

INNOVATIONS IN THE PUBLIC SECTOR IN RESPONSE TO THE CHALLENGES OF NEURODIVERSITY – FINDINGS FROM KRAKOW

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Purpose: The article analyzes innovations in public services in the context of the specific needs of neurodivergent individuals. The aim of the study is to identify key challenges associated with the implementation of these solutions and to evaluate their effectiveness based on an analysis of selected public services in Krakow.

Design/methodology/approach: The article employs a mixed-method approach, combining a literature review on innovations in the public sector and neurodiversity issues with empirical research. The study involved a survey conducted among students of Krakow's universities (N = 624) and a focus group interview with experts. The survey assessed the perception of the need for public service adaptations, while the expert interview provided in-depth insights into the challenges associated with implementing innovations in this area.

Findings: The majority of respondents recognize the need for improvements in the sensory accessibility of public services. The study indicates that this issue is systemic and requires a comprehensive approach. The findings also highlight a low level of public awareness regarding the needs of individuals on the autism spectrum and emphasize the necessity of actively involving them in the process of designing and evaluating implemented solutions.

Research limitations/implications: Given that the study was conducted among students, its results cannot be directly generalized to the entire population. It is recommended to extend the analysis to other user groups and a broader range of public services.

Practical implications: The research findings indicate the need to view adaptations for neurodivergent individuals not only as a legal requirement but as an integral part of a modern approach to public service management. The implementation of innovations in this area should incorporate evaluation mechanisms and active user participation, which will enhance the effectiveness of the adopted solutions.

Social implications: The analysis highlights the importance of raising public awareness about the needs of neurodivergent individuals and the necessity of conducting educational initiatives. Improving the accessibility of public services can contribute to greater social inclusion and an enhanced quality of life for individuals on the autism spectrum.

Originality/value: The article introduces a new perspective to research on public sector innovations, presenting adaptations for neurodivergent individuals as an integral part of public service management strategies. The findings may be useful for policymakers, researchers,

and public organizations seeking effective methods to adapt services to the needs of neurodivergent individuals.

Keywords: public services, public sector innovations, neurodiversity.

Category of the paper: Research paper.

1. Introduction

The issue of neurodiversity is a contemporary and still insufficiently explored area in management and quality sciences (Richards, Sang, 2016; Mellifont, 2020; Priscott, Allen, 2021; Spoor et al., 2022). The term neurodiversity is currently used in the literature in a rather broad sense, referring to various neurodevelopmental differences observed within the population. The resulting cognitive differences are often perceived positively as "naturally occurring types of cognitive mechanisms characterized by specific advantages that have contributed to technological and cultural development" (Silberman, 2017, p. 23). However, it is worth noting that the original understanding of the term was narrower and specifically associated with the autism spectrum (Singer, 1999, as cited in Jaarsma, Welin, 2012, p. 20). Given the specificity of different neurodevelopmental variations, in this article, the term neurodiversity will be used in this narrower sense – referring to the cognitive differences characteristic of individuals on the autism spectrum.

The relevance of research on neurodiversity is increasing due to the rising number of autism diagnoses and, consequently, the necessity of incorporating the perspectives of neurodivergent individuals in organizational activities. This is particularly significant for entities operating within the public sector, whose role is to achieve social goals and ensure equal access to services. Concern for this issue is also reflected in legal regulations, such as the Convention on the Rights of Persons with Disabilities (2006), ratified in Poland in 2012. According to Article 9 of the convention, individuals on the autism spectrum have the right to full participation in social life, including access to transportation and publicly available services and facilities.

