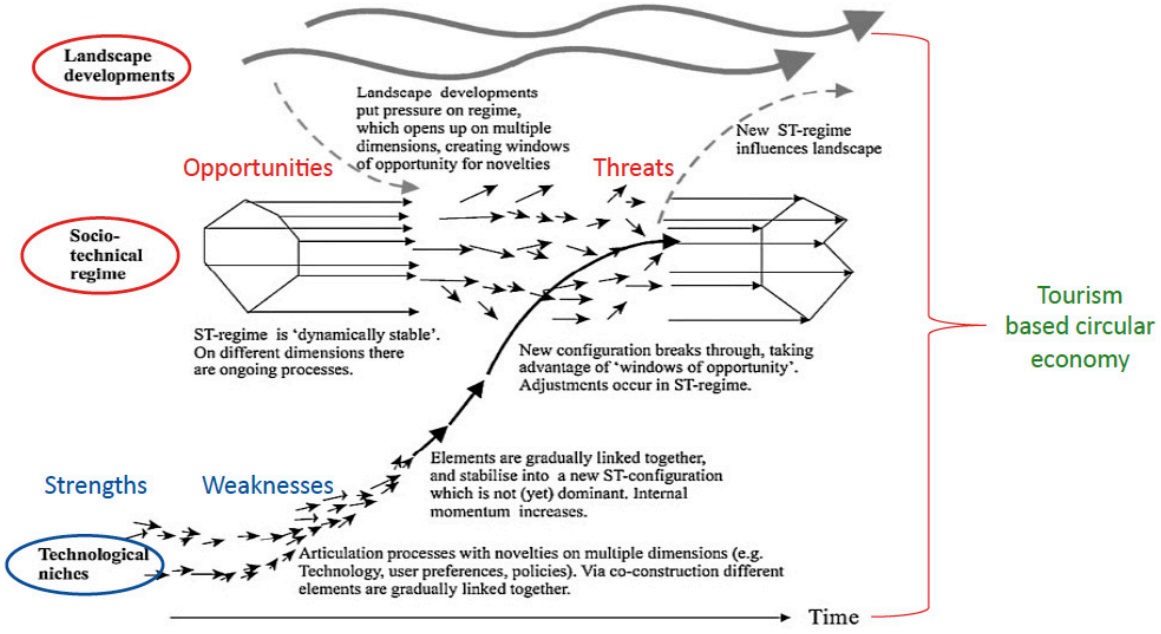

Figure 1. Strengths, Weaknesses, Opportunities and Threats - Multi-Level Perspective (SWOT-MLP) for a transition towards a tourism-based circular economy. Source: adapted from Falcone et al. (2019) and Geels (2011).

The MLP is a valuable tool for policy makers to understand and thus to address transitions in an efficient and effective way by placing the focus on both niche and regime levels (Coenen et al. 2010). Therefore, it allows us to gain an in-depth understanding of the framework conditions surrounding the tourism industry in Salento. With this understanding, potential policy directions for an effective transition towards a tourism-based circular economy can be suggested.

3. Materials and Methods

3.1. The Study Area

The Salento peninsula is an area located in the southeast of Italy in Apulia Region (Figure 2). It covers the provinces of Lecce, Taranto (the eastern part) and Brindisi (central-southern part), with a population of approximately 1.5 million inhabitants. Salento spans 5329 km^2 and has more than 300 km of coastline along the Ionic and Adriatic Seas.

In recent decades, Salento became known at both national and international levels due to its beautiful coasts and numerous events and entertainments proposed along with its well-known historical and artistic heritage. The economy, once purely based on agriculture and artisanal fisheries, has experienced a significant increase in the secondary and tertiary sectors, making this area one of the richest in Southern Italy. One of the most important economic sectors is tourism. Tourist arrivals registered an 80% increase between 2002 and 2009, followed by a more moderate 10% increase between 2009 and 2015 (ISTAT 2016). The tourism industry is especially intensive in MSW generation compared to other economic sectors, such as manufacturing or agriculture, and more prone to produce other kinds of polluting outputs (Mateu-Sbert et al. 2013). Therefore, the relationship between tourism growth and MSW generation in Salento and related management strategies are worth studying for at least three reasons: (i) the development of the tourism industry has resulted in an increase in waste generation

