energies

MDPI

Article

Contact Zones in the Energy Transition: A Transdisciplinary Complex Problem

Aleksander Jakimowicz [1,*] and Daniel Rzeczkowski [2]

[1] Department of Economic Policy, Institute of Economics, Polish Academy of Sciences, Palace of Culture and Science, 1 Defilad Sq., 00-901 Warsaw, Poland
[2] Department of Market and Consumption, Institute of Economics and Finance, Faculty of Economic Sciences, University of Warmia and Mazury in Olsztyn, 1/327 Cieszyński Sq., 10-720 Olsztyn, Poland
* Correspondence: ajakimowicz@inepan.waw.pl

Abstract: The success of energy transition relies on what happens in the contact zone, the area between citizens and municipality governments, which still awaits more thorough research. This article employs the concept of the contact zone both as a theory describing processes of developing energy prosumerism on a local level, and as a research method which enables one to uncover phenomena that are critical to attaining climate objectives. The research field was the Warmia and Mazury Province in Poland, which is the region with the lowest socio-economic potential both in Poland and in the European Union. The analyzed contact zone was divided into two parts: the human administrative legal contact zone and the more-than-human energy contact zone. To describe the relationships occurring in these subzones, the authors used empirical data originating from a survey addressed to citizens living in the above province. The aim was to explore the respondents' knowledge about current prosumption processes and the opportunities to implement them in the local government sector. Multiple correspondence analysis was used to analyze the data. The main findings were the low knowledge of citizens about prosumption, which was represented by a large number of the prosumption principles not indicated by the respondents, and—on the other hand—the evidence that local communities expect the implementation of digital prosumption, which they know from the market sector, in public administration. It was also demonstrated that the absence of citizens' involvement in the energy transition is a consequence of two historic colonialisms, German and Russian, which had a huge influence on the emergence of an autocratic management style in the analyzed region. Comparison of the analyzed contact zones with two reference zones showed that grassroots movements in the province are initiated mainly by external factors of a nationwide character. In the Warmia and Mazury contact zones, civic initiatives are in the early stage of development, although they display all features of developed zones, such as autoethnographic gestures, transculturation, struggle, violence, and anti-conquest.

Keywords: digitalization; energy transition; local government sector; virtuous cycle of digitalization; decentralization and electrification; more-than-human energy contact zone; human administrative legal contact zone; autoethnographic texts; transculturation; multiple correspondence analysis; principles of prosumption

Citation: Jakimowicz, A.; Rzeczkowski, D. Contact Zones in the Energy Transition: A Transdisciplinary Complex Problem. *Energies* **2023**, *16*, 3560. https://doi.org/10.3390/en16083560

Academic Editor: Vincenzo Bianco

Received: 17 February 2023
Revised: 10 April 2023
Accepted: 17 April 2023
Published: 20 April 2023

1. Introduction

In this article, we take the reader on a journey along new trails leading to the knowledge of distant and unknown realms, as we consider a problem that has not yet been recognized in science despite the fact that it is extremely important for preventing global warming and catastrophic climate change. The issue is extremely transdisciplinary, cross-sectional, complex, and fascinating. Here, we define the concept of contact zones as complex systems containing elements belonging to seemingly separate fields of knowledge, such as humanities, natural sciences, and social and technical sciences. What is important is

that the interactions of the components of contact zones can be decisive for the success or failure of the energy transition. That is why we consider this issue to be cutting-edge. It should be noted at the outset that this is a completely new and original problem, and it has not yet received its proper place in science. So far, there is no literature on the subject since contact zones have not been taken into account as a factor in the development of renewable energy. Aiming to rectify this, we have produced this article as a result. We address it to representatives of various scientific disciplines in order to arouse the interest of the scientific community in this topic and encourage other scientists to develop and supplement the ideas and concepts contained herein.

Contact zones are an issue studied mainly in the humanities, although one can also find applications of the concept to the study of human relations with animate and inanimate nature. However, these ideas are basically unknown in economics, social sciences, technical sciences, and natural sciences. In order to define contact zones for the energy transition, we have selected from the multidisciplinary literature on the subject all the components of these zones that may be relevant to the development of renewable energy. The most important components of contact zones are concepts that may come as a surprise to scholars involved in the transformation of current energy systems, which are still mostly based on fossil fuels. The list we have compiled, included in the last section of the article, is certainly not complete, but may provide a useful starting point for further research in this area. The features of the contact zones we have selected are not limited to a selected research context but can apply to all contact zones found anywhere in the world. They are universal in the sense that they can be applied locally, nationally, internationally and even globally.

Complementing the energy transformation issue with contact zones certainly increases the complexity of the problem itself as we add additional elements and variables, but the primary benefit is to bring it closer to reality, and this is crucial. Contact zones, like the transformation itself, are complex systems that cannot be studied by analytical methods alone. These zones contain many different quantitative, qualitative, tangible, and intangible elements, some of which have not yet been fully explored by the scientific fields to which they belong. These are primarily people, the expectations of individuals, local communities and entire nations, as well as the economy, energy law, technology, and many elements of animate and inanimate nature. Since contact zones are most often terra incognita in science, except, of course, in the humanities, this must lead to the conclusion that current knowledge of the energy transition has overlooked many important and critical elements for the development of renewable energy. By introducing contact zones into science, the humanities can contribute to achieving such important goals for humanity as limiting global warming and preventing climate change.

The structure of the article diverges somewhat from accepted standards due to the originality of the subject matter under study and the need for a broader explanation of some of the ideas and concepts applicable here. Section 2 includes a literature review, research questions, and a research hypothesis, and indicates that the concept of contact zones will be used not only as a theory but also as one of the primary research methods. Section 3 gives a definition of contact zones and characterizes their most important elements, providing model applications in humanities and environmental studies. The purpose of Section 4 is to demonstrate that digitalization is the driving force behind energy transition and that contact zones are its birthplace. Section 5 discusses the two most important types of contact zones found in energy transformation: the human administrative legal contact zone and the more-than-human energy contact zone. Section 6 presents a summary of our previous research on digitalization and distributed generation in the province of Warmia and Mazury, since—in view of the aforementioned lack of scientific literature on the subject—they provide, for the time being, the only, albeit imperfect, frame of reference for the research presented here. Section 7 verifies the research hypothesis using multiple correspondence analysis and presents the relevant calculations. Section 8 discusses the results of the calculations and presents the characteristic features of the Warmia and Mazury contact zones. The rationale for the need for further comparative research to clarify the conundrum of unselected

prosumption principles by respondents is also presented. Section 9 describes the two reference contact zones of Żurawlów and Kraków, which were chosen for comparative analysis and to clarify the problem of citizens' unchosen prosumption principles. Section 10 is devoted to discussing the results of the empirical research and comparative analysis. It also discusses the basic characteristics of the contact zones studied in both national and international contexts. Section 11 provides a comprehensive summary of the results of the research and presents a list of those features of the contact zones that are most important from the perspective of energy transition.

2. Literature Review

It is widely believed that the main responsibility for the prevention of climate change rests with governments and international institutions. However, such an approach seems incomplete because, according to the conservative worldview, responsibility for the environment should also be based on private property rights and a strong emotional bond between citizens and their own household and their immediate environment. Free economies based on private property rights and the rule of law are less energy-intensive, pivot more quickly to renewable energy production and emit less carbon dioxide than economies without such features [1]. Solving environmental problems cannot be monopolized by the state, but should be treated as a permanent element of people's daily lives. The role of the government is to create the conditions for proper motivation, from which true civic responsibility for the climate can spontaneously arise and develop. The essence of this motivation is the citizens' identification with not only groups of people close to them, but also with their places of residence and the customs adopted by them. This concept is known as oikophilia, which should be understood as a love for the household and the desire to protect it, as well as the ability to sacrifice for your surroundings. This is related to people's desire to settle in a specific place in preference to another. Environmental protection in a particular region is most effective only if it is carried out by the people living there.

The motivation resulting from oikophilia is deeply rooted in the human psyche and has a long-term character, as it arouses responsibility not only towards the closest household members but also towards past and future generations, and thus encompasses all people associated with a given place. The sentiment of oikophilia includes people's most important moral, aesthetic and spiritual values, which makes it the basic causative factor of their actions. It has a lot in common with friendship, a sense of beauty, a respect for the sacred and allows one to distinguish prices on the market from what is priceless at home. It offers the hope of achieving climate goals at both local and global levels. A cogent environmental policy must therefore be based on the proper motivation of the electorate and at least a partial departure from homo economicus because, otherwise, it will be difficult to resist the consumption of what is most valuable by global entropy [2]. Oikophilia stands out among the resources beneficial for the environment by being the easiest to acquire and the easiest to renew. The only way to renew it is through appropriate education based on the values mentioned above.

Environmental law is important for climate protection, but its effectiveness may be limited by people's lack of proper motivation. The worst environmental problems were not solved by centralized projects resulting from state planning, but by civic initiatives, which, once successful, became a source of legislation. There is ample evidence that environmental quality is best where oikophilia is strong. In fact, it seems that environmental protection is almost impossible without civil associations driven by oikophilia. Thus, the importance of the bottom-up approach based on the local responsibility of citizens for the energy transition cannot be overstated. Local initiatives should be conducted under a regime of private property, in which oikophilia strengthens market signals and enables local environmental problems to be solved. Successes on a global scale can come later, when proven solutions are taken up in other places [1].

Many climate goals cannot be achieved without the involvement of people. In the European Union, efforts are being made to increase energy efficiency and decarbonize the

building stock, which is expressed in legislation [3]. It turns out that the largest polluters include not only coal-fired power plants, airlines, or shipping companies, but buildings first and foremost, which account for 40% of energy consumption and 36% of greenhouse gas emissions. As the European Commission points out, about 75% of buildings currently do not meet the energy efficiency requirements. Their renovation is expected to reduce total energy consumption by 5–6% and reduce emissions of CO_2 by almost 5%. This is a very ambitious goal, given that only 0.4–1.2% of building stock is renovated annually depending on the country, and the implementation of this goal by 2050 would require at least doubling the current rates of renovations [4]. As reported by the Building Performance Institute Europe, only 2.5% of building stock is highly energy-efficient, i.e., complies with the Energy Performance Certificate (EPC) label A. Accordingly, as many as 97.5% of buildings do not currently belong to class A, which means that they should be upgraded in order to achieve the assumed climate objectives [5]. It will be very difficult to implement these plans without making room for civic initiatives and using the resources offered by oikophilia on a larger scale.

The implementation of EU legislation in Poland brought new energy efficiency standards for buildings into force in 2021. The changes concern the maximum value of a facility's annual demand indicator for non-renewable primary energy used for heating, ventilation, domestic hot water preparation, cooling, and lighting, as well as the heat transfer coefficient of walls, roofs, ceilings, and flat roofs for all types of buildings. For example, for single-family residential buildings, the partial index (including only heating, ventilation and hot water) decreased from 95 to 70 $kWh/\left(m^2 \cdot year\right)$, while the second index was reduced from 0.23 to 0.2 $W/\left(m^2 \cdot K\right)$. Meeting these standards is a prerequisite for recognizing a facility as a building with low energy consumption [6].

In Europe, more than 60% of buildings are residential, of which up to 70% are owner-occupied. Renovation of these buildings and their transformation into energy-saving and decarbonized stock requires involving the owners and identifying convenient sources of financing. These are the people who will determine Europe's energy consumption over the next few decades. Most owners of residential buildings belong to the middle class, so their financial situation is determined by their ownership of the property or apartment. In addition, the level of education in this group is higher than average, so they understand that renovation not only reduces energy costs, increases the value of the house, and extends its useful life, but also has a positive impact on their quality of life. They are also aware of the risks of environmental pollution. Therefore, they tend to take care of their buildings, try to keep them in good technical condition, and are willing to invest in increasing their energy efficiency. This is how homeowners strive to provide a sense of safety, health, and comfort for themselves and their loved ones. It should also be emphasized that buildings are the main financial asset that will be inherited by future generations. Ownership of the building also implies an interest in the immediate surroundings, encourages the establishment of social relations, and increases motivation for civic engagement. Hence, building owners should be treated not only as consumers but as active players in the energy transition as well. Economic strength, education, and oikophilia are the three features of the middle class that predestine it for the role of a key climate change stakeholder, making it the leading force in the decarbonization of Europe [7].

An important facet of the energy transition as a whole is the need to call upon local initiatives and involve citizens in this project. Just as the modernization and decarbonization of buildings requires the involvement of owners, the decentralization of the energy sector is similarly based on the transformation of existing consumers into energy prosumers, who will play an active role in the market by producing energy for their own needs, storing it, or diverting its surplus to the grid. All of these projects require a two-way flow of information between citizens and the local government sector, which takes place in an as-yet undefined common space known in the humanities as the contact zone. It is to some extent an imaginal sphere, having, to a greater or lesser extent, the attributes of ordinary

physical space–time or cyberspace, which contains such elements as ideas, desires, and expectations, as well as material and intangible values.

This article attempts to determine the elements necessary to conduct the energy transition, which should operate in the contact zone between the citizens in Warmia and Mazury and local governments. The starting point for these considerations was the division of the contact zone under study into two sub-zones: the human administrative legal contact zone and the more-than-human energy contact zone. The main objective of this study is to determine the relations within two identified contact sub-zones between citizens and the municipal governments in Warmia and Mazury. In order to streamline the energy transition processes, it was necessary to identify the prosumer potential of society and its usability in local public administration. In particular, the aim was to learn society's attitude to digital prosumption and digitalization of the local government sector. The emphasis was placed on digitalization for a reason, as this is a key element in the development of the green energy sector. The ongoing energy transition process encompasses three mutually propelling components: digitalization, decentralization, and electrification. Of these components, the most important is digitalization, which refers to the digital transformation of technologies as well as business models and processes, and which plays a key role in controlling the flow of energy and information.

Digitalization is an intermediary medium between citizens and the local government in both contact zones under study. Moreover, it plays a strong transformative role in the development of energy generation from renewable sources. This paper seeks answers to three research questions:

1. How can digitalization transform the existing models of local government operation so that it can stimulate energy prosumerism development?
2. Do citizens expect the public administration to release the prosumer potential of the society and to incorporate it into a virtuous cycle comprising interrelations between digitalization, decentralization, and electrification?
3. What are the major similarities and differences between the contact zones in Warmia and Mazury and the two reference contact zones in Żurawlów and in Kraków?

The prosumption rules are the fundamental elements of a contact zone, without which the energy transition is not possible. In prosumer capitalism, they are a kind of understanding between citizens and the municipal governments, whose approval by both parties is a guarantee of the success of all joint enterprises. The authors formulated ten basic rules of prosumption and tried to see if they could be accepted by citizens as the basis for energy prosumerism. With the research questions listed above, the issue in hand was formulated in the following manner.

> *The research hypothesis: society is ready to participate in improving the local government sector by introducing digital prosumption to the contact zones. In other words, digitalization of the contact zones is based on the ten proposed rules of prosumption supported by digital technologies.*

The use of the contact zone as a theory and the research method in the energy transition is the most important added value of this paper, as there are still few studies of the subject matter. This helped to identify a research gap overlooked by scholars. According to the major discovery presented in this paper, events in the contact zone are crucial to the success or failure of the energy transition on the local level. In order to justify this claim, we refer to empirical studies which employ multiple correspondence analysis and comparative analysis. The empirical data were provided by a survey whose aim was to find out what members of the public think about the digital implementation of the prosumption rules in the municipal governments, as proposed in this paper. Thus created, the economic stimulus should lead to a change in the existing local government operation models. Interesting findings were obtained using multiple correspondence analysis. However, the authors were able to refer to these findings only by comparing them with their previous research because of the originality of the subject matter dealt with, resulting in the absence of any other

studies in this field. Therefore, it was an additional aim to broaden the scope of research and to use the contact zone not only as a theory that would help to explain numerous phenomena but also as a research method. In order to achieve this, a comparative analysis was performed to determine the similarities and differences between the characteristic features of the contact zones in Warmia and Mazury and the features of two reference contact zones in Poland. In one zone, farmers in Żurawlów fought against the Chevron Corporation about shale gas extraction, whereas in the other, covering one of the major cities in Poland—Kraków—there was (and still is) a complex social conflict about the causes of air pollution and the choice of the optimum remedies.

3. Contact Zones in Science

3.1. Definition of the Contact Zone and Its Most Important Elements

The concept of the contact zone was introduced by Mary Louise Pratt to denote an area where different cultures can communicate, where linguistic and cultural meetings take place, where negotiations are conducted, or even where battles are fought to determine the common history and relations of power. Contact zones should be understood as

> *social spaces where cultures meet, clash, and grapple with each other, often in contexts of highly asymmetrical relations of power, such as colonialism, slavery, or their aftermaths as they are lived out in many parts of the world today [8].*

This concept has a lot to do with colonialism, so it can be treated as a synonym for the colonial frontier [9] (pp. 6–7). Explaining the emergence of contact zones, Pratt refers to a manuscript from 1613 written in two languages, Quechua and Spanish, by Felipe Guamán Poma de Ayala and titled *The First New Chronicle and Good Government*. In 1908, it was discovered by the German scholar Richard Pietschmann as he was viewing the collection of the Danish Royal Library. The manuscript was intended by the author, whose origin was Andean, as a letter addressed to King Philip III of Spain, in which, as an indigenous subject, he described the history of the conquest of the Inca Empire by the Spanish, waged harsh criticism of their colonial rule, and also presented principles of good governance of the country. The document is an extensive work, with a total of 1200 pages and containing 398 full-page illustrations, but it is not known whether the king ever received it. The Danish Royal Library has produced a high-quality digital facsimile of the original manuscript, along with a transcription that is now available online [10]. In addition, the English translation of the manuscript by Roland Hamilton is recommended to the reader [11]. An interesting two-volume edition of the work in Spanish with transcription, prologue, notes, and chronology developed by Franklin Pease García [12] also exists.

Nowadays, it is worth noting that Guamán Poma describes in his letter the basic principles of good governance, by which he understands the combination of Incan social and economic organization with European technical thought and Christian theology, to be adapted to the practical needs of the Andean nations [13]. His views on political issues were complex, but systematic, coherent, and unequivocal. He was not a supporter of colonialism and the direct rule of foreigners, instead supporting native rule and calling for the restoration of traditional Andean governance and the restitution of Andean lands and properties. He condemned the greed of both civil and ecclesiastical officials. For this reason, his views can be considered anticlerical, although, on the other hand, among his postulates was the institutionalization of the Christian religion. In his eyes, the Andeans were civilized Christians, while the Spaniards he regarded as lost sinners. He called for the creation of a sovereign Andean state, which would form part of a universal Christian empire ruled by the Spanish king. It is worth noting here that despite harsh criticism of the unjust and exploitative Spanish rule, he does not reject the Spanish king because, according to the New Testament view, he believes that all power comes from God. As Rolena Adorno aptly sums up, *Guamán Poma was anti-Inca but pro-Andean, anticlerical but pro-Catholic* [14].

Pratt cites this text as an example of a standard product of a contact zone, as Guamán Poma can be considered an intermediary and mediator in negotiations between native Peruvian and Spanish colonial societies and institutions. This illustrates the sociocultural

and economic complexities resulting from the conquest of the Inca empire by the Spanish. The Andean author chose the title of his work with deliberation because the chronicle was the main writing apparatus for the Spaniards, which they used to present their American conquests. He decided to appropriate the official Spanish genre and use it for a new description of the history of the Christian world, in the center of which he placed the Andean peoples, not the European peoples, and where Cuzco took the place of Jerusalem. In this way, the chronicle of Guamán Poma became what Pratt calls an autoethnographic text, which means *a text in which people undertake to describe themselves in ways that engage with representations others have made of them* [8]. Ethnographic texts are characterized by descriptions of how European metropolitan subjects present themselves to their others, i.e., mainly conquered peoples. On the other hand, autoethnographic texts are responses to the former prepared by such defined others or intended to enter into dialogue with them. In other words, in the first type of text, the oppressed societies are presented in a certain way by the colonizers, while in the second, the tables are turned, and the colonized peoples and cultures selectively cooperate with the literary genres and idioms of the metropolis, thus appropriating them. These elements are combined with indigenous idioms, as a result of which self-representations are created, entering into metropolitan modes of understanding in order to change them. We are dealing here with something similar to the mirror dance, in which images can be reflected many times [9] (p. 143).

Another phenomenon existing in the contact zone is transculturation, meaning the process of selective and creative use by the conquered or marginalized peoples of dominant or metropolitan culture. Subjugated peoples do not have an influence on what reaches them from the metropolitan culture, but they can decide what elements they will transfer to their own culture and what purposes they will use them for [8,9]. This term was introduced by Cuban anthropologist Fernando Ortiz to denote cultural change during which something is always given in exchange for what is received. During this give and take, two sides of the equation are modified. Transculturation, within the meaning of Ortiz, does not mean the necessity of adapting one culture to another, but the cooperation of both active cultures, contributing to the creation of a new civilizational reality, which is exemplified by the Cuban counterpoint of two commodities, tobacco and sugar, the first of which is native and the second brought in from the outside [15].

The contact zone is a place where cultures that have so far developed independently, and thus had distinct geographical locations and histories, now meet, establish lasting relationships, and create a new society, often of a colonial nature, in which there may be fundamental inequalities, coercion and insurmountable conflicts. In the contact zones created by invasion and violence, there is a struggle for interpretive power regarding the perception of culture, which takes place in the conditions of radical heterogeneity, ambiguities, and enormous difficulties in determining the meanings of key elements of the experienced reality. It should be noted that contemporary Indigenous peoples, unlike the Western world, identify their culture with survival. Therefore, in such a system, being "different" means for them the need to play the role of a double agent and living in a bifurcated world. In order to survive, one should create oneself as a "self" for oneself, while for the colonizer, one should create oneself as an "other". In the contact zones, there is also the issue of self-determination of Indigenous peoples, meaning the possibility of controlling the conditions in which they will shape their relations with the nation-state or the world economy. For this reason, they are an arena of fierce negotiations concerning the mutual obligations of the conquerors and the conquered, and culture itself may also be the subject of negotiations. Relations between colonizers and the colonized are the medium from which culture, language, society, and consciousness are formed [16].

3.2. Contact Zones in the Humanities

It follows from the definition of the contact zone that negotiations are an important element of it, as only they allow for a compromise and coexistence of different cultures and societies. However, the existence of strong negotiating potential in contact zones

is sometimes considered questionable since they are based on contact languages that, although ensuring survival, have lower symbolic and personal values for users than native languages. These zones do not give an accurate answer to the question of how cultural and political differences can be articulated and negotiated in order to avoid battle. It is also pointed out that Pratt does not explain how a public space is created in which people have a reason to negotiate with competing views or factions. Therefore, there is a danger of treating contact zones as a multicultural bazaar, where opposing views are presented in a harmless way and there is no conflict between them. The missing elements of the contact zone are, therefore, factors indicating a conflict, i.e., the mutual interpenetration of competing perspectives based on the multidirectional flow of information [17]. For this reason, it is proposed that the contact zone be reconceptualized and recognized as a forum whose functioning is maintained by continuous negotiations, interactions, and compromises between perspectives and individuals. Its essence is, therefore, a dispute over the differences regarding competing interests and views [18]. It is also proposed that the negotiations be looked at as a form of civil dialogue, which is possible when the will to compromise is shared by all parties. In such cases, the languages and protocols of negotiation are usually determined by the dominant groups and should therefore be placed in specific historical and political dimensions [19]. Civil dialogue must be preceded by the acquisition of real power relations, i.e., a strict definition of social roles and their immunity from routine questions about their legitimacy [20] (p. 236).

The concept of the contact zone has found many applications in the humanities, and it is particularly useful in various pedagogical spaces [21]. This idea can be used in research on multiculturalism [22,23], and giving it historical significance and organizing English studies around a concept thus defined allows for a significant improvement in teaching, which at the same time reduces the focus placed on literary or chronological periods and racial or gender categories [24]. It is also useful in museology, as it includes cultural actions, creations, and transformations of identities, all of which run along controlled and intercultural frontiers emphasizing the existence of nations, peoples, and locales. Museums should be understood as contact zones in which things and people move, not as centers or destinations [25]. There are also concerns that the neo-colonial nature of these contact zones has a negative impact on the empowerment of the source communities whose patrimonies are exhibited, which, after all, should be the fundamental purpose of museums. Some hold the opinion that the restoration of the colonial character of the museum as a contact zone results from the role of autoethnography as an instrument of appropriation [26]. Apart from the above, discursive contact zones are used to describe non-local and non-physical spaces in which differences and similarities between different environments of devotional fitness, both Christian and non-Christian, are negotiated [27].