The aim of this article is to discuss the necessary adaptations of public services to meet the needs of neurodivergent individuals and to assess how innovative solutions can contribute to increasing their accessibility. Two key research questions are formulated in this study: (1) What specific adaptations in transportation and entertainment services are considered essential from the perspective of individuals on the autism spectrum? (2) What are the opinions of users of selected public services in Krakow regarding the implemented accommodations for individuals on the autism spectrum? To address these questions, a literature review was conducted on the difficulties experienced by neurodivergent individuals and the mechanisms for implementing innovations in the public sector. Additionally, empirical research was carried out, including a survey among public service users in Krakow and a focus group interview with

experts. The analysis of the collected data allowed for the formulation of recommendations for public sector entities seeking to introduce innovative solutions that enhance accessibility and improve the quality of life for individuals on the autism spectrum.

2. Innovations in public services and the needs of neurodivergent individuals – theoretical background

The concept of autism as a diagnostic category within pervasive developmental disorders was introduced in the third edition of the *Diagnostic and Statistical Manual of Mental Disorders – DSM* by the American Psychiatric Association in 1980 (Grandin, Panek, 2021). However, research on autism had begun earlier, initiated by Leo Kanner's article "Autistic Disturbances of Affective Contact", published in *Nervous Child* in 1943. Today, the term pervasive developmental disorders has been replaced with autism spectrum disorder (ASD), and symptom descriptions, which account for severity and their impact on daily functioning, are classified using a three-level grading system (American Psychiatric Association, 2013).

In Poland, autism spectrum disorder (code 6A02) is diagnosed based on the International Classification of Diseases (ICD-11), which has been in effect since January 1, 2022, as developed by the World Health Organization. The diagnostic criteria in both classifications include persistent deficits in the ability to initiate and sustain reciprocal social interactions and communication, as well as a range of restricted, repetitive, and inflexible patterns of behavior, interests, or activities that are markedly atypical or excessive relative to age and sociocultural context (ICD-11 for Mortality and Morbidity Statistics).

In Poland, autism spectrum disorder (ASD) was incorporated into the disability certification system only in 2010, which may contribute to an underestimation of its actual prevalence (Supreme Audit Office, 2020). Undoubtedly, both in Poland and worldwide, there has been a dynamic increase in autism diagnoses – while in the 1980s, autism was diagnosed in 1 in 2000 children (0.05%), today it is identified in 1 in 100 children in Europe (Ferenc, 2020) and 1 in 54 children in the United States (Wright, 2020). In the European Union, approximately 5 million people (0.6%) are estimated to be on the autism spectrum, whereas in Poland, the number is estimated at around 45,000 individuals. The growing proportion of neurodivergent individuals in society necessitates a discussion on incorporating the perspective of neurodiversity into organizational activities, particularly within public service entities. Given their social mission, these organizations should be capable of flexibly responding to the diverse needs of their users to ensure accessibility and inclusion.

Among the challenges faced by individuals on the autism spectrum, sensory issues deserve particular attention, as they significantly limit the ability to fully utilize public services. A review of the literature indicates that over 90% of neurodivergent individuals experience

sensory integration disorders or exhibit an unusual sensitivity to sensory aspects of their environment (Chang et al., 2014). Sensory integration is the process in which information received by the brain through the senses is registered, sorted, and processed, then combined with previous experiences to enable an appropriate response to stimuli (Ayres, 1986). Disruptions in this process manifest as abnormal sensory reactivity, either hypersensitivity or hyposensitivity to light, colors, specific sounds, smells, or tastes (Grzywniak, 2016). Additionally, individuals with such dysfunctions are more prone to experiencing sensory overload, often with greater intensity (Karthikeyan, 2017). It is also important to emphasize that excessive stimulation of one or multiple senses may lead to their temporary "shutdown" or trigger a "fight or flight" response, thereby impairing the proper processing of sensory stimuli (Priporas et al., 2024).

