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Prosumption and Dissemination of Scientific Knowledge: Analysis of Lithuanian Prosumer Projects from a Digital Sociology Perspective

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Rima Žilinskaitė

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INTRODUCTION

Every technology that structures and restructures the economic life of societies inevitably has broader social and mental effects and impact than solely economic. Georg Simmel has gracefully and concisely captured this already at the beginning of the 20th century with his *The Metropolis and Mental Life*. Digital technologies and digitalisation of different societal spheres are no exception in this regard. The development of digital technologies progresses through various phases, directions and forms, encompassing both software and hardware. They enabled a broader user participation and collaboration, and were also accompanied by certain ideological assumptions that are expressed in the techno-optimistic and techno-pessimistic visions articulated at the dawn of the development of these technologies. In one of the prominent manifestos of this kind, Don Tapscott and Anthony D. Williams (2008 [2006]) proposed that the rationale for operating within the digital domain is underpinned by the principles of openness, peering, sharing, and acting globally. The present dissertation is undertaken from the standpoint that it is important to analyse popular assumptions about the functioning and impact of digital technologies in detail, in order to test, substantiate, reject or refine these assumptions. This approach serves to enhance comprehension of the social dimension of digitalisation, as well as to establish a foundation for critical approaches.

In the context of conceptualising digitally enabled and facilitated performance, prosumption is an important notion. It refers to the merging of production and consumption, and is employed to signify the user productive practices that occur within a digital domain or are mediated by digital technologies. It is worth noting that the concept of prosumption predates the digital era and is also used to describe and analyse a broad variety of activities, ranging from individual adaptation of mass-produced products to environmental activism and practices (Chen, 2012; Kotler, 2010 [1986]; Rau et al., 2023; Toffler, 1984 [1980]). In this regard, the internet and digital technologies are often seen as further encouraging user participation, stimulating and facilitating the general trend towards participation in different areas of social life (Dusi, 2015, 2018a; Ritzer, 2013, 2015d; Ritzer and Jurgenson, 2010).

In the digital domain, prosumption is first and foremost associated with the activities encompassing the creation and dissemination of information, knowledge, and data-based and driven artefacts. In the broadest sense, the processes of digitalisation that have enabled user participation and

collaboration on a wider scale are seen in this thesis as unfolding in parallel with participatory initiatives in science and the ideology of participation in science. Consequently, the notion of prosumption enables an examination of digitally facilitated user participation in the creation and dissemination of scientific knowledge within the broader context of digitalisation. At both the political and institutional levels of scientific organisations, trends toward democratising scientific processes by involving non-professionals in different stages of these processes have been observed for more than two decades and are sometimes referred to as the *participatory turn* (Jasanoff, 2003; see also Delvenne and Macq, 2020; Hetland and Schrøder, 2020; Lengwiler, 2007).

This *turn* attracts methodological approaches from various sciences involving the participation of non-professionals as research partners (more characteristic of the social sciences and humanities), as well as the involvement of non-professionals in data collection or identification, and in science governance processes. The development of the so-called social internet technologies, which began around the 2000s, created more opportunities for such participation, and at the same time offered certain ideological underpinnings to support the need for participation (e.g., citizens want open access and the right to participate in decision-making, information sharing, etc.).

It is difficult to ascertain whether a causal relationship exists between these processes; however, if popular ideological assumptions associated with digitalisation exert any influence on the processes and organisation in the field of science, it is imperative to enhance our comprehension of whether and how these attitudes correspond to the preferences and meanings attributed to these activities by individuals engaged in practices related to the creation and dissemination of scientific knowledge.

Research problem. In an attempt to comprehend the impact of digitalisation on the involvement of non-professionals in activities related to the creation and dissemination of scientific knowledge, the question arises as to whether and to what extent the assumed principles of the digital space and technologies, as proposed by Tapscott and Williams, apply to such activities. In addressing this question, it is essential to understand the mechanisms through which digital technologies facilitate prosumption in this domain, and its subsequent outcomes. Therefore, the research problem of this dissertation is how digitalisation facilitates the participation of non-professionals in the creation and dissemination of scientific knowledge, as well as the mechanisms and outcomes of such participation.

In the context of non-professional involvement with science, it is reasonable to differentiate between engagement, participation, and productive practices/prosumption, depending on the scale and range of the involvement[1]. Although the notions of *engagement* and *participation* are sometimes used synonymously in studies investigating the lay audience's relationship with science, *engagement* may also encompass activities such as receiving, obtaining, reading and familiarising oneself with scientific knowledge and information, which, from a perspective of institutionalised science, may be defined as science communication or scientific literacy (Bucchi and Neresini, 2007). *Participation*, then, would be more accurately described as contributing (or being involved) in the creation and dissemination of scientific knowledge, e.g. by sharing one's data, participating in research as a research subject, etc.

Meanwhile, *prosumption* in this thesis is considered to be an active participation in the creation and dissemination of scientific knowledge (e.g. data collection, analysis, interpretation, systematisation, description, and dissemination), as well as independent engagement in such activities. The suggestion to consider these differences between the levels of participation is consequential when aiming to understand and explain this phenomenon, not only at a structural but also at an individual level, as well as from the perspective of "lay people" in order to better understand their motivations to become involved and participate in different activities.

Digitalisation and digital technologies have created new possibilities for users to engage in the creation and dissemination of content (including scientific content) – however, even digitally facilitated participation is not universal among internet users. Van Dijck and Nieborg (2009, p. 861) state that approximately one-tenth of active internet users are considered to be involved in content creation. Research indicates that these patterns of activity in creating content on the internet essentially reflect the overall trends in participation in science-related activities.

Eurobarometer data for 2024 (Special Eurobarometer 557. European citizens' knowledge and attitudes towards science and technology) demonstrate that 5% of respondents in Lithuania indicate that they at least

[1] Losi (2023), for example, proposes a classification in which she attributes both data sharing and active participation in research to co-creative participation in science (p. 802). She also states that, based on the characteristics of the groups, empirical evidence does not show a significant difference between participants in science governance and those in initiatives related to specific research activities. Nevertheless, the present dissertation posits that it is analytically significant to differentiate between these activities, not only in view of their divergent characteristics, but also in consideration of the disparate outcomes and institutional ramifications that they imply.

sometimes (i.e., chose the answers “Yes, regularly” or “Yes, sometimes”) actively participate in scientific projects, contributing by developing research questions, collecting data, discussing the findings with others, etc. (together with Greece – the least in Europe). Moreover, 6% of respondents in Lithuania indicated that they participate in clinical trials at least sometimes (European Commission, 2025). Notably, this survey essentially only refers to institutionally organised science-related activities. Consequently, studies may also overlook certain activities enabled by digitalisation, such as contributing to Wikipedia or creating individual science-related projects online.

Digital technologies enable non-professionals to create and disseminate science-related and scientific content (e.g., online encyclopedias) which is publicly and widely available on the internet, bypassing professional gatekeepers. At least theoretically, such content competes for the audience’s attention with that created and coordinated by scientists and scientific institutions, yet is a result of the activities of a small proportion of active internet users. This prompts a series of questions concerning the motivations behind such activities, particularly the significance of the ideals of digitalisation as a motivating factor. Additionally, how do these individuals themselves comprehend their activities? That is to say, what principles guide their actions, and do these principles conflict with the scientific ethos of professional scholars, thereby potentially disrupting the institutionalised organisation of scientific knowledge creation and dissemination? These are the principal questions of the empirical analysis conducted in this dissertation.

Aim and objectives. The overall aim of the thesis is to analyse the digitally facilitated productive practices of users in the domain of scientific knowledge creation and dissemination, applying the new typology of prosumption. The achievement of this aim includes not only understanding the attitudes and motivations of prosumers in science-related activities but also involves an examination of the techno-optimist and techno-pessimist views of digitally enabled participation in the fields related to information and knowledge creation. To achieve this aim, the following objectives have been formulated:

1. To develop a definition of prosumption and to elaborate a systematic typology of prosumption as a social form.
2. To develop a strategy of explanatory analysis of prosumption of scientific knowledge, based on Coleman’s logic of social mechanisms.
3. To analyse citizen science as a form of institutionalised prosumption.
4. To identify the characteristics of Lithuanian scientific knowledge prosumer projects and define them in terms of the suggested typology.

5. To analyse the motivations of Lithuanian scientific knowledge prosumer project creators and participants, relating them to the principles of logic of acting in the environment of digital technologies, as described by Tapscott and Williams.
6. To analyse the attitudes that organise the activities of Lithuanian prosumer project creators and participants and evaluate them in terms of the scientific ethos, as described by Merton.

Theoretical background. Considering prosumption as an expression of acting and interaction that has been rendered more relevant by digitalisation processes, this dissertation defines it as a social form described by Simmel through which different aspects of social life can manifest themselves (Simmel, 2009 [1908]). In contemporary sociology, a predominant methodological approach has been to develop Simmel's formal sociology through a quantitative perspective, adapting and applying it to the analysis of social networks. In this thesis, social form is approached primarily as a theoretical construct and analytical tool, with a focus on its qualitative characteristics and possible expression in relation to the contents of social life. Simmel's work included the description of various examples of social forms, but also the anticipation that these forms could evolve, giving rise to new ones, and that their relevance and importance could change over time. This is associated with changes in the content of social life itself.

The concept of social form provides a basis for approaching the phenomenon it describes through the perspective of macro and micro level interaction. Interactions at the individual level that arise or become more pronounced in the context of certain social contents and social changes (e.g., technological) establish themselves as a social form that acquires social significance and is recognised as a certain mode of acting in different social domains. Simmel did not explicate such mechanisms in detail (although he described the workings of the logic itself in individual cases, e.g., in *The Philosophy of Money*, 2004 [1907]), therefore, for the aim of this dissertation, I draw upon the approach to social mechanisms developed in analytical sociology.

Specifically, James Coleman's (1987; 1994) diagram is utilised, which explains the impact of one macro-level phenomenon on another through the transition to and from the micro level, allowing for a more detailed understanding of the functioning of such processes and their outcomes. The applicability of Coleman's diagram in different theoretical contexts (including the possibility of integrating the concept of social form into it) is argued based on Petri Ylikoski's (2021) analysis. The combination of approaches and the

theoretical interpretation that has been proposed can be regarded as the theoretical and methodological novelty of this thesis.

In finding a theoretical and methodological approach to studying the social effects of digitalisation and choosing to interpret prosumption from a Simmelian perspective, this thesis adopts a standpoint similar to that of sociologist Ori Schwarz, as outlined in his book *Sociological Theory for Digital Society* (2021). In this work, Schwarz puts forward the argument that although theoretical approaches are inherently constructs of their respective times, rather than the creation of novel theories to explicate each emerging phenomenon of digitalisation, it is more constructive to first undertake a review of existing sociological instruments within the context of the emergent reality, with any necessary adjustments, and their subsequent application to the comprehension and interpretation of that reality. Simmel's theoretical concepts and methodological approach, which sought to apply sociological principles to the analysis of the rapid technological and social changes of his era, appear to be a suitable foundation for the examination of contemporary processes. Nevertheless, it may be necessary to clarify certain aspects of these concepts and approaches to ensure their relevance and applicability in the contemporary context.

Furthermore, Simmel emphasises the importance of comprehensively analysing the various modes of expression inherent to specific social forms in order to achieve a nuanced understanding of their nature. In order to follow this prescription, the dissertation not only provides a comprehensive analysis of the concept of prosumption, offering minimal and maximal definitions of the term, but also puts forward a systematic typology of prosumption. It is grounded in existing classifications of prosumer activities, in addition to an evaluation of the various empirical manifestations of prosumption. The proposed typology facilitates a more profound comprehension of the heterogeneity of this phenomenon, while simultaneously serving as an analytical instrument that can assist researchers in assessing whether any of the types of prosumption are more indicative of specific domains (both thematically and when comparing digital prosumption to non-digital prosumption).

Methodology. The active participation of non-professionals in the creation and dissemination of scientific knowledge is conceptualised in this dissertation as prosumption in the field of science, and such activities on the internet are considered to be prosumption facilitated by digitalisation, following Ritzer's assertion that it is digitalisation that has enabled prosumption to occur much more frequently and on a larger scale (Ritzer,

2013; Ritzer and Jurgenson, 2010). This concept serves to broaden the scope of non-professional involvement in the creation and dissemination of scientific knowledge.

Firstly, the focus is not primarily or exceptionally on institutional projects, but on those created independently by internet users. Secondly, the analysis is not confined to collaborative projects, thereby more effectively capturing the opportunities for participation in content creation that have arisen as a result of digitalisation. As will be demonstrated by the analysis of citizen science projects, the latter concept, as applied in practice, does not encompass these aspects. Furthermore, by shifting the standpoint from institutional to that of a prosumer, the focus is on the attitudes and experiences of the content creators themselves. The methodology of each of the empirical analyses is discussed in respective chapters of the thesis, following the development of arguments and the change in scope and focus that follows.

Digitalisation and digital technologies facilitate the involvement of non-professionals in research and scientific activities conducted by scientific institutions and other organisations engaged in scientific endeavours (e.g., most of the citizen science projects analysed have websites, and at least some of their activities are conducted online or using digital technologies). However, while the theoretical definition of citizen science would encompass a very wide range of activities, in practice the term is usually used to describe initiatives organised by professionals and institutions, with non-professionals often becoming a form of resource (a similar observation, only in the news media domain, was made by Stonkienė et al., 2018).

In order to test this statement, a quantitative analysis of the characteristics of citizen science projects carried out in Europe and registered on the EU-Citizen.Science platform[2] was conducted. Employing hierarchical cluster analysis and descriptive statistics methods (the procedures are defined in Section 3.1), the objective is to identify the organisers of such projects, the nature of the projects themselves, and the activities assigned to their participants. This analysis and its findings are not definitive and are primarily aimed at enhancing the understanding of the phenomenon denoted as citizen science – a concept that appears to overlap with that of prosumption in the field of science.

Following this analysis, the focus of this dissertation shifts to bottom-up projects, honing in on a more thorough, qualitative examination of digitally facilitated science-related prosumer projects. It is aimed at the creation and

[2] https://eu-citizen.science/

dissemination of scientific knowledge that were selected based on several criteria. Initially, the focus is on non-institutional, largely bottom-up collaborative and individual projects (online encyclopedias, blogs, websites, etc.). The sampling of cases was made on the condition that the projects are freely available on the internet and accessible to the general public, for example, via search engines (as opposed to the content shared in more or less closed social networking site groups). The Lithuanian language was chosen as one of the selection criteria not only to assess the local expression of global processes, but also to delineate the scope of the research sample, without prior knowledge of the total number of possible cases (the sampling criteria and procedures are outlined in Section 4.1).

The sampling strategy that was applied resulted in the generation of 18 cases suitable for further analysis: two online encyclopedias – Wikipedia in Lithuanian and Encyclopedia for Lithuania and the World (Enciklopedija Lietuvai ir pasauliui; hereafter ELIP), and 16 collaborative and individual blogs and websites. Following a description of the general characteristics of these projects, semi-structured interviews with their creators and participants were conducted, providing data for the analysis of their motivations and attitudes. Purposive sampling was employed (in the case of collaborative projects, the snowballing technique was also applied; the sampling strategy and procedures are described in Section 4.2). A total of 26 interviews were conducted, with participants distributed proportionally to the size and number of projects analysed (13 interviews with Wikipedia's and 5 with ELIP's participants, and 4 each with creators of small-scale collaborative and individual blogs/websites).

Scientific novelty. The motivations of individuals engaging in science-related activities, encompassing both digital and non-digital domains, have been the subject of academic research (Haklay, 2013; Hase et al., 2022; Nov et al., 2011; Sieber and Slonosky, 2019; Strasser et al., 2018). However, these studies have primarily explored general motivations, without delving into the specific values associated with digitalisation. Research in this area has identified a number of factors that drive participation. These include a general interest in science or a specific scientific field, a desire to contribute to research, personal experience in science or existing connections with scientists, the availability of resources, establishing and maintaining connections with other people, entertainment and leisure activities, and so on. It should be noted that these studies, again, mainly refer to scientific and science-related activities organised and supervised by scientific institutions and institutional scientists.

In research where digitalisation has been referred to, this has been done in more general terms, defining the characteristics of the activities themselves (see Haklay, 2013; Wiggins and Crowston, 2011). In the case of studies of online knowledge creation and dissemination, and in particular – Wikipedia, some aspects of digitalisation-related attitudes are touched upon, but in an isolated manner (concentrating on a particular technological aspect) or without elaborating in detail on ideological motives in the broader context of digitalisation (Jadin et al., 2012; Nov, 2007; Prasarnphanich and Wagner, 2009; for more general research and an overview of Wikipedia participants' motivations, see Crowston and Fagnot, 2018; Oreg and Nov, 2008; Xu and Li, 2015, as well as Baytiyeh and Pfaffman, 2010; Cho et al., 2010; Lai and Yang, 2014; Schroer and Hertel, 2009; Stewart and Ju, 2020; Yang and Lai, 2010). The present dissertation seeks to specifically address these nuances – what place do ideological attitudes related to digitalisation occupy in the motivations of people engaged in the creation and dissemination of science-related content on the internet, and how does their understanding of their activities correspond or not correspond to the norms and values established in traditional science.

The policies governing Wikipedia's activities, its organisational structure, the academic community's attitude toward Wikipedia content (including Wikipedia as a teaching tool) and macro-level factors that may influence different participation patterns among different language versions of Wikipedia are analysed in detail in Piotr Konieczny's studies (2009a; 2009b; 2016; 2020; 2021; 2023). Dariusz Jemielniak's ethnographic studies of Wikipedia describe the main principles that organise the overall collaboration and participation of Wikipedians (seen as a meritocracy-laden organisation, defined by a high degree of bureaucracy; consensus-oriented, but dissent-driven decision-making, see Jemielniak, 2014), and also the academic community's perception of Wikipedia's content quality (Jemielniak, 2020; Jemielniak and Aibar, 2016). The collaborative principles of Wikipedia, predicated on good faith and openness as conceived by its creators, have also been described in other studies (see, for example, Reagle, 2010; for a comparison with traditional encyclopedias, see Loveland and Reagle, 2013)[3].

Studies of the attitudes and orientations of Wikipedia content creators have been undertaken, albeit in specific aspects. For instance, research has been conducted into gender and racial biases in content (for an overview and an instance of one such study, see Lemieux et al., 2023) or management of

[3] For an overall review of academic research on Wikipedia and the variety of aspects of studies over the twenty years of its existence, see Hill and Shaw, 2020.

conflicts of interest (Beutler, 2020). Some observations that may reflect attitudes were made by analysing the content created by Wikipedia participants, rather than their perceptions, e.g., determining the overall extent of biases on Wikipedia (Greenstein and Zhu, 2012), as well as quantitatively measuring practices that demonstrate a tendency toward ownership of content created or the impact of strict rules on editing practices (Halfaker et al., 2009; Halfaker et al., 2012).

Meanwhile, the present dissertation conducts a more detailed analysis of the principles of activity subjectively perceived by internet users engaged in activities related to scientific knowledge and dissemination. It specifically links this to the norms and values of scientific ethos, as defined by Robert Merton in his classic work (Merton, 1973). Konieczny (2021) suggests that at least Wikipedia's culture is not significantly divergent from the principles that underpin academic activities. Therefore, it is worthwhile to ascertain whether or not the attitudes of individual content creators are aligned with the scientific ethos.

Research into the general principles of the activities of Wikipedia editors is largely based on an analysis of Wikipedia policies, the tracking of content creation processes and online discussions, and ethnographic approaches, with the researcher being a member of the community (e.g., Jemielniak, 2014; Reagle, 2010), whereas this dissertation employs a semi-structured interview method, enabling an external observer to maintain a greater distance from both the object and subject matter, thereby enabling capturing a broader range of perspectives. This approach is informed by the recognition that the expression of attitudes in collective discussions and individual interviews may differ significantly due to the potential existence of peer pressure and the tendency to express more socially acceptable attitudes in the former case. In this thesis, the attitudes and principles of participants in online projects related to the creation and dissemination of scientific knowledge are reconstructed from their own perceptions of their activities. The aim is to understand not so much the formal rules of content creation (if they exist), but how content creators themselves perceive the principles of activity that guide their practices.

Although there are general Wikipedia policies that formally define the activities of Wikipedians, each Wikipedia community in a different language implements and adapts these rules with variations. Jemielniak and Wilamowski suggest that "standards for encyclopedic knowledge are not globally agreed-upon and 'objective' but local and very subjective" (2017, p. 2460; see also Fichman and Hara, 2014; Konieczny, 2023; Pfeil et al., 2006). Therefore, the empirical analysis of the attitudes of content creators of the

Lithuanian Wikipedia (alongside other projects under analysis) conducted in this dissertation allows for the identification of local expressions of global and formal processes and tendencies.

Moreover, in order to comprehend the attitudes and motivations of the creators and participants of internet projects related to the creation and dissemination of scientific knowledge, the analysis is not confined to internet encyclopedias but also encompasses smaller collaborative and individual projects. Consequently, the object is refined in terms of globality/locality yet broadened in terms of form and expression.

It is also noteworthy that existing research on Wikipedia contributors' motivations (predominantly in the English version of Wikipedia) is primarily characterised by a quantitative approach, wherein motivations are examined through the employment of a predefined set of categories. Conversely, a narrowed focus and adoption of a qualitative approach allows capturing more nuances and a diversity of expression (see Asadi et al., 2013). This is important, as in the context of collaborative projects, the motivations of individual contributors may manifest in diverse forms. For instance, participation in a collaborative project does not inherently signify the importance of belonging to a community for all participants, or the creation of open access content does not necessarily imply its relevance as an ideological stance for all project participants.

The motivations of Wikipedia content creators were the focus of much study during the first decade after the creation of this internet encyclopedia. Some researchers noted that it would also be meaningful to assess how the perceived importance of specific motivations among Wikipedians changes over time (Schroer and Hertel, 2009, pp. 113–114). The analysis presented in this dissertation approaches the object from a longer perspective, thereby offering a partial appraisal of the changes in motivation as subjectively experienced and perceived by content creators.

The scientific novelty of the dissertation is also related to the extent to which the subject has been researched in Lithuania. According to studies by Lithuanian scholars, productive practices and collaboration enabled and facilitated by digitalisation are more frequently examined in fields such as marketing and management, as well as political science, political and civic participation, and public administration (Auškalnienė, 2012, 2025; Dvorak et al., 2020; Leckė et al., 2022; Navickaitė and Žilinskij, 2019; Petrauskaitė, 2012; Petrauskas et al., 2009; Tarutė, 2017; Tvaronavičienė and Paražinskaitė, 2013; Virvilaitė and Belousova, 2005). The practices of internet user participation have also been investigated through participation in media

content creation (Stonkienė et al., 2018) and so-called piracy practices as forms of social participation (Rekis and Rekienė, 2016). In research by Aelita Skaržauskienė, Monika Mačiulienė and colleagues, digital technology-enabled collaboration practices are examined using the concept of collective intelligence (see Mačiulienė and Skaržauskienė, 2016; Skaržauskienė, 2018, 2022). The primary focus here is on sharing knowledge, solving social problems, and creating social innovations through projects initiated by public organisations, civic movements and/or business entities.

Specifically, the concept of prosumption appears in certain cases when analysing user behaviour on social networks (Lankauskaitė and Liubinienė, 2018), internet users' cultural practices (Klivis, 2013), and is also used in the fields of environmental and energy research (see Bocullo et al. 2023; Grinevičiūtė and Valančius, 2024; Milčiuvienė et al. 2019; Šriupša et al. 2025; Tamošiūnas, 2024). In recent years, over a dozen bachelor's and master's theses have been written at Lithuanian universities, where, using this concept, the focus is also mainly on prosumption in the field of energy and the legal regulation of such activities.

At the intersection of science and digitalisation research, it is worth mentioning studies related to the digitisation of information, scientific sources, and heritage, as well as practices of digitisation as scientific research (see Laužikas, 2008; 2012; Migonytė, 2015; Prokopčik and Timčenko, 2013) and heritage communication on social networking sites (Kelpšienė et al., 2022; Kirtiklis et al. 2023). The issues of scientific data openness and open science are also explored through analysing institutional practices and infrastructure (see Dovidonytė, 2019; Kuprienė and Petrauskienė, 2018; Tautkevičienė and Cesevičiūtė, 2019) and professional scientists' attitudes towards open access repositories (Macevičiūtė and Kepalienė, 2022). The potential of open science for technological and social innovation is considered under the concept of co-creation (see, for example, Kučinskienė et al., 2023; Mačiulienė, 2022; 2023). In such cases, institutional practices are most often examined, with participation addressed by theoretical examination of the notion of participatory heritage and related concepts (Kelpšienė, 2021).

In some instances, when researchers focus on non-professional content created on the internet, particularly on Wikipedia, the emphasis is placed on the content of the project rather than on the activities and attitudes of the users behind its creation. The studies consider perspectives such as the use of Wikipedia-created information for studying history (Vyšniauskas, 2007) and the accuracy and reliability of information about climate change (Kažys, 2016; 2017).

The general non-professional involvement in science is addressed by Lithuanian researchers in studies on citizen science, but these studies typically do not focus specifically on digitally enabled participation in science. In the research by Eglė Butkevičienė, Monika Mačiulienė, Aelita Skaržauskienė and colleagues, citizen science is examined as a tool and approach for solving social problems, as well as for exploring the role and effectiveness of scientific institutions in fostering such activities and related methodological concerns (Butkevičienė et al., 2021; Butkevičienė et al., 2022; Mačiulienė et al., 2021; Mačiulienė and Butkevičienė, 2022; Skaržauskienė et al., 2023; Skaržauskienė et al., 2024; Skaržauskienė et al., 2025; Tauginienė et al., 2020; Telešienė and Butkevičienė, 2023). Groups of researchers investigate participation in citizen science and its implications for societal resilience (Butkevičienė et al. 2026), also taking into account ethical considerations related to citizen science (Ozolinčiūtė et al., 2022; Tauginienė, 2019; Tauginienė et al., 2025). The role of other institutions, such as libraries, in facilitating engagement in citizen science is also examined (Birk et al., 2024; Tautkevičienė et al., 2025).

In these studies, citizen science is primarily regarded as an institutionally organised practice. A similar institutional perspective is also applied in Austė Valinčiūtė's research on science communication and the attitudes of professional scientists towards this aspect (Valinčiūtė, 2017; 2020). Meanwhile, this dissertation specifically focuses on non-professionals' participation in creating and disseminating scientific knowledge, enabled and facilitated by digitalisation, and explores the subjective experiences and attitudes of users engaged in productive practices related to these activities.

In this context, the approach most similar to this dissertation is that employed by Maryja Šupa and Ingrida Kruopštaitė in their research on ethical considerations and social norms within online biohacking communities, treating them as technological counter-cultures (Šupa and Kruopštaitė, 2022). However, the empirical analysis conducted in the present dissertation differs from this study in several aspects, including scope and focus. The thesis does not examine closed communities on social media, but widely accessible science-related projects by groups of users and individual content creators on the internet. The implications of such different approaches are discussed in the conclusions.

The research conducted in this dissertation contributes to the academic discourse on digitalisation by specifying the analysis of social transformations brought about by these technological developments within the field of scientific knowledge creation and dissemination. The scientific novelty of this

dissertation includes an analysis of prosumption as a Simmelian social form that has been actualised and facilitated by digitalisation. It applies for the first time Coleman's idea of social mechanisms to elaborate on the potential ramifications of digitalisation-facilitated non-professional participation in the scientific field. By integrating the concept of social form into Coleman's diagram, a novel strategy to analyse digitally facilitated prosumption in different domains is proposed. The inventory of analytical tools is further enriched by the formulation of a systematic typology of prosumption, which is then applied to assess the user productive practices in the domain of the creation and dissemination of scientific knowledge.

By approaching non-professional engagement in this domain as prosumption, and the respective digitally facilitated practices as digital prosumption, this study contributes to the research of public engagement with science by encompassing non-institutional, bottom-up, user-generated content and activities. This approach serves to expand the existing scope of comprehension pertaining to non-professional participation, encompassing forms that have not been explicitly and conceptually addressed by alternative methodologies. Furthermore, this methodological approach enables the analysis to move from a structural framework to the conceptual and methodologically systematic examination of subjective experiences and practices.

Moreover, it is also noteworthy that in the context of digitalisation, prosumption is a conceptual term associated mostly with the emergence of the so-called social internet. Admittedly, the advent of artificial intelligence technologies has begun to transform the nature of the internet and the operation of digital technologies. Consequently, this transformation has the potential to influence the impact and social effects of these technologies. The participatory aspect of technologies is complemented, or is even being replaced to a certain extent, by the generative aspect. In light of the latest proliferation of AI tools and the emergence of novel usage practices, the topicality of the subject matter of this dissertation has expanded recently, and the problem and approach have assumed some characteristics of the history of technology and historical sociology. In other words, it aims to at least partly assess the promises (and fears) related to the digital technologies that were introduced more than two decades ago, analysing certain practices that have become a taken-for-granted aspect of the internet[4].

[4] To the extent that some younger generation internet users are not even familiar with the fact that, for example, Wikipedia can be edited by anyone – it is assumed an obvious part of the internet (an observation, based on the author's personal interactions).

Nevertheless, the participatory aspect of digital technologies remains a subject worth studying for several reasons. In contrast to emerging technologies and their new applications, participation practices enabled by digitalisation can be considered to have been institutionalised for more than two decades now. Consequently, the social implications of such relatively well-established practices can be more readily identified. In order to assess the social effects of digitalisation (as with any other technology), a certain distance in time is required – this was aptly illustrated in the title of the book by social science methodologist Andrew Abbott, *Time Matters*. In this work, Abbott discusses, among other things, that every phenomenon has a certain "horizon" that is necessary in order to adequately assess its consequences and outcomes (Abbott, 2010, p. 286). Therefore, for example, in the case of AI technologies, it is not yet possible to thoroughly assess the social consequences of their application since these technologies are still being developed rapidly, but there is already a substantial time perspective to analyse the social effects of previous technological shifts.

Moreover, the content created and generated in the process of participatory practices, as well as the data generated and accumulated, often become the basis and material for further technological developments (e.g., the use of Wikipedia content for training large language models). Therefore, the former are a prerequisite and constituent element of the latter. Hence, in order to comprehend the functioning of one, it is valuable to better understand the other. And thirdly, specifically with regard to prosumption as a concept, as new "agents"[5] in the digital space are emerging, new forms of prosumption – automated prosumption by prosuming machines – are also being discussed (Ritzer, 2015a; see also Degli-Esposti and Tirabassi, 2024), expanding the conceptualisation and the phenomena it denotes.

Theses defended:

- Prosumption, defined as the merging of production/creation and consumption/use that emerges as unpaid activities for one's own benefit or that of one's relatives or community, and which is rendered more present by digitalisation, can be treated as a Simmelian social form, capturing interactions between micro and macro levels of social structure.

[5] Some applications of the so-called artificial intelligence technologies are sometimes referred to as AI agents (see, for example, Chandra et al., 2022; Hunter et al., 2018; Parkes and Wellman, 2015; Walsh et al., 2021). It is evident that this term seems challenging for a sociologist, as the notion of agency is one of the fundamental concepts in the discipline. Consequently, the attribution of this concept to specific technologies and tools necessitates a more extensive discussion.

- Key characteristics that define and distinguish prosumer activities include the nature of such activities in terms of cooperation, sharing or usage as the primary reason for engaging in prosumption, and the required or preferred skills of the prosumer.
- A complete typology of prosumption comprises eight distinct types: (1) skilled sharer p-prosumption; (2) skilled sharer co-prosumption; (3) amateur sharer p-prosumption; (4) amateur sharer co-prosumption; (5) skilled user p-prosumption; (6) skilled community prosumption; (7) amateur user p-prosumption; (8) amateur community prosumption.
- The practices of engaging non-professionals in science, denoted by the concept of citizen science, despite its broad theoretical definition, usually involve institutionally organised activities in which non-professionals are frequently engaged as resources. From the participants' perspective, however, citizen science can be treated as a type of prosumption.
- The motivations of Lithuanian prosumers, creating publicly accessible online projects related to the creation and dissemination of scientific knowledge, can only be partially linked to ideological attitudes related to digitalisation, and these are not the fundamental motivating factors.
- Lithuanian prosumers involved in publicly accessible online projects related to the creation and dissemination of scientific knowledge are guided by values that reflect, rather than contradict, the norms of the scientific ethos as defined by Merton.

Structure of the dissertation. This dissertation comprises an introduction, four chapters, conclusions, a bibliography and appendices. It begins with a characterisation of the so-called social internet, relevant aspects of digitalisation processes and digital sociology as an approach for its analysis, introduces the techno-optimistic, techno-pessimistic and techno-sceptic perspectives and proceeds with a definition of the concept of prosumption in the first chapter. Prosumption is analysed as an analytical tool and theoretical construct, with a focus on the conceptualisations of authors who have substantively contributed to its definition. This refinement process entails the systematic examination and categorisation of variations in the content of the concept and the set of attributes assigned to it. This enables the presentation of systematic minimal and maximal definitions of the concept of prosumption.

In the second chapter, the sociological significance of user-productive practices, defined as prosumption and actualised by digitalisation processes, is demonstrated. In order to achieve this objective, a Simmelian approach is adopted, with prosumption being conceptualised as a social form providing a characterisation and interpretation of salient aspects of Simmel's work. The

efficacy of Coleman's diagram, when employed in conjunction with Simmel's methodology, is demonstrated to facilitate analysis of the social effects and outcomes of prosumption in the context of digitalisation. This chapter also proposes a systematic typology of prosumption, based on the assumption that, akin to any social form, prosumption can manifest in diverse ways. This is achieved by means of an analysis of existing classifications of prosumer activities and its practical manifestations.

The third and fourth chapters provide an empirical analysis of the participation of non-professionals in activities related to the creation and dissemination of scientific knowledge. In the third chapter, a quantitative analysis of citizen science projects carried out in Europe is performed to verify the extent to which empirical references correspond to the broad theoretical definition of citizen science. In the fourth chapter, the focus is placed on Lithuanian prosumer initiatives in the domains of scientific knowledge creation and dissemination. Utilising qualitative research methodology, factors motivating prosumer activities are analysed, alongside the significance of ideological motivations and assumptions concerning digitalisation processes. This section also explores the principles that research participants follow when creating content on the internet. The results of the empirical analyses are then assessed from the perspective of the analytical tool formulated in the preceding chapters. The dissertation concludes with a discussion and evaluation of the main results of the thesis, their implications and the limitations and caveats of the research.

1. THE RISE OF DIGITAL SOCIETY AND PROSUMPTION

The aim of this chapter is to propose a minimal and a maximal definition of prosumption by systematising existing conceptualisations. I discuss the origin of the concept and updates of its usage; evaluate the conceptualisations of activities on the internet and digital technologies and features of the concept of prosumption; determine the characteristics attributed to prosumption and, following the strategy of social science methodologist John Gerring (2012), formulate the minimal and maximal definitions of the concept of prosumption. The minimal definition includes a minimal set of essential characteristics attributed to the concept and specifies the necessary and sufficient conditions that must be met by the empirical referent noted by this concept. Meanwhile, the maximal definition is an ideal type, which includes all possible properties that are attributed to the phenomenon. However, I start with an explanation of why this concept provides the key for analysis of the phenomena, referred to by the catchword "social internet" or "social web", in the context of digitalisation, digital society and digital sociology.

1.1. Digitalisation, digital society, digital sociology and prosumption

The so-called participatory or social web is constituted by the technological structure and the online platforms and services that underpin it, enabling interactivity and user involvement in the creation of content and collaboration in its production. The technological developments that emerged around the 2000s have facilitated the process of content creation and dissemination among internet users, enabling them to share information through social networking sites (SNSs), blogging platforms and wiki pages. However, it is important to resist the tendency of internet technology developers and enthusiasts to proclaim an internet revolution with each new innovation, creating the illusion that each new generation of the internet replaces the preceding one[6]. In practice, new technological features and their applications are emerging alongside those that currently exist (e.g., blogs and programmable websites), gradually displacing some of the earlier forms,

[6] For instance, the term Web 2.0, which has been in circulation for a considerable period, can create the impression of referring to a new version of the internet. The term was coined by Tim O'Reilly, who described the emergence of internet technologies around the 2000s as a "turning point for the web" (see O'Reilly, 2005). Web 2.0 is a term used to describe the technological architecture and the underlying web platforms and services that facilitate increased interactivity and user participation, as well as data generation and collection.

reducing their popularity or changing their use (e.g., online forums or chat rooms).

The "social" in the notion of social internet (or social web) refers to technological features and elements of the internet that enabled users to engage with content creation and with each other on a wider scale, as well as to the practices surrounding the use of these features for specific purposes (that are deemed social or connected to the building of social ties and social capital, Pasek et al., 2009; for the usage of term see also Saxton et al., 2013; Thelwall et al., 2011). From the perspective of knowledge creation and value generation, these internet-related developments were also defined as an "ecosystem of participation, where value is created by the aggregation of many individual user contributions" (Gruber, 2008, p. 4). The existence of certain technological possibilities does not necessarily define the digital space as a whole, and the notion of a social internet should be accepted with reservations. However, as Zeynep Tufekci contends, the affordances of technologies delineate their utilisation, which in turn exerts an influence on the choices and practices of users; this assertion is also applicable to the technological dimension of the so-called social web (Tufekci, 2014, p. 15–16).

Considering the characteristics of participation and collaboration, the concept of platformisation is sometimes employed in academic research to summarise and assess the development of internet technologies over the last decades (referring, first and foremost, to the commercial, but also to commons-based platforms, such as Wikipedia). The evolution of the sociality-facilitating and -enabling features of the internet into social networking platforms (or social media platforms) has had, and continues to have, an impact on the internet as a techno-social structure. The notion of a platform has at least several meanings: it is an infrastructure that enables the development of applications and innovations through the different applications of particular platforms, a framework for the architecture of the internet and a political space (Gillespie, 2010; cited as in Helmond, 2015, p. 2).

Poell et al. (2019) define platformisation as "the penetration of infrastructures, economic processes and governmental frameworks of digital platforms in different economic sectors and spheres of life, as well as the reorganisation of cultural practices and imaginations around these platforms". As a business model and infrastructure, platforms function in a dual capacity, attracting both users and businesses. The attention, time and data of the former is transformed into a resource that can be monetised by the latter (Poell et al., 2019, p. 2–3). Consequently, platform providers assume a position of exclusive authority as intermediaries, data controllers, and regulators of

socially significant infrastructure and public space (through the operation of algorithms, the establishment of participation terms, etc.).

Academic research therefore explores both the economic preconditions and implications of platformisation, as well as its processes, effects and outcomes (see, for example, the dedicated journal *Platforms & Society*[7]). It is argued that platforms in essence structure, define and characterise a new form of capitalism. In this regard, platforms emerge as the pivotal framework that organises economic relations, economic activity and capital accumulation. This structure is characterised by network effects referring to the increase in a platform's value with the growth of its user base, by the aggregation of data as a pivotal resource and by monetisation of free and non-remunerated user activities (see Srnicek, 2016; Fagioli, 2021; Pasquale, 2016; Rahman and Thelen, 2019; van Doorn and Badger, 2020; see also Mirowski, 2018). Moreover, the concept of a society that functions and organises itself in such an environment has been proposed to be designated as a platform society. According to José van Dijck and colleagues, platform society refers to a "society in which social and economic traffic is increasingly channelled by an (overwhelmingly corporate) global online platform ecosystem that is driven by algorithms and fuelled by data" (van Dijck et al., 2018, p. 4; see also Beyes, 2022; Patel, 2022; Poell et al., 2021).

Nevertheless, it should be noted that the specific features of digital technologies (reliance on algorithms, the aggregation and delivery of services through platforms, the surveillance of users enabled by digital settings and tools, and beyond) became competing presuppositions for proposing new definitions of both capitalism and society. Occasionally, there is a temptation to adhere to the buzzwords employed in the marketing of digital technology industry (cf. *smart society*). However, it is generally accepted within academic discourse that all of these elements are components of what is widely recognised as a digital society.

The concept of a digital society can be defined as a society in which digital technologies facilitate the functioning and organisation of the structural elements and the interactions between individuals that constitute the society, thereby enabling new forms of social organisation and sociality. Digital technologies have permeated various social institutions and practices, transforming social interactions and structures, endowing them with new forms and enabling novel "patterns of sociality" to emerge, but also translating "interactions into digital data objects" (Schwarz, 2021, p. 1, 4).

[7] https://journals.sagepub.com/home/PNS

Therefore, digital society is characterised by the digitally mediated creation, storage and dissemination of information, digital mode of production and digital capitalism, user productive practices, platformisation, algorithmic governance/politics, datafication (including data as sociomaterial objects emerging from human and non-human interactions) and digital surveillance, automation, a fragmented public sphere, digitally-mediated formation of identity and presentation of self (see Castells, 2024; Fuchs, 2022; Housley at al., 2023; Katzenbach and Bächle, 2019; Lupton, 2015; Redshaw, 2020; Rosa, 2022; Schwarz, 2021; Timcke, 2017). It also refers to the notion of a digital commons, pertaining to a digitally enabled governance model seeking to overcome institutional and capital domination (Dulong de Rosnay and Stalder, 2020). Notably, the concept of a digital commons is more characteristic to the emergence of the so-called social internet. However, from a critical perspective, the tendency to commodify these practices is also observed (Fuchs, 2021).

Sociological research on the preconditions, processes and effects of digitalisation, and on the elements and modus operandi of the digital society, is often referred to as digital sociology. Digital sociology, understood not so much as a sub-field but as a trans-field of sociology (i.e., one that permeates all the other fields of sociology), can be defined in several ways: through object and through method. In the early definition of digital sociology, Deborah Lupton proposed that it comprises analyses of digital technology use, its implications on social relations, identity, and "the role of digital media in the creation or reproduction of social institutions and social structures". She further defined it as critical reflection on digitalisation processes, as well as the analysis of "naturally occurring" digital data by appropriate quantitative or qualitative methodologies (Lupton, 2013, p. 5; see also Lupton, 2015)[8]. A comparable comprehension of digital sociology can be identified in the approaches of other authors (e.g., Daniels et al., 2017; Orton-Johnson and Prior, 2013; Selwyn, 2019).

Therefore, digital sociology encompasses new forms of data and methods of research emerging in the context of the functioning of digital technologies, research on sociality, social relations and social structures, as well as the theoretical reflection of these processes and phenomena, and reconsideration of established sociological theories in the evolving context in which they are applied. In other words, it deals not only with new kinds of emerging data and

[8] Lupton also includes sociologists' professional digital practices (i.e., building networks, constructing online profiles, publicising and sharing research and instructing students, Lupton, 2015, p. 15) under the notion of digital sociology.

features of new technologies, but with the social and sociality of the processes of digitalisation[9].

Technology, understood in terms of a presumed sociality, cannot be regarded as a static tool. Rather, it is to be considered an intermediary that permeates the social fabric. Consequently, the ways in which it can be studied are manifold. Prosumption is a concept that facilitates the conceptualisation of the digital facilitation of participation on a wide scale. Admittedly, the idea of mass participation and collaboration contains certain exaggeration, because the opportunity for participation provided by digital technologies often remains unrealised as a large part of users continue to use digital services as traditional consumers rather than active participants and creators (Bruns, 2008, p. 2; 2012, p. 818; Fuchs, 2017, p. 38). Nevertheless, technologies provide the conditions for a user to act as a prosumer: a producer and consumer combined. This relates to a broader debate between observers of the developments of digitalisation, which can be deemed as techno-optimists, techno-pessimists or techno-sceptics: to what extent are the effects of digital technologies changing society and what are the essential characteristics of these potential effects?

The techno-optimistic perspective expresses the belief that digital technologies create a fundamentally new environment, which, following the principles corresponding to its logic, creates conditions for progress in various areas of social life, especially related to the creation and use of information and knowledge to enable users and to acquire economic capital. Taking a typical stance of the techno-optimistic perspective, Don Tapscott and Anthony D. Williams (2008 [2006]) referred to the economic environment and reality mediated by the so-called social web as Wikinomics, highlighting the positive consequences and opportunities of digitally enabled participation, and the online encyclopaedia Wikipedia as a prototype of such an activity. In their book that could be deemed a kind of manifesto[10] (van Dijck and Nieborg, 2009), Tapscott and Williams suggest that tools of user participation and mass collaboration provided by internet technologies have enabled businesses to create, develop and distribute goods and services in novel ways, transferring

[9] This assertion is evidenced by the extensive research conducted by sociologists affiliated with the International Sociological Association's Working Group on Digital Sociology (ISA WG10). See, for example, topics covered in one of the recent conferences: https://isaconf.confex.com/isaconf/forum2025/meetingapp.cgi/Symposium/861.

[10] Van Dijck and Nieborg criticise Tapscott and Williams' account as overgeneralising and lacking in a critical approach, but they also acknowledge that the images of digitally enabled public collectivism it presents permeate mainstream cultural theory on digital culture, and that therefore it is important to "deconstruct" the assumptions and conclusions of such manifestos (van Dijck and Nieborg, 2009, p. 855).

value creation and innovation to consumers (Tapscott and Williams, 2008 [2006], p. ix).

Tapscott and Williams suggest that there are certain principles that define the logic of acting in the environment of digital technologies – openness, peering, sharing and acting globally (Tapscott and Williams, 2008 [2006], p. 20–30). Openness is defined as the unlocking of information of all kinds, making it publicly available, it also refers to transparency, the openness of systems and sources, and open-mindedness towards various forms of self-organisation. Peering is defined by the terms of cooperation on an equal basis, spontaneous self-organisation and a horizontal structure of activities. Sharing refers to possibilities to freely utilise publicly available information and artefacts created on its basis, with the subsequent adaptation, modification and repurposing of these elements; it also encompasses mass collaboration. Acting globally is characterised by cooperation and activities that are not limited to a specific location; they are expected to transcend cultural, disciplinary and organisational boundaries. These four principles are presented not only as the basis for acting, but also as values that organise activities in the digital space. According to the authors, amateurs create competing structures to established forms of organisation and production and change every activity they touch (Tapscott and Williams, 2008 [2006], p. 11, 240). However, approaching this critically, these principles can be treated as an ideology of digital capitalism (see Fuchs, 2020a, p. 114).

Exponents of the techno-pessimistic perspective agree that technologies are fundamentally changing the social structure but treat it as a challenge or even threat to the stability of social and cultural institutions, their authority, and the quality and reliability of their production. For example, the vision that Tapscott and Williams debate with is that of Andrew Keen (2007), who proclaimed that the internet is dominated by a cult of amateurs that is destroying trust in authority and specialist expertise and undermining the institution of authorship. The potential for unlimited engagement in any activity, coupled with the extensive sharing of information and artefacts on the internet, serves to blur the conventional boundaries between specialists and laypeople, valid information/knowledge and unsubstantiated opinions/falsification. It appears that expert arguments and lay opinions hold equal weight in the decision-making of the crowd of internet users. Consequently, the preferences and habits of the crowd will determine what the algorithms of pages and applications will eventually prioritise as the information to be shown first to future users (Keen 2007; 3–6, 43). From this standpoint, technological development not only deprives professionals (film and music makers, journalists, authors and publishers of books, scientists, etc.)

of their income and authority but also destroys the traditional social institutions that are essential to the creation and promotion of culture. The techno-pessimistic position also emphasises the exploitative nature of digital technologies and the concentration of power in the hands of creators and owners of these technologies.

Sceptics of digital technologies also question their decidedly progressive nature, arguing that their image as a unified and relatively independent entity serves as a veil for developers seeking to avoid control and accountability of specific technologies (see Morozov 2014; 15–16, 21). This observation is particularly pertinent in the development and deployment phase of new technologies, when the specific impact of the technology and its wider social effects are not yet apparent, regulatory mechanisms are not yet in place, and developers are keen to avoid restrictive conditions and controls. At this stage, competition is crucial, and it might be suggested that the first player in the market often becomes a monopolist (as, for example, Google, Facebook or TikTok, and Wikipedia in previous years, or more recently, ChatGPT, in their respective fields).

The argument of the techno-sceptics also contributes to the idea that assessing the impact of technology requires a certain degree of distance, allowing not only the practices being analysed to settle, but also the tools of reflection and evaluation, and the opportunity to distance oneself from the conceptualisations and images imposed by market actors to emerge. This also includes distancing oneself from the overly negative forecasts and fears that accompany the introduction of new technologies.

A classic example would be the concerns that technologies capable of reconfiguring work, collaboration and economic processes as we know them will inevitably result in widespread job losses. Such concerns encompass a range of technologies, from those that mechanise processes to those that automate and digitalise them (including both the emergence of the social web, which has technically enabled a wider user participation, and the recent widespread adoption of technologies that fall under the AI umbrella). Technological change is undoubtedly having a profound impact on economic and labour relations, and consequently on the structure of the labour market. However, the precise nature and extent of these changes are difficult to predict with certainty.

Other authors have similarly distinguished between positions from which the impact of digitalisation is comprehended and interpreted. For example, Marian Adolf discusses different approaches on the impact of the internet and digital technologies (precisely, new media) on social relations and social structure, discerning between two heuristic ideal types of techno-optimistic

and critical positions (Adolf, 2015, p. 4). The former focuses on the emancipatory factors of digitalisation, especially on participation and cooperation, therefore the respective socio-technical developments from this perspective are somewhat "euphorically evaluated" (ibid.). The latter position in essence stands for the same understanding that here is noted as a techno-pessimist approach but is clearly linked to the critical theory tradition.

In sociology, a significant part of academic research concentrates on the studies of digital technologies and their impact from the structural perspective, analysing the economic interests of entities that create and control different technical and socio-technical structures, power relations and mechanisms, etc. Therefore, user involvement in productive practices is often studied from this perspective as well. Such studies and observations find, among other issues, that the digital economy and user productive practices via digital technologies reproduce social and economic inequalities and strengthen power imbalances (see Lukács, 2020; Ting, 2023). In this way, a critical perspective could treat user satisfaction and positive motivations, which are often associated with engaging in prosumption, as a false consciousness issue. However, users' own attitudes and understanding are still an important object of research as they motivate and support the action in question.

Accepting that users are often engaged in productive activities without consciously deciding to do so, and having no real options or alternatives, this thesis also aims to focus on prosumption from the perspective of those who participate in such practices. Researchers studying prosumption (not only in the context of digitalisation) stress that prosumption has, among other features, the potential to promote agency and challenge the established views of existing social institutions (see Chen, 2015; Rau et al., 2023). Therefore, this concept allows shifting the perspective and focusing on the actions and motivations of users. In this way, we not only add to the understanding of the heterogeneity of prosumption in general but also suggest an additional approach as to how this concept might serve the research of the social effects of digitalisation and connect the macro and micro levels of the social world.

With regard to the question of participation practices enabled and facilitated by digital technologies, it is important to note that these are not limited to purely economic activities. In the broadest sense, the subject under discussion pertains to domains associated with the generation and production of information, knowledge and data. In this regard, digitalisation has created opportunities and conditions for non-professionals to engage in activities that were previously mainly or exclusively carried out by professionals, including the creation and dissemination of scientific knowledge.

As previously stated, both techno-optimists and techno-pessimists hold the view that the involvement of amateurs can effect change in established structures and institutionalised practices. It has been discussed by some authors that prosumers require a lower level of skills to perform specific tasks (Jemelniak and Przegalinska, 2020). The argument is that, since they create content anonymously and are not formally committed to professional standards, they cannot be held responsible for the quality of the content they create and disseminate. However, the question remains as to the extent to which this feature is pronounced across different domains of social life.