3.3. Contact Zones in Environmental Studies

The original concept of the contact zone can be extended by including political ecologies, multispecies ethnography, and more-than-human geographies, which makes it both a method and a scientific theory extremely useful in environmental studies. Thus, key issues such as creating knowledge about the environment, nature management, and counteracting the exclusive governance of wildlife may be at the center of interest. In places where the environment is managed and explored, transformational processes take place, characterized by co-presence and unpredictability, and may also result in intimate violence. The more-than-human contact zones can help achieve three overlapping aims: finding a better explanation of non-human agency by taking multiple perspectives into account, preventing acts of violence and injustice, and facilitating the decolonization of the knowledge production process.

These interdisciplinary contact zones are dynamic, taking into account rhythmic patterns, phases, and ephemeral phenomena, by which they enable the study of variable human relations with the environment. Such an approach combines many important elements into a holistic unity, the most important of which are environmental and ex-

tended geographical research, postcolonial studies, and decolonization projects [28]. The inter-species contact zones involve interactions between people and other forms of life and, unfortunately, often asymmetrical encounters between capitalism and non-human nature, coercion, exploitation, neglect, destruction, violent oppression, wrongdoing, and other types of threats. Currently, these spaces serve to link together various phenomena, such as biodiversity conservation, climate change, and energy transition, which until recently have been the subject of separate policy discourses, now greatly increasing the ability to manage them. Due to the transformative nature of these zones, they should be places where environmental policy properly shapes and renegotiates existing relations and where effective sustainable development programs are implemented [29]. The contact zone, when extended to environmental, geographical, and biological elements, has many potential implementations.

Helen F. Wilson uses the concepts of the encounter and the contact zone as an analysis tool in research on multispecies scholarship and, for this purpose, refers to the documentary series on biological life in the oceans [30]. Multi-species contact zones located in the deep sea are the arena of struggles between filmmakers and technology, knowledge, various life forms, and natural phenomena in asymmetrical and changing power relations. It turns out that filmmaking of this type is ambivalent because although it shapes environmental awareness and consumer behavior, it also poses a threat to the oceans by initiating the development of maritime tourism and encouraging further exploration. Journeying across the seas in search of places beyond the human imagination and new underwater worlds waiting to be discovered has an undeniable imperial subtext, as it entails the inclusion of these marginal spaces into a realm of authority. Thus, it is a form of anti-conquest, i.e., a strategy of representation foregrounding gestures of innocence, whose task is to divert attention from the simultaneous pursuit of hegemony [9] (p. 7). Thus, oceanic contact zones are filled with extremely complex interactions involving humans, many species of animals, marine organisms and plants, and elements of inanimate nature. Technology imposes a means of contact by removing barriers between the benthic zone and the viewers [30].

Another more-than-human contact zone is discussed by Jenny R. Isaacs, focusing on people dealing with migratory shorebird conservation in the Delaware Bayshore in New Jersey's Cape May County [31]. On the beaches of this area, there are human–shorebird encounters whose asymmetry is a source of imperial domination and violence. During some stages of conservation research, such as bird banding, there is often aggression and brutality. This is interpreted as an expression of animality/coloniality, namely, reductive conceptions of the animal, common to colonialism and nature protection. The progressive globalization of nature conservation defines the ways in which this phenomenon manifests itself. Animality/coloniality may appear or disappear in a multispecies contact zone when face-to-face encounters occur and touch is practiced. This also illustrates the conservation paradox of interpreting harm as care, which is an example of conspicuous innocence in the field of bird and nature conservation. It occurs when there is a need to use force so that the bodies of individual birds can be marked and described in the name of the higher goal of survival of the entire species. In this approach, nature protection is presented as a neo-colonial form of anti-conquest, which is a confirmation of Western European authority and control using new definitions of care and concern. The phenomenon of anti-conquest can also be an expression of settler moves to innocence. Remote monitoring technologies are a new craft of the contact zone, as they allow an expansion of the encounter space and extend control over species, space, and time, even to the entire hemisphere. The contact zone concept is useful as an aid in developing harm reduction strategies that may arise during nature conservation activities [31].

Another development of the idea of the contact zone in environmental research is the intertidal contact zone studied by Aurora Fredriksen [32]. The interspecies meeting place in question is the Bay of Fundy's Minas Passage in the Canadian province of Nova Scotia, where extreme tides occur, having the largest range in the world. It is a very dynamic environment, as an average flood tide in the Bay of Fundy brings 14 billion tons of seawater,

which crosses the Minas Passage, 5 km wide, and flows into the Minas Basin. The speed of tidal currents in the passage may exceed 10 knots, i.e., 5 m/s. The potential for renewable energy generation here was estimated at 7000 megawatts, so it is not surprising that it is attractive for the governments of Canada and Nova Scotia in their attempts to decarbonize their energy systems. Underwater turbines located in the path of tidal streams enable the transformation of tidal energy into electricity. However, there is a serious problem with the fact that, along with the massive flood tides flowing through the narrow Minas Passage, a huge number of fish and other marine animals are pushed in and out of the pool twice a day, being the primary source of livelihood for many local fishermen. In the newly created tidal energy industry, environmental assessments, which determine the impact of underwater turbine work on marine fauna and flora, are still incomplete despite the intensive work of scientists. Fredriksen studied the generation of environmental knowledge in two contact zones. The first zone is the fishing contact zone, which is variable and constantly recreated during direct and natural meetings of traditional fishers with marine wildlife. The second zone, the scientific contact zone, includes researchers' meetings with marine organisms, staged and remote, since they are mostly mediated by technology. In these two contact zones, two types of knowledge are produced, which overlap only to a small degree. Practical ecological knowledge acquired by anglers collides with scientific knowledge focusing on the pursuit of objectivity and detachment [32]. The usefulness of Pratt's concept is revealed here in two important ways related to the creation of knowledge in more-than-human contact zones. The first concerns embody cognition and thus take into account the ways in which bodies are involved in meetings, while the second indicates that cognition and action in contact zones are connected with unequal power relations. In the intertidal contact zone, it is therefore necessary to take into account the possibilities and limits of the two ways of learning, one of which assumes direct contact with marine animals and the other does not. It is to be expected that the importance of embodied knowing will increase with the intensification of ecological changes. This explains why, for many people working and living in the region, underwater turbines are an unwanted intrusion that can disrupt existing ecological relations in the bay.

A very interesting case is the fire contact zone, created as a result of prescribed burns in Canadian national parks. Colin R. Sutherland points out that a fire in a national park is not always associated with disasters and destruction but is skillfully used as an effective tool for active landscape management, as it helps to create healthier and more diverse ecosystems and reduces the risk of large fires [33]. The method of environmental protection using prescribed burns is increasingly popular in various countries, but in many places it is contrary to contemporary policies in forestry, municipal planning, and agriculture. Western fire management practices are the result of settler colonialism and are mainly based on a suppression approach, while all other possibilities are overlooked. Thus, the ways of learning about landscapes and living with them used by the Indigenous peoples of North America have been superseded. For hundreds or even thousands of years, burning practices have been a natural part of shaping the environment in which those peoples lived. With the development of settlements, Canada has transformed landscapes and deteriorated the condition of some ecosystems, particularly landscape biodiversity. Forests have become less resistant to insects and forest diseases and the threat of large and uncontrolled wildfires has increased. All of this is directly related to the disruption of the relations of Indigenous peoples with fire. According to Sutherland, the return of fire as a method of managing national parks should be understood not only as a departure from the suppression of combustion but also as a departure from the suppression of burning practices and knowledge [33]. In this way, two different fire contact zones can be observed. The first zone is a typical human contact zone, in which there are meetings between people in matters related to politics, environmental legislation, and landscape management plans. During the clash of different attitudes and views, an organizational principle was developed called "ecological integrity", which enabled the efficient management of national parks, making fire not only a natural phenomenon but also a method of achieving intended goals.

The second contact zone is essentially more-than-human, because it refers to the embodied contact of people with burning landscapes and thus dying fauna and flora. Interpreting these results, it can be stated that prescribed burns are certain form of decolonization because the knowledge of the First Nations has been noticed and institutionalized—but also a form of anti-conquest, because restoring them to power over the land and the environment is not an option.

4. Basic Elements of Energy Transition

4.1. Digitalization as a Driving Force of Energy Transition

This article is a continuation of research on the energy transition of Warmia and Mazury Province, Poland, with particular emphasis on the impact of the cooperation between the citizens and the municipal governments in developing the renewable energy sector. Our previous findings show that the digitalization of public administration is a critical factor in the energy transition in this region [34]. Digitalization can improve electricity services and optimize the use of energy infrastructure by eliminating gaps in connection to the power grid, the cost of provision, and power supply quality, among others [35] (p. 19). In addition, the digitalization of public administration can optimize control and regulatory activities throughout the economy, which also increases the efficiency of the energy sector. Three contemporary trends, i.e., electrification, decentralization, and digitalization, create complex chains of events in the form of a virtuous cycle and, based on the positive feedback loops existing there, reinforce each other's impact [36]. The share of electricity in the production of renewable energy is constantly increasing, as a result of which the electrification of large sectors of the economy, mainly transport and heating, is particularly important in terms of reducing carbon dioxide emissions. Decentralization is caused by a decrease in the cost of electricity production from renewable sources, which results in the conversion of consumers, until recently passive actors on the energy market, into prosumers, i.e., active participants in this market. In turn, digitalization strengthens the other two trends, contributing to the creation of a smart electricity system, of which an integral part is the smart grid, enabling the bi-directional flow of electricity and information as well as automated operation of the system in real-time.

A distinction should be made between digitization and digitalization. Digitization means the conversion of analogue data into digital data by information and communication technology, while digitalization has a much broader meaning and refers to the digital transformation of both technology and business models and processes [35,37]. For this reason, digitalization creates additional opportunities for creating value and, thus, is a new source of revenue for enterprises. In addition, and most importantly, it is a major factor in the development of the energy system, as it enables the introduction of energy from distributed generation into it [38]. Digitalization is also the source of the phenomenon of convergence, understood as the simultaneous development of such fields as electricity production (including the growing role of prosumer power generation), heating, communication, mobility, and intelligent buildings [39].

4.2. The Contact Zone as the Birthplace of Digitalization

Figure 1 shows the most important dependencies in the modern economy from the point of view of the energy transition. Citizens, mostly middle-class, play a central role here, as they can make a decisive contribution to achieving climate goals. The light purple circle in the middle of the figure denotes them. Citizens can influence the energy transition via the local government sector, which has been marked with a hatched ring. The elements representing these two groups of actors do not come into direct contact with each other due to their distinctiveness; hence, mutual communication requires the existence of a certain intermediary space. Encounters between citizens and representatives of the municipal governments take place in the contact zone represented by the white ring. It is now almost literally terra incognita due to the fact that there is basically no research on the role and importance of this zone in the context of renewable energy development and climate

protection. This article is the first attempt so far to investigate this research gap and to show how important such a contact zone is for the development of the energy sector and what its characteristics are. The large blue circle symbolizes the entire national economy, and the three smaller circles placed around its perimeter indicate the three most important features of modern economic transformation: digitalization, decentralization, and electrification. The whole system constitutes a powerful economic machine whose proper functioning is necessary to achieve climate goals.

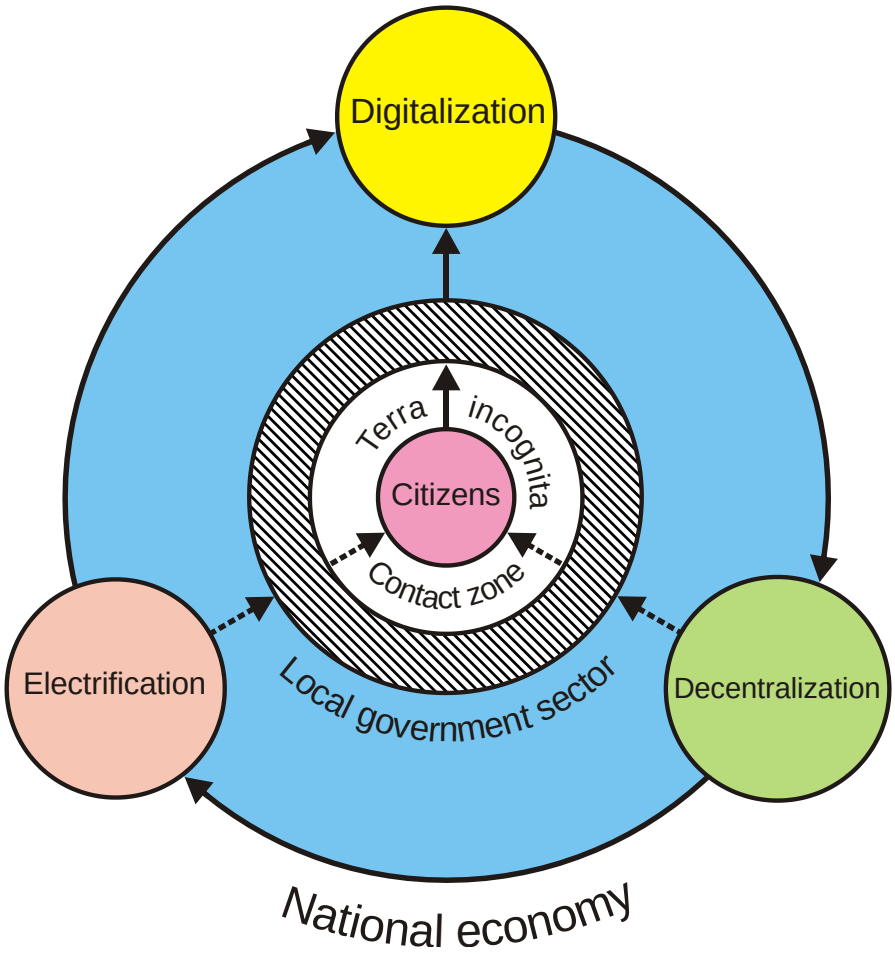

Figure 1. Forces driving the modern economy. The influence of citizens (middle class) on public administration causes the introduction of digital prosumption into this sector, which initiates a virtuous cycle involving digitalization, decentralization, and electrification.

As indicated by the arrows in Figure 1, the influence of citizens on energy transition takes place via the local government sector, and the meeting of both parties takes place in the contact zone. This is the place where critical changes take place; it is there that all this economic machinery is ignited and put into operation, but this will not be possible without civic initiatives and decisive civic action. Polish citizens have extensive experience in the field of digital prosumption, derived from the market sector, and expect the same from services provided by public administration. Unfortunately, to date, there remains a large asymmetry between the market sector and the local government sector in terms of the implementation and use of digital technologies. The market sector is already in a new phase of capitalism called prosumer capitalism, while the local government sector is still stuck in producer and consumer capitalism. Under these circumstances, citizens are taking steps towards the digitalization of the municipal public administration in order to change its business models and procedures to be more friendly and open to the needs of local communities. This is symbolized by a continuous upward arrow that runs through

the white ring of the contact zone. Typically, these activities meet with the understanding of the authorities and, depending on the financial possibilities and other conditions, are implemented sooner or later. The support of digitalization by the local government is symbolized by another continuous arrow pointing upwards and running through the blue circle of the national economy. Digitalization is the most important element of change, as it enables the decentralization of the energy sector and its shift to renewable sources. This phenomenon is indicated by a semi-circular arrow running around the perimeter of the large blue circle, from the yellow digitalization circle to the green decentralization circle. As a result of decentralization, electricity generation becomes cheaper, which allows the electrification of the most important sectors of the economy. This is indicated by another semi-circular arrow running from the green decentralization circle to the pink electrification circle. The entire cycle is closed by the last arrow connecting the pink electrification circle with the yellow digitization circle. This is because electricity is the basis of digital technologies. In this way, a virtuous cycle is created, where individual elements reinforce each other's effect. Notably, decentralization and electrification have a return impact on citizens through the local government sector, which is symbolized by dashed arrows. The place where these critical relationships operate is the contact zone.

5. Types of Contact Zones in the Energy Transition

Filling out the area marked in Figure 1 as terra incognita, i.e., defining the contact zone between citizens and the municipal governments, requires describing the types of meetings that take place here. Furthermore, economic models and processes that change under the influence of digital technologies must be taken into account. It is also important to define the purpose of these meetings. This is a similar situation to the previously discussed case of using the contact zone concept in environmental studies concerning prescribed burns, where it functions as a dual method. On the one hand, we saw struggles between people in the field of environmental legislation and related issues, while on the other hand, there were encounters and confrontations of people with burning landscapes.

In the contact zone shown in Figure 1, there are encounters and struggles between citizens and representatives of the local government sector, which are supposed to lead to the optimal fulfilment of set climate goals on the local, national, and international scales. As shown in Figure 2, this zone has a dual character as it consists of two partially overlapping contact zones. One of these can be called the human contact zone, while the other is the more-than-human contact zone. The light green circle shows the administrative legal contact zone, in which encounters happen between citizens on the one hand and the legal system and municipal governments on the other. The light pink circle symbolizes the energy contact zone, which is the place where people meet with the energy system, the legal basis for its functioning, and the broadly understood ecology. The intersection of these circles, marked in purple, represents the energy law, which regulates the principles of energy production and their compliance with current climate objectives.

In the administrative legal contact zone, legal solutions are being worked on to facilitate the development of the renewable energy sector and climate protection through the renovation of the building stocks. Broadly, legal contact zones are such zones

> *in which rival normative ideas, knowledge, power forms, symbolic universes and agencies meet in unequal conditions and resist, reject, assimilate, imitate, subvert each other, giving rise to hybrid legal and political constellations in which the inequality of exchanges are traceable [40] (p. 449).*

In the course of interaction with administrative legal processes, citizens learn about the structures of state power, the prevailing logic of governance, and ways of improving it. They try to modify their exercise of political liberal rights by using legal and administrative tools and discourse, as appropriate. Past experience indicates that struggles in this contact zone may take place both within formal institutional channels and outside them [41].

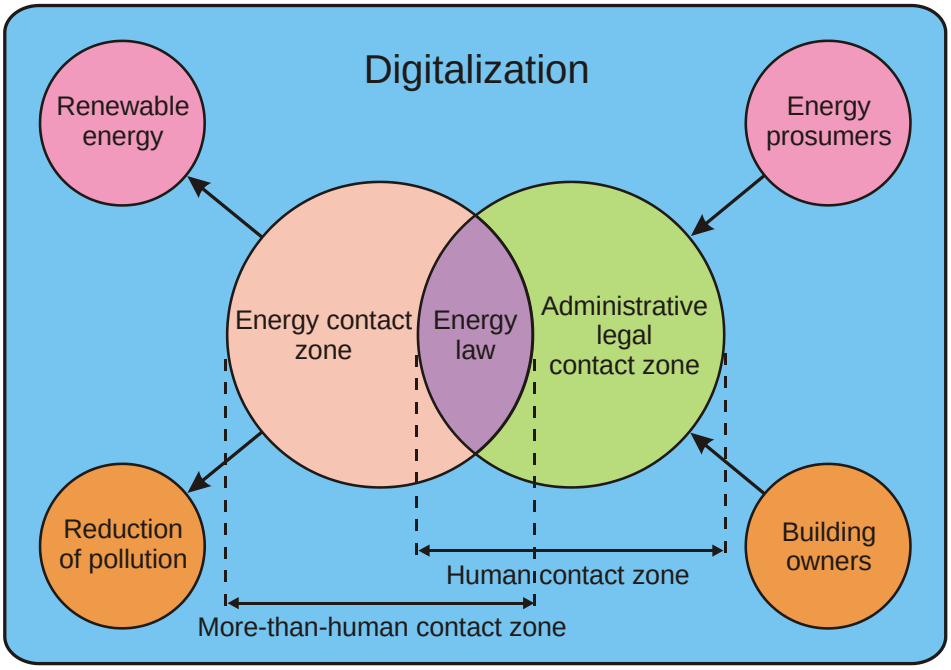

Figure 2. Types of contact zones in the energy transition.

In the energy contact zone, citizens encounter both what is human and what has a more-than-human character. An integral part of this zone is the energy law, which deals with problems related to energy production and its impact on the environment, relations of prosumers with energy companies, renewable energy sources, human–natural relations, environmental issues, preserving biodiversity, reducing pollutant emissions, meeting climate goals, and issues related to energy efficiency in buildings. As mentioned above, the middle class, particularly energy prosumers and building owners, have a big role to play here. The two groups have different goals. Energy prosumers specialize in the production of energy from renewable sources, while building owners focus on using the latest construction techniques to increase the energy efficiency of their buildings. Of course, the same people may find themselves in both groups. These groups are shown in the right part of Figure 2, while the left side shows their goals. Both groups and goals are represented by circles, with the colors of the circles emphasizing the relationships between them. For example, the energy prosumers are represented by a purple circle, and the same color is given to the circle corresponding to their objective, i.e., the production of renewable energy. Similarly, the two circles representing the building owners and their goal of reducing pollution are marked in orange. Achieving these objectives depends on the presence of citizens in two interconnected contact zones: the human administrative legal contact zone and the more-than-human energy contact zone.

Currently, almost all these phenomena and processes are shaped by digitalization, which in Figure 2 is marked as the blue background. It is the most important transforming factor, as it accelerates the processing of information and expedites the activities taking place in both contact zones. In a modern energy system, digitalization plays the role of a lever, i.e., a simple machine consisting of a rigid beam and a fulcrum, which allows obtaining a greater force by applying a lesser force. The law of the lever was proven by the Greek mathematician and inventor Archimedes of Syracuse in his work *On the Equilibrium of Planes or the Centres of Gravity of Planes* [42] (pp. 192–194). As noted by Pappus of Alexandria, during his research on levers, Archimedes made his famous statement: *give me a place to stand on, and I will move the Earth* [43] (p. 460). In this case, digital technologies play the role of the rigid beam, and the fulcrum is the interactions occurring in both contact zones, namely, the struggles of people with each other and with surrounding nature. These interactions are based on prosumption and will be formulated precisely later in the article.

6. Summary of Previous Research on Digitalization and Distributed Generation in the Warmia and Mazury Province

Figure 3 summarizes the authors' previous research on the impact of municipal governments on the development of the green energy sector in the Warmia and Mazury Province [34]. The need for an energy transition stems from the signing by Poland of international agreements aimed at limiting anthropogenic greenhouse gas emissions. The starting point was to determine whether the inhabitants of the region are interested in digital prosumption, which is a prerequisite for using public services related to distributed generation and decarbonization of the local economy. The answer came in the affirmative, as the public already had some experience in digital prosumption from the market sector. Historical determinants of prosumption were also of great importance because, in the socialist economy, prosumption was one of the basic methods of coping with the widespread shortage of goods and services [44]. Therefore, the local government sector, with societal support, decided to build a fiber-optic backbone distribution network and implement the 2025 Digital Plan for Warmia and Mazury. Next, the quality of municipal government websites was examined, which led to the conclusion that in terms of digitalization, public administration is significantly delayed in relation to the market sector. It was established that the cause of this is complex and has not only an economic basis, but also results from social, political, historical, geographical, and environmental issues. Furthermore, it turned out that municipalities with websites of the highest quality, which have the ability to jumpstart a new business model in the form of social platforms for participation, are closely related to the transport infrastructure. This is due to the fact that the Internet infrastructure largely overlaps with communication routes [45]. This leads to the conclusion that the infrastructural growth poles and development axes contribute to the acceleration of the province's digitalization at the municipal level, and the participation platforms facilitate the use of roads, railway lines, and inland waterway transport. In this way, we obtain something like a virtuous cycle, in which both elements mutually reinforce [46,47].

The inclusion of electricity production from renewable sources in this cycle is an essential condition for removing the asymmetry between the public administration sector and the market sector, and thus for decarbonizing the economy of Warmia and Mazury. The region has good conditions for the development of small hydro- and wind power stations, which was the main focus of the research. Determining the best location for such objects is the province of molinology. According to the final conclusion of the research, the energy transition is one of the most important factors of social change, which may result in the shift of public administration from producer and consumer capitalism to prosumer capitalism, catching up with the market sector.

In Figure 3, the impact of similar factors, elements, variables, and actions is marked with the same color. Sustainable development of the national and local economy requires that the public administration sector achieves a similar level of digitalization as the market sector, which is to ensure an appropriate level of compatibility between them in terms of economic models and processes. For this reason, both sectors were marked with circles of the same size, placed at the same level and given the same light purple color. Similarly, there are groups of factors such as acceptance of digital prosumption by society and digitalization at the municipal level (orange), prosumption and platforms for participation (blue), and sources of asymmetry and elimination of the gap between public administration and the market (purple). Infrastructural growth poles and development axes are correlated with the quality of websites and Internet infrastructure (green). Moreover, three important groups of non-economic factors shaping the province in question include geographical, environmental, and social issues in the region, historical determinants of prosumption, and molinology, which is why all these were marked in yellow. The area occupied by producer and consumer capitalism was marked in pink, and the space of prosumer capitalism was marked in light green.