Adapting public services to accommodate sensory integration disorders presents a significant challenge for service providers. The fact that these difficulties are common among individuals on the autism spectrum does not imply that a single, universal solution can address their needs. Public services encompass a wide range of sectors, including transportation, administration, healthcare, education, and culture, each varying in both the nature and intensity of sensory stimuli that may be distressing to sensory-sensitive individuals. Additionally, the feasibility of implementing modifications differs across sectors, necessitating tailored solutions adapted to the specific characteristics of each service. One example of such adaptations includes quiet hours in libraries and museums, during which noise levels and bright lighting are reduced to create a more accommodating environment for individuals sensitive to sensory stimuli. Another effective measure is the creation of designated quiet zones in public spaces, allowing individuals with sensory hypersensitivity to retreat from excessive stimuli. Mobile applications also hold significant potential in various aspects of neurodivergent individuals' daily activities, such as task planning and navigation in urban spaces. These initiatives not only enhance the accessibility of public services but also promote inclusivity and a greater understanding of diverse community needs (Sitarz et al., 2024; Bolak et al., 2024).

It is important to emphasize that efforts to improve the accessibility and comfort of public services for neurodivergent individuals are not optional but rather a legal obligation. In this context, general regulations concerning people with disabilities can be referenced. In Poland, the right of individuals with disabilities to fully participate in all aspects of life, including access to transportation, services, and public facilities, is guaranteed under Article 9 of the Convention on the Rights of Persons with Disabilities, which was ratified in 2012 (Convention on the Rights of Persons with Disabilities, 2006). Access to public services is crucial for fostering the independence of these individuals and enabling their full participation in society. Additionally, specific regulations apply directly to individuals on the autism spectrum. According to the Charter of Rights for Persons with Autism (2013), adopted by the Polish Parliament, these individuals are entitled to, among other things, support in using

transportation adapted to their needs and abilities, participation in cultural and entertainment activities, recreation, and sports, as well as equal access to public services and opportunities for social engagement.

The activities of public sector entities aimed at operationalizing these requirements generate numerous management challenges. The complexity of this process means that its explanation can be sought in various theoretical frameworks, such as change management, project management, and stakeholder relationship management (Joyce, 2015; Flynn, Asquer, 2016). Particularly useful in this context are diagnoses formulated within the field of public sector innovation management, which help explain the mechanisms, factors, and barriers associated with the implementation of such solutions (Dameri, Ricciardi, 2015; Bertot et al., 2016; Cinar et al., 2018).

For many years after the emergence of innovation as a concept in economic and management literature, it was primarily associated with private enterprises, where it played a key role in building competitive advantage and creating market value. However, since the 1990s, the significance of innovation in the public sector has been increasingly recognized. In this domain, innovation is seen as a tool for improving administrative efficiency, enhancing the quality and accessibility of public services, and responding to emerging societal challenges (Moore, 1995; Osborne, 1998; Gallouj, Savona, 2009). The way innovation is defined in the public sector is similar to its interpretation in business. It is typically understood as the practical implementation of new or significantly improved processes, technologies, organizational models, and service delivery methods, ultimately leading to positive outcomes (Hartley, 2005; Windrum, Koch, 2008; Jabłoński, Firszt, 2024). In the public sector, the primary benefits of innovation should be social in nature, aimed at improving stakeholders' quality of life – for example, by reducing waiting times for administrative decisions, ensuring equal access to services, strengthening social cohesion, or streamlining communication between citizens and government institutions. Economic benefits, such as reducing institutional operating costs, are also desirable in the public sphere, but they do not necessarily take priority (Mulgan, Albury, 2003).

Solutions introduced in public services to address the needs of individuals on the autism spectrum can be considered innovations, as they involve the implementation of new or significantly improved methods of service organization and delivery. The process of designing and implementing such accommodations is often more complex than in the case of solutions for individuals with physical disabilities, as difficulties related to sensory perception are less intuitive and less recognized in public service management practices (Gaines et al., 2016; Płatos, Pisula, 2019). This necessitates an innovative and unconventional approach. The innovativeness of these initiatives is evident not only in technological advancements but also in procedural and social solutions. The establishment of quiet zones in public spaces or flexible service hours are examples of improvements that address the needs of neurodivergent individuals while also aligning with the broader concept of social innovation (Bason, 2017).

