

## The 2021 National Census in Poland – addressing the challenges of a digital census

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**Abstract.** The article aims to present the implementation of the national census carried out in Poland in 2021 as a process, with particular attention devoted to the challenges that national censuses pose for official statistics. The paper also focuses on how the organiser of the census – Statistics Poland – addressed the problems reported during the survey. The significance of the census results as a source of information was also discussed. The research was based on a case study, which allowed an in-depth analysis of the census process. The results of the analysis show that the problems which occurred in the National Population and Housing Census 2021 were similar to those identified in the previous editions of the survey, such as questions relating to sensitive information and the potential ways in which the answers to this type of queries could be further processed. What is more, maintaining the digital (electronic) form of the census (the paper forms were abandoned in favour of the digital form in 2011) and the introduction of the Internet-based self-enumeration as the primary form of the survey, applicable to all its participants, created additional challenges, related to some respondents' lack of digital skills or limited access to the Internet. Statistics Poland offered a variety of forms of contact with the society and addressed Internet users' questions on an ongoing basis, mainly through information campaigns, which included using social media, and by directly responding to Facebook users' comments. The conducted analysis provides a useful insight as to how reliable data could be collected in a census, particularly with the use of the Internet.

**Keywords:** national census, National Population and Housing Census 2021, digital census, online self-enumeration, official statistics, sensitive information

**JEL:** D82, D91, J11, J18, N34

## Narodowy Spis Powszechny 2021 – mierzenie się z wyzwaniami spisu cyfrowego

**Streszczenie.** Celem badania omawianego w artykule jest przedstawienie realizacji spisu powszechnego w Polsce w 2021 r. jako procesu, ze zwróceniem szczególnej uwagi na wyzwania, jakie spis powszechny stawia przed statystyką publiczną i sposoby rozwiązywania przez jego organizatora – Główny Urząd Statystyczny – zgłaszanych problemów. Omówiono także zna-

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czenie wyników spisu jako źródła informacji. W badaniu zastosowano studium przypadku, co pozwoliło na dogłębną analizę przebiegu spisu. Wynika z niej, że podczas Narodowego Spisu Powszechnego Ludności i Mieszkań 2021 pojawiły się problemy analogiczne do występujących w poprzednich rundach, dotyczące pytań o kwestie wrażliwe oraz potencjalnych sposobów przetwarzania odpowiedzi na nie. Ponadto kontynuacja cyfrowej postaci spisu (po raz pierwszy zrezygnowano z formularzy papierowych na rzecz elektronicznych w 2011 r.) i wprowadzenie samospisu internetowego jako podstawowej formy badania, obowiązującej wszystkie osoby podlegające spisowi, spowodowało, że organizator musiał stawić czoła takim problemom, jak brak kompetencji cyfrowych części społeczeństwa i trudności z dostępem do Internetu. GUS stosował różne formy komunikowania się ze społeczeństwem, głównie poprzez kampanie informacyjne, m.in. w mediach społecznościowych, a także na bieżąco reagował na komentarze zamieszczane w serwisie Facebook. Przeprowadzona analiza dostarcza wiedzy na temat sposobów uzyskiwania wiarygodnych danych, w szczególności przez internet.

**Słowa kluczowe:** spis powszechny, Narodowy Spis Powszechny Ludności i Mieszkań 2021, spis cyfrowy, samospis internetowy, statystyka publiczna, kwestie wrażliwe

## 1. Introduction

Censuses are considered to be the largest-scale and most important type of research, both in demographic and statistical terms (Morphy et al., 2007). Censuses have a unique history and breadth. The first population censuses date back at least 6,000 years, according to clay tablets recovered in ancient Babylon (Skinner, 2018). Ancient censuses were carried out in Egypt, Palestine, Rome and China, and their primary goal was to determine the number of people who should be paying taxes or performing military service for the state (Krywult-Albańska, 2012). However, over the centuries, not only the purpose of censuses has changed, but also the form in which they have been conducted. In the 21st century, almost all states belonging to the United Nations (i.e. 233 countries) retained censuses in the traditional form, i.e. on paper and with a designated enumerator present (Krywult-Albańska, 2012). Along with the development of information technology and with the emergence of the phenomenon of digitisation, censuses began to take a digital (electronic) form. The first countries where national censuses were conducted in this format were the United States and Mexico (in 2010), followed by Australia (in 2016) and Ireland (in 2021) (Chatfield et al., 2018). In 2021, a digital-first national census (where the dominating response option was online) was performed in England and Wales, where 88.9% of the households responded online (Office for National Statistics, 2021). In 2022, the national census in Bangladesh took an online form for the first time (Shravan Krishnan, 2022). The main challenges faced by the above-mentioned countries in carrying out online censuses were: the processing of large volumes of data (big data analytics), assisting people with low digital skills and reaching regions with low Internet coverage (mainly rural). It is worth noting that transitioning from

traditional to online census-taking not only failed to solve the already census-related existing issues, but added new problems and challenges to the whole process (Skinner, 2018).

Analyses of modern censuses should begin with the understanding of their purpose, which depend mainly on the conditions in a given period. The first European country to introduce censuses was Sweden (in 1749), followed by Poland (1789). In many European countries such as Austria, France and Great Britain, the organisation of modern censuses began in the 19th century (Krywult-Albańska, 2012; Levitan, 2011). The United States conducted the first national census in 1790.

The first national census in Poland came as one of the consequences of the adoption of the Constitution by the Four Years' Sejm in 1789,<sup>1</sup> and its results were meant to be the primary source of information when determining the amount of tax intended to cover the maintenance costs of a permanent, one-hundred-thousand-soldier army. The census was universal for the lower classes, but the privileged ones (the nobility and the clergy) were exempted from taking part in it. The subsequent censuses were conducted, among other locations, in the Duchy of Warsaw<sup>2</sup> (in 1808 and 1810) and in the Kingdom of Poland<sup>3</sup> (in 1827 and 1897). After Poland regained independence, two censuses took place: in 1921 and 1931. After World War II, censuses have been performed in 1946, 1950, 1960, 1970, 1978 and 1988. After the change of the political system, three censuses<sup>4</sup> have been carried out so far: in 2002, 2011 and 2021 (more: Berger, 2002; Strzelecki, 2009). In general, censuses help to assess the demographic structure of a population, i.e.: sex, age, marital status, religion, education, and occupation. Therefore, the quality of the obtained data is of paramount importance (Berger, 2008).

Nowadays, when conducting a census, two types of problems can be identified: technological (e.g. connected with the form of the census and the access to the Internet), and psychological (e.g. the perception of the census and attitudes towards it). These translate, respectively, into the accessibility of respondents and their willingness to participate in the census. Despite the fact that many countries introduced a legal obligation for people to participate in a census, and the refusal may cost them penalties, the willingness of the respondents is critical (Baffour et al., 2013; Batini et al., 2009). Therefore, the literature emphasises that governments should make every effort to encourage citizens to take part in censuses. One of the

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<sup>1</sup> The 1789 census in Poland (at that time functioning under the name of the Polish-Lithuanian Commonwealth – a state composed of the Crown of the Kingdom of Poland and the Grand Duchy of Lithuania) is also known as *Smoke scrutiny and population reporting* (Old Polish: *Lustracya dymów i podanie ludności*).

<sup>2</sup> Remaining under control of the French Emperor Napoleon I.

<sup>3</sup> Being a part of the Russian Empire that time.

<sup>4</sup> Their official name is the National Census of Population and Housing.

convincing arguments to do that should be the wish to help identify the degree of common socio-economic challenges (Schuster et al., 2020), like, for example, generation replacement (Cai, 2013).

There is no single, optimal way to conduct a census, and most challenges concerning such undertakings have not yet been overcome. The analyses of censuses carried out around the world clearly indicate the need to search for methods to optimise the census process. This article deals with similar problems as the publication by Skinner (2018), i.e. the objectives of censuses, their role and challenges met. However, instead of reviewing the literature and making the comparison of experiences in a cross-country perspective on the basis of the paper, we present the course of the national census organised by Statistics Poland in 2021. This study is the result of observations made during the performance of this census. This approach is important because of its ability to identify and propose solutions, likely to translate into increased efficiency of the census process, as well as improved quality of the data. The National Census of Population and Housing 2021 was the second survey (following the one conducted in 2011) which used digital questionnaires only and the first one to have the form of online self-enumeration only. The online self-enumeration format was specified in the law as binding on all those subject to enumeration. However, in particular cases, a phone or face-to-face interview carried out by an enumerator also remained an option. The 2011 census, on the other hand, had a mixed form, i.e. the participant could either self-enumerate online, or use the help of enumerators (Główny Urząd Statystyczny [GUS], n.d. d) in a direct meeting or by telephone. Enumerators were equipped with hand-held devices (in the case of the CAPI method) to maintain the digital form of the questionnaire (paper forms were completely abandoned at this point). The alterations introduced to the 2021 census were caused by the COVID-19 pandemic, which restricted the face-to-face activity of the enumerators. Therefore, the basic format of this census was legally changed to the online self-enumeration option (in exceptional cases supplemented by the CATI method).