1.2. The concept of prosumption and its sociological provenience

The term "prosumption" predates the internet as a global network. The author of the "prosumer" concept is considered to be the American futurist Alvin Toffler, who used it in his book *The Third Wave* (1980). The author understood prosumption broadly – from repairs performed for one's own needs, housework or work for one's community, volunteering, adapting mass-produced products and services for oneself, and user participation in the development of products. According to Toffler, prosumption was the dominant form of economic activity in pre-industrial societies, but due to industrialisation and the development of the market economy, the functions of production and consumption were separated and clarified. In a post-industrial society, there is a move towards the convergence and merging of these functions once again (Toffler, 1984 [1980]).

In post-industrial or more advanced industrial societies, in order to meet the growing needs of consumers and increase profits, producers aim to involve consumers in the process of production or services, transferring to them part of the functions that were previously performed by the producer. It is often presented as an opportunity for self-expression, independent time planning and a chance for creativity. Examples of such activities include products produced and consumed on the basis of do-it-yourself (such as IKEA furniture, which consumers assemble themselves, and parts of which can be changed differently), self-service checkouts at supermarkets, ATMs, designing things like mugs or t-shirts, etc. (see Dusi, 2018a; Bruns, 2016; Rayna and Striukova, 2016; Denegri-Knott and Zwick, 2012). Developing digital technologies provide new opportunities for users to participate in the creation and production of products. The "prosumer" concept, which began to be developed in the last decades of the 20th century, gained new interest around the time of the so-called social internet.

In sociology, the terms "prosumption" and "prosumer" have been conceptually developed the most by the American sociologist George Ritzer, whose work significantly contributed to the revival and intensified use and application of these notions. Ritzer, like Toffler, argues that prosumption as a form of economic activity has always existed. However, the technological and social changes that the 21st century brought about give it a special significance. In Ritzer's view, digital prosumption creates preconditions for a new form of capitalism, in which the capitalist does not control the content and quality of the production created and consumed by prosumers, but takes the profit generated by this process. According to Ritzer, this new form of capitalism is characterised by the fact that it relies on unpaid labour, as the labour costs are borne by prosumers (Ritzer and Jurgenson, 2010; Ritzer et al., 2012; Ritzer, 2013; 2015a; 2015b).

Shah and colleagues conducted a bibliometric analysis of academic publications on prosumption and identified three main areas of use of the concept: energy research, sociology (mostly research on consumer culture) and business studies. Analysing the keywords of publications in the field of social sciences, the researchers found that the concept of prosumption is most often associated with co-creation, user generated content (UGC) and informational capital (Shah et al., 2019, p. 1030; Shah et al., 2020[11]). Therefore, it might be concluded that in the previous decade prosumption has been studied mainly as a phenomenon appearing in digital space, although some authors, like Toffler and Ritzer, see its origins in pre-industrial societies.

The bibliometric analysis conducted by Shah and colleagues finds that the most cited author in this research area is George Ritzer, while Ritzer's and Nathan Jurgenson's article "Production, consumption, prosumption: the nature of capitalism in the age of the digital prosumer" (2010), estimated by the number of citations, is considered the most influential publication in research on prosumption in the social sciences (Shah et al., 2020, p. 85-86; Shah et al., 2019, p. 1026).

Other authors whose work is considered important in prosumption research, in addition to **Toffler** (1984 [1980]; Toffler and Toffler, 2006) and **Ritzer** (2010; 2013; 2015a; 2015b; 2016; 2017; Ritzer and Jurgenson, 2010; Ritzer et al., 2012; Ritzer and Patella-Rey, 2013; Ritzer et al., 2018; Ritzer and Miles, 2019; Ritzer and Degli Esposti, 2020b), are Philip **Kotler** (2010 [1986]), Don **Tapscott** and Anthony D. **Williams** (2008 [2006]), Detlev **Zwick** (Zwick, 2015; Zwick et al., 2002; Denegri-Knott and Zwick, 2012),

[11] The authors analysed publications in English (published between 2010 and 2017) in the Web of Science database, selected using the keywords "prosumer" and "prosumption".

Christian **Fuchs** (2009; 2010; 2011; 2012; 2014; 2017; 2020a; 2020b; 2020c; 2021; Fuchs et al., 2009; Fuchs and Sevignani, 2013) and Davide **Dusi** (2015; 2015; 2018a; 2018b; 2019; Dusi and Huisman, 2020). Therefore, the work of these authors will form the basis for an attempt to formulate the minimal and maximal definition of the concept of prosumption.

The definition is formulated following the concept-making steps proposed by social science methodologist John Gerring (2012). They consist of (1) an explanation of how the particular concept differs from other concepts of the same semantic and phenomenological space, as well as an overview of possible alternatives and synonyms; (2) combining the possible meanings of the concept into a table of attributes, merging similar attributes according to different dimensions, and therefore (3) arriving at the verbal description of the term and the formulation of the minimal and/or maximal definition of the concept.

Following Gerring, we should start by reviewing the alternative or partially alternative concepts in the research field of the activities of internet and digital technology users. Different authors have presented a number of concepts to name such activities (for the conceptual overviews see Benkler and Nissenbaum, 2006; Zwick et al., 2008; Bruns, 2008; 2012; 2016; Ritzer, 2012; 2013; 2020; Fuchs, 2012; Dusi, 2017). In short, these notions could be divided into two groups: concepts emphasising the **collaborative** feature of users' activities and concepts emphasising the **participatory** feature.

The first group includes concepts of *value co-creation*, *commons-based peer production*, *co-innovation*, *crowdsourcing*, *digital communities*, as well as the term *platforms for consumer practice*, which describes not so much the activity but the structure through the particular activity. The second group, with a common emphasis on user participation in the creation of a product, service or other artefact, includes the concepts *user-generated content*, *consumer labour*, *professional amateur* (*pro-am*), *citizen-consumer*, *playbour* (play + labour), *working consumer, craft consumption*, *Do-It-Yourself* (DIY), *produsage* (production + usage).

The concept of prosumption, in essence, belongs to the second group. However, prosumption (often only implicitly) can also include the feature of cooperation emphasised in the first group of concepts, as prosumers usually rely on and use the content created by others in their activities. Compared to the concepts of the second group, prosumption is considered to be a clearer and more accurate description of the nature of the activity on the internet and digital technologies than concepts such as *user-generated content*, which is very general and is more intent on naming the result of a certain activity. On the other hand, prosumption and prosumer are somewhat broader and more

flexible concepts than, for example, *consumer work*, *working consumer* or *citizen consumer*. The latter ones indirectly indicate certain value propositions, theoretical assumptions or the scope of application.

Finally, the closest of the above-mentioned concepts to prosumption is the term *produsage*, which describes the merging of production and use. The author of the term, Axel Bruns, explains that, when formulating similar concepts, it is necessary to distance oneself from the characteristics and features of industrial production. Bruns emphasises that the result of user activities on the internet and digital technologies is no longer a product in the traditional sense, but a constantly changing artifact that never takes its final form (Bruns, 2008, p. 4–7). However, Bruns does not abandon the production dimension in his neologism, and since the concept of prosumption is more conceptually developed and applied in the field of research and is easily applicable to the same objects as *produsage*, the former is preferred.

1.3. Characteristics of prosumption: a set of concept attributes

The next step in arriving towards a minimal and maximal definition of the concept, following Gerring, is the identification and systematisation of the attributes of the concept. This requires a more detailed analysis of the content of the concept of prosumption. Conceptualisations of prosumption by the author of the term, Alvin Toffler, and George Ritzer, who developed it further, have already been briefly introduced. In the following sections, the essential characteristics attributed to prosumer activities by the other above-mentioned authors are reviewed.

However, before that, a certain clarification regarding Toffler's and Ritzer's conceptualisations should be made. Toffler regards prosumption as a principle of production for one's own use, therefore both traditional production (for exchange, sale) and prosumption are, in his view, separate forms of production. Prosumption differs from traditional production and consumption in terms of the aim of individuals performing these practices and how this aim is achieved. Actors are prosumers when they produce or participate in the production of a product or service for their own consumption or that of their community, instead of paying someone else for this work (see Toffler, 1984 [1980]; Toffler and Toffler, 2006). Therefore, Toffler considers the economy as consisting of two sectors: sector A includes various kinds of prosumer activities (unpaid work for the needs of oneself, one's family or community), and sector B – all the production of services and goods intended for exchange or sale in the market.

The development of technologies enables previously passive consumers to engage in prosumption in various fields on a wider scale, thus becoming active prosumers. Traditional producers promote the involvement of consumers in the production and creative process for their own reasons (e.g., aiming to better meet the needs of customers and increase sales). Toffler sees this as a positive change that empowers the consumer. The development of prosumer activities, according to this interpretation, should eventually lead to a decline in the weight of the B sector of the economy (Toffler, 1984 [1980], p. 276–277). In the 1980s, Toffler also considered that the decline of the market's influence in people's lives should be accompanied by the fact that the development of technology should shorten work hours and increase leisure time, which would provide individuals with more opportunities to engage in prosumption.

Meanwhile, in Ritzer's conceptualisation, production and consumption cease to exist in their pure form: they are both merged into prosumption (production is always some kind of consumption and vice versa, moreover, both aspects of a certain activity do not necessarily have to emerge at the same time), and each individual is always a prosumer (see Ritzer, 2010; 2012; 2013; 2015). Davide Dusi has noticed that Toffler's and Ritzer's interpretations of the prosumer's relationship with technology differ: for the former, technologies are the means for an individual to engage in prosumption, for the latter – they are a way to involve and subject an individual to this activity (Dusi, 2018a, p. 668–670). According to Ritzer, although prosumption has always existed and all economic activity is considered prosumption (even manufacturing at a factory encompasses consumption – materials required for the production of a certain product are used), the internet and digital technologies make this concept especially relevant, since these technologies are both the site and the means of prosumption (Ritzer and Degli Esposti, 2020b, p. 355).

Invoking a Marxist perspective, Ritzer explains that prosumers engaged in unpaid activities (using self-service checkouts in supermarkets, ATMs, buying books or other goods on the Amazon website, creating content on Facebook or YouTube, etc.) are not only exploited by capitalists who profit from their unpaid work, but also worsens the situation of paid workers performing the same functions, contributing to the reduction of the value of their work. However, Ritzer acknowledges that, for example, from the perspective of rational choice theory, prosumers are (or at least think they are) free to choose to engage in such activity, therefore they enjoy it, feel in control of it, and even benefit from it (Ritzer, 2015b, p. 8).

Ritzer also observes that at least some prosumers on the internet are more likely to resist attempts by capitalists to gain more control and profit than their predecessors in the *real* world (Ritzer and Jurgenson, 2010, p. 21; in this case one might think of such initiatives as Wikipedia; as well as alternative platforms to Facebook and other popular digital social networking sites; user-created and developed computer operating systems and software, etc.). Finally, Ritzer emphasises that although the application of the concept of prosumption is most obvious and relevant in the field of economics, the concept has a wider applicability in other areas of social life (e.g. media studies; Ritzer et al., 2012, p. 386; Ritzer, 2013, p. 5).

Shortly after Toffler proposed the prosumer concept and formulated his conceptualisation, Philip Kotler (2010 [1986]) attempted to apply it to consumer behaviour research and marketing practices. Kotler suggested viewing prosumers as a distinct market segment that businesses and marketers could instrumentally employ. According to Kotler, prosumer activities should be characterised by four features to attract consumers: they should promise significant cost savings, require minimal skills, require little time and effort (however, this condition might be ignored if greater effort guarantees better quality) and provide great personal satisfaction. Therefore, based on these characteristics, marketing specialists could assess which businesses have a tendency to lose regular customers more quickly (and which are most likely in need of rethinking their operating models). Kotler considers prosumption from the perspective of business and marketing, aiming to find ways to employ consumers' propensity to engage in prosumer activities.

A few decades later, with the development of the so-called social internet, the prosumer concept once again evoked a similar interpretation and aims of application. Don Tapscott's and Anthony D. Williams' (2008 [2006]) understanding of the concept resembles that of Kotler. Tapscott and Williams refer to the mass collaboration enabled by digital technologies as *Wikinomics* and explain that businesses trying to operate successfully in new conditions should follow the principles of Wikinomics and employ them. They emphasise the specifics of prosumer activity, its importance and possible ways it could be incorporated in business development. Tapscott and Williams are essentially talking about digital prosumption: users actively participate in the creation and update of digital products and otherwise, and sometimes even assume control of their development (such as computer operating systems and software, accessories for individual electronic devices, etc.). The most skilled users gather in virtual communities, whose members share tips and experience (Tapscott and Williams, 2008 [2006], p. 124–127).

Tapscott and Williams argue in an optimistic manner that the new generation of prosumers view the world as a space for creativity rather than consumption. They refer to prosumers as a community that is enabled in part by technology, whose members gain a certain kind of prestige by being involved and experience a sense of social belonging. Prosumer activities (e.g., music remixing), according to Tapscott and Williams, are characterised by the fact that artefacts are created in a decentralised, spontaneous and unconstrained manner, and internet platforms are the main site where such creativity is expressed (ibid., p. 136–137). In this view, prosumer activities are aimed at improving products and artefacts to better meet the needs of an individual or a group, and at enhancing the experience of products and services on the internet, as well as at reducing potential costs.

Tapscott and Williams emphasise that prosumers contribute to the development of technology by adapting and improving products to their needs, therefore businesses should not oppose such activities, but encourage them as adding value to their products. The authors argue that in the emerging *prosumer paradigm* (ibid., p. 143), individuals are able to easily change their roles from user to co-author or creator, and this paradigm itself marks the changing culture and approach towards knowledge. It should be noted that in the prosumer culture described by Tapscott and Williams, not only the attitude towards knowledge is changing, but also the understanding of authorship and authority. To be precise, their significance diminishes as products, content and other artefacts are constantly reworked, updated and developed by countless anonymous "authors" and content creators. As Tapscott and Williams note, amateurs disrupt every activity they get involved in (ibid., p. 11).

Other authors take a less instrumental approach to prosumption than Kotler and Tapscott and Williams and explore the nuances of this concept as an analytical tool. Detlev Zwick argues with Ritzer's conceptualisation of prosumption. Zwick accepts the growing importance of prosumption or even the emergence of a prosumer society, where early forms of consumer involvement, such as self-service at gas stations or fast-food restaurants, are universalised across different industries, product and service categories, and different locations (Denegri-Knott and Zwick, 2012, p. 440). According to Zwick, prosumption marks the transformation of the user from being a passive receiver of messages and goods to an active interpreter and producer (Zwick et al., 2008, p. 167). However, he disagrees with Ritzer's interpretation that prosumption includes any economic (or other) activity, while production and consumption cease to exist in their pure form.

Zwick argues that it is impossible to talk about production and consumption in the abstract, as the content of what is being produced and

consumed and the way this is done are important features, therefore if the whole range of activities is combined under the concept of prosumption, its analytical power is extremely narrowed (Zwick 2015, p. 488). In addition, an empirical study by Zwick and Denegri-Knott (2012) which applied the concept of prosumption to the users of the e-commerce platform eBay revealed that prosumer experience itself changes over time[12]. According to this micro-level study, the notion of prosumption is not always best suited to characterise the usage of the user-generated content sites (ibid., p. 453).

Zwick also contests Ritzer's treatment of prosumption as a completely unremunerated activity, as the reward in some instances might be received in a form other than a salary, for example, one may receive certain products and services at lower prices. Although such a reward is not always provided and often does not commensurate with the value of work put in, according to Zwick, it might nevertheless be more common than Ritzer's theorising suggests (Zwick, 2015, p. 491). In Zwick's view, this is exactly why maintaining the concepts of production and consumption remains useful, as it is through the comparison of activities that one can better understand the extent of prosumer exploitation, if any.

Hence, on the one hand, Zwick criticizes Ritzer's conceptualisation as overestimating the exploitation of prosumers. But, on the other hand, he argues that some other important aspects of the potential exploitation of prosumers remain overlooked: the technical possibilities to turn consumers into producers, specifically – data producers. Zwick refers to it as a *total prosumification of life*, as consumer databases allow not only to track, administer and predict consumption habits and trends, but also to turn consumers themselves into a commodity (ibid., p. 492–493). However, Zwick also recognises the capacity of prosumption, at least in theory, to create new forms of social and economic entities and structures that are not controlled by capital (see Zwick et al., 2008, p. 167; Zwick, 2015, p. 487).

Christian Fuchs employs the concept of prosumption in the characterisation of digital capitalism, which he associates with ideologies of creativity, participation, sharing, openness and collaboration. Following a Marxist perspective, Fuchs, like Ritzer, defines prosumption as a convergence of production and consumption that becomes a problem of consumer work. According to Fuchs, users of platforms such as Facebook and Google produce

[12] Following the Weberian perspective, researchers aimed to uncover the difference in experiences from "enchanted prosumption" to "disenchanted prosumption" as the collective production and consumption of desires, dreams and fantasies [prosumption] over time gives way to eBay, which is experienced as a site of sale and purchase characterised by routine, habits and efficiency (Denegri-Knott and Zwick, 2012, p. 439).

commodities – data and attention – that are sold to advertisers. Therefore, prosumers are *digital workers* (Fuchs, 2020c, p. 350). Additionally, in modern capitalism, creative workers' love for and satisfaction with the content of their work becomes a new ideology, obscuring the fact that individuals engage in such work in precarious conditions (Fuchs, 2020b, p. 9).

When defining prosumption, Fuchs draws on Toffler's conceptualisation but criticises his optimism for ignoring the fact that businesses transfer work to consumers and profit from it (Fuchs, 2011, p. 297). When dealing with prosumer activities in the production and consumption of information, Fuchs emphasises that it is produced not only by corporations, but also by users who provide the content with meaning; moreover, users are creating content on social networking platforms, which is appropriated by and makes profits for corporations. Fuchs claims that prosumption in this regard does not imply a democratisation of the media, but rather the complete commodification of human creativity (Fuchs, 2010, p. 192).

Fuchs, like Toffler and Ritzer, points out that prosumption is not solely an online phenomenon, but that digital technologies and social media have expanded our possibilities to engage in it. He observes not only the blurring of boundaries between production and consumption, but also between work hours and leisure, factory and home, work and play. The work done by prosumers does not look like work to them – it is experienced as pleasure or entertainment. According to Fuchs, new media has the potential to become an enabling structure, but the internet is appropriated by politicians, parties and corporations, therefore users engaging in prosumer practices have virtually no power to change existing structures. Moreover, participation in social platforms does not necessarily mean that their members are engaged in prosumption, as only a part of them are active in content creation, while the rest act as passive observers (Fuchs, 2017, p. 38).

Meanwhile, Davide Dusi, evaluating the conceptualisations of prosumption by Ritzer and other authors, views prosumer activities as not necessarily being deemed to be taken as exploitation, but also as enabling practices (and contrary to Fuchs – not only theoretically). According to him, the way different authors explain and interpret prosumption depends on the circumstances and conditions under which it is observed. If one examines prosumption in situations where the traditional producer seeks to benefit from the consumer's inclination to engage in production/creation, it will be treated as part of the exploitative process. If one observes instances of consumers attempting to partially or fully replace a traditional producer to meet their needs or to challenge existing structures, prosumption emerges as an empowering activity.

Dusi draws on Toffler's and Ritzer's conceptualisations of prosumption, but, like Zwick, criticises Ritzer's argument that all production and consumer activities might be considered prosumption (see Dusi, 2018a). Dusi notes that both Toffler's optimistic and Ritzer's pessimistic conceptualisations have some limitations. But in his own interpretation and definition, Dusi relies more on Toffler's approach, in which prosumption is understood as an unpaid activity for the benefit and needs of one's own or one's community. In addition, Dusi does not limit the concept of prosumption and the field of its application to strictly economic activities and applies this concept in empirical studies of volunteering among hospital patients and their relatives (Dusi, 2016), the use of information technologies to deal with unemployment (Dusi, 2019) and the roles and positions of students at university (Dusi and Huisman, 2020).

Other researchers apply the concept of prosumption in a more fragmented way, delve into its conceptualisation in less detail, follow the conceptualisations proposed by the aforementioned authors, or use the concept of prosumption while defining the alternative notions and the processes they describe. Among the latter, Axel Bruns argues that the term "produsage" is more appropriate to name the activities of users of social networking and other internet platforms, as this term denotes the merging of production and use, in contrast to production and consumption. The argumentation of this proposition was presented in the previous chapter. In addition, it is worth noting that in the cases where Bruns mentions prosumption, he defines it as the user's voluntary participation in the creation of a product or content. Bruns emphasises that the increasing participation in user-productive practices is enabled by the growing availability of technology and ever new opportunities to create not only physical objects but also intangible artefacts. The extent to which prosumer activities are considered exploitative depends on the circumstances of a specific prosumer project, as, in essence, user-productive practices as such are not necessarily exploitative (Bruns, 2016, p. 4; see also Bruns, 2012; 2013).

Dariusz Jemielniak and Aleksandra Przegalinska (2020), introducing the concept of *collaborative society* and reviewing related concepts, define prosumption as the merging of the functions of producer and consumer in the digital space (which they call *collaborative media*). The internet, where such merging takes place, becomes both a factory and a playground, open to exploitation through unpaid labour presented as a game (Jemielniak and Przegalinska, 2020, p. 13). Discussing the considerations of other authors on this topic, Jemielniak and Przegalinska summarise that prosumption leads to a lowering of the level of skills required and expected in the performance of certain professional activities: anonymous content creators cannot be held responsible for

the quality of the work performed, as they are not subject to the standards imposed on professionals. However, Jemielniak and Przegalinska note that the inclusion of amateurs in activities already performed by professionals is not exclusive to the digital space (ibid., p. 64–66).

Meanwhile, Alexandra Kviat writes that prosumption is characterised by what is usually identified as essential components of the sharing economy: peer-to-peer relationships and digital intermediaries. Kviat points out that prosumption goes beyond the sharing economy, but the latter is not possible without prosumption. Both phenomena are often associated with the digital space, although both existed to a greater or lesser extent before the emergence of the so-called social internet (Kviat, 2021, p. 3). Kviat argues that although the literature often emphasises the difference between creative and technologically sophisticated digital prosumers and their predecessors in the *real* world who perform activities that do not require great skills, little is known about the personal meanings given to these actions by their performers themselves.

The overview of the definitions of prosumption presented above enables the differentiation and organisation of the most significant attributes inherent to this concept. A table of attributes of this concept was created according to different dimensions by combining similar meanings of the properties that are attributed to the object/phenomenon in question. It is noteworthy that the completeness of such a set of attributes is conditional, as it is almost always possible to find additional or differently formulated characteristics attributed to the concept.

One remark should be made here. Gerring points out that conflicting attributes should not be included in the table (Gerring, 2012, p. 137). From what has been discussed above, one could get the impression that there is a certain contradiction between whether prosumption should be considered the exploitation of the engaged individuals or their empowerment. However, at this point, it might be meaningful to distance ourselves from particular theoretical explanations and interpretations, and raise the following question: is it possible that a certain prosumer activity benefits (possibly, indirectly) someone other than the actor engaged in it, and at the same time enables the actor to achieve his/her aims and change the existing structures? Examples that would allow to answer this question in the affirmative (not only hypothetically) are likely and existing[13]. Which of these two characteristics

[13] For example, using social networks or blogging platforms for communication (user activity is data that is used by the owners of such platforms to sell advertising and thus profit) while creating alternatives to commercial operating systems and software, engaging in the free exchange of items and other goods that might otherwise not be freely available in the market, etc.

will be explored and which of them is considered the most important depends on the theoretical perspectives applied, the direction of the interpretation and the aims of the analysis. Therefore, both of these properties attributed to prosumption are included among the attributes of the concept, which are presented in Table 1.

Table 1. Attributes of the concept of *prosumption*.

Core principle	The merging of production and consumption.
Attributes	a) Unpaid activity (i.e., no formal wage or salary).
	b) Involved in for the sake and interests of one's own, or for those of one's relatives, or community.
	c) Characteristic to digital space, but others not excluded (e.g., *real*, post-digital, augmented reality).
	d) Object – both tangible and intangible products/artifacts.
	e) Gives satisfaction, is involved in for entertainment, play.
	f) Provides benefits/profit for others than actors directly involved in it.
	g) Changes established structures and hierarchies.
	h) Takes place individually or collaboratively.

1.4. Minimal and maximal definitions of prosumption

Following Gerring, the minimal definition of a concept consists of a minimal set of essential features according to which a certain empirical phenomenon is assigned to a category of similar phenomena and described by this concept. This set is arranged as the necessary (and sufficient) conditions, meaning that every object named by this concept must have all the features included in the set. The minimal definition of a concept should have crisp borders; therefore, it is possible to clearly distinguish whether an object corresponds to this definition or not (Gerring, 2012, p. 135–136).

The maximal definition of the concept, on the contrary, includes all (not idiosyncratic) characteristics attributable to the phenomenon. It is, according to Gerring, an ideal type that may not have absolute empirical referents, but there are objects that come as close as possible to this maximal definition and align most consistently. In other words, the correspondence of a particular object to the maximal definition of a concept is usually a matter of degree (ibid., p. 136–137).

According to Gerring, the minimal definition of a concept is formulated based on the core principle, which constitutes the essence of a particular concept (in the case presented here – the merging of production and

consumption). However, Gerring argues that this principle alone usually does not draw the boundaries of the concept clearly enough, therefore it is necessary to identify the other most important attributes of the concept that are generally agreed upon (ibid., p. 136). The minimal definition must include the essential attributes that encompass the widest possible scope of the use of the concept, without losing its meaning. In other words, the definition should include only those attributes that are inherent in all known uses of the concept. Without the core principle (the merging of production and consumption) these would also be the first two attributes indicated above. Therefore, prosumption in its minimal definition is the merging of production and consumption, which emerges as free/unpaid activities for the sake and interests of oneself, one's relatives or community.

Meanwhile, the maximal definition of the concept should include all the enlisted attributes. Here, the feature of prosumption as being the most characteristic to the digital space might be further clarified. I suggest taking into account Bruns' aforementioned argument that the traditional concept of *product* is no longer suitable for the results of activities on the internet, as these artefacts are constantly changing and are not finite, therefore *productivist* concepts are no longer able to grasp the nature of the results of such activities. However, instead of adopting yet another alternative concept (e.g., *produsage*, as suggested by Bruns), it would be appropriate to include *creation* and *use* (alongside *production* and *consumption*) in the definition of prosumption. This step not only allows for a more accurate representation of the features of online activity but also corresponds better to the field of empirical application of the concept of prosumption, consisting not solely of pure economic relations.

Therefore, the maximal definition of prosumption is formulated as follows: it is the merging of production/creation and consumption/use, which emerges as a satisfying, formally unpaid individual or collaborative activity for the sake and interests of oneself, one's relatives or community, the object of which can be both material and immaterial artefacts and which often takes place in the digital space (but not exclusively) and provides benefits/profit not only to those engaged in this activity, but also enables changes in established structures and hierarchies.

Prosumption so defined is unlikely to have exact empirical referents. Each case would approximate the maximal definition to a certain extent (and the referents themselves should be fewer than in the case of the minimal definition, which is extensive; the maximal definition is intensive, i.e., it foresees the possible attributes in detail but therefore limits the field of referents). Furthermore, it is possible to combine some attributes of a concept

disjunctively, meaning that specific empirical referents might have different sets of the listed attributes and still be referred to as prosumption. The main advantage of a strategy providing the broadest concept possible is that such a concept covers the spectrum of occurrences of the phenomenon and enables their classification.

While indicating the steps of the definition of a concept, Gerring also suggests some criteria to assess its suitability: 1) resonance (to what extent does the definition of the concept correspond to its everyday, common usage?), 2) range of contexts (how widely does the concept cover different fields of use?), 3) consistency (is the concept used identically in different contexts and studies?), 4) coherence (how do the features that make up the content of the concept fit together and how consistently are they reflected in empirical referents?), 5) differentiation (how clearly is the concept differentiated from other similar concepts?), 6) analytical and empirical utility (how well does the concept serve in providing knowledge about reality? To what extent does it help to explain processes under consideration?), 7) operationalisation (how do we recognise the referents of the concept and how can they be measured?) (Gerring, 2012, p. 117–131; see also Norkus, 2009). However, as noted by Zenonas Norkus, the challenge while adhering to these criteria is that in the social sciences, some are to be met only at the expense of others (Norkus, 2009, p. 100). This is also characteristic to the concept of prosumption. It is noteworthy that as a neologism, this concept lacks resonance, but it is considered to be analytically and empirically useful.

2. SOCIOLOGICAL SIGNIFICANCE OF USER PRODUCTIVE PRACTICES AND A TYPOLOGY OF PROSUMPTION

2.1. Prosumption as a social form

An important feature of the concept of prosumption is that, in the context of digitalisation, it might be considered an instrument to connect the levels of social structure and actor. The concept enables us to grasp how the mode of acting, facilitated by technological changes (digital structures and services), might consolidate values and expectations that manifest in different areas of social life. In this way, prosumption can also be treated as a Simmelian social form or form of social interaction/sociation[14], which emerges in different areas (i.e., not only economic) and acquires various contents.

In his *Sociology. Inquiries Into the Construction of Social Forms* (2009 [1908]), Georg Simmel makes a distinction between the content of social life and social form. Interactions between individuals always arise from certain specific impulses that are related to specific goals. Simmel links these impulses and goals with the contents of human life (e.g. economic, religious, political), which determine that individuals enter a certain relationship and coordinate their actions with each other, against each other, for each other, etc. The content of human relations, according to Simmel, is not yet social in itself but is a prerequisite for social forms. In other words, social forms are the outcome of interactions motivated by a certain kind of content. As Horst J. Helle summarises: "[t]he individuals create together and for each other social forms in the context of which their wishes can be fulfilled, their desires can be realized. The forms are based on a common interest <...>" (Helle, 2009, p. 5). For example, technology-related developments as such could be considered the content of social life, i.e., they do not in themselves mean social interaction (the same as love, work or religiosity). However, they presuppose certain forms of sociality, interaction and reciprocity, where individuals act in more or less proximity to each other, depending on the specifics of the content and the motivations and goals it evokes.

Simmel also emphasises that "content and social form construct a united reality; a social form can no more exist disconnected from content as can a spatial form exist without some material, the form of which it is" (2009

[14] The term itself ("Vergesellschaftung" in German) has been variously translated into English as socialisation, social interaction, creating society, etc. According to Blasi and colleagues, the English neologism "sociation" was formulated by Simmel's translator Kurt Wolff in 1950 and "has not generally found its way into common usage, outside of discussions of Simmel's sociology" (Blasi et al. 2009: xv).

[1908], p. 23). However, this does not mean that every content of social life corresponds to a single particular form of social interaction. On the contrary, Simmel explains that by studying different contents one can observe the recurring diversity of different social forms, the study of which is the object of sociology as a science. Social interaction reaches different levels, intensity and stability depending on its nature, and manifest itself in different areas of social life (Simmel, 2009 [1908], p. 22). Different individuals or groups use different forms of interaction to reach the goals set by the same contents of social life. On the other hand, identical or similar forms are used to achieve different goals (political, economic, religious, etc.) (Helle, 2009, p. 5).

From Simmel's point of view, the totality of forms of social relations or sociation is diverse and heterogeneous. Among the examples of such forms, he names dominance and subordination, competition, imitation, representation, factionalism, inclusion and exclusion from a group, division of labour (2009 [1908], p. 24). The latter appears the most similar in nature to prosumption and implicitly indicates that there is a logical basis for considering prosumption as a social form. Simmel also notes that he does not seek to provide an exhaustive list of social forms, since they are constantly changing and emerging while existing in direct interaction with the constantly changing contents of life. Hence, it is reasonable to assert that as technologies and the content of economic relations develop, the forms of interaction that express this content and implement the respective impulses and goals change as well. Since new (digital) technologies are used and their effects are felt not only in the economic sphere, the forms of interaction emerging in this reality can just as plausibly be observed in various areas of social life.

Simmel also notes that social interaction, in which individuals affect each other and social content gains vitality and sociality emerges, is enacted directly or through an intervening third party (2009 [1908], p. 23). The social form is both – direct relations as well as relations expressed through a certain technology or intermediary/medium (e.g., money, see Helle, 2009, p. 5). This point is extremely important to the present thesis because prosumption may not necessarily seem social as it may be performed individually at any given moment in time (this point is demonstrated below in the proposed typology of prosumption). It is precisely this specification provided by Simmel that enables arguing that even actors engaged in prosumption individually are linked to other members of society through certain intermediaries/media (devices, technological structures and artefacts). The connection, as provided by the Simmelian vision of social forms, is more or less tight (e.g., in the case of self-service at the supermarket or an electronics store, prosumption is instant and interaction is short, while in collective practices, for example,

writing an electronic encyclopedia or developing computer operating systems and software, interaction is more fixed, sustained and lasting). According to Simmel, what is often overlooked is how seemingly unilateral activity is based on some kind of reciprocity – on implicit and tacit response, or asynchronous reaction and cooperation (Simmel, 2004 [1907], p. 79).

Simmel also emphasises that although the same social forms recur in different spheres of social life, it is necessary to study the different manifestations of each of these forms. By simply stating that one or another form is expressed in different spheres, little is clarified about the social reality. Simmel gives an example of competition as a form of social relations: once finding out how it works in politics, economics, religion, art and other spheres, one approaches the understanding of the circumstances under which competition generally manifests itself, how it develops, what modifications it undergoes in interaction with different objects, by what regulation it is encouraged or suppressed, how competition between individuals differs from competition between groups, etc. (Simmel, 2009 [1908], p. 28). Examination of the different variants of a particular social form means it can be better understood and explained at the theoretical level. Therefore, in the case of prosumption, it is also worthwhile to account for its different types (see Section 2.4) and to study how the specific contents of social life and the goals they pose to different actors determine the variations of prosumption as a phenomenon.

When explaining the impact of technological and economic changes of society, Simmel has demonstrated that these changes and adaptation *of* technologies and *to* technologies form certain habits and expectations towards other individuals, relations and social institutions. And they further change these institutions and relations. In his *The Metropolis and Mental Life* (2002 [1903]) Simmel explains that, due to the industrial revolution and the changing economic content of social life (i.e., division of labour, market economy, developed money economy), life in a modern times metropolis gains new social forms, new forms of relations among individuals and their attitudes[15] and expectations defined by their intellectualistic and individualistic character (Simmel, 2002 [1903], p. 12; Simmel, 2004 [1907], p. 285–292, 298–304). For example, money (instead of a direct exchange of goods) and mass

[15] It seems noteworthy that another one of Simmel's concepts – *blasé attitude* – might also be instrumental to characterise the individual and societal response to the environment of digitalisation (and related to it – an even greater flow of information compared to Simmel's time). The *blasé attitude* is understood as a reaction and response that an individual, group, community or society as such develops in the face of a very rapid life and changes, as well as an inability and unwillingness to grasp the scope of differences of the whole and distinctions between things (Simmel 2002 [1903]: 14).

products produced for the market are an objectification of the depersonalised economic relations characteristic of a metropolis (this idea is argued at length in Simmel's *Philosophy of Money*, 2004 [1907]). According to Simmel, money "is concerned only with what is common to all <…>. It is in this very manner that the inhabitant of the metropolis reckons with his merchant, his customer and his servant, and frequently with the persons with whom he is thrown into obligatory association" (Simmel, 2002 [1903], p. 12). Money emerges in Simmel's writings as a medium in relations, as well as the reified and objectified form of these relations.

Moreover, money objectifies exchange which, according to Simmel, is "the purest and most developed kind of interaction" (Simmel, 2004 [1907], p. 79, 128, 174–176). Simmel states that many social interactions can be interpreted as a certain form of exchange (to clarify, the latter is a narrower concept than the former, and "economy [is considered] as a special case of the general form of exchange", ibid: 84). Prosumption can also be treated this way. Prosumption, like the exchange described by Simmel, is characterised by the fact that it is not just a combination of two processes – giving and receiving (in the case of prosumption – producing/creating and consuming/using), – but a new phenomenon in which these two processes are both cause and effect (see Simmel, 2004 [1907], p. 88). Technologically mediated prosumption also encompasses some objectification, meaning that technologically mediated reciprocity can be fragmented and asynchronous.

Money as a medium and as a technology has brought about or facilitated new forms of sociation – those in which the relationship no longer involves the whole individual (contrary to, for example, medieval guilds) but enables membership to be expressed through depersonalised contributions or a share of property acquired with money, such as shares in the company (2004 [1907]), p. 345–347). Therefore, the developed money economy and the economic structure based on money as the content of social life, and money as a technology and medium, created conditions and incentives, and provided stimulus for the emergence of new social forms (e.g., belonging to a group through "contribution", instead of widespread individual involvement, without the need to give up a significant part of personal freedom). The economic environment based on the operation of digital technologies and digital devices and applications as intermediaries/media can be understood in a similar way.

Simmel also connects the tendency towards the accuracy of calculation in practical life with the ideals of the exact sciences – the aspiration of transforming the world into mathematical formulas, and with the tendency to accurately calculate time and punctuality as a value and necessity. However,

Simmel emphasises that all these considerations do not mean that other/previous forms of relations are no longer possible in the metropolis. Rather they are gradually becoming less desirable, and expectations to encounter and implement "intellectualistic" forms of relations are increasing (Simmel, 2002 [1903], p. 13–14). In other words, the emerging new social forms do not necessarily universally replace the previous ones (although in certain areas of social life this is possible). Nor are they necessarily expressed to the same extent in the entire society, rather, they add to the repertoire of possible social forms to express different contents of social life and achieve the implied goals.

But, going with this line of reasoning, how does one avert technological determinism? In *Sociology* (2009 [1908]), Simmel explains that the relationship between society (and its developments) and the individual is two-fold. On the one hand, the individual is a part of society and its developments, shaped, influenced and, in a sense, defined by them. On the other hand, the individual always retains a certain autonomy in relation to society (for example, if an individual is a civil servant and is socialised that way, a certain part of her/him is always a non-servant or someone beyond the servant). Simmel also anticipates that different social contents involve the individual to a different degree, for example, being a lover or a clergyman is likely to involve the individual on a larger scale and in a deeper relation with the other and the social reality of that area than simply being a civil servant (Simmel, 2009, p. 46–48).

This point is important for the problem of this thesis, as it suggests a reciprocal relation between the macro and micro levels of social life. If an individual is never completely involved in just one social sphere but maintains a certain autonomy in relation to each of them, then movement between the different spheres is possible (and in the social reality this is usually inevitable). Following Simmel's logic of the recurrence of social forms for different contents, it can be asserted that it is the individual level that enables the transfer of social forms. In other words, social forms that are effective in a certain structure move through different areas of social life as actions and interactions of individuals evoked by values, attitudes, skills and habits.

2.2. Modelling macro and micro level interaction

Simmel himself does not systematically explain such a mechanism, but the logic of his reasoning is arguably well corresponded by the diagram of transitions between the macro and micro levels proposed by James S. Coleman, the so-called Coleman's boat or bathtub (Figure 1). According to

Coleman, "the analysis [of social systems] can be seen as moving to a lower level than that of the system, explaining the behaviour of the system by recourse to the behaviour of its parts" (Coleman, 1994, p. 2; for an explication on Coleman's diagram see also Abell, 2000; Bowel, 2019; Lucas, 2016; Ylikoski, 2021; and also Swedberg, 2016 for a diagram, in general, as a tool for theorising). Following Coleman, the effect of a macro-level phenomenon on another phenomenon of the same level (e.g., the effect of digitalisation on the organisation of the creation and dissemination of scientific knowledge) is explained by the interaction between the macro and micro levels and the processes taking place at the micro level: 1) structural changes generate certain values and attitudes of actors; 2) actors guided by their values and attitudes develop orientations of behaviour and perform respective actions; 3) these orientations and actions generate outcomes at the macro level.

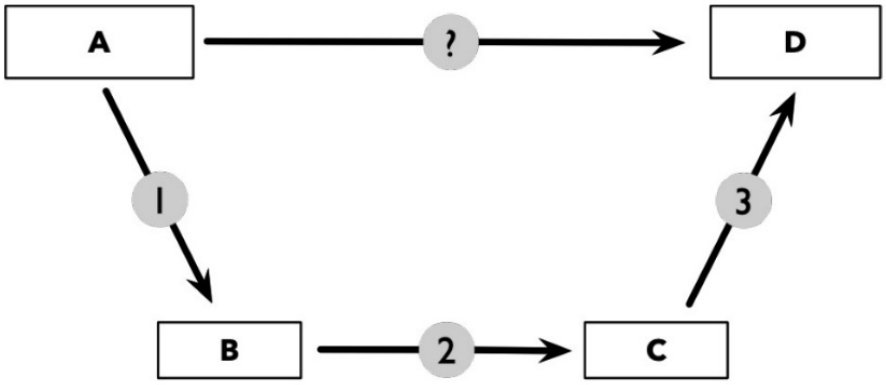

Figure 1. Coleman diagram by Ylikoski (2021, p. 51). The A and D nodes mark macro conditions and outcomes, the B and C nodes mark micro conditions and outcomes.

The first link is defined as "situational mechanisms", the second as "action formation mechanisms", the third as "transformational mechanisms" (see Jepperson and Meyer, 2011, p. 55). Hedström and Swedberg identify the micro-level transition as an explanation on "how the individual assimilates the impact of macro level events" (Hedström and Swedberg, 1998, p. 21–22, cit. by Jepperson and Meyer, 2011, p. 59). Some of these elements are implicit in the segment of Simmel's *Philosophy of Money* in which he defines purposive action (in relation to instinctive action; see Simmel, 2004 [1907], p. 204–207). The purpose of an action stems from the contents of social life; meaning and satisfaction is attained not by the performance of an action itself, but by the result achieved by performing it: "… conception of an end is experienced as a motive" (Simmel, 2004 [1907], p. 205). Therefore, the action is guided by a

certain motivation evoked by specific content. Such an explication corresponds to the transition from the macro to the micro level (A → B) and to the preconditions of an action and the action itself (B → C) at the micro level on Coleman's diagram.

According to Petri Ylikoski, the abstract form of Coleman's diagram enables it to be adapted to different theoretical interpretations and is not necessarily pertinent to methodological individualism[16] or the rational choice theory approach to which Coleman adheres, i.e., the diagram is "a cognitive tool that is independent of Coleman's other theoretical commitments" (Ylikoski, 2021, p. 49; see also Van Bowel, 2019, p. 273). Moreover, Ylikoski states that Coleman himself proposed that micro-level actors might include individuals as well as collective entities; the focus is on the agency, not personhood. In this way, the flexibility of Coleman's diagram in relation to different theoretical approaches is indicated while maintaining the essence of the cognitive tool itself – explaining the mechanism of links and transitions between the macro and micro levels.

Also noteworthy is Ylikoski's observation that Coleman's diagram aims to explain the effect of one macro-level phenomenon on another one of the

[16] This clause by Ylikoski is probably best understood in the context of the long-lasting dispute in analytical sociology on the ontological premises of methodological individualism (see, for example, Jepperson and Meyer, 2011, Little, 2012, Manzo, 2020, Ramström, 2018, Van Bowel, 2019). The essence of the dispute is whether it is actually impossible to explain the causal relationship of macro-level phenomena without delving into the micro-level. Ylikoski's interpretation of the Coleman's diagram (which also includes the proposition that the macro and micro levels are conditional, i.e., the purpose of the diagram is to explain the transition between different levels of social organisation, but the "lower" level is not necessarily that of an individual/person) appears to suggest a solution to maintain the explanatory power of the mechanism without reducing it to the question of macro or micro primacy. Presumably, the adherents of analytical sociology and social mechanisms and their critics have a slightly different understanding of a "cause" in this context and use this notion differently. Critics often explain it as a direct causality/determination, while adherents – as links and transitions between different parts of a mechanism. The main purpose of Coleman's diagram is to be considered an *explanation/explication* of the causal relation between two macro-level phenomena, in which the transition to a micro-level serves as a demonstration of an operation of a particular mechanism. Therefore, the workings of a micro-level are only conditionally a cause (see also Vromen, 2010 on causation and constitution). In my understanding, Ylikoski demonstrates that the mechanism primarily seeks to answer the "how?" question, rather than to fundamentally reveal causality. A certain social fact might be an outcome of several or many causes but when one chooses to study explicitly one of them, the mechanism of its workings is uncovered. It is akin to opening *black boxes*. The so-called agent-based models (ABMs, see Squazzoni, 2010) are also employed to this end in analytical sociology; however, the mechanism and its preconditions require particular theoretical explanations. One might argue that ABMs, in some sense, can be considered semi-empirical (these models use simulation of interactions between actors and structures) solutions to the problem of micro-to-macro transition, as they demonstrate that the macro-level outcomes emerge from the interactions at the micro-level.

same level, but the final point of the diagram itself (node D) does not necessarily have to be precisely clear or known in advance (Ylikoski, 2021, p. 52–53). This element may be something that needs to be clarified, that is not fully known or is hypothetical. Such an observation is important for the problem of this thesis. Some of the authors studying digitalisation and prosumption claim that participation of amateurs in the areas and practices that were previously carried out solely by professionals – and specifically, in those related to the creation and dissemination of knowledge and information – undermines the authority of professionals, diminishes the importance of authorship and overall quality of the content created, leads to worsening working conditions, etc. (see, for example, Fuchs, 2020b; Jemelniak and Przegalinska, 2020; Keen, 2007; Ritzer, 2015b; Tapscott and Williams, 2008 [2006]).

However, in order for such an assumption to be systematically examined and substantiated, a tool is needed that would either allow for it to be revised or to establish what kind of an outcome in this regard occurs in general (D). Therefore, the flexibility of Coleman's diagram as an analytical tool is particularly useful not only in generating the understanding of an interaction of different elements of a social mechanism, but it also enables us to explain the nature of certain social outcomes. According to Samuel R. Lucas, Coleman's diagram enables statements about the social effects of particular contexts to be turned into an object of study – it helps to explain the mechanism through which the social effects in question are activated (Lucas, 2016, p. 131).

A further important element of the logic of this diagram is the interpretation of preconditions evoking the action at the micro-level (B node). Coleman explains the elements of the diagram with examples, for instance, in the case of the Weberian thesis on the effect of Protestant religious doctrine on economic organisation, values are the action-motivating or determining factor. Coleman also mentions opportunities and interests. However, according to Ylikoski, the properties of agents and their situations can be extended to other parallel concepts that play a similar role in theoretical explanations (such as "beliefs, desires, goals, values, preferences, motives, emotions, habits (or habitus), routines, scripts" etc., Ylikoski, 2021, p. 51). Lucas also points out that the micro-level outcomes (node C in the diagram) "may be produced by endogenous or contextual processes" (Lucas, 2016, p. 131).

In the case of prosumption, those concepts of values and habits are relevant that correspond to the motivations of actions identified in Simmel's *Philosophy of Money*, as well as to several types of the Weberian concept of social action. Habits are understood as certain heuristics, i.e., as actions that

are based on previous experience and evoked by recognisable circumstances or environments (Reiners, 2001, p. 144), such as the availability of digital tools. Due to digitalisation, a technological environment evolved in which both the technical structure and the macro-level entities shape certain situational mechanisms (or action opportunities, see Van Bouwel, 2019, p. 264). As a result of these mechanisms, actors guided by certain values (such as principles associated with digitalisation by Tapscott and Williams) or habits participate in direct or indirect interactions and perform actions that take the form of prosumption. The latter operates as a transitional mechanism and potentially makes or facilitates changes in different areas of social life, i.e., it leads to social outcomes. In other words, digitalisation processes and the use of digital technologies motivate at least some of the actors to demonstrate a certain behaviour, which as a social form (prosumption) moves from one area of social life to another.

Digitalisation-enabled opportunities and demands for consumers to engage more often in productive practices in the economic sphere may form certain expectations (e.g., for involvement, peer-to-peer participation, etc.) that are carried across into other areas of social life and, accordingly, might lead to their greater or lesser modification. A likely example of such developments is the expanding possibilities provided by digitalisation for users to collect and disseminate information and the outcomes of this process in the field of dissemination of scientific knowledge (the challenge online encyclopedias pose to traditional encyclopedia publishing, the possible impact of information disseminated in social networks on the authority of science and scientific knowledge, etc.), as well as news media (the diminishing role of a journalist as an intermediary, changes in the organisational structure of the media, changes in the content and quality of media, etc.). The particular motivations to perform an action in different cases of prosumption and its outcomes in different areas of social life constitute questions for empirical research. At this point, Lucas' proposition that the true motivations of individuals are practically impossible to determine due to various reasons related to the limitations of human perception and memory is noteworthy (see Lucas, 2016, p. 131). However, it is possible to separate them purely from the analytical point of view while trying to account for the difference between motivations determined solely or mostly by the availability and presence of technical tools, and those that are more value-oriented.

Coleman emphasises that in his diagram the social outcome is generated not by the separate actions or characteristics of actors but due to the joint behaviour of individuals. Moreover, the social outcome is not simply an aggregation of separate actions but arises from different combinations and

interdependence among these actions (Coleman, 1987; 1994, p. 10–21). Coleman writes of a systemic action resulting from the interconnected actions of the participants of a system (Coleman, 1986, p. 1316, cit. by Manzo, 2020, p. 203). According to Ylikoski, Coleman denoted the micro-to-macro transition as the 'rules of the game', but did not provide a more detailed definition of the rules (Ylikoski, 2021, p. 55; this is the so-called micro-to-macro problem, in some contexts also known as the "problem of transformation" or "transformation problem", see Manzo, 2020, p. 201–203; for a criticism regarding this transition see Ramström, 2018).

In other words, these rules can be considered the interactions among actors and their impact on each other that generate certain collective effects. Therefore, if the micro-to-macro transition in Coleman's diagram is not just an accumulation of individual actions, then Simmel's concept of social form can be considered to meet the prerequisites for this transition or be the very expression of such a transition. Social form, on the one hand, encompasses interactions evoked by the specific contents of social life, on the other hand, it emerges from actions, or rather, the interactions of actors. Social form as such is defined precisely through the recurrence of interactions. It is not a mere accumulation of individual actions but is characterised by particular qualitative characteristics.

It is certainly necessary to explicate that micro level actors are not homogeneous and do not act identically even under more or less the same structural conditions. For example, not everyone engages in prosumption to the same degree or at all, and not all prosumer practices are evoked or facilitated by digitalisation. As the social science methodologist Andrew Abbott emphasises when writing about causality, the causes determining certain social outcomes are usually complex and number more than one (Abbott, 2001, p. 181). Coleman's diagram is a formal analytical tool designed to explain the mechanism of a specific effect of one social phenomenon on another, without denying that several or more such mechanisms might exist at the same time. In other words, every particular social mechanism is not universal (what might be more or less universal is the idea of a mechanism as such and its proposed visualisation) but is intended to explain certain phenomena. Were it universal, the outcomes of particular macro processes would completely replace the previously existing phenomena, while in reality different social outcomes of the same processes may exist side by side. The heterogeneity of actors provides a complexity of macro-outcomes (Manzo, 2020, p. 202).

Simmel's concept of social form suggests the same: various social forms exist side by side, new contents of social life can emerge or be facilitated by

them, but they do not necessarily replace previous phenomena (e.g., the fact that money-based market relations became dominant does not mean that barter has completely disappeared, as, for instance, some processes led by the ideology of ecology and sustainability exemplify). Thus, various outcomes are to be expected when studying the impact of digitalisation on the organisation of dissemination of scientific knowledge, and these outcomes might not necessarily be those proclaimed by enthusiasts or critics of digitalisation, claiming that it is fundamentally changing or has changed the existing structures.

Therefore, such a Simmelian understanding (coupled with a more systematic explanation of the mechanism of interaction between the macro and micro levels of social life) is instrumental in assessing the social effects of digital technologies (e.g., the impact of a habit to participate on a peer-to-peer basis on the approach to authority and authorship). Social forms or forms of sociation, according to Simmel, constantly emerge, disappear and change, thus prosumption might be considered a *newly* emerging social form namely in the context of digitalisation (as has already been reiterated, prosumption is only conditionally newly emerging and not primarily a digital phenomenon, but digitalisation enables it to exist at a new scale and extent). That is not to say that everyone everywhere will become prosumers, but that prosumption as a form of how individuals relate with each other and towards their environment, due to digital technologies, is more often observed and manifests in different areas of social life. Establishing the extent of this phenomenon is the question to be explored in empirical studies.