Given the scale of unmet needs among this group of public service users, it is clear that there is significant potential for implementing original and pioneering solutions in this area. At the same time, conducting benchmarking analyses is recommended to identify ideas that have already been implemented – even in pilot form – in other cities, countries, or institutions.

The specific operating conditions and objectives of public sector entities significantly influence the innovation processes they undertake. One of the fundamental differences between public sector innovations and those in the private sector is the critical importance of actively identifying citizen needs and expectations, as well as the subsequent evaluation of implemented solutions. While in the private sector, market research is conducted to understand consumer expectations and opinions, it is primarily market mechanisms that serve as the key informational and motivational forces. Innovators introduce new solutions with the aim of gaining a competitive advantage and improving profitability, with high demand and revenue generation serving as confirmation of their success. In the public sector, however, demand-driven innovation mechanisms are either nonexistent (e.g., in government administration) or weakened (e.g., in municipal enterprises operating as local monopolies). Properly directing innovation efforts is particularly crucial in this context, as the public sector operates within the framework of the principle of legality. This means that new solutions must be precisely designed to align with the mission and scope of responsibilities of a given institution while simultaneously providing a genuine response to the needs of service users (Osborne, Brown, 2011; De Vries et al., 2016). Clear differences also exist in the communication of implemented innovations. In the public sector, communication cannot be exclusively targeted at potential beneficiaries, as is common in the promotion of new products in the private sector. Instead, it is particularly important to reach the entire community, especially in the case of changes dedicated to individuals on the autism spectrum, whose specific needs may not be well understood by those outside this group.

The social impact of innovations in the public sector, which is often a top priority, may sometimes conflict with efforts to reduce costs and maximize economic efficiency. One example of such a conflict is the implementation of certain improvements for individuals on the autism spectrum, which may require more time-consuming procedures or specialized tools, such as quiet zones. The introduction of these measures can potentially reduce the efficiency of service delivery for other stakeholders or increase the operational costs of a given institution. However, this is the price of achieving greater social cohesion and enhancing the quality of life and opportunities for previously marginalized groups. It is important to note that these negative economic effects are often short-term and primarily related to the initial implementation phase. In the long run, as public sector employees gain experience, the efficiency of service delivery in its modified form may increase, and the services themselves may become more accessible and user-friendly for all (Hartley et al., 2013; Bason, 2017).

It is widely recognized that the effective implementation of innovation processes in the public sector requires the engagement of citizens at all stages of developing new solutions. This concept is referred to as citizen participation. This issue has been particularly well-diagnosed within discussions on the smart city framework, where the success of digital transformation in cities is closely linked to the active involvement of local communities in identifying needs, co-creating innovations, evaluating them, and continuously improving them (Granier, Kudo, 2016). In this context, particular emphasis is placed on the importance of open innovation, in which citizens are not merely recipients of services but also active participants in innovation processes – acting as reviewers and even co-creators of new solutions (Gassmann et al., 2010). When designing accommodations for individuals on the autism spectrum, the focus should not be limited to collaborating with organizations familiar with their specific needs. Instead, the innovation development process itself should be inclusive, meaning that neurodivergent individuals actively participate in design efforts as initiators, consultants, or testers. This approach aligns with the living labs concept – real-world environments for testing innovations, where collaboration between the public sector, private entities, and citizens leads to solutions that are better suited to social needs (Nguyen et al., 2022). Moreover, involving neurodivergent individuals in the design and implementation of innovations enables the utilization of their unique cognitive abilities. Research shows that autistic individuals often demonstrate strong analytical thinking skills, attention to detail, and the ability to identify patterns, which can be valuable assets in innovation development (Chown et al., 2017). Thus, neurodiversity emerges not only as a challenge in adapting public services but also as a creative resource that can contribute to the development of innovative solutions in the public sector.

3. Research methodology

To achieve the research objectives of this article, two research methods were employed. The first method was a focused group interview, a moderated discussion conducted with a small group of participants, aimed at gathering in-depth insights into opinions, experiences, and attitudes toward a specific issue. The discussion follows a predefined script, while allowing room for free exchange of views among participants (Kvale, 2023).