Our article can be a valuable contribution to the census research, as it combines practical and theoretical aspects. On the one hand, the paper presents problems occurring during the census, and on the other hand it proposes solutions. As noted by Batini et al. (2009) and Gołata (2012), thanks to a reliable and thorough evaluation of the existing census questionnaires, it is possible to significantly improve the quality of future surveys conducted by official statistics.

The aim of the article is to present the implementation of the 2021 national census in Poland as a process, with particular attention devoted to the challenges that national censuses pose for official statistics. The paper also focuses on how the organiser of the census addressed the problems reported during the survey. The

significance of the census results as a source of information was also discussed. In order to meet this aim, the following research questions were posed:

- What is the purpose of censuses;
- What methodological challenges occur during the process of organising a census? What challenges does the implementation of the digital form of the questionnaire and online form of the census entail? What other challenges were identified during the National Census of Population and Housing 2021;
- To what extent does the social involvement affect the quality of the performance of a census? Did the official statistics authority in Poland (Statistics Poland) encourage people to participate in the census? If so, in what ways.

It should be noted that due to the fact that the 2021 census in Poland has been chosen as a reference point, a significant part of the cited bibliography has been published in Polish scientific journals devoted to official statistics and is therefore written in Polish. Although the Polish literature is vast, it often concerns areas different from those covered by the literature in English. Thus, referencing Polish literature gives the article more value as it provides an appropriate context.

## **2. Literature review**

### **2.1. National census as a source of information**

The primary purpose of a census is to define a population (Simpson, 2007). However, from the very beginning of the census history, this kind of surveys served as a source of additional information, especially on the condition, structure and changes in the population (Gołata, 2012; Strzelecki, 2009). In antiquity, censuses were the basis for establishing the number of people obliged to pay taxes (Krywult-Albańska, 2012). In the Middle Ages in Poland, church registers were considered a reliable source of data on the condition of the population (Berger, 2002), but later censuses started to be organised in order to systematise the population and update the information on it. Nowadays, researchers identify three roles of a census (Gołata, 2014; Paradysz, 2010). It is the source of:

- information on demographic structures;
- information not covered by the current registration system;
- information on regional statistics.

Moreover, the census results are the only source of data on population structures in the smallest territorial units into which the country is divided (Holzer, 1997; Wardrop et al., 2018). According to e.g. Bowman et al. (2004) and Młodak (2014), the purpose of contemporary censuses (especially those held since the beginning of the 21st century) is to provide information on the demographic and socio-economic status of the population, as well as its structure. The function of the census was

defined in a similar way by Gołata (2012, p. 23), who sees it as ‘providing information on the state and structure of the population by sex and age, which will become a new basis for annual population estimates in subsequent years’. Keeping the purpose of organising censuses in mind, the concept of a census can be defined as the ‘periodic research aimed at obtaining complete information on the condition and structure of the population according to basic demographic, social and economic characteristics. In order to receive complete information on a population, all its units should be accounted for in a census’ (Gołata, 2012, p. 25).

The purpose of a census determines its form and the questions asked, as well as the level of detail at which the data is published (village, town/commune, voivodship/region, or the whole country; Bowman et al., 2004; Jarosz, 2004; Wardrop et al., 2018). Censuses have gained great importance throughout history both in the national- and community-related contexts, which has been reflected to a large extent in the history of Central and Eastern Europe. For example, after Poland regained independence in 1918, organising a census became very important for the reconstruction of the Polish state (Łazowska, 2019). All censuses were primarily aimed at determining the number of inhabitants, which came to be particularly important after the end of World War II. The need to determine the actual number of Polish citizens became pressing in 1946 (Berger, 2008). The main purpose of the 1978 National Census, on the other hand, was migration (Rosner, 1980). The first census in the new millennium (in 2002) was of fundamental importance due to the socio-economic transformations that had started over a decade earlier in Poland. It allowed the assessment of the effectiveness of the national reforms of the 1990s after the collapse of the Warsaw Pact and Poland’s exit from the Communist Block.

The results of censuses provide a significant amount of information about the population, and their importance is enormous because of the following factors (Strzelecki, 2002, pp. 5–6):

- a census is the most extensive database for a substantial number of socio-economic diagnoses;
- it provides information about the volume and the demographic and socio-economic structures of the population;
- it makes it possible to draw general conclusions relating to the socio-economic sphere;
- it allows the evaluation of the estimates of other studies in the inter-censual periods;
- it can be used as a basis for creating sampling frames for future research.

Toczyński (2002) as well as Bowman et al. (2004) came to similar conclusions as some of the above-mentioned researchers, meaning that the results of a census constitute the basic information on the demographic and socio-economic situation

of a population. These results can be further processed by various entities. As also argued by some of the scholars mentioned earlier in this section, censuses helped rulers to make fiscal decisions (Berger, 2008; Ladd, 1992; Porcano, 1988). In addition, Piątek and Karwacki (2004) assert that decision-makers setting the directions of social policy and scientific activity use the results of censuses also for the assessment of the standard of living in a given society. Similarly, Krywult-Albańska (2012) identifies groups of stakeholders who are aided by census results not only in the creation of social policy, but also in setting the directions of development for the broadly understood administration.

Warmińska (2004) notices that censuses make it possible to determine the prevailing religion and the population's national identity. Michna (2013) points to the fact that in Poland, local leaders of the Silesian minority cite census results in order to emphasise the importance of the Silesian nationality to the inhabitants of this region. It should be noted that in the literature, the determination of the ethnicity of a population is often considered one of the goals of a census. On the basis of the conducted censuses, Sans (2011) discusses the ethnic identity in Uruguay. Visoka and Gjevori (2013) also focus on ethnicity, but the target area of their study is Western Balkans. Ferguson (2015) explores the ethnicity and the related issues in Burma (Myanmar). Peach (2006) examines the attitude of citizens of London towards faith (religious beliefs) and ethnicity, while Morning (2015) analyses the ethnic classification in a broader perspective, comparing a cross-national survey of the censuses that took place in 2000.

Skinner (2018) suggests linking data sources to get a wider view on the demographic situation and to verify the data based on census results. Wallgren and Wallgren (2014, p. 103) emphasise that in some countries, unique personal identification numbers allow the compilation of multiple data sets. Poland, with the PESEL (Universal Electronic System for Registration of the Population) number for each resident, is one of such countries.

Holzer (1997) emphasises that censuses should go beyond what can be obtained from public registers. Krywult-Albańska (2012) argues that censuses ought to combine multiple aspects, and therefore the questions in a census should concern, in addition to the basic issues, also some complementary ones. As a result, it would be possible to obtain a much wider picture of the society, focusing on relevant data at a given moment (Jarosz, 2004). Censuses may also attempt to resolve methodological and socio-political issues (Okrasa, 2021).

The results of censuses carried out from the beginning of the 19th century formed the basis for scientific research on the population (Krywult-Albańska, 2012). Censuses are now organised every 10 years (Wardrop et al., 2018). A 10-year span makes it possible to capture socio-economic changes.

In Poland, the extension of the potential research context in the spirit of the above-mentioned literature was particularly advocated during the censuses in 2002 and 2011, i.e. after the collapse of the communist system, because it was believed that the censuses carried out during the communist era were mainly based on ‘Marxist statistics’ and were used to build a socialist society (Strzelecki, 2009). Other scholars argue that some of the census’ results may serve as a public database (after prior anonymisation; Amos et al., 2017), thus constituting the basis for subsequent scientific analyses.

To sum up, censuses play a key role in scientific research, because they enable (Paradysz, 2009):

- obtaining a population structure for demographic and social research;
- the construction of sampling frames for socio-demographic research;
- supplementing the current statistics on demographic and social events;
- the provision of information on events and population structures by region;
- obtaining supporting variables for the needs of indirect estimation in accordance with the rules of small area statistics.

## 2.2. Challenges of national censuses

Organising and carrying out such a large project as a census creates many challenges for the organiser, which, however, become increasingly often accounted for at the design stage. The method of determining the purpose and the target kind of information which is to be obtained from a census makes the agreement on methodological issues pivotal (Batini et al., 2009; Gołata, 2014). The understanding of the art of research methodologies comprises a vast number of components such as: time, context, resources, cultural awareness, research ethics, and other ‘backstage’ characteristics that have a crucial impact on the research process (Gooden & Berry-James, 2018). Most of the questionnaires are based on the questions from previous census editions, but there might be new questions designed to obtain new information. It should be mentioned here that asking questions concerning sensitive issues might create methodological challenges (Guyan, 2022).

Another problem related to the methodology of a census is the determination of the state and structure of the initial population (Gołata, 2012). This is necessitated by the fact that censuses are carried out over a certain period of time, but in order to standardise them, the current state of affairs is taken into account at a specific date, which is then considered a reference point for further analyses.<sup>5</sup>

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<sup>5</sup> It also happens that a certain group of respondents does not take part in the census because they die during the census. In such a situation, the results of the census do not include information on these persons, even though they were initially taken into consideration as respondents.