As the Simmelian approach encourages exploration of social forms in detail, the following sections of the chapter aim to propose a systematic typology of prosumption. This is done by drawing on the existing classifications, as well as on other conceptual and empirical research of prosumption. The purpose of the proposed typology is twofold. Firstly, it aims to systematically classify possible different forms of prosumption from the prosumer's perspective. Next, a typology is proposed as a formal analytical tool allowing for an assessment and comparison of how prosumption appears in different areas of social life, as well as an evaluation of whether digital prosumption, in particular, manifests in some specific forms.

Digital prosumption might be considered a new variety of prosumption, although the question remains to what extent. Since the digital space is constantly changing and expanding, it is beyond the scope of one study to examine all the possible empirical cases of digital prosumption. The aim here is limited to crafting an analytical tool that would help to systematically assess the variety of prosumer activities.

2.3. Existing classifications of prosumption

There are several classifications proposed by researchers studying prosumption. Some of them are more general and oriented towards a broad understanding of the phenomenon, thus they may serve as background material for further classifications. Others are more detailed or oriented towards specific aspects of certain activities and their content. They complement each other but are based on different classification criteria and, therefore, account for certain aspects of the phenomenon's multifaceted nature. The objective of this overview and assessment of the existing classifications is to clarify their essential characteristics and to identify significant formal features that should be included in the further systematic typology of prosumption.

Ritzer's Prosumption Continuum

George Ritzer proposes an analytical tool – the "Prosumption Continuum", which reveals the extent of an actor's involvement in the production and consumption of a product. The endpoints of this continuum are marked as "Prosumption-as-Production" and "Prosumption-as-Consumption" and in the middle, we find "'Balanced' Prosumption" (Ritzer, 2013). By proposing this tool, Ritzer places essentially all possible productive activities and consumption between the two ends of the continuum.

According to the author, production and consumption are simply the phases of prosumption, which in reality almost always overlap (Ritzer, 2016, p. 10). In this way, a car factory worker might be placed at the end of "Prosumption-as-Production", because, in order to produce a product or one of its parts, a worker uses certain materials and resources, and therefore becomes a user at the same time. At the other end of the continuum, one might place a customer of a luxury brand shoe store, who is essentially a consumer but participates in the creation of their own shopping and brand experience, and thus in some way, according to Ritzer, might be treated as a producer.

The classification proposed by Ritzer is broad and rather abstract, but it opens a way for further, more detailed classifications. In his classification, Ritzer does not delve into the specifics of the activity but aims to demonstrate the scope and range of activities that can be attributed to prosumption, as well as emphasising the fact that traditional producers tend to employ consumers' inclinations to engage in productive practices. The latter observation is very relevant in the digital space as well, and reflects the critical approach towards digitalisation processes. It also indicates the structural approach towards digitalisation processes, which is also implicit in some other classifications.

While Ritzer's classification is considered a suitable starting point for further typologies, an important criticism of his conceptualisation must also be taken into account. As noted by Detlev Zwick, Ritzer's Prosumption Continuum, such as it is formulated, has limited analytical capability, since it places very different activities under the same categories. According to Zwick, it is important not only to distinguish abstractly between the phases of production and consumption but to also pay attention to how certain artefacts are being produced and consumed (Zwick, 2015, p. 488). Therefore, if prosumption is treated as an all-encompassing process with certain theoretical implications ("prosumer capitalism"), it is reasonable for Ritzer to approach it as a continuum. But if the concept is employed as a formal analytical instrument, it is more useful to make a more clear-cut distinction between its different forms.

Chen's classifications of prosumption

The argument on the exploitative character of prosumption elaborated upon by Ritzer is both implicitly and explicitly developed in at least several other classifications. Katherine K. Chen (2015) outlines the potential for exploitation attributed to the phenomenon, proposing to analyse prosumption not only in for-profit organisations but also in state sectors, NGOs and voluntary associations. This approach allows for the further analysis of the adverse consequences of prosumption. Chen identifies them as the following: the immiseration of workers; cognitive overload and suboptimal decision making; deepened stratification; stigmatisation of the vulnerable and increased alienation; and parasitic prosumption (Chen, 2015, p. 447–451). Chen's proposition to assess the effects of prosumption beyond the scope of for-profit organisations represents a broader understanding of prosumption, where it is not limited to economic relations alone and is accounted for in different areas of social life.

Chen also elucidates another aspect of prosumption that Ritzer (2015b) mentions but does not prioritise in his wider critique, i.e., that some prosumer activities are aimed at replacing traditional producers and creating alternative social structures, practices, products and services. In this regard, Chen identifies three forms of prosumption: (1) transformational prosumption (agentic action and meaning-making by prosumers); (2) disruptive prosumption (acting against the generation of profits and orientation towards efficiency, challenging the legitimacy of traditional institutions); (3) prefigurative prosumption (acting towards a desired societal order, enacting new ideas and practices compared to received norms). The latter two types are meant to "disrupt institutions or prefigure desired society" (Chen, 2015, p.

452). This observation is consistent with the concept of "creative destruction" that Ritzer and Degli Esposti (2020a) discuss in the context of digitalisation. They identify prosumption as the precondition and origin of creative destruction (Ritzer and Degli Esposti, 2020a, p. 5) which refers to the empowering potential (for better or worse) of prosumption. In both aspects discussed here, Chen's conception of prosumption indicates, among other things, the diversity of motivations for users to engage in prosumer activities.

Dusi's five types of prosumption

The aspect of exploitation and empowerment is also reflected in Davide Dusi's (2017) typology. Dusi suggests that there are at least five types of prosumption: 1) producer-consumer collaboration in product development; 2) customer self-service; 3) basic digital prosumption; 4) bricolage; 5) collaborative (peer-to-peer) prosumption (Dusi, 2017, p. 4). Nevertheless, in essence, this classification encompasses two broad categories: activities where the traditional producer takes advantage of the productive aspects of consumer practices (the first three types) and those where actors, aiming to achieve their own goals, replace traditional producers and thereby alter the existing structures (the remaining two types).

Therefore, it might be implied that the dialectic of exploitation and empowerment is inherent to the phenomenon of prosumption. However, as it was already suggested in the conceptualisation of prosumption in the previous chapter, for the purposes of a formal analytical investigation it is worthwhile setting aside specific theoretical interpretations that tend to emphasise one aspect or another. Nevertheless, any systematic typology of prosumption should anticipate that the involvement or engagement of a prosumer may be primarily driven by different motivating factors and can possibly take different forms as a result.

Evaluating Dusi's typology, it is also worth paying attention to the fact that the use of social networking platforms is considered to be "basic digital prosumption". However, it should be noted that mere participation in such platforms does not mean that actors engage in prosumption, – a passive consumption of content created by others is also possible (see Denegri-Knott and Zwick, 2012; Fuchs, 2017). Nor does it mean that others (e.g. owners of digital platforms) are not able to benefit from such consumption, but in these cases, users are not participating actively.

Other classifications

The proposition that possible differences between motivations to be involved or be engaged in prosumer practices is an important basis for

classification is reflected in the typology proposed by Marie-Anne Dujarier (2014) as well. While not exclusively committed to the concept of prosumption, she analyses the productive practices of consumers. Dujarier uses the concept of *consumer work* and proposes its typology, evaluating four aspects: 1) the way the work is prescribed and organised; 2) the actual work done; 3) its output; 4) the meaning that the activity has for those who carry it out. Dujarier's analysis is limited to cases where there is a clear producer/supplier of the service, product or infrastructure. Such a producer/supplier is the main beneficiary but is not the same actor who performs the work. Therefore, this conceptualisation is mostly defined by the economic sphere (and, for example, such projects as Wikipedia are not included).

Dujarier identifies three types of users' productive practices: 1) directed self-production; 2) collaborative coproduction; 3) organisational work. In the first type, consumers work in order to consume; this includes activities such as self-service at gas stations, ATMs, self-service checkouts in supermarkets, shopping in electronic stores, etc. The second type is most commonly observed on the internet, where companies are able to exploit the unpaid activities performed by a large number of users. The third type encompasses activities that are carried out in order to choose a product or service as subjectively and to ensure it is as socially acceptable as possible (e.g., looking for information as to whether an item of clothing was manufactured using child labour, when such information is not provided by a producer, Dujarier, 2014, p. 565). However, these types do not include all possible prosumer activities. While consumers in clearly defined commercial spheres engage in productive practices "in order to consume", it can be assumed that prosumers in other spheres might engage in such practices for purposes other than mere consumption. Such purposes include, for instance, creativity or self-realisation (see Chen, 2012).

Piergiorgio Degli Esposti (2016) identifies four types of prosumers, also suggesting that the motivations behind their practices may vary. Degli Esposti (2016, p. 109) proposes that prosumers engage in user productive practices as "makers, fixers, sharers and testers". This classification serves to enhance the comprehension of the multifaceted nature of prosumer practices reflecting the heterogeneity of the spheres and content of prosumption, as well as different inclinations to be a participant. Nevertheless, as the author himself acknowledges, the proposed types are not mutually exclusive, as a prosumer may engage in making and sharing, fixing and sharing, or testing and sharing. The category of "sharers" is distinct from the others, as it indicates involvement in prosumption and the artefacts that result from it are not limited

to private use. Consequently, it is an important criterion for the further development of a systematic typology.

In the advent of the notion of the prosumer, Philip Kotler suggested a classification that also contributes to the explication of the heterogeneity of the phenomenon. It highlights that actors involved in prosumer practices have different levels of skills and experience. This classification is relatively straightforward and not overly complex. It encompasses two "prosumer profiles": The Avid Hobbyist and The Archprosumer (Kotler, 2010 [1986], p. 58–59). The former engages in prosumption to satisfy their interests or express their skills. The latter avoids being a part of a mass-consumer society and using mass-produced products altogether and specialises in different practices to meet their own needs. This, again, indicates different motivations to engage in prosumer practices. Furthermore, it is plausible that having different levels of skills and experience might not only facilitate engagement in productive practices, but also direct users to engage in such activities individually or collectively, depending on their confidence in their skills.

The latter distinction is more thoroughly explored by Ritzel and colleagues (2022). They argue that the decision whether to engage in prosumer practices individually or cooperatively is determined by the motivations of the actors involved. Such an insight is of particular significance when examining prosumer practices from the perspective of an actor. Ritzel et al. distinguish between private prosumer (p-prosumer) and commons prosumer (co-prosumer). Grounding their argumentation on examples from the energy and agriculture sectors, Ritzel et al. discuss individual photovoltaic prosumers who are connected to a power grid, home-gardening (p-prosumers), as well as energy neighbourhoods that implement peer-to-peer energy exchange and are based on algorithmic Smart home energy management systems, virtual power plants as a form of energy prosumer communities, community gardening in urban areas and community-supported agriculture (CSA) initiatives (co-prosumers). Ritzel et al. propose that co-prosumers are more often ideologically and politically motivated, community-oriented and seek common welfare maximisation, whereas p-prosumers tend to exhibit a greater proclivity towards independence from commercial value chains and autonomy (Ritzel et al., 2022, p. 303). As this typology is based on the analysis of specific activities, it includes mostly those forms of prosumption where alternatives to established structures are created to satisfy the needs of prosumers and, therefore, it does not exhaust the heterogeneity of prosumption in its entirety.

2.4. A new typology of prosumption

A systematic formal typology of prosumption should allow for an understanding of the intensity and extent of specific prosumer activities, it should also contribute to at least a partial understanding of the actors' motivations to engage in such activities. The existing classifications indicate that there are differences in motivations between different actors and activities, so it is worth capturing this in a more detailed way. Admittedly, specific motives vary and might be very particular to one or another activity. Nevertheless, it is necessary to consider certain characteristics of activities and actors when attempting to develop an analytical instrument that would direct empirical research towards a more detailed examination of prosumers' motivations.

Prior to elaborating on the classifying criteria for the proposed typology, it is possible to identify certain characteristics that are attributed to prosumption in the classifications discussed above, yet which overlap or are dialectical. It was already explained that the exploitation/empowerment distinction is essential to prosumption but the interpretation and explanation of particular activities in this regard depends on the point of view of the analysis and the theoretical approaches applied. It is conceivable that both characteristics can be inherent in the same activity. There is a dialectical relationship between production and consumption, and prosumer practices often maintain this character, i.e., some conditions to engage in empowering practices (technological, etc.) exist precisely because they benefit someone.

Another condition that is very important in the development of some features and directions of prosumption is the space where they occur – is it digital, *real*, or the space that connects them. Many prosumer activities first and foremost occur in the digital space, and this is where the actors are most actively involved in such activities. Moreover, the digital space enables prosumption in potentially new directions. However, some of these activities (e.g., customer self-service) can take place both in the digital and the *real* space, and this is not necessarily an essential characteristic of those activities. The extent to which certain forms of prosumption are more specific to the digital space is a question that can be best answered through empirical studies. In order to achieve this, systematic analytical instruments are needed that form the basis for the evaluation of the totality of such practices.

Assessing the existing classifications of prosumption, it is now possible to formulate several criteria for a formal systematic typology. These criteria reflect the heterogeneity of activities that fall under the concept of prosumption, while also pointing to the different motivating factors

influencing the actors engaged in prosumption. As they are not equally evident, they require a different extent of explication. The criteria for the proposed typology are the following:

a) The nature of prosumer activity in terms of cooperation, i.e., private (individual) or collaborative. This feature is implicit in almost all the aforementioned classifications. When evaluating prosumer activities from the perspective of an actor, the feature of collaboration is important as it may facilitate the motivation to act and become involved in certain activities. On the other hand, individual participation may indicate the importance of a combination of some other features (e.g., skills).

b) The initial reason to engage in a particular prosumer activity. As mentioned above, in a clearly economic sphere, consumers usually take on productive practices to obtain a particular product or service for their own use. However, the concept of prosumption is applicable to other spheres of social life as well. In reference to other classifications, the inclination for some prosumers to share artefacts that are made, fixed or being tested was captured by Degli Esposti (2016; his other three categories – "makers, fixers and testers" – could be further employed as sub-categories in even more fine-grained analytical instruments than the one developed here). Moreover, this criterion is identified taking into account Chen's indication that prosumption could be understood as both a means and an end, and may be intended as creative activities (Chen, 2015, p. 447; see also Chen, 2012). The specifics of Dujarier's classification ("[work] in order to be able to consume", Dujarier, 2014, p. 562) are also considered.

Furthermore, manifestations of prosumption discussed by Ritzer indicate that only some prosumer activities are tied exclusively to consumerist inclinations ("Prosumption-as-Production" and "Prosumption-as-Consumption"). Although Ritzer positions these forms on a continuum, the very idea of a continuum is set aside here for several reasons. Firstly, the rules for the construction of a typology require that the criteria and the types developed do not overlap, i.e., they must have clear distinctions and must be mutually exclusive. Secondly, Ritzer's conceptualisation of prosumption is tied to specific theoretical implications (the Prosumption Continuum is employed by Ritzer to develop argumentation for "prosumer capitalism"), whereas the typology formulated here is sought as a formal analytical instrument that is not tied to specific interpretative contexts. Admittedly, almost every typology of social life consists of ideal types around which the empirical referents are more or less centred. Therefore, the social reality is most likely to be more akin to the continuum. However, for formal analytical

purposes and in order to explicate on the heterogeneity of prosumption, it is necessary to delineate boundaries between the classifying segments.

c) The required or preferred skills, meaning whether specific technical or professional knowledge facilitates involvement in a particular prosumer activity. Ritzer's broad conceptualisation, as well as Kotler's types and the analysis of prosumption by Chen (2015, p. 449) indicate that prosumption includes some activities that require specific skills, or that having some skills may facilitate participation. Moreover, a particular prosumer can be more skilled in certain activities than in others. Therefore, different motivations may be needed to engage in an activity with or without some specific skills. This criterion comprises any technical knowledge and skills, as well as specific competencies and knowledge of certain topics.

The typology of prosumption based on these criteria is presented in Table 2. Such a typology is a formal one, i.e., it details the different forms this phenomenon acquires in both the *real* and digital space. Establishing whether some forms are more specific to the digital space, or if any forms are more common or more representative of exploitation, whether the user-generated content is a creation, or maybe even something harmful are questions for empirical studies and research into the particular content of prosumer practices.

Table 2. Typology of prosumption

	Particular skills are required or preferred		**No particular skills are required**	
	Private	**Collaborative**	**Private**	**Collaborative**
Prosumption for sharing	(1) skilled sharer p-prosumption	(2) skilled sharer co-prosumption	(3) amateur sharer p-prosumption	(4) amateur sharer co-prosumption
Prosumption for own use	(5) skilled user p-prosumption	(6) skilled community prosumption	(7) amateur user p-prosumption	(8) amateur community prosumption

The proposed typology consists of eight types of prosumption (the way they are titled incorporates some notions from other authors' classifications, see Degli Esposti, 2016; Ritzel et al., 2022). The resulting types refer to several differences between prosumers. They are identified as sharers and users, as skilled and amateur. "Community" in the titles of the types indicate that prosumption can take place in more or less closed groups to primarily

satisfy the needs of their members, whereas the collaborative prosumption of sharers is identified as co-prosumption.

Although the proposed typology is formal, it is necessary to ascertain whether all the types do have or may have empirical equivalents and are meaningful:

1. *skilled sharer p-prosumption*: creating electronic music while using digital tools (Born, 2022, p. 316) or specialised apps, such as GarageBand; creating YouTube gamer videos (see Chia, 2021); writing a blog in one's free time on one's professional topics (see Davis, 2014);

2. *skilled sharer co-prosumption*: user engagement in the development of open-source computer operating systems and software; user-generated maps on platforms such as Wikimapia and OpenStreetMap (see Bittner and Glasze, 2021);

3. *amateur sharer p-prosumption*: creating lip-sync (imitating singing along to a music track) videos on TikTok; writing fanfiction on social media or other platforms (see Jones, 2011);

4. *amateur sharer co-prosumption*: citizen science initiatives in the *real* space, as well as carried out via digital technologies (e.g., Foldit); Wikipedia;

5. *skilled user p-prosumption*: DIY-type work (repairs, sewing, coding one's own internet page, etc.) performed by individuals with particular skills instead of hiring others; prosumption of medicines enabled by digital technologies and allowing users to bypass professional "gatekeepers" (see Liu and Lundin, 2020); making solar energy for one's own use, or growing one's food (the traditional way or by incorporating new technologies, see Vicdan et al., 2024);

6. *skilled community prosumption*: crypto-currency mining collectives; Energy Neighborhoods and Virtual Power Plants (see Ritzel et al., 2022);

7. *amateur user p-prosumption*: user-curated music playlists on Spotify and other music platforms (see Durham and Born, 2022); monitoring one's own health via digital devices and apps; online political participation via social media platforms, gaining information to make political decisions (see Yamamoto et al., 2020); self-service in supermarkets, ATMs, electronic shops;

8. *amateur community prosumption*: community-based services, such as sharing food and other goods (see Norbutas and Corten, 2018); Maker communities and Fablabs (see Cenere, 2022); music and literary social media fandom groups engaged in enhancing and producing their own experience, e.g., Jane Austen reader communities on Instagram and Facebook (see Krueger, 2019).

The list of examples is not exhaustive and is subject to further updates. Its purpose is to verify whether each type has observable or potential empirical cases. Arguably, however, any particular prosumer activity should qualify as one of the types above. Moreover, some digital platforms may cover several types of prosumer activities. For example, non-specialised social networking platforms (Facebook, X, TikTok, etc.) can also be used for purposes related to some professions. That is the case because many digital platforms are both a space and a means of prosumption (Ritzer and Degli Esposti, 2020b, p. 355); and if they are complex, then there may be numerous possibilities in how they could be used, depending on the goals, needs and skills of the user. It is also important to reiterate that the mere use of social networking platforms does not necessarily indicate that the user is engaging in prosumption as an active participant. Therefore, there is a need for empirical studies of specific activities in order to gain a deeper understanding of the phenomenon. When employing the proposed typology as an analytical tool for prosumer activities, it would be worthwhile to further approach such activities at the individual level, which would allow uncovering the specific motivations of actors and compare them between types.

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In order to demonstrate the application of the suggested analytical model (Coleman diagram + Simmelian social form (including typology)) in evaluating the outcomes of digitalisation as a prosumption facilitating factor on the organisation of the creation and dissemination of scientific knowledge, there are several questions that need to be addressed. First, in what forms does prosumption as a user productive practice manifest in this sphere? Second, what factors (values, habits) motivate individuals to engage in such activities? Both of these questions are important in order to demonstrate the functioning of the mechanism and to assess the possible outcomes of this process (i.e., node D in the diagram) in regard to the assumptions of techno-optimists and techno-pessimists.

The following chapters of the thesis outline the empirical analysis of manifestations of prosumption in the creation and dissemination of scientific knowledge. The goal is to demonstrate the fecundity of the analytical tools developed here for our understanding of prosumption and the particular social effects of digitalisation. One of the advantages of Coleman's diagram is that in linking the micro and macro levels it enables us to integrate data of different types into a methodological whole, depending on the theoretical approach chosen and on the part of the mechanism that is being analysed (see, for example, Taylor, 2010, p. 457). Therefore, a phenomenon or a process that one seeks to explain is approached from different angles and the same mechanism is potentially applicable to variations of the same phenomenon.

To this end, analyses of European citizen science projects and Lithuanian prosumer projects in the creation and dissemination of scientific knowledge are carried out in the following chapters. The first objective is to clarify the nature and main features of such initiatives and the content they generate. The analyses aim to indicate the characteristics of creators and participants in these projects, their operational and organisational structure and thematics. In other words, the purpose of the formal analysis is to explain in what particular instances and how prosumption as a social form manifests itself. The elaboration of these characteristics should help to identify the possible implications of such activities in the wider context of the organisation of the creation and dissemination of scientific knowledge, i.e., to assess the possible social outcome of digitally facilitated user productive practices. Following that, the focus of analysis is narrowed down to concentrate on the examination of the motivations and attitudes of creators and participants in Lithuanian science-related prosumer projects. The qualitative approach employed there allows understanding the nature of these motivations and how they relate to the principles of digitalisation, as well as grasping the viewpoints underlying these practices and their correspondence to scientific norms.

3. PROSUMPTION AND SCIENTIFIC KNOWLEDGE: CITIZEN SCIENCE

In this thesis, activities denoted as citizen science are considered a special form of prosumption in the creation and dissemination of scientific knowledge and are not exclusively related to digitalisation. It is a rather institutionalised variant of prosumption. Considerably systematic data on citizen science at the European level, which is registered on the platform EU-Citizen.Science, enables an analysis of the characteristics of this phenomenon. These projects are analysed in the following section. It is important to ascertain that the objective of this analysis is not to present entirely definitive findings, but rather to enhance comprehension of the phenomenon referred to as citizen science, as this concept overlaps with that of prosumption in the field of science.

The hierarchical cluster analysis method is applied to assess the heterogeneity of citizen science activities and the forms they take. The correspondence of the empirical sample of citizen science to the theoretical definition of the phenomenon and its coverage is assessed. Moreover, the proposed typology of prosumption is applied to indicate which types of prosumption correspond to the empirical expression of the citizen science phenomenon. Overall, the analysis of citizen science is based on the assumption that, in the context of digitalisation, these activities are mostly oriented towards the use of a technical structure on behalf of scientific and other institutions in order to extend the possibilities and scope of user involvement and to generate certain resources. In other words, in the context of this study, contemporary citizen science may be treated as an institutional response to the digitalisation processes and to the tendency of users to engage in productive practices, as well as to the conditions for such activities, created by digital technologies (a part of the social outcome or node D in the Coleman diagram). Therefore, in this chapter, I also discuss citizen science as a way to crowdsource resources and briefly review and assess some typologies of citizen science that include the virtual dimension.

3.1. Theoretical definition and empirical equivalent

The documents of the European Citizen Science Association (ECSA) provide a very broad description of citizen science to which a wide range of activities could be attributed: from individual to large group activities in various scientific fields, initiated and organised by citizen-scientists themselves,

professional scientists, scientific institutions, non-governmental organisations or public authorities. The definition also foresees that non-professionals can participate or be initiators in any or all the stages of the research process (ECSA, 2015; ECSA, 2020). *Community science* can also be attributed to citizen science, but there is no final consensus regarding its attribution. One of the main features of community science is that the research problem is formulated by the community in a specific situation or location, and professional scientists participate as consultants helping to organise and conduct research relevant to the problem being solved. Such activities are usually related to environmental activism and other local problems, where the local community seeks scientifically based arguments to consolidate its position.

Some authors consider community science as a type of citizen science, others – as a separate activity (see Hakley, 2013, p. 109; Krick, 2022, p. 997–998; Strasser et al., 2018, p. 58; Wiggins and Crowston, 2011, p. 2). This depends on the very definition of citizen science that is being employed: to what extent does it install a hierarchy in the research process, also, is there an expectation that such activities must comply with the strictly defined rules and procedures of scientific work (Sieber and Slonosky, 2019, p. 165). It is noteworthy that in the methodologies of social sciences, this kind of approach is paralleled by the notion of participatory research.

Several studies have already pointed out the multifaceted nature of the notion of citizen science and its definition, demonstrating the complexity of assigning particular activities to this concept (see Haklay et al. 2021; Ozolinčiūtė et al. 2022). However, it can be argued that in practice citizen science is usually understood and this concept is applied rather narrowly: as an activity initiated or mediated by professional scientists or scientific institutions (in some cases, non-governmental or governmental organisations), where non-professionals are involved only in a particular stage of the research. Non-professionals are usually tasked with collecting, classifying, and sometimes – analysing and disseminating data (Hakley, 2013, p. 105–106). This observation is further supported with the analysis of the platform of citizen science projects created by ECSA with its partners[17].

[17] https://eu-citizen.science/projects

Data and method of analysis

At the time that this analysis was conducted, there were 258 citizen science projects initiated or carried out in the European countries registered on the EU-Citizen.Science platform (the complete list of projects under analysis is presented in Appendix 1). The data was collected in the summer of 2023[18]. Projects are registered on a self-reporting basis; therefore the information provided on the platform is not entirely consistent. Although the platform creators ask citizen science project initiators to provide certain characteristics of their initiatives, not all of these are described in the same way or to the same level of detail. Therefore, although the platform allows projects to be filtered according to certain criteria, each project was coded separately for the analysis presented here. Cases are coded according to the following criteria:

- project initiator (scientific institutions, including public and private scientific institutions, museums, departments of state institutions conducting research, etc.; NGOs; non-institutional initiators, including individual non-professionals or groups of non-professionals, individual scientists or groups of scientists, non-affiliated with scientific institutions as their employees for the particular citizen sciences project);
- tasks assigned to participants (tasks that only involve data collection, classification, tagging and labelling, and/or distributed computing; tasks that also involve data analysis, participation in formulating the research problem, interpreting data, making conclusions and disseminating them; other tasks, e.g., DIY);
- whether the project is theoretical/administrative (i.e., the purpose of the project is not to conduct research but to analyse engagement in citizen science, promote understanding and participation in citizen science, as well as administrating projects, etc.);
- field of research (biology/biodiversity; environment; astronomy; other natural sciences; technical sciences and IT; social sciences; humanities; various);
- geographical coverage of the project (local/national and international).

[18] Following the collection and analysis of data presented in this thesis, modifications were made to the website's structure, therefore, this database should be considered a dynamic entity that is subject to constant updating.

The detailed coding scheme is provided in Appendix 2.

These criteria were chosen in order to evaluate the specificity and diversity of citizen science projects, as well as to determine the dominant organisational structure of such projects and what role is commonly attributed to non-professionals. Project initiators, tasks assigned to the participants and characteristics of the locality of projects are also distinguished in other studies as important criteria for explaining the specifics of non-professional engagement with science (for an overview, see Schrögel and Kolleck, 2019), therefore, the results of the analysis presented below are also comparable in the context of a wider field of research.

In order to define and determine the diversity of citizen science projects, descriptive statistics and hierarchical cluster analysis methods were employed. The number of possible clusters and their characteristics allow examining the heterogeneity of European citizen science projects. The aim of this analysis is to assess the proposition that even though the scope of citizen science outlined in its formal definition is broad, in practice it is a rather specific activity characterised by hierarchical organisation and the assignment of narrow, specific tasks to non-professional participants. This analysis should be regarded as exploratory rather than definitive due to the limitations of the scope (only projects carried out in Europe and registered on one particular platform, which is constantly updated with new projects) and nature (registered on a self-reporting basis, subject to certain inaccuracies) of the data. Nevertheless, it permits the formulation of several noteworthy observations.

It should also be noted that this analysis does not aim to present any specific typology of citizen science projects as such, therefore the clusters are not assigned labels, as is usually done in the case of formulating typologies. Hierarchical cluster analysis as a strategy and method for clustering was chosen due to the nature of the data – it was conducted based on categorical variables. Hierarchical cluster analysis is indicated in the literature as a suitable methodology for categorical variables (see Andreopoulos, 2014; Henry et al., 2015; Guest and McLellan, 2003; Macia, 2015). Overall, clustering methods are employed to group cases based on their similarity, as determined by their variable values. However, the prevailing distance measures – most notably those based on numerical differences – are not suitable for nominal or ordinal data. As noted by Laura Macia (2015), nominal variables, in particular, are characterised by an absence of inherent order, thereby precluding meaningful comparison or measurement of categories in terms of distance. To address this limitation, qualitative data are converted into

binary form to indicate the presence or absence of a particular attribute (Macia, 2015, p. 1086). This can be regarded as a particular limitation of applying hierarchical cluster analysis to qualitative data, since such clustering is less nuanced and more sensitive to the predefined logic of the chosen variables used to define the data. Therefore, it is imperative to acknowledge that the findings of such an analysis should not be considered definitive. Primarily, the analysis is regarded as exploratory in nature.

A general term for methods that group a sample of cases in certain arrangements is hierarchical agglomerative clustering (as opposed to hierarchical divisive methods; see Beckstead, 2002, p. 309). In this approach, each case is initially treated as a separate cluster. The aim is to identify the most similar cases based on their values across different variables. Therefore, the cases that are closest to each other are grouped together step by step in a hierarchical manner, until the clustering culminates in one overarching cluster. Deciding on which exact level of clustering results in a meaningful result and choosing the final number of clusters is always left to the researcher who evaluates the data, the specifics of cases and the theoretical and methodological questions that arise.

Hierarchical cluster analysis as a method is useful in that it allows grouping of cases without predetermining a specific number of clusters. This offers an overview and understanding of how the cases group initially before proceeding with the determined number of clusters. Therefore, before deciding on clusters, a hierarchical cluster analysis was conducted without first specifying the number of clusters. Clustering was performed using the IBM SPSS Statistics (version 29.0.1.0) program, applying Ward's method (with Euclidian distances[19]) which clusters cases into groups of approximately the same size. The resulting dendrogram (see Appendix 3) indicated that the most robust and logical result is to distinguish between four clusters. Alternatively, it was also possible to form five clusters, but since the cases are rather homogeneous breaking them down further is not reasonable. It was also possible to settle on three clusters, since the third and fourth are almost identical, but they were nonetheless separated due to the following characteristics.

[19] Choosing the distance measure for the binary data is not entirely obvious since the nature of data (qualitative) does not allow for the robust measuring, and literature indicate several measures can be appropriate to this end (Macia, 2015); the present analysis followed the example and explications of other research on qualitative data, see Henry et al., 2015.

Results

In order to obtain a general understanding of the analysed cases, the frequencies in the data set according to different variables were counted. Exploring the diversity of initiators of citizen science projects (N=257; N/A=1), data indicate that the majority – three quarters of all cases – are initiated by scientific institutions (private or public, museums, departments of state institutions conducting or commissioning research): 23% of the projects analysed are initiated by NGOs. Some of these NGOs focus on specific topics, such as environmental issues, some are created to solve the problems of specific communities, and some focus purely on the implementation of citizen science projects.

Projects initiated by a group of independent researchers, or by individual non-professionals or their communities, account for almost 2% of all cases. Examples of such projects include a private initiative to create a hiking trail connecting museums in one of the Italian regions, more or less formal projects led by private scientists, and cases that may at least partly be assigned to the notion of community science, such as measuring snow cover in the mountains led by a community of mountaineering enthusiasts or an initiative by astronomy and environmental protection enthusiasts to measure light pollution levels in the night sky.

In terms of the tasks assigned to participants in the projects analysed (N=258), most are focused on data collection, classification, tagging, labelling and distributed computing. Such cases account for 76% of all projects. Slightly more than a tenth of all projects involve non-professionals in the analysis, data interpretation and other research stages. Another tenth involves participants in other tasks, such as learning, DIY, etc.

According to the field of research, the majority (74%) are citizen science projects related to the natural sciences. Within it, a large separate group consists of initiatives dedicated to biology and, specifically, biodiversity (36.4%): 14% of all cases are listed as intended for the social sciences. But, as noted previously, these are mostly (although not exclusively) theoretical/administrative projects that are focused more on the development of citizen science and its applicability than on solving specific scientific problems. It is also noteworthy that the relationship between citizen science and the social sciences is a question for a separate discussion, since participatory research methodology in the social sciences partly corresponds to what is understood as non-professional participation in the natural sciences, although it is not necessarily labelled as citizen science in the former. This follows both from the specificity of the object of the social sciences and from the epistemological approaches and methodological practices of these sciences.

The hierarchical cluster analysis allows for a more detailed exploration of the tendencies within a data set. According to its results, the main characteristics of the first cluster (58 cases, for the relevant section of the dendrogram, see Figure 2) are that projects are mostly initiated and organised by non-governmental organisations. Data collection tasks dominate, and these projects are somewhat more often related to the topic of biology, but not exclusively.

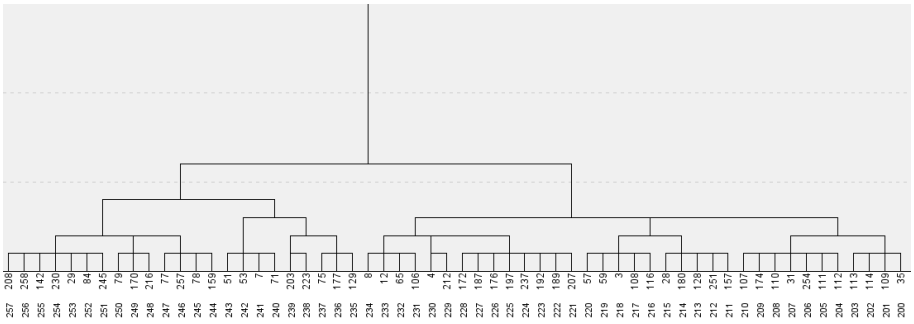

Figure 2. I cluster of citizen science projects.

The second cluster (see Figure 3) is most conspicuous and interesting – assigned to this group are the theoretical and administrative projects (this aspect was one of the variables used to describe data and it became the main indicator for assigning cases to this particular cluster, which again points out that in other aspects the analysed citizen science projects are rather homogeneous). Although this cluster is the smallest (46 cases; including all three Lithuanian cases in the data set), it could be thought of as reflecting a particular trend – the orientation of scientific institutions and NGOs to promote and develop citizen science projects, which is in line with the expectations and requirements at the policy level of scientific organisations and science as an institution, as well as, presumably, with funding streams. The topic of social sciences dominates in this cluster (related to the identification of problems faced by local communities or the development of citizen science methodology, its promotion, the development of citizen science tools, the evaluation of its influence, etc.). In the projects assigned to this cluster, participants are often foreseen to engage with the greatest variety of activities. However, this could result from the fact that at least some of these projects do not carry out any specific research but only plan to promote them, or mediate in the implementation and formulation of more than one citizen science initiative.

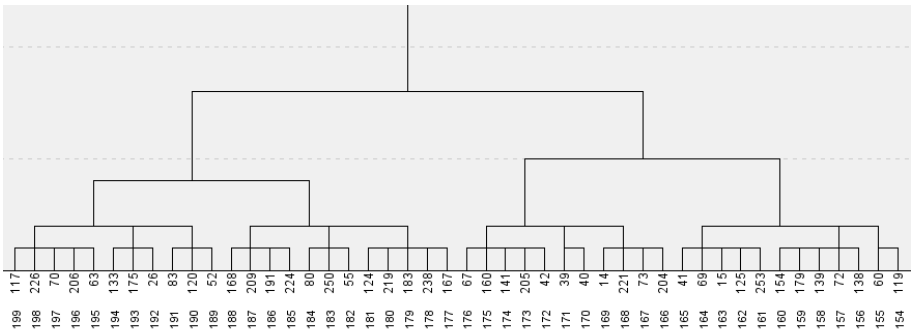

Figure 3. II cluster of citizen science projects.

Cases from the third cluster (see Figure 4), compared to the fourth, are more specialised and focused on the topics of biodiversity and the environment. This is one of the larger groups, possibly due to the geographical distribution of data characteristic to these research areas, and because different localities are a key aspect of these topics. The projects assigned to the third cluster (63 cases) are mainly initiated by scientific and other public institutions, participants are usually asked to perform data collection tasks, and these projects are slightly more often local/national.

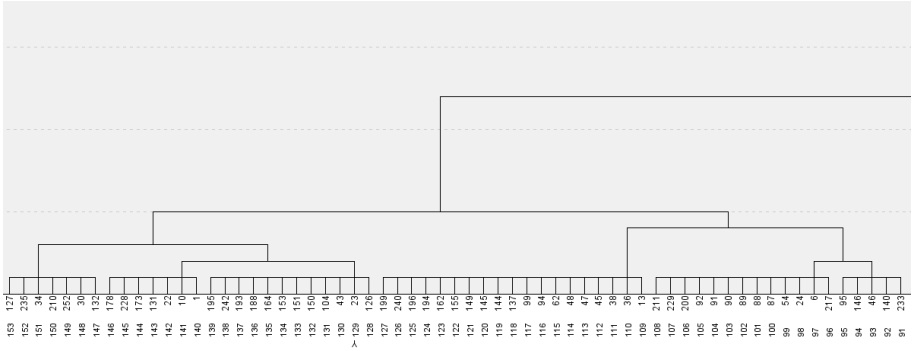

Figure 4. III cluster of citizen science projects.

The fourth cluster is the largest (90 cases, see Figure 5). It, in essence, corresponds to the same characteristics as the third one, except that thematically it is not concentrated on a specific topic but projects mostly deal with the natural sciences in general.

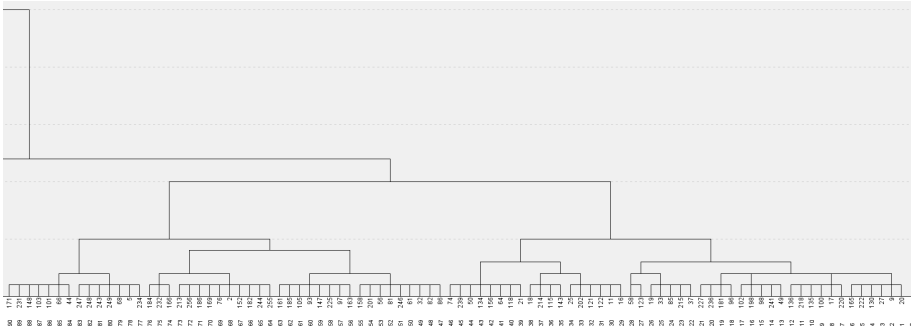

Figure 5. IV cluster of citizen science projects.

It is also noteworthy that there are no clusters based on variables indicating that the project was initiated by non-institutional actors or those that would indicate the greater involvement of participants in the research process, as the data analysis revealed. Hence, although such citizen science projects do exist, they are quite rare overall.

To summarise, the analysis results suggest that citizen science, in principle, is an activity initiated by institutions where non-professionals are typically assigned narrow, specific tasks, mainly for data collection. In other words, based on broad theoretical definitions of citizen science, one might expect diversity in the types of initiators, tasks performed and research topics. However, in practice, these projects tend to be quite homogeneous. This also confirms that the practice labelled as citizen science is only one of the possible forms of non-professional participation in creating and disseminating scientific knowledge, usually hierarchical and organised by institutions. Losi (2023) has reached similar conclusions, albeit from a different perspective and relying on different data, in her empirical study focused on ways people engage with science.

3.2. Non-professionals as a resource

In a broader context, in light of digitalisation and related processes, citizen science can be regarded, according to its dominant understanding, as a form of crowdsourcing (see Baudry et al., 2022, p. 401). Admittedly, some authors highlight significant differences between citizen science and crowdsourcing projects: the latter are seen as less defined, more open, usually organised and executed via digital platforms, and requiring less preparation and skills from participants. Conversely, citizen science is characterised as more structured and less open to self-organisation (see Sieber and Slonosky, 2019, p. 165). Nevertheless, the boundaries between these two types of activity and

organisation are somewhat blurred and can be viewed as different levels of involvement.

Therefore, it can be argued that, in the most general sense, the organisation of citizen science projects is top-down. In a process with a clear hierarchy, the centre of power and the primary decision-makers in the research process are professional scientists who treat non-professionals as a particular resource. This resource can be:

1. cognitive – to recognise, understand, register, classify or analyse data;
2. technical – volunteers allow scientific institutions or research project groups to use the computing power of their computers by connecting them to designated networks, as well as projects collecting data from devices owned by volunteers and data-collecting apps installed on such devices;
3. financial – crowdfunding projects.

It should be noted that assigning the last two groups to citizen science is conditional and debatable. If citizen science is understood as activities involving non-professional participation in the research process, then its funding – despite not occurring in a traditional institutionalised manner – is external to this process. Participation, seen as an active engagement, is minimal in providing both technical devices and funding (some authors refer to this as "task granularity" to describe participation intensity, see Nov et al., 2011, p. 1–2). If a distinction is made between participation in science governance and the research process, funding would be attributed to the former. Meanwhile, providing technical resources could be viewed as the most passive form of involvement in the scientific process.

A tendency to involve non-professionals in the research process may arise from the necessity to gather and process data that are widely geographically spread or that require significant time or technical resources to collect and record. Common examples include various projects for monitoring and recording the distribution of birds and other biological species, as well as initiatives for classifying astronomical bodies, weather data, and geographic information collection and analysis.

Furthermore, the tendency to include "lay people" or the public also stems from the demands and expectations placed on the scientific process by political institutions, that is, a desire to make the scientific process more open, democratic and accessible to the public (Krick, 2022, p. 995; Strasser et al., 2018, p. 54). This aim is sometimes described as a "participatory turn", a concept originally used in analysing political decision-making processes; however, its meaning and rationale are understood ambiguously within the

scientific community (Strasser et al., 2018, p. 53; see also Mede and Schäfer, 2020, p. 481–483; Krick, 2022, p. 995; Jasanoff, 2003). Ultimately, the opportunity to involve non-professionals in scientific processes more easily and on a larger scale has arisen due to the conditions created by information and communication technologies.

However, the internet and digital technologies that facilitate large-scale cooperation and provide quicker, easier access to scientific knowledge and information also enable ordinary users to organise and conduct more or less scientific projects independently, as well as to engage personally in disseminating scientific knowledge. These technologies make it simpler for users to take part in certain activities by bypassing traditional structures and organisational methods, effectively allowing for bottom-up organisation. Consequently, participants can become active agents rather than just performers of well-defined and organised tasks. At this point, the concept of prosumption may serve as a valuable analytical tool to explain how digitalisation affects the organisation of both the creation and dissemination of scientific knowledge.

It is noteworthy that, in some cases, non-professional projects can also be initiated by or through a specific "centre" that provides an organisational structure (e.g., Wikipedia, which offers users a technological framework; also, social networking sites that can be utilised to coordinate activities). However, the fundamental difference from citizen science projects is that the creators or such platforms largely do not control and do not always establish strict overarching rules regarding content, its format and nature, information collection procedures and sources or content utilisation (although the owners of commercial platforms regard users as a resource in a different sense). And where rules are established in some cases, they are set and refined by the non-professional participants themselves.

When discussing the characteristics of citizen science, it is important to emphasise that it is commonly defined as an activity based on collaboration among many participants. Analysis of projects registered on the platform EU-Citizen.Science supports this view – all projects analysed were collaborative. On one hand, this may be because science is generally perceived as the natural and exact sciences (particularly in English-speaking cultures), which are inherently cumulative and where major discoveries often result from the cooperation of many scientists, either in real-time or historically. On the other hand, the established understanding and practice of citizen science do not fully account for the changing conditions that allow non-professionals to access equipment (often simplified) and scientific information, and to engage

independently and individually in research activities and the dissemination of scientific knowledge.

3.3. Citizen science and digitalisation

It is important to recognise not only the current popular understanding of citizen science but also its original and broader definition, proposed by Alan Irwin in 1995 (Irwin, 1995, p. xi, 105–111; Richard Bonney introduced a similar – though somewhat narrower – definition at around the same time, see Strasser et al., 2018, p. 53–54). According to Irwin, citizen science encompasses, among other aspects, the creation of scientific knowledge outside the traditional bounds of scientific institutions (he also highlighted the role of scientists as citizens, Irwin, 1995, p. 9–17). Nevertheless, Irwin's definition indicates that even when citizen science occurs outside academic institutions, it remains largely influenced by the norms and values of institutional science (Strasser et al., 2018, p. 54).

Therefore, when considering the impact of digital and internet technologies on the organisation, processes and content of science, even the broadest definition of citizen science cannot fully capture this potential impact (if it exists) because the concept is rooted in a specific logic and its way of working. Everything that does not conform to this logic remains outside the scope of the concept of citizen science. This is reasonable – a concept's definition must have clear boundaries. However, this raises the question of whether the concept of citizen science exhaustively encompasses all the possibilities and forms of non-professional participation in scientific activities and the dissemination of scientific knowledge.

A radical example would be that pseudo-scientific or anti-scientific projects might fall out of sight, even though they may reflect the relationship to science and how people understand science in certain parts of society. The existence of different kinds of user-generated projects may also influence the perception of the authority of science and scientists. According to the internal logic of scientific research itself, this question is not directly relevant, but such a perspective allows us to observe and trace certain processes that could affect how science's status as an institution is perceived.

Confining ourselves to the discussed concept of citizen science and its logic of acting, one could assume that digitalisation does not fundamentally alter anything but merely enables a new scale and allows for its easier organisation. Bonney and colleagues noted that the development of internet technologies prompted a swift increase in citizen science projects (Bonney et al. 2015, p. 3). It should be noted that certain types of citizen science

incorporate the aspect of virtuality, though the basis of some classifications remains subject to debate. A typology proposed by Andrea Wiggins and Kevin Crowston (2011) identifies five types of citizen science projects: action, conservation, investigation, virtual and education. Projects are considered virtual if they are carried out solely using information and communication technologies, without any physical components (although it could be argued that computer equipment and other technological devices are physical elements). It is difficult to convincingly define this particular type solely by the medium – the technology used to carry out projects – when the other four types are distinguished on a different basis. It could be argued that all other types of projects can occur in the digital space to a greater or lesser degree if needed. The authors note that in virtual projects, volunteers apply heightened human perceptual abilities to recognition and classification tasks that are too challenging for computers (Wiggins and Crowston, 2011, p. 7). In other words, volunteers do precisely what humans have always done when performing similar tasks.

On the one hand, if the only reason to consider everything created with a tool as innovative and the fact of it being specific is its novelty, there is a risk of overemphasising the tool itself. The clear divide between the digital and real space could be challenged as digital technologies encompass more areas and become more integrated into daily life. On the other hand, the unique and specific effects of digital and internet technologies are no longer examined in detail once such a distinction is made.

The type of "citizen cyberscience", described by Francois Grey, could be considered more accurate and better defined: computers, GPS devices, mobile phones and other equipment are used as scientific instruments in such citizen science projects. This type has several subcategories: volunteered computing – only the volunteers' computers, connected to a designated network, are used; volunteered thinking – participants also perform particular tasks; participatory sensing – smartphones and other devices are used to gather information about the environment and project volunteers (cit. according to Haklay, 2013, p. 109–110).

However, this classification and assignment of activities to citizen science also raises some questions, such as the uniqueness of the second subcategory, which is similar to the previously discussed typology. On the other hand, as mentioned earlier, when only participants' devices are used, it is debatable whether such activities can reasonably be considered citizen science as a form of participation. Nonetheless, the advantage of this classification is that it provides more detailed descriptions of the specific and potentially new features that the internet and digital technologies bring to

citizen science. However, even in this case, the full range of possible forms of non-professional participation in scientific or science-related activities remains uncovered, as the concept of prosumption would permit.

3.4. Citizen science as a type(s) of prosumption

By analysing citizen science as activities that involve users in productive practices, it is possible to describe these activities as various forms of expression of a particular social form, namely prosumption, within the realm of science. According to the proposed typology of prosumption, citizen science would fall under type 2 (skilled sharer co-prosumption), 4 (amateur sharer co-prosumption), or 8 (amateur community prosumption), depending on the project's objectives, its origin and the technical and other preparations needed for participation. In this typology, prosumers are not regarded as professionals who are paid for their work (e.g., researchers working within scientific institutions).

Nevertheless, some participants may possess knowledge and skills that can be applied to specific prosumer activities. For instance, taking part in a citizen science project like "Foldit", a computer game aimed at modelling protein configurations, might require certain computer skills, among other things. However, it should be noted that citizen science projects are typically organised to include the widest possible range of participants, with the goal that activities can be performed with as little specialised knowledge as possible.

Furthermore, by proposing to view citizen science as a type(s) of prosumption, the perspective shifts. It is no longer viewed from the standpoint of professional scientists, scientific institutions or science policy makers, but from that of the laypeople or non-professionals involved in such activities. The aim of further analysis using this framework would be to identify who the participants in prosumer activities are and what motivations drive them to engage in creating and disseminating scientific knowledge.

The motivations and characteristics of participants in citizen science have already been studied, though these studies are limited in scope and diversity. One study examined the motivations of individuals involved in science crowdfunding projects. Although it was noted that classifying crowdfunding projects as citizen science is debatable, some findings from this study can be interesting and valuable. Valerie Hase and colleagues (2022), analysing the scientific projects section of the Swiss crowdfunding platform "wemakeit", discovered that only a small, unrepresentative segment of the population is involved in funding these initiatives.

The study concluded that participants have higher than average education and income, are older than those who fund non-scientific projects on the same platform and about a third of participants are scientists themselves; men and women participate equally. Among the possible motivations, it was found that participants are usually interested in science and have a positive attitude towards it; they are familiar with the project initiators or someone from the scientific community (Hase et al., 2022, p. 993, 1004, 1006). Researchers who have analysed other science crowdfunding projects report the following motivations among participants: interest in the project, being part of the community, helping others, connections with project initiators and interest in a reward if it is offered (e.g., meetings with the scientists who initiated the project; see Hase et al., 2022, p. 996–997).

Authors studying citizen science projects beyond crowdfunding suggest that these activities are more likely to be undertaken by people living in advanced economies, often white men, who tend to be middle class, more educated, and possess greater technical skills, as well as access to resources and infrastructure that facilitate participation. Participants in citizen science projects are also often students (see Haklay, 2013, p. 112–113; Sieber and Slonosky, 2019, p. 173; Strasser et al., 2018, p. 63). According to studies on citizen science, participants are motivated by interests in science or its specific branches, a desire to contribute to research, entertainment, competition, an aim to acquire technical knowledge, a sense of belonging to a team, a wish to maintain relations with other participants and to create their own reputation (Nov et al., 2011, p. 2–3).

However, if citizen science is viewed as a form of prosumption, it is useful to study the motivations of other non-professionals involved in science-related activities, not just in projects that are considered citizen science as it is implemented in practice. This can help us better understand not only who and why participates in projects initiated by scientists, but also why people engage with science and the dissemination of scientific knowledge independently, whether the former differ from the latter, and whether their understanding of science varies. From an institutional perspective of science, this also has the potential to highlight missed opportunities and challenges in public engagement with science.