(UNEP/GPA 2006); (ii) inadequate MSW management can bring negative effects on the attractiveness of the touristic area, reducing tourism inflows (Arbulú et al. 2015); (iii) valorizing available waste materials, in circular economy models, allows for closing the loop not only material-wise but also energy-wise (Pan et al. 2018). Due to these premises, the tourism industry in Salento represents an interesting case of investigation for understanding the socio-political dynamics based on experts' insights and awareness in order to support a radical form of sustainability transition. Italy has recently taken steps in this direction with two second-generation biorefineries, namely Gela and Porto Marghera. However, they still represent a small industrial niche, facing strong socio-economic challenges (Imbert et al. 2017). From this perspective, the tourism industry in Salento could represent an open-air laboratory for the application of the most advanced environmental and renewable technologies and become a frontrunner not only for Italy but also for the whole EU.

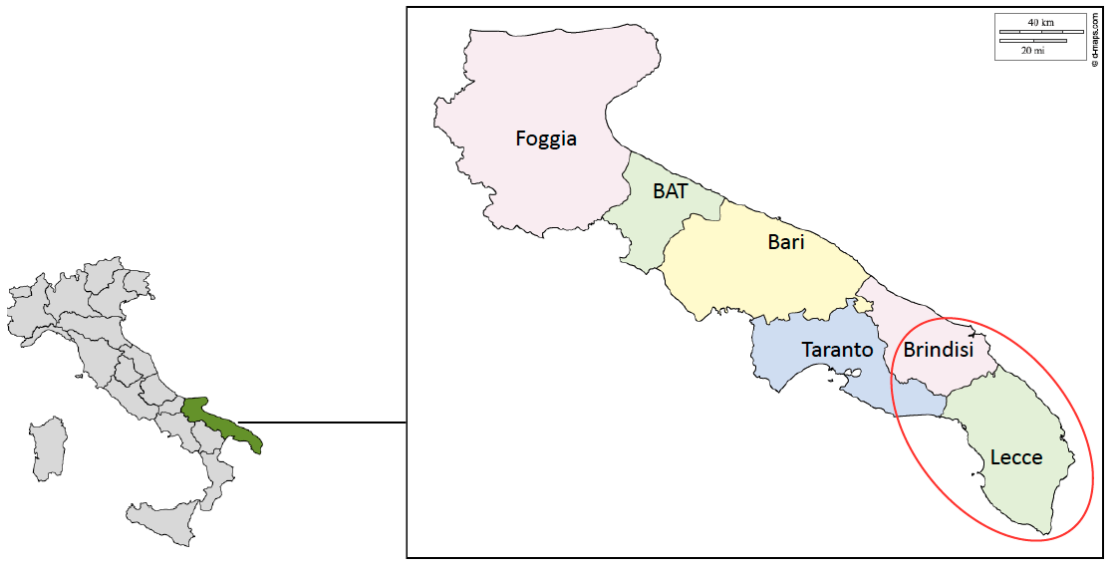

Figure 2. Geographical position of the study area. **Source:** author.

3.2. Methods

With the aim of determining the quantitative values of SWOT factors, the Analytic Hierarchy Process (AHP) or the ANP are the most suitable techniques (Saaty 1996). The AHP is generally employed to determine the quantitative values for SWOT analysis, since it works on the idea that elements function independently of one another in a hierarchical configuration (Catron et al. 2013; Saaty 2005). This represents a severe assumption to meet, especially when the considered attributes become interdependent owing to a complex situation. Such a degree of complexity makes the ANP appropriate to study factors' dependencies (Starr et al. 2019). Assessing the conditions able to promote socio-institutional changes for a sustainable energy transition in Salento (e.g., second-generation biorefinery) includes a number of complexities and interdependencies involving different stakeholders. For example, urbanization, demographic trends and related socio-cultural changes will likely impact the waste management practices in the area. Accordingly, SWOT-ANP is the appropriate method for this analysis.

The methodological approach can be divided in two distinct phases:

1. Identification and selection of relevant SWOT factors by means of a literature review and expert interviews;
2. Prioritization of the internal and external factors identified through a survey administered to a variety of knowledgeable stakeholders.