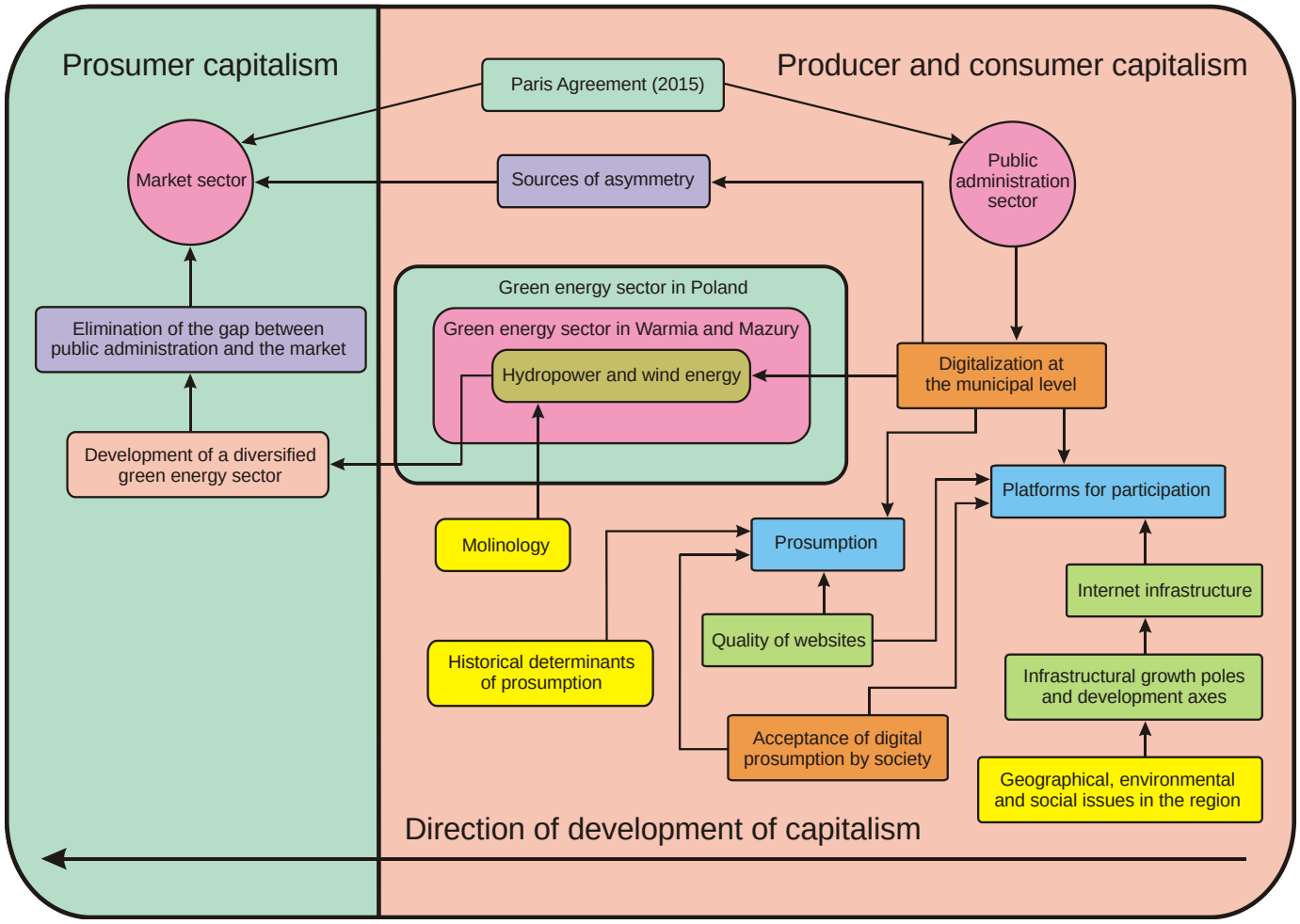

Figure 3. The first stage of research on the impact of citizens on the digitalization of municipal offices. Acceptance by the inhabitants of the Warmia and Mazury Province of digital prosumption in the local government sector was a prerequisite for the development of distributed generation.

In previous studies, the emphasis was placed on demonstrating that the inhabitants of Warmia and Mazury Province accept digital prosumption, which was to be a preliminary step towards a reform of public administration. The main issue was determining whether digital prosumption was acceptable to the local society. A positive answer was obtained, and at the same time, it was indicated that in order to accelerate the development of the prosumer power industry in the region, a change in the model of functioning of the local government sector was needed. Correspondence analysis was used to discover relationships between categorical variables in the database. The quality of municipal government websites was also studied using the binary method, and it was found that most of them do not play the role of social participation platforms.

This article presents the results obtained from an extended database on how digitalization can change operational and business models in local public administration for it to become the main driver in the development of energy prosumerism. In other words, this article seeks to determine whether the local government sector is able to release the prosumer potential of the society and incorporate it into a virtuous cycle involving feedback between electrification, decentralization, and digitalization (Figure 1). Previously, the focus was on determining the ability of the society to participate in the sphere of digital prosumption related to public administration, while in the current article the reverse dependence is examined, namely, whether municipal governments will be able to release the prosumption potential of citizens and direct it to the development of a regional prosumer power industry. A more advanced research method in the form of multiple correspondence analysis is

another innovation compared to past research. This article found that, in Warmia and Mazury, citizens are the driving force of the energy transition, with the middle class having an outsized role [7]. The local government sector needs to be reformed in order to change from a barrier to the development of renewable energy into a catalyst for change.

7. Materials and Methods

7.1. The Research Hypothesis: Principles of Prosumption in the Contact Zones

The introduction of digitalization in contact zones must be preceded by a certain consensus between citizens and the local government sector, whose economic and administrative–legal basis should guarantee and stimulate economic development, with particular emphasis on the production of energy from renewable sources. It should probably not be done in the way of an experiment because, in the event of failure, it would generate significant costs but could be introduced as a proven and stable management principle. Such a solution has long been known in the market sector and is called prosumption. However, its implementation in the municipal government sector is slow and has encountered a number of obstacles, the most important of which is the low transparency of public administration. For this reason, there is a high asymmetry between the market sector and the public administration sector, which contributes to losses in economic growth at local, national, and international levels. It also negatively affects the development of energy production from renewable sources, thus delaying the energy transition. Without initiating prosumption in the local government sector, both contact zones, the human administrative legal contact zone and the more-than-human energy contact zone, will be dead and digitalization will not be possible, as it will not find a fulcrum there.

Prosumption is one of the most important business models of wikinomics [48]. Prosumers are a new type of economic entities who are not only consumers, but they are also actively involved in the design and creation of new products and services [49,50]. Their contribution to the whole business process is to provide unique ideas and non-standard solutions. Existing definitions of prosumption relate mainly to the market sector, while attempts to define this concept for the public administration sector are limited [51,52]. As part of the general concept of prosumption, ten detailed principles have been formulated, which are presented in Table 1 [34,53].

Table 1. The principles of prosumption.

Codes	Ten Principles of Prosumption
P.1	An official's efficiency of service
P.2	Expertise and competence of an official
P.3	The personal culture of an official
P.4	Technical conditions for providing of services
P.5	Availability of information, i.e., knowledge of where and how to deal with the matter
P.6	Consistent communication in the client–official relationship
P.7	How the service is performed as a factor that improves client–official relationships
P.8	A more favored attitude of the officials
P.9	Possibility of dealing with the matters at one branch of the office
P.10	The ability to deal with the matters online

In 2015, a direct survey was conducted in Poland. The aim was to rate the suitability of the ten principles of prosumption proposed by the authors (Table 1). The evaluation was made by the citizens of the Warmia and Mazury Province. When preparing the list of principles, the authors were guided by the knowledge of the most important elements of contact zones previously defined in the literature, in both theoretical and empirical references, economic and sociological determinants of efficient activities in communication between citizens and officials, and also issues related to the digitalization of public administration services. The present article examines the following research hypothesis:

society supports the idea of improving the local government sector by introducing digital prosumption and is ready to actively participate in this undertaking.

It can also be formulated in the form of the following equation:

$$\textit{Digitalization of contact zones} = \textit{ten principles of prosumption} + \textit{digital technology}. \quad (1)$$

From the point of view of the interactions taking place in the contact zones, answers will be important not only as to which rules of prosumption have been chosen by citizens but also as to which rules have not been chosen by them. The choices made are most often based on the knowledge possessed by the respondents, and the lack of response suggests that the respondents do not have adequate information. These shortcomings should prompt the municipal governments to fill the existing knowledge gaps of citizens, which will allow public administration to interact with people in order to jointly launch a virtuous cycle consisting of digitalization, decentralization, and electrification.

7.2. Multiple Correspondence Analysis

Multiple correspondence analysis is primarily used in research to examine issues with a number of categorical variables bigger than two [54–59]. It is frequently employed to analyze data from questionnaires [60]. This method is an extension of simple correspondence analysis and likewise it is used to study the co-occurrence of phenomena. This method uses the inner product of an indicator matrix called the Burt Table [61–63]. The table structure is based on frequency tables and consists of adding parts that represent the relationships of each variable to itself. The Burt Table is the symmetric matrix.

In recent years, multiple correspondence analysis has become increasingly popular in a variety of scientific disciplines, especially in medical and economic sciences. Regarding medical sciences, the usefulness of this method has been demonstrated in epidemiology [64], where it enabled in-depth research on epidemics of malaria [65,66]. Moreover, it has allowed researchers to achieve interesting results in the scope of cognitive aging [67]. It has also been used in studies on nonlinear relationships of the motor cortex and basal ganglia [68], and proved helpful in the identification of behavior patterns associated with overweight and obesity in adults [69]. In economic sciences, the multiple correspondence analysis is helpful in studying such issues as financial inclusion [70–73], multidimensional poverty [74–77], measuring the circular economy [78], and emergencies [79]. Based on results achieved with this method, the classification of residential electricity consumers has been developed [80]. Furthermore, this statistical method has considerable application potential in social sciences [81]. One interesting example is its use in exploring Nobel Prize data involving four categorical variables: the country of birth or residence of the laureate, the scientific discipline, the period in which the Nobel Prize was awarded, and the gender of the laureate [82]. Multiple correspondence analysis is also helpful for analyzing opinions of students about their school [83]. Moreover, it provides interesting knowledge on attitudes of Americans to life according to their marital status, people's opinion on abortion according to their religion and education, and association patterns developed by a mother and her infant during the first six months of life [84].

7.3. The Empirical Database

Empirical data collected during the direct survey were used to construct the 27 × 27 Burt Table. It was divided into three parts, which are presented in Tables 2–4. Part one of the Burt Table contains the number of respondents divided according to sex and age (Table 2). The second part contains the principles of prosumption that were not selected (symbol 0) or selected (symbol 1) by the respondents, taking the sex division of respondents into account (Table 3). The third part contains the principles of prosumption that were not selected (symbol 0) or selected (symbol 1) by the respondents, taking the age distribution into account (Table 4). The sampling was random.

Table 2. Number of respondents divided by age and sex.

Sex	Table of Observed Frequencies. Input Table (Row × Column): 27 × 27 Burt Table				
	AGE:0 (18–20)	**AGE:1 (21–35)**	**AGE:2 (36–45)**	**AGE:3 (46–60)**	**AGE:4 Up 60**
Women (W)	77	800	89	72	39
Men (M)	93	403	117	96	26

Table 3. The principles of prosumption that were not selected (symbol 0) and selected (symbol 1) by the respondents divided by sex.

Sex	Table of Observed Frequencies. Input Table (Row × Column): 27 × 27 Burt Table																			
	P1		**P2**		**P3**		**P4**		**P5**		**P6**		**P7**		**P8**		**P9**		**P10**	
	0	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**
Woman (W)	456	621	428	649	767	310	957	120	755	322	640	437	466	611	799	278	780	297	703	374
Men (M)	326	409	242	493	461	274	597	138	432	303	481	254	255	480	463	272	474	261	419	316

Table 4. The principles of prosumption that were not selected (symbol 0) and selected (symbol 1) by respondents divided by age.

Age Division	Table of Observed Frequencies. Input Table (Row × Column): 27 × 27 Burt Table																			
	P1		**P2**		**P3**		**P4**		**P5**		**P6**		**P7**		**P8**		**P9**		**P10**	
	0	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**	**0**	**1**
AGE:0 (18–20)	65	105	50	120	107	63	134	36	105	65	98	72	52	118	121	49	108	62	137	33
AGE:1 (21–35)	497	706	459	744	798	405	1052	151	797	406	711	492	483	720	822	381	817	386	726	477
AGE:2 (36–45)	92	114	83	123	152	54	170	36	152	54	163	43	76	130	161	45	156	50	118	88
AGE:3 (46–60)	94	74	55	113	123	45	149	19	90	78	104	64	82	86	111	57	129	39	102	66
AGE:4 Up 60	34	31	23	42	48	17	49	16	43	22	45	20	28	37	47	18	44	21	39	26

The following formula was used to determine the minimum sample size N_{min}:

$$N_{min} \geq \frac{(Z_{\alpha/2})^2}{4E^2}, \tag{2}$$

where $Z_{\alpha/2}$ is the number determined by the desired level of confidence and E denotes the margin of error. Usually, surveys assume that the confidence level is 95%, which results in $Z_{0.025} = 1.96$, and that the margin of error is $E = 0.03$. Based on the inequality (2), $N_{min} \geq 1067$ is obtained. In this study, the sample size equals $N = 1821$, which at the confidence level of 95% reduces the margin of error to $E \approx 0.023$.

7.4. Calculations

The three-part Burt Table (Tables 2–4) has become the basis for multiple correspondence analysis. Table 5 shows the quantitative characteristics of the Burt Table for fifteen dimensions: singular values, eigenvalues, percent of inertia, cumulated percent, and chi-square distances. The values for the first three dimensions have the largest contribution to inertia. Further dimensions explain the ever-smaller percentage of total inertia. The essence of multiple correspondence analysis is to move the relationships between variables from the original multidimensional space to the space of smaller number of dimensions as accurately as possible. Typically, the reduction of the dimension of a studied issue is carried out up to two or three dimensions, which allows the problem to be graphically analyzed.

Table 5. Quantitative characteristics of Burt Table.

Number of Dimensions	Eigenvalues and Inertia for All Dimensions. Input Table (Row × Column) = 27 × 27 Burt Table. Total Inertia = 1.2500				
	Singular Value	**Eigenvalue**	**Percent of Inertia**	**Cumulated Percent**	**Chi-Square Distance** (χ^2)
1	0.452265	0.204544	16.36351	16.3635	5426.368
2	0.337560	0.113946	9.11572	25.4792	3022.898
3	0.334371	0.111804	8.94430	34.4235	2966.056
4	0.309036	0.095503	7.64026	42.0638	2533.615
5	0.298270	0.088965	7.11722	49.1810	2360.169
6	0.288973	0.083505	6.68042	55.8614	2215.320
7	0.285695	0.081622	6.52974	62.3912	2165.352
8	0.282019	0.079535	6.36279	68.7540	2109.991
9	0.272199	0.074092	5.92736	74.6813	1965.596
10	0.257154	0.066128	5.29027	79.9716	1754.326
11	0.250720	0.062860	5.02883	85.0004	1667.629
12	0.237375	0.056347	4.50775	89.5082	1494.831
13	0.222021	0.049293	3.94346	93.4516	1307.707
14	0.205041	0.042042	3.36334	96.8150	1115.329
15	0.199532	0.039813	3.18504	100.0000	1056.202

In multiple correspondence analysis, the distribution of the Burt matrix by singular value decomposition method is essential. The eigenvalues obtained from the analysis of the Burt matrix are a better approximation of the inertia explained by the factors than the eigenvalues of the indicator matrix. Inertia is analogous to the concept of the moment of inertia used in physics, which denotes the mass of body product and the squared distance to the axis of rotation. In other words, inertia is the overall value of chi-square statistic divided by the total sum of the observations. Table 5 shows that the issue of prosumption in the public administration sector is fifteen-dimensional. In order to visualize the structure of links between categorical variables in a space with a smaller number of dimensions as closely as possible, the directions of the axes (dimensions) should be determined so that subsequent dimensions explain the smaller part of the total inertia (or the total value of chi-square statistic). The cumulative percentages of inertia explained by the dimension of the assumed space are used to determine the number of dimensions. In this case, the three-dimensional and two-dimensional space is adequate to represent the original structure of variables. Significantly, the chi-square metric is used in the study.

Table 6 shows the coordinates of twenty-seven columns, and it also includes the statistics of the quality of the solution. This information is needed to graphically illustrate the co-occurrence of such phenomena as sex and age of respondents with the non-selection (symbol 0) or the selection (symbol 1) of ten postulated principles of prosumption applicable in the local government sector.

In Table 6, separately for each of the 3 dimensions, there are 27 points representing all the categorical variables present in the studied issue. The distances between these points were calculated using the chi-square metric. The mass of the point indicates its validity in the conducted research study. It was found that the largest masses were points P4:0 (0.071468), P8:0 (0.058039), and P9:0 (0.057671). Therefore, the non-selection by some of the respondents of principles P4 (technical conditions for providing of services), P8 (a more favorable attitude of the officials), and P9 (possibility of dealing with the matters at one branch of the office) may indicate that they attach less importance to digital prosumption. This might prove that they are to some extent unaware of the immense prosumption power that lies in them. This may also partly confirm Ritzer's statement that prosumers do not realize that they can play a productive role in the economy and that companies have already made a profit out of it [85,86].

Table 6. Coordinates of columns and the statistics of the quality of the solution.

Name of Row	Column Coordinates and Contributions to Inertia. Input Table (Row × Column) = 27 × 27 Burt Table. Total Inertia = 1.2500												
	Number of Rows	Mass	Quality	Relative Inertia	Coordinates			Dimension 1		Dimension 2		Dimension 3	
					Dimension 1	Dimension 2	Dimension 3	Inertia	Cos^2	Inertia	Cos^2	Inertia	Cos^2
W	1	0.049531	0.418352	0.027042	−0.201513	0.142077	−0.474037	0.009833	0.059502	0.008775	0.029578	0.099551	0.329271
M	2	0.033802	0.418352	0.039625	0.295278	−0.208186	0.694610	0.014409	0.059502	0.012857	0.029578	0.145872	0.329271
AGE:0	3	0.007818	0.031209	0.060412	0.293364	−0.441625	0.142650	0.003290	0.008910	0.013382	0.020192	0.001423	0.002107
AGE:1	4	0.055326	0.316010	0.022406	0.004152	0.118305	−0.382050	0.000005	0.000034	0.006796	0.027647	0.072229	0.288329
AGE:2	5	0.009474	0.250850	0.059088	−0.213760	−0.927081	1.024933	0.002116	0.005861	0.071460	0.110244	0.089015	0.134745
AGE:3	6	0.007726	0.177235	0.060486	−0.056762	0.671453	1.131503	0.000122	0.000329	0.030570	0.046072	0.088476	0.130834
AGE:4	7	0.002989	0.011323	0.064275	−0.019942	0.168154	0.525024	0.000006	0.000015	0.000742	0.001052	0.007370	0.010256
P1:0	8	0.035964	0.558106	0.037896	−0.437269	0.457399	0.578518	0.033618	0.145166	0.066032	0.158840	0.107658	0.254099
P1:1	9	0.047369	0.558106	0.028771	0.331985	−0.347268	−0.439225	0.025524	0.145166	0.050133	0.158840	0.081736	0.254099
P2:0	10	0.030813	0.338779	0.042016	−0.368145	−0.457242	−0.482534	0.020417	0.079515	0.056536	0.122660	0.064170	0.136604
P2:1	11	0.052520	0.338779	0.024650	0.215987	0.268259	0.283098	0.011978	0.079515	0.033169	0.122660	0.037648	0.136604
P3:0	12	0.056475	0.443814	0.021486	−0.444083	0.110580	0.040338	0.054450	0.414680	0.006061	0.025712	0.000822	0.003421
P3:1	13	0.026858	0.443814	0.045180	0.933791	−0.232522	−0.084820	0.114495	0.414680	0.012744	0.025712	0.001728	0.003421
P4:0	14	0.071468	0.478745	0.009492	−0.281691	0.010469	−0.004813	0.027725	0.477945	0.000069	0.000660	0.000015	0.000140
P4:1	15	0.011865	0.478745	0.057174	1.696698	−0.063059	0.028991	0.166995	0.477945	0.000414	0.000660	0.000089	0.000140
P5:0	16	0.054590	0.417843	0.022995	−0.435559	−0.133878	−0.111243	0.050631	0.360301	0.008587	0.034040	0.006042	0.023503
P5:1	17	0.028744	0.417843	0.043672	0.827214	0.254260	0.211273	0.096159	0.360301	0.016308	0.034040	0.011475	0.023503
P6:0	18	0.051554	0.599893	0.025423	−0.276565	−0.464062	0.279178	0.019279	0.124086	0.097436	0.349365	0.035940	0.126442
P6:1	19	0.031779	0.599893	0.041244	0.448667	0.752842	−0.452907	0.031275	0.124086	0.158068	0.349365	0.058304	0.126442
P7:0	20	0.033159	0.581321	0.040140	−0.475084	0.805986	−0.065752	0.036589	0.149159	0.189038	0.429304	0.001282	0.002857
P7:1	21	0.050175	0.581321	0.026527	0.313964	−0.532645	0.043453	0.024180	0.149159	0.124928	0.429304	0.000847	0.002857
P8:0	22	0.058039	0.280895	0.020235	−0.332833	−0.019703	0.106077	0.031433	0.254185	0.000198	0.000891	0.005841	0.025819
P8:1	23	0.025294	0.280895	0.046431	0.763702	0.045210	−0.243398	0.072125	0.254185	0.000454	0.000891	0.013403	0.025819
P9:0	24	0.057671	0.287232	0.020530	−0.345172	−0.093093	0.001282	0.033593	0.267753	0.004386	0.019476	0.000001	0.000004
P9:1	25	0.025662	0.287232	0.046137	0.775709	0.209208	−0.002882	0.075493	0.267753	0.009857	0.019476	0.000002	0.000004
P10:0	26	0.051600	0.230009	0.025386	−0.258478	−0.132888	−0.238704	0.016854	0.108640	0.007997	0.028715	0.026298	0.092654
P10:1	27	0.031733	0.230009	0.041280	0.420307	0.216087	0.388154	0.027407	0.108640	0.013004	0.028715	0.042762	0.092654

Table 6 also shows the quality of all points after the reduction of the dimension of the studied issue. This is to assess whether they are properly represented in the selected coordinate system. In other words, the distance between points should be approximated with satisfactory accuracy in the space with fewer number of dimensions. The quality of a given point is the square quotient of its distance from the center of the selected coordinate system and the square of the same distance in the coordinate system with a maximum number of dimensions (here fifteen). The definition of quality implies that this measure is a number that accepts values between 0 and 1. The closer the unity is, the better the point is represented. If the quality of a given point is less than 0.1, then it is not very well represented in the selected coordinate system. In Table 6, each principle of prosumption has a quality value, regardless of whether the respondents chose it or not. Table 6 shows that the points representing the principles of prosumption—P.6 (0.599893), P.7 (0.581321), and P.1 (0.558106)—had the best quality. Thus, the points associated with P.6 (consistent communication in the client–official relationships), P.7 (how the service is performed as a factor that improves client–official relationships), and P.1 (an official's efficiency of service) are best represented in three-dimensional and two-dimensional spaces. The lowest quality, below 0.1, was only seen in points AGE:4 (0.011323) and AGE:0 (0.031209), so these age groups are moderately represented in the selected coordinate system. The quality of a given point may also be considered as its share in the overall inertia at the chosen number of dimensions.

The next indispensable concepts in the analysis of Table 6 are the relative inertia and the relative inertia for each dimension. The relative inertia represents the proportion of a given point in the total inertia, which is measured irrespective of the number of selected dimensions. The following age groups had the biggest influence on the overall inertia: AGE:4 (0.064275), AGE:3 (0.060486), and AGE:0 (0.060412), although the first and third groups had slightly lower quality. This means that the opinions of these respondents on the principles of prosumption in the local government sector are important for the purpose of research study. This is consistent with common sense, as these groups include both people who have personal and professional experience and people who have just started their professional life (but who are important from the perspective of the future). The columns

presenting the relative inertia for each dimension contain the relative contributions of the individual points to the inertia, which is generated by the given dimension. Therefore, these values are given separately for each dimension.