4. LITHUANIAN PROSUMER PROJECTS IN THE CREATION AND DISSEMINATION OF SCIENTIFIC KNOWLEDGE

The understanding of citizen science in practice rarely includes non-institutional, loosely organised or individual initiatives that are the focus of the following analysis. In most of these cases, initiators and authors of such projects do not typically create new scientific knowledge themselves but are involved in disseminating already existing scientific knowledge. Essentially, while non-professionals participating in citizen science are mainly engaged in data collection and identification, those involved in loosely organised prosumer projects are primarily involved in later stages of the scientific process, namely communicating and disseminating findings and knowledge. An important characteristic of prosumer initiatives, which also applies to citizen science projects, is that such activity is unpaid (therefore, activities of science journalists working for certain publications or public communication specialists at scientific institutions, who are paid for this work, will not be considered prosumption in this context).

Participation of non-professionals in science-related activities is frequently examined from a structural perspective. This is reflected both in the very concept of public engagement with science and by empirical studies on the involvement of non-professionals in scientific pursuits (see, for example, Bucchi and Neresini, 2007; Losi, 2023; Sieber and Slonosky, 2019; Strasser et al., 2018; Sui et al., 2013). Meanwhile, analysing prosumer projects of a different kind – formally non-institutional and individual – proves more complex, mainly due to the lack of a systematic register of such initiatives, which complicates project sampling.

However, it is precisely this form of user productive practices that could be considered the purest form of prosumption, in the sense that it emerges from the bottom up, i.e., it is based on the initiative of users themselves (the formal theoretical definition of citizen science implies this as well, although in practice such cases are particularly rare). Therefore, to understand this kind of prosumption, the analysis of Lithuanian prosumer projects in the creation and dissemination of scientific knowledge is conducted.

Lithuanian prosumer projects were selected for analysis not only to explore local manifestations of global processes and their expression in Lithuanian society, but also to define a manageable sample within the limitations of this dissertation's scope of research. The Lithuanian language, as one of the selection criteria, limits and defines a specific set of cases that can be analysed within the context of this thesis, compared to, for example,

all possible projects in English, which are difficult to define even provisionally. As decentralisation is a characteristic of the so-called social internet, it is often challenging to define the scope of digital data in advance. The analysis concentrates on projects related to the creation and dissemination of scientific knowledge (online encyclopedias, blogs, websites, etc.) produced by internet users or groups of users. The sampling strategy and outcomes are presented in Section 4.1.

The purpose of analysing Lithuanian prosumer projects is twofold. Firstly, it clarifies the characteristics of these projects. The formal features of their structure and content are defined, enabling classification of the sampled cases and evaluation within the prosumption typology. Secondly, it examines the motivations of actors to engage in such activities, along with the principles and attitudes guiding them, based on semi-structured interviews with creators and participants of these projects (Section 4.2). This analysis aims to assess actors' motivations concerning digitalisation and the key principles of acting in the digital space. Additionally, the following sections seek to elucidate how these attitudes align or diverge from the scientific ethos within institutionalised science and among professional scientists. Ultimately, this analysis aims to shed light on potential shifts in perceptions of scientific principles, authority and authorship, which may be threatened by such activities, as early commentators on the so-called social internet have suggested.

The following analysis concentrates on prosumer projects in science and the dissemination of scientific knowledge that are readily accessible to a broad audience on the internet (e.g., through search engines). In other words, it focuses on cases that are available online, often alongside information from scientific institutions. This focus determines not only what is included in the analysis sample but also what is excluded – such as various groups on social networking sites and other platforms that discuss and share information usually accessible only to group members or platform users. The activities of these groups also come under the banner of prosumption, but they are excluded from this analysis due to their relatively limited access and highly specific content, which may require specialised knowledge and certain technological skills to understand and access (see, for example, Šupa and Kruopštaitė, 2022).

4.1. Characteristics of Lithuanian prosumer projects

Data and method of analysis

To study prosumer activities in the creation and dissemination of scientific knowledge that fall outside the dominant understanding of citizen science, it is necessary to recognise that such activities may take diverse forms (web pages and websites, blogs, internet forums, video-sharing platforms, social networking sites, etc.). There is no existing register that includes all Lithuanian (or other) prosumer projects. This is one of the challenges in defining the sample for an empirical study.

Since the general population is unknown and presumably not large, the aim was to collect all or most of such cases for the following analysis. The Google search engine was chosen to conduct the internet search, as it is the most popular and widely used search engine. As the aim of the analysis and this thesis is to focus mainly on the widespread, easily accessible common knowledge of 'lay people', the search strategy assumed to be the simplest and most intuitive for an ordinary internet user was chosen (its particular limitations are discussed below).

The online encyclopedia Wikipedia could be considered a prototypical example of a prosumer project. Its Lithuanian version is included as the first case for analysis. Next, a search for other similar cases was conducted using the Lithuanian keywords "enciklopedija", "internetine enciklopedija", "interneto enciklopedija", "elektronine enciklopedija" ("encyclopedia" and several forms for "internet/electronic encyclopedia" in Lithuanian). The criteria against which the search results were evaluated for their relevance to the analysis are as follows:

- content is in Lithuanian;
- the project is named as an encyclopedia and corresponds to the form of an encyclopedia (consists of encyclopedic articles on various topics or is dedicated to one broad topic)[20];
- content is created by users rather than by professional paid authors (this is assessed from the project description and other publicly available information);

[20] Projects that imitate the form of an encyclopedia but have been created for other purposes, such as entertainment (e.g. https://www.pipedija.com/index.php/Internet), were not included.

- the project is not entirely an online version of encyclopedias published by official scientific institutions or publishing houses, or online encyclopedias published by such institutions[21].

For a case to be accepted as suitable for analysis, it must meet all the criteria listed above. Given Wikipedia's monopolistic position in this segment, sampling internet encyclopedias yields only a few cases suitable for further analysis. Admittedly, the search engine may have missed smaller or rarely used or updated projects, as the results also depend on the search engine's parameters. Nevertheless, given the objective of identifying the most popular and predominantly accessible cases, this limitation is deemed permissible.

In addition to internet encyclopedias, further prosumer projects were selected for analysis by conducting a search based on the classification of scientific fields. The keywords corresponded to the names of the scientific fields in Lithuanian ("matematika", "fizika", "chemija", etc.). All search results in Lithuanian were reviewed, and suitable cases were selected for analysis. The selection criteria were as follows:

- content is in Lithuanian;
- the project is not a website of a scientific institution or the official website of an employee of such an institution;
- if an author/authors/one or more of the authors of a project are scientists by profession (i.e., they work at a scientific institution and/or engage in science as their main professional activity as employees of such an institution), the project must not be directly related to their work (i.e., it is not primarily intended to present lecture materials, official research results related to their direct work, or publicise the activities of the represented institution, etc.);
- the project is not a media outlet specialising in science or scientific news22;
- the project can be created by one or several/many authors.

For a case to be accepted as suitable for this analysis, it must meet all the criteria listed above.

The aforementioned sampling strategy (conducted and revisited between 2021 and 2023) generated a total of 18 cases suitable for further analysis – two internet encyclopedias and 16 collaborative and individual blogs and websites. Admittedly, this number is not fixed, and the list is not definitive, as

[21] E.g., website of *Visuotinė lietuvių enciklopedija* (*Universal Lithuanian Encyclopedia*) https://www.vle.lt/, other projects by publishing houses such as https://mkp.emokykla.lt/enciklopedija/lt/ by "Šviesa", etc.

[22] E.g., the science news website *Techo.lt* http://techo.lt/, etc.

the scope of cases may have changed since the sampling was conducted, some project creators may have ceased to be active, or new projects may have emerged. The use of online search engines also indicates some limitations, as their algorithms do not present the full picture but only a partial image of the digital space. The search engine's policies (e.g., advertising) also determine the order in which search results are presented. In the context of the analysis carried out here, the order of results is not an essential factor; the diversity of cases is more important.

Given these limitations, the number of cases sampled is only indicative, and the following analysis is primarily intended to explicate the possible diversity of prosumer activities. Defining the totality of such projects and initiatives is made impossible by the constant dynamics of the digital space and its ephemerality, as well as by the nature of these projects. Because they are non-institutional, these initiatives are likely to be less internally and externally structured than citizen science and other institutional projects. This makes their emergence and management more spontaneous and less binding, and more dependent solely on the authors' motivations and enthusiasm, time and other individual resources. Therefore, the sample in this analysis should be understood as a snapshot that demonstrates transient tendencies fixed at a particular moment in time. In essence, this is one of the main characteristics of digital data.

First, the analysis of the characteristics of the sampled cases was conducted. It aims to identify the organisational structure of projects, indicating which are collaborative (created by several or many authors) and which are individual, as well as the scientific fields they address. The sampled projects are classified by size, according to the number of participants. The characteristics of the projects' authors are captured, indicating whether they are professional scientists (engaged in prosumption as a free-time activity) or amateurs and enthusiasts. The resulting classification is assessed according to the typology of prosumption, and differences are established in relation to the same assessment in the case of citizen science.

Results

According to the criteria of individual/collaborative and the scale of collaboration, the projects selected for analysis can be classified into three groups: 1) individual projects, 2) small-scale collaborative projects, i.e., two or more authors, where the main creator/initiator of the project is identified or it is indicated that there is a group of them, 3) large-scale collaborative projects, in which anyone can participate in creating the content of the project. The list of sampled prosumer projects is presented in Table 3. It also indicates the characteristics relevant to the analysis.

Table 3. Lithuanian prosumer projects in the creation and dissemination of scientific knowledge.

	Project	Link	Form	Authorship	Topics
Individual projects	Agorafobija	https://agorafobija.lt/	blog	authored; specialist	psychiatry
	Biomokslai	http://biomokslai.blogspot.com/	blog	authored; specialist	chemistry, genetics, biology
	Gamtininkas.lt	https://gamtininkas.lt/	blog	authored; amateur	nature
	Istorija.net	http://www.istorija.net/	blog	authored; specialist	history
	Konstanta-42	http://www.konstanta.lt/	blog	authored; specialist	physics and other natural sciences
	Norvaisa.lt	http://norvaisa.lt	blog	authored; specialist	mathematics, education, science and ethics, policy of science
	Psichologas.lt	https://psichologas.lt/	blog	anonymous; not identified	psychology
	Smetona.lt	https://www.smetona.lt/	website	authored; specialist	philology
	Trismegistos	http://www.trismegistos.eu/	blog	mixed; specialist	science and technology (including social sciences and humanities)

	Project	Link	Form	Authorship	Topics
	'Vartiklis' page for mathematics	http://www.lithuanian.net/kursas/math.htm	blog	authored; specialist	mathematics
	Zondas	https://www.astronomija.info/	website	authored; not identified	astronomy
Small-scale collaborative projects	Aplinkkeliai	https://aplinkkeliai.lt/	website	authored; specialist	philosophy
	Ateizmas ir ateistai	http://ateizmasirateistai.lt/	website	authored; mixed	philosophy, religion studies
	Filosofija.info	http://www.filosofija.info/	blog	mixed; specialist	philosophy
	Sociali sociologija	https://sociologai.lt/	blog	authored; specialist	sociology
	Šaknys karčios	https://saknyskarcios.lt/	website	authored; specialist	life sciences
Large-scale collaborative projects	Enciklopedija Lietuvai ir pasauliui (ELIP)	https://lietuvai.lt/wiki/Pagrindinis_puslapis	wiki	authored (upon registration); mixed	various
	Vikipedija (in Lithuanian)	https://lt.wikipedia.org/wiki/Pagrindinis_puslapis	wiki	anonymous; mixed	various

The first group (11 cases) comprises mostly authored blogs or websites. In almost all cases, the authors of these projects can be identified as researchers, individuals with at least some expertise in the relevant field, or students, etc. As noted, one of the criteria for selecting projects for the analysis was that they should not be institutional. Therefore, most of these professionals engage in the creation of such projects as free-time, voluntary activities, which is one of the elements of the definition of prosumption. Thematically, the projects in this group are varied but usually limited to a particular field or several fields of scientific knowledge. A larger share of these projects is devoted to the natural and exact sciences, but the small sample of cases does not allow for stating any regularities or making strict generalisations.

The second group of projects (5 cases) comprises small-scale collaborative initiatives in which content is created by two or more people (a small group) and where there are usually clear lead authors of the initiative. Evaluating these projects, it can be assumed that they are characterised by at least a partially hierarchical organisational structure (for example, to publish content there, one needs to contact the initiator or a group of them). The authors of initiatives assigned to this group are also mostly individuals engaged in the scientific or academic field, i.e., they have specialist knowledge of the topics they write about and create content on. One of the five cases in this group was devoted to life sciences topics, and all the rest were devoted to social sciences and humanities topics.

The last group – large-scale collaborative projects – is the smallest in terms of the number of cases (2) but the largest in terms of the number of content creators. This group comprises two online encyclopedias. It is important to note that the scale of such projects may vary: the technical possibility of engaging a large number of participants is not always realised to the same extent, nor is it necessarily of the same scope throughout the entire existence of the project. Among these cases, first of all, there is the Lithuanian version of Wikipedia (since only Lithuanian-language projects were selected for analysis). Wikipedia, in general, can be considered a prototypical case of pure prosumption in the dissemination of scientific knowledge. At the same time, it is a kind of monopolist in this field, both in terms of the variety of topics covered and the number of participants (according to some website ratings, Wikipedia is one of the most visited websites in the world, see Top Websites Ranking, 2023). The online encyclopedia "Enciklopedija Lietuvai ir pasauliui" (Encyclopedia for Lithuania and the World, hereinafter – ELIP) is of a similar nature; it is created on the basis of wiki pages as well. However, the content published in this encyclopedia is more defined by topic

("Lithuania-oriented topics", "Topics – only those that are in normal encyclopedias"). As these projects differ from previous groups in terms of organisation, scope, and, in the case of Wikipedia, duration, a more detailed description of them would be worthwhile.

One of the common characteristics of the cases assigned to this group is that the content is freely and independently created by anyone connected to the website. The content creators are (at least hypothetically) more diverse in terms of available knowledge and specialisation than in the other two groups. Articles dedicated to a specific scientific topic can be edited equally by both a specialist in that field and an amateur or enthusiast.

However, there is one difference between these two cases that may be considered essential in relation to the principles of digitalisation, namely the issue of authorship and content anonymity. In Wikipedia, all articles are anonymous and can be edited collectively, and the authors do not sign the articles. Meanwhile, ELIP publicly indicates its initiators and technical developers, and it announces the authorship of articles. In addition, although the content can be created by anyone who is interested, it also has a certain editorial board, the members of which are mainly academics, with their scientific degrees indicated in the Contacts section. In practice, this council does not undertake a comprehensive review of the content created by participants; however, the organisational structure underscores the significance attributed to authorship and credentials.

This difference is noteworthy because, on the one hand, ELIP adopts the technical structure of Wikipedia (as some of its initiators are former active members of Wikipedia who created ELIP based on content copied from the Lithuanian version of Wikipedia). On the other hand, it at least partially maintains the logic of traditional institutionalised publishing of encyclopedias. The empirical study of these cases and the motivations of their creators will further indicate whether these technical and organisational differences reflect different attitudes and motivations in relation to digitalisation and its impact on the creation and dissemination of information and knowledge.

A distinctive feature of ELIP is that the vast majority of its content consists of very short articles automatically generated by internet robots, so-called bots, created by one of the project's founders. These articles are generated from publicly available information and statistics, which are then linked through different categories. Moreover, as previously stated, all materials from the Lithuanian Wikipedia that were created prior to the initiation of ELIP have been transferred to the project (Wikipedia, in principle, permits the copying and free utilisation of its content). In this way, ELIP announces (at the time of writing this text) that it has a total of over 21 million

articles. The Lithuanian version of Wikipedia currently has over 214,000 entries.

Yet these numbers do not reflect the actual activity and scope of content creators. In addition, the Lithuanian Wikipedia community does not permit the automatic generation of texts at such a scale, nor does it allow texts of such a small size. Therefore, ELIP does not impose restrictions on the scope of articles, and, as it states, "there may be articles that contain only the definition of a term or word, a proverb or an adverb" (ELIP, 8 August 2017). Wikipedia states that "each entry in Wikipedia must be about a topic that is encyclopedic and is not a dictionary entry or dictionary-style" (Wikipedia, 15 November 2023).

The Lithuanian Wikipedia has significantly more registered users – over 100,000, of whom about 300 are active, i.e., those who have edited at least once a month (Lietuviškoji Vikipedija, 30 October 2022). ELIP reports a total of 320 registered users, of whom 8 are active (editing at least once a month; Statistika [ELIP], 15 November 2023). These figures are available on the respective websites, and the term "registered users" refers to any individual who has registered on the platforms and has not deleted their account since the projects' establishment. However, according to participants in these projects, in practice Wikipedia has a core of approximately 15–20 active, predominantly long-term members, while ELIP has had a central group of 5 to 10 more or less active members.

According to the proposed typology of prosumption, the groups of prosumer projects discussed above can be assigned to the respective three types. The first group corresponds to type 1 – *skilled sharer p-prosumption* – because the projects are created individually. Their authors are mostly individuals with special knowledge in the field they write about. This may be subject-specific or technical knowledge, which, on the one hand, facilitates involvement in prosumer activities and, on the other hand, may motivate such activities outside paid work. As with the other two groups, the purpose of these projects is the creation and dissemination of content (not the adaptation of a product or artefact for one's own private use).

The second group of projects selected for analysis – small-scale collaborative projects – is to be assigned to type 2 of the prosumption typology, i.e., *skilled sharer co-prosumption*. As in the first case, the authors of the initiatives in this group are mainly individuals with specialised knowledge in a particular field. They create project content collaboratively in smaller or larger groups. This cooperation varies in intensity and consistency.

The third group, at least formally, should be assigned to type 4 – *amateur sharer co-prosumption* – since, in principle, these platforms are focused on

ordinary internet users and operate in such a way that no specific skills are required for content creation, and both people specialising in certain fields and enthusiasts without any specific knowledge can participate. Specialists are definitely involved in these projects, especially in the case of ELIP, but this is not a defining feature of such projects. Moreover, large platforms are characterised by the fact that they can include several types of prosumption simultaneously. This is because a large proportion of digital platforms are both a space and a means of prosumption, and if they are complex, they can be used in a multitude of ways, depending on the goals, needs and skills of the user.

4.2. Prosumer motivations: general and digitalisation-related

With regard to the participation of internet users in activities related to the creation and dissemination of knowledge, and the factors motivating such activities, the motivations of Wikipedia contributors have been the subject of considerable study. A significant proportion of this research is constrained to the analysis of the motivations of English Wikipedia content creators, frequently employing a quantitative approach (surveys) grounded in predefined categories. Xu and Li (2015) provide a comprehensive overview of extant studies in this field, categorising motivations according to two distinct groups: extrinsic and intrinsic. The former encompasses motivations such as reputation building, learning, and self-development, while the latter includes altruism, enjoyment, and a sense of belonging to a community. The initial group of motivations, as posited by the authors, elucidates the aspiration to engage with the community, while the subsequent group elucidates the aspiration to create content. This categorization originates from the domain of social movement studies and psychological research, and it effectively prevails over other studies of the factors that motivate the activities of Wikipedia contributors (Baytiyeh and Pfaffman, 2010; Cho et al., 2010; Crowston and Fagnot, 2018; Jadin et al., 2012; Lai and Yang, 2014; Oreg and Nov, 2008; Schroer and Hertel, 2009; Xu and Li, 2015; Yang and Lai, 2010).

Stuart and Ju's (2020) research further demonstrated that motivational factors may encompass the aspiration to represent the knowledge and visibility of specific disadvantaged groups, such as those based on race or ethnicity. Meanwhile, a qualitative study of the motivations of Persian Wikipedia content creators conducted by Asadi and colleagues (2013) suggested that different language Wikipedias may have specific motivations, such as the desire to produce the best possible content in the local language.

Moreover, the existing studies have addressed motivations without providing a comprehensive examination of the ideological attitudes associated

with digitalisation as a whole. In instances where the ideological level is alluded to, it is addressed in broad terms (e.g., by asserting that one of the motivations is ideology, essentially equating it with advocacy for open access; Nov, 2007). Meanwhile, Prasarnphanich and Wagner (2009) demonstrate that Wikipedia in itself is an ideological undertaking, and they examine the correlations between the motivations of participants and the ideological assumptions of this particular project, such as knowledge sharing.

The present dissertation conducts a qualitative analysis of the motivations of Lithuanian prosumers in the field of science. The analysis is not limited to Wikipedia content creators and seeks to reveal the subjectively perceived importance and diversity of motivating factors, without being tied to a predefined set of categories. The study also seeks to evaluate the relationship between the motivations typically articulated by research participants and the principles of behaviour in the digital realm as delineated by Tapscott and Williams (2008 [2006]). In other words, the objective of this analysis is to explore the ideological implications of digital technologies and digital space for this activity, or whether these technologies function more as a formal technical structure that shapes and maintains the habits of participants. Furthermore, the analysis seeks to ascertain the extent and nature of the subjectively experienced changes in prosumer motivations over time.

Data and analysis method

Following a description of the general characteristics of Lithuanian science-related prosumer projects, semi-structured interviews with their creators and participants were conducted. The purposive sampling was employed for this aim (in the case of collaborative projects, the snowballing technique was also applied). In the case of online encyclopedias, the invitation to participate in the research was posted in their respective discussion sections. Based on the data provided on these platforms, personal messages were also sent to the most active participants inviting them to participate in the research. In the case of both platforms, this sampling strategy was not highly efficient, due to the participants' concerns about their anonymity (in the case of Wikipedia) and the relatively low activity of the members of the project (in the case of ELIP).

Therefore, following the establishment of contact with the most active project participants or initiators during the initial sampling stage, the snowballing technique was further applied. In the case of ELIP, this approach facilitated the acquisition of the personal contact information of several participants. In the case of Wikipedia, the recommendation of an experienced

project member and their encouragement to other members in the discussion section contributed to the recruitment of additional research participants. Those engaged in the creation of content for blogs and websites were invited to participate in the research via the contact details provided (if available). In instances where it was possible to identify the individual content creators, they were also contacted via social media platforms. This selection strategy resulted in a total of 26 interviews, with participants distributed proportionally to the size and number of projects analysed (13 interviews with Wikipedia's and 5 with ELIP's participants, and 4 each with creators of small-scale collaborative and individual blogs/websites).

The interviews were conducted in person and online. The combination of these modes was selected based on several factors. Initially, the objective was to align the schedule of interviews with the participants' availability and convenience, whilst also considering the temporal and other resources available for the researcher. Not all research participants reside in Lithuania, and some of them exhibited a strong desire to maintain their anonymity and declined to provide their personal contact details, indicate their place of residence, or reveal their faces. Prior to the interviews, the interviewees were provided with a general overview of the research's objective and were requested to provide their informed consent for participation. The participants were informed in advance about the interview process, the possibility to withdraw from the research at any time or to refuse to allow the use of their data within a certain period of time after the interview, the specifics of data storage, and the measures taken to ensure anonymity.

The interviews ranged in duration from 43 minutes to 2 hours and 14 minutes. They were then transcribed and analysed using qualitative data analysis software MAXQDA 2024. The interview data were analysed by employing a qualitative content analysis method, utilising deductive and inductive techniques. The interview guidelines (see Appendix 4) were developed in accordance with the research questions supported by the theoretical assumptions of this dissertation. Elaborating on these guidelines, a preliminary coding structure was formulated, which was further reorganised and refined based on observations and insights arising from the data (the coding schemes are presented further).

Before analysing and discussing the data, it is noteworthy that interviews with participants in the most extensive projects in terms of scale and scope (Lithuanian Wikipedia and ELIP) revealed the most diverse array of views, attitudes and opinions. Moreover, the technical and organisational specifics of these projects enable the identification of a greater number and variety of aspects relevant to the dissertation problem than in smaller projects.

Consequently, these larger projects receive greater attention in the data analysis and discussion.

Results

As illustrated in Figure 6, the research participants' motivations were categorised using a coding scheme encompassing both general and digitalisation-related motivations. The subsequent sections of this chapter present a detailed discussion and analysis of the research data and findings.

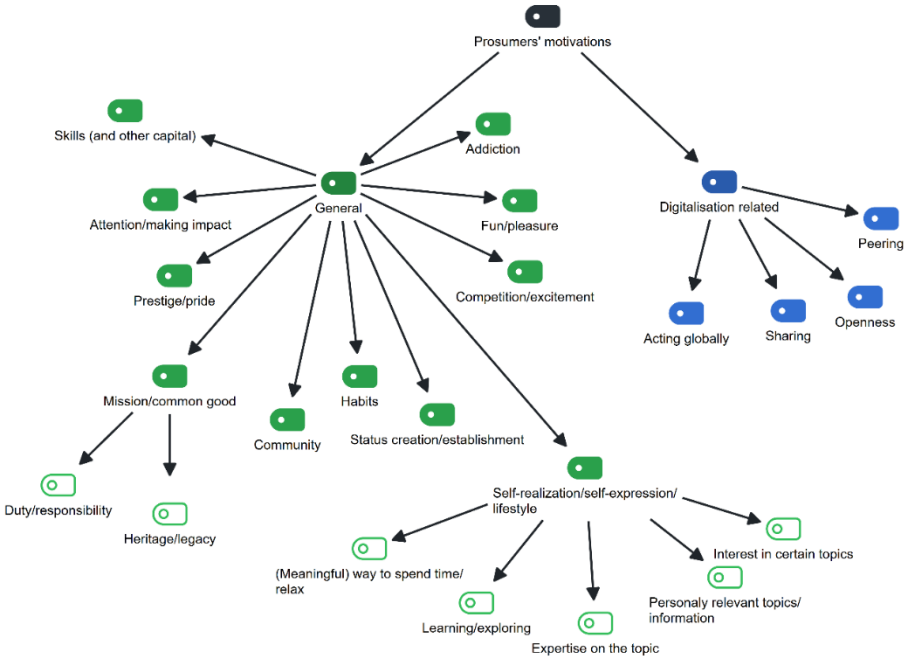

Figure 6. Prosumers' motivations.

General motivations

Mission and common good

It is worthwhile to begin the discussion of motivations with those that were most universal and evident. When asked directly what motivates them to participate in projects related to the creation and dissemination of knowledge on a voluntary basis, almost all research participants provided explanations that could be described as an understanding of their activities as a kind of mission and contribution to the common good. The mission is centred on the dissemination of knowledge, the establishment of a comprehensive knowledge and information base, the expansion of societal and community

knowledge and the presentation of a diverse array of worldviews and global perspectives.

A prevalent viewpoint amongst content creators of online encyclopedias is the necessity to edit and present information on specific subjects to ensure its wider availability in Lithuanian. This viewpoint is often accompanied by a stress on the importance of language usage and preservation. These motives are also linked to an understanding of what an encyclopedia is and what information it should contain (e.g., basic knowledge of geography, the physical world, history, etc.). In some cases, such contributions to the common good are described by research participants involved in different projects as charitable activities, civic engagement or volunteering:

On the other hand, I have associated a lot of my life with volunteering, specifically in [field] *volunteering, because while studying* [in the city]*, we created an organisation of volunteers* [in the field]*, so Wikipedia also reminded me a little of volunteering, mmm, a way of contributing to the good of society and so on.* (Interviewee 6)

In the case of ELIP, the aim of bringing together the global Lithuanian community is also important. The creators of this online encyclopedia see it as a means of connecting Lithuanians scattered around the world and as a place where communities can share information about themselves. The extent to which this goal is successfully achieved is a separate question, as the motivation of the project initiators does not necessarily coincide with the motivations of other content creators, nor is it necessarily strong or significant enough to sustain long-term engagement.

The fact that the participants themselves describe prosumer activities as a contribution to the common good may, on the one hand, indicate that this is an important and fairly universal motivating factor for engaging in such activities. On the other hand, since the research participants usually mention this motivation first, this may indicate that such an explanation is the most socially acceptable and desirable answer. A more detailed analysis of motivating factors and circumstances reveals that the sense of contributing to the common good is arguably of particular significance, although it is not the primary motivation in all cases.

For example, Wikipedia's participants argued relatively more often that this activity is primarily interesting to themselves, that they delve into what corresponds to their intrinsic way of acting, e.g., a tendency to structure information. It can be assumed that in cases where prosumer activity is not closely related to the professional identity of an individual, there is no need for them to explain it to the public in a more socially acceptable way. This is different from cases where prosumer projects are created by people whose

professional identity and activities are related to science (or other areas of their expertise, despite also being unpaid in these particular cases). This might reflect different levels of awareness of the activity, arising from perceived expectations of one's position. However, even in such cases this explanation is not universal, as the following statement demonstrates:

That is what I wanted to say, that there is no social mission in here for me. I just gave in to what I call 'the pull of the swamp' that draws me in. (Interviewee 25)

Duty and responsibility

The feeling of contributing to the common good is associated with a sense of duty and responsibility, which some of the research participants directly or indirectly describe as their motivation for engaging in prosumer activities or for continuing and not giving up. There are two types of motivation of this kind. On the one hand, it is a sense of duty to society. This differs from motivation based on a mission or the common good in that it refers to a feeling that one owes something to society, that one receives something from society and therefore wants to give something back. Motivation based on a mission or contribution to the common good is more closely related to altruism, while duty is related to the desire not to feel indebted:

My [professional] work does not bring any direct benefit to society. The fact that I find out something about [the subject] will not result in improvements in medicine, increase in pensions, neither will it make Lithuania safer, bring about energy independence, or anything else. It will not solve any human problems. ... so, I do not want to be a parasite. At least I can tell interesting stories that are based on real science. (Interviewee 21)

A slightly different and much more common understanding of duty and responsibility can be observed when the participants explain why they keep participating in the project and how they understand their commitment to it. This includes noticing that a particular topic has not been explored, there are errors or information missing, etc. It is also a commitment to maintain order (in terms of technology and content) and meet readers' needs. A comparison with caring for one's home or property is employed: *imagine you have a **farm** somewhere and you need to take care of it. Well, in terms of my articles that I consider better and more worthy, I always check to see what is going on with them.* (Interviewee 5) *probably over the years, I have become so attached that it really feels like it is my own **yard** or own **home**, or something like that, there really is a wish to keep it tidy*. (Interviewee 6)

Among all the research participants, this attitude was expressed most often by Wikipedians. This is likely related to the logic and structure of Wikipedia, where anyone can create content and participants join the project upon their own initiative, without being encouraged by anyone. Moreover, this observation may also result from the fact that Wikipedia authors who agreed to participate in the research are mostly long-term contributors to the project, which in itself indicates a certain level of commitment.

Heritage and legacy

Another motivation related to mission and the common good is the feeling and understanding that one is leaving a legacy and contributing to the preservation of heritage. The research participants often mention that they believe and hope that the information they have collected, prepared and published will remain for the future, for generations to come, and that it will record heritage that may be disappearing or that does not receive the attention it deserves. In the case of Wikipedia, its creators point out that Wikipedia itself can be freely copied, transferred and duplicated, which is an additional opportunity for knowledge to survive and continue to be used. It should be noted that this motivational aspect (heritage/legacy) was again more prominent in discussions with contributors to online encyclopedias. This is most likely related to the nature of such projects – an encyclopedia as a kind of information array that transcends the authors of each individual piece of information it contains and at the same time gives it a certain weight and permanence as an element of a collective entity.

Furthermore, several contributors to online encyclopedias – both Wikipedia and ELIP – stated that they were involved in the collection and writing of local history prior to commencing their contributions to these platforms. Consequently, online encyclopedias have emerged as a technological solution, serving as a repository for the dissemination of accumulated knowledge. However, the inclination and aspiration to amass such information for these participants predates its publication on online encyclopedias.

In this context, the research participants (both authors of collective and individual projects) reflect on the ephemeral nature of the digital space and express their understanding that information recorded in this way could hypothetically disappear at any time. In a collectively created project, where information is prepared jointly, no one can guarantee that their specific contribution will not be changed. Furthermore, it is impossible to be certain how long and in what form a project created on a voluntary basis will survive,

as its technical support still requires certain resources and infrastructure. This also applies to individual projects, as they are often created using certain online platforms (e.g., the content management platform WordPress).

Regardless of the above fact, research participants still prefer the internet for the storage and sharing of information over the traditional media, such as information written on paper:

It is like contributing to something, the feeling that you are doing something that will remain, in principle, rather than just writing something on a piece of paper that your grandchildren will later throw in the rubbish bin [laughs]. *... What remains of those pieces of paper? Nothing*. (Interviewee 10)

Self-realisation, self-expression and lifestyle

Another fairly universal motivation for prosumers is that they see this activity as a form of self-realisation, self-expression, self-creation or a way of life. Regardless of the nature of the project, these motivations are common to almost all content creators who participated in the interviews, but they manifest themselves in different forms and aspects, realising different personality traits, inclinations, skills, experience or interests, creating an alternative to everyday activities that helps to reveal certain personality traits. For example, in at least a few cases, the research participants state that they became interested and fascinated by encyclopedias, catalogues, dictionaries, maps, etc. in their childhood, and tended to systematise information.

Although it might seem that personal expression is more closely linked to individual projects, participants in collaborative projects, including online encyclopedias, point out this aspect as well: *you add your own photos and present some of the content, ... in a way that somewhat differs from a standard text, and you make something a little individualised – even if it is within the framework of a standard, – but it is still, well, an original text.* (Interviewee 1)

However, the opposite experiences are also present. Feeling a lack of space for self-expression (i.e., the ability to implement certain ideas as they see fit), some Wikipedia participants have temporarily or permanently exited the platform, sometimes getting involved in new projects. There are also cases where, after just trying out or getting acquainted with the structure of Wikipedia, the research participants decided that it would be better to create their own project or get involved in projects of a different nature. Depending on the nature of the self-realisation sought, the forms that best enable it are chosen.

Besides prosumer activities being an entirely freely chosen form of self-realisation or a way of life, in some cases they are taken up because life circumstances have prevented the same activity from becoming a profession:

Interviewer: *Listening to you, how much time you devote to this, judging by how much skill and experience you have, you could do this professionally, as an academic activity. Why do not you do it?*

Interviewee 5: *Ah, well, there is a very simple answer to that, I would have to tell you a little more about my personal life… But in short,* [identifies a personal reason] *did not allow me to pursue becoming a member of an academic community. … and that is why I see an opportunity to realise myself on Wikipedia. I am not saying it is 100%, but to some extent, yes.*

Moreover, research participants who are professional scientists report that in projects created in their free time, they can write about topics they do not have the opportunity to develop in their work, publicly discuss issues bypassing the established process and form of scientific publications or media content, and engage in writing that can be more creative.

In the context of self-realisation, a moment of self-reflection should also be noted. Information recorded on the online space becomes easily and quickly accessible and structured not only for other users, but also for the author themselves. On the other hand, the very practice of writing and thinking about what one is writing can become an act of self-creation:

Because a person who does everything for a particular gain is no longer doing it for themselves. And they are not creating themselves. They are constructing what society imposes on them. A lecturer, professor, [member of profession]*, who acts according to the relevant definitions. An entrepreneur, politician, prime minister. … But if you reflect upon yourself and if you do* ***not*** *do things for gain, then you can* ***at least*** *try, so to say, to create yourself.* (Interviewee 22)

Interest in certain topics

Self-realisation is also related to a more particular motive, i.e., an interest in a certain topic. In a sense, this is a subcategory of self-realisation. Not all research participants *specialise* in clearly defined areas, but many still have certain topics that interest them most or that they become interested in by chance, and this motivates or sustains their motivation to participate in prosumer projects. In this case, their specialisation does not refer to deep expertise in a single specific topic (a subject which will be addressed in later segments), but rather, to a more general interest, curiosity and engagement

with certain issues and hobbies, expressed by the phrase "I am simply curious" (Interviewee 3).

In case of Wikipedia, the nature of the platform is more conducive to this type of motivation, as an encyclopedic endeavour covers a very wide range of topics, but at the same time does not tie content creators to a specific topic, as they do not have to be experts in any field:

I think part of the motivation is that there is no commitment, in the sense that you can do pretty much whatever you want. There is no requirement to write a certain amount of text in order to be a Wikipedian, or to write only about one topic. I would say that the motivation comes from the inspiration that arises from time to time for a specific topic. (Interviewee 11)

It is like, I would say, the kind of inspiration writers get, in a very minimal sense. (Interviewee 6)

Individual or small-scale collaborative projects tend to specialise in a particular topic, therefore there is almost no jumping between completely different areas of interest. However, within the chosen theme, the specific aspects that authors write about at one time or another are also determined by various reasons – some plan their themes, while others are more prone to random inspiration.

Research participants compare their interest in a particular topic and the gathering and structuring of information about it with collecting, and this is characteristic to both online encyclopedias and individual projects:

I have several main topics that I write about and keep coming back to, or I spend more time on one, then I get bored and move on to another. I call it collecting. I take these articles, some longer, some shorter, and create a collection for myself. (Interviewee 8)

Perhaps the motivation behind the catalogue is the human desire to collect. (Interviewee 24)

The project becomes a means of structuring and cataloguing of information on a topic of interest.

Personally important topics and information

An even more specific category of motivations related to the topic is writing about personally important topics or sharing information that is important for personal reasons or circumstances. This may include family history and genealogy, local history and related information, other objects, events or phenomena related to the individual that they wish to explore and describe. Such personal motivations are a fairly strong impetus. When talking to research participants, it is clear that personally important topics are what

keep them involved in the project, encourage them to create the most complete and high-quality content possible, and sometimes even become the main motivation for creating such projects or participating in them in the first place.

For example, when preparing texts about a certain location or places visited, authors often explore them in person, take photographs, and embark on expeditions of a sort. It is also noteworthy that, in collaborative projects, participants are less willing to compromise with others on issues that are personally important as compared to information of other kinds.

This category also includes cases where participation in a specific project has personal significance related to the participant's personal life or worldview, such as a connection to Lithuania while living abroad. This is characteristic of some Wikipedia and ELIP participants. As was already mentioned, the initiators of the latter project are generally focused on maintaining the community of Lithuanians around the world and promoting Lithuanian identity ("For us, Lithuanian identity is... we are ready to die for it," Interviewee 12). Meanwhile, on Wikipedia, this is more of a personal stance held by contributors, for example, emphasising that writing in Lithuanian itself allows them to feel a connection with Lithuania.

ELIP participants, in principle, tend to write about topics that are of greater personal importance to them (people, places or communities they consider close or deem personally important). This may be due to the organisational structure of the project, since the initiators invite people to join and describe their own biography, place of residence, school, workplace, etc. For some research participants, this opportunity is very important:

I will always remember how, when the page about my grandfather was already finished, we all sat down in the room at the computer, and I called my father over to show him: look, I wrote down the story of your father, my grandfather. And when he sat there in the room, ... how he cried and how he remembered, and how happy he was that the history had been preserved, that it would be remembered – these seem priceless things to me. (Interviewee 18)

In individual or small-scale collaborative projects, the personal relationship with the content created is expressed on a different level: not so much through specific objects, but primarily through the project's overarching theme and, often, the desire to present it to a wider audience. The projects reflect authors' interest in a specific field or their worldview, but not necessarily their personal connection to the specific objects or phenomena.

Expertise on a topic

Individual or small-scale collaborative projects are more characterised by another motivation related to content and topic – incentives arising from having expert knowledge in a certain field. It is important to emphasise again that expertise is treated broadly here – as having specific and in-depth knowledge of the subject or subjects being written about. This knowledge and expertise can be acquired both through professional activity (in which case prosumption projects are free-time activities for such experts) and through long and consistent non-professional (i.e., unpaid) study of a particular topic and a passionate interest in it.

The majority of interviewed authors of individual or small-scale collaborative projects have at least some formal education in the field they write about, or even conduct research on. Although the topics they write about in their prosumer projects are often much broader and more diverse than those they deal with in their direct work or studied at university, their existing knowledge provides an important background for their project activities and motivation to engage in them:

I thought: well, what would be interesting to write about in a blog? I am studying [field]*, I learn a lot of interesting things. Well, I could try to write about that. … At first, there were even more divergence into all kinds of interests. But now I have somehow focused on writing about what I know best, that is, about all kinds of things related to* [field]. (Interviewee 21)

Formal or informal expert knowledge is also possessed by the creators of content in online encyclopedias. Despite the fact that these are not limited to specialisation in a particular field, some research participants often focus on and delve deeper into a specific topic. Most of them (with a few exceptions) are not scientists, but some employ and deepen the knowledge they acquired during their studies or other activities. Others have refined the knowledge they have accumulated in their free time about certain objects or phenomena to an expert level. In such cases, the research participants themselves reflect that their long-standing interest in a particular topic not only motivates them to write about it but also facilitates further engagement in this activity.

Learning and exploring

In both cases of expertise and general interest, learning and expanding one's knowledge on a particular topic, rather than simply sharing it, is a very important motivation alongside the interest itself. This kind of opportunity to gain more knowledge or learn something about a topic of interest is a kind of

reward for the time and effort invested. Sometimes it is described as satisfying curiosity or an intellectual game. Moreover, participants in collaborative projects, especially Wikipedia, feel that they are learning something new not only by independently gathering information, but also by receiving feedback, advice and criticism from other project participants.

Various things can be learned and explored. First of all, knowledge of the topic being studied is expanded. This applies both to cases where one begins to delve into the topic without any prior knowledge at all, and to cases where the author of the project is an expert in some field, but the creation of a prosumer project is a prerequisite for expanding knowledge beyond the limits of one's narrow field of expertise. In individual or small-scale collaborative projects, some participants also learn how to maintain and administer a website or blog. In several cases, research participants even learned new languages in order to gain a deeper understanding of their field of interest. Participants of online encyclopedias also learn how to gather information and prepare and edit texts, both stylistically and technically:

I noticed that my article [on Wikipedia] has been deleted, well, that is bad, I need to create another one. I wrote it a second time, a third time, a fifth time, and then somehow I got hooked on Wikipedia. If that article had not been deleted, I probably would not be participating now. (Interviewee 13)

In addition, a prosumer project can serve as a means of reflecting on a particular area of interest, i.e., it can be understood primarily not as a means of disseminating knowledge, but as an instrument for reflecting on issues of interest, systematising one's thoughts and structuring information. When the research participant who expressed this understanding (Interviewee 25) was asked why it was not enough to do this on their personal computer, they explained that the blog's structure was more convenient and that the information organised in it was more easily accessible.

(Meaningful) way to spend time and relax

Prosumption as self-realisation and learning shows a certain determination to take action. However, not all involvement in prosumer projects necessarily has such a clear direction and weight. Sometimes it is a way to spend time that seems more meaningful than the alternatives and helps to relax from work and other commitments.

This motivation is relatively more common among contributors to online encyclopedias (although it has also been noted in conversations with several blog authors). This can again be explained by the structure and nature of such projects. Online encyclopedias do not, in principle, require any commitment

from their contributors and, by design, thrive more on mass collaboration than on the consistent involvement of individual contributors. Furthermore, unlike in the case of blogs, contributions do not necessarily have to be of a certain length. They can be minimal corrections that do not take much time to make.

Contributors to online encyclopedias often oppose their activity to participating in social networking sites, and sometimes with watching television. Writing for an online encyclopedia, therefore, is seen as a much more meaningful way of spending time. It is sometimes described as intellectual leisure, a hobby or a way of changing activities and taking a short break from work:

Interviewer: *Did you edit Wikipedia while at work?*

Interviewee 10: *Yes, I did, but why not? If there is no work, technically you are freer – why not? I probably used to do a mechanical work at such moments – sitting down, bringing coffee to the computer, turning it on, checking for changes, then continuing to work.*

Even in cases where prosumers are scientists by profession, they often see this activity as a way to relax and take a break from direct scientific work (Interviewee 21). For some other prosumers, it is a kind of alternative to sinking into domestic life or, as Interviewee 15 put it, "killing time".

However, the aforementioned opportunity to write for online encyclopedias without making too much of a commitment does not necessarily mean that it takes little time. On the contrary. As with browsing social networking sites, a quick visit to look around or pass the time can turn into hours spent on an online encyclopedia. Nevertheless, this time is considered to be spent more meaningfully, because either the content creator learns something of value to them, or they feel that the activity itself and its result will be useful to someone else.

Skills (and other capital)

It has already been discussed that good knowledge of the subject can be one of the motivations for engaging in prosumer activities. However, there are other skills or resources that encourage research participants to create such projects or participate in their creation. These skills can act both as initial inspiration and as motivation to continue participating in projects. Skills and resources can be of different types.

One of the skills that is important in such activities is the ability to prepare text properly, write clearly, know the rules of language or foreign languages, and in the case of online encyclopedias – the ability (not just a tendency towards, as in the case of self-realisation) to prepare encyclopedic texts and

structure information. This facilitates not only the preparation of one's own texts, but also, in the case of collaborative projects, the editing of information prepared by other contributors:

Well, but still, to write an encyclopaedia article – not only the internet, not only time is needed, well, it is also some kind of intellectual ability, or not just intellectual, but also the ability to sit down, delve into something and so on. That is how it is. Some people just do not feel like getting into it. (Interviewee 1)

Access to information and various related resources (e.g., books, access to certain publications) can be important in maintaining motivation to participate in projects or write on certain topics. Life experience, such as access to a particular field due to personal circumstances, can also be a strong motivator to share knowledge about a particular field. Such access, and not just the knowledge gained through it, can be treated as a resource.

An important aspect is technical skills and equipment. In some cases, having these skills is also one of the decisive factors in deciding to undertake a project. Examples include the ability to process statistical information or programming skills and information technology competences. Such skills can be acquired through direct work experience that is not related to the prosumer project. Examples of this can be found in both online encyclopedias and blogs:

… *switching from one job to another, if it involves programming, making robots* [so-called bots, which are used to manage information in online encyclopedias – RŽ]. (Interviewee 14)

This probably comes from... from the availability of possibilities. Since, so to speak, creating web pages is my job, and it is not a complicated thing to do, there are resources available to do it. (Interviewee 24)

Another extremely valuable resource is time. Some research participants clearly stated that the ability to devote time to this activity is decisive. Due to a lack of time, for example, when starting a family or taking on other commitments, motivation may wane or disappear altogether, making it impossible to participate in projects of this kind. Both authors of online encyclopedias and bloggers sometimes refer to the opportunity to devote time to such activities as a privilege or a luxury.

Attention and influence

It is arguably evident that one motivation for undertaking relatively public activities, such as creating content on the internet rather than preparing it for private use or a limited audience, is the attention received and the sense of having some influence. Rarely do research participants themselves name

this as one of their main motivations; more often, they elaborate on it in response to the researcher's questions. Sometimes they even state that attention is not important; however, a more detailed conversation often reveals that the audience is indeed considered and that its presence has some effect (for example, it is suggested that attention is not essential, but that it is "nice" to be read, Interviewee 21).

There are at least three possible reasons for this. On the one hand, for at least some of the research participants, such activity is indeed more of a personal project, even though it has been chosen to be public. Second, it may be a socially desirable response or attitude, with participants believing that acknowledging the need for attention may seem immodest. Thirdly, the need for attention itself may not be reflected upon or clearly identified, or it may not necessarily be the most important motivation.

However, some research participants clearly state that the attention their content receives is a reward for their activity. The online format of such projects allows participants and creators to monitor the readership of their content, and some research participants mention hundreds or thousands of readers who view the content they have created. The visibility, popularity and recognition of the project, especially for Wikipedia (but in some cases also for ELIP) participants, is often the reason why they chose this online project rather than, for example, creating their own personal blog.

Regarding the influence of their activity, some interviewees note that the information they produce is sometimes republished or quoted by the media. For research participants engaged in scientific work in their professional lives, attention to their prosumer projects (e.g., blogs) becomes an additional means of popularising the scientific field they represent. Thus, although blogging is not work for them in the broad sense of the term, leisure and professional activities undoubtedly overlap.

The importance of feedback, which also serves as an incentive, is emphasised. Feedback can be internal (within the project) or external (from outside). In collaborative projects, it is important for participants to receive attention not only from readers but also from their co-authors. Wikipedia has various initiatives that allow participants to provide feedback to each other. For example, articles can be designated as featured articles or articles of the week, which shows the appreciation of the whole community. In ELIP, where texts are signed, authors sometimes receive external feedback, which encourages them to continue participating in the project. The same applies for some blog authors. Those research participants who receive such attention also mention that it is a strong motivation to continue their activities.

However, some blog authors are sceptical about the popularity of their project or directly state that their readership is not large and that they receive little or no direct feedback. But even in such cases, the social dimension can be important:

Interviewer: *When you say you create yourself through texts, reflect and construct your identity, one might say you could as well do this in a diary. You do not necessarily have to do it publicly, for others to read. Why do you need others to read it?*

Interviewee 22: *Well, but look, this so-called diary... Okay, a diary… Where would it go? Into one's drawer?*

Interviewer: *Well, but if the goal is to create oneself?*

Interviewee 22: *Yes. But, you see, again, to create oneself: is a person just for a room? Or a "man in a case," as Gogol wrote. You see, Aristotle said that a person is, in principle, a social being. One is not a character of a room or a case, or a piece fermenting in a jar, so to say.*

In certain instances, the awareness of a limited readership can, in fact, facilitate a certain degree of freedom. For example, it allows one to formulate their thoughts and ideas more freely, to publish texts that are still in the process of being written, corrected, edited, supplemented, etc.

Status creation and establishment

In different forms of prosumer projects, creation and establishment of status has certain characteristics and is not universal. On the one hand, status can be established among project participants, if it is collaborative. On the other hand, the emphasis is on status of the project itself, or on the establishment of oneself as a person (specialist, expert, holder of certain knowledge, etc.).

In Wikipedia, not only the collaborative nature of the activity, but also certain elements of the system create the conditions for the formation of status. In addition to formal credentials indicating status (e.g., becoming an administrator), user activity statistics (number of edits) and length of participation are also recorded and published, and badges (rankings) are awarded for particularly well-written articles, articles of the week, etc. Authors who participate intensively and consistently in the creation and editing of Wikipedia content acquire senior status, which means that other community members have more confidence in the content they create compared to newly registered or unregistered content creators.

For at least some Wikipedia authors, these elements are important in maintaining their motivation to write texts and participate in the project, even if they are somewhat critical of the focus on personal statistics:

There are tables where some users are ranked higher and others lower. I have noticed that this is very important to some people. Some try very hard to achieve this. … It was important for me to get into that table, let's say, to achieve it, to be among the most important, but I did not force it, I just did it naturally. (Interviewee 8)

The pursuit, creation and establishment of status can also be external. In the case of ELIP, its creators have sought to establish the project's status. This is done by disseminating information about the project externally, seeking contacts with influential institutions (for example, a conference organised at the Lithuanian Academy of Sciences to present the project and discuss its activities), inviting people from influential institutions to become co-authors of the project, or even seeking formal national project status. On the one hand, this is done to secure some of the resources necessary for the project to survive, but also to gain recognition, which would confirm the meaningfulness of such activities for the project creators themselves. It was also mentioned that participation in the project and its creation provided its creators with some "good connections" (Interviewee 14).

Another form of creating and establishing external status is related to the personal activities of the project authors. It should be noted that this form was primarily defined in conversations with the creators of prosumer projects (blogs) whose professional activities are related to scientific work. Although blogging is a leisure activity, in the broadest sense it still may be carried out in the same thematic area of the creator's professional activity. The status gained through prosumer activity (public awareness, recognition, authority, expert status, etc.) can be a direct incentive to create such a project or be its *side product*. It should be noted that a project as a means of establishing and consolidating status can arise both when the research participants have just started their academic careers and when they are already well established. It can be inferred from some interviewees' experiences that this was not necessarily the primary motivation, but it is important and recognised.