In the first phase, a literature review was carried out by looking at two main databases of scientific literature, i.e., Scopus and Web of Science, to ascertain a list of relevant factors to be used in our

investigation. A broad keyword search was conducted in order to retrieve relevant papers within the publication timeframe of 2015–2019. We paired some anchor keywords (i.e., "bio*," "circular*," and "sustainab*") with search strings (i.e., "tourism", "energy", "transition", "refinery"). Our in-depth literature review uncovered more than 150 papers engaging with the sustainability of the tourism sector and more than 20 regarding waste-to-energy transitions. With the aim of selecting the most relevant factors, we refined this pool of articles by carefully examining the text of each article in order to ascertain the presence of a well-defined idea or value judgement with regard to the area of investigation. In doing so, we employed the QDA Miner 5.0 software package (Provalis Research 2015), which allowed us to perform a qualitative assessment of the context in which relevant keywords appeared in the selected documents. Table 1 reports some descriptive statistics about the documents analyzed and the relative keywords found.

Table 1. Descriptive statistics of the keywords search.

Total number of documents analyzed	151
Total number of words	1,583,418
Average number of words per document	10,486
Total number of keywords found	847
Average number of keywords per document	5.6

We accessed 151 documents for a total of 1,583,418 words, with an average number of words per document equal to 10,486. The majority of documents refer to the sustainability and development of the tourism sector. In this framework, we found 847 keywords corresponding to an average of 5.6 per each accessed document. The word map below (Figure 3) allows the visualization of the most relevant words employed in literature to characterize the sustainability of the tourism industry.

From the total number of words used in the 151 articles, the map includes only those terms which appear at least 5 times in the analyzed corpus of the single article. The bigger the letter size, the more frequent the word. It is important to mention that the term energy is in the middle of the map, and it is connected to all the focal points of the current research (biorefinery, development, tourism, circular), but also to other important aspects, such as: transition, policy, jobs, etc. In a further stage, with the aim of choosing the most relevant factors and summarizing them by way of a 2×2 matrix (internal factors: strengths and weaknesses; vs external factors: opportunities and threats), we conducted two interviews with two academicians (i.e., an agricultural economist and a commodity scientist) with long-term involvement (i.e., more than a decade) in the field under investigation. This allowed the labelling of the factors retrieved by means of literature review as internal and external to the tourism industry.

In the second phase, and building on the protocol followed in Starr et al. (2019), a survey was developed and administered to a group of knowledgeable local stakeholders. A larger group of experts was identified, starting from a preliminary list of actors derived from the Italian Association of Tourism Professionals and Cultural Operators (AIPTOC). The association has more than 300 effective members covering different categories (e.g., managers, researchers, evaluators of management systems, consultancy companies, institutions and trade associations, etc.). Successively, considering the information collected by means of websites, technical reports and blogs, we refined the list by focusing only on actors with long-term involvement (i.e., more than a decade) in the field under investigation for the selected study area. Interviewees were selected with the intention of representing a wide range of actors involved in the tourism industry. In particular, the group of experts taking part in the survey were: two tourism industry professionals, a trade association, two representatives of a consumer association and environmental associations, a local policy maker, and two researchers. The eight interviews were conducted by telephone over the period of February to April 2019, and lasted approximately one hour. Respondents were asked to make several pairwise comparisons between the identified SWOT factors using a scale suggested by Saaty (1996). The scale ranges from equal

importance (participant assigns a numerical value of 1) to extreme importance (participant assigns a numerical value of 9) of one element over another. After comparisons between each factor within the SWOT categories were made, comparisons between each category were made by employing the same protocol. Therefore, two matrices were administered to respondents: (i) pairwise comparisons per group (Table 2); and (ii) pairwise comparisons of the groups (i.e., strengths, weaknesses, opportunities and threats) (Table 3).

Figure 3. Word map of text-based analysis of the tourism industry. **Source:** author.

Table 2. Pairwise comparisons per group.

	F1	F2	F3	F4	F5
F1	1	$1/V_{F2F1}$	$1/V_{F3F1}$	$1/V_{F4F1}$	$1/V_{F5F1}$
F2	V_{F2F1}	1	$1/V_{F2F3}$	$1/V_{F2F4}$	$1/V_{F2F5}$
F3	V_{F3F1}	V_{F2F3}	1	$1/V_{F3F4}$	$1/V_{F3F5}$
F4	V_{F4F1}	V_{F2F4}	V_{F3F4}	1	$1/V_{F4F5}$
F5	V_{F5F1}	V_{F2F5}	V_{F3F5}	V_{F4F5}	1
Sum	SC_{F1}	SC_{F2}	SC_{F3}	SC_{F4}	SC_{F4}

Table 3. Pairwise comparisons of the groups.