An additional problem raised in the literature is that some respondents are reluctant to participate in censuses due to the fact that the intentions of the survey and the way the data will be later used are unclear to them. Historical experience shows that citizens were reluctant to provide information when they were concerned about the purpose of its use (Kruskal, 1984). In the European Union countries, at the beginning of collecting census data in an 'updated' format (i.e. supplemented with new questions in order to deepen the analysis of social phenomena), there was a concern about maintaining the confidentiality of the collected data, which resulted in a decreased interest in the participation in censuses (Roszka, 2009). However, bearing in mind the qualitative aspects of a census in the context of obtaining and operating on citizens' personal data, it should be noted that the data collected by Statistics Poland in a census are used for statistical analyses intended not only to determine the current demographic situation, but also to contribute to modelling processes over time (these data will serve as historical data for up to a hundred years).<sup>6</sup> It should also be remembered that taking care of the security of data collection and processing is regulated at international level. Hence, since keeping official statistics, including obviously census results, is the responsibility of each EU member state, the processing of census data must go in line with the national act on the protection of personal data and the General Data Protection Regulation (GDPR).<sup>7</sup>

Censuses require that every citizen be reached regardless of their place of residence, and are obligatory for everyone without regard to their intellectual abilities or digital skills. The form of a census must be adapted even to those citizens who cannot write or read, i.e. are illiterate (Dygaszewicz, 2009). Modern technologies used while conducting censuses do not solve the existing problems. They actually create new ones: despite the large coverage of the broadband Internet network in Poland (92%; Eurostat, n.d. a), there are still many households that do not have access to it, which makes it difficult for its members to self-enumerate online. For such households, computer stands with installed software that enabled self-enumeration via the Internet were organised in the municipal offices. However, despite the fact that many citizens have access to the Internet, the level of 'digital literacy' in Poland, reflecting at least the basic level of the ability to use digital amenities, is still below the European average and reaches 43% (Eurostat, n.d. b). As a result, the deepening effect of 'digital exclusion' is likely to become a significant

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<sup>6</sup> It results directly from Article 32 Par. 1 of the Act on the National Population and Housing Census.

<sup>7</sup> Full name: Regulation (EU) 2016/679 of the European Parliament and of the Council of 27th April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.

challenge for the official statistics authorities carrying out censuses at a time when the digital form is considered to be the basic or the only one.

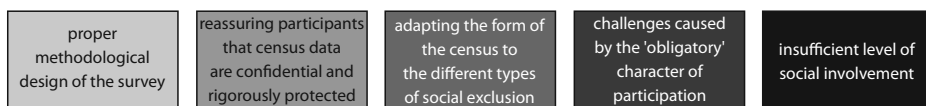
According to Pupkiewicz (2002, p. 19), a census must be preceded by a legal act of an appropriate rank which will define its rules, so that it could be successfully conducted.<sup>8</sup> Other researchers, including Kruskal (1984), believe that imposing the mandatory nature of censuses may create problems. From the point of view of the public sector, it is necessary to issue a legal act specifying the manner and legitimacy of spending public money. Nonetheless, from the social point of view, making censuses obligatory might discourage participation.

Berry-James et al. (2020), Hillygus et al. (2006) and Szreder (2009) believe that community involvement is essential to conducting a census, as thanks to it, more reliable data are obtained. Hypothetically, with full social involvement in a census, the estimates would be of substantial accuracy and, consequently, of a notable value, as all citizens would provide true information. However, even when there is full cooperation between the society and the authorities, census participants might misunderstand some questions which, in turn, might lead to misguided answers. High-quality data was, is and will be vital because reliable research results cannot be obtained without it (Steckel, 1991).

Encouraging citizens to take part in a census is done with the help of marketing mechanisms, which are an integral part of the entire census process (Berger, 2008). Activities in the marketing campaign include informing the public about the survey in traditional media (i.e. TV, radio or press advertisements) and social media (i.e. free and sponsored posts), as well as conducting a lottery with prizes. An example of such a lottery can be the one carried out by the organiser of the 2021 National Census in Poland. It is described in detail in Subsection 4.2.

Figure 1 presents the specified and systematised challenges related to conducting national censuses.

**Figure 1.** Challenges associated with conducting national censuses



Source: authors' work.

<sup>8</sup> In Poland, the participation in a census is a legal obligation imposed on every citizen and permanent resident of the country ('Polish resident'; GUS, n.d. e). It is regulated by individual acts on the national census for a specific year (such as the Act of 9th August 2019 on the National Population and Housing Census 2021).

### 3. Methodology of the research

Our article presents the results of the study on the methodological challenges of the Polish solely online census and on the social involvement in the census. The research examined Statistics Poland's posts on its official Facebook profile, as well as comments from Internet users. In the first stage of the study, we described the implementation process of the National Population and Housing Census 2021, conducted from 1st April to 30th September 2021 in Poland. The date and form of the census were regulated by the following acts:

- the Act of 9th August 2019 on the National Population and Housing Census 2021;
- the Act of 30 March 2021 amending the Act on National Population and Housing Census 2021. This act, among other things, prolonged the duration of the census by three months (initially, the plan was to complete the survey by 30th June 2021, but this period was extended to 30th September 2021).

This stage also involved a thorough analysis of the electronic tool, with a particular emphasis placed on the description of its functionality. The tool was available on Statistics Poland's web page dedicated to the census (<https://spis.gov.pl>), and was applied for self-enumeration. The analysis was carried out empirically at the time of launching the census form, and updated on an ongoing basis with the observations of technical improvements made throughout the census as a response to user-reported faults.

The second step of the study was to identify the ways which Statistics Poland used to encourage people to participate in the 2021 census. All the methods aimed at persuading residents to take part in the census, and in particular to perform online self-enumeration, were taken into account. The undertaken marketing and social campaigns focused primarily on making people aware of the obligatory nature of the census, but also strove to increase public trust in official statistics, with the aim of improving the quality of the collected data.

The third stage of the study was the analysis of Facebook posts published between 1st March and 30th September 2021,<sup>9</sup> i.e. in the period from one month before the start of the 2021 National Census until its completion, and extracting comments from Internet users where they reported problems. Because collecting posts automatically would be difficult (especially due to the lack of standardised hashtags), we decided to screen posts manually. As Statistics Poland published various content

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<sup>9</sup> The precise determination of the number of entries concerning the census is very difficult for two reasons. Firstly, some of the entries published on Statistics Poland's official Facebook page either did not directly refer to the census, or were census-themed posts authored by other entities, which Statistics Poland only shared. The second reason was the inconsistent use of hashtags, i.e. markings informing about the connection of an entry with a given topic. There were posts regarding the census, but without a hashtag.

on its official Facebook profile (not only regarding the census), at first it was necessary to select those entries that concerned – directly or indirectly – the census. Then they were systematised on the basis of the types of challenges previously identified by various authors (cited in the previous section). The results of the systematisation of types of errors are presented in Table 1.

**Table 1.** Types of problems identified in the 2021 National Census

Social aspects	Technical aspects
<b>Methodology</b>	
<ul style="list-style-type: none"> <li>● vague questions raising doubts</li> <li>● negative perception of questions</li> <li>● doubts regarding the scope of the collected information in the questions</li> <li>● doubts about the method of data processing and use</li> </ul>	<ul style="list-style-type: none"> <li>● questionnaire shape</li> <li>● accusations that the compulsory character of an electronic census was imposed while remaining unadjusted to the level of digital exclusion</li> </ul>
<b>Inability of performing electronic self-census (concerning the enumerated person)</b>	
<ul style="list-style-type: none"> <li>● lack of technical skills to complete the survey ('digital illiteracy')</li> </ul>	<ul style="list-style-type: none"> <li>● no (or difficult) access to the Internet</li> </ul>
<b>Problems with the hotline and the self-census website (concerning the census organiser)</b>	
<ul style="list-style-type: none"> <li>● evoking negative social emotions</li> <li>● limited trust in conducting a census</li> </ul>	<ul style="list-style-type: none"> <li>● technical problems that prevent self-enumeration via the website</li> <li>● problems with the hotline, preventing contact with the census enumerator</li> </ul>

Source: authors' work.

The last, fourth stage of the study was the analysis of Statistics Poland's posts in their official profile on Facebook, responding to the doubts reported by users – people who did self-enumeration online or with the help of the census enumerator (via hotline).

## 4. Results

### 4.1. Completion of the 2021 National Census

The electronic form of the National Population and Housing Census 2021 was available from 1 April 2021 to 30 September 2021. The Act of 9th August, 2019 on the National Population and Housing Census 2021 defined the basic and compulsory format of its completion for every resident of Poland as the online form (on the above-mentioned Internet website). However, the act foresaw some exceptions to this general rule – e.g. 'health conditions' or 'legitimate interest' – in the case of which it was possible to apply for a different format of doing the census (through a telephone interview or a personal meeting with an enumerator).

As regards the prime, digital format of the census, the most important condition for the correct transfer of data to the central database of Statistics Poland is that respondents have access to the Internet. According to the Eurostat data for 2021, 92% of households in Poland have access to the Internet, which is the vast majority of people living in Poland (Eurostat, n.d. a). However, only 44% of them have basic digital skills, by which it is meant that they are able to navigate the Internet and fill in the census questionnaire in the electronic form (Eurostat, n.d. b). On the other hand, the electronic questionnaire allows one respondent to list other members of his/her household, who live at the same address as the respondent, using just one form. The security of information flow inside the household may therefore be inconsistent. This is the consequence of the legislator's partly misguided assumption that people living under one roof trust each other, and thus one, most technically fluent member of the household will be able to fill in the census form for other members, who are not digitally proficient, according to their will (especially in the case of sensitive questions, such as those about nationality, a sense of belonging or religion).