Prestige and pride

Prestige and pride are related to status, but they may not necessarily arise solely from one's personal position, as discussed in the previous section, but also from belonging to a particular group or engaging in a particular activity. In the case of Wikipedia, at least some of its creators feel pride in contributing

to and being part of a large project. They repeatedly mentioned during the interviews that Wikipedia is one of the most popular and accessible sources of information on the internet. This means not only the readability of texts, but also a certain prestige in being part of this phenomenon:

I told my [relatives] *that I was contributing, and they were like, "Oh, it is you!" – such a surprise, you know. ... And that gave me a lot of motivation to continue, because I saw their reactions, you know*. (Interviewee 7)

A sense of pride can also be felt when work is done successfully, for example, when the initial idea for an article is well executed. Or when cooperation with other participants is successful, when the help or advice provided is appreciated. Sometimes, solely knowing of one's contribution is enough to feel proud:

When I write an article, I read it maybe fifteen times afterwards, on the first day, it is simply a feeling of respect for myself and some pride. (Interviewee 13)

The importance of a project's prestige is not unique to Wikipedia, but in the case of blogs, popularity and importance must first be created. However, as noted by one of the research participants, blogging itself was prestigious some time ago, when it was still a new format on the web, and might have motivated people to become involved in such activities:

Now it is like, "Pff, a blog. Do those still exist?" But back then, bloggers were a thing. It was a really cool label. Like, we are blogging. (Interviewee 26)

Community

It is arguably quite coherent that for at least some of the participants in collaborative projects, one of the motivations for participating is being a part of community. However, the understanding of collaboration and how it is practiced, as well as the meaning of community, may vary. In the case of Wikipedia, some research participants emphasise specific community characteristics – it is united around its activities and, for example, in *talks* (discussions) it is acceptable to talk only about issues related to the content[23]. It is a community of practice, and the connections between members (with a few exceptions) and their knowledge of each other are limited exclusively to the platform space:

[23] The author of the thesis experienced this during the sampling stage, when, after several announcements inviting participants to take part in the research, one user commented that such behaviour was inappropriate in Wikipedia discussions, as they are intended for discussing content-related issues; otherwise, certain sanctions may be imposed (the user may be blocked).

At that time [on Wikipedia]*, many people were older, and although I had never met anyone, and only have chatted online with a couple of people, I felt at home among these people. It can be called community*. (Interviewee 16)

Nevertheless, it should be noted that some Wikipedia contributors claim the community component is irrelevant to them, or acknowledge its existence yet do not consider it an essential motivation for participating in the project. In general, when asked to describe what Wikipedia is, the research participants first describe it in terms of content and form, and only when asked whether it is also a community do they begin to share their thoughts. Some express doubts:

The community is, I would say, quite limited, in the sense that I have never been to any of their events. I usually just edit on my own. (Interviewee 2)

In Lithuania, it is even, I would say, an anti-community project … no one organises meetings because everyone knows that most people will not come, and if they do, it will be just a couple of pawns. (Interviewee 3)

This suggests different concepts of community and what kind of connection is sufficient for a sense of community to be felt. Among other things, the experiences of a specific individual and their interaction with other users are also important. If there are conflicting situations that in some cases may result in certain sanctions (e.g., a user being banned from editing content for a certain period of time or permanently), it is likely that sentiments towards the community will be negative and community spirit as such will be questioned.

Maintaining a sense of community as a motivation can also be important for participants in smaller collaborative projects. As Interviewee 26 explains, the project arose from a need to bring the community together and support it, to unite like-minded people interested in similar things, and to create a space where they could engage in activities they enjoyed together. This need stems from a perceived lack of a unifying element in the structures to which they belong, for example, at university ("studying just meant going to lectures," Interviewee 26). Another blog author (Interviewee 22) also notes that the project resulted from the efforts of a small community, but in this case the primary factor was a desire to delve deeper into the particular subject and satisfy personal interests rather than bring the community together.

Habits

In some cases, a habit may serve as a substitute for motivation or become an alternative to it. Wikipedia users state that regularly logging on to this platform has become a habit for them. This does not necessarily mean that

new, comprehensive content is created every time they log in. Participants also develop a habit of monitoring the content they have already created, the changes made by others, and adding to or correcting it. This generates ideas for new content as well. A specific routine may be described as follows:

It starts with me opening Wikipedia and first checking what is happening with my own articles: whether there are any comments under my articles or whether any edits have been made. If there are some edits, I check whether they are accurate, meaning, whether they are right. Then I look at the latest changes, see what is going on there, and get hooked on some article. (Interviewee 5)

Similarly, among bloggers, there are cases where writing for a project becomes a self-evident habit, like "brushing one's teeth" (Interviewee 26). Undoubtedly, when creating content for a project over a long period of time, the activity itself often becomes part of a routine. However, in individual or small-scale collaborative projects, such activity typically requires more consistent planning, and it is often not enough to simply open a page and hope the content appears by chance (although this option cannot be ruled out). In the case of a large collaborative project such as Wikipedia, the technical and conceptual nature of collaborative content creation provides conditions for more random involvement, such as a small edit or contribution. In such cases, the simple habit of visiting the site and the inspiration that arises during such visits are sufficient motivation.

Competition and excitement

Competition or excitement are also motivating factors for some research participants to create content in prosumer projects. Several Wikipedia authors have mentioned these motivations. The collaborative nature of this online encyclopedia means that contributors edit, correct and add to each other's content. For some research participants, this creates a certain excitement – to write a text that will require as few corrections as possible so that it will not be rejected, to prove their arguments in discussions, and so on. There may be competition with other Wikipedia contributors to see who can write more articles or make more changes. However, the research participants reflect that if the focus is solely on quantity, there is a risk that the activity will lose its meaning:

Yes, there is a certain sporting interest. But you can get carried away and end up not creating articles, but just doing something automatically, and then there is no value, in principle. (Interviewee 10)

Long-time Wikipedia contributors also discuss another competitive factor. When the Lithuanian Wikipedia was first created, it competed with Wikipedia's versions in other languages to create a solid base of articles and make it "complete" (Interviewee 11). This is done both by writing new texts and translating articles from other languages, as well as by coordinating initiatives to describe a particular phenomenon or event:

When we reached twelve thousand articles, I think we calmed down a bit, we had already made a real contribution. (Interviewee 9)

The excitement can also be felt during the information collection stage – when searching for sources or people who can provide information, as well as new material. It is a kind of satisfaction derived from the unexpectedness of discoveries. This satisfaction becomes a reward for the time spent. Similar motivations were mentioned by the author of one blog: it is interesting to see whether one will be able to obtain the information one is looking for. In this case, the activity is metaphorically compared to hunting (Interviewee 23).

Addiction

As already mentioned, the variety and scope of topics and contributors in online encyclopedias allow for a capture of less common experiences. For example, several research participants described their involvement in Wikipedia as an addiction or compared it to one. The technical structure and features of Wikipedia support involvement through various formal elements of the platform, such as notifications about received messages, comments, changes, etc., which are also characteristic of other user-driven communication and collaboration platforms. In the interviews, references to addiction emerged several times when discussing the time devoted to the project and the intensity of involvement:

I feel like I am spending too much time on it, I feel a bit like I have developed an addiction. But on the other hand, when I think about it, I could leave the project, it would not be difficult, because sometimes I get bored – why am I spending so much time on this? (Interviewee 8)

Several research participants also suggested that writing for Wikipedia has become an alternative to their strong (and in some cases – problematic) engagement with computer games. Therefore, joining Wikipedia and devoting oneself to its activities was a conscious decision and a substitute (Interviewee 2). According to the research participants, there is even a special term for Wikipedia addiction – "wikiholism" (cf. alcoholism). It is described as devoting all of one's free time to Wikipedia, without being able to fully explain why:

People who are addicted to alcohol also do not know why they drink so much. A person who is addicted to Wikipedia does not know why they write for it. That is their addiction. (Interviewee 13)

What is meant by devoting "all your free time" and "not know why you are doing it" can vary widely. The involvement of research participants in Wikipedia ranges from occasional logins to several hours or even a dozen hours per day. Therefore, it would be difficult to state to what extent strong involvement in Wikipedia can be considered an addiction, and these aspects do not lie within the aim, scope or methodology of this study.

Fun and pleasure

Some research participants report engaging in prosumer activities for fun or enjoyment. It is not always easy to identify exactly what provides fun or pleasure. Therefore, I refer to cases in which participants themselves described their activities as enjoyable, satisfying, fun, etc. For example, it is mentioned that it is pleasant when an idea is successfully implemented and when one is able to see the results of one's work and show them to others. Once skills are acquired, participants become quicker to familiarise themselves with the system, which also provides some pleasure. Bloggers have also mentioned the free style of expression:

There is a kind of creative impulse. You start writing, start thinking, looking for additional information, so to say. You feel that creative satisfaction. (Interviewee 20)

However, it is important to consider the context of each instance in which research participants indicate that an activity provides pleasure or enjoyment, as such designations can bear diverse meanings. One may then pose the following question: what precisely in this process provides pleasure? The notions of fun and pleasure can be considered synonymous with reward, a term denoting a feeling of satisfaction, the reasons for which may be more specific. It is evident that such designations are frequently grounded in one or more of the motivations previously discussed.

More specific in this context is the gamification element of the activity, for example, following the performance of other users or filling in gaps of content in collaborative projects:

There is also something like "most active users" or something like that. Those who have made the most edits. It is also a kind of gamification. ... and filling in the red links on Wikipedia: when there is no article, you have to create one. It is a game – filling in these gaps. (Interviewee 4)

The author of one of the blogs (Interviewee 23) also notes that their activity began as a game. Initially, they posted information on social media, and when the audience grew, they decided to create a web page for the project. Another research participant describes blogging as a game, in contrast to professional work (Interviewee 24).

Gamification is an important element in user productive practices, as reflected in some of the terms used to describe such activities (e.g., *playbour*). Developers of various platforms and service providers (both as an ideology and through special technical elements or reward systems) use it to encourage users to participate in the creation of a product, service or artefact. However, the statements of the research participants discussed here indicate that people are naturally inclined to seek or notice gamification in their activities, even in situations or structures that are not specifically oriented towards it.

The concept of gamification aligns with the characteristics of activities that are intrinsic to the digital domain. However, before delving into the specific motivations associated with digitalisation, it is noteworthy that the motivations for engaging in prosumer activities are not static. The experiences articulated by the research participants demonstrate that these motivations tend to evolve over time.

Change in motivations

Motivations to engage in prosumer activities, regardless of the nature of the project, follow a discernible trajectory. Research participants who have been involved in these activities for a relatively long time (i.e., more than several years) reflect on their motivations and acknowledge that they have changed over time. This can be linked both to a decline in enthusiasm as the activity becomes routine (sometimes referred to as monotony or burnout) and to changing personal circumstances and the resulting shift in perspective. At least some of the research participants became involved in prosumer projects at a relatively young age – during their school or university years – and over time, as family and/or work commitments grew, their motivations and priorities changed. As already mentioned, time is one of the essential resources, and its availability can be an important motivating factor. This does not necessarily mean that they lost motivation to engage in this activity, but it may be that the nature of their motivation changed, and with it the topics they wanted to explore, the time they were willing to devote to the project, their level of involvement and their quality requirements. In isolated cases, a more stable regularity of project execution, planning and commitment to this activity has emerged over time.

It is important to note that the research participants who engaged in projects more than a decade ago did so under relatively specific circumstances. The platforms and technological solutions that enabled user participation and collaboration were still relatively new at the time, and the opportunity to experiment with such innovations was itself an inspiring and motivating factor (learning something new, satisfying curiosity, gaining prestige, etc.). Once such innovations become common practice, this inspiring element disappears.

Changes in motivations may also be linked to a broader perception of the relative expansion of information availability, or information overload. This is observed among contributors to different types of prosumer projects:

With time Lithuanians get better and better in English, so in principle there is really no point in having a Lithuanian Wikipedia. Except perhaps for children who have not yet learned English well enough to use another language. (Interviewee 10)

And, you know, maybe the world consumes us, in a sense that there is now an excess of everything. Articles, videos, information. (Interviewee 26)

In the case of ELIP, a fairly specific motivational factor related to the project's technical structure and its change was identified. Unlike Wikipedia, ELIP content is hosted on servers located in Lithuania. Wikipedia is a huge project managed by a foundation operating on the principles of a non-governmental organisation, which attracts funding for the project's worldwide technical maintenance, including support from major sponsors such as Google. Meanwhile, ELIP's activities are constrained by its technical resources, which means that for those project participants who were motivated to join by the possibility of automatically generating large quantities of new encyclopedia entries, technical limitations reduce their motivation to participate:

The most significant factor is the lack of resources. It is no longer possible to do anything quickly in large quantities because the servers are currently running at over 90% capacity. (Interviewee 14)

Some negative feedback and reception from outside can also significantly weaken motivation to continue the project. Activities of at least some prosumer project authors were not limited to blogging alone but extended to other forms (e.g., events). The experience of Interviewee 23 demonstrates that following one such event, which provoked a controversial or even hostile reaction in the wider community, motivation to continue writing on the blog and to continue with the project in general was significantly diminished.

Several research participants had considered formalising their activities at a certain stage (in other words, not engaging solely in prosumption anymore). In one case, this was through projects with non-governmental

organisations and support from state funds (Interviewee 22), and in another case there was an attempt to include advertisements on the blog and thus potentially earn money, as there was noticeable interest in the content from the media (Interviewee 24). In the first case, according to the author, there was a lack of human resources and certain skills, and in the second case, there was a lack of time and willingness to organise activities in such a way that they could be commercialised:

But this money part, well, you just understand that if you want to earn something from it, you have to spend a lot more time on all the deception. You have to deceive people somehow to get them to come and read it. But that was not my goal, I do not want to lure people into reading it. (Interviewee 24)

Another research participant (Interviewee 21) has joined a crowdfunding platform that allows readers to provide one-off or regular support to creators. However, this participant's experience also shows that such remuneration does not become a significant source of income or a primary motivator for their activity.

Therefore, it can be posited that motivations may change over time whilst also overlapping. This assertion is not only applicable to the aspects previously examined but also to the prevalence of motivations to engage in prosumer activities across diverse domains and to the extent to which these motivations are influenced by attitudes associated with digitalisation.

Digitalisation related motivations

The following analysis of prosumer attitudes considers suggestions by some authors that there are principles inherent to acting in the digital space (Tapscott and Williams, 2008 [2006]) or that such activities are characterised by a particular ideology (Fuchs, 2020a; 2020b; 2020c). For example, Wikipedia emerged as a fairly ideologically motivated project focused on free access to information, universal sharing and equal collaboration. However, this does not necessarily mean that all Wikipedia contributors, let alone internet users participating in other prosumer projects, are guided by such ideas. Furthermore, it is not always easy to distinguish such ideologically charged attitudes from more universal motivations. Nevertheless, for analytical purposes, motivations related to digitalisation have been identified as a discrete category in order to assess if and how they are considered by research participants.

Notably, research participants predominantly articulated their motivations related to digitalisation only when prompted specifically to do so. Even then, articulating their stance and comprehension was not always

straightforward. To facilitate such reflection, research participants were asked, among other things, to consider a hypothetical scenario – if the internet would not exist at all, would they engage in any similar activity related to the creation and dissemination of knowledge? The following discussion of digitalisation-related principles focuses only on cases where research participants discuss ideas and factors related to digitalisation specifically as motivations, rather than simply stating the existence of certain characteristics.

Sharing

One of the principles discussed by Tapscott and Williams, which is relatively characteristic of research participants' attitudes, is the sharing of knowledge and information enabled by digitalisation and digital technologies. Digital artefacts are characterised as being easy to share, copy, rework, modify and adapt to one's needs. The idea of sharing as a motivating factor is reflected in the statements of some of the research participants. In collaborative projects, information is shared both internally and externally:

Often it is something you have written yourself, or a photo, and then you see it being reused or retold somewhere else, and so on. (Interviewee 1)

Wikipedia has separate derivative projects where authors can share not only text but also illustrations, photographs, audio and video recordings, etc. (Wikimedia Commons). At least some of the research participants have actively contributed by sharing their own photographs. These can be used to illustrate other contributors' texts, as well as outside the project. In the case of this research, such contributions are more often related to topics in regional or local history. In such cases, interviewees specifically indicate that the material uploaded will not only be visible to others but will also be available for use (some authors agree to share their works precisely on the condition that due acknowledgement of their authorship is provided).

Copying, moving and adapting information to one's needs is an active expression of the sharing process. However, there are also technical structural elements that act as intermediaries and facilitate the sharing of information. For example, as noted by one of the creators of Wikipedia content (Interviewee 2), links, i.e., active references between articles and external sources, make information easier to find and accessible to users. In this way, content creators use these elements to share pieces of information they or others have created with users who do not necessarily come directly to the original or related source of information.

Wikipedia allows its content to be copied and used for various purposes, including external projects, without restriction. This feature was important in

the creation of ELIP, where a large amount of content previously created by authors on Wikipedia was automatically transferred. While it would be inaccurate to assert that this was the primary motivation behind the creation of ELIP, it is nevertheless plausible that this particular feature of Wikipedia played a significant role in the decision-making process that led to the implementation of the new project. In addition, information sharing in general is an important value for the founders of ELIP (sometimes referred to as an honour):

And this sharing of information, well, it fosters goodwill, social awareness and so on. (Interviewee 12)

It should be noted, however, that the concept of sharing takes on several meanings in the statements of both online encyclopedias and blog authors – making something available for others to use, or making a certain object known and publicly visible. The latter aspect overlaps with other principles associated with activity in the digital space – openness and acting globally.

Openness

Tapscott and Williams define openness primarily as the opening up of information and the expansion of access to resources in the private sector, sometimes using the term synonymously with transparency (2008 [2006], pp. 20–23). However, in the broader context of digitalisation, openness is understood as free access to and availability of information in general (for instance, open, i.e., technologically enabled and tax-free access to scientific knowledge, research results and data). For internet users involved in knowledge creation and dissemination projects, this principle is often a fundamental condition for their activities. It is sometimes taken for granted in the digital space and not necessarily actively considered. However, some research participants – both authors of online encyclopedias and bloggers – clearly stated that this is an important element that contributes to their motivation to engage in their activities and enriches them:

Well, I think the most important thing for me personally when writing for Wikipedia is the availability of data. Because if I am writing an article, in the structure I choose, and I cannot find the data in printed literature, in traditional sources, then there would be some empty space in my article, unfilled, ... so, in this sense, data sharing [overlapping of concepts of sharing and openness, RŽ], *global sharing of data, facts, is very useful to me.* (Interviewee 2)

I completely understand this view – and I adhere to it – that information should be free and freely shareable. … I think this makes a lot of sense. (Interviewee 16)

In addition, by creating content for online encyclopedias or other prosumer projects, research participants themselves contribute to the accessibility and openness of information. Some research participants reflect on the varying levels of access to information across different internet platforms. Internet users can create content on the same topic in online encyclopedias and on social networking platforms (e.g., those interested in local history). However, the latter usually do not make the information created by their participants available to external users. According to Interviewee 14, this circumstance is also important for the further development of technologies:

Now Google or AI technologies are already trying to collect, process and present such information from the public internet, so to speak, and in principle, this may mean that Wikipedia is no longer necessary. There are various ways of thinking about this. But if information is not stored anywhere, no one will find it. … it is important that there is enthusiasm and that someone actually puts that information into some kind of source. (Interviewee 14)

It should also be noted that openness encompasses systems, software resources and equipment. This aspect was important in the development of ELIP, as it is based on technological solutions and tools created by Wikipedia contributors (MediaWiki open-access software). The entire structure of ELIP was created by replicating Wikipedia's structure, modifying some technological solutions and adapting them to its own needs.

Acting globally

The possibility and tendency to act globally, enabled and mediated by internet technologies, indicate that activities need not be bound to the physical location of the person performing them. Furthermore, digital technologies facilitate large-scale collaboration between individuals who are not necessarily physically proximate to each other in real time. Such modes of communication and collaboration are not confined by the boundaries of organisations, states or cultures. The notion of acting globally, with its manifold dimensions, has the capacity to serve as a motivating factor for the creators and participants of prosumer projects in several ways.

Firstly, digital technologies and the digital space provide the opportunity to reach a wide and geographically undefined audience. Since the research participants create content in Lithuanian, it is understandable that their

audience is limited in this respect. However, even in this case, the internet makes it possible to reach a much larger share of that audience than other forms and means of communication available to the research participants. This aspect was highlighted in separate cases by authors of both individual and collaborative projects.

In particular, ELIP focuses on cooperation among Lithuanians around the world, and the opportunity for the project's initiators and creators to communicate and cooperate globally is both a fundamental operating principle and a goal. Moreover, both ELIP and the Lithuanian Wikipedia include participants who do not live in Lithuania. The opportunity to participate in the project while physically distant from Lithuania, along with other related motivations, is an important element of this activity and a motivating factor for some of the research participants.

However, only a few Wikipedia contributors, as reported in interviews, said they were initially motivated by the opportunity to contribute to a global project, thereby supporting and expanding the idea of a "free encyclopedia." Others mentioned that the scope of their activities was broadened by the chance to create links between content in different languages. Some research participants, in addition to writing for the Lithuanian Wikipedia, are also involved, to a greater or lesser extent, in other language versions of Wikipedia:

... as I like other languages, I always look at the regional sections and so on, so it is interesting that you can read there in a wide variety of languages, even if it is just a short sentence, even in the most exotic ones. And therefore, this kind of global dimension, yes, it is interesting. (Interviewee 1)

In such cases, opportunities do not necessarily become long-term motivations, but there have been instances where interest and involvement arose from rather accidental access to information.

Peering

The digital space, being less formally defined and enabling various forms of collaboration, provides opportunities for participation and cooperation on an equal footing. This stems from the relative ephemerality of the digital space, the organisational principles of individual platforms and the technological prerequisites for operating in parallel and participating anonymously, if desired. Peering is characterised by a horizontal organisational structure rather than a hierarchical (vertical) one, based on the principle of self-organisation. This is important to some participants in larger collaborative projects. For example, Wikipedia authors are not necessarily opposed to authority in principle, but some are motivated to participate in this

project because everyone's contribution is valued equally, provided it is done properly. It is not necessary to be formally an expert in a particular field, nor is it necessary to know whether others are: "you do not feel neither better, nor worse than anyone else" (Interviewee 10).

Wikipedia authors also have the right to edit and add to each other's texts, which, according to some research participants, enriches the content being created and is even encouraging:

It is a collaborative project. You have to be prepared for the fact that everyone can edit, everyone can add, and that is how it is filled; and you see that sometimes there are some really cool things, new things. ... that is very interesting and good, because you cannot cover everything by yourself. (Interviewee 7)

Collaboration in content creation means that it often does not remain static but changes with each user's contribution. For some Wikipedia authors, this is what makes this activity interesting. It also provides a feeling that one is not working alone, even though contributions are made independently.

However, the fact that the project takes the form of an online encyclopedia does not necessarily mean it has a uniform organisational structure. Even Wikipedia, which declares the principle of equal cooperation, has organisational features that formally or informally give some participants more power and influence over others (e.g., administrators, experienced members). However, at least formally, mechanisms are in place to ensure that acquired authority does not confer superiority. In the case of ELIP, although the importance of cooperation in implementing the project as a whole is also emphasised, the organisational structure itself is different. Firstly, there is a formal ELIP council and a board of publishers, which could be considered the editorial or administrative equivalent of the project. Interviews with participants in this project indicate that the founders of the project also perform organisational and editorial work. In other words, there is a more pronounced hierarchical structure in place. In addition, the principles of cooperation in preparing content and prioritising original articles also differ.

Internet as a tool

Most research participants are unable to imagine a world in which they would engage in similar activities without the internet. However, this does not imply that they are necessarily guided by clearly articulated ideas about digitalisation and the digital space. As previously stated, research participants tend to contemplate these concepts only when prompted, perceiving the internet primarily as a tool or medium that facilitates their activities and

provides them with a space and framework. Interviewees identified several features and elements of the digital space and digital technologies that they considered important.

The internet, as a space for information dissemination and technological access to information, **saves the resources** that would otherwise be required to implement knowledge dissemination projects by other means. Research participants also note that not only are fewer resources needed, but in some cases fewer technical skills are required. This is related to the technological features of the so-called social internet. Blogging platforms or wiki-based online encyclopedias do not require content creators to have highly sophisticated programming skills in order to publish their content. Therefore, some research participants, regardless of their motivations, cannot imagine engaging in such activities in any other way:

I do not think so. In order for them to realise [their inclinations and motivations]*, some kind of environment is needed. Without the means, you just keep everything in your head.* (Interviewee 10)

Furthermore, among different forms of prosumer projects, there are differences in how content creators understand the skills required by a particular platform. Some Wikipedia content creators believe that this platform makes it easier to publish information than, for example, blogs. Meanwhile, bloggers themselves have varying technical skills, ranging from content creators who hire people to oversee the technical side, to those who share these responsibilities with more knowledgeable co-authors, to IT specialists with professional programming skills.

Another notable feature of the internet, which research participants sometimes highlight as important, is its virtually **unlimited space** and structure. Admittedly, this space is only relatively unlimited, as exemplified by the case of ELIP, where server capacity and capabilities can and do limit some activities. The argument about unlimited space is more often invoked when comparing writing for online encyclopedias with traditional paper encyclopedias. In the first case, there are, in principle, no formally defined restrictions on the length and detail of articles, the number and type of attachments and links they can include, etc.:

I liked the way it was presented, how it was filled in, and you can really write a lot, no one limits you there. (Interviewee 10)

Meanwhile, for authors of individual or small collaborative projects, the internet provides an opportunity to discover, or more precisely, to create a place for themselves in a form that is acceptable to them, thereby creating a niche for themselves. Furthermore, it is anticipated that information stored in digital formats will persist for a duration that exceeds the creators' capacity

and resources to maintain it ("Let's say, pages that no longer exist, they are still copied somewhere, in some archives, Google has stored them somewhere," Interviewee 20). This becomes a certain form of archiving.

Some research participants also highlight **interactivity** as an important feature of the digital space – links between different elements of content and the ability to share and publish it immediately. This possibility is relevant both for linking content within projects and for directing readers to external sources or marking external information for oneself (in the case of some blogs), as well as for sharing content in different forms – not just text. One of the essential characteristics of encyclopedias, not limited to the online ones, is the system of links from one article to another. Digital technologies enable these links to be expanded and simplified, making access direct and, in principle, unlimited.

However, not all authors of online encyclopedias consider interactive system elements important. On the contrary, they may be seen as additional work and, in some cases, even annoying:

It does not look like that [like the version visible to the reader – RŽ]*, and you have to put certain brackets there and then put each word in them. Well, and these brackets – because you have to put them at the beginning and end of the word – they just get in the way. You simply cannot do the job properly, and in the text itself, once it is finished, they* [highlighted links – RŽ] *annoy me. It is just a personal opinion.* (Interviewee 17)

This case seems worth mentioning because (along with the other attitudes of this research participant) it at least partially indicates that motivations not directly related to the ideas of digitalisation are likely more significant for the author of this statement. It can be assumed that in this case, the characteristics of the digital space are treated as elements that must be adapted to and are inevitable if one wants to successfully implement one's undertaking, which is driven by motives arising from completely different implications.

The same applies to technologically enabled and mediated feedback – it is important to at least some of the research participants, but not to all. According to several bloggers, the digital space fosters meaningless and sometimes even malicious comments and superficial discussions, which they consider a waste of time (although, in principle, these participants value the freedom and diversity of content offered by the internet). Some of the ideological assumptions associated with digitalisation are also viewed with scepticism:

Well, this cooperation component and similar things that you have raised here seem to me to be self-deception. Digital technologies are distancing

people from each other. They are not bringing them closer but distancing them. (Interviewee 19)

More broadly, research participants have articulated a range of **critiques and assessments** of digitalisation processes and the social phenomena they influence. These statements are not usually part of the motivations discussed (they could even be interpreted in the opposite way), but they are worth mentioning as they reveal participants' general understanding of the digital space. One aspect discussed by some participants is the ephemeral nature of information on the internet, in the sense that it is intangible, unrecorded and constantly changing, and that the duration of information storage and publication essentially depends on the resources of platform administrators:

None of us know the owners of Wikipedia, and one day they could simply delete that information. ... I always understand that everything can be temporary, and at the same time, I am just glad that people read it. In addition, there are all kinds of duplicate "Wikipedias" that have copied all the articles, so if this Wikipedia disappears, the other ones will definitely remain [laughs]. (Interviewee 11)

Several research participants raised privacy issues in the online space. However, in some cases, efforts to protect privacy are treated not as a goal but as a subject of criticism:

[comments on a person's request to remove a photo posted online:] *Child, how are you going to live your life then? Are you going to live underground, hiding somewhere? You still are going to live somewhere, study, work, ... in the end, a photo on your passport, on your ID card or on some student ID, one cannot move without it...* (Interviewee 15)

In another case, the use of information already published by other authors was described. In this instance, the request to remove some information was regarded as surprising. Such attitudes among the research participants can be interpreted either as an argument for freedom of information or as a failure to fully assess the challenges to privacy on the internet. In the latter case, it could be argued that privacy is not considered a value. Notably, these observations were provided by research participants who, in other segments of the interviews, also spoke in favour of authorship of content published online and against the anonymity of information. Taken as a whole, these statements suggest that the expectations of these research participants for the digital space mirror their expectations for human interactions and principles for acting in real life, and reflect a particular understanding of the digital space.

Another issue on which the participants shared their insights was the development of so-called artificial intelligence technologies and their potential impact on projects with which they are personally involved. With a

few exceptions, the research participants stated that they were not particularly familiar with these technologies and hardly used them in their activities. Automatic translation is, on occasion, cited in the context of applications. Nevertheless, AI technologies are generally viewed in an ambiguous way. It is evident that these tools are regarded as a prospective instrument that can assist in editing texts, selecting sources and illustrations, and conducting translations. However, certain challenges associated with these technologies are also considered. In the case of online encyclopedias, it is observed that over time, a few users who are more skilled with AI technologies may emerge and come to dominate the project:

Interviewee 10: *As far as it regards users, I think that sad times lie ahead because there will be a few super users who will use artificial intelligence.*

Interviewer: *But then they will be banned, kicked out, reported and...*

Interviewee 10: *At first, probably yes, one hundred percent, they will all be banned and prohibited by artificial intelligence policies... but I think time will show that everyone will get used to it. People will learn to deal with it.*

It has been posited that if text-generating AI tools ultimately supersede search engines, this could pose a significant challenge to the relevance of online encyclopedias, given that, for example, Wikipedia articles frequently rank among the initial results in search engine queries and consequently garner substantial internet traffic. The advent of competing technological solutions and evolving user habits, therefore, may result in a transformation of the project's role:

The worst thing about this artificial intelligence is that, I think, such kind of an artificial intelligence will emerge that will be able to create an alternative encyclopedia in a matter of days. Then Wikipedia will no longer have any meaning, if the quality of that one is good. Who cares about the person who is struggling with that article, writing it with some mistakes? No one will care about it. (Interviewee 8)

Meanwhile, other research participants argue that online encyclopedias are a very important source of information for training text-generation tools based on large language models (e.g., Wikipedia was one of the data sources used to train the model on which ChatGPT is based). This means that the activities of online encyclopedia content creators are not losing their meaning but are being validated in new forms. One of the blog creators also pointed out that digital tools can perform tasks significantly faster, but there are tasks that tools based on algorithms and machine learning cannot perform. An example of a citizen science project in astronomy is provided, where human recognition skills were needed to classify astronomical objects for some tasks,

while algorithms performed better for others. Therefore, a combination of both is needed to achieve the best results.

Another technological challenge identified by several Wikipedia authors, which was already more evident than the effects of AI at the time these interviews were conducted, is the widespread use of smartphones and its impact on content creation on Wikipedia. According to the research participants, as people increasingly access online content via smart devices, it is becoming less convenient for them to edit Wikipedia. The format of this project is fundamentally designed for computers and keyboard input, and it is much less convenient to compose and edit longer texts on small touchscreen devices. Some research participants link this circumstance (as well as the popularity of social media platforms) to the fact that younger content creators are less likely to participate in the project:

Statistics can be seen on how many articles were viewed on a computer and how many were viewed on a smart phone. And if I remember correctly, currently about 85 % are on phones. Phone users read a lot, and reading has even increased with the advent of smart phones, but writing has decreased. (Interviewee 11)

According to this research participant, there are active discussions on other language Wikipedias about how the platform's structure could be better adapted to smart devices and optimised for mobile users. This could also change the way content is created. For example, there would likely be fewer detailed articles, which Wikipedia contributors currently often prepare using text-editing programmes and then upload to the platform.

In **summary**, the interview material indicates that the perception of activities as a form of mission, with a subsequent link to the contribution to the common good and to self-realisation, emerges as the most universally prevalent motivation among research participants, irrespective of the nature of the project. The analysis of general motivations largely corroborates findings from other studies. As previously mentioned, the most common motivations identified in previous research include learning, self-development, reputation building, and satisfaction (see Xu and Li, 2015), which align with the motivational factors reported by participants in the present analysis. This analysis lends further support to the finding that, for example, in the case of Wikipedia, communities in different languages are motivated by more specific factors, such as the desire to create high-quality content in their local language (see Asadi et al., 2013). In a similar vein, the ELIP case demonstrated that the concept of national consolidation can serve as a significant motivational basis for the entire project. The analysis of

bottom-up prosumer projects also suggests that the aspirations observed in citizen science projects to contribute to scientific knowledge, develop skills, and compete (Nov et al., 2011) are fairly universal.

However, the present study also revealed specific aspects, such as the importance of habits, even their transformation into addiction, the establishment of status and reputation not only within the project but also outside it, and the incentive to delve deeper into personally important topics. This was, to a certain extent, made possible by the broadening of the range of cases incorporated within the analysis. Furthermore, the qualitative research approach facilitated the identification of variations within projects and between formally similar projects.

Moreover – and this is specific to the present research – the analysis suggests that the digital space in this regard, first and foremost, provides prosumer project creators with the means and tools to create and share content. Research participants reflect on some characteristics of the digital space, but this does not necessarily mean that their activities are motivated by ideas and principles specifically related to digitalisation. Only in rare cases are these ideas and principles clearly expressed and identified as key motivating factors. More often, motivations related to digitalisation overlap with other, more universal ones. For example, it was often mentioned that one important motivation is that the content of the projects reaches a relatively wide audience. On the one hand, this suggests that the opportunity to act globally (not necessarily in the literal sense) is one of the essential elements of this activity. On the other hand, the need for attention to oneself or the results of one's activities is of a much more general nature and is not exclusively linked to the online space. Similarly, openness and sharing of information (data, knowledge, etc.) as ideological attitudes overlap with the understanding of the activity being a kind of mission, a sense of influence, and the imparting of the meaning of heritage and legacy.

The results of the analysis suggest that, for the participants, the digital space is more of a tool for realising various motivations and a means of doing so at a relatively lower cost than a political (in the broadest sense) manifesto. In pursuing these goals, they also implement certain principles associated with the digital space, such as peering in the case of online encyclopedias. However, as the examples discussed indicate, for at least some of the participants in such projects, the community and cooperation aspect is not a priority; it is more important for them to have a space for self-realisation. This finding is somewhat at odds with the motivations identified in other studies of users' productive practices in knowledge-creation activities. In particular, in the context of large-scale collaborative projects (for example, Wikipedia or

citizen science projects), participation in the community is often cited among the key motivations (see overviews in Hase et al., 2022; Xu and Li, 2015).

Furthermore, slight differences in motivations emerge between the different types of prosumer projects with regard to the aspects of motivations and the inspiration associated with them. In the following paragraphs, a summary of the most common trends in motivations according to the identified types of prosumer projects is provided. In all kinds of projects – individual prosumer projects (corresponding to prosumption typology type 1), small-scale collaborative prosumer projects (corresponding to type 2), and large-scale collaborative prosumer projects (corresponding to type 4) – participants had various motivations; therefore, the following paragraphs discuss in more detail those that were most common and most pronounced.

As indicated in the overall statements of the research participants, self-expression and self-realisation are universal motivations for engaging in prosumer activities in the context of **individual** projects. Almost all research participants developing projects of this type are also professional scientists in their respective fields. In such cases, these projects offer opportunities to realise their skills, satisfy interests that their work does not directly allow and gain additional knowledge in related fields. In the context of such projects, authors have indicated that the opportunity to learn and explore issues of interest is a significant motivating factor. Furthermore, these interview participants suggested that readers' attention to the content they create also adds meaning to this activity.

However, unlike other types, not all authors of individual projects associate their activities with a mission (sharing, disseminating knowledge, etc.). One research participant in this group emphasised that they did not consider their activities a mission and that they were creating the project purely for personal reasons. Despite the content of this project still being publicly shared, this case could also be considered a partial example of type 5 of the prosumption typology (*skilled user p-prosumption*). This demonstrates that projects that are more or less identical in form can address different aspects of prosumption, thereby substantiating the argument that prosumption is a heterogeneous phenomenon. It is therefore essential that formal instruments for its analysis are combined with more detailed empirical case studies.

When considering motivations related to digitalisation, it is evident that the topic of peering did not arise in the interviews conducted with the authors of individual projects. This issue is, in essence, not pertinent to their activities. A greater emphasis was placed on the openness of information and data,

namely the principle that enables project authors to access the information on which they base the content of their projects.

Small-scale collaborative projects are characterised by authors who discuss both the importance of the mission and self-fulfilment in their activities. This group, like the authors of individual projects, is characterised by expert knowledge, which serves as a motivation for engaging in this activity. However, the authors of small-scale collaborative projects are also characterised by having started this activity as students, though they did not necessarily become scientists. Therefore, self-realisation is partly related to personal growth – the opportunity provided by the project to learn, explore and apply the knowledge acquired is also emphasised. Among other motivations, the activity also provides a certain degree of satisfaction and pleasure.

Although these projects are collaborative in nature (and some were initiated by like-minded individuals), not all participants directly identified community spirit as a motivating factor. Only one participant in this group assigned particular importance to this aspect and cited it as one of the main reasons for creating the project. This is most likely related to the specific contexts in which the projects emerged (e.g., whether they were inspired by others, as a means of delving deeper into certain content or created specifically as a tool for community building). In addition, the quantitative characteristics of these small groups also differ slightly. The founding group of the project, whose author identified community as a motivating factor, was relatively larger than in the other three projects (6–7 people vs. 2–3 people). However, as will be demonstrated in the following segments, this is not the sole significant aspect for the emergence of a sense of community. In regard to digitalisation, this group demonstrates some tendencies towards peering and stresses the importance of openness of information.

Large-scale collaborative projects are characterised by even greater internal diversity, although only two cases can be classified as such: the Lithuanian Wikipedia and ELIP. As in other cases, participants in both projects view their activities as a mission to create a common good and to achieve self-realisation. However, other motivational elements related to these inspirations differ. ELIP participants tend to emphasise the significance and preservation of heritage and legacy in their activities. This project allows participants to focus on topics that are personally meaningful to them. Writing for ELIP is also seen as a meaningful use of time (the same is true for Wikipedia contributors). In terms of motivations associated with digitalisation, the opportunity to act globally, that is, to reach people outside Lithuania, is of relatively greater importance to participants in this project. For some of the

creators and participants of ELIP, this is one of the main inspirations, while for others it is a pleasant and somewhat unexpected consequence of their activities.

Conversely, the notion of ELIP authors as a collective entity, which would be regarded as a significant rationale for engagement in the project, was almost never articulated in the interviews. The interviewees assert that they rarely, if ever, communicate with content creators they do not personally know. Therefore, being part of the ELIP community did not emerge as a motivating factor in the statements of the research participants. This detail is interesting because, when assessing the number of its active participants (as opposed to the total number of registered users), the ELIP community would be similar in size to the small-scale collaborative project mentioned above. However, its origin and organisational principles are completely different – it is not a group of people who have come together independently to create a project, rather, it is the project that brings people together. But unlike Wikipedia, the people writing for ELIP were often (although not always) personally invited to join by members already participating in the project or by the project initiators, meaning that they come more from personal relationships. Meanwhile, most of the interviewed Wikipedia contributors directly or indirectly stated that being part of the community is one of the factors that motivates them to participate in this project, although also with some exceptions.

Another motivation, particularly characteristic of Wikipedia contributors and related to community spirit, is a sense of duty and responsibility. Participants in other types of projects also mention this aspect, but more often in relation to a duty to the wider community or society in which they live. Several other motivations were exclusively or significantly more common among Wikipedia contributors than among participants in other projects. First, these were the prestige associated with the project's popularity and influence, and a sense of pride. In addition, participants who write exclusively for Wikipedia explicitly stated on several occasions that participating in this project and writing for it has become a habit, and for some, in their own words, even an addiction. It is also noteworthy that Wikipedia participants were the ones who mentioned competition and excitement as key motivational factors.

Among the motivations related to digitalisation, interviewees who contribute to this online encyclopaedia almost exclusively identified the opportunity to engage in peer-to-peer interaction as being significant. Furthermore, they emphasised the importance of sharing, encompassing not only content dissemination but also the provision of resources for others' use. The aspect of acting globally – both in terms of content accessibility and the

project's independence from a specific location – was also identified as important to the research participants. Nevertheless, it is important to note that these attitudes cannot be generalised to the entire type 4 of the typology. In this context, Wikipedia appears to be a rather unique project, which arose precisely from the ideological attitudes of its founders that are not necessarily shared by all Wikipedians, but which are nevertheless relatively clearly expressed as a whole.

Therefore, although Wikipedia and ELIP are formally quite similar projects, even created using the same technological framework, the motivations and attitudes of participants towards their projects are markedly different. In addition to the ideological aspect mentioned above, it is also pertinent to consider the organisational structure of these projects and the established principles of content creation. These factors may shape participants' perceptions of their place and function within the project and their orientations regarding what content can or should be created and how. In terms of the typology of prosumption, this suggests that the identified types could be further subdivided into subtypes by introducing additional meaningful criteria for classifying prosumption cases, such as organisational structure, skills characteristics (technical/content-related; formally/informally acquired, etc.), and others.

ELIP is characterised by a slightly more hierarchical structure, and some research participants who joined the project after its establishment consider its founders to be a form of editorial authority. The founding group is responsible for technical decisions and related tasks. Furthermore, ELIP and Wikipedia have divergent policies regarding the anonymity of content creators and content authorship, as well as divergent approaches to whether content can result from independent research. These aspects are of particular importance for prosumer motivations and partly determine the final product, i.e., how prosumption manifests in the context of knowledge dissemination as a whole. Therefore, these aspects will be discussed in more detail in the following sections.

4.3. Authorship and dimensions of anonymity

One of the distinguishing features of the digital space is its capacity to facilitate the dissemination of content anonymously. Although the advent of the so-called social internet, which partially replicates offline communication and relationships, has led to a decline in anonymity in the digital space (Tufekci, 2014, p. 15), anonymous and pseudonymous participation on the internet persists. Furthermore, some researchers considered the logic of users'

productive practices, expressed through the notion of digital commons, to be both a challenge and an alternative to established authorship practices (for an overview, see Dulong de Rosnay and Stalder, 2020, p. 9–10). As the following analysis demonstrates, internet users have various motivations for engaging in anonymous content creation. However, the mere existence of this possibility does not imply that all prosumers avail themselves of it. Some research participants expressed strong convictions about the importance of authorship of content. Additionally, it becomes evident that the concepts of anonymity and authorship on the internet are heterogeneous and nuanced.

Most of the blogs included in this research were authored, with several exceptions in which authorship was not explicitly stated or where not all content was signed with the author's name. ELIP requests that its participants identify themselves upon registration. While articles can be published under pseudonyms, many users opt to use their real names. Wikipedia, in contrast, adopts a different approach by not requiring users to disclose their real identities. Participants typically interact with each other through pseudonyms, and articles are not signed, although it is possible to verify the editors of the content through article editing history (by pseudonyms only).

Authorship

For research participants who opt to publish their content with authorship identification, there may be several rationales for this decision. One reason is the imperative to mark their content as their intellectual property, underscoring their investment and contribution. This decision indicates an effort to associate their name with the content they have created, which may also serve to garner recognition from their existing and potential audience:

For me, it is important [the attribution of authorship]. *It is a kind of remuneration for my work, because, as I said, nobody pays me for it, so, well, at least there is authorship.* (Interviewee 17)

It is sad if someone takes your ... article, swaps paragraphs around and says it is theirs. I think it is, well, necessary just to prevent someone from misusing your hard work. (Interviewee 24)

For some research participants, authorship attribution serves as a means of attaining status, particularly when they perceive their contributions to be significant in their respective fields. It is emphasised that status is not possible without a certain amount of publicity.

Even on Wikipedia, where content is published anonymously (from the perspective of an external reader), some interviewees report occasionally feeling as though they are the authors of the article, despite recognising its

status as a co-created object. This tendency has been already observed in the research by Halfaker and colleagues, as exemplified by reversions of given edits (Halfaker et al., 2009). The present analysis demonstrated that the feeling of the ownership of the article is more prevalent when most of it has been written by a single user, and when it is larger and more comprehensive. However, other Wikipedians emphasise that their authorship remains very limited:

Well, our authorship is based on quotations. Quotes ... bear responsibility for the information, in my opinion. And those who edit, those working bees, they do a very good job and thanks to them, so to say. But that is where their authorship ends – with the editing. (Interviewee 9)

For the creators of authorised content, publication through authorship is also a declaration of honesty, integrity and responsibility for the quality of the content. According to Interviewee 21, not all internet users possess the skills to accurately assess the credibility of information, thereby attributing authorship to the content serves as a form of validation. It demonstrates that the author has thoroughly reviewed and critically evaluated the content. In other words, it is additional information that helps the reader decide whether to trust the content or not (Interviewee 26). Authorship attribution is also occasionally described as being "disciplining" for content creators, although this may not always be strictly necessary (Interviewee 25).

In a similar vein, authors who write anonymously often express the view that not all content on the internet should be published anonymously. They advocate authorship, for example, for scientific content. This stance is often presented as pivotal in ensuring the veracity and credibility of the information. Here, again, the attribution of authorship implies that the information has been verified and that there is a system and a set of norms behind the author and their publication, which guarantee the credibility of the information.

Personal responsibility for content is one of the main reasons ELIP requires authors to register on the site by identifying themselves. The founders of ELIP also argue that author identification should help avoid so-called edit wars. Edit wars are situations in which several authors repeatedly change each other's content without reaching a consensus on the truthfulness and correctness of the information. One of ELIP's solutions to such situations is to allow different authors to create separate articles on the same topic, with each article considered a personal contribution.

The founders of ELIP also state that the decision to require authors to identify themselves upon registration and to prevent unregistered individuals from editing content was partly technical. This measure was implemented to safeguard against acts of vandalism. In the context of online encyclopedias,

"vandalism" refers to the malicious editing of content with the intent to distort or corrupt it. According to the founders of ELIP, it was foreseen at the outset of the project that handling and restoring damaged content would require significant additional resources. For this reason, the decision was made to exclude unregistered users from content creation altogether (unlike Wikipedia). One interviewee posits that a potential disadvantage of this decision is that it may result in a narrower pool of internet users contributing to content creation on ELIP. This decision effectively hinders the spontaneous corrections that unregistered users might make to content they have come across. Drawing upon the experience of Wikipedians, it is clear that in some cases occasional corrections can evolve into a dedication to the project.

Furthermore, one research participant advanced a more epistemic argument in favour of content authorship. The argument holds that identifying the authorship of any scientific content contributes to understanding the cultural context in which a particular piece of knowledge is produced. The interviewee asserts that this condition applies to both the social sciences and humanities, as well as the natural and exact sciences:

Because for me, knowledge is not naked, it is not bare. [The field of science] *is different in every country, and the teaching methods as well .... It is called the "ethnographic aspect". Thus, it is maybe intuitively important for me to know the authorship, when I know that some things depend on the mentality of the author. It is important as additional information – where the knowledge came from, what might have prompted it and in what context it emerged.* (Interviewee 25)

Consequently, authorship of the content is an integral component of the context in which it was created. The attribution of authorship is not only a formal aspect of the reliability of information but also an issue concerning the content of the knowledge itself, its understanding and interpretation.

Anonymity

With regard to the justifications for anonymity on the internet, these were most explicitly articulated by Wikipedia members, with at least some of them citing it as a significant factor in their decision to join this particular project. A major argument in favour of anonymity on Wikipedia is the safety of content creators. This is particularly salient in countries where content is subject to censorship, authoritarian regimes predominate, and other circumstances that inhibit freedom of information and expression are prevalent. Nevertheless, the research participants also highlighted the importance of fostering a sense of safety when contributing to content that is regarded as controversial:

Maybe less so in here, of course, although there were also some kind of ideological opponents, some kind of [names a group of people] *trying to find out which person did what, why is someone allegedly acting against them, or something like that. Well, then it is better that it* [anonymity] *exists.* (Interviewee 1)

It is suggested that involvement in personal issues and disputes can diminish motivation and enthusiasm to contribute to unpaid activities. Furthermore, the decision to participate anonymously in creating online content may, in a broader sense, also be linked to a desire to reduce one's digital footprint ("It is peaceful to live my life unknown to anybody...", Interviewee 8). This phenomenon has also been observed among the co-authors of some blogs. This reasoning is not always explicitly articulated but can inform the decision to write anonymously.

As observed by some Wikipedians and bloggers, anonymity (or the use of pseudonyms) allows individuals to explore a wider range of topics, including those not directly related to their education or professional activities. Several interviewees suggested that anonymity was a significant factor at the very beginning, when they first started writing. It helped mitigate the fear of making mistakes that might otherwise have prevented them from starting to write in the first place. Anonymity also enables a certain distance to be established between the content and its creator:

In some cases, one does not want, as a person, to be associated with a specific topic. Perhaps one wants to write about the Nazis, and by being anonymous, one can avoid the slander that they themselves are a Nazi. In this way, they can keep their identity undisclosed and share information with others. Anonymity ensures freedom of speech and courage. (Interviewee 9)

For some other research participants, anonymity seems to create a niche in their own lives where only they are aware of their engagement with the project. This can feel like establishing an alternative identity. In certain instances, the authorship of specific segments or overall participation in the project is kept confidential from the interviewees' families and relatives. While not a prevalent practice, it did occur among participants in online encyclopedias as well as among bloggers. One notable instance involved a relative who, unaware of the author's identity, had used a Wikipedia article written by a research participant for a university assignment. The research participant chose not to disclose the authorship in order to avoid discomfort and awkwardness:

He used my Lithuanian piece, then translated a bit from the English one. It was secretly funny to me, but I did not tell him. "Oh, well", I thought, "then he will not want to use it, then he will think of something else". (Interviewee 7)

However, some interviewees who write for Wikipedia state that anonymity is not important to them. They choose to disclose their real names and argue for authorship of their content, which, in some cases, is seen as helping to build status. In one case, anonymity is also associated with the perceived dominance of a group of Wikipedians, which can hinder democratic decision-making processes:

For example, there is a certain administrator and then there are his supporters. There are also lots of signs that "clones" are used. So, how do these clones emerge? They exist because of the anonymity. (Interviewee 3)

This interviewee posits that anonymity is, on occasion, a prerequisite for the disrespectful treatment of other participants in the project. It is associated with discussions of topics that may be interpreted differently depending on the point of view and values of the particular content creator.

Besides the attitudes of research participants towards anonymity already discussed, there are also some Wikipedians who take part in the project under a pseudonym but claim that they would now assign authorship if asked to choose at this point. This change in attitude has been linked to the extent of the individual's contributions to the project. Following an extended period of involvement and the recognition of a substantial contribution to the project as a whole, a desire may emerge to declare authorship.