The last value given in Table 6 is cosine^2, which should be understood as quality or squared correlations with each dimension. These columns contain quality measures for each point in relation to each dimension. The sum of the values of these columns calculated for all dimensions is equal to the total quality of a given point. For example, consider the P.1 principle of prosumption (regardless of whether or not it is selected by respondents). By summing $0.145166 + 0.158840 + 0.254099$ we obtain 0.5581, which is the value found in the column describing the quality of the P.1 point. The cosine^2 values can also be interpreted as the proportion of the dimension in the inertia point. This share is equal to the squared cosine value of the angle between the vector determined by a given point and the corresponding axis of the coordinate system.

Based on Table 6, the points representing all 27 categorical variables in three-dimensional and two-dimensional spaces are drawn. This table contains a lot of information that is not directly transferred to charts. Therefore, the graphical analysis shown below (Figures 4–7), which is based solely on the coordinates of the points representing the variables, should be supplemented by the other information included in Table 6. This obviously provides a very broad possibilities of interpretation of the obtained results. This paper is limited to the findings that are most strongly linked to the objectives of the research, and therefore to the importance of prosumption in the public administration and the possible role of this sector of the economy in accelerating the energy transition.

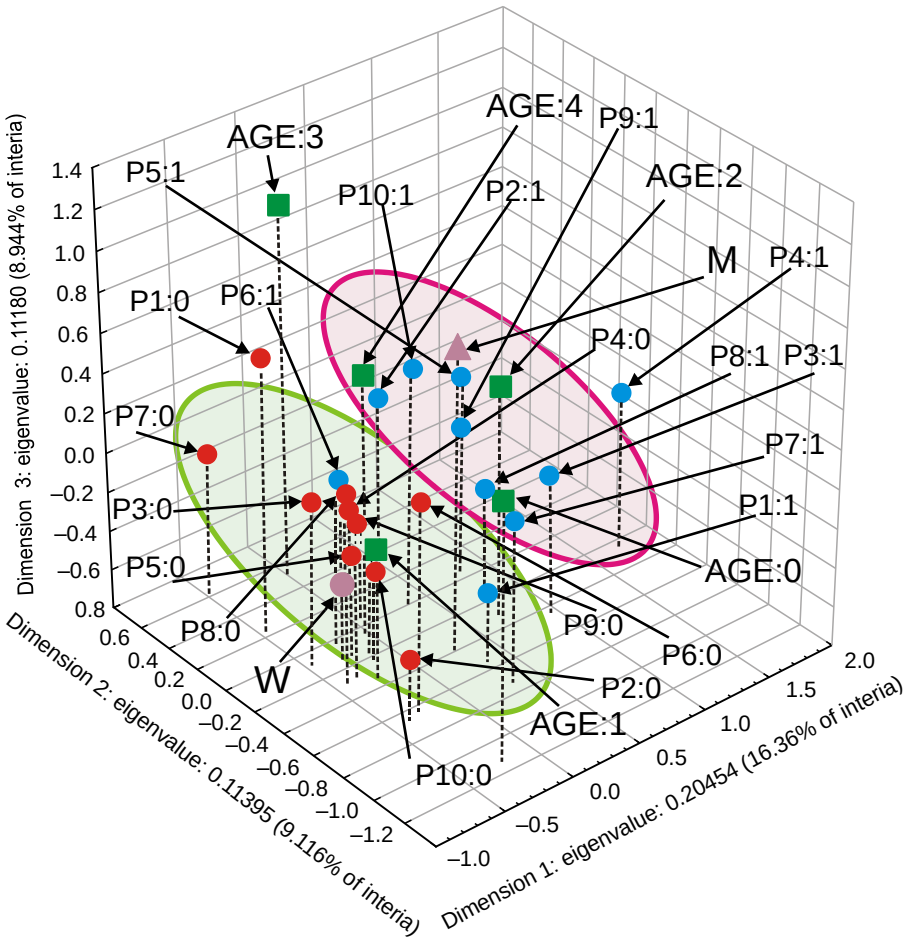

Figure 4. Three-dimensional plot of column coordinates—dimension 1 × 2 × 3. Input table (rows × columns): 27 × 27 Burt Table.

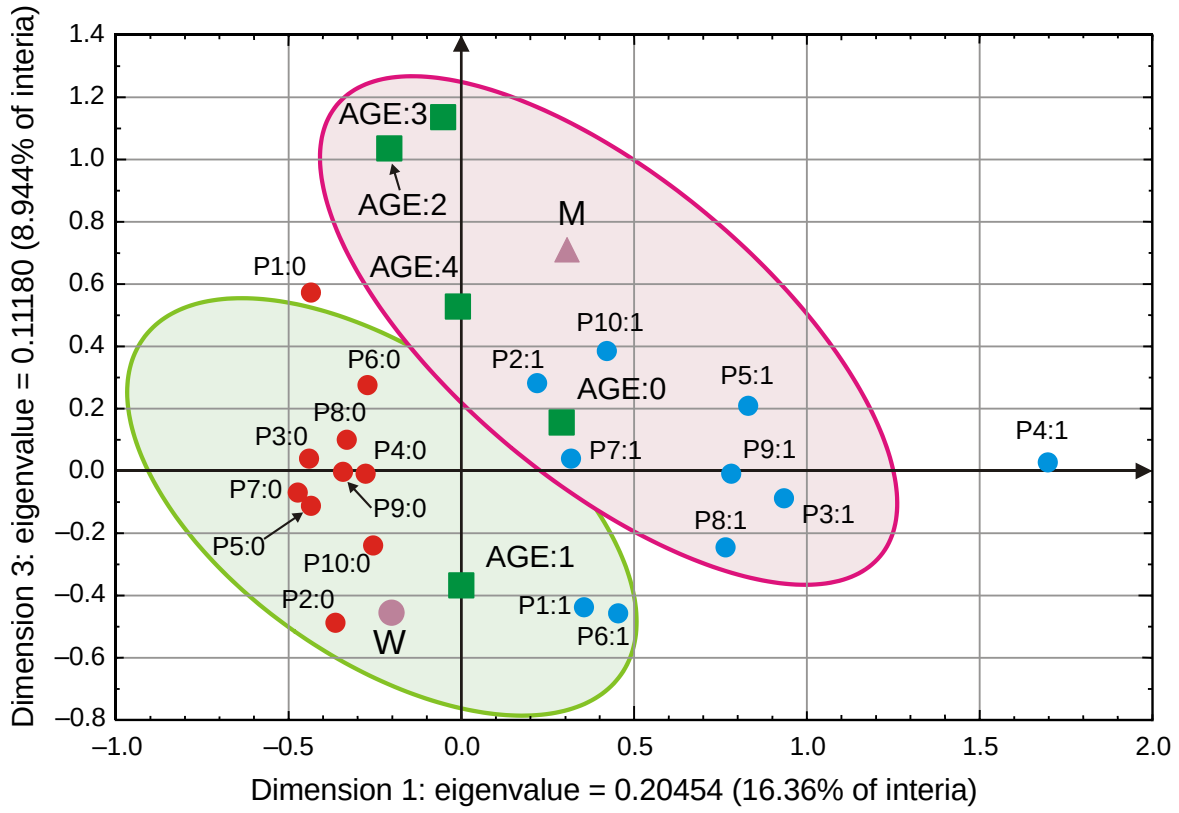

Figure 5. Two-dimensional plot of column coordinates—dimension 1 × 3. Input table (rows × columns): 27 × 27 Burt Table.

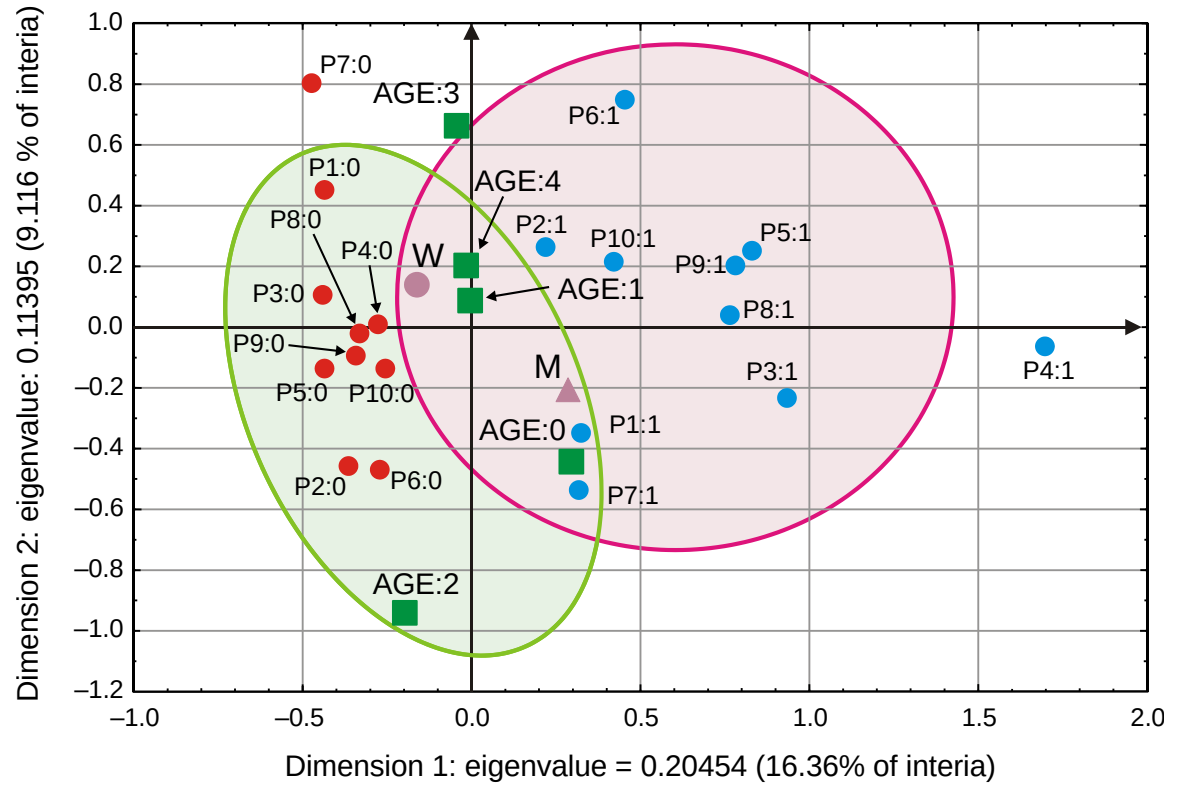

Figure 6. Two-dimensional plot of column coordinates—dimension 1 × 2. Input table (rows × columns): 27 × 27 Burt Table.

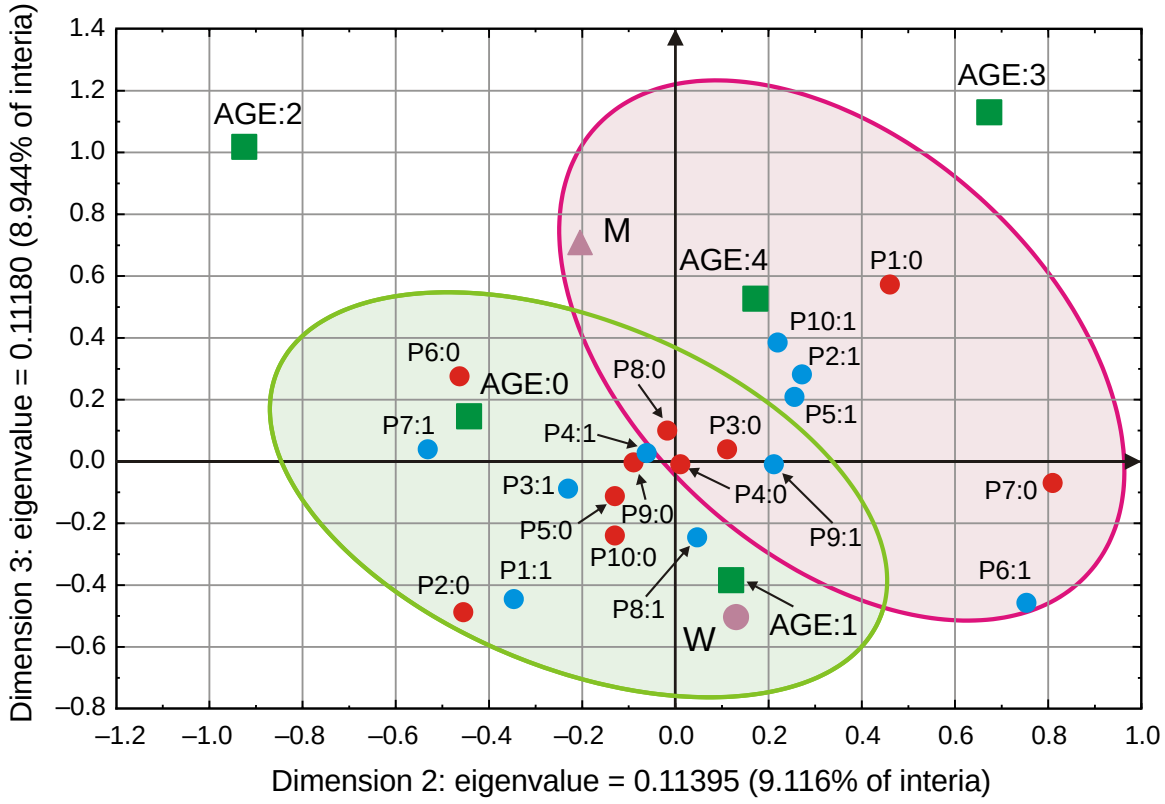

Figure 7. Two-dimensional plot of column coordinates—dimension 2 × 3. Input table (rows × columns): 27 × 27 Burt Table.

8. Results

8.1. Digital Prosumption as the Basic Principle of the Functioning of Contact Zones

The essence of multiple correspondence analysis is the reduction of the dimension of the studied issue, while maintaining the exact structure of the links between the categorical variables. As can be seen from Table 5, the issue of prosumption in the public administration is by its nature fifteen-dimensional. In order to present them graphically, it is necessary to reduce the number of dimensions from fifteen to three or two. Figures 4–7 present the studied issue in three-dimensional or two-dimensional sections, while ensuring the highest possible accuracy of preserving the original structure of the relationships between the variables.

Figure 4 shows the coexistence of phenomena in a three-dimensional space. If the respondents did not choose a particular principle of prosumption, the point representing that fact was marked with a red circle, and if selected the corresponding point was marked with a blue circle. The age groups of respondents are symbolized by the green squares. The sex of respondents was colored purple—circle for women and triangle for men. Two ellipses—purple and green-yellow—were used to visualize the respective structures in the data. Note that Figure 4 has an illustrative character. More detailed information is provided by simultaneous analysis of the three two-dimensional cross-sections shown in Figures 5–7.

In Figure 5 we have a more accurate confirmation of the observations made in the three-dimensional space (Figure 4). All the respondents, regardless of sex, who belong to groups AGE:0, AGE:2, AGE:3, and AGE:4 are aware of the fact that the introduction of prosumption in the local government sector is beneficial both to households and to businesses. The similar phenomenon—asymmetry in the evaluation of individual principles of prosumption by women and men—can be seen in the two-dimensional cross-section shown in Figure 6. The most interesting information, however, is shown in Figure 7. It appears that prosumption attitudes are widespread in the age groups AGE:0, AGE:1, and AGE:4

regardless of sex. Thus, the introduction of prosumption in the municipal governments will be welcomed and expected by the public.

It is possible to analyze Figures 4–7 in more detail. From the perspective of the digital prosumption, the most important principles of prosumption are: P4:1 (technical conditions for providing service), P5:1 (availability of information), P6:1 (consistent communication), P7:1 (how the service is performed), P9:1 (possibility of dealing with the matters at one branch of the office), and P10:1 (the ability to deal with the matters online). In Figure 4, all of these principles, apart from P4:1, are in the areas defined by ellipses. This rule is repeated in Figures 5 and 6. In Figure 7, all the principles, including P4:1, are inside the ellipses.

There is a very interesting situation connected with point P4:1. Figures 5 and 6 show that this is an isolated point. However, the calculations in Table 6 show that the P4:1 principle has a relatively high impact on the overall inertia (0.057174). It is therefore important for the point of view regarding the aim of this study. Moreover, the point that represents it has a relatively high quality (0.478745). At the same time, it is clear that the contribution of this point to the inertia generated by the first dimension is large (0.166995), significantly higher than the corresponding contribution to the inertia generated by the second (0.000414) and third dimension (0.000089). It also turns out that the quality of this point for the first dimension—represented by cosine^2—is 0.477945, and therefore it is much higher than for the other two dimensions (0.000660 and 0.000140). Figures 5 and 6 show that P4:1 has the highest correlation with the axis representing the first dimension, since the vector joining the origin point of the coordinate system to point P4:1 has the smallest slope in relation to that axis. In other words, point P4:1 is literally on the axis corresponding to the first dimension. Therefore, the rule P4:1 must represent some hidden property. Figure 5 and Table 6 show that similar properties are shown by points P9:1 and P7:1 in relation to the first dimension. In contrast, Figure 6 shows that the vector inclination angles P5:1, P9:1, and P.10:1 (the variables related to the digital prosumption) to the axis of the first dimension are also small. In turn, in Figure 7, point P4:1 is near the origin of the coordinate system, so it creates something similar to a prosumption standard. This information is sufficient to state that the hidden dimension correlated with the first axis (dimension) must be the digital prosumption. Thus, the respondents point to very important information related to prosumption in the local government sector—the only acceptable form of prosumption is digital prosumption. This fully confirms Ritzer's conclusion that digital prosumption is the most balanced form of prosumption [85,86]. It seems that its proper application in the municipal governments can be an effective tool to offset the negative effects of uncontrolled prosumption in the market sector. These threats arise mainly from economic development being based on the free-of-charge work of prosumers.

Table 5 shows that the first three dimensions have the greatest share in explaining inertia; hence, the research study was conducted in a three-dimensional space (Figure 4). Figures 4–7 illustrate the results obtained using multiple correspondence analysis. On the basis of Figure 4, it can be said that there is a great difference between men and women in their approach to prosumption in the public administration sector. Nonetheless, both approaches have complementary character. The highest number of non-selected answers is characteristic for women in the age group AGE:1. However, the aforementioned group see the importance of the principles P1:1 and P6:1. For men and women in groups AGE:0, AGE:2, and AGE:4, almost all the principles of prosumption are valid. The exception is P4:1, which in Figures 5 and 6 is an isolated point, but contains a hidden dimension—digital prosumption. A more detailed analysis of co-occurrence phenomena is possible using the two-dimensional cross-sections (Figures 5–7). The general conclusion is that the vast majority of respondents expect the introduction of postulated principles of prosumption to the public administration sector. At the same time, they are aware that the prosumption should be supported by ICT, and should therefore take the form of digital prosumption. This is evidenced by the central position of the P10:1 point in all the figures. This is probably due to the fact that respondents already have some experience with the digital prosumption taken from the market sector. They also seem to be aware of the importance of the P4:1

principle (technical conditions for providing of services). As shown in Figures 4–6, it is seemingly an isolated point, but in Figure 7 it is located near the origin of the coordinate system. This rule may therefore be considered a certain standard of digital prosumption to some extent emphasized by the respondents.

The conclusions from the research study on prosumption in the public administration clearly indicate that in this sector of the economy, respondents will only accept digital prosumption. The implementation of prosumption must therefore be supported by digital technologies. Thus, the research hypothesis concerning the implementation of digitalization in contact zones was verified positively. Society voiced their opinion, supporting the selected prosumption principles, although the survey revealed some gaps in their knowledge as certain prosumption principles were not selected. The latter are critical for initiating meetings and interactions between citizens and the public administration. Citizens' opinions are already known, which means that the development of solutions promoting climate protection and generation of energy from renewable sources in the more-than-human energy contact zone will require specific measures to be taken by the municipal governments in the near future.

8.2. Characteristic Features of Warmia and Mazury Contact Zones

The Warmia and Mazury Province is a region with relatively weak socio-economic potential in both Poland and the European Union [87,88]. The level of information infrastructure there is low, but changes in the synthetic ICT index determined for the province in comparison with the national average indicate the occurrence of a catching-up effect [89]. A negative phenomenon of shrinking of municipalities is observed in the region due to adverse demographic changes. A decrease in the population has occurred in more than 80% of municipalities in the province, which causes unfavorable economic effects in the form of a decrease in the budgetary revenues [90]. One of the most interesting initiatives undertaken in this region is the accession of many cities to the Polish National Cittàslow Network [91]. This serves the development of prosumer attitudes in society important from the point of view of the local government sector, because one of the postulates contained in the organization's program is precisely to improve the functioning of this sector.

In 2015, the construction of a fiber-optic backbone distribution network was completed in Warmia and Mazury, with the aim to enable broadband Internet access for residents, entrepreneurs, and government institutions from this region. This investment was accomplished as part of a public–private partnership, which signifies that the province's authorities must have considerable experience in this type of venture [92]. Therefore, the development of IT infrastructure in this region should be continued on similar principles in the future.

All the rules of prosumption not chosen by citizens remain a potential challenge for the local government sector. A closer look at this problem indicates the existence in the human administrative legal contact zone of all the features of a typical contact zone, such as autoethnographic texts, transculturation, colonialism, anti-conquest, radical heterogeneities, fundamental inequalities, coercion, violence, ambiguities, insurmountable conflicts, and the struggle for interpretive power.

A survey is a kind of autoethnographic text, a response to many earlier official documents, which are, in fact, ethnographic texts in which municipal governments present their views on citizens and perceptions of the problems of local communities. A large number of unselected rules of prosumption prove that people rarely meet with representatives of public administration, and even if they do, there are fundamental inconsistencies between the idioms of the metropolis and indigenous idioms. The only source of citizens' knowledge about prosumption and the possibilities of its application in the local government sector is the market sector, whereas municipal governments do not take sufficient measures to adapt to the requirements of the modern economy nor support the initiatives of local communities. The response of local public administration to such research as presented in this article leaves much to be desired; hence, the mirror dance which Pratt mentions

cannot yet take place. Two facts can be cited in support of these conclusions. The first is a very worrying demographic phenomenon occurring in Warmia and Mazury, which has already been mentioned. In search of better living and working conditions, people have moved to other regions of Poland or even to other European or non-European countries. The second fact is the large potential for the development of micro- and small hydropower plants in the region [34]. Unfortunately, it is not utilized due to the lengthy administrative and legal procedures. According to the current regulations, hydroelectric power stations are classified as economic activities with a significant potential impact on the environment. In consequence, a potential investor must obtain not only an environmental approval, but also an approval for building conditions, a water permit, an approval for the acquisition of rights to use real estate owned by the State Treasury, and a building permit. Briefly, the construction of a small hydropower plant with a nameplate capacity in the tens of kilowatts requires the same number of permits and administrative approvals as the construction of a larger hydropower plant with a capacity of several megawatts [93]. It usually takes two to five years to settle all administrative and legal issues before the investor can proceed to the more-than-human energy contact zone [94].

Human administrative–legal contact zones are also places of transculturation, as citizens are forced to use what the metropolitan culture offers, which in this case is represented by the municipal governments. To explain this problem, reference must be made to the historical context. The lands of contemporary Warmia and Mazury used to belong to East Prussia, part of the German Empire and then the Third Reich, and they were incorporated into Poland as part of the Recovered Territories by the 1945 Potsdam Conference. In addition, until 1989, Poland had a centrally planned economy, and the whole country was in the sphere of influence of the Soviet Union. Only the economic changes initiated in the early 1990s resulted in the emergence of a capitalist economy. In the twentieth century, the province underwent German colonialism, which was later replaced by Soviet colonialism. In both cases, local governments were far from transparent, mostly based on a command-and-control system of management. The local public administration still bears the marks of these colonial influences, as they have penetrated deeply into the regional culture. Warmia and Mazury still has remnants of the centralized public administration of the Third Reich and the socialist economy imposed immediately after the Second World War. A common element of both these colonialisms was the enormous power of local authorities, which allowed for the effective suppression of any civic initiatives. This perfectly explains the current difficulties in adapting municipal governments to the requirements of the digital economy. Over the past few decades, citizens have tried to appropriate certain elements of dominant cultures, German and Soviet, and use them under a centrally planned economy, but after the advent of the digital economy, these have turned out to be contrary to the new market logic. Therefore, there has been no permanent cooperation between two metropolitan cultures and the Polish indigenous culture and, as a result, no new economic and legal reality was created. During the process of cultural change and mutual give and take, the two sides of the equation were not modified, as Ortiz assumed, but inequalities in many dimensions were created and increased, so in this case, we can only talk about failed transculturation. The remains of both colonialisms are visible in the survey in the form of the rules of prosumption which were not selected by citizens.