The online self-census in the form of an electronic questionnaire was available to every person under the census obligation. In order to submit the questionnaire, the respondent had to log into the system by providing his/her national identification number (PESEL), and his/her mother's maiden name, or through another certified external government system, such as the Trusted Profile or the e-ID system.<sup>10</sup> For foreigners who did not have the Polish national identification number at the time of the census, an alternative form of access was provided, i.e. through the 'conventional' creation of an account on the website using the respondent's e-mail address. When the log-in was performed without the use of the electronic layer of the identity card (e-ID) or a Trusted Profile, a secure password was sent to the user, by means of which it was possible to return to the questionnaire already started, but no later than 14 days from starting doing it. After this period, the electronic self-register became inactive, and the questionnaire had to be completed by phone or in person, with the help of the enumerator. Some shortcomings of this solution have been identified, such as the short deadline for completing the questionnaire via the Internet, after the expiration of which it was not possible to continue to register online, as well as the necessity of using the services of an enumerator or a census hotline, within their specific working hours.

The questionnaire was available on any electronic device with Internet access, including smartphones and tablets, which was enabled by a login mechanism, thanks to which the data saved in the cloud were accessible from any device connected to

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<sup>10</sup> These are the official methods of confirming identity in Poland provided to citizens/residents by the Polish government.

the Internet, in any place. The questionnaire was also responsive, which means that its electronic version dynamically adjusted to the size of the device on which it was displayed. It was moreover designed respecting the latest trends in web design, by the application of the Material Design<sup>11</sup> at the initial design stage. The application featured single-choice, multiple-choice and open questions fields. Most of them also contained dynamic hints (e.g. in the sections asking for selecting a voivodship or nationality) that were displayed after pressing the button with the question mark in order to clarify the context and purpose of the question. In addition, a phone hotline was available with the purpose of answering specific census-related questions, but only on working days.

It was possible to submit a request for being enumerated by telephone through a hotline which operated on weekdays from 8:00 a.m. to 6:00 p.m.,<sup>12</sup> or wait for the operator, who was an enumerator of the regional branch of Statistics Poland. Using a dedicated census website, it was possible to verify the enumerator's ID to avoid data extortion by fraudsters. Carrying out the census by phone, however, encountered several problems. First and foremost, the necessity of conforming to the working hours of the hotline may have been inconvenient to some respondents. The hotline was generally very busy, so the waiting time for a connection with a consultant-enumerator took a very long time. Moreover, there was no specific indication as to when the consultant would return the call, and communication disruptions were likely to occur. Phone-assisted enumeration took in most cases more time than the online enumeration.

#### **4.2. Ways of encouraging participation in the census**

In the first months of the census, Statistics Poland carried out intensified marketing activities, including the census lottery. The lottery was designed as an incentive for people to take part in the survey. The winners were selected by a periodic draw.<sup>13</sup> The participation in the lottery had to be preceded by the respondent's consent – no one was automatically included in the lottery. The lottery was held seven times during the census, and the prizes were cash prizes in the form of prepaid cards and passenger cars. Ads for the census lottery appeared both in the traditional media and on the Internet, in the form of static entries, graphics or video clips.

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<sup>11</sup> Material Design (<https://material.io/>) is a visual web design language initiated by Google, characterised by clarity, responsiveness and intuitiveness. It is a widely used standard that is applied to many customer-driven commercial and non-commercial web projects.

<sup>12</sup> From 13th to 30th September 2021, i.e. in the last days of the census, Statistics Poland extended the operation of the census hotline; on those days the helpline was available from 8:00 a.m. to 8:00 p.m., also on Saturdays and Sundays (GUS, n.d. b).

<sup>13</sup> The draws were conducted every week or every two weeks – according to the schedule available on the dedicated website. The earlier the list was completed, the greater the number of lottery draws the reported person took part in.

After the end of the census lottery, cyclical smaller contests were organised in social media. Their goal was similar to the lottery – to boost the rate of participation in the census, as well as to increase the trust in Statistics Poland (the organiser) and in the census itself. These competitions included a contest for teachers for the best script on the National Census. The competition for the ‘most digital commune of the National Census’ encouraged inhabitants of a commune to register online. The commune with the highest percentage of people who completed the census online received prizes from Statistics Poland.<sup>14</sup> Moreover, smaller-scale competitions for Internet users were organised.

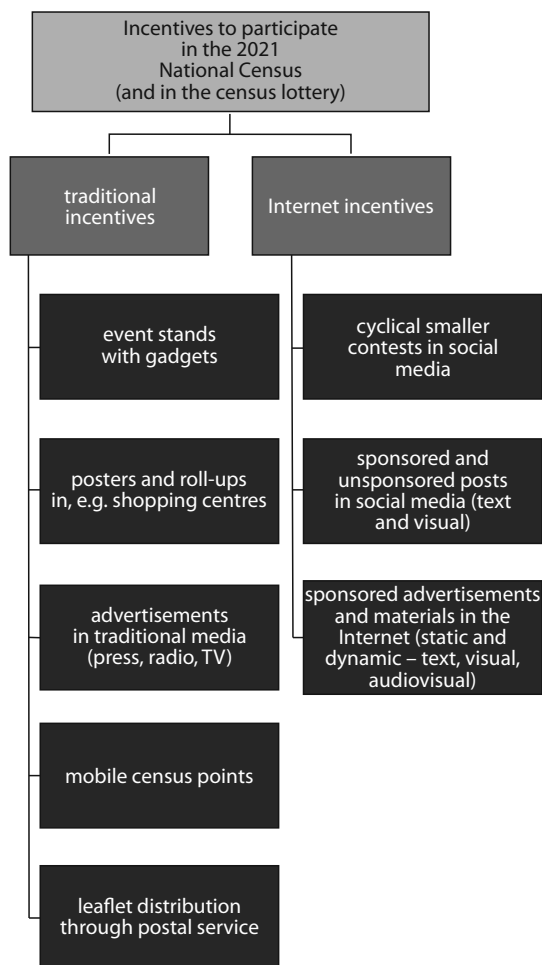
People were encouraged to take part in the census also in previous editions, but mainly in the traditional form, although modern mass media were also used for this purpose then (but to a lesser extent; Michna, 2013). However, the development of information society and the deployment of the digitalised form of a census as primary necessitated a wider information campaign through the modern means, such as the Internet and social media. This posed new challenges. The census promotion campaign was carried out through diversified channels – as mentioned before – through traditional media (press, radio and television), and through modern media (the Internet advertisements and sponsored posts in social media). The choice of varied marketing tools was dictated by the desire to reach as many recipients as possible.

The traditional way of promoting the census involved placing census-related stands in shopping centres during various events, and ‘mobile census points’, i.e. buses driving around various places in Poland, where the census could be completed with the assistance of an enumerator. The stationary and mobile stands were accompanied by posters, roll-ups, leaflets, as well as gadgets such as mugs, pens and lanyards. In the traditional media, the campaign focused on the broadcast or unilateral messages, such as leaflets sent by traditional mail or audiovisual materials broadcast on television. Television also showed audiovisual sponsored materials (quasi-reports), where the 2021 National Census appeared as a product placement, as did Statistics Poland as the organiser of the survey. The online media (including social media) presented static (text and visual) and dynamic advertising banners, promotional and instructional videos, as well as sponsored posts/ads in the social media and other online sources, e.g. in news portals. All of the above was aimed at increasing influence of messages promoting the census in order to raise the interest in it, encourage people to take part in it, and increase the social awareness of its procedures. A compilation of all types of advertising and incentives is presented in Figure 2.

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<sup>14</sup> 96 winner municipalities were awarded prizes in the form of electronic devices (GUS, 2022).

**Figure 2.** Ways of encouraging participation in the 2021 National Census



Source: authors' work.

### 4.3. The reported problems – an analysis of the Facebook comments

From the very beginning of the census, its online participants reported technical problems related to the functioning of the website and the hotline. Moreover, Internet users expressed their doubts or disapproval concerning data processing and data security, the methodology of the census (relating to the questions asked in the questionnaire) or the very essence of the census, i.e. its form and course. The comments were posted mainly under current entries on the Statistics Poland



Facebook account. The topics that these messages addressed are compiled into relevant categories listed in Table 2.

**Table 2.** Categories of problems concerning the 2021 National Census reported by enumerated users

Type of problem	Description
Data utilisation	Comments expressing irritation and doubts as to how the obtained data is to be further utilised
Data security	Comments expressing doubts as to the security of the transferred data
Questions	Comments on improperly formulated questions and any related concerns
Technical issues	Comments on reporting technical problems with the census hotline and the self-census website
Way of conducting	Comments expressing doubts about the method of conducting the census

Source: authors' work.