The interview was conducted during the expert panel discussion titled “Neurodiverse Organization – Characteristics, Benefits, Challenges”, held as part of the 16th International Scientific Conference “Knowledge – Economy – Society” (CMQ2024) on May 21, 2024, at the Cracow University of Economics. The discussion involved three experts, who were selected purposefully based on their experience in implementing neurodiversity perspectives in Polish organizations.

The survey research was conducted in the first half of 2023 among students from eight major universities in Krakow. The selection of this group as respondents for the analysis of the adaptation of selected public services (transport and entertainment) to the needs of individuals on the autism spectrum was based on the fact that students are among the most active users of urban infrastructure. They frequently use public transportation and participate in cultural, sports, and entertainment events, allowing them to provide an informed assessment of the quality and accessibility of the analyzed solutions. Pragmatic considerations also played an important role in this decision – the survey was part of a broader research project on the study conditions in Kraków, which facilitated the seamless integration of issues related to sensory accessibility into an already ongoing study. This approach enabled the use of well-established respondent recruitment procedures and ensured access to a large and relatively homogeneous group. Moreover, other studies indicate significant sensory barriers in academic environments (Pisula et al., 2024), suggesting that students – including neurodivergent individuals – may have a heightened awareness of the challenges associated with functioning in public spaces.

According to the 2023 Municipality Report (UMK, 2024), at the time of the study, 129,360 students were enrolled in higher education institutions in Krakow. Assuming a confidence level of 95%, a margin of error of 5%, and a population proportion of 50%, the minimum required sample size for this population was approximately 383 respondents. It was assumed that, in the context of the research problem, students form a relatively homogeneous population. Ultimately, 624 students participated in the study, with 618 fully completed questionnaires. This means that the minimum sample size requirement was met, and the results can be considered representative of the entire student population in Krakow.

The diagnostic tool used in the study was an online survey questionnaire, which students completed during their academic classes, after prior coordination of the survey schedule and distribution of the survey link to academic instructors conducting the classes.

4. Identification of the needs of neurodivergent individuals in public spaces – expert opinions

The experts participating in the focus group interview shared their opinions and insights on three key aspects of introducing accommodations for neurodivergent individuals: sensory accessibility in public services, customer service for neurodivergent individuals in public institutions, and the inclusion of both inclusivity and rationality criteria in the design of adaptations.

The panel participants unanimously emphasized that sensory factors play a crucial role in adapting public spaces to the needs of neurodivergent individuals. The discussion revealed a shared conclusion that public spaces in Poland are currently designed primarily with the standard user in mind, leading to the marginalization of individuals with different sensory needs. The experts highlighted that various neurodivergent groups have distinct requirements, making it essential to provide diverse solutions, such as the option to choose areas with different levels of sensory stimuli. As one expert noted: "Let's start by thinking about it, exploring, researching, and asking questions – and based on that, we can design or redesign public spaces."

The discussion also highlighted that the modern pace of life and technological advancements have significantly contributed to the increase in sensory overload issues, particularly among younger generations. As one expert noted: "Blue light, fast-paced living, the simple fact that we no longer ride animals but instead travel in machines that reach speeds of 100–200 km/h – these factors stimulate our brains in completely different ways. (...) These are the effects of civilization." The experts emphasized the need for implementing solutions such as quiet hours in government offices, service facilities, and cultural institutions, allowing individuals to access these spaces under conditions that minimize sensory stress. According to the participants, such initiatives have already yielded positive results in commercial spaces, such as shopping malls, and should be more widely adopted in public services.