The survey is also a reflection of conquest and anti-conquest. The history of Warmia and Mazury over the last several hundred years is extremely complex, which to some extent still affects the current situation of the region. These areas were previously part of Royal Prussia and the Duchy of Prussia and, as such, belonged to the Crown of the Kingdom of Poland, the Duchy of Prussia remaining in fiefdom dependence [95,96]. The Treaties of Wehlau and Bromberg of 1657 led to the loss of the Duchy of Prussia, while the annexation of Royal Prussia by the Kingdom of Prussia took place in 1772 as a result of the First Partition of Poland. It can therefore be said that the region was lost as a result of conquest and remained so until the end of World War II. In the years 1945–1989, Warmia and Mazury, as well as Poland at large, had a command economy, which for the local society

was an alien system of management imposed by the Soviet Union. During this period, the phenomenon of anti-conquest was perfectly visible in the region, as a representation strategy including both gestures of innocence and the simultaneous pursuit of hegemony was pursued. On the one hand, the region found itself again within the borders of Poland, but obedience to the colonizer ruled out any major changes in the social, economic, and legal spheres.

The current activities of society in the field of energy transition, particularly participation in the virtuous cycle of digitalization, decentralization, and electrification, may require the use of administrative–legal tools and discourses both within and outside formal institutional channels. In some cases, needing to protect the environment may force citizens to correct the mistakes of local governments through marches, demonstrations, rallies, pickets, strikes, roadblocks, or other forms of civil disobedience. In Poland, in recent years, two such cases in the form of grassroots movements deserve special attention, as they show how a local protest may transition into proactive energy policy formation at the national level. In the first case, citizens of the village of Żurawlów located in the Zamość region stopped the prospecting and extraction of shale gas. The second is the fight against air pollution in Kraków [41]. It is true that both examples come from outside Warmia and Mazury, but they are worth mentioning here for the sake of comparing contact zones in the studied province with the equivalents existing in other regions of the country.

8.3. The Rationale for the Need for Further Comparative Research

A prosumer sentiment survey showed that many of the prosumption principles listed in Table 1 were not chosen by respondents. Their ignorance and uncertainty in this regard indicate that something interesting may be happening in the contact zones in Warmia and Mazury. The questionnaire survey identified in this region some elements of contact zones known from the humanistic, social, and environmental literature cited earlier, such as ethnographic and autoethnographic texts, transculturation, and inconsistencies between the idioms of the metropolis and indigenous idioms. To end the empirical research at this point would mean that it would remain significantly incomplete. This has necessitated the introduction of two additional sections in the article (9 and 10), which will ensure the completeness of the research presented here. They are needed for the following reasons:

1. The issue of the impact of contact zones on energy transition is addressed here for the first time in science, which means that there is a lack of a frame of reference necessary to evaluate the results of the survey. To date, no other scientific papers have addressed this topic. The only paper is our previous study, which we mention in Section 6, but this insufficient, as its goals were somewhat different.
2. Explaining the reasons why many prosumption principles have not been chosen by citizens points to the need to find a reference system in the form of other local contact zones, preferably in Poland. Such zones should be developmental in nature and thus potentially have an impact on national energy policy. This will enrich the interpretation of the survey results. Two such contact zones were found in Żurawlów and Kraków. Without additional comparative analysis of all three contact zones, it would not be possible to draw up a list of their characteristics, which are critical for energy transition.
3. A full explanation of the importance of survey research is not possible without reference to such factors as the socio-economic history of the region, its current level of development, and specific features, as well as geographical and environmental conditions.

9. Two Selected Reference Systems: The Human Administrative Legal and the More-than-Human Energy Contact Zones Located Outside Warmia and Mazury

9.1. The Fight of Farmers from Żurawlów against Shale Gas Extraction

In the opinion of the Polish Geological Institute, the prospective resources (onshore and offshore) of shale gas in Poland range from 346 to 768 Bcm (billion cubic meters) [97] (p. 4). Some of the deposits are located in the vicinity of Żurawlów, located in the munici-

pality of Grabowiec, Zamość District, a village of only 96 inhabitants, including children and the elderly. Between 3 June 2013 and 7 July 2014, residents and farmers from the vicinity protested against the activity of Chevron Corporation, an American multinational energy corporation, which intended to prospect for shale gas in the nearby areas [98]. By taking over the local company Lublin Energy Resources, Chevron succeeded in obtaining license number 30/2007/p, issued in a non-bidding procedure by the Ministry of Environment on 6 December 2007, for the exploration and prospection of deposits of coalbed methane and natural gas in the Grabowiec area. The licensed area of 1195 km^2 included the city of Krasnystaw and areas in 18 municipalities, including Grabowiec, Miączyn, Sitno, Skierbieszów, and Zamość [99] (pp. 20–24). The protest was caused by the numerous threats to the environment and life of citizens associated with the extraction of shale gas by hydraulic fracturing, which uses toxic chemical compounds and can release naturally occurring radioactive material. Residents feared the loss of their farms, which provided them with livelihoods, damage to houses and roads, as well as the irreversible degradation of the unique ecosystem and adverse changes in its biodiversity. Several dozen meters from the area leased by Chevron is the Wolica Valley, named for the Wolica River flowing through this area, constituting the right-hand tributary of the Wieprz River, which covers 938.28 ha and is a special area of habitat protection belonging to the Natura 2000 network [100]. Aware of the risks associated with fracking, citizens blocked access to the site where the exploratory drilling rig was to be built with tractors and agricultural machinery and then proceeded to continuously occupy it. As it soon turned out, Chevron did not have a sufficient legal basis for the actions that it intended to take in Żurawlów [99] (pp. 108–116). On one of the protesters' banners appeared an inscription in the form of an equation:

$$\text{Fracking} = \text{death of agriculture.} \quad (3)$$

Another banner indicated that the inhabitants of Żurawlów were keenly aware of international energy politics: *Chevron + Gazprom are a deadly threat to energy security*. In this way, they probably also pre-empted accusations of acting in favor of the Russian Gazprom corporation. The farmers' protest quickly gained publicity, not only in Poland but also abroad [101,102]. Billboards appeared in the center of Warsaw, which read: *Żurawlów in defence of land and water against the world's most toxic company. The fight continues. Now* [103]. In addition, support for the inhabitants of Żurawlów came from all over the world, and from the first days of the blockade they were supported by French committees and associations fighting against shale gas [104]. The protesters were also supported by Catholic priests from nearby parishes [105]. After 400 days, the occupation protest was successful, Chevron left the leased land, and the residents saved their soil, as well as drinking water resources including the Major Underground Water Reservoirs in Poland numbered 405, 406, and 407 [106] (pp. 30, 275–281). This action was the longest local protest against the exploration and exploitation of shale gas deposits in the world [107]. It was also a valuable lesson given by citizens to central and local authorities, who had to seriously revise their existing energy policy.

9.2. Citizen Initiatives against Air Pollution in Kraków

Air pollution is a serious problem in many cities around the world, and low emission is one of its major sources. Low emission refers to the emission of products of the combustion of solid, liquid, and gaseous fuels from sources of emission located at a height of no more than 40 m. Depending on the sources, three main types of emissions can be distinguished: from the generation of heat in household boilers and local boiler facilities, from transportation, and from industrial sources. Low emission is composed of suspended particulates PM10 and PM2.5, sulfur dioxide SO_2, nitrogen oxides NO_x, heavy metals, polycyclic aromatic hydrocarbons, and dioxins [108]. In large concentrations, they pose a threat to human health and life. In many large urban agglomerations in Poland, suspended particulates PM10 and PM2.5 are particularly hazardous because their daily allowed levels are exceeded. As regards PM10, its daily permissible threshold is 50 $\mu g/m^3$ and it may not

be exceeded more than 35 times in a calendar year, while the permitted annual mean value is set at 40 $\mu g/m^3$. For PM2.5, the limit to be achieved by 1 January 2020 was 20 $\mu g/m^3$ (previously 25 $\mu g/m^3$). In 2019, the alert threshold for PM10 was lowered from 300 to 150 $\mu g/m^3$, while the information threshold went down from 200 to 100 $\mu g/m^3$, both being daily average values [109].

Among the Polish cities, Kraków stands out as the worst case, with the concentrations of suspended particulates PM10 in 1998–2008 approximating 70–95 $\mu g/m^3$ in a year [110] (p. 11). In 2017, the average yearly concentration of PM2.5 in that city was the highest in Poland, and equaled 28.4–40.1 $\mu g/m^3$ depending on the location of the measuring station [111] (p. 17). The situation has now improved slightly, but the thresholds are still exceeded and Kraków has been one of the world's most badly polluted cities for years. As a result, a civic organization called the Kraków Smog Alert was launched in December 2012. It was the first anti-smog civic movement in Poland [112]. The Kraków Smog Alert began to inform the city's residents, via social media, about air quality measurements commissioned by the local authorities and about threats to health due to air pollution. The subsequent measures included anti-smog campaigns and marches, whose main objective was to make citizens and local governments aware of the problem they are faced with and to suggest the best solutions [113]. Since the findings reported by the local authorities suggested that the main source of air pollution in the city was low emission, the movement recommended the imposition of some restrictions on heating buildings with low quality coal or wood [112]. These steps resonated increasingly within the community. While the first anti-smog march gathered around 300 people, the next one attracted around 2000 participants [114]. Over time, the Kraków Smog Alert has gained fame across Poland. It initiated the foundation of the Polish Smog Alert in 2015, which associates over 40 local movements from all over the country [112]. These initiatives have been noticed by foreign mass media [115–117].

The major successes of the Kraków Smog Alert include persuading local governments to adopt the country's first anti-smog resolutions that aimed at improving the air quality in Kraków and in the entire Małopolska Province [112,118]. Consequently, a total ban on burning coal and wood in boilers, stoves and fireplaces was imposed in Kraków on 1 September 2019, leaving gas and light fuel oil as the only allowed fuels now. The regulations are less stringent in the Małopolska Province. The burning of coal sludge and coal flotation concentrates has been banned since 1 July 2017, while wood and biomass have been allowed as long as their moisture content does not exceed 20%. Moreover, coal- and wood-fired boilers or a wood-burning fireplace may be used if their emission parameters comply with the EU eco-design regulations. However, local residents are obliged to replace coal- and wood-fired boilers by the end of 2022 if these devices do not meet any emission norms, and by the end of 2026 also those boilers that currently meet only basic emission requirements [119]. With time, other provinces in Poland have adopted similar anti-smog resolutions, which enforce the replacement of old boilers, stoves, and fireplaces with modern devices at different times, and sometimes impose a partial or complete ban on coal or wood burning. To this day, only two provinces have not passed such resolutions: Warmia and Mazury Province and Podlasie Province [120].

A more thorough inspection of the Kraków contact zones demonstrates that they are far more complex than it might appear at first glance. It turns out that there is another civic movement, called the Social Initiative Kraków Alert Stop the Ban, which was set up in 2013 and now associates around 300 persons who oppose the ban to burn coal and wood in stoves; hence, it is a countermove against the Kraków Smog Alert [118]. Those who protest against the ban argue that the Kraków Smog Alert takes advantage of doctored research on air pollution sources and draws erroneous conclusions regarding the environmental protection policy. They maintain that data from air monitoring stations of the Regional Inspectorate for Environmental Protection are only able to detect the presence and concentration of pollutants in the air, but fail to identify where these pollutants originate from. The new initiative admits that smog is a significant issue but emphasizes the role of pollutants produced by vehicles, and suggests completely different corrective measures.

Among the suggestions raised by this movement, there is an option to allow the use of modern, automated coal-fired retort boilers, which could be fed with eco-pea coal: high-quality coal fuel emitting far less pollutants than ordinary coal, hence the prefix 'eco'. Other types of fuels allowed could be renewable biofuel composed of wooden pellets. The proponents of this initiative also suggest reducing air pollution due to road traffic by implementing so-called green waves: smart traffic management systems in cities that facilitate the flow of vehicles. Essentially, such systems ensure the synchronization of traffic lights at all intersections so that vehicles travelling at a certain speed are ensured green lights at every intersection they pass through. Thus, the speed of vehicles is more stable, which reduces fuel consumption and thereby generates less pollution [121]. In other words, while the mentioned new group aims to improve the quality of air, it claims the goal cannot be achieved by imposing a total ban on the burning of solid fuels, but will require a series of more complex and fairer measures [122].

Further research on the air pollution in Kraków has shown that this problem is more complex than expected. A new actor appeared in the contact zone: a team of researchers from the Department of Environmental Protection and Design of the AGH University of Science and Technology in Kraków, who questioned the claim that low emissions were the main source of air contamination, and highlighted the need to re-examine sources of particulate matter and other harmful chemical compounds in the city's air [122]. The researchers maintained that the data collated by the Marshal's Office, which served to develop air protection programs for the entire province, were dubious. According to this information, the structure of air contamination with PM10 dust in 2005 was as follows: 68% originated from transportation and traffic, 24% came from solid fuel furnaces (mainly fed with coal), and 8% was generated by industries. However, in 2013, the data provided by the same office were completely different: the sources of smog consisted of vehicle exhaust fumes (21%), furnaces fed with coal and wood (53%), and industries (26%). These data instantly reveal distinct anomalies, as the number of vehicles registered in Kraków and in the region of Małopolska (figures in brackets) increased rapidly, from 383,000 (1,056,755) in 2005 to 503,287 (1,615,661) in 2013. Additionally, the higher percentage of air contaminants originating from industries in 2013 is puzzling. In fact, the number of industrial plants in Kraków decreased considerably between 2005 and 2013. One would therefore expect a reverse tendency; that is, the percentage of transportation emissions should be higher in 2013 than in 2005, while the percentage of industrial emissions should be lower. Should these observations be true, solid fuel furnaces might turn out to be a less serious threat to air quality than previously thought [123]. Despite the lack of adequate research, the above opinions were criticized by both the Kraków Smog Alert and the local authorities, and the researchers were accused of hindering the fight against smog [124].

Nevertheless, the hypotheses put forth by the Kraków-based scholars were confirmed by Stanisław W. Gawroński from the Independent Department of Natural Foundations of Horticulture at the Warsaw University of Life Sciences, who suggests that the major source of particulate matter in air is mechanical vehicles. These pollutants come from exhaust fumes and from tires, asphalt, brake discs, and brake pads as they are worn out. The available data show the following structure of air pollutants in Warsaw: over 70% of particulate matter originates from transport emissions, 20% from industries, and 10% from households. Gawroński points to an important, though often underestimated method for smog elimination, such as adequately designed urban green areas, which are an excellent trap for airborne pollutants. There is a list of selected plant species, comprising over 25 species of trees, over 25 species of shrubs, and 6 species of creeping and climbing plants, which are recommended for growing in towns because of their ability to arrest particulate matter. The plants which thrive well in polluted urban areas include birches, oaks, yews, ash trees, and purple willows [125]. The plant detoxification mechanism works very well even when the contamination is caused by heavy metals and polycyclic aromatic hydrocarbons. The composition of green belts along roads with heavy traffic should comprise plants with high phytoremediation capabilities [126].

The latest studies by the Kraków-based scientists point to other, previously unrecognized causes of air pollution in that city; namely, changeable meteorological conditions. The low wind velocity and low mixing-layer height could contribute to elevated concentrations of airborne dust particles and other air contaminants, especially in the winter months [127]. Moreover, it was found that mechanical street cleaning might lead to a short-lived, around 3 h, increase in the concentrations of PM10 dust in air because the garbage trucks used for this purpose cause air turbulence and lift pollutants from the streets, thereby re-introducing them to the atmosphere. As a result, the concentration of PM10 in air can double, and the duration of this effect depends on wind velocity and the atmospheric stability class [128]. Furthermore, a similar effect was discovered in connection with the traffic of vehicles, which also lifts dust from streets and increases the particulate matter concentration in air by about 50%. Thus, improper cleaning of streets is a considerable source of air contamination. This effect could be averted if streets were washed regularly [129]. It was also determined that the emissions of PM10 which originate from re-entrained road dust could comprise up to 25% in winter and 50% in summer of the total PM10 concentrations in the air near roads [130]. Thus, a conclusion can be drawn that the PM10 amounts determined in air can be counted several times, which means that the data obtained from air monitoring stations are burdened with a certain error. The above studies cast more light on the origins of air pollution and can provide at least a certain measure of explanation why—despite the numerous initiatives, bans on using coal and wood for heating homes, and programs of replacing old boilers—Kraków is still among the most polluted cities in the world. On 14 December 2021, at 8.40 a.m. local time, Kraków ranked as the most polluted city in terms of air quality and pollution, and its U.S. AQI (Air Quality Index) was 316, which corresponds to a level hazardous to health. In response, the city's authorities provided free public transport to everyone, which proves that traffic is taken into account as a serious source of pollution, just like coal and wood stoves [131]. When the U.S. AQI value is as high as mentioned above, anyone exposed to such air pollution can experience considerable deterioration in health [132].

In response to the discrepancies indicated above, a new civic legislative initiative was undertaken by the Open Wieliczka Association, where the principal desideratum was to say 'yes to wood burning and no to the gas lobby'. The authors demand amendments in the anti-smog resolution for Małopolska, such as lifting the ban on using dry wood and pellet for heating homes in Kraków, and postponing the deadline for replacing uncertified fireplaces and boilers in the whole Małopolska Province for 3 years. They emphasize that citizens should be given a choice of ecological methods for heating of their homes, which should not be constrained to the option offered by the gas lobby comprising German boilers and Russian gas. The main goal of this initiative is 'to stop forcing people to use expensive gas' [133]. On 1 March 2022, the association submitted to the Małopolska Regional Assembly a civic draft resolution on this matter signed by 2500 people [134]. The activists cite results of analyses which prove that the ban on using coal and wood in Kraków has not contributed to a significant reduction in the concentration of benzo(a)pyrene in air, which in 2016–2020 was persistently the highest in Poland, even though it decreased by 21%. In the same time period, the results obtained in the other fifteen Polish provincial capital cities were much better, and the cumulative numerical average of the air concentration of benzo(a)pyrene in these cities declined by 34%, even though they did not impose a total ban on using solid fuels [135]. In addition, the inconclusiveness of the results of earlier studies on relationships between an increase in air pollution and higher mortality or shorter average longevity was emphasized [136]. It was also hypothesized that activities carried out under the umbrella of smog alerts is very profitable for some individuals. Focusing only on the fight against coal and wood redirects financial resources, both public and private, to specific business environments while discarding some other valuable solutions able to improve air quality, such as chimney electrostatic precipitators, which can arrest from 50 to 90% of pollutants even if the fireplaces or furnaces using coal or wood do not have proper certificates [137]. It is worth mentioning that in the years 2012–2019 over PLN

320 million, approximately EUR 75,301,200 (according to the monthly exchange rate of July 2019), was allocated in Kraków to the program of replacing boilers [138]. Furthermore, the VAT tax rate on firewood was raised from 8 to 23% in 2020, which presumably was expected to improve the competitiveness of gas heating [139]. The hypotheses put forth by the activists from Wieliczka are confirmed by other sources, which implicate some links between the Kraków Smog Alert and organizations associating entrepreneurs interested in the replacement of old boilers and in the modernization of buildings to improve their energy efficiency [140].

The information provided above attests to the extraordinary complexity of Kraków's contact zones arising from both administrative and legal questions, as well as energy issues. There are many clashing opinions of citizens, associations and grassroots movements, and local governments, in addition to which there are many more-than-human elements in our environments, such as polluted air, sources of renewable and non-renewable energy, or heating equipment. In this environment, a smog alert can be perceived as a perfect example of anti-conquest because of innocence gestures when activists assure us of their selfless intention for clean air in the country. On the other hand, only one 'true' solution to the problem of smog is exposed while other measures, equally good and effective, are stifled, and huge business ventures are hidden under the guise of ecology, monopolizing energy markets and heating equipment as well as thermomodernization of buildings.

A comparison of the above case with the previously described protests against shale gas can substantiate the conclusion that—considering both contact zones—the only winners so far on the side of the citizens are the farmers from the village Żurawlów, who retained their farmland.

10. Discussion

A large number of prosumption principles not indicated by the citizens responding to our questionnaire indicates that the human administrative legal and the more-than-human energy contact zones in the region of Warmia and Mazury differ significantly from the reference contact zones in Żurawlów and Kraków. All this suggests that in recent years, there have not been such civic movements active in the analyzed region, focusing on issues connected with the energy transition and environmental protection, that could boast of sufficiently significant achievements to have an impact, if not on national policy, then at least on provincial policy. Farmers' protests have stood out in recent years among the civic initiatives in the Warmia and Mazury Province. They mostly consist of roadblocks and slowing down the flow of traffic on roads, although they may assume harsher forms, such as the blockade of the Province Office in Olsztyn [141]. The protesters emphasized the need to amend the agricultural policy so that it would favor domestic agricultural production and improve its profitability. Nowadays, most farmers' protests in Warmia and Mazury are coordinated by the Agrounia—the National Farmers' Association, an organization started in 2018. This association put forward five demands against the central authorities in Poland [142,143]: the government must compensate producers for the errors made when developing the agricultural policy (making intervention purchases of agricultural products and paying compensation for losses); 70% of food products in shops should be made in Poland; Polish farmers must not be discriminated against in the European Union; liquidation of profitable branches in agricultural production must be forbidden; and using the competitive advantage of retail chains must be stopped. Additionally, two local civic movements in the region are worth mention: Social Initiative Save Mazury and the Sadyba Association for the Protection of the Cultural Landscape of Mazury, which protest against the construction of the S16 expressway, which would cut through the Land of the Great Mazury Lakes, the most valuable part of the region in terms of natural, landscape, and tourist assets, as well as the Biebrza National Park in Podlasie Province. The S16 is planned as a four-lane road with parameters close to those of a motorway. It will belong to the Trans-European Transport Network (TEN-T) and will connect two international transport corridors: Via Carpatia and Via Baltica [144]. Activists from both

movements carry out information campaigns on social media, submit petitions to offices, and inform the general public about the ecological threats associated with the construction of this road. Interestingly, the activists from both movements are being supported in their stance by an increasing number of local governments from the municipalities and districts which this road is planned to cross [145]. In brief, a daily flow of 23,000 motor vehicles, mainly trucks, will cause irreparable ecological damage in this area. Local inhabitants maintain that sacrificing the natural environment of Mazury is too high a price to pay for Russian and German transit. This trend in the development of civic initiatives encompasses the aforementioned activity of the 21 cities in the region which belong to the Cittàslow network, where the priority is given to sustainable development, protection of the natural environment, and generation of clean energy [146].

Studies carried out in selected municipalities in Warmia and Mazury suggest the presence of an autocratic management style in these administrative units. Strong power is held in the hands of one person because the citizens are unprepared to deal with public matters due to the lack of adequate knowledge. Self-government is understood there as the highest possible decision-making and financial independence of the mayor, and the mayor's smallest possible dependence on higher levels of authorities. The municipal community tends to be perceived as inert, helpless, and unprepared to solve common problems. In such a system, initiatives undertaken by local residents or activities pursued by associations, such as the Citizens' Committees created in 1989–1990, have been always treated as manifestations of political fractiousness. A distinguishing feature of the local communities in this region is that they were formed anew after the Second World War from new settlers, displaced persons, and few autochthonous people. A sense of social unity is hard to expect under such circumstances, and thus while the local inhabitants admit that the participation of citizens in making decisions about the community's matters is proper, in their situation it is essentially unachievable. The reason is the lack of adequate social and cultural infrastructure for the development of civil society. As a result, independent public opinions cannot be voiced. Many municipalities have no local newspapers, while some have had poor access to the Internet until recently. The local authorities are free from social control, which means that they are tempted to act beyond their competences established in legislation. This deepens the inertia of the local community while some sort of mild despotism or overprotective power evolves. The situation is certainly aggravated by the distrust and hostility of society towards authorities inherited from the time of socialism in Poland, 1945–1989, which is reciprocated by the authorities suppressing any grassroots initiatives [147]. The above considerations lead to the conclusion that the large number of the prosumption principles not indicated by the survey respondents is due to the deficit of social capital, which is founded on trust [118]. The relationships between citizens and local governments have been overwhelmed by the culture of distrust (cynicism), which should be understood as the general sense of suspicion in interpersonal relations, leading to constant monitoring of the actions of the other party in the hope of preventing abuse, lies, and conspiracies [148] (p. 326).