Table 3 presents the content of selected individual comments from the period of the study. The comments were placed under various posts on the official Facebook account of Statistics Poland. For identification purposes, the dates of the posts are given in the first column of Table 3. The table presents only a fraction of the numerous comments, selected arbitrarily, although reflecting the problems reported by Internet users (many of the users submitted comments of a similar content). For the purposes of the study, the entries in Table 3 have been translated from Polish into English and both punctuation and spelling have been corrected therein. Posts (or their parts) containing profanity or other elements irrelevant from the point of view of the study were omitted. It should be emphasised that most of the comments in Table 3 can be assigned to more than one category from Table 2.

**Table 3.** Reported problems concerning the 2021 National Census published on Statistics Poland Facebook account

Date	Comment	Problem
27th July	Surveillance and that's it. They don't know how many citizens they have? They know this and much more.	Data utilisation
27th July	After all, our beloved State knows everything about us... Why should we enumerate ourselves? We will report our financial status, etc. The officials own our data, our financial status and what else (...)	Data utilisation
23rd July	The more people talk about freedom and security, the less we have of those! Surveillance and distribution of data back and forth.	Data utilisation
21st June	Do you know why the government needs to have information about our apartments? To introduce a sufficiently high cadastral tax.	Data utilisation

**Table 3.** Reported problems concerning the 2021 National Census published on Statistics Poland Facebook account (cont.)

Date	Comment	Problem
9th April	<p>A few questions:</p> <ol style="list-style-type: none"> <li>1. What happens if the people sharing the apartment do not allow you to provide their ID number? Everyone has the right to protect their private data, no one is allowed to rummage in documents... (because it's probably against the law).</li> <li>2. How do data protection regulations correspond to transferring a social security number to persons other than myself?</li> <li>3. With knowledge of someone's PESEL number and the mother's maiden name – you can do really ugly things. Note that this combination often occurs in banking. Nobody would like to have their identity stolen or a credit they never took themselves.</li> <li>4. Gender question: what about people who are currently undergoing gender transition?</li> <li>5. Why do you, after all, have land and mortgage registers, where you can find all information about real estate? Why do you ask for them again?</li> <li>6. Why do we have a PESEL number register and do not use it?</li> <li>7. If an enumerator calls me, how can I be sure that it is an enumerator, not a bandit called Stephan from Pueblo, who is about to steal identities for purposes quite unrelated to the census?</li> <li>8. Why shouldn't invitations to the Internet census be sent to people on their accounts on their profiles on gov.pl portal? This way, you can send everyone a dedicated link, which increases security.</li> </ol>	Data utilisation, Data security, Questions
4th April	Why on earth such detailed questions? Asking about some of these things is beyond your authority! This is just a census and why on earth do you ask about health, past diseases, property? I wonder if someone reports it to the European authorities, will it be considered inconsistent (...).	Data utilisation, Data security, Questions
2nd July	When taking the census via the Internet, it does not matter where the person enumerates themselves. Is it enough for them to provide their place of residence, not their registered address? Or is it not?	Questions
4th August	There are many doubts and concerns, so write precisely where and in what legal act it is specified that the enumerator can arbitrarily terminate the census by contacting a citizen?	Way of conducting
28th September	Nice that you cannot enumerate yourself on the website because there is an error 'SyntaxError: Unexpected token < in JSON at position 0'. And the hotline just doesn't work at all.	Technical issues
27th September	The hotline is not working and it is not possible to register on the website.	Technical issues
27th September	The phone is deaf all the time, it is impossible to connect, and attempts to register via the Internet are a disgrace for this institution. Unable to login, denied every time.	Technical issues
3rd September	I am calling today from 8.00 a.m. and I am being disconnected! Why? The hotline was to be open today!	Technical issues

**Table 3.** Reported problems concerning the 2021 National Census published on Statistics Poland Facebook account (cont.)

Date	Comment	Problem
22nd September	Hey there! Your web application is not working, the hotline tells me that 'number does not answer'. What am I supposed to do to enumerate myself? Do you accept the racing pigeons? Smoke signals? Telegraph? (...).	Technical issues
29th September	The hotline does not work, there is no email address. How to get to you if someone wants to do a good job and there is no possibility of using the Internet? Of course, the enumerator hasn't called yet either.	Technical issues

Source: authors' work based on data from <https://spis.gov.pl/>.

Table 3 shows that the reported problems related to a variety of issues that could be systematised. The understanding of these problems enables the formulation of an effective response. In its marketing campaign, Statistics Poland referred to all of the categories of problems. This was done through a direct response to the user in a comment (if the problem was individual) or through general posts on Facebook visible to a greater number of recipients (if the problem could be related to a wider group of people or when the reported issue was important from a social point of view). It should be mentioned that problems were posted until the very end of the census process. Nevertheless, when the discussed issue was considered extremely important, Statistics Poland's responses to this subject appeared in other marketing materials, also outside the social media space. The ongoing observation of the Facebook entries allowed the organiser to adapt to the expectations of the Internet users and to the situation concerning problems with the census. The categories of Statistics Poland's responses are presented in Subsection 4.4, where an analysis of the census-related posts was performed.

#### **4.4. The responses of Statistics Poland to the reported problems and doubts – an analysis of Facebook posts**

Posts on the official Facebook account of Statistics Poland regarding the National Population and Housing Census 2021 published between 1st March and 30th September, 2021, can be divided into several categories. Table 4 presents the categories and their descriptions (the same category names are used in the methodological part presenting the analysis of individual entries from the Statistics Poland Facebook account).

**Table 4.** Categories of posts concerning the 2021 National Census published on the Statistics Poland official Facebook account

Category of post	Description
Security	Information on data security and how the data are processed and managed
Reminder	Reminder of the compulsory nature of the census and information about its end date
Awareness	Information to spread awareness of the essence of the census, dispelling doubts and denying disinformation materials
Methods	Presentation of the methods of completing the self-enumeration
Census points	Mobile and stationary census points, i.e. places where the census services may be reached
Help	Help offered to the elderly and disabled taking part in the census
Lottery	Information on the 'census lottery'
Promotion	Promoting census participation, information about the organised contests for the Internet users (additionally to the actual census lottery), conducted in social media
History	History of censuses
The published posts were not analysed as they are largely not authored by Statistics Poland	News on the census presented on television, articles from websites of external entities reporting on the survey

Source: authors' work.

The majority of Statistics Poland's posts related to the various aspects of data security and were reminders of the citizens' legal obligation to participate in the survey. Certain posts described the enumeration methods and others offered help to those having difficulties in filling in the census forms on their own. There were also posts which focused on spreading awareness about the essence of the census and ones which denied any unverified or untrue information (fake news) circulating in the public space. Throughout the period when the census took place, promotional information was posted about the census lottery or smaller-scale contests, as were presentations of the census' historical facts.

Table 5 presents the content of individual posts uploaded on the official Facebook account of Statistics Poland throughout the period when the survey was conducted. The table relates only to some of the posts, selected arbitrarily, although in such a way as to illustrate the essence of the raised issues. Many posts were similar in terms of the assigned categories from Table 4, but differed in content, hence the condensation. For the purposes of the study, the posts in Table 5 have been translated from Polish to English. Moreover, it should be emphasised that most of the entries in Table 5 can be assigned to more than one category from Table 4, similarly to user comments (Tables 2 and 3).

**Table 5.** Content of the posts concerning the 2021 National Census published on the Statistics Poland Facebook account

Date of post	Content	Post category (reply to a category from Table 2)
27th September	The National Population and Housing Census 2021 applies to all inhabitants of Poland, including seniors. If you know seniors (grandparents, neighbours, friends) who may have problems taking part in the census, help them safely fulfil the census obligation in the form that is most convenient for them.	Help (reply to Way of conducting)
26th April	The National Population and Housing Census 2021 applies to all the inhabitants of Poland, including seniors. If your relatives, friends and neighbours include elderly people who do not have a computer or have problems with using a telephone, help them safely fulfil the census obligation in the form that is most convenient for them: online self-census (at home or at a census point) or by phone with an enumerator.	Help (reply to Way of conducting)
22nd September	We would like to thank #DeafLesserPolandTV24 for the material promoting the 2021 National Census. It is important for deaf people to know where and how they can participate in the census. Among the enumerators there are people who help fill in the census forms in sign language.	Help, Awareness (reply to Way of conducting)
23rd June	Why are data on the nationality of respondents collected in the census and how can it be declared?	Awareness (reply to Data utilisation)
29th June	Have you seen these two phone numbers: 22 828 88 88 or 22 279 99 99? Pick up, the census enumerator is calling.	Awareness, Security (reply to Technical issues)
9th March	Certainly, the respondents of Statistics Poland in enterprises, households and farms wondered many times how the data they provided was used. All institutional users and those conducting their own analyses can use the socio-economic data which were collected and compiled by Statistics Poland.	Awareness, Security (reply to Data utilisation)
19th August	Fear usually comes from ignorance or misinformation. We encourage you to read the text in which we debunk the myths about the census. The National Census is legal, safe and very important for the development of Poland. It is carried out every 10 years, starting in 1921!	Awareness, Security, History (reply to Data security)
30th June	The security of the data we obtain in the #NationalCensus and other statistical surveys is our priority. We publish the data in a form that prevents it from being associated with a specific entity, person and address. They are protected by appropriate control procedures. Personal data provided by respondents is confidential and subject to special protection.	Security (reply to Data security)

**Table 5.** Content of the posts concerning the 2021 National Census published on the Statistics Poland Facebook account (cont.)