	G1	G2	G3	G4
G1	1	$1/V_{G2G1}$	$1/V_{G3G1}$	$1/V_{G4G1}$
G2	V_{G2G1}	1	$1/V_{G2G3}$	$1/V_{G2G4}$
G3	V_{G3G1}	V_{G2G3}	1	$1/V_{G3G4}$
G4	V_{G4G1}	V_{G2G4}	V_{G3G4}	1
Sum	SC_{G1}	SC_{G2}	SC_{G3}	SC_{G4}

In Tables 2 and 3, F1,..., F5 are the identified factors, G1, . . . , G4 are the SWOT groups, V_{F2F1} represents the value of factor F2 with respect to factor F1 (the same logic is applied to all factors), V_{G2G1} is the value of group G2 with respect to group G1 (the same logic is applied to all

groups), SC_{F1} and SC_{G1} are the sum of values regarding the columns of group F1 and G1, respectively (the same logic is applied to all groups)[1].

The local factor priority is obtained evaluating the average values of the expert comparisons among the factors in the same SWOT group. Meanwhile, the group priority is based on the average of the expert comparison among all groups. The global factor priority of all SWOT factors is calculated as the product of the local factor priority and the respective group priority.

The two aforementioned phases are common in both AHP and ANP procedures. However, to appraisal the interdependence between SWOT factors, an additional analysis is needed. Table 4 was employed to weight the interdependence of each category. For example, respondents were asked to consider how strengths may be used to mitigate weaknesses or enhance opportunities (Catron et al. 2013; Starr et al. 2019).

Table 4. Assessing the interdependence of each category.

	G1	G2	G3	G4
G1	1	I_{G1G2}	I_{G1G3}	I_{G1G4}
G2	I_{G2G1}	1	I_{G2G3}	I_{G2G4}
G3	I_{G3G1}	I_{G3G2}	1	I_{G3G4}
G4	I_{G4G1}	I_{G4G2}	I_{G4G3}	1

In Table 4, I_{G2G1}, I_{G3G1} and I_{G4G1} represent the factors' interdependence. They measure the relative importance of weaknesses, opportunities, and threats in enhancing strengths, respectively, and I_{G1G2}, I_{G3G2} and I_{G4G2} represent the relative importance of strengths, opportunities, and threats relative to mitigating weaknesses and so forth.

The global priority value based on factor interdependence, for individual SWOT factors, can then be calculated as: global priority of factor G_{ij} = priority value of factor Gij * (interdependent scaling value of SWOT category).

4. Results and Discussion

The first step of the methodological approach allows the identification and selection of the relevant SWOT factors describing the tourism industry, with particular emphasis on the investigated area. According to the literature review and experts' perspectives, several driving forces and barriers might trigger or hamper the transition towards a tourism-based circular economy in Salento (Table 5).

The mere analysis of different SWOT factors highlighted that a possible driving force (i.e., opportunities and/or threats) of the tourism industry relates to the potential engagement of several knowledgeable stakeholders in sustainable production and consumption processes. The scientific and technological collaboration among actors along the whole tourism chain could ensure both environmental sustainability and social inclusion (Kohon 2018). On the other hand, possible barriers (i.e., weaknesses and threats) to the development of a second-generation biorefinery encompass institutional (e.g., policy uncertainty), financial (e.g., low financial support) and social factors (low social acceptance). These findings are in line with the literature, suggesting that one of the main concerns of local government officials is the potential negative effect of new projects and plants on the tourism industry (Vargas Payera 2018). This could explain the lack of long-term planning by policy makers, whose attention are sometimes mainly directed towards the short-term consensus (Laird 2001).

[1] Following Margles et al. (2010), the obtained results have been tested for consistency.

Table 5. Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of the tourism industry in the study area.