The second area discussed during the interview was customer service in public institutions. Experts pointed out that the current system of interaction with service users does not always meet the needs of neurodivergent individuals, and the introduction of simple infrastructural changes could significantly improve their comfort and experience. One example given was the designation of individual service rooms, which are already successfully implemented in the banking sector. Such solutions help reduce stress levels and enable personalized communication with individuals who are sensory-sensitive. Another key issue is the need to simplify documentation used in offices and public institutions. Experts referred to the simplified forms and procedures introduced after the outbreak of the war in Ukraine, which significantly facilitated administrative support for citizens affected by the migration crisis. A similar approach could be applied to neurodivergent individuals, for whom complex instructions and lengthy procedures may represent a significant barrier.

The literature emphasizes that adaptations should be carefully designed to avoid unintended segmentation and isolation of neurodivergent individuals (Kenna, 2022), while also meeting rationality criteria, including financial feasibility, practical applicability, and maintaining service quality for other users (Brown, Coomes, 2015; Ortiz, 2020; Sheykhmaleki et al., 2021; Waisman-Nitzan, Gal, Schreuer, 2021; Petty et al., 2022). The experts unanimously confirmed the validity of these recommendations. Another important issue raised in the discussion was the involvement of neurodivergent individuals in the design process. Experts pointed out that initiatives undertaken without the active participation of this group may fail to reflect their actual needs. As one participant noted: "Let's not do this alone, because what matters to us

might be something entirely different." Collaboration with neurodivergent individuals could contribute to the development of more effective and practical solutions, ensuring that they are not merely a formal compliance with accessibility requirements, but a genuine form of support for users.

The experts also agreed that adaptations should not be viewed as privileges, but rather as a means of ensuring equal opportunities, similar to accommodations for individuals with disabilities. As one participant emphasized: "These are not privileges; they are as objectively necessary as accommodations for people with disabilities."

5. Expectations regarding innovations and accommodations for individuals on the autism spectrum in selected public services in Krakow – survey results

The survey study collected opinions on two main topics: a general perspective on public sector innovation and a more specific focus on the adaptation of selected public services in Krakow. The analyzed services included public transportation, provided by Miejskie Przedsiębiorstwo Komunikacyjne S.A. (MPK Kraków), and entertainment services available at Tauron Arena Kraków, managed by Arena Kraków S.A. Both institutions are municipal companies owned by the City of Krakow, meaning that their operations fall within the public sector. The respondents expressed clear expectations regarding public sector innovation. The vast majority (nearly 80%) stated that the public sector should implement innovative solutions, with almost two-thirds of respondents viewing this as a fundamental obligation of public institutions. Only 1% of respondents believed that innovations in the public sphere are unnecessary (see Figure 1).

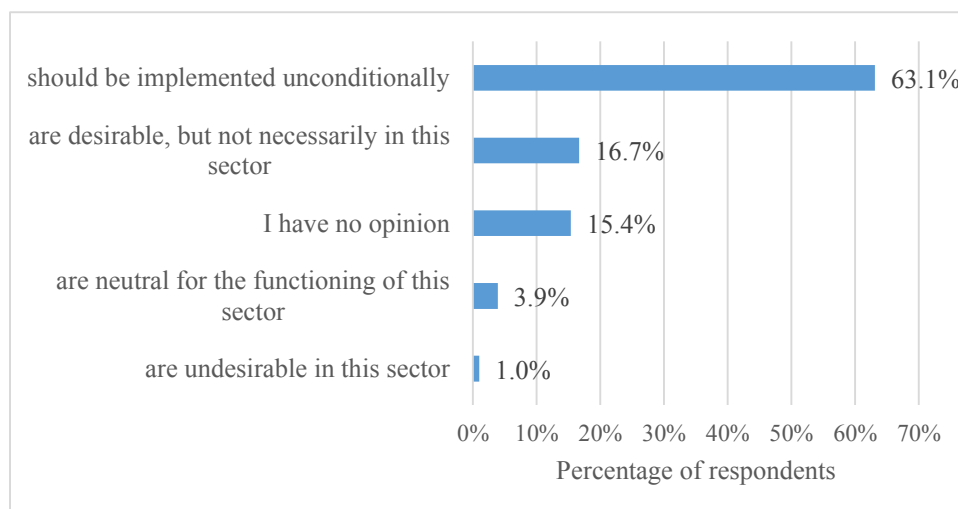


Figure 1. Respondents' perceptions of innovation in the public sector (N = 618).