Date of post	Content	Post category (reply to a category from Table 2)
27th September	100 years have passed since the first census in independent Poland. Even then, just like today, you could self-enumerate together with your family. The difference is, however, that in the current census, we do not focus on a large census sheet but usually on a computer screen. The results of the census of 1921 were a great learning material of a particular value for governing the state. 100 years have passed and censuses are still a unique source of knowledge about the social and demographic processes taking place in society.	History (reply to Questions)
28th May	Do you know that the National Census is in progress until 30th September of this year? Do it as soon as possible and take part in the National Census lottery. To participate in the next draw on 8th June of this year, you have to self-enumerate online and register for the lottery by 2nd June of this year. It's simple, after completing the form you will be able to download a special 10-character code. (...) In this draw, as many as 240 people have a chance to win! Prepaid cards will be drawn at random: 160 cards worth PLN 500 and 80 cards worth PLN 1,000.	Lottery (reply to Questions)
16th August	The Municipal Police Headquarters in Sosnowiec would like to remind you that the participation in the National Population and Housing Census 2021 is obligatory, and the refusal to participate in the #NationalCensus may result in a fine. The census lasts until 30th September, 2021. Don't wait until the last minute! Register today at: <a href="https://spis.gov.pl/">https://spis.gov.pl/</a> .	Reminder (reply to Questions)
1st September	Only 30 days left until the end of the census! The National Population and Housing Census 2021 is organised only once every 10 years, but its results affect our lives every day! Haven't done it yet? Do not wait until the last minute and fill in the census form on the website: <a href="https://spis.gov.pl/">https://spis.gov.pl/</a> ! It's really easy and takes only 10 minutes! Watch the instructional video that will introduce you to the self-enumeration method. Not convinced? You can also do it at the census hotline: 22 279 99 99 or with the personal help of the census enumerator at census points!	Reminder, Methods (reply to Way of conducting, Technical issues)
9th July	Are you a student? Or maybe at your first job? As an adult, you have the right and obligation to participate in the #NationalCensus. This unique survey is carried out only once every 10 years! Its results will affect your whole life – how your neighbourhood, city and country will develop. Go to <a href="https://spis.gov.pl/">spis.gov.pl</a> and fill in the census form. The data you provide is confidential. The census lasts until 30th September of this year, but you can self-enumerate via the Internet until you are contacted by the census enumerator – then you are obliged to enumerate yourself during a direct conversation or by phone. Do not postpone the census obligation until the last minute!	Methods, Promotion, Awareness (reply to Questions, Technical issues, Data security, Way of conducting)

**Table 5.** Content of the posts concerning the 2021 National Census published on the Statistics Poland Facebook account (cont.)

Date of post	Content	Post category (reply to a category from Table 2)
21st September	Teacher! Only until 30th September, you have the chance to take part in our competition and win attractive cash prizes! The #StatisticsPoland competition for 'Statistically, the best scenario about National Census 2021' is underway. Take up this challenge with us and prepare a lesson plan for #NationalCensus2021.	Promotion (reply to Questions)
28th September	Tomorrow (Wednesday, 29th September) the #Puławy commune will be visited by the census bus. If you haven't done the enumeration yet, come and do it with the enumerator from 9:00 a.m. to 12:00 p.m. at the Municipal Public Library in Góra Puławska, and from 12:30 p.m. to 4:00 p.m. at the Village Community Centre in Gołąb. The census is mandatory and only lasts until 30th September. Feel invited!	Census points (reply to Way of conducting, Questions)
30th June	Did you enumerate in the #NationalCensus via the Internet? You can take part in the next draw for the National Census lottery prizes, which will take place on 2nd July of this year. How? It's simple, after completing the census form, download a special 10-character code and no later than today – on 30th June of this year, register it here: <a href="https://loteria.spis.gov.pl/#formularz">https://loteria.spis.gov.pl/#formularz</a> . In each draw, as many as 240 people have a chance to win! You can also be in this group! Hurry: there are only 2 draws left – on 2nd and 9th July of this year. We are also getting closer to the grand finale, on 14th July of this year. 16 cars will be randomly drawn! All registered applications will again take part in the final draw. Online broadcast of the draws on Friday, 2nd July of this year at 12.00 p.m. Watch on YouTube and Facebook on official Statistics Poland profiles and check if you've won!	Lottery (reply to Questions)

Source: authors' work based on data from <https://spis.gov.pl/>.

Table 5 shows that Statistics Poland managed to successfully respond to the problems reported by users. Although new issues were reported until the very end of the census, the organisers reacted almost immediately. As comments were submitted online (mainly on Statistics Poland's Facebook account), the answers were sent through the same medium. However, when a particularly important issue emerged, such as fake news requiring an immediate response, it was also transmitted through other channels, e.g. traditional media, including television and radio. It can be therefore concluded that Statistics Poland as a body of public statistics proved effective in fighting the infodemic, i.e. an overabundance of information, which causes confusion as to which part of it is trustworthy and which is unreliable. The phenomenon intensified especially during the COVID-19 pandemic (Cuan-Baltazar et al., 2020; Springer et al., 2021; Zarocostas, 2020). In addition, this phenomenon

is a reminder of the census obligation, it also points to the correctness of the methodology included in the research and ensures the security of data processing.

In its messages posted on social media, Statistics Poland also engages the society in helping people in need (such as the elderly or disabled) in self-enumeration, encourages to take part in contests related to the census, and draws the recipients' attention to the heritage of the census.

## 5. Discussion

Focusing on the 2021 National Census of Poland enabled an in-depth analysis of the census process. This approach differed from the comparative approach presented in many studies which aimed at determining the issues and challenges in census taking (e.g. Skinner, 2018). Since the National Population and Housing Census 2021, the basic form of the survey in Poland has been the online self-enumeration. Thus, attention should be paid to the numerous technological aspects that arise from this type of census taking. It is worth noting that the census discussed in this study was the second one in the history of Poland (after the 2011 census) that was conducted online, which at the same time became its basic form. The main difference between the 2011 and 2021 censuses was that the role of the enumerators was significantly restricted in the latter case (i.e. mainly to the use of the CATI technique) due to the COVID-19 pandemic. What should be emphasised again at this point is that the digital format of the census in 2021 was binding for all persons subject to the census obligation, which directly results from the provisions of the act initiating the survey. Earlier censuses were held exclusively in traditional form, i.e. on paper, and nearly always with a designated enumerator present. Conducting a census in a pandemic was possible as a significant number of people in Poland had access to the Internet (9 out of 10; Eurostat, n.d. a), although the proportion of Poles whose proficiency level in using digital services was at least basic was much lower (44%; Eurostat, n.d. b).

The use of online tools to ensure the health security of the census participants in times of the COVID-19 pandemic can be seen as justified. On the other hand, considering the number of people who had difficulties in handling the digital aspect of the survey, a number of organisational problems could be expected. However, problems were also encountered by those characterised as 'digitally literate' experiencing no technical issues with completing the questionnaires online. Their main concerns related to the privacy (security) aspect of the processed data, the technical problems they had with the website, as well as the strained census hotline.

Undoubtedly, the census process can be perceived as a particular challenge for official statistics, despite the fact that it is a cyclical survey. Gołata (2012) believes



that census-based research does not produce 'ideal' results, even when taking into account data from each subsequent census, their methodologies and international experience. The methodology of the survey has been changing over the years, especially in terms of the scope of the questions. However, to be consistent with the previous editions, some queries should form the unchangeable core of the questionnaire, and the remaining ones, as e.g. Wilson et al. (2017) point out, can be modified or extended. Notwithstanding, Esteve and Sobek (2003) call for the standardisation of censuses, as harmonising the core of the questionnaire which addresses socio-economic issues will ensure the comparability of data between countries.

Comparing the presented results with those of other studies concerning censuses, it can be concluded that what they all have in common is the main goal, i.e. to obtain information on the state of demographics. However, based on the analysis of the history of modern censuses in Poland and taking into account the National Population and Housing Census 2021, it should be stated that each subsequent census clearly differs from the previous one in terms of the process of its implementation and the methodology used. Censuses are not only changed by technological development (e.g. the Internet) and the new opportunities it brings, but, most of all, by the evolution of the social conditions, i.e. the reality in which a census is implemented. Szreder (2009) emphasises that as the awareness of a democratic society increases, so do the expectations towards statistics. In consequence, the methods of conducting censuses are under constant change as well. Considering the fact that national censuses are the largest-scale social surveys, they tend to entail the most significant social issues, especially regarding the respondents' willingness to participate in the census. Toczyński (2002) believes that social commitment is the key to a successful census and thus to obtaining reliable data. He also indicates the need to build a communication system that will ensure mutual trust between the census organiser and the public. Hillygus et al. (2006) also believe that social mobilisation translates into a successful census. When the first census after regaining independence was organised in Poland in 1921, it was already then that emphasis was placed on encouraging citizens' participation (Berger, 2008). Due to technological changes, the campaigns of the 2021 census aiming to encourage participation had a different formula, yet the goal remained the same. Statistics Poland used various media (online and traditional) to reach the widest possible audience. The main goal of this campaign was to encourage people to participate in the census lottery and thus to dispel any doubts about the methodology of the whole process.