Strengths		**Weaknesses**	
S1	High number of involved actors	W1	Limited sectorial expertise
S2	Utilization of non-marketable waste	W2	Low financial support
S3	Technical requirements well-known	W3	Lack of awareness
S4	Production of value-added products	W4	Lack of technology and infrastructure
S5	Additional source of income	W5	Excessive bureaucracy
Opportunities		**Threats**	
O1	Pollution reduction and land remediation	T1	Lack of long-term planning
O2	Reduced dependency on energy imports	T2	Social acceptability (Not In My Back Yard, NIMBY)
O3	Building infrastructure	T3	Policy uncertainty
O4	Scientific and technological collaboration	T4	Poor attitude towards waste management
O5	Increasing green jobs	T5	Competition from other energy sources

Following the SWOT-MLP combined framework (Falcone et al. 2019), two conditions—one internal (i.e., niche development) and one external (i.e., regime and landscape pressures)—should be met for the transition towards circularity to happen. Analyzing the stakeholders' perspective towards the prioritization of the SWOT factor provides some preliminary information on the effective possibility for the niche to breakthrough (Figure 4).

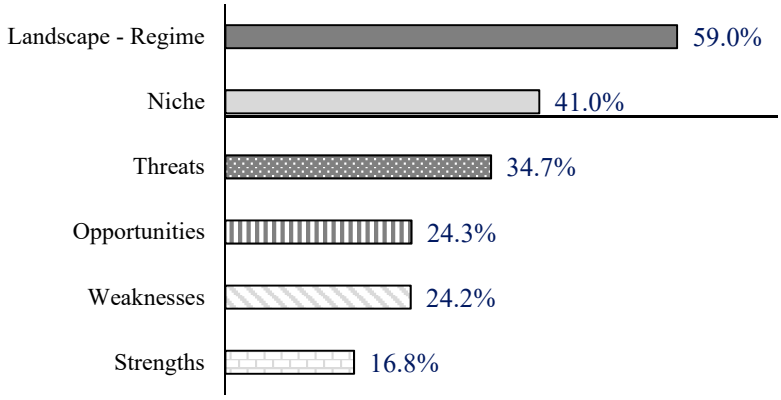

Figure 4. Priority levels of SWOT-MLP factors. **Source:** author.

Specifically, the aggregation of different levels of priority assigned by respondents to each SWOT category allows us to assign the highest priority to threats (34.7%), followed by opportunities (24.3%) and weaknesses (24.2%), while strengths are recognized with a lower priority level (16.3%). Taking together internal niche factors (i.e., strengths and weaknesses) and external regime and landscape pressures (i.e., threats and opportunities), experts recognized a higher level of priority for the external pressures (59%) over the internal niche dynamics (40%).

As mentioned in the previous section, the global factor priority of all SWOT factors is calculated as the product of the local factor priority and the respective interdependent group priority. The values of global priorities of the SWOT factors, determined through ANP, as well as their priority rankings are shown in Table 6. Figure 5 provides a graphical representation. Factors further away from the origin are relatively more important than factors closer to the origin.

Table 6. The global priorities for SWOT factors determined through Strengths, Weaknesses, Opportunities and Threats–Analytic Network Process (SWOT-ANP).

Strengths		**Global Priority**	**Global Ranking**
S1	High number of involved actors	0.022	18
S2	Utilization of non-marketable waste	0.028	15
S3	Technical requirements well-known	0.017	19
S4	Production of value-added products	0.031	13
S5	Additional source of income	0.041	8
Opportunities			
O1	Pollution reduction and land remediation	0.046	6
O2	Reduced dependency on energy imports	0.037	11
O3	Building infrastructure	0.039	9
O4	Scientific and technological collaboration	0.011	20
O5	Increasing green jobs	0.058	3
Weaknesses			
W1	Limited sectorial expertise	0.045	7
W2	Low financial support	0.033	12
W3	Lack of awareness	0.026	16
W4	Lack of technology and infrastructure	0.047	5
W5	Excessive bureaucracy	0.059	2
Threats			
T1	Lack of long-term planning	0.049	4
T2	Social acceptability (NIMBY)	0.065	1
T3	Policy uncertainty	0.037	10
T4	Poor attitude towards waste management	0.029	14
T5	Competition from other energy sources	0.025	17