Changes in life circumstances may also be one reason the importance of writing anonymously has shifted. For instance, such a shift may occur in response to relocating to another country or to changes within one's immediate community. In such cases, it is argued that anonymity may be more important for individuals in positions of importance or influence, who, due to their professional or social standing, may be recognised in their communities, yet, for reasons that may vary, wish to remain anonymous. An example from the academic realm shows anonymity being used to avoid being tied to professional topics (Interviewee 11). This may also be an attempt to avoid being identified with information on Wikipedia that still has uncertain credibility. Jemielniak and Aibar (2016) have previously demonstrated that despite Wikipedia being relatively accurate, academia still harbours scepticism towards it (similar observations are made in Konieczny, 2016; 2021). A similar argument, linking anonymity in the digital space to status in real life, was made by the author of a blog that had some anonymous authors among its content creators (Interviewee 26).

Dimensions of anonymity

While the typical Wikipedia reader is unaware of the identities of individual article authors, those who actively contribute to the project hold a more nuanced perspective on the matter. Several dimensions of the concept of anonymity can be observed. First, for Wikipedians, anonymity is often **conditional**. At least some research participants do not perceive Wikipedia as a completely anonymous project, as internet users are usually traceable to their IP addresses, and pseudonyms may be linked to the topics a user writes about and the edits they make. In this way, although the exact identity of the user is often unknown, some characteristics of their actions are readily recognisable. Conversely, some interviewees posit that even when an individual's identity is explicitly declared online, there is no guarantee that the person in question actually is who they profess to be. Therefore, in this particular view, writing anonymously or not makes no essential difference.

Although writing anonymously may be associated with an abdication of responsibility for the content produced, interviewees stress that they remain concerned about their reputation in relation to each other and the wider audience:

I am anonymous on Wikipedia, but I am no longer anonymous <u>within</u> Wikipedia, I am the user that everyone knows there. And I try not to disgrace this avatar of mine. (Interviewee 8)

This understanding of being recognisable and reachable by others may be considered a distinctive feature of a relatively small Lithuanian Wikipedia community. But it is also an outcome of the understanding that one's activity on the project (and on the internet, in general) is never entirely anonymous.

Secondly, there is a distinction between those who remain **anonymous** and those who edit Wikipedia under **pseudonyms**. Wikipedia permits editing by non-registered users, in which case the user's IP address is displayed instead of a pseudonym. Nevertheless, such users are often regarded by experienced editors as unskilled, prone to mistakes, untrustworthy, and sometimes as "vandals". The interviewees further posit that unregistered users are predominantly responsible for deliberate mistakes and other defacements (e.g., swearing). It is particularly these users who are referred to by the research participants as "anonymous". In contrast, the project's more experienced contributors, although mostly known only through pseudonyms, are considered more trustworthy and at least partly familiar:

You know some of them as individuals, you know their bibliographies, you know what sources they rely on. (Interviewee 4).

This categorisation, together with the acknowledgement of the conditional nature of anonymity, suggests a more nuanced understanding of the potential of internet anonymity.

Impact on content

As has already been noted, proponents of authorship argue that declaring and attributing authorship are instrumental in ensuring accountability for the content and its quality. From this perspective, anonymity is often associated with concealing one's identity and evading identification, as if engaging in wrongdoing or injustice. It is asserted that anonymity does not inherently preclude responsibility, rather, it is a possibility that can be exercised. However, it is important to note that not all creators of authored projects adhere to such provisions. Some acknowledge the merits of anonymity, perceiving their decision to publish under authorship as a personal prerogative, albeit not necessarily the exclusive optimal choice. They contend that, in the event of anonymity, they would be equally responsible for the content they create.

Conversely, it is important to note that not all authors of projects that offer anonymity necessarily exercise this option, nor do all of them explicitly value anonymity. For instance, one research participant asserts that they generally support adherence to established norms and consider the declaration of authorship of information to be a commendable quality (Interviewee 3). From his perspective, the act of authoring content serves not only to prevent harm or use for undisclosed purposes, but also to ensure the creation of something distinctive and valuable. This research participant posits that formal equality is not conducive to producing any exceptional results and hinders the process.

In contrast, proponents of anonymity argue that it can influence content yet emphasise that this influence need not be inherently detrimental. Anonymity is sometimes associated with a degree of autonomy, which enriches content and enables the exploration of topics that might otherwise remain unaddressed. Some research participants have also asserted that they create content without considering that they are writing anonymously, and they do so with the same responsibility; however, they do not favour publicity in principle.

Although some Wikipedia contributors admit that the ability to write anonymously inherently allows deliberate errors, they claim that mistakes are usually spotted and that devoted users have tools to react relatively quickly. Wikipedia's system allows users to view information about recent changes to the platform and the contributors who made them, and to review new content.

As mentioned above, intentional errors are more likely to be associated with unregistered users, and therefore content created by them is more likely to be reviewed quickly and carefully.

Moreover, some argue that even if the real names or professions of the Wikipedians were disclosed, that knowledge would not confer greater credibility. From this standpoint, knowledge of authorship is advantageous only when the reliability of the information is evaluated based on the author's credentials, including their educational background and professional training. However, given that Wikipedia is not compiled by professionals (although they may be involved in the process), the identity of the individual contributor is not essential and does not necessarily add to confidence in the content:

If it were not for this anonymity, these people, well, would be known, but they still could not be trusted. Because then it would be the milkmaid, the salesman, right? These are the kind of people who cannot be trusted [with scientific knowledge]*, whether they are anonymous or not. ... the point* [of Wikipedia] *is who writes it – that it is not written by specialists and scientists.* (Interviewee 8)

The idea behind this statement is that Wikipedia information, by its very nature, cannot be accepted unquestioningly, and that the responsibility for determining the veracity of the content rests with the reader. Should the reader have reservations about the reliability of the information, they are advised to examine the sources cited in the Wikipedia articles and similar online sources. Therefore, while Wikipedia contributors generally concur that the project is largely free of fundamental errors, the concept of credibility varies. Nevertheless, the credibility of the information is one of the core values that guides content development. In the following section, the principles and values that inform the activities and content of the prosumer projects under analysis are discussed.

4.4. Scientific ethos

The creation and dissemination of scientific knowledge on the internet can be undertaken by non-professionals and internet users without specific expertise. It can therefore be argued that their activities may not necessarily reflect the institutional scientific process or its governing values. At the advent of the social web, critics raised this concern, expressing scepticism about the possibility of non-professional participation. The aim of this section is to discuss the attitudes of the research participants towards their activities and the content they produce, and to assess whether these attitudes correspond to or deviate from the scientific ethos as defined in the classical work by Robert

Merton (1973). Merton identifies four norms and values that define the scientific ethos: universalism, communism, disinterestedness and organised scepticism.

Universalism, as proposed by Merton, holds that claims to scientific truth must meet predetermined criteria, be consistent with observational findings and align with previously validated scientific knowledge. The acceptance or rejection of such claims must not be determined by the personal qualities and affiliations of the author; objectivity is to be favoured, and particularism prohibited. The principle of communism holds that scientific discoveries arise from collective social endeavours and, by extension, are the collective property of the community. In other words, a law or theory does not become the exclusive property of its discoverer or creator but is considered a common heritage. The principle of disinterestedness in scientific practice is manifested in the accountability of scientists to one another and to the scientific community. Results that claim to be scientific knowledge should not be produced to serve the interests of any particular group. Organised scepticism is the process of evaluating claims and beliefs by applying logical and empirical standards, while avoiding premature, partial, or prejudiced judgments. Merton's position is that this constitutes a methodological and institutional mandate for scientists (Merton, 1973, p. 270–278).

The attitudes of prosumers captured in the research are identified and discussed in relation to the points raised and addressed in the interviews. The coding scheme delineating the principles guiding the activities of prosumers in the field of science is presented in Figure 7. Their attitudes will then be compared with Merton's definition of the scientific ethos.

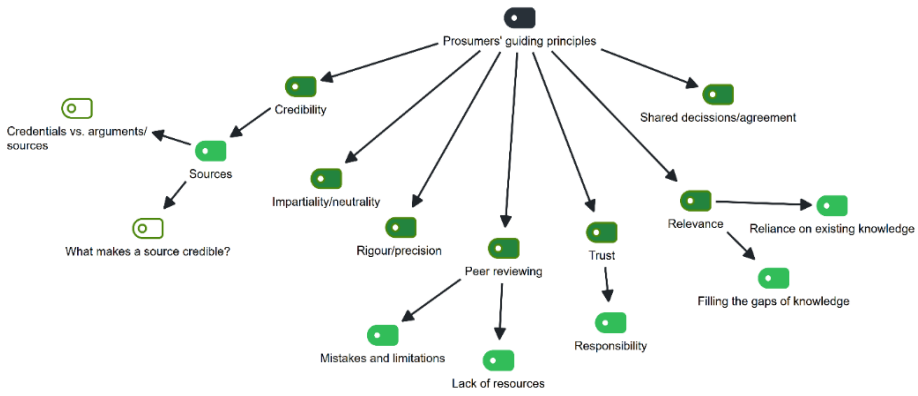

Figure 7. Prosumers' guiding principles.

A number of these attitudes were articulated by the research participants during their deliberations on other aspects of their activities. They were further elaborated when interviewees were specifically asked to compare their activities with those of scientists and to discuss the principles that guide their work. Participants with experience in scientific work were invited to reflect on whether that experience informed the development of the project's material. The comprehension of the remaining participants' attitudes was facilitated through the examination of exemplars from their prosumer activity and experiences.

Credibility

The significance of credibility is repeatedly emphasised by the research participants. In Wikipedia, credibility is primarily associated with the use of references and reliance on them. It is imperative that statements and facts in Wikipedia articles are supported by reliable sources, thereby transferring responsibility for the credibility of the content from the pseudonymous or anonymous Wikipedia contributors to the authors of the sources. The research participants have indicated that the various language versions of Wikipedia demonstrate a range of levels of strictness in the precision and detail with which they apply source requirements. The rule has also evolved over time; initially, a significant proportion of articles in the Lithuanian Wikipedia did not contain references. However, this has become stricter over time, to the point where initiatives have been launched to delete all articles without sources.

Hence, reliance on sources ensures credibility for Wikipedians. But what exactly makes a particular source credible? This is a complex question. Wikipedia has established standards for what is deemed a reliable source, and when attempting to understand how the research participants themselves perceive the credibility of a source, it becomes evident that they initially adopt a rather formalistic perspective. When interviewees are asked to articulate their understanding of and approach to evaluating the credibility of sources, they typically refer to the rules established by Wikipedia. However, it is rare for them to cite these rules in their entirety, often providing their own understanding of them. The objective of the interviews was to ascertain how research participants apply these rules in practice, given that a particular understanding is gained and established through practice and occasional discussions with the community.

In essence, reliable sources are predominantly composed of scholarly works, publications by academic institutions and publishing houses, official

statistics, textbooks and encyclopedias. For instance, the Universal Lithuanian Encyclopedia is frequently cited by research participants as a reliable reference source. Depending on the topic, reputable media can also be considered reliable sources (e.g., publications such as Politico, the New York Times, the Washington Post, and major Lithuanian news portals). It is emphasised that the source must be independent. Therefore, blogs, social networks, internet forums, and user-created online encyclopedias are not considered reliable sources of information:

Interviewee 13: *We are very sceptical about* [mentions other internet encyclopedia]. *Because anyone can write it. ... So, basically, we don't really like sources that anybody can write...*

Researcher: *... although Wikipedia itself is a source that anyone can write...*

Interviewee 13: *Yeah, well, we don't accept such sources because we know ourselves what it means that anyone can write. There could be a lot of nonsense. Wikipedia is a big website and everything is being checked.* [Other internet encyclopedias] *are altogether forgotten things, nobody checks them.*

Some research participants note that they aim to identify the primary source of information where possible and to rely on multiple sources rather than a single one (taking into account time and other costs). Furthermore, after at least 500 edits, Wikipedia provides experienced users who have been registered on the platform for more than six months with access to source databases. The interview data indicate a tendency towards the use of online sources, a practice that is both convenient for the authors and enhances the accessibility of information for readers. Nevertheless, this is not an absolute rule, and a number of research participants mentioned owning or even specifically acquiring printed books in order to have material for their articles.

As several research participants have noted, there is a prevalent tendency to accept printed sources as reliable. Nevertheless, it is acknowledged that absolute certainty regarding the veracity of these sources is not possible. Therefore, reference sources are occasionally checked to ascertain their reliability. A further approach adopted by some Wikipedians to ensure the reliability of sources is to refer to sources utilised in exemplary Wikipedia articles in other languages on the same topic. It is hypothesised that, in the given scenario, the materials have previously been verified by other users and have thus successfully passed the credibility filter.

However, the interview data show that research participants recognise the limitations of their ability to assess the reliability of the sources they use. This can occur when the number of suitable sources is either insufficient or excessive. When asked how they recognise that a source is reliable and usable,

interviewees sometimes explain that it is a skill that develops over time. The emergence of such a skill is more likely to result from specialisation in one or several topics. Questioning the credibility of each other's sources is not a common everyday practice. According to the research participants, it only becomes common when controversial topics are addressed, which provide an incentive to revisit the sources used and discuss their credibility.

However, even a formally well-organised article, replete with references and accurate language, may be inaccurate or contain erroneous facts and interpretations. Consequently, the responsibility for verifying the authenticity and relevance of the references cited, as well as the accuracy of the information they contain, ultimately rests with the reader:

Let's say, if my source is a book by [name]*, who is an academic, a* [profession]*, then I think there is no question. But the only other question is whether I am not lying when I give the source, that the information I am giving is exactly on that page. ... it is up to the readers to decide whether they are going to look for that book, open that page and see whether it contains exactly what I am writing about*. (Interviewee 5)

According to the research participants, one way to verify the accuracy of information is to check the relevant article on Wikipedia in another language. A further method for addressing articles that appear to contain information of questionable nature, yet for which the individual lacks the necessary skills or resources to verify their accuracy, is to utilise special panels to highlight the pertinent sections (to mark them). Such flagging serves to attract the author's attention, thereby providing them with the opportunity to either clarify the information themselves or have other Wikipedia contributors do so.

Meanwhile, ELIP's accuracy and credibility, as perceived by its participants, are enhanced by the disclosure of the authorship of information, as already explained. This enables readers to help correct errors and provide supplementary information:

I upload it, so, you know, some time goes by, somebody writes me something, adds to it, or remembers something, and there you go. (Interviewee 15)

The authors of this project mention that they rely on sources such as scholarly publications, scientific institutions, official statistics and public authority documents, making arguments similar to those of Wikipedians. Unlike Wikipedia, however, ELIP also allows for independent research, such as using locally collected historical materials. Therefore, it is crucial to recognise the importance of authorship and author accountability in maintaining information reliability.

When research participants have an academic background and/or are engaged in scientific work, they draw on their existing skills to assess the

reliability of information and sources. This observation applies equally to participants in online encyclopedias and to bloggers. These interviewees are also more articulate about how they decide which information is reliable:

Well, I am trying to figure out what the scientific consensus is there. If there is a consensus. If there is no consensus, then there are still a few strands, or two or three or whatever the main strands are, as to how to explain some phenomenon or problem. Then I try to represent them, to explain what the advantages are, what are the disadvantages. (Interviewee 21)

This research participant argues that the expertise of the authors of sources in a particular field is also subject to assessment. If the author of the source is a scientist, the extent to which their work aligns with the subject matter of the publication is taken into account. This involves evaluating whether the author represents a generally accepted trend or a radical branch. In the latter case, further information is sought to ensure a comprehensive understanding of the subject. If the author of a source is not a scientist, the source's own references are subject to assessment. Consequently, the interviewees' personal experience of scientific activity functions as a form of social baggage of knowledge, which is employed to inform decision-making.

However, when topics extend beyond the initial scope of one's expertise, reliance on authority becomes a practical decision, given the time and skill required to verify the accuracy of the information. Even in projects whose authors prefer anonymity, the credibility of information is at least partly based on trust in the credentials, which refer to specific institutional systems and practices intended to ensure the credibility of information. For instance, one of the Wikipedians was critical of the credibility of some professors (Interviewee 2), but the same person also recognised that authority can set important boundaries.

Impartiality and neutrality

Another principle frequently mentioned by research participants that should guide their work is impartiality. Impartiality is commonly perceived as the absence of alignment with a specific position. In essence, this means that the content of the information should not be derived from any undisclosed interests of the content creator or of any associated institutions or groups. This aspect may become more problematic in anonymous collaborative projects, where potential connections are not immediately evident. Wikipedia applies some rules that have the potential to mitigate the limitations of content produced by contributors who are not neutral. As demonstrated by William Beutler (2020), Wikipedia's policies regulating conflicts of interests

developed over time, however, some users still find ways to overcome them. Therefore, according to the participants of the present research, certain practices are employed to prevent biases:

Of course, you can just write immediately in the comments that you are associated [with some company or institution]*, and other users will take notice. Then they will take another look at what you wrote there.* (Interviewee 6)

As a result, some research participants avoid engaging with topics related to their personal activities or work. For the same reason – maintaining neutrality – some contributors have expressed a preference for not editing articles related to contemporary politics.

A further aspect in which questions of impartiality and neutrality arise in a collaborative anonymous project like Wikipedia is the clash of different worldviews. The necessity of factuality, the importance of maintaining a neutral stance and the avoidance of judgement in the drafting of articles are all emphasised. Nevertheless, despite these stated aspirations, there are controversial issues where worldviews clash. During the course of the interviews, participants repeatedly referenced contentious subjects pertaining to Lithuania's historical context or contemporary geopolitical landscape. Some interviewees evaluated viewpoints on these issues as either exhibiting an excess of nationalistic sentiment or a lack of patriotism. It has even been posited that all the content pertaining to Lithuania in the Lithuanian Wikipedia is, to a certain extent, biased (Interviewee 11). In order to ensure that they remain as neutral as possible, some research participants have adopted certain strategies:

[I]n some controversial topics, historical topics, I try to use non-Lithuanian sources, ... I try to use, for example, [Encyclopedia] *Britannica, where the British are kind of neutral in this respect, they are not so interested, they are more likely to write in a neutral way.* (Interviewee 13)

When divergent viewpoints are particularly pronounced, disputes and conflicts may arise, giving rise to "edit wars". This may result in accusations between each other of "covering up with neutrality" and censorship (Interviewee 3), with the aim of reinforcing one's position. This state of affairs is indicative, in part, of a lack of consensus on what constitutes a neutral approach, although there is more or less agreement that it is an aspiration.

In the event of prolonged disagreements, the user with administrator rights can "lock" the article (thereby preventing any further editing), remove the content that is the subject of the disagreement, and instead leave a concise text stating that there are divergent views or interpretations on the topic. As a result, this may reduce the quality and completeness of the article itself:

... there remains just an article which very briefly defines what this phenomenon is and why it is criticised, and it has just been, I do not know, maybe eight times shorter. ... It seemed to me that it was possible to simply remove, not seven-eighths, but, say, one-eighth, by way of discussion, and make a quality, interesting article. But the easier way was taken to simply delete. Even though it was previously pronounced an article of the week – a good one. (Interviewee 16)

ELIP, as a collaborative effort, is not anonymous but still faces issues like different interpretations and assessments of the same phenomenon. For example, Interviewee 12 describes a case where an encyclopedia article was written by a specialist in atomic energy, yet some individuals offered interpretations that diverged from the article's content. To address such problems, the ELIP initiators suggest creating a new article on the same topic rather than revising the existing one. This approach aims to present multiple perspectives, allowing readers to choose the most accurate information ("there may not even be an absolute truth", Interviewee 12).

Among authors of small-scale collaborative or individual projects, some interviewees emphasise the need to thoroughly evaluate source information and to maintain 'objectivity'. In such cases, objectivity is understood to mean reflecting all possible positions and opinions. When multiple lines of interpretation exist within a particular field, it is imperative that the content presented, or the authors themselves, do not align exclusively with a single interpretation. Instead, the multifaceted nature of these lines of interpretation must be recognised and understood. It is further noted that acquiring external funding for the project may reduce the scope and possibilities for impartial and independent activity. While certain bloggers have indeed received financial offers, they claim to have perceived such offers as a potential risk of direct or indirect pressure, and thus have declined.

Relevance

The relevance and importance of the content to be created emerge as objectives in the interviewees' narratives. However, these principles are interpreted and applied differently across project types and by different project participants. For Wikipedians, a primary criterion for assessing the relevance of an issue is that the phenomenon, object or person must be described in detail by independent sources, and that the information contained therein must be

sufficient for an article[24]. The topic should be of more or less universal relevance and recognised as such by more than just a small circle within a particular community:

[I]f there is no, let's say, article on Mohammed or on red blood cells, it will look very strange and incomplete. It should include the most important categories. (Interviewee 16)

This interviewee notes that the most active Wikipedia contributors have compiled lists of 1,000 and 10,000 "vital articles"[25]. These lists can serve as a basis for language-specific Wikipedia coverage of essential topics. However, the cultural contexts of these lists and the extent to which the included topics are universally relevant are open to debate. Nevertheless, it is argued that such lists can still serve as a valuable point of departure. Some research participants also noted that the Lithuanian Wikipedia occasionally applies stricter relevance criteria than other language Wikipedias.

However, interviewees acknowledge that some content creators who invest a significant amount of time and energy in preparing their articles develop a strong attachment to them, making it challenging when someone raises concerns about their relevance. Content deemed to lack adequate relevance may be removed by members with administrator rights or marked with a special banner:

Such articles can stay there for a year or ten years, but if they remain there for too long and are still being argued about, they are deleted .... I had put a banner regarding the relevance there myself, and in the end, we were all looking for those independent sources, books and so on, to prove the significance. (Interviewee 13)

Discussions about relevance are typically conducted within the framework of "talks" ("aptarimai", in Lithuanian), the virtual forum or comments section of every Wikipedia article. Contested issues may also be referred to a vote, and subsequently, information deemed irrelevant may be eliminated. Nevertheless, it is important to note that consensus is not always reached. Tension may arise from the need to prove to other Wikipedians what seems obvious to an author who is specialised in a certain field or relatively more knowledgeable. In this case, it may be posited that a divergence of opinions exists with regard to the overall principles and rules that govern Wikipedia.

[24] However, according to Konieczny (2021), the discussion about which topics are relevant enough to be included in Wikipedia is an ongoing process.

[25] https://en.wikipedia.org/wiki/Wikipedia:Vital_articles

Meanwhile, ELIP follows a different concept of relevance – it does not require the subject matter to be universally relevant, rather, it emphasises describing local cases as a means of capturing topics that would not receive attention in traditional encyclopedias. Some ELIP participants see this project as a means of recording knowledge of personal or local significance. In this regard, the nature of the project could be linked to its focus on preserving Lithuanian identity around the world and bringing together local communities.

Moreover, unlike Wikipedia, ELIP allows its contributors to conduct independent new research. However, there is no consensus on the optimal methodology for such research, and participants are guided by their own understanding, which often leads to variations in their perceptions:

For example, I do not include all the details of everyday life. ... But [another ELIP participant]*, if you compare our work, they include a lot of details. I do not really pay attention to those details*. (Interviewee 17)

As has already been noted, such independent research is more closely related to local history, regional studies, local heritage, etc. Among the topics mentioned by interviewees, there were no cases of independent attempts to conduct research in the natural or exact sciences, and it is unclear how such practices would be regarded if they occurred. Topics from the natural or technical sciences are usually covered based on existing research.

In interviews with authors of smaller-scale or individual prosumer projects, a slightly different aspect of relevance emerges – the relevance of a specific topic to their particular audience. At this point, it is also important to note differences in overall approach between projects in different scientific fields. Authors of projects in the natural and exact sciences tend to view their content as the dissemination of scientific knowledge, and sometimes as a way to systematise knowledge (Interviewee 24). In such cases, when discussing relevance, the focus is on what might be of interest to their readers, depending on, for example, events, current affairs, discoveries, etc., related to a particular field. Inaccuracies, misunderstandings or errors noticed in the public sphere may also indicate the relevance of a particular topic:

When I look at the comments on Delfi [Lithuanian news website] *or Facebook, I notice that people often feel the lack of clarity. Usually, this is expressed in the comments not as a question, but as grumbling about what nonsense scientists are doing. But you can still see that there is some kind of ignorance, a lack of understanding. And then I decide to write about it.* (Interviewee 21)

Whereas for interviewees writing in the social sciences and humanities, their projects can serve as an opportunity for the direct application of their

skills and knowledge beyond the conventional academic milieu. In certain instances, this may be attempted without any background in a specific field:

Actually, I was simply trying to think about this question. And there, basically, are my own thoughts ant thinking. I came up with that theory myself. If someone very intelligent were to read it and draw on some [subject in humanities] *knowledge, they might be able to refute my theory.* (Interviewee 20)

In such cases, topics that appear relevant in society also become the subject of more detailed independent analysis. The prosumer project serves as a tool for examining issues regarded as significant problems within a specific field of science. In this way, the skills acquired are applied not only to the dissemination of existing knowledge but also to the generation of new knowledge. It is not necessarily a universal practice, but there were several examples of such cases among the research participants.

From what has been discussed in the previous sections, several other aspects of scientific ethos can be identified: **reliance on existing knowledge** and the desire to **fill gaps in knowledge**. The first aspect is characteristic of all the prosumer projects analysed, but in some cases it is the fundamental basis, main resource and motivation for the activity, while in other cases it is a self-evident aspect, though not the only prerequisite and condition for content creation. As demonstrated, Wikipedians take the requirement to rely on existing knowledge very seriously – it is a principle that ensures both the credibility and relevance of content. Wikipedia does not allow the publication of original research, regardless of the author's competence and knowledge:

It does not matter if you are a scientist or not, or even if you are the one who has created some field of science – nobody cares. If original research is prohibited on Wikipedia, the scientist will still have to rely at least a little on another article. Okay, they can write their own article and add it [as a source]. (Interviewee 13)

One of ELIP's founders emphasises that this requirement was unsatisfactory to them when they were previously participating in Wikipedia. The interviewee recalls trying to upload original research to the English Wikipedia, which was quickly removed. From this perspective, Wikipedia's practice of not allowing original research is more of a disadvantage than an advantage.

Meanwhile, several creators of smaller scale, individual projects, who also work in academia, emphasised that familiarising themselves with the research on the issue being discussed, the existing literature and citing it are common practices in their prosumer activities as well. Some of them pay particular attention to sources and references, specifically adapting the structure of the project for this purpose and creating separate categories on the

web page of their blog for sources and external references. Others take a more liberal approach to applying this requirement (e.g., they do not necessarily include footnotes, choose different styles of references, etc., Interviewee 19), but still adhere to it. It can be posited that in the absence of original research, reliance on existing scientific knowledge is typically confined to reliance on sources. Whereas in cases where independent analysis is conducted, the concept of reliance on existing knowledge is broadened to encompass possession of knowledge in the relevant field, familiarity with knowledge traditions and the application of such knowledge to the analysis of the topics covered.

However, regardless of whether a specific project allows for original research or focuses on the examination and dissemination of existing scientific facts, research participants often state that they aim to fill gaps in knowledge. In the first case, this is straightforward – collecting information about objects or phenomena about which little or nothing was known before and describing them. For example, data for analysis may come from other activities the author of a prosumer project is engaged in, and such data enrich the blog's topics, supplementing it with new cases and thus enhancing knowledge (Interviewee 26).

In cases where no original research is conducted – and this is particularly true of Wikipedia – the aim (with some exceptions[26]) is to fill gaps of knowledge within the project itself. This can involve creating articles that Wikipedians believe should be part of every encyclopedia, expanding articles that lack detail or updating outdated ones. During interviews, Wikipedia contributors frequently highlighted outdated content as a key issue. Researcher participants noted that many articles initially written for Wikipedia are left unmaintained, often because the original authors are no longer involved or no longer find the topics relevant or engaging. Some articles may not need updates if their information remains accurate. However, others, especially those covering ongoing processes, phenomena or objects, require revision since knowledge about them is constantly evolving, which can create gaps in Wikipedia's coverage. Due to the relatively small Lithuanian Wikipedia community, it is often challenging to find someone to address these gaps.

[26] For example, Interviewee 2 writes about topics on Wikipedia that are "very little known in Lithuania"; in their opinion, there are few professional researchers in this field in Lithuania, so they have to rely on primary sources, thus conducting what could be called quasi-original research. Interviewee 11 shared a similar experience, having to conduct more in-depth source searches due to a lack of available information. It should be noted that these cases are also related to issues in the field of social sciences and humanities. It can be assumed that there is a difference (although not expressed or identified by the research participants) in the concept of original research between different fields of science.

Rigour and precision

As the research participants describe their activities, the motives associated with rigour and precision also recur consistently. One element that helps to ensure these principles is attention to detail. It is anticipated that both other content creators and the sources utilised will adopt such an approach. Even when the sources are considered reliable, extracting knowledge from the body of information for the material being prepared can still require hours of careful reading. Interviewee 18 characterises this as "painstaking" and "endless" searches in digital archives. Paying close attention to detail is conducive to creating a more accurate representation of the topic. However, it is posited that, given the tendency of such projects to target a broad audience, the content should not be excessively detailed ("there is definitely a line between being too detailed and being too general", Interviewee 2).

Contributors to online encyclopedias also emphasise a neat, clean writing style. It is asserted that such articles should not contain "belletristics" (Interviewee 6) or "blathering" (Interviewee 10). That is, they should not be mere opinions or a disorderly patchwork of ideas but should maintain an encyclopedic style. Participants with academic backgrounds and degrees posit that they may exercise slightly more freedom in their contributions than in academic papers. However, they emphasise that they have invested a substantial amount of effort in some of the articles (which may not even be related to their professional expertise). As another research participant observes, members of the Wikipedia community, particularly those with extensive experience, disapprove of "chaltura" (Interviewee 8), defined as superficial contributions, material that is hastily produced and lacks depth.

In the case of Wikipedia, the commitment to rigorous standards of thoroughness, accuracy and completeness is further evidenced by the establishment of the valuable articles category. On the one hand, the badge bestowed by the community (see Figure 8) serves as a form of recognition for a contributor's efforts. However, given that such a label may not be immediately apparent to an external observer and may not be considered a significant piece of information, the system appears to function as a reiteration and reinforcement of established norms within the community itself. This categorisation, along with the articles assigned to it, serves as a benchmark for the desired quality of the material to be produced for the project:

[T]*his article is already endorsed by the community as being of a higher quality, and in this case, you expect more accurate information that is based on sources, more detailed information.* (Interviewee 10)

Figure 8. A Lithuanian Wikipedia article that has been given the valuable article badge.

Moreover, in ELIP, where independent research is allowed, the authors note that the knowledge collected and summarised is sometimes verified with the individuals who provided it, such as through ethnographic or local history materials. The goal remains to ensure that the final texts follow an encyclopedic style and structure. Interviewee 17 mentions creating a template they use for their ELIP articles. When asked about its origin and rationale, the interviewee explained that it was based on their understanding of what an encyclopedic article should resemble, referencing examples they had previously encountered.

Some authors of smaller scale collaborative or individual projects assess the quality of the material they produce by stating that their articles are not scientific in nature, but they do aim to maintain a certain standard. It is imperative that the information is precise:

[Field of science] is full of all sorts of delusions, all sorts of self-taught people, all sorts of people who write nonsense. It would be very unwise and foolish to lower oneself to that. (Interviewee 19)

The goal is to deliver a systematic, thoroughly evaluated, well-structured and complete overview of a subject. For some interviewees, inaccurate information online acts as a catalyst, prompting them to explore topics in greater depth and present organised material to readers. In small collaborative projects, there is an example of practices that for a certain period of time have included cross-checking information and a somewhat formal editorial process, which involved reviewing texts and verifying sources. However, it is important to recognise that this approach is not universally applied across all such projects.

Trust

The creation and dissemination of shared knowledge, as processes and activities, are partly based on trust. In scientific practice, one of the most important criteria for research methodology and the evaluation of results is their reproducibility. However, it would be an understatement to say that not all research is attempted to be replicated. If the knowledge described and the methods used to obtain it do not raise any obvious doubts, authors are usually given a certain amount of credit (the extent of which depends on the field of research, the subject matter and the specific research questions). However, this credit is subject to various conditions – compliance with established scientific knowledge and procedures, institutional practices for publishing research results and the guarantees they provide, as well as social elements such as recognition of authority, etc. Similar trends can be observed in larger-scale collaborative prosumer projects related to scientific knowledge. It is characteristic of this type of project that participants do not know each other or know only some of the people involved in the project, which makes the issue of trust even more relevant.

Wikipedians emphasise that trust is not primarily based on personalities and credentials but on the validity of arguments, as confirmed by sources. However, interview material indicates that there are certain internal authorities – content creators who have proven themselves and are considered reliable. Being a reliable Wikipedia contributor is both a goal and a prerequisite for smooth collaboration. For some research participants, the profile of Wikipedia co-authors seems no less important than the reliability of sources; however, not in the general sense of professional or other credentials, but specifically in terms of their activity on Wikipedia.

Personal attitudes and a commitment to the community, demonstrated by creating content honestly, consistently and in accordance with established and agreed rules are also important. One Wikipedia member succinctly summarises several criteria that are important in determining whether a user is considered reliable:

Whether they edit, whether they have been blocked, whether they have created clones, why they were blocked. For example, if they were blocked for a minor misconduct, then the user is still reliable in terms of the article. If they were blocked for entering false information, they are less reliable. (Interviewee 13)

Research participants can gauge whether they are considered reliable users and when they become so from the attitudes of other Wikipedia contributors towards them. In practice, this is evident in the fact that the texts

created by these individuals are rarely, if ever, edited by other long-term contributors. The interviewees' statements also reveal respect for the most experienced Wikipedia contributors, who are sometimes described as authoritative or "smarter than me" (Interviewee 7). Overall, according to some interviewees, the Lithuanian Wikipedia, being a small community, is essentially based on mutual trust, and as long as this trust is not violated, it is one of the main prerequisites for successful collaboration.

In the case of ELIP, the underlying principle is a prior trust in all project participants, anchored in the fact that their identities are declared during the registration process. As the statements made by the founders of ELIP during the interviews suggest, apart from registration and the project's formal technical specifications, there is no further control or consistent monitoring of participants and the content they create due to limited resources. The reliability of sources is also left to the competence of the creators of specific content ("I do not know what exact sources she uses," Interviewee 14), and the content itself may, though not always, undergo review and verification.

However, some research participants who write for ELIP believe that those accepted into the project are vetted by its creators or even known to them personally. There were also statements suggesting that the interviewee considers the founders of ELIP to be an editorial board that supervises the content, and that, if they do not edit the articles, it is because they trust and consider a particular user to be very experienced:

There is someone who can check and see what has been written, there are certain signs that indicate that something new has been added. I see that mine are usually not checked, after all these years... (Interviewee 15)

In other words, this participant perceives the workings of ELIP as similar to those of Wikipedia. However, the statements of the project's creators indicate the exact opposite.

Trust and responsibility are two closely related aspects of the relationship with the community, and they are more pronounced in the statements of large collaborative prosumer projects. However, the element of responsibility is also evident in interviews with some authors of smaller projects. In such cases, they describe responsibility towards readers, i.e., the wider community in which they act, or even a certain responsibility towards their professional community. In the latter case, this is usually related to the choice of topics to be discussed and reliance on established theoretical traditions:

For example, there are things that I would not write on [project title]*, even though I would write them on my personal account. Because I still feel a certain sense of responsibility to community.* (Interviewee 26)

Shared decisions and agreement

Another principle characteristic of collaborative projects, and in the context of this research – specifically Wikipedia – is agreement on the knowledge shared and collective decision-making. In practice, this is primarily reflected in one of Wikipedia's fundamental principles, namely that articles are the result of collaboration among the project's authors, i.e., the content is created collaboratively and anyone can contribute. However, this practice of collective decision-making is much more evident when disputes arise over the interpretation of facts or statements, the relevance of an object or issue or the validity of sources.

Moreover, discussions and voting can occur not only when opinions differ but also when more formal decisions are required. Several research participants mention a case in which, following an explanation by the State Commission of the Lithuanian Language (in Lithuanian, Valstybinė lietuvių kalbos komisija, VLKK), a decision was sought on the use of the terms "sovietinis" or "tarybinis" (alternative terms referring to the Soviet era):

This is not a case of differing opinions, but rather a case of a person who found an official source and proposed to change everything. ... when it was decided, we had to change the names of all those Lithuanian, as well as Estonian and so forth, well, in short, we had to change the names of all the former states, I think that this was a job given to a robot, a bot. (Interviewee 6)

However, according to the research participants, votes are infrequent and are held only in exceptional cases.

Moreover, whether a voting outcome truly reflects a consensus is a different matter. Some interviewees mentioned that typically about ten participants vote on major issues, but there are instances where only a few Wikipedians voice their opinions. This indicates a small core group of regular, long-term contributors to Wikipedia, not all of whom necessarily engage in controversial debates. It was also noted that if the Lithuanian Wikipedia community is uncertain or cannot reach consensus, they can refer to the English Wikipedia. By examining its discussions and debates, they can find relevant solutions, as the English Wikipedia community is larger and more diverse.

Peer reviewing

Another form of collaborative project practice related to collective decision-making is somewhat similar to academic peer review, though it tends

to be informal and less systematic. As noted by Konieczny (2020), the most popular articles are usually the ones that are most intensively reviewed. This kind of peer review involves reviewing content created by other project members, finding and correcting mistakes and providing feedback. Among Wikipedia editors, this is considered standard practice. Several review levels can occur. The first is a formal check for compliance with standards such as grammar, structure, formatting and source citations. This may be followed by a more detailed review assessing the accuracy of facts, the correctness of interpretations and the appropriateness of sources. Interview participants suggest that the latter is more often applied to newcomers. The community is driven by a shared belief that content should be well-organised and that everyone has a role in contributing to this goal.

I remember that in the past, there was a negative attitude towards Wikipedia in society in general, people thought that it was full of nonsense, that anyone could change anything and it stays unchecked. ... but there really is some order, it is not as simple as it might seem, that anyone can write absolutely anything there. (Interviewee 6)

Given the relatively small size of the Lithuanian Wikipedia community and the corresponding number of changes, it is relatively easier to monitor and review them than in the Wikipedias of more popular languages:

In [the English] *Wikipedia, there are about seven thousand changes per minute made, while in Lithuanian there are one or two per minute, so to speak, and sometimes even less, depending on what is happening. ... therefore, it was possible to look at everything more critically, because when someone writes something, other users contribute, improve it, and so on.* (Interviewee 11)

However, although there are fewer contributors than on the English Wikipedia, there are also fewer readers who can spot inaccuracies and are willing to review the content.

Research participants reported that they were more likely to review articles on topics they felt knowledgeable about, as it was easier to spot inaccuracies or errors in such cases. Yet, when asked what errors they had encountered, interviewees usually mentioned inaccuracies (e.g., spelling of place names), gaps in information, spelling and formatting issues and biased presentation of information, but reported specific factual errors less often. This can be interpreted in two ways: either factual errors are extremely rare in the information posted on Wikipedia or the small community does not always have the competence and time to accurately assess the content.

When discussing the practice of reviewing content and providing feedback, Wikipedians highlight both its positive and negative aspects. First, constructive criticism helps clarify the standards and expectations for articles.

Viewing criticism as advice allows individuals to learn from it, which may lead to receiving less criticism over time. The research participants adopt this mindset not only when receiving feedback but also as motivation and incentive to give feedback to others:

You can see that they are still schoolchildren, so they rush to write those articles and so on, and then you try to correct them, add a footnote or ask them to add something else. And sometimes people correct themselves. And now I can see that some of those schoolchildren, school kids, are probably no longer schoolchildren – they are adults, and they are probably still doing something on Wikipedia. (Interviewee 10)

In some cases, comments or criticism are not perceived as well-intentioned. Interviewee 3 describes receiving comments from other Wikipedians as "coming to pick a fight." These situations involve disagreements over the subject or its relevance. When the author feels they know the topic better than peer reviewers, it calls into question the purpose of the review process. Nevertheless, this practice is part of Wikipedia's fundamental concept. Therefore, according to this participant, the information on Wikipedia will always be limited to what can be broadly agreed upon.

In contrast, in the case of ELIP, participants avoid editing each other's texts. According to the project founders, no one has performed or is performing any "control function" (Interviewee 14) over the content. As already mentioned, this decision was made at the very beginning of the project, taking into account the resources that would be required. Therefore, although ELIP is a collaborative project, it features much less of what could be considered peer review. Nevertheless, several research participants who contribute content to ELIP reported that project administrators sometimes correct at least the technical elements of the articles:

If something was wrong, you know, this person [surname] *would get in touch, the one who was one of the encyclopedia's creators. If something was wrong, he would teach me so that I would understand better what was appropriate for such a page and what was not.* (Interviewee 18)

Other ELIP participants, however, report that even after some time, they notice inaccuracies in their previously published texts that no one else had caught. These varied experiences can be partly explained by the different relationships among project members. Some are personally acquainted and were directly invited to contribute, often resulting in more informal communication that is not necessarily considered a formal review. When there is greater mutual trust among the creators, corrections tend to be more formal and technical.

Several smaller collaborative projects also employed practices resembling peer review. In these instances, the review might involve both editing corrections and suggestions for authors on how to improve their texts for publication.

They send us something, we would comment on it …. Then they correct it, send it back, and we make suggestions again. And in the end, [name] *and I would do the final editing ourselves, correcting something and publishing it*. (Interviewee 26)

However, the interview data show that these practices were mostly applied when external authors' texts were accepted. In collaborative projects where only their creators publish texts, participants mention that they typically do not review each other's content.

Returning to the norms and values that define the scientific ethos as identified by Merton, it can be seen that the attitudes of the research participants essentially reflect these norms and values and do not demonstrate any fundamental opposition to the scientific ethos, rather, they express compliance with it. Merton's universalism is reflected in the reliability and significance emphasised by the research participants (especially the need to rely on existing scientific knowledge), as well as in the emphasis on rigour and precision in the activities of prosumers. Communism is reflected in shared decision-making and agreement on the content being prepared, especially in Wikipedia, where it is declared that the content created and knowledge published do not belong to anyone in particular and are the result of collective creation. This is also partly reflected in the principle of trust and peer-reviewing practices. Disinterestedness corresponds to the principle of impartiality and neutrality, which echoes Merton's definition. The research participants particularly emphasised reliability, impartiality, relevance and rigour, which are implicitly or explicitly achieved through critical thinking and, in principle, cover the requirement of organised scepticism. This is also facilitated by peer-reviewing practices.

When asked about following the principles typical of professional scientists, some research participants indicated that their own activity results might be less precise and objective compared to that of scientists. However, they view this as the ideal aim. Interviewees engaged professionally in academia mentioned that they apply the same principles in their prosumer projects as they do in their professional work.

The interview data indicate that, while digital technologies facilitate informal ways of creating and disseminating scientific knowledge outside of traditional professional norms, this does not mean individuals see these norms

as constraints they refuse to follow. The research suggests that interviewees generally have a clear, often nuanced understanding of the principles related to scientific knowledge and its dissemination, as well as how following or ignoring these principles can affect the content.

Therefore, it can be suggested that the opportunities the internet provides for non-professionals to participate in a domain traditionally led by experts do not necessarily result in negative effects or harm to that field, nor do they automatically challenge the knowledge generated there. Rather, the interview data indicate the reproduction of certain norms and principles of scientific activity in a broader society.

4.5 A generalisation: the mechanism of science-related prosumer activities

Returning to the notion of prosumption as a social form, and to the forms of prosumption enabled by digital technology in the context of the creation and dissemination of scientific knowledge, the empirical data suggest several explanations for the mechanism represented by Coleman's diagram. The impact of digitalisation-enabled user engagement on the organisation of the creation and dissemination of scientific knowledge, under both techno-optimist and techno-pessimist assumptions, can be schematically presented by the diagram in Figure 9.

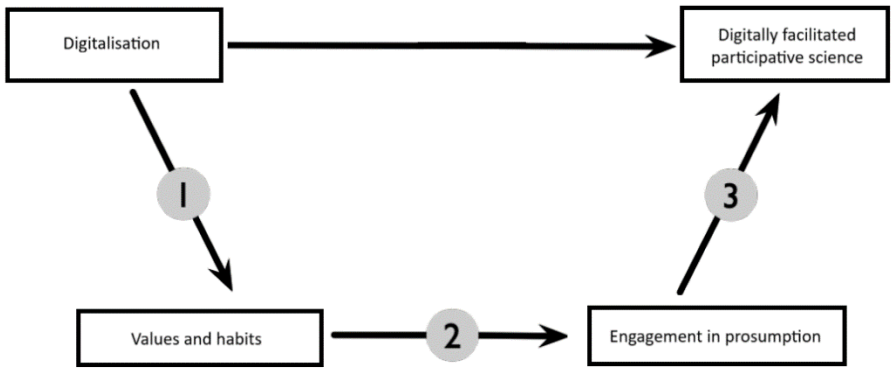

Figure 9. Digitally enabled prosumption in science-related activities.

It is important to note that the assumptions about the pronounced effects of digitalisation are treated as given in order to empirically test and evaluate the separate elements of the mechanism. This is due to the fact that there are no effective instruments or resources available to measure the impact of digitalisation on the organisation of the creation and dissemination of scientific knowledge in a single, limited study. The phenomenon is broad, heterogeneous and multi-layered. Therefore, the utilisation of a hypothetical

model, coupled with the evaluation of the empirical equivalence of its constituent elements, facilitates at least a partial understanding and encapsulation of certain aspects of the phenomenon under investigation.

The diagram represents a process in which, according to Tapscott and Williams (2008 [2006]), amateur users in the digital environment, driven by the principles of openness, peering, sharing and acting globally, engage in prosumption that should result in a loosely defined participative science. The latter is characterised as either emancipatory and enriching (although, admittedly, amateurs "are disrupting every activity they touch", Tapscott and Williams 2008 [2006], p. 11, though it is not entirely clear in what ways), or as ignorant, damaging and discrediting scientific activity as such (Keen, 2007). However, these radical visions, expressed at the beginning of the so-called social internet era, offer only an abstract view (based on isolated examples) of the potential outcomes of lay people participating in the creation and dissemination of knowledge.

The empirical analysis conducted in this thesis demonstrates that, first, the diversity in node D can be captured. An analysis of citizen science projects registered on the EU-CitizenScience platform revealed that, in this type of project, non-professional prosumer activities are predominantly initiated by institutionalised science or non-governmental organisations. In essence, these initiatives are typically initiated top-down, with participants invited to contribute within a process governed by the logic and principles of institutionalised science. Consequently, non-professionals are frequently employed as a resource for the collection, documentation and identification of data and information. In certain cases, they are invited to learn and participate in a variety of local initiatives, under the guidance of NGOs, which represent another kind of institutionalised organisation. This demonstrates, among other aspects, that digitalisation does not occur in isolation; rather, it is integrated into existing institutional processes as opposed to being merely imposed on them.

Meanwhile, the analysis of Lithuanian prosumer projects indicates the existence of alternative forms of involvement in activities thematically or formally associated with science and knowledge dissemination. In contrast to institutionally organised citizen science, there are instances of individual prosumption, as well as bottom-up collaborative projects on a larger or smaller scale. Admittedly, a project such as Wikipedia can be regarded as a form of institutionalisation; however, it is founded on self-regulation and self-organisation.

The cases analysed are characterised by differences in the extent to which non-professionals are involved in different parts of the scientific process. In

the context of citizen science projects, non-professionals are predominantly engaged in collecting and documenting data, or in identifying and tagging already collected data. Conversely, the activities of the bottom-up projects analysed are more closely associated with the dissemination and communication of scientific knowledge that has already been produced. These activities do not require the same level of resources as other stages of the process (e.g., specific equipment and technology) but are enabled and facilitated by the technological developments and access to information created by digitalisation.

In neither case do digitalisation-enabled prosumer activities fundamentally challenge existing notions of science and the scientific method, nor the organisation of the creation and dissemination of scientific knowledge. In the case of citizen science, this is ensured by the guidance provided by institutional actors. Consequently, the changes facilitated by digitalisation are more likely to be integrated into the prevailing structure. The existing structure of scientific knowledge creation and dissemination appears to be undergoing an evolutionary transition rather than a revolutionary one.

Meanwhile, in the case of Lithuanian prosumer projects, empirical analysis demonstrates that research participants are guided by principles that closely align with a scientific ethos, despite the absence of formal gatekeepers. In other words, they reproduce it in new forms. However, it is important to note that the thesis research covers only a part of the total possible digital prosumption in science-related activities, as only the most popular and publicly accessible forms were analysed (excluding, for example, various closed digital communities on social media sites). A more extensive analysis of the empirical cases may well reveal further diversity in the D node of the diagram. Therefore, for a more fine-grained understanding of the effects of digitally enabled participation in the creation and dissemination of scientific knowledge, it is possible to identify several parallel mechanisms with variations in the D node.

Furthermore, the qualitative analysis of Lithuanian prosumer projects, by narrowing the focus, allows examination of the individual level of the mechanism in question (the B and C node) and of the values and habits that motivate individuals to take action and engage in prosumer activities. This was examined by analysing prosumers' motivations and comparing them with the principles associated with activities in the digital space, as described by Tapscott and Williams (openness, peering, sharing, acting globally). As the empirical analysis demonstrates, motivations related to these principles acted only rarely and only partially as key motivating factors for the participants.

Factors such as self-fulfilment and self-expression, the perception of contributing to the common good and of capturing a particular legacy or heritage, interest in a specific or personally relevant topic, the development of skills and expertise, prestige, status and even addiction were more frequently mentioned by the participants. Conversely, the digital space functions as a medium and instrument through which research participants can achieve objectives driven by these motivations. To summarise, the phenomenon of digitalisation can be associated with individuals' habits of engaging in activities within the digital domain and utilising the competencies and instruments they have acquired in this environment to actualise their aspirations. This perspective contrasts with the perception of digitalisation as a unifying, universally transformative force, as might have been initially anticipated at the advent of the so-called social internet technologies.

The motivations of prosumers are also partly related to the forms of prosumption they choose, such as the creation of individual or small-scale collaborative projects, or involvement in large-scale collaborative projects. In the latter, significant differences in participants' attitudes are evident and are reflected in the organisation of the projects and the content created. The analysis therefore captures how variations at the individual level are reflected in variations of the D node. Furthermore, it is demonstrated that even a specific form of prosumption in activities pertaining to the creation and dissemination of scientific knowledge (bottom-up projects) is a heterogeneous outcome.

In other words, digitalisation-facilitated non-professional participation in a science-related domain is a multifaceted outcome, and prosumption as a social form encompasses diversity while, in principle, describing similar interactions and formally similar results. This diversity cannot be fully understood without examining the micro-level processes, the analysis of which reveals that the effects of technology and its development are not unidirectional (adding to arguments against technological determinism). Examination of the motivations and principles that guide research participants' actions indicates that individuals adapt technology to align with their needs, rather than being solely influenced by technological factors. Digitalisation facilitates new forms of interaction, yet it does not uniformly define them, just as Simmel's contents of social life do not strictly determine social forms. Furthermore, the analysis emphasises the significance of micro-level studies in research on digitalisation and its effects, with the objective of enhancing comprehension of phenomena that emerge in interaction with new technological developments and of the nature of their functioning.

CONCLUSIONS

Although the notion of prosumption predates the advent of the internet, its use in sociological research has intensified alongside the development of the so-called social internet technologies. The concept encompasses activities ranging from repairs performed for one's own needs to content created and shared by users on the internet. As conceptualisations of prosumption and its possible forms of expression demonstrate, activities of this nature are primarily observed in the economic sphere (or are mainly studied in this regard) but are not limited to this domain. In other words, prosumption, as a form of social interaction, can manifest itself in different ways. Following a comprehensive analysis of the concept of prosumption, its characteristics as an analytical tool, and its empirical forms of expression, the following conclusions are drawn.

1. The analysis of prosumption conceptualisations demonstrated that, in addition to the fundamental principle of the convergence of production and consumption, the most significant attributes of this concept are that it is a free/unpaid activity undertaken for one's own benefit, that of one's relatives or community; that it is associated more with the digital space (although not exclusively so); that it encompasses both tangible and intangible products/artefacts; that it provides satisfaction to those who engage in it; that it can be beneficial/profitable not only to them; and that it has the capacity to change established structures, whether undertaken individually or collaboratively.