## 6. Conclusions

National censuses are mainly organised in order to determine the state of a population and its demographic characteristics. The National Population and Housing Census implemented in 2021 posed many challenges, most of which had already been identified during its previous editions, also with regard to censuses organised in other countries. The 2021 Polish census was conducted during an ongoing pandemic, therefore changing the format of the survey into entirely online-based was fully justified, as it limited the necessary contact between the enumerators and the citizens. The online census was more convenient for the digitally-competent respondents, as they could fill out the form at any time convenient to them. On the other hand, those lacking technical skills or Internet access were faced with a challenge. The critical analysis of the literature and the case study presented in this article demonstrate that social commitment is the key to any successfully implemented census.

A cross-sectional analysis of censuses showed that the organisers use various marketing tools to encourage participation. During the National Population and Housing Census 2021, different communication channels were used, although the greatest emphasis was placed on social media. Statistics Poland, as a public agenda of official statistics and the organiser of the census, published through various channels announcements, promotional videos and information about the ‘census lottery’ as an incentive to self-enumeration. The institution’s Facebook posts also provided reports on the course of the project and reassured the readers about the security of data and their processing. The administrators also responded to the issues raised by Internet users. Although Statistics Poland offered many forms of contact, the occurrence of technical problems was not avoided, which hindered the quick and effective transition of the respondents’ queries to the institution. In conclusion, the capacity and efficiency of the telephone and Internet service system should be verified and the number of enumerators should increase in order to improve the situation.

The results of the survey could be applied in a multitude of ways, therefore an in-depth analysis of the census process is likely to provide significant information as to how the data may be further utilised. It should be noted, however, that in order to take full advantage of the gathered data, a better understanding of the census process is needed, including the methodology behind it. The fact that the study focuses on one particular census, allows, on the one hand, a greater understanding of the complex process, but on the other hand it may constitute a serious limitation of the study. It should also be emphasised that the conclusions cannot be generalised, as they concern the National Population and Housing Census 2021 in Poland only.

As far as the further research in this regard is concerned, there are several directions that the study may be developed in. For instance, similar case studies of other censuses could be conducted, followed by a comparative study capable of not only identifying the challenges that come with censuses, but also compiling the latest practices in increasing social involvement. As a result, it would allow the development of guidelines to ensure an even higher quality of future censuses.

## References

- Amos, B., McDonald, M. P., & Watkins, R. (2017). When boundaries collide. Constructing a National Database of Demographic and Voting Statistics. *Public Opinion Quarterly*, 81(S1), 385–400. <https://doi.org/10.1093/poq/nfx001>.
- Baffour, B., King, T., & Valente, P. (2013). The Modern Census: Evolution, Examples and Evaluation. *International Statistical Review*, 81(3), 407–425. <https://doi.org/10.1111/insr.12036>.
- Batini, C., Cappiello, C., Francalanci, C., & Maurino, A. (2009). Methodologies for Data Quality Assessment and Improvement. *ACM Computing Surveys*, 41(3), 1–52. <https://doi.org/10.1145/1541880.1541883>.
- Berger, J. (2002). Spisy ludności na ziemiach polskich do 1918 r. *Wiadomości Statystyczne*, 47(1), 12–19.
- Berger, J. (2008). Powszechny spis ludności w 1921 r. *Wiadomości Statystyczne*, 53(12), 1–11.
- Berry-James, R. M., Gooden, S. T., & Johnson III, R. G. (2020). Civil rights, social equity, and Census 2020. *Public Administration Review*, 80(6), 1100–1108. <https://doi.org/10.1111/puar.13285>.
- Bowman, C., Whistler, J., & Ellerby, M. (2004). A national census of care home residents. *Age and Ageing*, 33(6), 561–566. <https://doi.org/10.1093/ageing/afh177>.
- Cai, Y. (2013). China's New Demographic Reality: Learning from the 2010 Census. *Population and Development Review*, 39(3), 371–396. <https://doi.org/10.1111/j.1728-4457.2013.00608.x>.
- Chatfield, A. T., Ojo, A., Puron-Cid, G., & Reddick, C. G. (2018). Census Big Data Analytics Use: International Cross Case Analysis. *Proceedings of the 19th Annual International Conference on Digital Government Research: Governance in the Data Age*. <https://doi.org/10.1145/3209281.3209372>.
- Cuan-Baltazar, J. Y., Muñoz-Perez, M. J., Robledo-Vega, C., Pérez-Zepeda, M. F., & Soto-Vega, E. (2020). Misinformation of COVID-19 on the Internet: Infodemiology Study. *JMIR Public Health and Surveillance*, 6(2), 1–9. <https://doi.org/10.2196/18444>.
- Dygaszewicz, J. (2009). Spisy powszechne XXI wieku. *Wiadomości Statystyczne*, 54(6), 13–27. <https://ws.stat.gov.pl/Article/2009/6/013-026>.
- Esteve, A., & Sobek, M. (2003). Challenges and Methods of International Census Harmonization. *Historical Methods: A Journal of Quantitative and Interdisciplinary History*, 36(2), 66–79. <https://doi.org/10.1080/01615440309601216>.
- Eurostat. (n.d. a). *Households – level of internet access* [Data set]. Retrieved December 16, 2021, from [https://appssso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc\\_ci\\_in\\_h&lang=en](https://appssso.eurostat.ec.europa.eu/nui/show.do?dataset=isoc_ci_in_h&lang=en).

- Eurostat. (n.d. b). *Individuals' level of digital skills* [Data set]. Retrieved November 30, 2021, from <https://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do>.
- Ferguson, J. M. (2015). Who's Counting? Ethnicity, Belonging, and the National Census in Burma/Myanmar. *Bijdragen tot de Taal-, Land- en Volkenkunde*, 171(1), 1–28. <https://www.jstor.org/stable/43819166>.
- Główny Urząd Statystyczny. (2022, October 9). *Wyniki konkursu Prezesa GUS na najbardziej cyfrową gminę NSP 2021*. [https://spis.gov.pl/aktualnosci/wyniki\\_konkursu/](https://spis.gov.pl/aktualnosci/wyniki_konkursu/).
- Główny Urząd Statystyczny. (n.d. a). *Home* [Facebook page]. <https://pl-pl.facebook.com/GlownyUrzadStatystyczny>.
- Główny Urząd Statystyczny. (n.d. b). *Infolinia spisowa będzie działać dłużej*. <https://stat.gov.pl/aktualnosci/infolinia-spisowa-bedzie-dzialac-dluzej,381,1.html>.
- Główny Urząd Statystyczny. (n.d. c). *Loteria*. <https://loteria.spis.gov.pl/>.
- Główny Urząd Statystyczny. (n.d. d). *Metody zbierania danych*. <https://stat.gov.pl/spisy-powszechne/nsp-2011/metody-zbierania-danych/>.
- Główny Urząd Statystyczny. (n.d. e). *O obowiązku spisowym*. <https://spis.gov.pl/o-obowiazku-spisowym/>.
- Gołata, E. (2012). Spis ludności i prawda. *Studia Demograficzne*, (1), 23–55.
- Gołata, E. (2014). Jakość spisów nowej generacji. *Wiadomości Statystyczne*, 59(5), 26–38. <https://ws.stat.gov.pl/Article/2014/5/026-038>.
- Gooden, S. T., & Berry-James, R. M. (2018). *Why Research Methods Matters. Essential Skills for Decision Making*. Melvin & Leigh.
- Guyan, K. (2022). Constructing a queer population? Asking about sexual orientation in Scotland's 2022 census. *Journal of Gender Studies*, 31(6), 782–792. <https://doi.org/10.1080/09589236.2020.1866513>.
- Hillygus, D. S., Nie, N. H., Prewitt, K., & Pals, H. (2006). *The Hard Count. The Political and Social Challenges of Census Mobilization*. Russell Sage Foundation.
- Holzer, J. Z. (1997). Kilka uwag o przygotowaniach do NSP 2000. *Wiadomości Statystyczne*, 42(5), 6–8.
- Jarosz, M. (2004). Narodowy Spis Powszechny 2002. Zalety i wady. *Studia Socjologiczne*, (1), 9–17. [https://www.studiasocjologiczne.pl/img\\_upl/studia\\_socjologiczne\\_2004\\_nr1\\_s.9\\_17.pdf](https://www.studiasocjologiczne.pl/img_upl/studia_socjologiczne_2004_nr1_s.9_17.pdf).
- Kruskal, W. H. (1984). The census as a national ceremony. *Federal Statistics and National Needs*, 177–180.
- Krywult-Albańska, M. (2012). Spis powszechny jako źródło informacji o ludności. *Studia Socjologiczne*, (4), 87–107. [https://www.studiasocjologiczne.pl/img\\_upl/studia\\_socjologiczne\\_2012\\_nr4\\_s.87\\_107.pdf](https://www.studiasocjologiczne.pl/img_upl/studia_socjologiczne_2012_nr4_s.87_107.pdf).
- Ladd, H. F. (1992). Mimicking of local tax burdens among neighboring counties. *Public Finance Quarterly*, 20(4), 450–467. <https://doi.org/10.1177/109114219202000404>.
- Levitan, K. (2011). “A national Undertaking”: Taking the Census. In A. J. La Vopa, S. Marchand, & J. Majeed (Eds.), *A Cultural History of the British Census. Envisioning the Multitude in the Nineteenth Century* (pp. 15–46). Palgrave Macmillan US. [https://doi.org/10.1057/9780230337602\\_2](https://doi.org/10.1057/9780230337602_2).