Source: Own elaboration based on survey research.

When interpreting these results, it is important to note that the respondents were students, a group of young individuals who are typically more interested in new solutions across various areas of life. However, such clear and strong declarations suggest that, along with the evolving approach to public sector innovation in academic literature, public perception of this phenomenon is also shifting. It is also worth noting that the authors conducted a similar study a few years earlier (in 2019) on a comparable group of respondents. At that time, the percentage of individuals supporting innovation in the public sector was significantly lower – by approximately 25 percentage points (Jabłoński, Firszt, 2024).

In the next question, students were asked to identify specific issues that public sector innovations should focus on addressing. The responses obtained are illustrated in Figure 2.

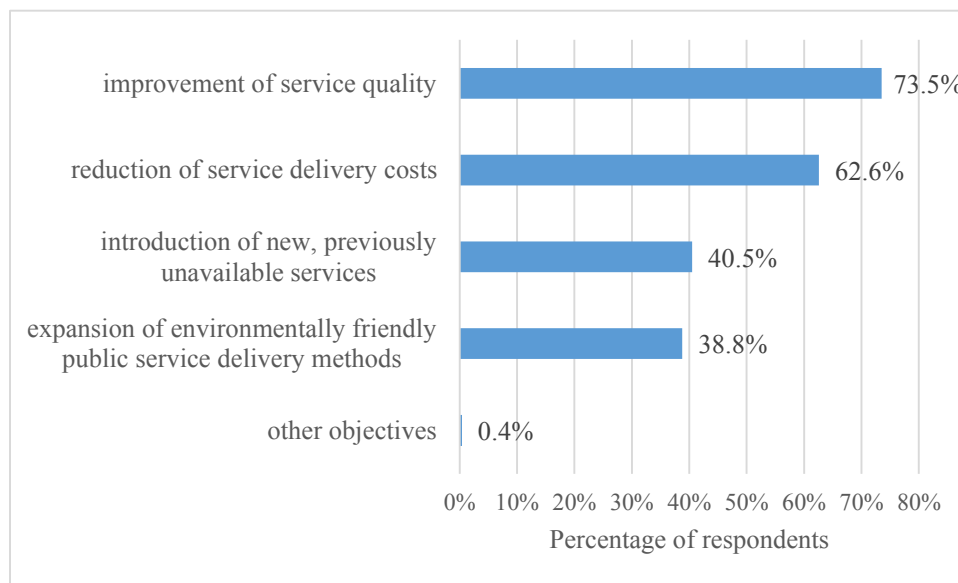


Figure 2. Respondents' opinions on desired directions of innovation in the public sector (N = 618).

Source: Own elaboration based on survey research.

Among the respondents, the prevailing view was that the primary goal of innovation in the public sector should be improving the quality of services provided. Nearly three-quarters of respondents expressed this expectation. Although the concept of quality is broad, it can be assumed that it also includes changes and accommodations that enhance service accessibility for individuals with specific needs. Respondents also recognized the potential economic benefits of an innovative approach to public services – nearly two-thirds of participants identified cost reduction as one of the expected outcomes of new solutions. In contrast, the scope for introducing entirely new services, which would be the equivalent of product innovation in the private sector, appears more limited – fewer than 40% of respondents expected that new, previously unavailable services would be introduced. A similar proportion of respondents believed that public sector innovations should focus on achieving positive environmental effects. It is important to note that this question allowed for multiple responses, meaning that the results do not sum to 100%.