   Therefore, the minimal definition of prosumption is articulated as follows: prosumption signifies the merging of production/creation and consumption/use, and it manifests as free and unpaid activities for the benefit and interests of oneself, one's relatives or community. Meanwhile, the maximal definition encompasses all other attributes, thus establishing itself as an ideal type.
2. Simmel's concept of social form provides a theoretical framework that substantiates the sociological relevance of prosumption as a form of acting and interaction that has been actualised by digitalisation, and it also facilitates the identification of potential effects of digitalisation on sociality. The social mechanism delineated in Coleman's diagram elucidates the linkage between specific macro-level processes, such as advancements in digital

technologies (i.e., the so-called social internet, enabling participation and collaboration on a broader scale), and individual-level values and expectations/habits, which become actions that take on a social form. The manifestations of these forms in different areas of social life can have macro-level effects.

Simmel noted that certain interactions can be objectified and therefore become intermediaries or substitutes for interactions, which can make some interactions initially appear one-sided. It can thus be concluded that technology can function as an intermediary, thereby facilitating asynchronous interactions in which a certain degree of sociality remains intact. This enables the consideration of individual prosumption as a form of social interaction, without limiting it to collaborative prosumption alone.

3. Analysis of existing groupings and classifications of prosumer activities further highlights characteristics inherent across different forms of prosumption, clarifying their diversity and distinctions. These characteristics include the nature of prosumption in terms of cooperation, sharing or usage as the primary reason for engaging in prosumption, and the required or preferred skills of the prosumer. These characteristics are taken as the essential criteria for the typology formulated in the dissertation. Consequently, the typology comprises eight distinct types: (1) skilled sharer p-prosumption; (2) skilled sharer co-prosumption; (3) amateur sharer p-prosumption; (4) amateur sharer co-prosumption; (5) skilled user p-prosumption; (6) skilled community prosumption; (7) amateur user p-prosumption; (8) amateur community prosumption.

    3.1. Several considerations were taken into account during the development of the typology. Firstly, the exploitation/empowerment distinction is integral to the concept of prosumption. However, the significance of these elements depends on the theoretical framework, interpretative perspective and research focus adopted. Secondly, the same prosumer activity can be characterised by both elements, as prosumption encompasses the dialectical relation between production and consumption. Another relevant consideration concerns the manifestations of prosumption within the digital domain. It is evident that a proportion of prosumer activities occur initially in the digital space; however, the extent to which digital

prosumption is qualitatively different from prosumption in the real space, in real life, remains an empirical question.

4. The so-called social internet technologies have enabled greater involvement of non-professionals in knowledge creation and dissemination. Overall and not limited to the online space, the term citizen science is a relatively well-established concept describing the participation of non-professionals in science-related activities. This concept also at least partly overlaps with that of prosumption. However, an analysis of citizen science projects carried out in Europe suggests that such activities are most often institutionally organised as collaborative initiatives involving many participants. Due to the limited variety of tasks assigned, non-professionals are often treated as a form of resource (cognitive, technical or financial) in such projects. The analysis of the citizen science projects conducted in this thesis is not definitive due to the limitations of the scope and nature of the data (therefore, findings are applicable with reservations and only within the specific cultural context), but it allows several observations to be offered.
    4.1. Hierarchical cluster analysis indicates the presence of four distinguishable groups of projects. The first cluster comprises projects initiated by non-governmental organisations, in which participants are frequently tasked with collecting data to address issues raised by scientists or local challenges. The second cluster comprises administrative initiatives, with projects aimed not at specific scientific activities but at promoting citizen science and administering related activities. The third and fourth clusters are the largest and include initiatives organised mostly by scientific institutions or scientists. These differ slightly in subject area, with the third cluster focusing more on biodiversity and the environment, and the fourth on natural sciences in general.
    4.2. Existing analyses of the digital aspect in citizen science demonstrate no major changes in how projects are organised; digital tools are mainly used as additional aids for tasks, not fundamentally altering the concept of citizen science. As a result, in practice, the idea does not fully capture the range of possibilities digitalisation offers for users to participate in creating and disseminating scientific knowledge. This suggests that, from the perspective of

participants, citizen science can be regarded as a form of prosumption within the scientific domain, albeit in a limited number of specific types: type 2 (skilled sharer co-prosumption), 4 (amateur sharer co-prosumption) or 8 (amateur community prosumption) of the prosumption typology. The variations in these initiatives are contingent upon the goals, objectives, skills and requisite preparedness of the participants.

5. The analysis of digitalisation-enabled non-institutional prosumer activities related to the creation and dissemination of scientific knowledge included online encyclopedias, blogs and websites dedicated to scientific topics. The activity levels of these initiatives fluctuate over time; compared to the initial phase of this research, some creators of these projects may no longer be active, and the projects themselves might not be updated anymore. This represents a certain limitation of the research, but is mainly characteristic of such projects and is also an important feature of online data. Since these projects are often unaffiliated with institutions and are often supported solely by personal effort, they tend to be more spontaneous and less bound by formal structures. Their activity mostly depends on the authors' motivation, enthusiasm, available time and resources. Additionally, digital artefacts are inherently dynamic, continuously evolving. As a result, their form at a specific moment reflects a temporary state rather than a permanent, unchanging version that can be revisited at any time.
    5.1. An analysis of the characteristics of projects indicates that their creators relatively often are people who are professionally involved in science but treat their prosumer activities as a hobby or a free-time pursuit. These research participants have specific knowledge in particular areas, which facilitates their participation in such activities and is one of the important motivational factors. This finding lends further support to the notion that the adoption of skills is an important criterion for the typology of prosumption.
    5.2. Among thematically specialised projects (excluding online encyclopedias), there are slightly more initiatives focused on the natural and exact sciences. However, when compared to citizen science projects, individual and small-scale collaborative efforts more frequently address topics in the social sciences and humanities. Additionally, Lithuanian

prosumer projects tend to involve more science communication activities, often without conducting independent data collection or analysis. Nonetheless, due to the qualitative nature of the methodological approach and the limited number of cases, broader generalisations cannot be made. Therefore, these findings should be viewed as characteristics of a specific sample rather than universal observations.

5.3. The analysed cases fall into three categories: individual, small-scale collaborative and large-scale collaborative prosumer projects. The first category includes projects where the creators are typically researchers, individuals with relevant expertise or students. These projects usually focus on a single scientific field. The second category involves small groups working together, often led by someone with specialised knowledge in the area. The third, smallest in number but largest in participation, consists mainly of online encyclopedias that enable unlimited contributions from many users across diverse scientific or thematic areas. Each category aligns with a specific prosumption type, accordingly: type 1 (skilled sharer p-prosumption), type 2 (skilled sharer co-prosumption) and type 4 (amateur sharer co-prosumption). Compared to citizen science initiatives, bottom-up prosumer projects tend to feature individual engagement and emphasise particular skills, whether content-related or technical.

6. The main motivations of the participants of Lithuanian prosumer projects include viewing their activities as a mission and contribution to the common good, alongside self-realisation, self-expression and showcasing a lifestyle. These reasons are connected to interest in specific topics, opportunities to learn and explore new areas and engaging in meaningful free-time activities. Possessing particular skills is also a key driver for prosumers, encompassing both specialised knowledge and technical abilities. The recognition their content receives, along with the prestige and status gained, significantly motivate participants, whether by building a reputation outside the project or within collaborative efforts (in which case, competition can also motivate some individuals).

6.1. Research participants indicated that their motivation tends to change over time. Initially, they are often driven by

enthusiasm for self-expression or contributing to the common good (knowledge), but eventually this is replaced by habit, a sense of commitment to the project and its collaborators, and a focus on maintaining content quality. Notably, some Wikipedia contributors and blog authors began these activities around the same time or shortly after the emergence of the so-called social internet technologies. At that point, blogging seemed an attractive activity in its own right. As the novelty diminishes – both over time and due to technological changes – interest in such activities may decline.

6.2. The research data largely corroborates the conclusions of previous studies on the motivations of internet-based content creators and participants in science-related activities. Nevertheless, the qualitative research methodology captured certain nuances and identified specific motivations. For instance, an analysis of participants in large-scale collaborative projects reveals that not everyone values a sense of community. Some research participants, on the contrary, report feeling disconnected from others involved in the project. A closer look at how interest in specific topics motivates involvement indicates various forms of topic relevance – such as expertise-related topics, unfamiliar subjects one hopes to learn more about, or personally meaningful topics like family or local history. Additionally, participation in the project has sometimes been described as addiction (*wikiholism*).

7. Assessing the extent to which motivations of prosumers are associated with specific ideological attitudes linked to digitalisation, it is important to note that the research participants rarely mentioned such motivations in detail and usually did so only when specifically asked. This suggests these motivations are either of secondary relevance or not reflected upon. Prosumers mostly consider it important that the internet provides open access to information and facilitates the sharing of information with a wider audience than other means available to them.

7.1. The internet and digital technologies are more often perceived as tools. It is emphasised that they facilitate the execution of the activities in question without the need for substantial resources, that the digital space is relatively

unlimited, and that, for some research participants, the interactivity of this space is important. Aspects such as collaboration and sharing become habits formed by the digital space. Utilising the social mechanism depicted in Coleman's diagram, at the individual level (node B), it becomes evident that digitalisation exerts a lesser influence on motivations and values, and instead it is more effective in shaping habits, routines and scripts, thereby creating opportunities for specific actions. In this context, habits are defined as actions based on prior experience and evoked by recognisable circumstances or environments.

8. Another part of the qualitative research conducted in this dissertation offers a closer look at the possible social effects of prosumption enabled by digitisation (diagram node D). Analysing the attitudes and principles that guide prosumers' activities, and evaluating them in relation to the Mertonian scientific ethos, enables a partial assessment of the extent to which these activities (and, consequently, in some sense, their outcomes) differ in this respect from institutionalised professional practices.

   8.1. One notable feature of the digital space is its capacity to facilitate content creation while allowing some degree of anonymity. The authors and participants of some projects have recognised this opportunity and even consider it important, but they do not agree that it would compromise the quality of the content being created. The possibility of anonymity is also significant at the very beginning of prosumer activities, as it allows one to choose topics to explore more boldly or to feel safer. However, research participants highlight the conditionality of anonymity. While it is technically possible to trace any internet user to their IP address, in contexts like Wikipedia, participants identify different perspectives on anonymity. Since content here can be generated either with or without registration, users who register and use pseudonyms are not fully anonymous – they establish a recognisable persona through their content and interactions.

   8.2. The fundamental principles guiding prosumers' activities include content credibility, reliance on existing scientific knowledge, impartiality and neutrality, rigour, accuracy, the aim to address knowledge gaps, trust, and, in collaborative

projects, peer review and shared decision-making. Although different projects may emphasise these principles differently – such as Wikipedia's focus on universal relevance and restriction on original research versus ELIP's allowance for independent research and local relevance – these principles are common across various project categories.

8.3. An analysis of the principles that guide prosumer activities suggests that they are not significantly different from the Mertonian scientific ethos, rather, they replicate it. Universalism is reflected in the research participants' emphasis on reliability and significance, as well as on rigour and precision. The principle of communism is evident in shared decision-making and a consensus-based approach to creating and sharing content; this also includes practices similar to peer review. Disinterestedness aligns closely with the principles of impartiality and neutrality. The need for organised scepticism is addressed through principles such as reliability, impartiality, relevance, rigour and a focus on critical thinking. Consequently, interview data suggest that norms and values typical of institutionalised science are reproduced within the publicly available online non-institutional, self-organised prosumer projects involved in producing and disseminating scientific knowledge.

It can therefore be concluded that, contrary to both techno-optimists' expectations and techno-pessimists' fears regarding the emergence of social internet technologies, the participatory and collaborative opportunities enabled by these technologies, which manifest as prosumption, do not always lead to substantial qualitative changes in fields traditionally controlled by professionals. While digitalisation promotes prosumption as a social form, its specific content varies across different social domains, leading to different impacts (for example, prosumer activities in journalism and science can have different levels of significance, see Ritzer and Degli Esposti, 2020a for further discussion).

Scientific activity requires specific skills and expertise, often needing diverse physical and infrastructural resources. These resources are hard to reproduce through voluntary efforts alone at a similar scale and, therefore, to challenge established institutional structures. This is supported by the focus on skills in bottom-up prosumer projects and a relatively higher prevalence of such projects in social sciences and humanities, which typically need fewer

physical resources. Furthermore, the prosumer activities studied mainly centre on sharing scientific knowledge, especially in projects related to natural sciences. Science, as a social institution, appears to remain quite stable; rather than being radically disrupted by digital technologies, it adapts and incorporates the changes they introduce. These changes are happening, but in more subtle ways and not as directly as techno-optimists or techno-pessimists have predicted. Instead, the transformation occurs through shifts in science policy and a reconsideration of methodological approaches, exemplified also by citizen science, which often involves digital tools. Conversely, public activities outside the system often consider the same principles that govern the system itself, showing a strong similarity in logic. Meanwhile, user productive practices in science are to be seen as a manifestation of a more general social form of prosumption, often facilitated and enhanced by digital technologies and stemming from the habits and expectations people form through their overall use of these technologies.

Technological changes are often analysed from a structural perspective; however, Coleman's mechanism offers the potential to elucidate the meanings of subjective experiences that develop within this framework. The data indicate that digital technologies serve more as tools for prosumers to pursue activities they enjoy and broaden their knowledge, rather than as structures that promote political action in the broadest sense. This is especially true because internet users engaged in such activities clearly recognise the limitations of digital technologies and digital spaces, such as their ephemeral nature and the data they hold, as well as how shifting hardware and software – like smartphones, artificial intelligence, social network algorithms and policies – affect the content produced. Consequently, the analysis lends support to the proposition advanced by Christian Fuchs (2020a; 2020b; 2020c) that certain principles of digitalisation ought to be regarded more as the ideology of digital capitalism, or to the techno-sceptics' perspective that these are merely persuasive slogans employed by technology developers to present digital technologies as challenging to define and thus partially to circumvent regulation that could constrain their development. These insights remain relevant when evaluating recent digital technologies that are transforming the internet by adding automatically generated content alongside user-generated and collaborative material.

It is important to note that the analysis of prosumption in the field of science, undertaken in this dissertation, covered only projects publicly available on the internet, excluding, for example, closed groups or communities on social networking sites. Consequently, the research presented in this thesis offers only limited generalisations. Conducting a detailed

analysis of a greater variety of cases could produce more diverse results and reveal different underlying principles, making it a valuable area for further research. Nevertheless, this observation highlights that prosumption is a diverse and complex phenomenon, emphasising the importance of empirical studies to understand its many facets. This reinforces the idea that broad predictions about the uses of new technologies and their social effects are inherently unable to foresee specific outcomes or their diversity that may develop.

Moreover, analysing the principles behind creating publicly accessible knowledge online is important in the face of emerging technologies such as artificial intelligence. Data from the internet, including Wikipedia, feeds into the training of large language models. Chatbots using these models rely on this data to answer questions, include links to sources, and more. Although prosumer-generated content makes up a small portion of this data, examining its creation helps clarify its origins and sheds light on potential biases it may hold. Conversely, examining the features of the so-called social internet within the framework of scientific knowledge creation and dissemination encourages similar reflection and empirical studies of artificial intelligence technologies. It invites further investigation into what new elements, beyond mere scale and speed, these technologies introduce to the field and how specific user practices and perceptions – including those of scientists – could have wider implications in this domain.

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APPENDICES

Appendix 1. List of citizen science projects under analysis.

1. Observers App
2. SIREN project
3. OpenLitterMap
4. The plastic experiment – Plastexperimentet
5. IMPETUS 4 Citizen Science!
6. BioRegisto
7. Atlantis-Geomag
8. FuenAragón
9. Mini Secchi app and disk
10. Algforskarsommar
11. I demokratins namn - In the Name of Democracy
12. Urban Health Citizen Laboratory (Laboratorio Ciudadano de Salud Urbana)
13. Artportalen
14. NieuwsWijsNeuzen (NewsKnowItAlls)
15. INCENTIVE. Citizen Science Hubs
16. Digitale Polarisatie
17. EcoVoce
18. amai!
19. Step Change
20. COMPAIR
21. Utopian Stories
22. Flora Incognita
23. Explorator
24. On Drought (Na suchu)
25. MonuMAI
26. Andalucía Mejor con Ciencia / Andalusia Better With Science
27. SOCIO-BEE
28. Step Change - Energy Communities/Tenant electricity
29. The Global Healthsites Mapping project
30. IPM Popillia
31. izeltlabuak.hu
32. INCREASE - Intelligent Collections of Food Legumes Genetic Resources for European Agrofood Systems
33. TwinRevolution
34. Observatoire des Vers luisants et des Lucioles (OVL) / National French Glowworm and Firefly Observatory
35. MICS: Measuring the impact of citizen science
36. MyPond - Az én kistavam
37. RadoNorm Citizen science projects
38. GelAvista
39. COESO - Connecting Research and Society
40. Crowd4SDG
41. Open17 Challenge on Climate Justice
42. Achieving a new European Energy Awareness (AURORA)
43. Butterfly Migration
44. Naturens kalender
45. Obtectus Finders
46. Citizen Observatory of Drought / Observatorio Ciudadano de la Sequía
47. Marine mammals in Belgium

48. Observers App
49. SIREN project
50. OpenLitterMap
51. The plastic experiment – Plastexperimentet
52. IMPETUS 4 Citizen Science!
53. BioRegisto
54. Atlantis-Geomag
55. FuenAragón
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91. Naturens kalender
92. Obtectus Finders
93. Citizen Observatory of Drought / Observatorio Ciudadano de la Sequía
94. Marine mammals in BelgiumVigie Nature Ecole
95. NOSE - Network for Odour Sensitivity
96. Transcribathon - Europeana Transcribe
97. OSDG Community platform
98. STEP CHANGE: Non-alcoholic fatty liver disease
99. Hush City
100. Plataforma INVASORAS.PT

101. IMPETUS: turning climate commitments into action
102. Oxford COVID-19 Government Response Tracker
103. Chronolog
104. ACTION
105. Plastic Origins
106. Cos4Cloud
107. Harnesstom (Harnessing the value of tomato genetic resources for now and the future)
108. Koster Seafloor Observatory
109. CoAstro - @n Astronomy Condo
110. Detektiva avdelningen
111. Genigma
112. SMARTLAGOON
113. DeVOTE - The meanings of 'voting' for citizens
114. DRYvER
115. CITIZENSHACK2022
116. STEP CHANGE: Demonstration of the Potential of Renewable Energy for Productive Use in Rural Uganda
117. WikiTopia Archives
118. NEWSERA
119. GEOVACUI: citizen science and cooperation initiatives against depopulation in rural areas
120. Literatura i societat: arxius, entitats i publicacions - 'Literature and society: archives, organizations and print media'
121. SEEDS - Scientific EngagEment for ADolescentS
122. URwatair
123. CURL
124. D-NOSES
125. HOOP
126. ECSAnVis
127. Mosquito Alert
128. Identificación de asteroides cercanos a la Tierra (Near-Earth Asteroids precovery)
129. Wreck History
130. Proyecto COVID-PHYM
131. FLOODUP
132. Cities at night
133. Orchids Conservation Program of Vitoria-Gasteiz
134. Urban Birds Conservation Program of Vitoria-Gasteiz
135. Dragonfly Conservation Program of Vitoria-Gasteiz
136. Moths Conservation Program of Vitoria-Gasteiz
137. Land Conservation Program of Vitoria-Gasteiz
138. 100&CIA for Vitoria-Gasteiz
139. Machine learning as a citizen science tool to improve the quality of life of older people and their caregivers.
140. Night Predatory Birds Conservation Program of Vitoria-Gasteiz
141. Ambassadors of Biodiversity Embajadores de la Biodiversidad
142. Nixnox
143. Transbiome
144. Sympnia - Air quality monitoring and forecasting using satellite and low-cost sensors deriving data
145. Stoepplanten - Sidewalk Plants
146. CurieuzeNeuzen Vlaanderen
147. Liquencity·2
148. IceWatchApp

149. Vadonleső (The WildWatcher)
150. SPIN-CITY
151. Street Spectra
152. The Tea Bag Experiment - Tepåseförsöket
153. The Best-Before-Date Experiment (Bäst före-försöket)
154. The Acoustic Experiment – Akustikförsöket
155. The News Evaluator – Nyhetsvärderaren
156. The Vegetable Experiment - Grönsaksförsöket
157. The Autumn Experiment – Höstförsöket
158. The Ladybird Experiment - Nyckelpigeförsöket
159. The Risk Picture – Riskbilden
160. The Notice Board - Anslagstavlan
161. Svinnkollen (The Food Waste Experiment)
162. The Star-Spotting Experiment (Stjärnförsöket)
163. WeCount - Telraam
164. Zeit.shift
165. WeObserve
166. SMOVE - Science that makes me move
167. Wizards of Centenary
168. IESAISTIES.LV
169. Kampala NOSES (Network for Odour Sensing Empowerment and Sustainability)
170. Science in the city
171. SISCODE
172. iSpot
173. X-Polli:nation
174. Vigilantes del aire
175. Proyecto #Servet
176. RiuNet
177. MammalNet: Watch Wildlife for Science
178. Looking for Cowslips
179. STEP CHANGE: Infectious Disease Outbreak Preparedness
180. Heritage Quest
181. iSpex
182. Plastic Spotter
183. Orchid Observers
184. EU-Citizen.Science
185. TIME4CS
186. InNat
187. YouCount
188. OSPARITO
189. Citizen Scientists Investigating Cookies and App GDPR compliance - CSI-COP
190. Objective 1000 @JardinMassart
191. Cluana Urban Nature
192. STEP CHANGE: Wildlife conservation in Slovenia
193. GreenspaceHack
194. FILMAR: Promotion of public participation in marine mammal research in areas of the Natura 2000 network
195. Da Museo a Museo
196. BeBirds: Belgian Ringing Scheme
197. BioBlitz a tutti i costi
198. Paddle Surfing for Science
199. Penguin Watch
200. Advancing work on Public Participation in Scientific Research (PPSR)

201. Natura sulle Mura
202. Try the edit button (Prova il tasto modifica)
203. NO2 NO Grazie (NO2 NO Thanks)
204. Folding@Home - Coronavirus
205. LastQuake
206. Citizen Heritage
207. Window Expeditions
208. Naturæ Social Mapping
209. GenerationSolar
210. NestCams: Watch birds on their nests and help us find out more about their breeding behaviour!
211. Walking on the Sea Traces
212. POC21 - Harnessing the power of Crowdsourcing for Mountain Monitoring
213. FoldIt:Quarantine Edition
214. Innovating for a Sustainable Post-Pandemic World
215. Explore Your Shore!
216. careables
217. Dragonfly Ireland 2019 - 2024
218. Micromascotas
219. Cricket Tales
220. Herpterkep
221. Community Drive
222. National Moth Week
223. Topotheque | Local History
224. Yellowhammer Dialects
225. CS Track
226. Járókelő.hu
227. Asteroid Hunters
228. Schools and Satellites
229. CitieS-Health
230. Participatory Lithology
231. EyeOnWater
232. Romania geomagnetic map
233. Frogs on the road
234. My Naturesound
235. Summer garden birding diary
236. Citizen Science Garrotxa
237. Ground Truth 2.0
238. Instant Wild
239. UMAPIT - an urban biodiversity recording app
240. Atlas of Estonian mammals
241. eBird
242. LIFE ESC360 - 360 Volunteers for monitoring forest biodiversity in the Italian Natura 2000 Network
243. GrowApp
244. CoKoNet
245. BioBlitz by Maremma Natural History Museum
246. STOC (Suivi Temporel des Oiseaux Communs)
247. OpenTEK
248. FLAMENCO
249. IANUS Peacelab
250. ScienceAtHome
251. The Neureka Project
252. The Nightingale Research Project - a citizen science project on the natural and cultural history of nightingales
253. SCENT - Smart Toolbox for Engaging Citizens into a People-Centric Observation Web
254. Ocean Initiatives
255. CoAct
256. ALPTREES iNaturalist
257. Vespawatch

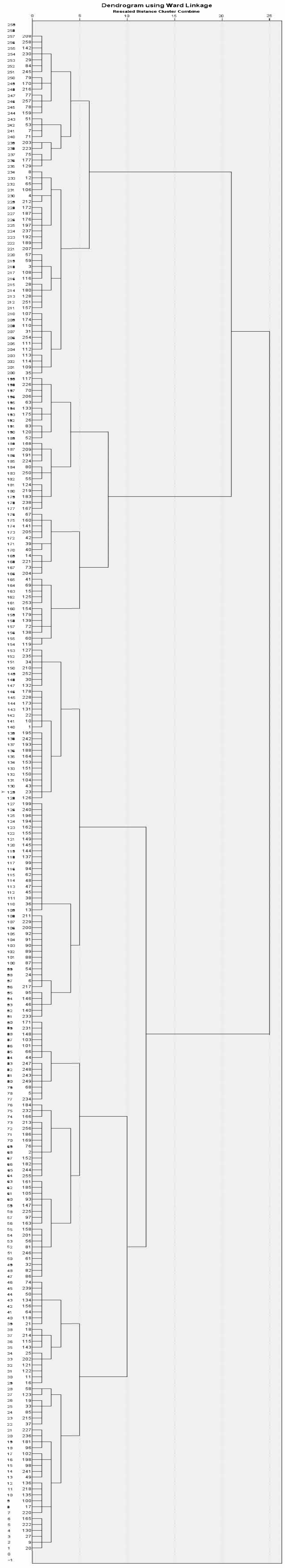
258. Sharks and Rays in Greece and Cyprus
259. SAC Domus
260. Járókelőkutató (Passer-by Researcher)
261. Plastic Pirates – Go Europe!
262. Melanogaster: Catch the Fly!
263. Raccolte del Museo Civico di Storia Naturale di Ferrara
264. SIMILE (Informative System for the Integrated Monitoring of Insubric Lakes and their Ecosystems)
265. Sleep: One Third of Life
266. Pescadores de Plastic
267. Sensing for Justice - Citizen Sensing as a source of evidence in environmental justice litigation and as a tool for environmental mediation
268. Plant Alert
269. Make it Special
270. REINFORCE
271. CrowdWater
272. PLACES
273. Dark Sky Meter
274. Dawn Chorus - Stop and listen!
275. Butterfly-net (Lepke-háló)
276. Observation.org
277. PhenoTandem - Harmonizing Remote Sensing and Citizen Science vegetation phenology observations
278. Mysnowmaps
279. Farfalle in ToUr
280. GLOBE
281. MammalWeb
282. Radio Galaxy Zoo: LOFAR
283. Biodiversity4all
284. MosquitoWeb
285. Memória para Todos
286. Plant Letters
287. GripeNet
288. Project Plumage
289. Observadores del mar
290. Project Roadkill
291. Biodiversidad Virtual
292. Malaria Spot
293. GROW Observatory
294. LandSense
295. Picture Pile
296. FotoQuest Go
297. Car-based Bat Monitoring
298. Big Seaweed Search
299. CS4Welfare - Citizen Science as an Innovative Form of Citizen Participation for Welfare Society Development
300. Big Garden Birdwatch
301. Earthworm Watch
302. Capturing our Coast
303. Naturehood
304. Fresh Water Watch

Appendix 2. Citizen science projects' coding scheme.

Variable	Values assigned
Project initiator	1 = scientific institution (public or private, academic, museums) 2 = non-governmental organization 3 = non-institutional/citizen group/scientist group/individual citizens/individual scientists
Tasks for non-professionals	1 = mainly data collection, classification, labelling, distributed computing 2 = includes and focuses on data analysis, formulation of research problems, data interpretation, conclusions, dissemination 3 = other, i.e., DIY, theoretical, administrative, etc.
Topic(s) covered	1 = biology/biodiversity 2 = astronomy 3 = environment 4 = technical sciences and IT 5 = social sciences 6 = humanities 7 = other natural sciences 8 = various
Locality of the project	1 = local/regional (within a country) 2 = national 3 = international

NOTE: For the hierarchical cluster analysis, variable values were recoded to binary ones (1/0).

Appendix 3. Dendrogram of projects registered on EU-Citizen.Science.



Appendix 4. Guidelines for the interviews with Lithuanian prosumers in the creation and dissemination of scientific knowledge.

- If someone would ask you what [*title the blog, online encyclopedia, website, etc.*] is, how would you define it?
- How (why) did you decide to create this project / participate in its creation?
- You are engaged in this activity in your free time, it is not your direct work – what motivates you to devote time to it?
- Do you feel that you receive any reward for this activity? What kind of it?
- How do you decide what is worth writing about, what topics to pay attention to?
- How do you prepare the content? [What information and how is it collected, where do you collect it from? On what basis do you select it?]
- Professional scientists are guided by certain principles in their research (e.g., they apply various methods so that the collected data and their analysis are reliable, so that they can be verified, so that interpretations are argumentative and based on existing scientific knowledge, etc.). Do you think it is important to adhere to such principles when creating content in this project? Why? How do you do it [if important]?
- Alongside, let's say, traditional science, what do you see as the meaning and significance of a project like yours?
- There are probably various ways to get involved in scientific activities and the dissemination of scientific knowledge. Why did you decide to create (participate in the creation of) a blog / website / online encyclopedia, etc.?
- Did you need to learn any new skills for this?
- It would be interesting to consider: if there were no internet, would you do something similar?
- In your opinion, are there any features of the internet as a digital space that are important in your activities (or seem like a challenge)? Which ones and why?
- One of the features of the digital space is that it is possible to publish information and content anonymously. Do you think this is important? Why?
- Is there anything else that I did not ask, or we did not discuss, that you consider important and would like to share?

Thank you for the conversation.

SANTRAUKA

Mokslinio darbo aktualumas. Kiekviena technologija, kuri struktūruoja ir perstruktūruoja visuomenės ekonominį gyvenimą, neišvengiamai turi platesnių socialinių ir mentalinių pasekmių ir įtakos nei vien tik ekonominė. Georgas Simmelis dar XX a. pradžioje elegantiškai ir glaustai tai nusakė savo esė „Didmiesčiai ir dvasinis gyvenimas“. Skaitmeninės technologijos ir įvairių socialinio gyvenimo sričių skaitmenizacija šiuo požiūriu nėra jokia išimtis. Skaitmeninių technologijų vystymas pereina skirtingas fazes, kryptis ir formas, plėtojant tiek programinę įrangą, tiek fizinius įrenginius, ir sudarant sąlygas platesniam vartotojų įsitraukimui bei bendradarbiavimui. Tačiau šių technologijų vystymą lydi ir tam tikros ideologinės prielaidos, dar jų plėtojimo aušroje išreikštos techno-optimistinėse ir techno-pesimistinėse vizijose. Viename iš populiarių manifestų Donas Tapscottas ir Anthony‘is D. Williamsas (2008 [2006]) tvirtino, kad skaitmeninių technologijų tarpininkaujamų veiklų logiką nusako ir pagrindžia atvirumo, lygiateisiškumo, dalijimosi ir globalaus veikimo principai. Ši disertacija remiasi požiūriu, kad svarbu detaliai analizuoti tokio pobūdžio populiarius vaizdinius ir prielaidas apie skaitmeninių technologijų veikimą ir poveikį, siekiant jas patikrinti, pagrįsti, patobulinti arba atmesti. Toks požiūris padeda geriau suprasti skaitmenizacijos procesų socialinį dėmenį bei suteikia tvirtesnį pagrindą kritinei prieigai.

Vienas iš bandymų konceptualizuoti skaitmeninių technologijų įgalintą ir tarpininkaujamą veikimą yra gamybos ir vartojimo susiliejimą nusakanti *prosumpcijos* (angl. *prosumption*, *production+consumption*) sąvoka. Ji atsirado dar iki skaitmenizacijos ir yra pasitelkiama įvardyti įvairias veiklas: nuo masinės gamybos produktų pritaikymo savo reikmėms ir aplinkosaugos aktyvizmo ir praktikų (Chen, 2012; Kotler, 2010 [1986]; Rau et al., 2023; Toffler, 1984 [1980]). Internetas ir skaitmeninės technologijos laikomos įgalinančiomis aktyvesnį vartotojų įsitraukimą, nes per techninius sprendimus ir ypatybes skatina bei palengvina dalyvavimą įvairiose socialinio gyvenimo srityse (Dusi, 2015, 2018a; Ritzer, 2013, 2015d; Ritzer ir Jurgenson, 2010).

Skaitmenizacijos kontekste, prosumpcija pirmiausia siejama su informacijos, žinių ir duomenų bei jais grįstų artefaktų kūrimu ir sklaida. Plačiausia prasme, skaitmenizacijos procesai, įgalinę vartotojus dalyvauti ir bendradarbiauti platesniu mastu, šioje disertacijoje matomi kaip vykstantys lygiagrečiai su dalyvavimo moksle iniciatyvomis ir ideologija. Todėl prosumpcijos sąvoka leidžia pažvelgti į skaitmeninių technologijų tarpininkaujamą vartotojų dalyvavimą kuriant ir skleidžiant mokslo žinias

platesniame skaitmenizacijos kontekste. Tiek politiniu, tiek instituciniu lygmeniu jau daugiau nei du dešimtmečius stebimos mokslo demokratizavimo tendencijos, įtraukiant neprofesionalus į įvairius mokslinių procesų etapus. Šis fenomenas įvardijamas kaip *dalyvavimo posūkis* moksle (angl. *participatory turn*, Jasanoff, 2003; žr. taip pat Delvenne ir Macq, 2020; Hetland ir Schrøder, 2020; Lengwiler, 2007).

Šis *posūkis* apima įvairių mokslų metodologines prieigas, numatančias tiek neprofesionalų kaip tyrimo partnerių įtraukimą (būdingiau socialiniams ir humanitariniams mokslams), tiek jų pasitelkimą renkant ir žymint duomenis, taip pat – ir įtraukimą į mokslo politikos procesus. Apie 2000 m. pradėtų vystyti vadinamojo socialinio interneto technologijų plėtra sukūrė daugiau galimybių tokiam dalyvavimui, bet taip pat suteikė ir tam tikrą ideologinį pamatą, pagrindžiantį dalyvavimo poreikį (pvz., piliečiai nori atviros prieigos ir teisės dalyvauti sprendimų priėmime, dalintis informacija ir pan.). Tiksliai nustatyti, ar tarp šių procesų yra priežastinis ryšys, – sudėtinga. Tačiau jei su skaitmenizacija susijusios populiarios ideologinės prielaidos daro kokį nors poveikį procesams mokslo srityje, svarbu suprasti, ar ir kaip šios nuostatos reiškiasi mokslo žinių kūrimu ir sklaida užsiimančių neprofesionalų praktikose bei kokias prasmes šioms veikloms jie suteikia.

Tiriamoji problema. Bandant suprasti skaitmenizacijos poveikį neprofesionalų dalyvavimui su mokslo žinių kūrimu ir sklaida susijusiose veiklose, kyla klausimas, ar ir kokiu mastu jose atsispindi Tapscotto ir Williamso įvardyti principai. Sprendžiant šį klausimą, reikalinga suprasti mechanizmus, paaiškinančius, kaip skaitmeninės technologijos fasilituoja prosumpciją šioje srityje ir kokios yra to pasekmės. Taigi, šios disertacijos tiriamąją problemą galima nusakyti klausimu, kaip skaitmenizacija įgalina ir tarpininkauja neprofesionalų dalyvavimui mokslo žinių kūrime ir sklaidoje bei kokie yra tokio dalyvavimo rezultatai.

Neprofesionalų dalyvavimo moksle kontekste – priklausomai nuo dalyvavimo masto ir apimties – tikslinga atskirti įsitraukimą, dalyvavimą ir produktyvias praktikas/prosumpciją. Nors sąvokos *įsitraukimas* ir *dalyvavimas* tyrimuose kartais vartojamos kaip sinonimai, *įsitraukimas* taip pat gali apimti tokias veiklas kaip susipažinimas su mokslo žiniomis ir informacija, jų paieška, skaitymas ir įsisavinimas. Institucinio mokslo požiūriu tai gali būti apibrėžta kaip mokslo komunikacija arba mokslinis raštingumas (Bucchi ir Neresini, 2007). O *dalyvavimas* tiksliau apibūdintinas kaip indėlis į mokslo žinių kūrimą ir sklaidą, pvz., dalijantis savo duomenimis, sutinkant būti tiriamaisiais medicininiuose eksperimentuose ir pan.

Tuo tarpu *prosumpcija* šioje disertacijoje laikomas aktyvus dalyvavimas kuriant ir skleidžiant mokslo žinias (pvz., renkant, analizuojant, interpretuojant, sisteminant, aprašant duomenis ir skleidžiant mokslo žinias), taip pat individualus ir savarankiškas užsiėmimas tokia veikla. Siūlymas atsižvelgti į dalyvavimo lygių skirtumus nėra trivialus, kai siekiama suprasti ir paaiškinti šį reiškinį ne tik struktūriniu, bet ir individualiu lygmeniu, t. y. iš pačių neprofesionalų perspektyvos, taip mėginant geriau suprasti jų motyvacijas.

Svarbu pastebėti, kad nors skaitmenizacija ir skaitmeninės technologijos suteikė naujų galimybių vartotojams kurti ir skleisti turinį (įskaitant mokslinį turinį), tačiau ir skaitmeninėje erdvėje interneto vartotojų dalyvavimas nėra visuotinis. Van Dijck ir Nieborgas (2009, p. 861) teigia, kad maždaug dešimtadalis interneto vartotojų laikytini aktyviai dalyvaujančiais turinio kūrime. Tyrimai rodo, kad bendras turinio kūrimo internete aktyvumo lygis iš esmės atkartoja ir įsitraukimo į su mokslu susijusias veiklas tendencijas.

2024 m. Eurobarometro duomenys (Specialusis Eurobarometras 557. Europos piliečių žinios ir požiūris į mokslą ir technologijas) rodo, kad 5% respondentų Lietuvoje teigia, jog jie bent kartais aktyviai dalyvauja moksliniuose projektuose, prisideda kurdami mokslinių tyrimų klausimus, renkant duomenis, aptariant rezultatus su kitais ir pan. (kartu su Graikija – mažiausiai Europoje). Be to, 6% respondentų Lietuvoje nurodo, kad bent kartais dalyvauja klinikiniuose tyrimuose (European Commission, 2025). Pažymėtina, kad šis tyrimas iš esmės koncentruojasi tik į instituciniu lygmeniu organizuojamas su mokslu susijusias veiklas. Todėl panašūs tyrimai gali neatspindėti bent dalies skaitmeninių technologijų įgalintų veiklų, pvz., rašymo į Vikipediją ar individualių su mokslu susijusių projektų kūrimo internete.

Taigi, skaitmeninės technologijos leidžia neprofesionalams kurti ir skleisti plačiai internete prieinamą su mokslu susijusį ir mokslinį turinį (pvz., internetines enciklopedijas), apeinant profesionalus kaip tarpininkus. Bent jau teoriškai toks turinys konkuruoja dėl auditorijos dėmesio su profesionalių mokslininkų ir mokslo institucijų skelbiamomis žiniomis, tačiau yra tik nedidelės dalies aktyvių interneto vartotojų veiklos rezultatas. Tai kelia klausimų apie motyvaciją tuo užsiimti, ir ypač – apie skaitmenizacijos idealų kaip motyvuojančių veiksnių reikšmę. Aktualu suprasti, kaip patys turinio kūrėjai suvokia savo veiklas. Kitaip tariant, kokiais principais jie vadovaujasi ir ar šie principai prieštarauja profesionalaus mokslo etosui, taip galimai sutrikdydami institucionalizuotą mokslo žinių kūrimo ir sklaidos

organizaciją? Tai yra pagrindiniai šios disertacijos empirinio tyrimo klausimai.

Tikslas ir uždaviniai. Disertacijos tikslas yra išanalizuoti skaitmeninių technologijų įgalintas ir tarpininkaujamas vartotojų produktyvias praktikas mokslo žinių kūrimo ir sklaidos srityje, pritaikant naują prosumpcijos tipologiją. Šis tikslas apima ne tik prosumerių mokslo srityje nuostatų ir motyvacijų ištyrimą, bet ir techno-optimistinių bei techno-pesimistinių požiūrių į skaitmenizacijos įgalintą dalyvavimą įvertinimą. Siekiant šio tikslo, suformuluoti tokie uždaviniai:

1. Suformuluoti prosumpcijos apibrėžimą ir sudaryti sistemingą prosumpcijos kaip socialinės formos tipologiją.
2. Parengti mokslo žinių prosumpcijos analizės strategiją, remiantis Jameso Colemano socialinio mechanizmo logika.
3. Išanalizuoti piliečių mokslo raišką kaip institucionalizuotą prosumpcijos formą.
4. Nustatyti lietuviškų mokslo žinių prosumerių projektų internete charakteristikas ir apibrėžti jas pagal pasiūlytą prosumpcijos tipologiją.
5. Išanalizuoti lietuviškų mokslo žinių prosumerių projektų internete kūrėjų ir dalyvių motyvacijas, susiejant jas su Tapscotto ir Williamso aprašytais skaitmeninių technologijų tarpininkaujamo veikimo principais.
6. Išanalizuoti lietuviškų mokslo žinių prosumerių projektų internete kūrėjų ir dalyvių nuostatas jų veiklų atžvilgiu ir įvertinti jas Roberto Mertono apibrėžto mokslinio etoso atžvilgiu.

Teorinės prielaidos. Prosumpciją laikant skaitmenizacijos procesų suaktualinta veikimo ir sąveikos išraiška, šioje disertacijoje ji apibrėžiama kaip Simmelio aprašyta socialinė forma, per kurią gali reikštis įvairūs socialinio gyvenimo turiniai (Simmel, 2009 [1908]). Sociologijoje vyrauja metodologinis požiūris plėtoti Simmelio formaliąją sociologiją iš kiekybinės perspektyvos, pirmiausia taikant ją socialinių tinklų analizei. Tuo tarpu šioje disertacijoje socialinė forma pirmiausia nagrinėjama kaip teorinis konstruktas ir analitinis įrankis, sutelkiant dėmesį į jos kokybines charakteristikas ir galimą raišką santykyje su socialinio gyvenimo turiniais. Simmelis aprašė įvairius socialinių formų pavyzdžius, bet taip pat numatė, kad šios formos gali

evoliucionuoti, rastis naujos, o laikui bėgant jų aktualumas ir svarba gali kisti. Tai siejama su paties socialinio gyvenimo turinio pokyčiais.

Socialinės formos samprata suteikia pagrindą nagrinėti analizuojamą reiškinį makro ir mikro lygmenų sąveikos perspektyvoje. Individo lygmens sąveikos, kurios randasi ar tampa labiau išreikštos tam tikro socialinio turinio ir socialinių pokyčių (pvz., technologinių) kontekste, įsitvirtina kaip socialinė forma, kuri įgyja socialinę reikšmę ir yra atpažįstama kaip tam tikras veikimo būdas skirtingose socialinėse srityse. Simmelis išsamiai nedetalizavo tokių mechanizmų (nors aprašė, kaip ši logika veikia atskirais atvejais, pvz., „Pinigų filosofijoje“, 2004 [1907]), todėl šios disertacijos tikslui pasitelkiama analitinėje sociologijoje vystoma socialinių mechanizmų prieiga.

Konkrečiai, naudojama Jameso Colemano (1987; 1994) diagrama, kuri paaiškina vieno makro lygmens reiškinio poveikį kitam to paties lygmens reiškiniui per perėjimą į mikro lygmenį ir iš jo, ir leidžia detaliau suprasti tokių procesų veikimą bei jų rezultatus. Colemano diagramos pritaikomumas skirtinguose teoriniuose kontekstuose (įskaitant galimybę į ją integruoti socialinės formos sąvoką) grindžiamas Petrio Ylikoskio (2021) analize. Disertacijoje naudojamų prieigų derinimas ir pasiūlyta teorinė interpretacija laikytini šio darbo teoriniu ir metodologiniu naujumu.

Ieškant tinkamo teorinio ir metodologinio požiūrio skaitmenizacijos socialiniams efektams tirti bei pasirenkant prosumpciją interpretuoti iš Simmelio teorinių prielaidų perspektyvos, šioje disertacijoje laikomasi panašaus požiūrio, kokį sociologas Oris Schwarzas išdėstė savo knygoje „Sociological Theory for Digital Society“ (2021). Schwarzas argumentuoja, kad nors teorinės prieigos iš esmės yra savo laikmečio produktas, vietoje naujų teorijų kūrimo besirandančių su skaitmenizacija susijusių reiškinių paaiškinimui konstruktyviau yra pirmiausia peržiūrėti jau esamus sociologinius instrumentus, įvertinti juos naujos realybės kontekste, atitinkamai koreguoti ir taikyti tos realybės supratimui ir interpretavimui. Simmelio teorinės koncepcijos ir metodologinis požiūris, kuriuo siekta sociologinius principus taikyti jo laikmečio sparčių technologinių ir socialinių pokyčių analizei, atrodo tinkamas pagrindas ir šiuolaikinių procesų tyrimui. Vis dėlto būtina paaiškinti tam tikrus šių koncepcijų ir požiūrių aspektus, siekiant užtikrinti, jog jie yra aktualūs ir pritaikomi aktualioms problemoms aiškinti.

Be kita ko, Simmelis pabrėžė, kad norint visapusiškai suprasti konkrečių socialinių formų pobūdį, svarbu išsamiai analizuoti įvairius jų raiškos būdus. Sekant tokiu nurodymu, disertacijoje ne tik pateikiama išsami prosumpcijos sąvokos analizė, suformuluojant minimalias ir maksimalias šio termino

apibrėžtis, bet ir pasiūloma sisteminga prosumpcijos tipologija. Ji grindžiama esamomis prosumerių veiklų klasifikacijomis, be to, įvertinamos įvairios empirinės prosumpcijos raiškos formos. Tipologija padeda geriau suprasti šio reiškinio heterogeniškumą, bet taip pat pasitarnauja ir kaip analitinis įrankis, galintis padėti tyrėjams įvertinti, ar kuris nors iš prosumpcijos tipų yra labiau būdingas konkrečioms veiklos sritims (tiek tematiškai, tiek lyginant skaitmeninę ir neskaitmeninę prosumpciją).

Metodologija. Neprofesionalų aktyvus dalyvavimas kuriant ir skleidžiant mokslo žinias šioje disertacijoje laikomas prosumpcija mokslo srityje, o tokia veikla internete laikoma skaitmeninių technologijų įgalinta ir tarpininkaujama prosumpcija. Ši sąvoka padeda išplėsti neprofesionalų dalyvavimo kuriant ir skleidžiant mokslo žinias veiklų aprėptį. Pirma, dėmesys telkiamas ne tik ar ne tiek į institucinius projektus, bet ir į tuos, kuriuos savarankiškai kuria patys interneto vartotojai. Antra, analizė neapsiriboja daugelio dalyvių bendradarbiavimu grįstais projektais, todėl tiksliau užčiuopia skaitmenizacijos procesų pasėkoje atsiradusias galimybes įvairiomis formomis įsitraukti kuriant turinį. Kaip pademonstruojama piliečių mokslo projektų analize, pastaroji sąvoka, kai taikoma praktikoje, dažniausiai neatspindi visų šių aspektų. Be to, perkeliant žiūros tašką iš institucinio į pačių prosumerių, dėmesys sutelkiamas pirmiausia į šių turinio kūrėjų nuostatas ir patirtis.

Nors teorinis piliečių mokslo apibrėžimas gali apimti labai platų veiklų spektrą, praktikoje šis terminas įprastai vartojamas apibūdinti profesionalų ir įvairių institucijų organizuojamas iniciatyvas, o neprofesionalai dažnai tampa tam tikru ištekliumi (panašų pastebėjimą, tik žiniasklaidos srityje, žr. Stonkienė ir kt., 2018). Siekiant patikrinti šį teiginį, disertacijoje atliekama kiekybinė Europos piliečių mokslo projektų, registruotų platformoje EU-Citizen.Science, charakteristikų analizė. Naudojant aprašomosios statistikos ir hierarchinės klasterinės analizės metodus, siekiama identifikuoti tokių projektų organizatorius, projektų pobūdį ir jų dalyviams paskiriamas veiklas. Ši analizė ir jos išvados yra daugiau žvalgomojo pobūdžio ir pirmiausia yra skirtos geriau suprasti reiškinį, įvardijamą kaip piliečių mokslas, nes ši sąvoka persidengia su prosumpcijos mokslo srityje samprata.

Toliau disertacijoje dėmesys perkeliamas į *iš apačios* organizuojamus prosumerių projektus internete, susiaurinant fokusą iki skaitmeninių technologijų įgalintų ir tarpininkaujamų su mokslu susijusių projektų kokybinio tyrimo. Atvejai analizei atrinkti pagal keletą kriterijų. Pirmiausia, tai – neinstituciniai, pačių interneto vartotojų individualiai arba bendradarbiaujant kuriami projektai (internetinės enciklopedijos,

tinklaraščiai, interneto puslapiai ir pan.). Analizuojami tik tie atvejai, kurie plačiai ir laisvai prieinami internete, pavyzdžiui, per paieškos sistemas (priešingai nei, pvz., turinys, kuris kuriamas ir skleidžiamas daugiau ar mažiau uždarose internetinių socialinių tinklų grupėse). Lietuvių kalba pasirinkta kaip vienas iš atrankos kriterijų ne tik siekiant įvertinti lokalias globalių procesų raiškos formas, bet ir aiškiau apibrėžti tyrimo imtį, iš anksto nežinant galimų atvejų visumos.

Taikant tokią atrankos strategiją, atrinkta 18 atvejų, tinkamų tolesnei analizei: dvi internetinės enciklopedijos – Vikipedija lietuvių kalba ir Enciklopedija Lietuvai ir pasauliui (toliau – ELIP) bei 16 kolaboracinių ir individualių tinklaraščių ir interneto puslapių. Aprašius bendras šių projektų charakteristikas, atlikti pusiau struktūruoti interviu su jų kūrėjais ir dalyviais, siekiant išanalizuoti jų motyvacijas ir nuostatas. Taikyta tikslinė atranka (kolaboracinių projektų atveju pasitelkta ir sniego gniūžtės strategija), siekiant atspindėti analizuotų projektų apimtį ir skaičių bendroje projektų imtyje. Iš viso buvo atlikti 26 interviu: 13 su Vikipedijos ir 5 su ELIP dalyviais, po 4 su nedidelės apimties kolaboracinių ir individualių tinklaraščių bei interneto puslapių kūrėjais.

Disertacijos mokslinis naujumas. Tiek skaitmeninėje, tiek neskaitmeninėje erdvėje į su mokslu susijusias veiklas įsitraukiančių žmonių motyvacijos analizuotos įvairiuose moksliniuose tyrimuose (žr. Haklay, 2013; Hase et al., 2022; Nov et al., 2011; Sieber ir Slonosky, 2019; Strasser et al., 2018), tačiau daugiausia nagrinėtos bendro pobūdžio motyvacijos, nesigilinant konkrečiai į su skaitmenizacija sietinas nuostatas ir veiksnius. Šiuose tyrimuose identifikuoti įvairūs motyvai, kurie gali skatinti įsitraukimą: domėjimasis mokslu ar konkrečia mokslo sritimi, noras prisidėti prie mokslinių tyrimų, asmeninė patirtis mokslo srityje ar turimi ryšiai su mokslininkais, išteklių prieinamumas, ryšių su kitais žmonėmis užmezgimas ir palaikymas, taip pat tai gali būti laisvalaikio praleidimo būdas, pramoga ir pan. Reikėtų pažymėti, kad tokiuose tyrimuose, vėlgi, daugiausia analizuojamos veiklos, kurias inicijuoja ir organizuoja mokslo institucijos arba jose dirbantys mokslininkai.