Currently, the residents of Warmia and Mazury are facing an extremely important test of their civic strength, which arises from anti-smog resolutions, only recently drafted and practically ready for implementation. As usual, the implementation was supposed to proceed according to the autocratic model, where the authorities know best what the people need. These resolutions, the same as in other provinces, would impose a ban on burning low-quality solid fuels, including biomass with a moisture content of over 20%, that would enter into force on the date of adopting the resolution in question. Different deadlines were also given for the replacement of old boilers powered with solid fuels, depending on their class and location (in or outside urban areas). The only acceptable fuels are to be gas and light heating oil. In the future, it will be prohibited to heat homes with coal or wood in buildings which are situated within a piped gas grid or heating network [149,150]. The content of these resolutions has caused astonishment and disbelief for many reasons.

Warmia and Mazury is the least polluted region in Poland [151], with the least developed gas grid [152], but the sixth-highest province in Poland in terms of total forest cover [153], and the region with the smallest socio-economic potential in Poland [87,88]. In the current economic and political conditions, the abandonment of the option of heating homes with wood, which is an inexpensive ecological fuel available in abundance in this region, in favor of expensive and imported fossil fuels, such as natural gas, is a highly ill-considered move. This decision may force the local inhabitants to burn expensive Russian gas imported from Germany. The anti-smog resolutions in Poland propose such actions that are an exact opposite to the energy policies conducted by West European countries. For example, in Germany, from January to November 2021, the Federal Funding for Efficient Buildings (BEG) received numerous applications for co-funding of renewable heating systems. The statistics distinguish the following renewable heating types [154]:

- Gas hybrid and gas renewable ready heaters—32,991 grant applications;
- Solar thermal heating systems—39,338 grant applications;
- Biomass heating systems—62,967 grant applications;
- Environmental heaters (heat pump heaters)—56,075 grant applications;
- Heat network heaters—8349 grant applications.

These data show that most applications were submitted to co-fund biomass heating systems, as they made up 31.5% of all applications, and the second most popular were heat pump heaters, with a contribution of 28%. Moreover, using gas is possible only in combination with another source of heat, and a gas installation must be adopted to be powered with a renewable fuel, which should encourage a step-wise transition towards electricity [155]. Last but not least, the report commissioned by Greenpeace and developed by the Wuppertal Institute for Climate, Environment and Energy assures that the heat supply to buildings in Germany will be fully secured by renewable energy by the year 2035, and this will allow a complete departure from oil or natural gas [156]; thus, the installation of new oil and gas heating systems should be banned from 2024, and the existing systems should be gradually phased out by 2035 [157]. Similar solutions with the aim to discontinue the heating of buildings with natural gas have been implemented in other countries of Western Europe. In Denmark, for example, a ban on installing fossil oil and gas boilers in new buildings came into force in 2013. Similar restrictions on natural gas used for heating have been imposed in the Netherlands, where new buildings have been prohibited from being connected to a gas grid since July 2018. In addition, a local planning approach has been introduced in this country, where gas heating is phased out gradually at district level, and the aim is to create gas-free districts. Austria has banned the installation of central heating boilers powered with liquid or solid fossil fuels in new buildings, and the current government program includes further plans to phase out fossil oil and gas boilers. In France, a regulation was to come into force in 2022 which would forbid heating systems based on fossil fuels only. In Belgium, in the Flemish Region, a ban was introduced in 2021 to connect large building projects to a gas grid. In Germany, it will be prohibited to install mono-fuel fossil boilers from 2026. Ireland, in turn, is planning to introduce legal solutions prohibiting the installation of fossil gas boilers in new buildings from 2025 [158] (pp. 18–21).

The import of gas to Poland is influenced by both economic and political factors. One of the most important economic aspects is inflation, which is forecast by the National Bank of Poland to increase in the coming quarters of 2022, and will exceed 12% on a year-to-year basis in the third quarter of this year. One of the major causes of inflation is the rise in prices of energy resources on global markets, including natural gas, the price of which in February 2022 was three times as high as a year earlier [159]. Political factors play a significant role as well, and the war waged by Russia against Ukraine comes to the fore. In these circumstances, the German press appeals to the German authorities to stop imports of gas and crude oil from Russia, because paying for these imports means financing the war [160,161]. Interestingly, similar demands were addressed to the Polish government by the Polish Smog Alert, demanding the cessation of imports of coal, gas, and oil from

Russia [162]. This is largely contrary to the anti-smog resolutions adopted recently in Poland by local governments, where using gas for heating buildings is mandatory. It is not known, however, where this gas should come from, since the Baltic Pipe, which was to deliver natural gas from Norwegian fields to Denmark and Poland, will not be launched until October 2022, and it is still not rather unclear if and to what extent it will ensure the country's energy security. Furthermore, the amounts of liquefied natural gas delivered to the Świnojuście LNG terminal by tankers from Qatar and other countries do not seem to be certain.

In the Warmia and Mazury Province, anti-smog resolutions are observed to be proceeding in an autocratic regime. For instance, an invitation to open consultations about draft resolutions was posted on the website of the Public Information Bulletin on 22 December 2021, and the deadline was set for 21 January 2022 [163]. This time period was most probably chosen deliberately because it includes the Christmas and New Year season, followed by Epiphany. During this festive time, most citizens do not deal with official matters and therefore the actual time for submitting comments and motions was shortened by almost half. The websites of municipal offices displayed this information much later; for example, the Miłki municipality announced this invitation in the Current Events section as late as 17 January 2022, thereby reducing the time for social consultations to just four days [164]. The authorities know better what citizens need. Despite these obstacles, the local governments were astonished by the active stance taken by citizens, who submitted around 500 comments to the proposed legislation [165]. Activists of the Warmia and Mazury Region branch of the National Movement, a nationwide political party in Poland, noticed the problem in time, publicized it and appealed to the councilors of the Warmia and Mazury Regional Assembly to reject the anti-smog draft resolutions [166]. In justification of their protest, they point to the fact that the ban on using wood for heating houses can ruin the local economy, where the timber industry generates a considerable revenue in the region. Moreover, the condition of the natural environment is good enough to deem restrictions and bans envisaged in the proposed regulations as unjustified. Another argument was that, in compliance with the EU and national law, products obtained from woody biomass are counted as renewable energy sources, while natural gas is a fossil fuel being gradually phased out in West European countries. In light of these facts, the resolutions which put a preference on gas and enforce the installation of expensive fossil fuel powered heating devices are short-sighted and may considerably worsen the living standards of local residents in the future. The path towards clean air should proceed through a rise in the wealth and awareness of citizens rather than through the use of force [167]. The local authorities responded as might have been expected. Rather than providing substantiated arguments, they accused the opponents of incompetence and misleading the region's inhabitants. It seems that the true motivation for adopting anti-smog resolutions was the fact that most other Polish provinces have already adopted such laws and we (Warmia and Mazury Province) must not lag behind. Additionally, the arguments concerning the sources of air pollution appear peculiar because the authorities claim that as much as 89–99% of the pollutants originate from the heating of houses. Hence, it would seem that there was hardly any traffic or industry in the region. However, some of the provisions proposed in these resolutions are acceptable; for example, the ban on burning trash in heating installations or the obligation to gradually phase out boilers that do not meet the essential combustion standards, i.e., the so-called 'smokers' [168].

The above discussion demonstrates that the contact zones in Warmia and Mazury are in the stage of gradual transformation from a purely autocratic model to a model appropriate for civil society. Thus far, the civic initiatives in this region have been encouraged by national organizations, such as farmers' unions or political parties. This type of activities deserve to be treated as extremely valuable because they give the region's inhabitants a model of how to shape and employ prosumer attitudes in the field of energy transition and in other areas. As regards anti-smog resolutions, they are most clearly an outcome of astroturf campaigns; that is, only seemingly arising from grassroots citizen movements,

but actually shaped by lobbying actions undertaken by corporations and various interest groups [169]. This is a characteristic feature of a contact zone described previously as anti-conquest. In this situation, the residents of the Warmia and Mazury Province are yet to face a true test of their prosumer abilities in the spheres of economics and politics, and the outcome of this test is difficult to predict.

The actual energy transition takes place in the contact zone, where the thoughts and expectations of citizens clash with the solutions developed by the local government sector. An important factor in building a civil society is prosumption in public administration, which is a prerequisite for the revival of the human administrative legal contact zone. It is not until this zone develops that a step towards the more-than-human energy contact zone can be taken, in which the energy prosumers and the building owners will be able to participate in the development of renewable energy sources, reduction of pollutants and protection of the environment. There are several obstacles in Warmia and Mazury preventing the implementation of prosumption in the public sphere. Some elements of past German and Russian colonialism continue to linger in the awareness of the local residents, and the legacy of socialist economy still weighs heavily on contacts between citizens and municipal governments. In these circumstances, an autocratic system of public matters management can grow and consolidate easily. In recent years, however, some signs of energy prosumerism have appeared in the region although, notably, most measures taken in this area have been initiated by Poland's nationwide organizations. Local grassroots movements still seem weak, but they may turn into a permanent element of contact zones in this province with the increase in the awareness and wealth of the region's inhabitants. The role of civic initiatives following the stagnation period of 1995–2015 should gain more importance. The above research proves that in the social sphere, in this terra incognita illustrated in Figure 1, people who compose the middle class make an increasing number of autoethnographic gestures, which will cause transculturation of elements of metropolitan discourses. In this way, citizens, who in the current situation play the role of pawns subjugated by conquest, strive to free themselves from the excessive subordination to the authorities by creating self-affirmations addressed to the metropolis. This is a form of becoming engaged in the metropolis' constructions, where the aim is to neutralize autocratic elements in the social sphere, as these are perceived negatively by the majority of society. The propensity of the respondents to digital prosumption, revealed by this study, is one such autoethnographic gesture which is expected to weaken the adverse consequence of the conquest.

One of the principal goals of digitalization is to improve the flow of energy and information in both local and national economy. Thus far, the digital transformation in the local government sector has been poorly researched, and this is where the causes of failure and delays in the energy transition lie. These problems require in-depth research because citizens' daily contact with the municipal public administration offices determine the implementation of digital technologies [170]. The results of the study presented in this article shed new light on the conditions underlying digitalization on the level of municipalities and define the division of roles between citizens and local governments. Prosumption attitudes among society in Warmia and Mazury have been initiated by the digitalization of the market sector, but due to the conditions resulting from the autocratic management style they are yet in the early stage of development. In general, the municipal governments are alienated from their local communities, which forces people to look for better living conditions elsewhere because, for the time being, they are unattainable in their current place of residence. The best proof supporting this conclusion is the fact that our respondents can refer to some of the prosumption principles but fail to recognize some others. This implicates the need for the inclusion of society in the sphere of public administration so as to set up institutional practices based on participative citizenship [171]. This paper demonstrates that the starting point should be the ability of people to define a set of autoethnographic gestures indicating their willingness to use digital prosumption in public administration. In this way, society could voice its expectations, and the local

governments must now act in the field of implementing digital technologies. Digitalization of the public administration is a factor accelerating the inclusion of people in this sector of economy.

Changes in the contemporary world economy tend to move the business models of wikinomics from the private sector to the public sector, and especially to the local government sector [51]. An important role in improving the functioning of public administration is played by the principles of prosumption and the platforms for participation, which can contribute both to the emergence of completely new public services and to the improvement of existing services.

The platforms for participation are another wikinomics model which is developing thanks to the rapid progress in ICT. These are the products and technological infrastructure shared by modern businesses to partner communities in order to create new economic values and initiate innovative projects. The platforms for participation are based on all four principles of wikinomics: openness, peering, sharing, and acting globally. This business model is slowly supplanting the conventional business model, because as a result of moving parts of the business to the Internet, they can operate on a broader stage. This enables faster and more effective collaboration with relevant partners to improve existing solutions. The company's productive capacity can thus be increased without incurring additional fixed costs. In the private sector, the platforms for participation are usually websites that have an e-commerce system for warehousing, purchasing, and distributing goods [48].

The results of the survey of public administration offices websites indicate that in their present form, they are not suitable for the platforms for participation [46,47]. This implies a delay in implementing the principles of prosumption in this sector. Thus, a serious barrier to growth and economic development is revealed. This also contributes to difficulties in foreign trade and lowers the country's position in the world economy, which can only be overcome by the appropriate economic policy of the state. Thus, the digital prosumption is, to a very small extent, present in the public administration sector in Poland.

In the public administration sector, it is necessary to implement the ten principles of prosumption which are discussed in this paper. This will require simultaneous transformation of the existing municipal office websites into wikinomics platforms for participation. These should be the platforms for grassroots action based on public disclosure and neighborhood knowledge [48]. In terms of the principles of prosumption and the platforms for participation, the Polish public administration sector is much less developed than the market sector. The reason for this is the low transparency of the entire public sector.

The harmonization of the public administration sector with the market sector encounters a number of barriers that can be divided into technological and mental barriers. The former concern the technical requirements of the platforms for participation. Therefore, they can easily be overcome with the right inputs, while the latter are not. Breaking mental barriers is only possible through the transformation of clients into prosumers, which requires simultaneous bottom-up actions of citizens and the implementation of the principle of openness in the public administration itself.

11. Conclusions

In today's world, the role of prosumer energy is steadily increasing, and this trend is expected to continue in the future [172,173]. This article shows that a success factor for the energy transition at the local level is the stimulation of the prosumption potential of societies by local municipal governments. At the same time, many changes in the contact zones are desirable, which are detailed below.

Two types of conclusions can be drawn from this study. The first type concerns the characteristic features of the contact zones in Warmia and Mazury, Poland, whereas the others are of general economic importance and they can span the entire country, international communities and the whole world. Local, international, or global, the contact zones have the same common features, and they can explain the inevitable conflicts of interest, clashes of opposing views, and the fight for economic and political power and

domination in all aspects of reality. First, conclusions on the contact zones in Warmia and Mazury will be presented, arising both from the survey concerning the acceptance in society of the rules of prosumption proposed by the authors and from a comparative analysis aimed at determining the differences and similarities between the contact zone under study and the two reference contact zones. Subsequently, the paper presents general reflections on the study and the extrapolation of some discovered regularities onto higher, non-local levels of the economic reality. The paper will be concluded by identifying the directions of future research.

The empirical analysis performed with the use of multiple correspondence analysis shows that the contact zones in Warmia and Mazury exhibit a majority of typical features discussed earlier with examples from humanities and environmental science. However—obviously—these features are exemplified differently. The conclusions can be summarized as follows:

1. The research hypothesis was confirmed, which means that the society in the province under examination uses digital prosumption as the basic tool for communication with the municipal governments;
2. The rules of prosumption not chosen by the citizens mean that they lack the knowledge necessary to cooperate with the local governments. This also means that it is now the municipal governments' turn to act. However, developing common solutions concerning climate protection and energy generation from renewable sources should be preceded by education and building mutual trust.
3. The respondents' answers in the survey questionnaire are a kind of autoethnographic text, which is a list of citizens' experiences from previous contacts with the local government sector using official documents, i.e., ethnographic texts. The rules of prosumption that are not chosen mean that people's meetings with public officials are rare and that there are certain differences between the idioms of the metropolis and the indigenous idioms. This means that there is no mirror dance.
4. Failed transculturation is present in the contact zones in Warmia and Mazury. A metropolitan culture, represented now by the municipal governments, is based on the remnants of German and Soviet colonialism, which led to the huge competence of the local governments at the expense of civic initiatives. However, citizens did not adopt almost any elements of the dominant cultures—neither at the times of a centrally planned economy, nor during the subsequent economic transformation and the return to capitalism. Polish indigenous culture remained permanently alienated, which means that the Ortiz equation must be—for the time being—replaced with an inequality. This is shown by the rules of prosumption not chosen by citizens.
5. There are visible effects of the conquest and anti-conquest in the contact zones under study. Their remnants have survived until now as the autocratic style of municipal management. Warmia and Mazury were lost by Poland in the 17th and 18th centuries. The land was regained after 1945, but together with the command economy imposed by the Soviet Union.
6. There is still a representation strategy in the region, which simultaneously includes gestures of innocence and striving for hegemony. These territories were formally incorporated into Poland after 1945, but the need to cooperate with the colonizing forces ruled out any significant social and economic reforms. This strategy of representation is still followed by the local governments in a slightly modified form.
7. Not much can be inferred from the survey about the competing perspectives. Their existence is indicated by the rules of prosumption not chosen by citizens. This can also be a form of a silent protest against the relations of power in the province.
8. There is no visible platform for public consultations and negotiations, which is a direct result of the inherited colonialism and the autocratic style of the municipality management. This may be one of the factors responsible for the dwindling population in the region, as it forces economic migration. At the same time, it explains the low level of use of the existing hydropower potential.

The results of the comparative analysis of the contact zones in Warmia and Mazury with the two Polish contact zones—Żurawlów and Kraków—deepen and broaden these conclusions. Table 7 shows major similarities and differences between the contact zones under study, considering such features as the influence on the national energy policy, involved social strata, the method for initiating grassroots movements, dominating style of management, astroturf campaigns, radical heterogeneities, negotiations and civil dialogue, languages of contact zones, struggle for interpretive power, competing perspectives, neocolonial nature of social relations, conquest and anti-conquest, representation strategy, transculturation, autoethnographic and ethnographic texts, mirror dance, and oikophilia. This list shows that the contact zones in Warmia and Mazury are developing gradually and, with time, they can reach a level high enough to exert an impact on the domestic energy policy.

Table 7. Comparison of the most important features of the contact zones in Warmia and Mazury with those of the two reference contact zones in Żurawlów and Kraków.

Key Features of the Studied Contact Zones	Warmia and Mazury	Żurawlów	Kraków
Impact on national energy policy	None	Yes	Yes
Involved social strata	Middle class	Farmers	Middle class
Initiating grassroots movements	Top-down (by national organizations)	Bottom-up	Bottom-up
Prevalent management style	Autocratic	Democratic	Democratic
Astroturf campaigns	Likely	Currently lacking	Likely
Radical heterogeneities	Yes	Yes	Yes
Negotiations and civil dialogue	Initial phase	Advanced phase	Advanced phase
Languages of contact zones	Dominant groups	Mix: native and dominant groups	Mix: native and dominant groups
Struggle for interpretive power (marches, roadblocks, demonstrations)	Initial phase	Advanced phase	Advanced phase
Competing perspectives	Initial phase	Developed in all parties to the conflict	Developed in all parties to the conflict
Neocolonial nature of social relations	Yes	No	No
Conquest and anti-conquest	Yes	Yes	Yes
Representation strategy	Innocence and hegemony	Innocence and hegemony	Complex
Transculturation	Failed: Ortiz's inequality	Successful: Ortiz's equality	Successful: Ortiz's equality
Autoethnographic and ethnographic texts	Yes	Yes	Yes
Mirror dance	No	Yes	Yes
Oikophilia	Yes	Yes	Yes

The phenomena taking place in the contact zones examined in this study are of a general nature, and they are present on the local, international, and global levels. In Poland, the European Union and many other countries around the world, there are similar contact zones as in Warmia and Mazury. Most of them have the features mentioned in Table 7. Making use of their potential and filling them in with cooperation, despite the conflicts, opposite interests, and large contrasts, is a condition for sustainable development. There are not only problems but also solutions to be found in the contact zones.

This study examines the impact of the phenomena taking place in the contact zones on the shape of the energy policy oriented towards a reduction of global warming, which is regarded as the cause of catastrophic climate change. A virtuous cycle is sought, which

includes digitalization, decentralization, and electrification, and which stimulates the use of energy from renewable sources. One of the trends in future research will be to focus on contact zones as a factor critical to the success or failure of the energy transition. The division of a contact zone into two sub-zones, the human administrative legal contact zone and the more-than-human energy contact zone, can also be useful, as it allows for categorizing phenomena into those shaped by people and those arising from human–nature relations. This involves local contact zones and investigating how to make use of their potential for green energy sector development. The energy transition is of a global nature as it was conceived of as a remedy for a global threat, but its success will be a consequence of a favorable outcome of the glocalization processes in various places around the world. Studies of the contact zones on various levels, i.e., those covering the development of the regional, but also the national and international energy policy, can be of particular importance. Such contact zones exist, and complex processes occur in them every day. One example is the contact zone covering the whole of the European Union, in which each member state has to submit its plan concerning energy and climate [174]. The authors hope that this work will encourage other scholars to continue similar research.

Author Contributions: Conceptualization, A.J. and D.R.; methodology, A.J. and D.R.; software, A.J. and D.R.; validation, A.J. and D.R.; formal analysis, A.J. and D.R.; investigation, A.J. and D.R.; resources, A.J. and D.R.; data curation, A.J. and D.R.; writing—original draft preparation, A.J. and D.R.; writing—review and editing, A.J. and D.R.; visualization, A.J. and D.R.; supervision, A.J. and D.R.; project administration, A.J. and D.R.; funding acquisition, A.J. and D.R. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: Data are contained within the article.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Scruton, R. *How to Think Seriously about the Planet: The Case for an Environmental Conservatism*; Oxford University Press: New York, NY, USA, 2012; ISBN 978-0-19-989557-1.
2. Scruton, R. Environmentalism Starts with Loving Our Own. *The Conservative*, 1 October 2018. Available online: https://theconservative.online/article/environmentalism-starts-with-loving-our-own(accessed on 28 January 2022).
3. Directive (EU) 2018/844 of the European Parliament and of the Council of 30 May 2018 Amending Directive 2010/31/EU on the Energy Performance of Buildings and Directive 2012/27/EU on Energy Efficiency (Text with EEA Relevance). *Off. J. EU* **2018**, L156. Available online: https://eur-lex.europa.eu/eli/dir/2018/844/oj (accessed on 29 January 2022).
4. In Focus: Energy Efficiency in Buildings. European Commission, Brussels, 17 February 2020. Available online: https://ec.europa.eu/info/news/focus-energy-efficiency-buildings-2020-feb-17_en (accessed on 30 January 2022).
5. Buildings Performance Institute Europe: 97% of Buildings in the EU Need to be Upgraded. Available online: https://www.bpie.eu/publication/97-of-buildings-in-the-eu-need-to-be-upgraded/ (accessed on 31 January 2022).
6. Obwieszczenie Ministra Inwestycji i Rozwoju Z Dnia 8 Kwietnia 2019 r. w Sprawie Ogłoszenia Jednolitego Tekstu Rozporządzenia Ministra Infrastruktury w Sprawie Warunków Technicznych, Jakim Powinny Odpowiadać Budynki i Ich Usytuowanie. Dziennik Ustaw RP 2019, poz. 1065. Available online: https://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20190001065 (accessed on 31 January 2022).
7. Svobodová, I. Energy efficiency in buildings: Middle-class status as a trigger for the European fight against climate change. *Eur. View* **2019**, *18*, 163–170. [CrossRef]
8. Pratt, M.L. Arts of the Contact Zone. *Profession* **1991**, *1991*, 33–40. Available online: https://www.jstor.org/stable/25595469 (accessed on 15 January 2022).
9. Pratt, M.L. *Imperial Eyes: Travel Writing and Transculturation*; Routledge—Taylor & Francis Group: New York, NY, USA, 2003; ISBN 0-203-16309-5.
10. Guaman Poma, *Nueva Corónica y Buen Gobierno* (1615); GKS 2232 4°. København, Danmark, Det Kongelige Bibliotek. Available online: http://www5.kb.dk/permalink/2006/poma/info/es/frontpage.htm (accessed on 28 January 2022).
11. Guamán Poma de Ayala, F. *The First New Chronicle and Good Government: On the History of the World and the Incas up to 1615*; Hamilton, R., Ed.; Hamilton, R., Translator; University of Texas Press: Austin, TX, USA, 2009; ISBN 978-0-292-71959-0.
12. Guamán Poma de Ayala, F. *Nueva Corónica y Buen Gobierno; Pease García, F.—Transcripción, Prólogo, Notas y Cronología*; Fundación Biblioteca Ayacucho: Caracas, Venezuela, 1980; Volume 1, ISBN 84-660-0053-4. Volume 2, ISBN 84-660-0054-2; Available online: https://www.clacso.org.ar/biblioteca_ayacucho/ (accessed on 31 January 2022).