- Łazowska, B. (2019). Spis ludności na ziemiach wschodnich Rzeczypospolitej Polskiej w 1919 r. *Wiadomości Statystyczne. The Polish Statistician*, 64(10), 63–76. <https://doi.org/10.5604/01.3001.0013.7586>.
- Michna, E. (2013). Narodowy Spis Powszechny Ludności i Mieszkań w 2011 r. i jego wykorzystanie w polityce tożsamości i walce o uznanie. Casus Ślązaków. *Studia Migracyjne – Przegląd Polonijny*, 39(2), 135–172.
- Młodak, A. (2014). Zastosowanie metody bootstrapowej do oceny precyzji szacunków danych z badania reprezentacyjnego NSP 2011 na przykładzie dojazdów do pracy. *Wiadomości Statystyczne*, 59(12), 38–57. <https://ws.stat.gov.pl/Article/2014/12/038-057>.
- Morning, A. (2015). Ethnic Classification in Global Perspective: A Cross-National Survey of the 2000 Census Round. In P. Simon, V. Piché, & A. A. Gagnon (Eds.), *Social Statistics and Ethnic Diversity. A Cross-National Perspectives in Classifications and Identity Politics* (pp. 17–37). Springer. [https://doi.org/10.1007/978-3-319-20095-8\\_2](https://doi.org/10.1007/978-3-319-20095-8_2).
- Morphy, F., Sanders, W., & Taylor, J. (2007). Accommodating agency and contingency: towards an extended strategy for engagement. In F. Morphy (Ed.), *Agency, contingency and census process. Observations of the 2006 Indigenous Enumeration Strategy in remote Aboriginal Australia* (pp. 113–126). ANU E Press. <http://doi.org/10.22459/CAEPR28.12.2007>.
- Office of National Statistics. (2021). *Designing a digital-first census*. Retrieved, 2022, from <https://www.ons.gov.uk/peoplepopulationandcommunity/householdcharacteristics/homeinternetandsocialmediausage/articles/designingadigitalfirstcensus/2021-10-04>.
- Okrasa, W. (2021). Spisy ludności w Stanach Zjednoczonych i statystyka imigracji z Polski – perspektywa metodologiczno-historyczna. *Wiadomości Statystyczne. The Polish Statistician*, 66(6), 27–49. <https://doi.org/10.5604/01.3001.0014.9336>.
- Paradysz, J. (2009). Spisy jako źródło informacji o warunkach życia ludności w Polsce. *Wiadomości Statystyczne*, 54(7), 1–9.
- Paradysz, J. (2010). Konieczność estymacji pośredniej na użytek spisów powszechnych. In E. Gołata (Ed.), *Pomiar i informacja w gospodarce* (pp. 45–66). Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu.
- Peach, C. (2006). Islam, ethnicity and South Asian religions in the London 2001 census. *Transactions of the Institute of British Geographers*, 31(3), 353–370. <https://doi.org/10.1111/j.1475-5661.2006.00214.x>.
- Piątek, K., & Karwacki, A. (2004). Narodowy Spis Powszechny z 2002 roku a polityka społeczna (ze szczególnym podkreśleniem kwestii mieszkaniowej). *Studia Socjologiczne*, (1), 121–138. [https://www.studiasocjologiczne.pl/img\\_upl/studia\\_socjologiczne\\_2004\\_nr1\\_s.121\\_138.pdf](https://www.studiasocjologiczne.pl/img_upl/studia_socjologiczne_2004_nr1_s.121_138.pdf).
- Porcano, T. M. (1988). Correlates of tax evasion. *Journal of Economic Psychology*, 9(1), 47–67. [https://doi.org/10.1016/0167-4870\(88\)90031-1](https://doi.org/10.1016/0167-4870(88)90031-1).
- Pupkiewicz, M. (2002). Regulacje prawne narodowych spisów powszechnych. *Wiadomości Statystyczne*, 47(1), 19–29.
- Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC.

- Rosner, A. (1980). Narodowy Spis Powszechny 1978 jako źródło informacji o migracjach. *Więś i Rolnictwo*, (3), 160–164.
- Rozzka, W. (2009). Metody łączenia baz danych na potrzeby spisu. *Zeszyty Naukowe. Uniwersytet Ekonomiczny w Poznaniu*, (128), 102–115.
- Sans, M. (2011). National Identity, Census Data, and Genetics in Uruguay. In S. Gibbon, R. V. Santos, M. Sans (Eds.), *Racial Identities, Genetic Ancestry, and Health in South America* (pp. 195–211). Palgrave Macmillan. [https://doi.org/10.1057/9781137001702\\_10](https://doi.org/10.1057/9781137001702_10).
- Schuster, M. A., Oshero, A., & Chung, P. J. (2020). Why Counting Black Lives Matters – the 2020 Census. *The New England Journal of Medicine*, 383(9), 1–3. <https://doi.org/10.1056/NEJMp2022162>.
- Shravan Krishnan, S. (2022, June 21). *Bangladesh concludes first digital census*. Retrieved October 10, 2022, from <https://foreignbrief.com/daily-news/bangladesh-concludes-first-digital-census/>.
- Simpson, L. (2007). Fixing the population: from census to population estimate. *Environment and Planning A: Economy and Space*, 39(5), 1045–1057. <https://doi.org/10.1068/a38141>.
- Skinner, C. (2018). Issues and challenges in census taking. *Annual Review of Statistics and its Application*, 5, 49–63. <https://doi.org/10.1146/annurev-statistics-041715-033713>.
- Springer, S., Zieger, M., & Strzelecki, A. (2021). The rise of infodemiology and infoveillance during COVID-19 crisis. *One Health*, 13, 1–4. <https://doi.org/10.1016/j.onehlt.2021.100288>.
- Steckel, R. H. (1991). The Quality of Census Data for Historical Inquiry: A Research Agenda. *Social Science History*, 15(4), 579–599. <https://doi.org/10.1017/S0145553200021313>.
- Strzelecki, Z. (2002). Znaczenie NSP 2002 dla analiz społeczno-gospodarczych. *Wiadomości Statystyczne*, 47(1), 5–12.
- Strzelecki, Z. (2009). Spisy powszechne ludności w Polsce a potrzeby informacyjne administracji państwowej. *Wiadomości Statystyczne*, 54(8), 1–14. <https://ws.stat.gov.pl/Article/2009/8/001-013>.
- Szreder, M. (2009). Statystyka w państwie demokratycznym. *Wiadomości Statystyczne*, 54(6), 6–13. <https://ws.stat.gov.pl/Article/2009/6/006-012>.
- Toczyński, T. (2002). Narodowe spisy powszechne w 2002 r. *Wiadomości Statystyczne*, 47(1), 1–4.
- Ustawa z dnia 9 sierpnia 2019 r. o narodowym spisie powszechnym ludności i mieszkań w 2021 r. (Dz.U. 2019 poz. 1775).
- Ustawa z dnia 30 marca 2021 r. o zmianie ustawy o narodowym spisie powszechnym ludności i mieszkań w 2021 r. (Dz.U. 2021 poz. 615).
- Visoka, G., & Gjevari, E. (2013). Census politics and ethnicity in the Western Balkans. *East European Politics*, 29(4), 479–498. <https://doi.org/10.1080/21599165.2013.819349>.
- Wallgren, A., & Wallgren, B. (2014). *Register-based statistics: statistical methods for administrative data* (2nd edition). Wiley.
- Wardrop, N. A., Jochem, W. C., Bird, T. J., Chamberlain, H. R., Clarke, D., Kerr, D., Bengtsson, L., Juran, S., Seaman, V., & Tatem, A. J. (2018). Spatially disaggregated population estimates in the absence of national population and housing census data. *Proceedings of the National Academy of Sciences of the United States of America*, 115(14), 3529–3537. <https://doi.org/10.1073/pnas.1715305115>.

- Warمیńska, K. (2004). Spis powszechny a etyczny wymiar tożsamości jednostki. In M. Flis (Ed.), *Etyczny wymiar tożsamości. Studia z antropologii społecznej* (pp. 89–106). Zakład Wydawniczy Nomos.
- Wilson, R. T., Hasanali, S. H., Sheikh, M., Cramer, S., Weinberg, G., Firth, A., Weiss, S. H., & Soskolne, C. L. (2017). Challenges to the census: international trends and a need to consider public health benefits. *Public Health*, 151, 87–97. <https://doi.org/10.1016/j.puhe.2017.05.015>.
- Zarocostas, J. (2020). How to fight an infodemic. *The Lancet*, 395(10225), 676. [https://doi.org/10.1016/S0140-6736\(20\)30461-X](https://doi.org/10.1016/S0140-6736(20)30461-X).