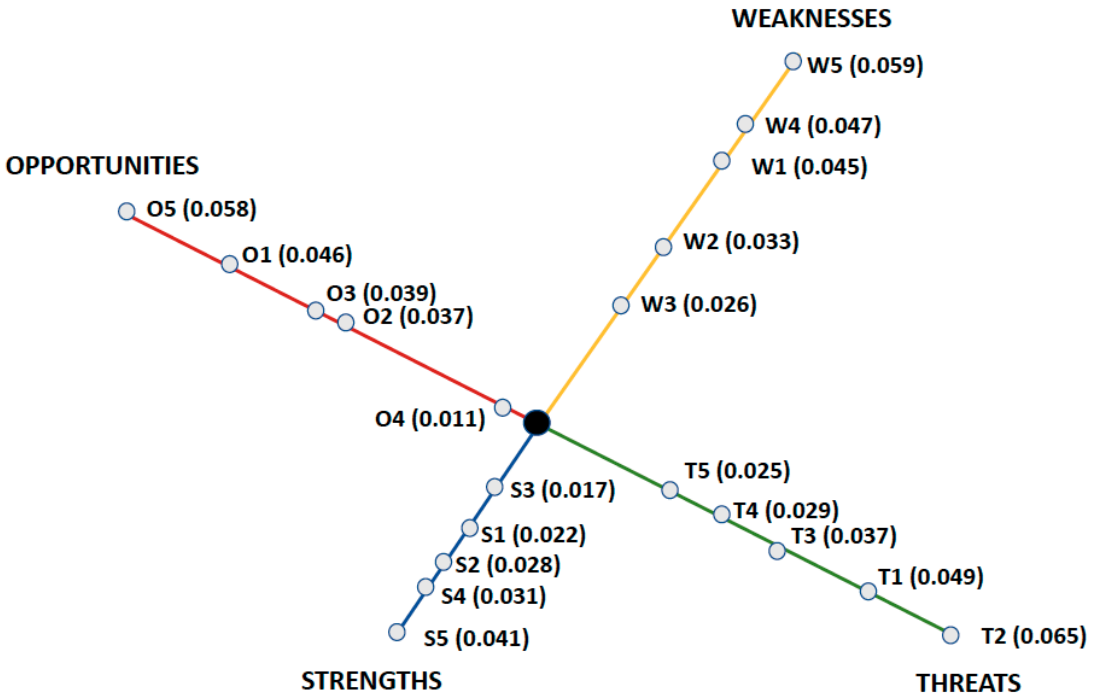

Figure 5. Graphical representation of SWOT factors and their corresponding global priorities. **Source:** author.

For strengths, respondents recognized that with the installation of a biomass pre-treatment plant, and using second-generation raw materials derived from non-marketable waste (S2),

a second-generation biorefinery could be also able to produce an additional source of income (S5), and this represents a circular economy model. A clear example is represented by the recovery of organic waste from accommodation facilities towards responsible initiatives. Literature has documented the relevance of responsible tourism in the tourism industry (Ruiz-Lozano et al. 2018; Wocke and Merwe 2007). It emphasizes practices that are environmentally friendly, socially acceptable and economically beneficial to all stakeholders (Musavengane and Steyn 2013). On the supply side, hotels should focus on green purchasing, ecolabelling and certification, waste management and recycling (Mensah and Blankson 2014). Waste disposal should be phased out and, where it is unavoidable, policy makers need to develop sustainable strategies appropriate for the community need to be accomplished with responsible practices (Goffi et al. 2019). Industry operators can be encouraged by the public sector to participate in responsible tourism, including education, economic motivation, marketing motivation and building social networks (Musavengane 2019), in order to sufficiently increase public awareness and to correct the public perception of unsustainable tourism practice towards an environmental practice (Ruban et al. 2019). From this perspective, the existence of devices in the tourist's home is a determining factor for acquiring digital knowledge, skills and attitudes (Díaz-Meneses 2019).

With reference to weaknesses, the analysis emphasized that the administrative burdens of bureaucracy (W5) was the top-rated concern. Excessive bureaucracy in Italy has caused a competitive disadvantage compared to other EU countries in attracting private investments, including in the tourism industry (Falcone 2018b). Bureaucracy represents a classic issue in change management (Bevir 2009; Hall 2005). However, there is still little empirical evidence regarding the issue of bureaucracy in the tourism industry. In a recent study on the effect of bureaucracy on the tourism sector in Italy, Marino and Pariso (2018) contribute to creating a pool of knowledge related to change management by underlining the relevant elements within different bureaucratic typologies. As found by the authors, the private sector is better than the public sector in some specific ways: private sector organizations are more cost conscious, more inclined to implement modern personnel management and more capable of developing corporate change as a steering instrument. Therefore, pointing at the involvement of private actors could have more effective results in the transition towards sustainability. Moreover, the lack of technology and infrastructure (W4) for a proper waste management has been recognized as an important weakness among the majority of stakeholders. They also expressed concern about the low financial support (W2) mainly due to: (i) limited sectorial expertise of the potential investors; and (ii) short term orientation of financial tools. Financial instruments must be matched with the development of science and technology progress and the financing needs of renewable energy; energy security law and energy funds accord with political objectives in order to better promote the development of the waste-to-energy industry (Wang and Zhi 2016). However, touristic businesses operating in rural areas face, overall, higher difficulties in accessing finances compared to similar businesses located in more industrialized areas (Badulescu et al. 2015).