13. Adorno, R. Felipe Guaman Poma de Ayala's Nueva corónica y Buen Gobierno (New Chronicle and Good Government). In A Multi-Lingual Anthology of Texts and Links Compiled for the First Early Ibero/Anglo Americanist Summit in Tucson, AZ, USA, 16–19 May, 2002. Panel 10: New World Antiquities and Histories. Available online: https://archive.mith.umd.edu/summit/Proceedings/Adorno.htm (accessed on 31 January 2022).
14. Adorno, R. *Guaman Poma: Writing and Resistance in Colonial Peru*, 2nd ed.; With a New Introduction; University of Texas Press, Institute of Latin American Studies: Austin, TX, USA, 2000; ISBN 0-292-70503-4.
15. Ortiz, F. *Cuban Counterpoint: Tobacco and Sugar*; Alfred, A. Knopf, Inc.: New York, NY, USA, 1947; ISBN 978-0-307-82026-6.
16. Pratt, M.L. Apocalypse in the Andes: Contact Zones and the Struggle for Interpretive Power. Encuentros, March 1996, No. 15. Inter-American Development Bank, Cultural Center: Washington, D.C.; USA. Available online: https://publications.iadb.org/publications/english/document/Apocalypse-in-the-Andes-Contact-Zones-and-the-Struggle-for-Interpretive-Power.pdf (accessed on 22 January 2022).
17. Harris, J. Negotiating the contact zone. *J. Basic Writ.* **1995**, *14*, 27–42. Available online: https://wac.colostate.edu/docs/jbw/v14n1/harris.pdf (accessed on 2 February 2022). [CrossRef]
18. Miller, R.E. Fault lines in the contact zone. In *Professing in the Contact Zone: Bringing Theory and Practice Together*; Wolff, J.M., Ed.; National Council of Teachers of English: Urbana, IL, USA, 2002; pp. 121–146, ISBN 0-8141-3740-7.
19. West, T. Differencing negotiation. *Compos. Stud.* **1997**, *25*, 7–18. Available online: https://compstudiesjournal.com/archive/ (accessed on 5 February 2022).
20. Kingwell, M. *A Civil Tongue: Justice, Dialogue, and the Politics of Pluralism*; The Pennsylvania State University Press: University Park, PA, USA, 1995; ISBN 978-0-271-02773-9.
21. Key, D. Safe houses and sacrifices: Filling the rooms with precious riches. In *Professing in the Contact Zone: Bringing Theory and Practice Together*; Wolff, J.M., Ed.; National Council of Teachers of English: Urbana, IL, USA, 2002; pp. 102–118. ISBN 0-8141-3740-7.
22. Edelstein, M. Multiculturalisms past, present, and future. *Coll. Engl.* **2005**, *68*, 14–41. [CrossRef]
23. Lu, M.-Z. Professing multiculturalism: The politics of style in the contact zone. *Coll. Compos. Commun.* **1994**, *45*, 442–458. [CrossRef]
24. Bizzell, P. "Contact zones" and English studies. *Coll. Engl.* **1994**, *56*, 163–169. [CrossRef]
25. Clifford, J. *Routes: Travel and Translation in the Late Twentieth Century*; Harvard University Press: Cambridge, MA, USA, 1997; ISBN 0-674-77960-6.
26. Boast, R. Neocolonial collaboration: Museum as contact zone revisited. *Mus. Anthropol.* **2011**, *34*, 56–70. [CrossRef]
27. Radermacher, M. *Devotional Fitness: An Analysis of Contemporary Christian Dieting and Fitness Programs*; Springer International Publishing AG: Cham, Switzerland, 2017; ISBN 978-3-319-49823-2. [CrossRef]
28. Isaacs, J.R.; Otruba, A. Guest Introduction: More-than-human contact zones. *Environ. Plan. E Nat. Space* **2019**, *2*, 697–711. [CrossRef]
29. Skillington, T. Democracy, biodiversity and more than human justice imperatives: Institutional responses to crisis. *Soc. Sci.* **2020**, *9*, 166. [CrossRef]
30. Wilson, H.F. Contact zones: Multispecies scholarship through "Imperial Eyes". *Environ. Plan. E Nat. Space* **2019**, *2*, 712–731. [CrossRef]
31. Isaacs, J.R. The "bander's grip": Reading zones of human—Shorebird contact. *Environ. Plan. E Nat. Space* **2019**, *2*, 732–760. [CrossRef]
32. Fredriksen, A. Encounters in the ebb and flood: Knowing marine ecologies in the intertidal contact zone. *Environ. Plan. E Nat. Space* **2019**, *2*, 761–780. [CrossRef]
33. Sutherland, C.R. Encountering the burn: Prescribed burns as contact zones. *Environ. Plan. E Nat. Space* **2019**, *2*, 781–798. [CrossRef]
34. Jakimowicz, A.; Rzeczkowski, D. The impact of public administration digitalization on the decarbonization of the economy. *Energies* **2021**, *14*, 5739. [CrossRef]
35. Cont, W.; Romero, C.; Lleras, G.; Unda, R.; Celani, M.; Gartner, A.; Capelli, L.; Zipitría, L.; Besfamille, M.; Figueroa, N.; et al. *IDEAL 2021: Reducing Service Gaps: How Digitalization Can Improve the Use of Infrastructure*; Corporación Andina de Fomento—Development Bank of Latin America: Caracas, Venezuela, 2021; ISBN 978-980-422-223-8. Available online: http://scioteca.caf.com/handle/123456789/1763 (accessed on 3 January 2022).
36. Astarloa, B.; Kaakeh, A.; Lombardi, M.; Scalise, J. *The Future of Electricity: New Technologies Transforming the Grid Edge*; World Economic Forum: Cologny/Geneva, Switzerland, 2017; Available online: https://www3.weforum.org/docs/WEF_Future_of_Electricity_2017.pdf (accessed on 5 January 2022).
37. Collin, J.; Hiekkanen, K.; Korhonen, J.J.; Halén, M.; Itälä, T.; Helenius, M. (Eds.) *IT Leadership in Transition—The Impact of Digitalization on Finnish Organizations*; Aalto University publication series: Science + Technology, 7/2015; Aalto University, School of Science, Department of Computer Science, ACIO Research Program: Helsinki, Finland, 2015; ISBN 978-952-60-6243-3. Available online: http://urn.fi/URN:ISBN:978-952-60-6243-3 (accessed on 4 January 2022).
38. Kotilainen, K. Energy prosumers' role in the sustainable energy system. In *Affordable and Clean Energy. Encyclopedia of the UN Sustainable Development Goals*; Leal Filho, W., Azul, A.M., Brandli, L., Salvia, A.L., Wall, T., Eds.; Springer Nature Switzerland AG: Cham, Switzerland, 2021; pp. 1–14. ISBN 978-3-319-95863-7. [CrossRef]
39. Kucharska, A. Społeczny wymiar "Energiewende"—Rozwój energetyki prosumenckiej w Austrii. *Stud. Humanist. AGH* **2018**, *17*, 67–84. [CrossRef]

40. De Sousa Santos, B. The counter-hegemonic use of law in the struggle for a globalization from below. *An. De La Cátedra Fr. Suárez* **2005**, *39*, 421–474. Available online: https://revistaseug.ugr.es/index.php/acfs/article/view/1035/1225 (accessed on 21 February 2022). [CrossRef]
41. Grobelski, T. Becoming a Side: Legal Mobilization and Environmental Protection in Poland. A Dissertation Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy, University of Washington, Seattle, WA, USA, 2016. Available online: https://digital.lib.washington.edu/researchworks/handle/1773/38149 (accessed on 26 April 2022).
42. Archimedes of Syracuse. On the equilibrium of planes or the centres of gravity of planes. In *The Works of Archimedes*; Ed. in Modern Notation, with Introductory Chapters by T.L. Heath; Cambridge University Press: Cambridge, UK, 1897; Book I; pp. 189–202.
43. Pappus of Alexandria. *Pappi Alexandrini Mathematicae Collectiones a Federico Commandino Urbinate. In Latinum Conuersae, & Commentarijs Illustratae. In Hac Nostra Editione ab Innumeris, Quibus Scatebant Mendis, & Praecipuè in Graeco Contextu Diligenter Vindicatae. Et Serenissimo Principi Leopoldo Gvlielmo Archidvci Avstriae, &c. Dicatae*; Ex Typographia, H.H., Ed.; de Duccijs: Bononiae, Italy, 1660; Available online: https://books.google.pl/books?id=KCvY8DKof7AC&hl=eng (accessed on 19 February 2022).
44. Jakimowicz, A. Wikinomiczne wzorce biznesowe w warunkach polskich. *Stud. I Pr. WNEiZ US* **2017**, *47*, 25–34. [CrossRef]
45. Jakimowicz, A.; Rzeczkowski, D. Application of the four colour theorem to identify spatial regional poles and turnpikes of economic growth. *Acta Phys. Pol. A* **2018**, *133*, 1362–1370. [CrossRef]
46. Jakimowicz, A.; Rzeczkowski, D. New measure of economic development based on the four-colour theorem. *Entropy* **2021**, *23*, 61. [CrossRef] [PubMed]
47. Jakimowicz, A.; Rzeczkowski, D. Municipality digital platforms and local development in the Warmia and Mazury region: Implications for smart specialization. In *Partnerships for Regional Innovation and Development: Implementing Smart Specialization in Europe*; Gancarczyk, M., Ujwary-Gil, A., González-López, M., Eds.; Routledge—Taylor & Francis Group: New York, NY, USA, 2021; pp. 246–270, ISBN 9780429330261. [CrossRef]
48. Tapscott, D.; Williams, A.D. *Wikinomics: How Mass Collaboration Changes Everything*; Portfolio/Penguin: New York, NY, USA, 2006; ISBN 978-1-59184-138-8.
49. Toffler, A. *The Third Wave*; William Morrow and Company: New York, NY, USA, 1980; ISBN 0-688-03597-3.
50. Toffler, A.; Toffler, H. *Revolutionary Wealth: How It Will Be Created and How It Will Change Our Lives*; Doubleday: New York, NY, USA, 2007; ISBN 978-0-385-52207-6.
51. Tapscott, D.; Williams, A.D. *Macrowikinomics: Rebooting Business and the World*; Portfolio/Penguin: New York, NY, USA, 2012; ISBN 978-1-59184-356-6.
52. Jakimowicz, A.; Rzeczkowski, D. Prosumption in the public administration sector. *Acta Phys. Pol. A* **2016**, *129*, 1011–1017. [CrossRef]
53. Jakimowicz, A.; Rzeczkowski, D. Perspektywy realizacji zasad wikinomii w administracji publicznej w Polsce. *Stud. I Pr. WNEiZ US* **2017**, *47*, 221–232. [CrossRef]
54. Abdi, H.; Valentin, D. Multiple correspondence analysis. In *Encyclopedia of Measurement and Statistics*; Salkind, N.J., Ed.; Sage Publications: Thousand Oaks, CA, USA, 2007; Volume 2, pp. 651–656, ISBN 9781412916110.
55. Greenacre, M. From simple to multiple correspondence analysis. In *Multiple Correspondence Analysis and Related Methods*; Greenacre, M., Blasius, J., Eds.; Chapman & Hall/CRC—Taylor & Francis Group: Boca Raton, FL, USA, 2006; pp. 41–76, ISBN 978-1-58488-628-0.
56. Nenadić, O.; Greenacre, M. *Computation of Multiple Correspondence Analysis, with Code in R. UPF Working Paper No. 887*; Universitat Pompeu Fabra: Barcelona, Spain, 2005. [CrossRef]
57. Hill, T.; Lewicki, P. *Statistics: Methods and Applications. A Comprehensive Reference for Science, Industry, and Data Mining*; StatSoft, Inc.: Tulsa, OK, USA, 2006; ISBN 1-884233-59-7.
58. Le Roux, B.; Rouanet, H. *Geometric Data Analysis: From Correspondence Analysis to Structured Data Analysis*; Kluwer Academic Publishers: Dordrecht, The Netherlands, 2004; ISBN 1-4020-2235-2.
59. Le Roux, B.; Rouanet, H. *Multiple Correspondence Analysis*; Sage Publications, Inc.: Los Angeles, CA, USA, 2010; ISBN 978-1-4129-6897-3.
60. Husson, F.; Josse, J. Multiple Correspondence Analysis. In *Visualization and Verbalization of Data. Computer Science and Data Analysis Series*; Blasius, J., Greenacre, M., Eds.; CRC Press—Taylor & Francis Group: Boca Raton, FL, USA, 2014; pp. 165–184, ISBN 978-1-4665-8981-0. [CrossRef]
61. Burt, C. The factorial analysis of qualitative data. *Br. J. Math. Stat. Psychol.* **1950**, *3*, 166–185. [CrossRef]
62. Lebart, L.; Saporta, G. Historical elements of correspondence analysis and multiple correspondence analysis. In *Visualization and Verbalization of Data. Computer Science and Data Analysis Series*; Blasius, J., Greenacre, M., Eds.; CRC Press—Taylor & Francis Group: Boca Raton, FL, USA, 2014; pp. 31–44, ISBN 978-1-4665-8981-0. [CrossRef]
63. Beh, E.J.; Lombardo, R. *Correspondence Analysis: Theory, Practice and New Strategies*; John Wiley & Sons: Chichester, UK, 2014; ISBN 978-1-119-95324-1.
64. Sourial, N.; Wolfson, C.; Zhu, B.; Quail, J.; Fletcher, J.; Karunananthan, S.; Bandeen-Roche, K.; Béland, F.; Bergman, H. Correspondence analysis is a useful tool to uncover the relationships among categorical variables. *J. Clin. Epidemiol.* **2010**, *63*, 638–646. [CrossRef]
65. Ayele, D.; Zewotir, T.; Mwambi, H. Multiple correspondence analysis as a tool for analysis of large health surveys in African settings. *Afr. Health Sci.* **2014**, *14*, 1036–1045. [CrossRef]

66. Lana, R.M.; Riback, T.I.S.; Lima, T.F.M.; da Silva-Nunes, M.; Cruz, O.G.; Oliveira, F.G.S.; Moresco, G.G.; Honório, N.A.; Codeço, C.T. Socioeconomic and demographic characterization of an endemic malaria region in Brazil by multiple correspondence analysis. *Malar. J.* **2017**, *16*, 397. [CrossRef]
67. Costa, P.S.; Santos, N.C.; Cunha, P.; Cotter, J.; Sousa, N. The use of multiple correspondence analysis to explore associations between categories of qualitative variables in healthy ageing. *J. Aging Res.* **2013**, *2013*, 302163. [CrossRef]
68. Rodriguez-Sabate, C.; Morales, I.; Sanchez, A.; Rodriguez, M. The multiple correspondence analysis method and brain functional connectivity: Its application to the study of the non-linear relationships of motor cortex and basal ganglia. *Front. Neurosci.* **2017**, *11*, 345. [CrossRef]
69. van Horn, A.; Weitz, C.A.; Olszowy, K.M.; Dancause, K.N.; Sun, C.; Pomer, A.; Silverman, H.; Lee, G.; Tarivonda, L.; Chan, C.W.; et al. Using multiple correspondence analysis to identify behaviour patterns associated with overweight and obesity in Vanuatu adults. *Public Health Nutr.* **2019**, *22*, 1533–1544. [CrossRef]
70. Balliester Reis, T. A Multi-Dimensional Index of Financial Inclusion: A Micro-Data Approach. In 18º Seminário de Diamantina, Universidade Federal de Minas Gerais—Centro de Desenvolvimento e Planejamento Regional da Faculdade de Ciências Econômicas (UFMG—Cedeplar): Belo Horizonte, Minas Gerais, Brazil, 19–23 August 2019. Available online: https://diamantina.cedeplar.ufmg.br/portal/download/diamantina-2019/D18_398.pdf (accessed on 28 September 2021).
71. Dungey, M.; Tchatoka, F.D.; Yanotti, M.B. Using multiple correspondence analysis for finance: A tool for assessing financial inclusion. *Int. Rev. Financ. Anal.* **2018**, *59*, 212–222. [CrossRef]
72. Toukam, C.K.; Sezine, S.T.; Tiomela, A. Socio-economic and geographical determinants of financial inclusion in Cameroon. *Int. J. Res. Sci. Manag.* **2020**, *7*, 17–33. [CrossRef]
73. Kambewa, P.; Seyama, A.; Mazalale, J.; Chaweza, R. A Comparative analysis of financial inclusion indices: Evidence from Malawi. *Asian J. Econ. Financ.* **2020**, *2*, 309–320. Available online: http://arfjournals.com/index.php?route=product/product/volumearticle&vissue_id=34&issue_id=73&product_id=393 (accessed on 24 September 2021).
74. Asselin, L.-M.; Anh, V.T. Multidimensional poverty and multiple correspondence analysis. In *Quantitative Approaches to Multidimensional Poverty Measurement*; Kakwani, N., Silber, J., Eds.; Palgrave Macmillan: Basingstoke, UK, 2008; pp. 80–103, ISBN 978-1-349-28165-7. [CrossRef]
75. Asselin, L.-M. *Analysis of Multidimensional Poverty: Theory and Case Studies*; Springer Science + Business Media: New York, NY, USA, 2009; ISBN 978-1-4419-0842-1. [CrossRef]
76. Ezzrari, A.; Verme, P. A Multiple Correspondence Analysis Approach to the Measurement of Multidimensional Poverty in Morocco, 2001–2007. In *Policy Research Working Paper, No. 6087*; The World Bank: Washington, DC, USA, 2012; Available online: http://hdl.handle.net/10986/9330 (accessed on 29 September 2021).
77. Ambapour, S. Using multiple correspondence analysis to measure multidimensional poverty in Congo. *J. Data Anal. Inf. Process.* **2020**, *8*, 241–266. [CrossRef]
78. Parchomenko, A.; Nelen, D.; Gillabel, J.; Rechberger, H. Measuring the circular economy—A multiple correspondence analysis of 63 metrics. *J. Clean. Prod.* **2019**, *210*, 200–216. [CrossRef]
79. Corral-De-Witt, D.; Carrera, E.V.; Muñoz-Romero, S.; Tepe, K.; Rojo-Álvarez, J.L. Multiple correspondence analysis of emergencies attended by integrated security services. *Appl. Sci.* **2019**, *9*, 1396. [CrossRef]
80. Bastos, R.R.; Hippert, H.S.; Souza, A.C. An Application of Multiple Correspondence Analysis to the Classification of Residential Electricity Consumers. In Proceedings of the XIII International Conference on Industrial Engineering and Operations Management. Energy that Moves Production: A Dialogue among Integration, Project and Sustainability, Iguassu Falls, PR, Brazil, 9–11 October 2007; pp. 1–9.
81. Hjellbrekke, J. *Multiple Correspondence Analysis for the Social Sciences*; Routledge—Taylor & Francis Group: New York, NY, USA, 2019; ISBN 978-1-138-69968-7.
82. Alhuzali, T.; Beh, E.J.; Stojanovski, E. Multiple correspondence analysis as a tool for examining Nobel Prize data from 1901 to 2018. *PLoS ONE* **2022**, *17*, e0265929. [CrossRef]
83. Mahdiyasa, A.W.; Pasaribu, U.S. Multiple correspondence analysis using Burt matrix: A study of Bandung Institute of Technology student characteristics. *IOP Conf. Ser. Mater. Sci. Eng.* **2019**, *598*, 012012. [CrossRef]
84. Khangar, N.V.; Kamalja, K.K. Multiple Correspondence Analysis and its applications. *Electron. J. App. Stat. Anal.* **2017**, *10*, 432–462. [CrossRef]
85. Ritzer, G. Prosumer capitalism. *Sociol. Q.* **2015**, *56*, 413–445. [CrossRef]
86. Ritzer, G. Prosumption: Contemporary capitalism and the "new" prosumer. In *The Oxford Handbook of Consumption*; Wherry, F.F., Woodward, I., Eds.; Oxford University Press: New York, NY, USA, 2019; pp. 75–93, ISBN 978-019-069-558-3.
87. Czyżewska-Misztal, D.; Golejewska, A. The least innovative regions in Poland in the process of smart specialization. *Optimum* **2016**, *5*, 123–137. [CrossRef]
88. Kogut-Jaworska, M.; Ociepa-Kicińska, E. Smart specialisation as a strategy for implementing the regional innovation development policy—Poland case study. *Sustainability* **2020**, *12*, 7986. [CrossRef]
89. Wierzbicka, W. Information infrastructure as a pillar of the knowledge-based economy—An analysis of regional differentiation in Poland. *Equilibrium* **2018**, *13*, 123–139. [CrossRef]
90. Wichowska, A. Shrinking municipalities and their budgetary revenues on the example of the Warmian-Masurian Voivodeship in Poland. *Oecon. Copernic.* **2019**, *10*, 419–432. [CrossRef]

91. Wierzbicka, W. Socio-economic potential of cities belonging to the Polish National Cittaslow Network. *Oeconomia Copernic.* **2020**, *11*, 203–224. [CrossRef]
92. Węgrzyn, J. Does experience exert impact on a public-private partnership performance? The case of Poland. *Equilibrium* **2018**, *13*, 509–522. [CrossRef]
93. Kuchmacz, J.; Mika, Ł. Description of development of prosumer energy sector in Poland. *Polityka Energetyczna Energy Policy J.* **2018**, *21*, 5–20. [CrossRef]
94. Kotłowski, R.; Szmidtke, L. Elektrownie Wodne—Dziś Trzeba Budować Od Podstaw. Pomorski Przegląd Gospodarczy 2013. Available online: https://ppg.ibngr.pl/pomorski-przeglad-gospodarczy/elektrownie-wodne-dzis-trzeba-budowac-od-podstaw (accessed on 2 March 2022).
95. Achremczyk, S. *Historia Warmii i Mazur*; Ośrodek Badań Naukowych im. Wojciecha Kętrzyńskiego w Olsztynie: Olsztyn, Poland, 2010; Volume 1: Pradzieje—1772, ISBN 978-83-60839-33-1. Volume 2: 1772–2010, ISBN 978-83-60839-46-1.
96. Małłek, J. *Dwie Części Prus. Studia z dziejów Prus Książęcych i Prus Królewskich w XVI i XVII Wieku*; Wydawnictwo Pojezierze: Olsztyn, Poland, 1987; ISBN 83-7002-302-9.
97. Kiersnowski, H.; Dyrka, I.; Janas, M.; Sidorczuk, M.; Rudnicki, A.; Jureczka, J. Oil & Gas in Poland: New Opportunities; 4 September 2015. Project: "Support to Informational, Analytical and Implementation Shale Oil and Gas Activities Aimed at Ensuring Poland's Energy Security and Protection of the Environment, including Public Participation in the Licensing Process". Available online: https://infolupki.pgi.gov.pl/en/library/folder-oilgas-poland-new-opportunities (accessed on 3 March 2022).
98. Occupy Chevron (Poland). Protest Mieszkańców Żurawlowa Przeciwko Inwestycjom Koncernu Chevron. Available online: https://occupychevron.tumblr.com (accessed on 3 March 2022).
99. Szołucha, A. *Gaz Łupkowy w Polsce. Historia, Magia, Protest*; Wydawnictwo Naukowe PWN SA: Warsaw, Poland, 2021; ISBN 978-83-01-22065-5. Available online: https://ruj.uj.edu.pl/xmlui/bitstream/handle/item/287497/szolucha_gaz_lupkowy_2021.pdf (accessed on 5 March 2022). [CrossRef]
100. Dolina Wolicy. Natura 2000 a Turystyka—Portal Informacyjno-Edukacyjny. Available online: https://ine.eko.org.pl/index_areas.php?rek=669 (accessed on 3 March 2022).
101. Neslen, A. Poland's Shale Gas Revolution Evaporates in Face of Environmental Protests. *The Guardian*, 12 January 2015. Available online: https://www.theguardian.com/environment/2015/jan/12/polands-shale-gas-revolution-evaporates-in-face-of-environmental-protests?CMP=share_btn_fb#img-3(accessed on 4 March 2022).
102. Reed, S. Chevron to Abandon Shale Natural Gas Venture in Poland. *The New York Times*, 30 January 2015. Available online: https://www.nytimes.com/2015/01/31/business/international/chevron-to-abandon-shale-venture-in-poland-a-setback-to-fracking-europe.html(accessed on 4 March 2022).
103. Protest w Żurawlowie wspiera Warszawa. Available online: https://zamosc.naszemiasto.pl/protest-w-zurawlowie-wspiera-warszawa/ar/c1-1904427 (accessed on 4 March 2022).
104. Brutalne działania korporacji Chevron w Polsce. Solidarnościowe Wsparcie Dla Mieszkańców Żurawlowa od Francuskich Komitetów i Stowarzyszeń Walczących z Gazem Łupkowym, 10 June 2013. Available online: http://eko.org.pl/index_news.php?dzial=2&kat=19&art=985 (accessed on 5 March 2022).
105. Żurawlów: Drugi Tydzień Protestu i Żadnych Widoków Na Ugodę, 14 June 2014. Available online: https://www.lublin112.pl/zurawlow-drugi-tydzien-protestu-i-zadnych-widokow-na-ugode-zdjecia/ (accessed on 5 March 2022).
106. Mikołajków, J.; Sadurski, A. (Eds.) *Informator PSH (Państwowej Służby Hydrogeologicznej): Główne Zbiorniki Wód Podziemnych w Polsce*; Państwowy Instytut Geologiczny—Państwowy Instytut Badawczy: Warsaw, Poland, 2017; ISBN 978-83-7863-720-2. Available online: https://www.pgi.gov.pl/psh/dane-hydrogeologiczne-psh/947-bazy-danych-hydrogeologiczne/8890-gzwp.html (accessed on 5 March 2022).
107. Leman, H. Przynajmniej nie staliśmy bezczynnie. *Tygodnik Przegląd*, 11 August 2014. Available online: https://www.tygodnikprzeglad.pl/przynajmniej-nie-stalismy-bezczynnie/(accessed on 6 March 2022).
108. Kaczmarczyk, M. (Ed.) *Niska Emisja: Od Przyczyn Występowania do Sposobów Eliminacji*; Redakcja Globenergia—Geosystem Burek, Kotyza, S.C.: Kraków, Poland, 2015; ISBN 978-83-64339-02-8.
109. Obwieszczenie Ministra Klimatu i Środowiska z Dnia 12 Kwietnia 2021 r. w Sprawie Ogłoszenia Jednolitego Tekstu Rozporządzenia Ministra Środowiska w Sprawie Poziomów Niektórych Substancji w Powietrzu. Dziennik Ustaw RP 2021, poz. 845. Available online: http://isap.sejm.gov.pl/isap.nsf/DocDetails.xsp?id=WDU20210000845 (accessed on 6 March 2022).
110. Graboś, A.; Żymankowska-Kumon, S.; Sadlok, J.; Sadlok, R. Przeciwdziałanie Niskiej Emisji Na Terenach Zwartej Zabudowy Mieszkalnej. Stowarzyszenie Na Rzecz Efektywności Energetycznej i Rozwoju Odnawialnych Źródeł Energii "Helios": Bochnia, Poland, 2014. Available online: http://home.agh.edu.pl/~szk/files/docs/niska_emisja.pdf (accessed on 6 March 2022).
111. Toczko, B. Pomiary i oceny zanieczyszczenia powietrza w Polsce. Pył zawieszony. In *Zanieczyszczenia Powietrza w Polsce: Stan, Przyczyny, Skutki. Raport*; Pawłowski, L., Ed.; Wydawnictwo Polskiej Akademii Nauk—Komitet Inżynierii Środowiska: Lublin, Poland, 2019; pp. 8–23, ISBN 978-83-63714-50-5. Available online: https://kis.pan.pl/images/stories/pliki/pdf/Monografie/Monografie-vol-144.pdf (accessed on 6 March 2022).
112. Medoń, S. Problem smogu w świetle socjologii translacji. Studium przypadku zanieczyszczeń powietrza w Krakowskim Obszarze Metropolitalnym. *Przegląd Socjol.* **2021**, *70*, 41–64. Available online: http://journals.ltn.lodz.pl/index.php/Przeglad-Socjologiczny/article/view/1198/1109 (accessed on 8 March 2022). [CrossRef]