Tais atvejais, kai gilinamasi į žinių kūrimą ir sklaidą internete, ir konkrečiai – Vikipedijoje, paliečiamos kai kurios su skaitmenizacija susijusios nuostatos, bet tai daroma izoliuotai (koncentruojantis į konkretų technologinį aspektą, pvz., *wiki* puslapių veikimą) arba išsamiai neaptariant ideologinių motyvų platesniame skaitmenizacijos kontekste (Jadin et al., 2012; Nov, 2007; Prasarnphanich ir Wagner, 2009). Tuo tarpu šioje disertacijoje nagrinėjami būtent tokie niuansai: kokią vietą su skaitmenizacija sietinos ideologinės

nuostatos ir veikimo principai užima mokslinio turinio kūrimu ir sklaida internete užsiimančių žmonių motyvacijose, taip pat – kaip jų supratimas apie savo veiklą atitinka arba neatitinka tradicinio mokslo normas ir vertybes.

Piotras Konieczny savo tyrimuose detaliai analizavo taisykles, reguliuojančias veiklas Vikipedijoje, šio projekto struktūrą, akademinės bendruomenės atstovų požiūrį į Vikipedijos turinį (įskaitant Vikipediją kaip mokymo priemonę), taip pat – makro lygmens faktorius, galinčius lemti skirtingas dalyvavimo tendencijas skirtingų kalbų Vikipedijose (Konieczny, 2009a; 2009b; 2016; 2020; 2021; 2023). Dariuszas Jemielniakas etnografiniuose Vikipedijos tyrimuose aprašė pagrindinius principus, kuriais remiantis organizuojamas Vikipedijos autorių bendradarbiavimas ir dalyvavimas (meritokratinė organizacija, pasižyminti aukštu biurokratijos lygiu; konsensuso siekiantis, bet ginčais grindžiamas sprendimų priėmimas, žr. Jemielniak, 2014). Jis taip pat gilinosi į akademinės bendruomenės požiūrį į Vikipedijos turinio kokybę (Jemielniak, 2020; Jemielniak ir Aibar, 2016). Vikipedijos bendradarbiavimo procesai, kuriuos jos kūrėjai grindė sąžiningumu ir atvirumu, aprašyti ir kituose tyrimuose (žr., pvz., Reagle, 2010; palyginimą su tradicinėmis enciklopedijomis žr. Loveland ir Reagle, 2013).

Tačiau principai, kurių laikosi Vikipedijos dalyviai, taip pat analizuoti tik tam tikrais aspektais. Pavyzdžiui, vertintas (ne)šališkumas etniniu/rasės ir lyties atžvilgiu (tyrimų apžvalgą ir analizės pavyzdį žr. Lemieux et al., 2023) arba interesų konfliktų valdymas (Beutler, 2020). Kai kurios galimai turinio kūrėjų požiūrius atspindinčios išvados darytos analizuojant ne konkrečiai jų nuostatas, bet sukurtą turinį, pvz., vertinant bendrą šališkumo Vikipedijoje mastą (Greenstein ir Zhu, 2012), taip pat tendencijas prisiskirti kuriamo turinio autorystę ir jį *savintis*, arba Vikipedijos bendruomenių taisyklių poveikį redagavimo praktikoms (Halfaker ir kt., 2009; Halfaker ir kt., 2012). Tuo tarpu šioje disertacijoje išsamiau analizuojama, kaip interneto vartotojai, užsiimantys su mokslo žinių kūrimu ir sklaida susijusiomis veiklomis, subjektyviai suvokia jų pamatinius principus. Šios sampratos įvertinamos klasikiniame Roberto Mertono (1973) darbe apibrėžto mokslinio etoso atžvilgiu.

Egzistuojantys Vikipedijos turinio kūrėjų veiklos principų tyrimai daugiausia remiasi Vikipedijos tvarkų ir taisyklių analize, turinio kūrimo procesų ir rašytinių internetinių diskusijų stebėjimu bei etnografiniais metodais, kai tyrėjas yra ir bendruomenės narys (pvz., Jemielniak, 2014; Reagle, 2010). Tuo tarpu šioje disertacijoje pasitelkiamas pusiau struktūruoto interviu metodas, leidžiantis tyrėjui iš išorės išlaikyti didesnį atstumą tiek nuo

objekto, tiek nuo problematikos, taip sudarant galimybę užfiksuoti platesnį perspektyvų spektrą. Toks metodo pasirinkimas grindžiamas nuostata, kad požiūrių ir įsitikinimų raiška kolektyvinėse diskusijose ir individualiuose interviu gali labai skirtis dėl realaus ar numanomo bendruomenės spaudimo ir tendencijos tokiu atveju reikšti labiau socialiai priimtinus požiūrius. Šioje disertacijoje internetinių projektų, susijusių su mokslo žinių kūrimu ir sklaida, dalyvių nuostatos ir jų veiklos principai rekonstruojami remiantis jų pačių subjektyviu suvokimu apie savo veiklą.

Nors Vikipedijoje egzistuoja bendros dalyvių veiklą ir turinio kūrimą apibrėžiančios tvarkos ir taisyklės, kiekvienos skirtingos kalbos Vikipedijos bendruomenė šias taisykles įgyvendina ir prisitaiko su tam tikromis variacijomis. Todėl šioje disertacijoje atliktas empirinis Vikipedijos lietuvių kalba turinio kūrėjų nuostatų tyrimas leidžia identifikuoti lokalią globalių ir formalių procesų bei tendencijų raišką. Be to, siekiant suprasti internetinių projektų, susijusių su mokslo žinių kūrimu ir sklaida, kūrėjų ir dalyvių nuostatas ir motyvacijas, analizė neapsiriboja vien internetinėmis enciklopedijomis, bet apima ir mažesnio masto kolaboracinius ir individualius projektus. Tokiu būdu tyrimo objektas sukonkretinamas ir pagilinamas globalumo/lokalumo požiūriu, tačiau išplečiamas formos ir raiškos atžvilgiu.

Mokslinis disertacijos naujumas taip pat susijęs su problematikos ištirtumu Lietuvoje. Remiantis Lietuvos mokslininkų atliktais tyrimais, skaitmenizacijos įgalintos ir tarpininkaujamos vartotojų produktyvios praktikos bei bendradarbiavimas dažniau yra rinkodaros ir vadybos, taip pat – politikos mokslų, politinio ir pilietinio dalyvavimo, viešojo administravimo tyrimų objektas (Auškalnienė, 2012, 2025; Dvorak et al., 2020; Leckė et al., 2022; Navickaitė ir Žilinskij, 2019; Petrauskaitė, 2012; Petrauskas et al., 2009; Tarutė, 2017; Tvaronavičienė ir Paražinskaitė, 2013; Virvilaitė ir Belousova, 2005). Į interneto vartotojų dalyvavimo praktikas taip pat gilintasi tiriant vartotojų dalyvavimą kuriant žiniasklaidos turinį (Stonkienė et al., 2018), vadinamąsias piratavimo praktikas kaip socialinį dalyvavimą (Rekis and Rekienė, 2016). Aelitos Skaržauskienės ir Monikos Mačiulienės bei kolegų tyrimuose skaitmeninių technologijų tarpininkaujamos bendradarbiavimo praktikos tirtos pasitelkiant kolektyvinio intelekto sąvoką (angl. *collective intelligence*, žr. Mačiulienė ir Skaržauskienė, 2016; Skaržauskienė, 2018, 2022). Pagrindinis dėmesys čia kreipiamas į dalijimąsi žiniomis sprendžiant socialines problemas ir kuriant socialines inovacijas per viešųjų organizacijų, pilietinių judėjimų ir (arba) verslo subjektų inicijuotus projektus.

Konkrečiai prosumpcijos sąvoka atskirais atvejais pasirodo analizuojant vartotojų elgseną socialiniuose tinkluose (Lankauskaitė ir Liubinienė, 2018), interneto vartotojų kultūrines praktikas (Klivis, 2013), vartojama aplinkosaugos ir energetikos tyrimų srityse (žr. Bocullo ir kt. 2023; Grinevičiūtė ir Valančius, 2024; Milčiuvienė ir kt. 2019; Šriupša ir kt. 2025; Tamošiūnas, 2024). Pastaraisiais metais parengta per dešimtį baigiamųjų bakalauro ir magistro darbų Lietuvos universitetuose, kur, pasitelkiant šią sąvoką, irgi daugiausia koncentruojamasi į prosumpciją energetikos srityje bei tokios veiklos teisinį reguliavimą.

Mokslo ir skaitmenizacijos tyrimų sankirtoje paminėtini tyrimai, susiję su žinių, mokslinių šaltinių ir paveldo skaitmeninimu, skaitmeninimu kaip moksliniu tyrimu (žr. Laužikas, 2008; 2012; Migonytė, 2015; Prokopčik ir Timčenko, 2013), paveldo komunikacija socialinių tinklų platformose (Kelpšienė ir kt., 2022; Kirtiklis ir kt. 2023). Taip pat gilinamasi į mokslinių duomenų atvėrimo ir atvirojo mokslo problematiką, analizuojant institucines praktikas ir infrastruktūrą (žr. Dovidonytė, 2019; Kuprienė ir Petrauskienė, 2018; Tautkevičienė ir Cesevičiūtė, 2019), profesionalių mokslininkų požiūrį į atviros prieigos talpyklas (Macevičiūtė ir Kepalienė, 2022). Atvirojo mokslo potencialas technologinėms ir socialinėms inovacijoms analizuotas pasitelkiant bendrakūros sąvoką (žr., pvz., Kučinskienė ir kt., 2023; Mačiulienė, 2022; 2023). Tokiais atvejais dažniausiai tyrinėjamos institucinės praktikos, o dalyvavimo aspektas paliečiamas, pvz., teoriškai analizuojant dalyvaujamojo paveldo ir susijusias sąvokas (Kelpšienė, 2021).

Atskirais atvejais, kai tyrėjų dėmesio sulaukė neprofesionalų kuriamas turinys internete ir konkrečiai – Vikipedija, iš principo fokusuojamasi į projekto turinį, o ne jį kuriančių vartotojų veiklas ir nuostatas. Analizuotos Vikipedijos vartotojų sukuriamos informacijos panaudojimo istorijos studijose perspektyvos (Vyšniauskas, 2007), informacijos apie klimato kaitos tematiką tikslumas ir patikimumas (Kažys, 2016; 2017).

Neprofesionalų dalyvavimas moksle bendriausia prasme nagrinėjamas Lietuvos mokslininkų vykdomuose su piliečių mokslu susijusiuose tyrimuose, tačiau šie tyrimai nesikoncentruoja specifiškai į skaitmenizacijos įgalintą ir tarpininkaujamą dalyvavimą moksle. Eglės Butkevičienės, Monikos Mačiulienės, Aelitos Skaržauskienės ir kolegų tyrimuose piliečių mokslas nagrinėjamas kaip priemonė ir būdas spręsti socialines problemas, taip pat gilinamasi į mokslo institucijų vaidmenį ir efektyvumą plėtojant tokią veiklą ir su ja susijusius metodologinius klausimus (Butkevičienė et al., 2021; Butkevičienė et al., 2022; Mačiulienė ir kt., 2021; Mačiulienė ir Butkevičienė, 2022; Skaržauskienė ir kt., 2023; Skaržauskienė ir kt., 2024; Skaržauskienė ir

kt., 2025; Tauginienė ir kt., 2020; Telešienė ir Butkevičienė, 2023). Mokslininkų grupės tiria dalyvavimą piliečių mokslo veiklose ir to sąsajas su visuomenės atsparumu (Butkevičienė ir kt. 2026), su piliečių mokslu susijusius etinius iššūkius (Ozolinčiūtė ir kt., 2022; Tauginienė, 2019; Tauginienė ir kt., 2025). Taip pat tiriamas įvairių institucijų, pvz., bibliotekų, vaidmuo skatinant dalyvavimą piliečių mokslo veiklose (Birk ir kt., 2024; Tautkevičienė ir kt., 2025).

Šiuose tyrimuose piliečių mokslas pirmiausia traktuojamas kaip instituciškai organizuojamos praktikos. Panaši – institucinė – perspektyva taikoma ir Austės Valinčiūtės mokslo komunikacijos ir profesionalių mokslininkų nuostatų jos atžvilgiu tyrimuose (Valinčiūtė, 2017; 2020). Tuo tarpu šioje disertacijoje fokusuojamasi konkrečiai į skaitmenizacijos įgalintą ir tarpininkaujamą neprofesionalų dalyvavimą mokslo žinių kūryboje ir sklaidoje bei gilinamasi į pačių produktyviomis praktikomis užsiimančių vartotojų subjektyviai suvoktas patirtis ir nuostatas tokių veiklų atžvilgiu.

Šiuo požiūriu, artimiausias šios disertacijos prieigai būtų Maryjos Šupos ir Ingridos Kruopštaitės tyrimas, kuriame autorės gilinasi į internetines vadinamųjų biohakerių (angl. *biohacking*) bendruomenes, analizuodamos etinius aspektus ir socialines normas ir traktuodamos šias bendruomenes kaip technologines kontrkultūras (Šupa ir Kruopštaitė, 2022). Tačiau disertacijoje atliekama empirinė analizė nuo šio tyrimo skiriasi keliais aspektais, įskaitant imtį ir pagrindinius akcentus. Disertacijoje nagrinėjamos ne uždaros socialinių tinklų bendruomenės, o plačiai prieinami su mokslu susiję interneto vartotojų grupių ir individualių turinio kūrėjų projektai, nesikoncentruojant į vieną tematinę ar veiklos sritį.

Šioje disertacijoje atliktas tyrimas prisideda prie akademinės diskusijos apie skaitmenizaciją, sukonkretindamas jos procesų sukeliamų socialinių transformacijų analizę konkrečiai mokslo žinių kūrimo ir sklaidos srityje. Disertacijos mokslinis naujumas apima prosumpcijos kaip Simmelio socialinės formos, aktualizuotos ir įgalintos būtent skaitmenizacijos procesų, analizę. Colemano socialinio mechanizmo idėja pirmą kartą pritaikoma skaitmeninių technologijų tarpininkaujamo neprofesionalų dalyvavimo mokslo srityje paaiškinimui. Į Colemano diagramą integruojant socialinės formos sąvoką, pasiūloma nauja strategija skaitmenizacijos įgalintos prosumpcijos įvairiose socialinio gyvenimo srityse tyrimui. Analitinių instrumentų sąrašas taip pat papildomas suformuluota sisteminga prosumpcijos tipologija, kurios pritaikomumas pademonstruojamas analizuojant vartotojų produktyvias praktikas mokslo žinių kūrimo ir sklaidos srityje.

Traktuojant neprofesionalų dalyvavimą šioje srityje kaip prosumpciją, o atitinkamas skaitmeninių technologijų tarpininkaujamas praktikas – kaip skaitmeninę prosumpciją, šiuo tyrimu prisidedama prie visuomenės dalyvavimo moksle tyrimų, įtraukiant neinstitucinių, *iš apačios* kylančių vartotojų veiklų ir kuriamo turinio analizę. Šis požiūris padeda išplėsti neprofesionalų dalyvavimo aprėptį, apimdamas formas, kurios nėra konceptualiai plėtojamos alternatyviose metodologinėse strategijose. Be to, čia taikomas metodologinis požiūris leidžia analizę perkelti iš struktūrinio lygmens į konceptualų ir metodologiškai sistemingą subjektyvių patirčių ir praktikų tyrimą.

Ginamieji teiginiai:

- Prosumpcija, apibrėžiama kaip gamybos/kūrimo ir vartojimo/naudojimo susiliejimas, besireiškiantis kaip neatlygintina veikla savo, artimųjų ar bendruomenės naudai ir suaktualintas skaitmenizacijos procesų, gali būti traktuojama kaip Simmelio socialinė forma, atspindinti sąveiką tarp socialinės struktūros mikro ir makro lygmenų.

- Pagrindinės ypatybės, nusakančios prosumerių veiklas, apima tokios veiklos pobūdį bendradarbiavimo požiūriu, dalijimąsi arba naudojimąsi kaip pagrindinę priežastį užsiimti prosumpcija, ir prosumeriui reikalingus arba veiklą palengvinančius įgūdžius.

- Tokiu būdu prosumpcijos tipologiją sudaro aštuoni veiklos tipai: (1) į dalijimąsi orientuota prosumpcija, kuria individualiai užsiima įgudę prosumeriai; (2) į dalijimąsi orientuota prosumpcija, kuria bendradarbiaudami užsiima įgudę prosumeriai; (3) į dalijimąsi orientuota, įgūdžių nereikalaujanti prosumpcija, kuria prosumeriai užsiima individualiai; (4) į dalijimąsi orientuota, įgūdžių nereikalaujanti prosumpcija, kuria prosumeriai užsiima bendradarbiaudami; (5) į naudojimąsi orientuota prosumpcija, kuria individualiai užsiima įgudę prosumeriai; (6) į naudojimąsi orientuota įgudusių bendruomenių prosumpcija; (7) į naudojimąsi orientuota įgūdžių nereikalaujanti prosumpcija, kuria prosumeriai užsiima individualiai; (8) į naudojimąsi orientuota įgūdžių nereikalaujanti bendruomenių prosumpcija.

- Neprofesionalų įtraukimą į mokslines veiklas nusakanti piliečių mokslo sąvoka, nepaisant plačios jos teorinės apibrėžties, praktikoje įprastai apima institucišKai organizuotas veiklas, kuriose

neprofesionalai dažnai pasitelkiami kaip išteklius. Tačiau žvelgiant iš dalyvių perspektyvos, piliečių mokslas gali būti traktuojamas kaip prosumpcijos tipas(-ai).

- Su mokslo žinių kūrimu ir sklaida susijusius viešai internete prieinamus lietuviškus projektus kuriančių prosumerių motyvacijos tik iš dalies atliepia su skaitmenizacija siejamas ideologines nuostatas, ir jos nėra pagrindinis motyvuojantis veiksnys užsiimti šiomis veiklomis.
- Su mokslo žinių kūrimu ir sklaida susijusius viešai internete prieinamus lietuviškus projektus kuriantys prosumeriai vadovaujasi vertybėmis, kurios ne prieštarauja, o veikiau atspindi Mertono apibrėžto mokslinio etoso normas.

Disertacijos struktūra. Disertaciją sudaro įvadas, keturi skyriai, išvados, bibliografija ir priedai. Darbas pradedamas vadinamojo socialinio interneto ypatybių ir aktualių skaitmenizacijos aspektų aptarimu bei skaitmeninės sociologijos kaip šių procesų analizės prieiga pristatymu. Taip pat paaiškinamos techno-optimistinė, techno-pesimistinė ir techno-skeptikų perspektyvos bei suformuluojamos minimali ir maksimali prosumpcijos sąvokos apibrėžtys. Antrajame skyriuje, pritaikant Simmelio teorinius aiškinimus, pagrindžiamas prosumpcijos kaip socialinės formos apibrėžimas, paaiškinamas Colemano diagramos (integruojant socialinės formos sampratą) analitinis veiksmingumas ir pasiūloma sistemiška prosumpcijos tipologija.

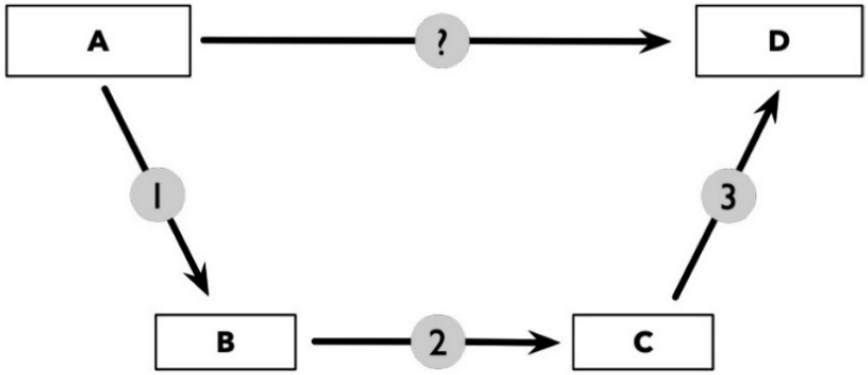
Trečiajame ir ketvirtajame skyriuose pateikiama empirinė neprofesionalų dalyvavimo veikloje, susijusioje su mokslo žinių kūrimu ir sklaida, analizė. Trečiajame skyriuje atliekama Europoje vykdytų piliečių mokslo projektų analizė, siekiant patikrinti, kiek empiriniai duomenys atitinka plačią teorinę šios sąvokos apibrėžtį. Ketvirtame skyriuje dėmesys skiriamas lietuviškoms internetinėms prosumerių iniciatyvoms mokslo žinių kūrimo ir sklaidos srityse. Analizuojamos prosumerių motyvacijos ir veiklos sampratos bei jų santykis su skaitmenizacijai priskiriamomis ideologinėmis nuostatomis ir profesionaliajame moksle galiojančiomis normomis. Disertacija užbaigiama pagrindinių tyrimo rezultatų, jų reikšmės, tyrimo ribotumų ir išlygų aptarimu ir vertinimu.

Tyrimo rezultatai ir išvados. Nors prosumpcijos sąvoka atsirado dar prieš internetą, jos naudojimas sociologiniuose tyrimuose sustiprėjo kartu su vadinamojo socialinio interneto technologijų plėtra. Ši sąvoka gali apimti tiek savo paties poreikiams atliekamus remonto darbus, tiek interneto vartotojų kuriamą ir skleidžiamą turinį. Kaip rodo prosumpcijos sąvokos ir jos galimų

raiškos formų konceptualizacijos, tokio pobūdžio veikla pirmiausia stebima ekonomikos srityje (arba šioje srityje tirta daugiausiai), bet vien ja neapsiriboja. Kitaip tariant, prosumpcija kaip socialinės sąveikos forma gali įgyti įvairų turinį. Išanalizavus prosumpcijos sąvokos apibrėžtis, jos kaip analitinio instrumento ypatybes ir empirines raiškos formas, daromos toliau dėstomos išvados.

1. Prosumpcijos sąvokos analizė rodo, kad be gamybos ir vartojimo susiliejimo, jai taip pat būdinga, kad šiuo konceptu nusakoma formaliai neapmokama veikla savo, artimųjų ar bendruomenės (plačiausia prasme) naudai. Ši veikla yra labiau (nors ne išimtinai) būdinga skaitmeninei erdvei, gali būti vykdoma tiek individualiai, tiek bendradarbiaujant, apima tiek materialius, tiek nematerialius produktus ir artefaktus ir teikia pasitenkinimą tiems, kas ja užsiima. Prosumpcijai taip pat būdinga, kad ji gali būti naudinga ne tik patiems prosumeriams, be to, ji gali keisti nusistovėjusias struktūras. Minimalus prosumpcijos apibrėžimas apima pagrindinius šiai sąvokai priskiriamus atributus ir gali būti išdėstytas taip: prosumpcija yra gamybos/kūrimo ir vartojimo/naudojimo susiliejimas, besireiškiantis kaip neapmokama veikla savo, artimųjų ar bendruomenės labui. Tuo tarpu maksimalus apibrėžimas apima visas su šia sąvoka siejamas ypatybes ir tokiu būdu yra idealusis tipas.

2. Simmelio socialinės formos samprata suteikia teorinį pagrindą, leidžiantį paaiškinti prosumpcijos kaip skaitmenizacijos suaktualintos veiklos ir sąveikos formos sociologinę reikšmę, taip pat sudaro sąlygas aiškiau identifikuoti galimą skaitmenizacijos poveikį socialumui. Colemano diagramoje (žr. 1 pav.) užfiksuotas socialinis mechanizmas padeda paaiškinti ryšį tarp konkrečių makro lygmens procesų, pavyzdžiui, skaitmeninių technologijų pažangos (šio tyrimo atveju – vadinamojo socialinio interneto, įgalinančio platesnio masto dalyvavimą ir bendradarbiavimą), ir individualaus lygmens vertybių, lūkesčių bei įpročių, virstančių veiksmais ir sąveikomis, kurios įgauna socialinę formą, o jos raiška įvairiose socialinio gyvenimo srityse gali turėti makro lygmens efektų. Sekant Simmeliu, technologija gali veikti kaip tarpininkas, įgalinantis asinchronines sąveikas, kuriose išlaikomas tam tikras socialumo laipsnis. Tai paaiškina, kodėl prosumpcija, kuria užsiimama individualiai, taip pat gali būti priskiriama prie socialinės sąveikos formų.



1 pav. Colemano diagrama (pagal Ylikoski, 2021, p. 51). A ir D taškai žymi makro lygmens sąlygas ir rezultatus, B ir C taškai žymi mikro lygmens sąlygas ir rezultatus.

3. Prosumpcija yra heterogeniškas fenomenas, tačiau išanalizavus esamas jos klasifikacijas ir raiškos formas, galima teigti, jog egzistuoja keletas kriterijų, kurie fiksuoja esmines tokių veiklų ypatybes bei sudaro pagrindą sistemingai prosumpcijos tipologijai. Šie kriterijai, tai: veiklos pobūdis bendradarbiavimo požiūriu, dalijimasis arba naudojimasis kaip pagrindinė priežastis užsiimti prosumpcija ir prosumpcijai reikalingi arba įsitraukimą į prosumpciją palengvinantys įgūdžiai. Taip pat būtina numatyti keletą išlygų. Pirmiausia, nuo prosumpcijos sąvokos neatskiriamas santykio tarp įgalinimo ir išnaudojimo klausimas. Tačiau daroma išvada, kad šių dėmenų svoris ir dėmesys jiems kiekvienos konkrečios analizės atveju priklauso nuo pasirinkto teorinio pagrindo, interpretacinės perspektyvos ir tyrimų krypties. Be to, svarbu pažymėti, kad vienai ir tai pačiai prosumerio veiklai gali būti būdingi abu šie elementai, nes prosumpcija apima dialektinį santykį tarp ją sudarančių gamybos ir vartojimo. Antras svarbus aspektas yra susijęs su prosumpcijos raiška skaitmeninėje erdvėje. Akivaizdu, kad dalis prosumerių veiklų pirmiausia ir daugiausia vyksta skaitmeninėje erdvėje. Tačiau kiek skaitmeninė prosumpcija kokybiškai skiriasi nuo neskaitmeninės (plg. savitarną prekybos centre ir savitarną internetinėje parduotuvėje), yra empirinių tyrimų klausimas. Įvertinus šias išlygas ir remiantis aptartais kriterijais, sudaryta atitinkama prosumpcijos tipologija (žr. 1 lentelę).

1 lentelė. Prosumpcijos tipologija.

	Įgūdžiai reikalingi / yra privalumas		**Įgūdžiai nereikalingi**	
	Individualiai	**Bendradarbiaujant**	**Individualiai**	**Bendradarbiaujant**
Dalijimasis	(1) į dalijimąsi orientuota prosumpcija, kuria individualiai užsiima įgudę prosumeriai	(2) į dalijimąsi orientuota prosumpcija, kuria bendradarbiaudami užsiima įgudę prosumeriai	(3) į dalijimąsi orientuota, įgūdžių nereikalaujanti prosumpcija, kuria prosumeriai užsiima individualiai	(4) į dalijimąsi orientuota, įgūdžių nereikalaujanti prosumpcija, kuria prosumeriai užsiima bendradarbiaudami
Naudojimasis	(5) į naudojimąsi orientuota prosumpcija, kuria individualiai užsiima įgudę prosumeriai	(6) į naudojimąsi orientuota įgudusių bendruomenių prosumpcija	(7) į naudojimąsi orientuota įgūdžių nereikalaujanti prosumpcija, kuria prosumeriai užsiima individualiai	(8) į naudojimąsi orientuota įgūdžių nereikalaujanti bendruomenių prosumpcija

Ši tipologija kaip analitinis įrankis gali būti naudojama tiriant prosumpcijos kaip socialinės formos raišką skirtingose socialinio gyvenimo srityse, taip pat – aiškinantis, ar skaitmeninei prosumpcija yra labiau būdingos kokios nors specifinės raiškos formos.

4. Vadinamojo socialinio interneto technologijos įgalino platesnio masto neprofesionalų dalyvavimą su žinių kūrimu ir sklaida susijusiose veiklose. Apskritai, neprofesionalų dalyvavimui moksle įvardinti yra gana nusistovėjusi piliečių mokslo sąvoka, kuri bent iš dalies persidengia su prosumpcijos samprata. Tačiau šiame tyrime atlikta Europoje vykdomų piliečių mokslo projektų analizė rodo, kad šios veiklos dažniausiai yra institucišKai (mokslo institucijų arba nevyriausybinių organizacijų) organizuotos ir daugelio dalyvių bendradarbiavimu paremtos iniciatyvos, kurių dalyviams dažniausiai pavedamos duomenų rinkimo, identifikavimo, žymėjimo, apdorojimo ir pan. užduotys, kitaip sakant, neprofesionalai panaudojami kaip tam tikras išteklius (kognityvinis, techninis arba finansinis).
    4.1. Piliečių mokslo projektų hierarchinė klasterinė analizė indikuoja, kad galima skirti keturias projektų grupes. Pirmas klasteris apima nevyriausybinių organizacijų vykdomus projektus, kur dalyviai dažnai kviečiami rinkti duomenis kokiai nors mokslininkų iškeltai ar lokaliai problemai spręsti. Antras klasteris iš esmės nurodo administracinių iniciatyvų egzistavimą, kur projektai skirti ne tiek konkrečioms mokslinėms veikloms, bet paties piliečių mokslo propagavimui ir administravimui. Trečias ir ketvirtas klasteriai apima mokslo institucijų ar mokslininkų organizuojamas iniciatyvas, kurios tarpusavyje šiek tiek skiriasi tematiškai – trečiam klasteriui labiau būdinga orientacija į bioįvairovės ir aplinkosaugos tematiką, ketvirtam – į gamtos mokslus apskritai. Svarbu pabrėžti, kad analizuota tik Europoje vykdomų projektų imtis, todėl analizės rezultatai galioja tik šiame kultūriniame kontekste. Kaip svarbų ribotumą reikėtų įvertinti ir tai, kad projektai platformoje registruojami pačių jų iniciatorių, todėl taip pat gali neatspindėti visos įmanomos visumos.
    4.2. Vertinant piliečių mokslo fenomeną skaitmenizacijos kontekste, galima daryti išvadą, kad skaitmeninės technologijos įprastai pasitelkiamos kaip papildomos

priemonės neprofesionalų užduotims atlikti, bet tai kokybiškai nekeičia pačios piliečių mokslo sampratos. Todėl galima teigti, kad praktikoje taikoma piliečių mokslo samprata neapima visų skaitmenizacijos sudaromų galimybių vartotojams savarankiškai įsitraukti į su mokslo žinių kūrimu ir sklaida susijusias veiklas (pvz., individualūs, neinstituciniai, vien mėgėjų projektai ir pan.). Vadinasi, piliečių mokslą iš dalyvių perspektyvos galima laikyti prosumpcija mokslo srityje, besireiškiančia kaip keli konkretūs jos tipai (2, 4 ir 8). Variacijos priklauso nuo iniciatyvų tikslų, dalyvių įgūdžių ir reikalaujamo pasirengimo.

5. Su mokslo žinių kūrimu ir sklaida susijusioms skaitmenizacijos įgalintoms neinstitucinėms prosumerių veikloms priskirtinos interneto enciklopedijos, tinklaraščiai, mokslo žinių kūrimui ir sklaidai skirti tinklalapiai ir pan. Siekiant geriau išsiaiškinti tokių iniciatyvų pobūdį, o per tai – suprasti, ar skaitmenizacijos įgalintas neprofesionalų dalyvavimas veiklose, kuriomis anksčiau užsiėmė tik profesionalai, atskleidžia kokius nors reikšmingus pokyčius, skelbtus techno-optimistų bei techno-pesimistų, atlikta kokybinė lietuviškų internetinių prosumerių projektų mokslo žinių kūrimo ir sklaidos srityje analizė. Reikia atkreipti dėmesį, kad šių iniciatyvų aktyvumas kinta laike, palyginus su šio tyrimo pradine faze, dalis analizuotų projektų kūrėjų gali būti nebeaktyvūs, o projektai – nebeatnaujinami. Tai gali būti laikoma tyrimo ribotumu, bet visų pirma tai yra tokio pobūdžio projektų bei internetinių duomenų ypatybė. Būdami ne institucišKai organizuoti ir kai kuriais atvejais vien asmenine iniciatyva paremti projektai, jie dažniau yra sąlyginai labiau spontaniški ir mažiau įpareigojantys, labiau priklausomi vien nuo autorių motyvacijos ir entuziazmo, laiko ir kitų asmeninių išteklių. Be to, skaitmeniniams artefaktams būdinga ypatybė, kad jie kinta laike ir tam tikru laiko momentu fiksuota jų išraiška yra labiau to konkretaus momento būklės momentinė nuotrauka nei baigtinė forma, prie kurios galima bet kada sugrįžti.

   5.1. Tirtų projektų charakteristikų analizė rodo, kad sąlyginai dažnai mokslo žinių kūrimo ir sklaidos prosumpcijai priskirtina veikla internete užsiima žmonės, kurie profesiškai yra susiję su mokslu, tačiau šios veiklos jiems yra laisvalaikio užsiėmimas. Kitaip sakant, nors veikia kaip prosumeriai

(kuria turinį savo įdomumui arba siauriau ar plačiau suprastai bendruomenei), šie tyrimo dalyviai turi specifinių žinių konkrečiose srityse, kurios palengvina jų įsitraukimą į tokias veiklas arba yra vienas iš svarbių motyvacinių veiksnių jomis užsiimti. Tai dar kartą pagrindžia įgūdžių kaip svarbaus kriterijaus prosumpcijos tipologijai pasirinkimą.

5.2. Tyrimo duomenys taip pat indikuoja, kad tarp tematiškai specializuotų projektų (atmetus interneto enciklopedijas) sąlyginai daugiau yra tokių, kurie orientuoti į gamtos ir tiksliuosius mokslus, bet lyginant su piliečių mokslo projektų tendencijomis, individualūs ir nedidelės apimties kolaboraciniai projektai dažniau apima ir socialinių bei humanitarinių mokslų tematiką. Lyginant su piliečių mokslo projektais, analizuotiems lietuviškiems prosumerių projektams taip pat labiau būdingos mokslo žinių sklaidos veiklos, savarankišku duomenų rinkimu ar analize užsiimama ne visais atvejais. Tačiau prosumerių projektų analizei taikyta kokybinė prieiga ir nedidelė atvejų aibė neleidžia šiuo atžvilgiu pasiūlyti labiau generalizuojančių pastebėjimų, jie turi būti laikomi tik konkrečios atvejų imties charakteristika.

5.3. Analizuotų atvejų ypatybės leidžia juos suskirstyti į tris grupes – individualūs, nedidelės apimties kolaboraciniai ir didelės apimties kolaboraciniai prosumerių projektai. Pirmai grupei būdinga tai, kad šių projektų autoriai daugeliu atvejų gali būti identifikuojami kaip tyrėjai arba asmenys, turintys bent tam tikrą patirtį atitinkamoje srityje, taip pat – studentai; tematiškai šie projektai paprastai apsiriboja viena mokslo sritimi. Antra grupė apima atvejus, kur turinys kuriamas bendradarbiaujant dviem ar daugiau žmonių (bet grupės nedidelės), įprastai jie yra inicijuoti ir prižiūrimi pagrindinio autoriaus, turinčio bent tam tikrų specifinių žinių nagrinėjamomis temomis. Trečia grupė – nors mažiausia atvejų skaičiumi, bet didžiausia dalyvių skaičiumi – iš esmės apima interneto enciklopedijas, kurių specifinė techninė ir organizacinė struktūra numato, kad prie turinio kūrimo gali prisidėti iš principo neribotas skaičius dalyvių. Be to, šiai grupei būdinga tai, jog projektų turinys neapsiriboja viena mokslo ar tematine sritimi. Kiekviena iš šių projektų grupių atitinka tam tikrus prosumpcijos tipologijos tipus (atitinkamai

1, 2 ir 4). Lyginant su piliečių mokslo projektų atitikimu prosumpcijos tipams, šiems atvejams labiau būdingas individualus dalyvavimas, taip pat sąlyginai didesnę reikšmę turi specifinių įgūdžių (susijusių su turiniu ar techniniais gebėjimais) turėjimas.

6. Lietuviškų prosumerių projektų dalyvių motyvacijų analizė rodo, kad tarp pagrindinių motyvuojančių veiksnių yra savo veiklos kaip tam tikros misijos ar indėlio į bendrąjį gėrį supratimas, taip pat – savirealizacija, saviraiška ir gyvenimo būdo išraiška. Tai susiję su domėjimusi konkrečia tematika, galimybėmis išmokti ir sužinoti naujų dalykų bei prasmingu laisvalaikio leidimu. Gana reikšmingą vietą tarp prosumerių motyvacijų užima tam tikrų įgūdžių turėjimas. Tai gali būti specifinės žinios tam tikra tema, bet taip pat ir techniniai įgūdžiai, kurių turėjimas, viena vertus padeda greičiau susiorientuoti skaitmeninėje erdvėje, kita vertus pats projekto kūrimas gali būti proga tobulinti šiuos įgūdžius. Reikšmingą motyvuojantį poveikį tyrimo dalyviams turi sulaukiamas dėmesys sukurtam turiniui ir tam tikras prestižas bei statuso įgijimas (susikuriant reputaciją projekto išorėje, arba paties projekto viduje kolaboracinių iniciatyvų atveju, kur daliai dalyvių tampa svarbus ir konkurencijos elementas).

   6.1. Tyrimo dalyvių motyvacijos, jų pačių vertinimu, kinta laike. Entuziastingą saviraiškos ar indėlio kuriant bendrąjį gėrį (žinias) etapą keičia veiklos kaip įpročio nusistovėjimas, atsirandantis įsipareigojimas projektui ir jo bendraautoriams, sukurto turinio kokybės palaikymui. Svarbu pastebėti, kad bent dalis Vikipedijos dalyvių ir tinklaraščių autorių pradėjo užsiimti šiomis veiklomis kaip tik tuo metu ar netrukus po to, kai atsirado ir išpopuliarėjo vadinamojo socialinio interneto technologijos. Blėstant veiklos naujumui (ne tik laiko, bet ir techniniu požiūriu), sąlyginai gali blėsti ir entuziazmas užsiimti tokia veikla.

   6.2. Bendrųjų motyvacijų atžvilgiu, tyrimo duomenys iš esmės daugmaž patvirtina ankstesnių tyrimų pastebėjimus apie turinio kūrėjų internete ir su mokslu susijusių veiklų dalyvių motyvacijas. Tačiau kokybinė tyrimo metodologija leido fiksuoti tam tikrus niuansus ar užčiuopti kai kurias labai specifines motyvacijas. Pavyzdžiui, priešingai nei būtų galima tikėtis, didelės apimties kolaboracinių projektų dalyvių motyvacijų analizė rodo, kad ne visiems

priklausymas bendruomenei savaime yra svarbus, dalis tyrimo dalyvių kaip tik nurodė nejaučiantys jokio ypatingo ryšio su kitais projektų nariais. Detalesnė domėjimosi tam tikra tematika kaip motyvuojančio veiksnio analizė atskleidė, kad esama skirtingo pobūdžio tematikos aktualumo. Tai gali būti tematika, susijusi su turimomis kvalifikacijomis ir išmanymu; tematika, kuria kaip tik mažai žinoma, bet norima gilinti žinias; asmeniškai aktualios temos (pvz., susijusios su giminės istorija ar vietovės kraštotyra). Keletu atveju dalyvavimas projekte buvo įvardytas kaip priklausomybė (plg. *vikiholizmas*).

7. Šio tyrimo tikslas buvo ne tik išsiaiškinti bendriausias prosumerių motyvacijas, bet ir pamėginti įvertinti, kiek jos susijusios su tam tikromis ideologinėmis nuostatomis, kurios galėtų būti siejamos su skaitmenizacija (Tapscotto ir Williamso įvardytos kaip atvirumas, lygiavertis bendradarbiavimas, dalijimasis, globalus veikimas). Svarbu pastebėti, kad pasakodami apie savo veiklas, tyrimo dalyviai retai kada išsamiai minėjo tokias motyvacijas ir dažniausiai apie jas pasakojo specifiškai klausiami. Interviu duomenys leidžia daryti išvadą, kad daliai tyrimo dalyvių svarbu, jog internetas suteikia atvirą prieigą prie informacijos ir įgalina lengviau ja dalintis bei pasiekti platesnę auditoriją nei kitomis priemonėmis.

   7.1. Dažniau internetas ir skaitmeninės technologijos yra traktuojamos kaip įrankis. Pabrėžiama, kad jis sudaro sąlygas užsiimti aptariama veikla nereikalaujant didelių išteklių, skaitmeninė erdvė yra sąlyginai neribota, kai kuriems tyrimo dalyviams svarbus ir šios erdvės interaktyvumas – galimybė laisvai susieti skirtingus informacijos vienetus. Tokios dimensijos kaip bendradarbiavimas ar dalijimasis tampa savotiškais skaitmeninės erdvės suformuotais įpročiais, kurie laikomi gana savaime suprantamais ir retai kada motyvuoja veiklą kaip aiškiai išreikštos ideologinės nuostatos. Kitaip sakant, Colemano diagrama išreikšto mechanizmo individualiame lygmenyje (taškas B) galime fiksuoti, jog skaitmenizacija ne tiek veikia motyvacijas ir vertybines nuostatas, bet labiau suformuoja įpročius, rutinas ir scenarijus bei sukuria galimybes tam tikram veiksmui. Įpročiai šiame kontekste turėtų būti suprantami kaip veiksmai, kurie

grindžiami ankstesne patirtimi ir kuriuos sukelia atpažįstamos aplinkybės ar aplinka.

8. Kita šioje disertacijoje atlikta kokybinio tyrimo dalis leidžia kiek detaliau pažvelgti į galimus skaitmenizacijos įgalintos prosumpcijos socialinius efektus (diagramos taškas D). Analizuojant prosumerių veiklas pagrindžiančias nuostatas ir principus bei įvertinant juos santykyje su mertoniškuoju moksliniu etosu, galima spręsti, ar pačios veiklos (ir tokiu būdu iš dalies – jų rezultatai), šiuo aspektu kaip nors reikšmingai skiriasi nuo institucionalizuotų profesionalių praktikų ir galimai keičia mokslo žinių kūrimo ir sklaidos organizaciją kokybine prasme.
    8.1. Skaitmeninė erdvė, be kita ko, sudaro sąlygas kurti turinį (bent iš dalies) anonimiškai. Kai kurių projektų autoriai ir dalyviai pasinaudoja tokia galimybe ir net laiko ją svarbia, tačiau tokiais atvejais pabrėžia nemanantys, jog tai kenktų kuriamo turinio kokybei. Daliai tyrimo dalyvių anonimiškumo galimybė buvo svarbi pradedant aptariamas veiklas, nes leido drąsiau rinktis temas, į kurias gilinamasi, ar leido jaustis saugiau. Tačiau beveik visada tais atvejais, kai tyrimo dalyviai kuria turinį anonimiškai, jie pabrėžia ir šio anonimiškumo sąlygiškumą. Viena vertus, bet kuris interneto vartotojas gali būti atsekamas bent iki IP adreso. Antra vertus, pavyzdžiui, Vikipedijos atveju galima fiksuoti ir atskiras tyrimo dalyvių anonimiškumo sampratos dimensijas. Kadangi šiame projekte turinį galima kurti prisiregistravus arba neprisiregistravus, pseudonimus naudojantys registruoti vartotojai nelaikomi visiškais anonimais, kadangi per kuriamą turinį ir sąveikas su kitais dalyviais formuoja tam tikrą savo personą, kuri yra atpažįstama ir identifikuojama.
    8.2. Tarp svarbiausių principų, kurie nusako tyrimo dalyvių veiklas, įvardyti turinio ir šaltinių patikimumas, rėmimasis egzistuojančiomis mokslo žiniomis, nešališkumas ir neutralumas, tikslumas ir kruopštumas, siekis užpildyti egzistuojančias žinojimo spragas (bendrąja prasme arba projekto kontekste), pasitikėjimas. Kolaboracinių projektų atvejais taip pat minėti lygiavertis bendradarbiavimas ir kolektyvinis sprendimų priėmimas. Nors esama tam tikrų variacijų, kaip šie principai traktuojami skirtinguose projektuose (pvz., Vikipedijoje pabrėžiamas universalus žinių

reikšmingumas ir draudžiami originalūs tyrimai, kai ELIP leidžia savarankiškus tyrimus ir lokalų reikšmingumą), iš esmės jie atsikartoja nepriklausomai nuo projekto pobūdžio.

8.3. Prosumerių veiklą grindžiančių principų analizė leidžia daryti išvadą, kad jie esmingai nesiskiria nuo mertoniškojo mokslinio etoso, bet greičiau jį atkartoja. Universalizmas iš esmės atsikartoja tyrimo dalyvių akcentuojamame patikimume ir reikšmingume, taip pat akcentuojant tikslumą ir kruopštumą. Komunizmą/bendruomeniškumą atliepia bendras sprendimų priėmimas ir susitarimas dėl rengiamo turinio bei dalijimasis juo, taip pat – recenzavimui prilygintinos praktikos. Nesuinteresuotumą iš esmės atitinka nešališkumo ir neutralumo principai. Patikimumas ir nešališkumas bei reikšmingumas ir tikslumas, kritinio mąstymo akcentavimas iš principo persidengia ir organizuoto skepticizmo reikalavimu. Taigi, tyrimo duomenys leidžia teigti, kad internete laisvai prieinamuose neinstituciškai organizuotuose su mokslo žinių kūrimu ir sklaida susijusiuose prosumerių projektuose iš esmės reprodukuojamos institucionalizuoto mokslo normos ir vertybės.

Tyrimo duomenys ir atlikta analizė leidžia teigti, kad, skirtingai nei vadinamojo socialinio interneto technologijų vystymo aušroje išsakyti techno-optimistų lūkesčiai ir techno-pesimistų nuogąstavimai, šių technologijų sudaromos dalyvavimo ir bendradarbiavimo galimybės, įgijusios prosumpcijos formą, nebūtinai esmingai kokybiškai keičia sritis, kuriose iki tol veikė daugiausia vien profesionalai. Skaitmenizacija fasilituoja prosumpciją kaip socialinę formą, tačiau įgydama skirtingus turinius, ji gali reikštis skirtingai atskirose socialinio gyvenimo srityse (todėl, pvz., suprantama, kad prosumerių praktikos žurnalistikoje ir mokslo srityje turi nevienodo reikšmingumo pasekmių; platesnę diskusiją žr. Ritzer and Degli Esposti, 2020a).

Mokslinė veikla reikalauja specifinių įgūdžių ir žinių, o dažnai – ir įvairių fizinių bei infrastruktūros išteklių, kuriuos vien savanoriškais pagrindais sudėtinga atkartoti tiek, jog būtų pasiekti panašaus masto rezultatai ir kiltų iššūkis institucionalizuotai struktūrai. Tai iš dalies patvirtina ir įgūdžių reikšmė įsitraukiant į iš apačios kylančius prosumerių projektus, ir faktas, kad tokie projektai sąlyginai dažniau yra iš socialinių ir humanitarinių mokslų (dažniausiai reikalaujančių mažiau fizinių išteklių) srities. Be to, tirtos prosumerių veiklos daugiau apima mokslo žinių sklaidą (ypač – jei projektai

susiję su gamtos mokslų tematika). Mokslas kaip socialinis institutas yra gana stabili struktūra, veikiau inkorporuojanti skaitmeninių technologijų įnešamus pokyčius, nei yra jų reikšmingai sutrikdoma. Pokytis šioje srityje vyksta, manytina, subtilesniais būdais ir ne taip tiesiogiai, kaip numatė techno-optimistų ar techno-persimistų manifestai – labiau per pokyčius mokslo politikoje ir metodologinių prieigų permąstymą (kaip iliustruoja ir neretai skaitmenines technologijas įdarbinančio piliečių mokslo fenomenas). Tuo tarpu veiklos sistemos *išorėje* iš principo daugmaž atkartoja šios sistemos veikimo logiką.

Technologiniai pokyčiai dažnai tyrinėjami struktūriniu lygmeniu, tuo metu Colemano mechanizmas suteikia galimybes atskleisti šiame kontekste besireiškiančių subjektyvių patirčių prasmes. Tyrimo duomenys leidžia teigti, kad skaitmeninės technologijos prosumeriams greičiau yra įrankis užsiimti mėgstama veikla ir plėsti žinias, nei politišką – plačiausia prasme – veiksmą skatinanti struktūra. Juo labiau, kad tokiomis veiklomis užsiimantys interneto vartotojai gana aiškiai artikuliuoja skaitmeninių technologijų ir skaitmeninės erdvės ribotumus, tokius kaip šios erdvės ir duomenų joje efemeriškumas, besikeičiančios techninės ir programinės įrangos (išmaniųjų telefonų, dirbtinio intelekto, socialinių tinklų algoritmų ir politikos, ir kt.) poveikis kuriamam turiniui. Todėl tyrimas greičiau paremia Christiano Fuchso (Fuchs, 2020a; 2020b; 2020c) idėją, kad kai kurie su skaitmenizacija siejami veiklos principai labiau laikytini skaitmeninio kapitalizmo ideologija, arba techno-skeptikų požiūrį, kad tai veikiau skambūs šūkiai, padedantys technologijų vystytojams jas pateikti kaip sunkiai apibrėžiamas ir tokiu būdu iš dalies išvengti reguliavimo, kuris galimai ribotų plėtrą. Šios įžvalgos lieka aktualios vertinant ir naujausias skaitmenines technologijas, kurios iš dalies keičia interneto veidą, dalyvavimu ir bendradarbiavimu paremtą turinį papildant automatiškai generuojamu.

Svarbu pabrėžti, kad šioje disertacijoje atlikta prosumerių mokslo srityje analizė apėmė tik viešai internete prieinamus projektus, neįtraukdama, pavyzdžiui, sąlyginai uždarų grupių ar bendruomenių socialiniuose tinkluose. Tokių atvejų analizė, labai tikėtina, duotų įvairesnių rezultatų ir pademonstruotų skirtingų veiklos principų. Todėl tyrimo duomenys leidžia daryti tik ribotus apibendrinimus. Vis dėlto tai tik patvirtina, kad prosumpcija yra heterogeniškas fenomenas ir atskirų atvejų empirinė analizė padeda užčiuopti jos įvairovę, bet taip pat pagrindžia nuostatą, kad generalizuojančios prognozės apie vystomų technologijų panaudojimo kryptis ir jų socialinius efektus negali iš anksto numatyti nei tikslių padarinių, nei jų įvairovės.

Be to, viešai internete prieinamų žinių sukūrimo principų analizė yra prasminga ir naujų besivystančių technologijų, pirmiausia – vadinamojo dirbtinio intelekto, kontekste. Viešai internete prieinama informacija (pvz., Vikipedijoje) tampa duomenimis ir medžiaga didžiųjų kalbos modelių vystymui, o šiais modeliais paremti pokalbių robotai, atsakinėdami į vartotojų užklausas, remiasi jais, duoda nuorodas kaip į išorinius šaltinius ir pan. Suprantama, kad prosumerių sukurta informacija sudaro tik sąlyginai nedidelę tokių duomenų dalį, bet jų analizė bent iš dalies prisideda prie tokių duomenų kilmės nuskaidrinimo ir geresnio galimų juose esančių šališkumų suvokimo. Iš kitos pusės, vadinamojo socialinio interneto ypatybių apmąstymas mokslo žinių kūrimo ir sklaidos organizacijos kontekste skatina siekti panašiai apmąstyti bei empiriškai tirti ir dirbtinio intelekto technologijas, aiškinantis, ką specifiškai naujo (be apimčių ir greičio) jos įneša į šią sistemą ir kokios konkrečios vartotojų – įskaitant ir mokslininkus – praktikos bei subjektyvios sampratos gali turėti platesnių pasekmių šioje srityje.

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