With respect to opportunities, interviewees recognize a proactive role for local policy makers in incentivizing biorefinery development. The construction of infrastructure (O3) was identified as an important opportunity for biorefinery development in Salento by providing job opportunities for local population (O5). This action includes donor funds aimed at the installation of new environmentally friendly plants (i.e., biorefinery facilities, R&D center), infrastructural subsidies (e.g., storage platforms for biomass serving the biorefinery) and long-term assets (i.e., transportation, energy and social infrastructures). As recognized by respondents, large infrastructural investments can foster local economic development along the whole supply chain by increasing the firms' economic performance. This finding is supported by the literature (Bostick et al. 2018; Falcone et al. 2017). Moreover, increasing efficiency in the industry is expected to have positive effects on local employment; as such, infrastructure investments are likely to impact on quality of life and well-being.

For threats, the respondents highly recognized the relevance of the social acceptability of a new biorefinery plant (T2). Specifically, they pointed to the lack of a well diffused environmental culture in the local community as a possible obstacle. For example, with reference to waste management

and NIMBY (Not In My Back Yard) attitudes, citizens do not want plants situated within their cities, because of the potential issues for the pollutants and odor which might have negative effects on the tourism industry (D'Adamo et al. 2019). It is important to ensure social sustainability by providing a healthy and safe environment for all stakeholders, in both physical and psychological aspects (Zuo and Zhao 2014), not only for the current time but also for future development (Lu et al. 2019). Similarly, a lack of long-term planning by governments (T1) and overall policy uncertainty (T2) also received a relatively high ranking from all the stakeholders within the region. Specifically, policy uncertainty distorts the fundamental relation between investment and the cost of capital (Drobetz et al. 2018) and is a significant challenge for actors in the renewable energy sector (Dalby et al. 2018). As a starting point, including biorefineries in the government's long-term strategic plans is a relevant way to pave. It could guide and reassure investors, providing, thus, capital to deploy commercial-scale versions of mature biorefinery technologies (Ellen MacArthur Foundation 2015).

5. Conclusions

Transitioning from a fossil fuel-based economy to one based on the use of biomass is increasingly perceived as a needed feat among scholars, analysts and policy makers. Defining effective ways to align sustainable supply chain practices to the CE paradigm represents a cutting edge topic at the intersection of scientific research and public policy (Genovese et al. 2017).

In this framework, the present paper has shed light on external pressures and internal dynamics so as to provide a clear direction for policy strategies to support the transition towards a tourism-based circular economy. To this aim, we built our analysis upon an integrated SWOT-MLP framework to provide crucial theoretical perceptions for the transition under investigation.

The findings emerging from our investigation can represent useful insights for policy makers. Specifically, among the top five ranked factors, we can recall: (i) T2 (social acceptability); (ii) W5 (excessive bureaucracy); (iii) O5 (green jobs); (iv) T1 (lack of long-term planning by governments; (v) W4 (lack of technology and infrastructure). Four out of these five factors represent weaknesses (i.e., W4, W5) and threats (i.e., T1, T2), which can concretely jeopardize the transition towards greater sustainability in the investigated area.

Policy strategies should aim at reducing the administrative burdens of bureaucracy by introducing, for example, on a large scale, e-government services. Moreover, promoting information campaigns could increase the degree of social awareness and reduce the NIMBY concern. Additionally, supporting public infrastructural investments can raise local economic development and increase firms' economic performance so as to exploit the potential creation of green jobs.

The main limitation of this approach rests on the qualitative nature of the methodological approach, which is not able to identify the most effective policy strategies (policy design) nor to appraise the financial support for each measure (policy engineering). Nevertheless, this approach is crucial to provide a clear direction for policy maker interventions. Further lines of research could aim at extending this investigation to policy design, by including a fuzzy inference simulation based on a causal-effect map, to identify the most effective instrument mix for the development of the tourism-based circular economy.

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