113. Grzechnik, J. *Rola nowych Mediów w Aktywizacji Społeczności Lokalnej Na Przykładzie Ruchów Miejskich w Krakowie. Studium Przypadku: Krakowski Alarm Smogowy*; Wydawnictwo ToC: Gdańsk, Poland, 2018; ISBN 978-83-952278-6-8. Available online: https://mediastery.ug.edu.pl/publikacje/ (accessed on 8 March 2022).
114. Lutomska, E. Krakowski Alarm Smogowy. Historia Ludzi, Którzy Się Wreszcie Zorganizowali, 30 September 2017. Available online: https://wszystkoconajwazniejsze.pl/ewa-lutomska-krakowski-alarm-smogowy/ (accessed on 9 March 2022).
115. Gardiner, B. Air of Revolution: How Activists and Social Media Scrutinise City Pollution. *The Guardian*, 31 January 2014. Available online: https://www.theguardian.com/cities/2014/jan/31/air-activists-social-media-pollution-city(accessed on 10 March 2022).
116. Gardiner, B. 'The Air is Stinking, it's Dirty': The Fight against Pollution in Kraków. *The Guardian*, 13 April 2015. Available online: https://www.theguardian.com/cities/2015/apr/13/air-dirty-fight-pollution-krakow-poland-ban-wood-coal(accessed on 10 March 2022).
117. Barteczko, A. Activists Warn Smog in Poland's Top Winter Resort Denser than in Delhi. *Reuters—World News*, 8 January 2016. Available online: https://www.reuters.com/article/poland-climatechange-pollution-idINKBN0UM1MZ20160108(accessed on 10 March 2022).
118. Łabędź, K. Nowe ruchy społeczne w przestrzeni miejskiej (na przykładzie Krakowa). *Ann. Univ. Mariae Curie Skłodowska Lub. Pol. Sect. K Politol.* **2017**, *24*, 187–204. Available online: https://journals.umcs.pl/k/article/view/3641/5038 (accessed on 11 March 2022). [CrossRef]
119. Antysmogowe ABC. Available online: https://www.malopolska.pl/dla-mieszkanca/srodowisko/antysmogoweabc (accessed on 11 March 2022).
120. Przegląd uchwał antysmogowych, 4 February 2022. Available online: https://czysteogrzewanie.pl/podstawy/uchwaly-antysmogowe/ (accessed on 12 March 2022).
121. Kelly, B. A 'Green Wave' Reprieve. *Traffic Eng. Control.* **2012**, *53*, 1–15. Available online: https://www.semanticscholar.org/paper/A-%E2%80%98Green-Wave%E2%80%99-Reprieve-Kelly/bc795655b1e9b8e78e1e41d81a8bb0103f93cb0d (accessed on 14 March 2022).
122. Bojadżijewa, I. Ekologia polityczna powietrza: O uwidzialnianiu miejskiego ryzyka. *Kult. i Społeczeństwo* **2016**, *60*, 35–53. Available online: http://czasopisma.isppan.waw.pl/index.php/kis/article/download/1242/1015/ (accessed on 14 March 2022). [CrossRef]
123. Rąpalski, P. Smog w Krakowie. Naukowcy z AGH Podważają Wcześniejsze Wyliczenia. *Gazeta Krakowska*, 11 December 2014. Available online: https://gazetakrakowska.pl/smog-w-krakowie-naukowcy-z-agh-podwazaja-wczesniejsze-wyliczenia/ar/3680048(accessed on 14 March 2022).
124. Maj, A. Teoria Naukowca z AGH Utrudni Walkę Ze Smogiem. *Dziennik Polski*, 13 December 2014. Available online: https://dziennikpolski24.pl/teoria-naukowca-z-agh-utrudni-walke-ze-smogiem/ar/3682398(accessed on 14 March 2022).
125. Serbeńska, A. Zieleń Receptą Na Zanieczyszczenia i Odtrutką Dla Cywilizacyjnych Toksyn cz. I, 21 August 2012. Available online: https://edroga.pl/ochrona-srodowiska/zielen-recepta-na-zanieczyszczenia-i-odtrutka-dla-cywilizacyjnych-toksyn-cz-i-21086390 (accessed on 15 March 2022).
126. Serbeńska, A. Zieleń Receptą Na Zanieczyszczenia i Odtrutką Dla Cywilizacyjnych Toksyn cz. II, 22 August 2012. Available online: https://edroga.pl/ochrona-srodowiska/zielen-recepta-na-zanieczyszczenia-i-odtrutka-dla-cywilizacyjnych-toksyn-cz-ii-22086397 (accessed on 15 March 2022).
127. Oleniacz, R.; Bogacki, M.; Szulecka, A.; Rzeszutek, M.; Mazur, M. Assessing the impact of wind speed and mixing-layer height on air quality in Krakow (Poland) in the years 2014–2015. *Czas. Inżynierii Lądowej Sr. I Archit. JCEEA* **2016**, *33*, 315–342. [CrossRef]
128. Bogacki, M.; Oleniacz, R.; Rzeszutek, M.; Szulecka, A.; Mazur, M. The impact of street cleaning on particulate matter air concentrations: A case study of a street canyon in Krakow (Poland). *E3S Web Conf.* **2018**, *45*, 00009. [CrossRef]
129. Jaskulska, A. Kraków: Nowe Pomysły Na Walkę z Zanieczyszczeniem Powietrza. Pomysł Czyszczenia Ulic Pojawił Się Po ogłoszeniu Wyników Badań Akademii Górniczo-Hutniczej. *Inżynieria*, 9 November 2016. Available online: https://inzynieria.com/energetyka/smog/wiadomosci/46540,krakow-nowe-pomysly-na-walke-z-zanieczyszczeniem-powietrza(accessed on 15 March 2022).
130. Bogacki, M.; Mazur, M.; Oleniacz, R.; Rzeszutek, M.; Szulecka, A. Re-entrained road dust PM10 emission from selected streets of Krakow and its impact on air quality. *E3S Web Conf.* **2018**, *28*, 01003. [CrossRef]
131. Sowa, P. Kraków Najbardziej Zanieczyszczonym Miastem Świata. Fatalna Jakość Powietrza. Interia Wydarzenia—Wiadomości Lokalne, 14 December 2021. Available online: https://wydarzenia.interia.pl/malopolskie/news-krakow-najbardziej-zanieczyszczonym-miastem-swiata-fatalna-j,nId,5706742 (accessed on 16 March 2022).
132. Air Quality Index (AQI) Basics. Available online: https://www.airnow.gov/aqi/aqi-basics/ (accessed on 16 March 2022).
133. "Wybór, nie zakaz"—Apelują Autorzy Obywatelskiej Inicjatywy, Domagając Się Zmian w Uchwale Antysmogowej dla Małopolski, 21 February 2022. Available online: https://nowytarg24.tv/wybor-nie-zakaz-apeluja-autorzy-obywatelskiej-inicjatywy-uchwalodawczej-domagajac-sie-zmian-w-uchwale-antysmogowej-dla-malopolski/ (accessed on 16 March 2022).
134. Obywatelski Projekt TAK Dla Drewna Złożony. Podpisało się 2500 Osób, 2 March 2022. Available online: https://panbartek.pl/obywatelski-projekt-tak-dla-drewna-zlozony-podpisalo-sie-2500-osob/ (accessed on 16 March 2022).

135. Analiza Wpływu Zakazu Palenia w Krakowie Na Zmiany Stężeń Benzo(a)pirenu Na Tle Innych Miast Wojewódzkich. Stowarzyszenie Otwarta Wieliczka, January 2022. Available online: http://badtek.webd.pro/wp-content/uploads/2022/01/analiza-wplywu-zakazu-palenia-w-Krakowie-na-zmiany-stezen-zanieczyszczen-powietrza-na-tle-innych-miast-wojewodzkich.pdf (accessed on 17 March 2022).
136. Uproszczona Analiza Wpływu Zanieczyszczeń Powietrza Na Zdrowie w Miastach "Smogowych" i "Nie Smogowych" Na Podstawie Oficjalnych Danych Statystycznych w Polsce. Stowarzyszenie Otwarta Wieliczka, January 2022. Available online: https://panbartek.pl/wp-content/uploads/2022/01/Uproszczona-analiza-wplywu-zanieczyszczen-powietrza-na-zdrowie-w-miastach-1.pdf (accessed on 17 March 2022).
137. Walka ze Smogiem: Walka o Nasze Zdrowie, Czy o Nasze Pieniądze? Pierwszy w Polsce Obywatelski Raport o Smogu, Który nie Został Sfinansowany Przez Żadne Instytucje ani Środowiska Biznesowe. Stowarzyszenie Otwarta Wieliczka, January 2022. Available online: https://panbartek.pl/wp-content/uploads/2022/01/Obywatelski-raport-o-smogu-styczen-2022.pdf (accessed on 17 March 2022).
138. Rekordowe Zainteresowanie Wymianą Pieców, 2 July 2019. Available online: https://www.krakow.pl/213212,1962,231438,powietrze,rekordowe_zainteresowanie_wymiana_piecow_.html (accessed on 18 March 2022).
139. Stawka VAT Na Drewno Opałowe Wzrosła Kilkanaście Procent! Magazyn Biomasa, 2 July 2020. Available online: https://magazynbiomasa.pl/stawka-vat-na-drewno-opalowe-wzrosla-kilkanascie-procent/ (accessed on 18 March 2022).
140. Brzoza, W. Ujawniamy. Kto i Co Stoi Za Alarmem Smogowym? Ekologia, Czy Biznes? Gazeta Bałtycka—Polski Serwis Informacyjny, 17 January 2017. Available online: http://gazetabaltycka.pl/promowane/ujawniamy-kto-i-co-stoi-za-alarmem-smogowym-ekologia-czy-biznes (accessed on 18 March 2022).
141. Stankiewicz, C. Blokada Urzędu Wojewódzkiego w Olsztynie Zakończona. *Rolnicy Zablokują Mrągowo*, 12 February 2015. Available online: https://olsztyn.naszemiasto.pl/blokada-urzedu-wojewodzkiego-w-olsztynie-zakonczona-rolnicy/ar/c8-3278853(accessed on 18 March 2022).
142. Szałaj, K. "Piątka AgroUnii". Rolnicy Przedstawili Postulaty. Sad Nowoczesny, 30 November 2020. Available online: https://www.sadnowoczesny.pl/artykuly/prawo-dla-sadownikow/agrounia-przedstawiala-swoje-postulaty/ (accessed on 18 March 2022).
143. Oleszczyński, I. Jak AgroUnia Chce Poprawić Sytuację Polskiego Rolnictwa? *Tygodnik Poradnik Rolniczy*, 7 December 2020. Available online: https://www.tygodnik-rolniczy.pl/articles/aktualnosci_/jak-agrounia-chce-poprawic-sytuacje-polskiego-rolnictwa/(accessed on 18 March 2022).
144. Worobiec, K.A. S16—Kontrowersyjna Inwestycja Drogowa Na Mazurach i Nie Tylko. Miesięcznik Dzikie Życie 2019, 7–8/301–302. Available online: https://dzikiezycie.pl/archiwum/2019/lipiec-i-sierpien-2019/s16-kontrowersyjna-inwestycja-drogowa-na-mazurach-i-nie-tylko (accessed on 18 March 2022).
145. Ziomek, W. Mazury Nie Chcą Nowej Drogi. Protesty Przeciwko Budowie S16. Money.pl, 6 May 2019. Available online: https://www.money.pl/gospodarka/mazury-nie-chca-nowej-drogi-protesty-przeciwko-budowie-s16-6378058578208385a.html (accessed on 18 March 2022).
146. Miasta Dobrego Życia 2030. Program Rozwoju Miast Sieci Cittaslow Województwa Warmińsko-Mazurskiego. Projekt; Cittaslow, 8 November 2021. Available online: https://cittaslowpolska.pl/images/stowarzyszenie/miasta_2030/CITTASLOW_2030_Program_2021_PROJEKT_1111.pdf (accessed on 19 March 2022).
147. Malewska–Szałygin, A. *Wiedza Potoczna o Sprawach Publicznych. Rozmowy o Władzy Lokalnej w Wybranej Gminie Mazurskiej w Latach 1994–1995*; Instytut Etnologii i Antropologii Kulturowej Uniwersytetu Warszawskiego & Wydawnictwo DiG: Warsaw, Poland, 2002; ISBN 83-7181-252-3.
148. Sztompka, P. *Socjologia. Analiza Społeczeństwa*; Wydawnictwo Znak: Kraków, Poland, 2002; ISBN 83-240-0218-9.
149. Treter, W. Warmińsko-Mazurskie: Przymus Ogrzewania Gazem w Krainie Taniego Drewna? 17 January 2022. Available online: https://czysteogrzewanie.pl/2021/12/warminsko-mazurskie-przymus-ogrzewania-gazem-w-krainie-taniego-drewna/ (accessed on 19 March 2022).
150. "Uchwały Antysmogowe" Dla Obszarów Miast Województwa Warmińsko-Mazurskiego/Oraz Dla Obszarów Poza Miastami. Available online: http://wfosigw.olsztyn.pl/wp-content/uploads/2022/01/Streszczenie-uchwal.pdf (accessed on 19 March 2022).
151. Ocena Jakości Powietrza w Strefach w Polsce za rok 2020. Zbiorczy Raport Krajowy z Rocznej Oceny Jakości Powietrza w Strefach Wykonanej Przez GIOŚ Według Zasad Określonych w Art. 89 ustawy—Prawo ochrony środowiska. Główny Inspektorat Ochrony Środowiska, Narodowy Fundusz Ochrony Środowiska i Gospodarki Wodnej: Warsaw, Poland, 2021. Available online: https://powietrze.gios.gov.pl/pjp/documents/download/109787 (accessed on 19 March 2022).
152. Warmińsko-Mazurskie 2030. Strategia Rozwoju Społeczno-Gospodarczego, Olsztyn, Poland, 18 February 2020. Available online: https://strategia2030.warmia.mazury.pl/wp-content/uploads/2020/02/Strategia-W-M-2030.pdf (accessed on 19 March 2022).
153. Leśnictwo w Województwie Warmińsko-Mazurskim w 2017 r. Urząd Statystyczny w Olsztynie, 31 August 2018. Available online: https://olsztyn.stat.gov.pl/download/gfx/olsztyn/pl/defaultaktualnosci/1290/2/4/1/lesnictwo_2017.pdf (accessed on 19 March 2022).
154. Brumme, D. BAFA—Förderung für Solarthermie: Nachfrage legt im November zu, 13 December 2021. Available online: https://blog.paradigma.de/bafa-foerderung-fuer-solarthermie-nachfrage-legt-im-november-zu/ (accessed on 20 March 2022).

155. Britto, A.; Dehler-Holland, J. Optimal investment in energy efficiency as a problem of growth-rate maximisation: Evidence and policy implications. In *ECEEE 2021 Summer Study on Energy Efficiency: A New Reality*; Lindström, T.L., Blume, Y., Hampus, N., Eds.; European Council for an Energy Efficient Economy: Stockholm, Sweden, 2021; pp. 855–864, ISBN 978-91-983878-9-6.
156. Thomas, S.; Schüwer, D.; Vondung, F.; Wagner, O. *Heizen ohne Öl und Gas bis 2035—Ein Sofortprogramm für erneuerbare Wärme und effiziente Gebäude. Im Auftrag von Greenpeace e.V.*; Wuppertal Institut: Wuppertal, Germany, 2022; Available online: https://www.greenpeace.de/publikationen/Heizen%20ohne%20%C3%96l%20und%20Gas%20bis%202035.pdf (accessed on 20 March 2022).
157. Greenpeace—Studie: Gebäudewärme ab 2035 vollständig ohne Öl und Gas möglich. Ausstiegsgesetz für Öl- und Gasheizungen kann Umstieg auf Erneuerbare beschleunigen, 2 March 2022. Available online: https://presseportal.greenpeace.de/211054-greenpeace-studie-gebaudewarme-ab-2035-vollstandig-ohne-ol-und-gas-moglich (accessed on 20 March 2022).
158. Braungardt, S.; Keimeyer, F.; Bürger, V.; Tezak, B.; Klinski, S. *Phase-Out Regulations for Fossil Fuel Boilers at EU and National Level*; Öko-Institut e.V. Institut für angewandte Ökologie: Freiburg im Breisgau, Germany, 2021; Available online: https://www.oeko.de/fileadmin/oekodoc/Phase-out_fossil_heating.pdf (accessed on 21 March 2022).
159. Raport o Inflacji—Marzec 2022 r. Narodowy Bank Polski—Rada Polityki Pieniężnej: Warsaw, Poland, 2022. Available online: https://www.nbp.pl/home.aspx?f=/polityka_pieniezna/dokumenty/raport_o_inflacji.html (accessed on 20 March 2022).
160. Brinkmann, B. Krieg in Europa: Deutschland kann auf Gas und Öl aus Russland verzichten. *Süddeutsche Zeitung*, 8 March 2022. Available online: https://www.sueddeutsche.de/meinung/russland-deutschland-ukraine-gas-oel-importstopp-1.5543329?reduced=true(accessed on 21 March 2022).
161. Dudek, B. Niemiecka Prasa: Zachód Finansuje Wojnę Putina, 9 March 2022. Available online: https://www.dw.com/pl/niemiecka-prasa-zach%C3%B3d-finansuje-wojn%C4%99-putina/a-61058620 (accessed on 21 March 2022).
162. PAS Podpisał Apel do Rządu o Zaprzestanie Importu Surowców Energetycznych z Rosji, 28 February 2022. Available online: https://polskialarmsmogowy.pl/2022/02/pas-podpisal-apel-do-rzadu-o-zaprzestanie-importu-surowcow-energetycznych-z-rosji/ (accessed on 21 March 2022).
163. Zarząd Województwa Warmińsko-Mazurskiego Ogłasza Konsultacje Projektów Uchwał w Sprawie Wprowadzenia Na Terenie Województwa Warmińsko-Mazurskiego Ograniczeń Lub Zakazów w Zakresie Eksploatacji Instalacji, w Których Następuje Spalanie Paliw, o Których Mowa w Art. 96 Ustawy z Dnia 27 Kwietnia 2001 r. Prawo Ochrony Środowiska, 22 December 2021. Available online: https://bip.warmia.mazury.pl/kategoria/59/konsultacje-spoleczne.html (accessed on 22 March 2022).
164. Kusznerczuk, P. Spotkanie Konsultacyjne w Sprawie Projektów tzw. *Uchwał Antysmogowych*, 17 January 2022. Available online: http://gminamilki.pl/2022/01/17/spotkanie-konsultacyjne-w-sprawie-projektow-tzw-uchwal-antysmogowych/(accessed on 22 March 2022).
165. Treter, W. Konsultacje i Zmiany Uchwał Antysmogowych—Luty 2022, 20 February 2022. Available online: https://czysteogrzewanie.pl/2022/02/konsultacje-i-zmiany-uchwal-antysmogowych-luty-2022/ (accessed on 24 March 2022).
166. Grosz, K. Ruch Narodowy z Olsztyna Stanowczo Sprzeciwia Się Uchwale Antysmogowej. Przewodnicząca Sejmiku: To Puste Słowa. Gazeta Olsztyńska, 13 January 2022. Available online: https://gazetaolsztynska.pl/797746,Ruch-Narodowy-z-Olsztyna-stanowczo-sprzeciwia-sie-uchwale-antysmogowej-Przewodniczaca-Sejmiku-to-puste-slowa.html (accessed on 24 March 2022).
167. Wysocki, K.M. Przymus? Nie Tędy Droga. *Gazeta Olsztyńska*, 15 February 2022. Available online: https://gazetaolsztynska.pl/806770,Przymus-Nie-tedy-droga.html(accessed on 24 March 2022).
168. Szczepanik, R. Zielone Płuca Polski Zagrożone Smogiem. Co z Uchwałami Antysmogowymi? *Gazeta Olsztyńska*, 10 February 2022. Available online: https://gazetaolsztynska.pl/805467,Zielone-Pluca-Polski-zagrozone-smogiem.html(accessed on 24 March 2022).
169. Lyon, T.P.; Maxwell, J.W. Astroturf: Interest group lobbying and corporate strategy. *J. Econ. Manag. Strategy* **2004**, *13*, 561–597. [CrossRef]
170. Bousdekis, A.; Kardaras, D. Digital transformation of local government: A case study from Greece. In *Proceedings of the 2020 IEEE 22nd Conference on Business Informatics (CBI 2020), Antwerp, Belgium, 22–24 June 2020*; IEEE Computer Society: Los Alamitos, CA, USA, 2020; Volume 2, pp. 131–140, ISBN 978-1-7281-9926-9. [CrossRef]
171. dos Santos, M.P.; de Melo, S.C.; Santiago, M.C.; Nazareth, P. Inclusion in public administration: Developing the concept of inclusion within a school of accounts and administration. *Int. J. Educ. Admin. Pol. Stud.* **2017**, *9*, 35–46. Available online: https://files.eric.ed.gov/fulltext/EJ1136777.pdf (accessed on 24 March 2022). [CrossRef]
172. Jakimowicz, A. The energy transition as a super wicked problem: The energy sector in the era of prosumer capitalism. *Energies* **2022**, *15*, 9109. [CrossRef]
173. Jakimowicz, A. The future of the energy sector and the global economy: Prosumer capitalism and what comes next. *Energies* **2022**, *15*, 9120. [CrossRef]
174. Maris, G.; Flouros, F. The Green Deal, National Energy and Climate Plans in Europe: Member States' compliance and strategies. *Adm. Sci.* **2021**, *11*, 75. [CrossRef]