When analyzing general issues related to innovation activity in the public sector, responses from all respondents were considered. However, for specific issues regarding adaptations aimed at the needs of neurodivergent individuals, it was deemed necessary to assess the respondents' level of knowledge on this subject. Taking into account the principle "Nothing about us without us", which is associated with the Convention on the Rights of Persons with Disabilities and was adopted as the theme of the United Nations' International Day of Persons with Disabilities in 2004, a question measuring familiarity with autism spectrum characteristics was included in the survey (Figure 3). Based on the responses, a decision was made to exclude from the analysis those respondents who declared a lack of knowledge on this issue.

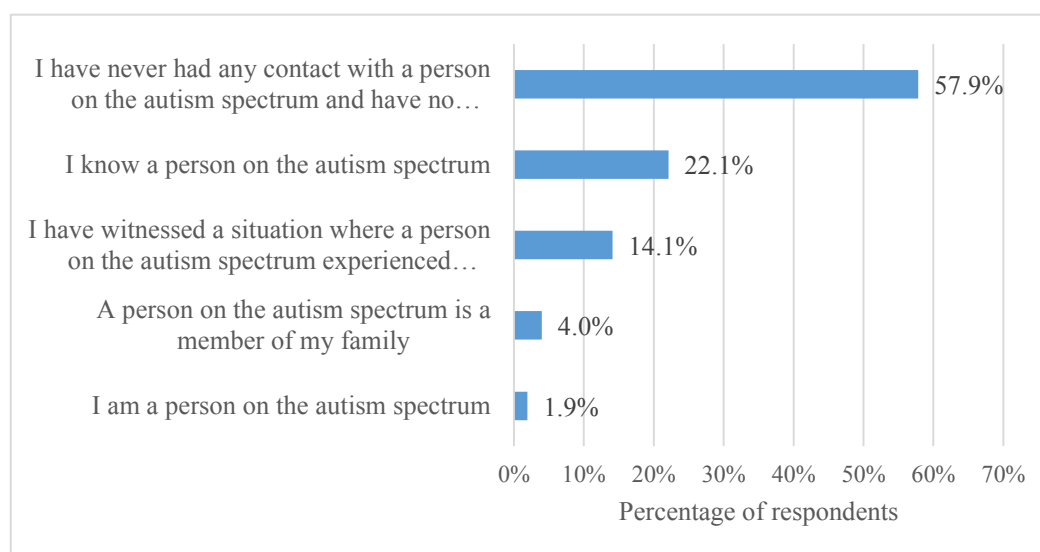


Figure 3. Respondents' declarations regarding their knowledge of autism and sources of information on the topic (N = 618).

Source: Own elaboration based on survey research.

The study results indicate that the specific challenges faced by individuals on the autism spectrum are not widely recognized among students in Krakow. Nearly 58% of respondents stated that they had never had any contact with individuals on the autism spectrum and had no knowledge on the subject. Among those who reported some level of experience, the largest group consisted of students who know someone with autism – this response was indicated by over 22% of participants. An interesting observation is that a significant portion of respondents (14%) had witnessed a situation where a neurodivergent individual encountered difficulties while using public services. This suggests that such barriers are noticeable not only to those directly affected but also to bystanders, which may imply that the lack of accommodations is not an isolated issue but a systemic challenge that requires attention. Additionally, 4% of respondents reported having a family member on the autism spectrum, while just under 2% identified themselves as autistic.

Analyzing these data, it can be observed that the prevalence of autism within the surveyed student population is comparable to U.S. statistics, which, as previously mentioned, indicate that 1 in 54 children is diagnosed with autism. If we extrapolate these findings to the entire

student population in Poland, estimated at approximately 1.25 million individuals (GUS, 2024), the number of autistic students in this group could be estimated at around 24,000. This estimate aligns with previous assumptions that official statistics, which report 45,000 autism cases in Poland across all age groups, may be significantly underestimated. However, these results should not be interpreted as definitive conclusions, due to interpretational limitations stemming from the sample – the findings are representative of students in Krakow, but not necessarily of students nationwide or the general population. It is also worth noting that the number of individuals identifying as autistic may be underreported due to lack of diagnosis, as many individuals receive a formal autism diagnosis only in adulthood.

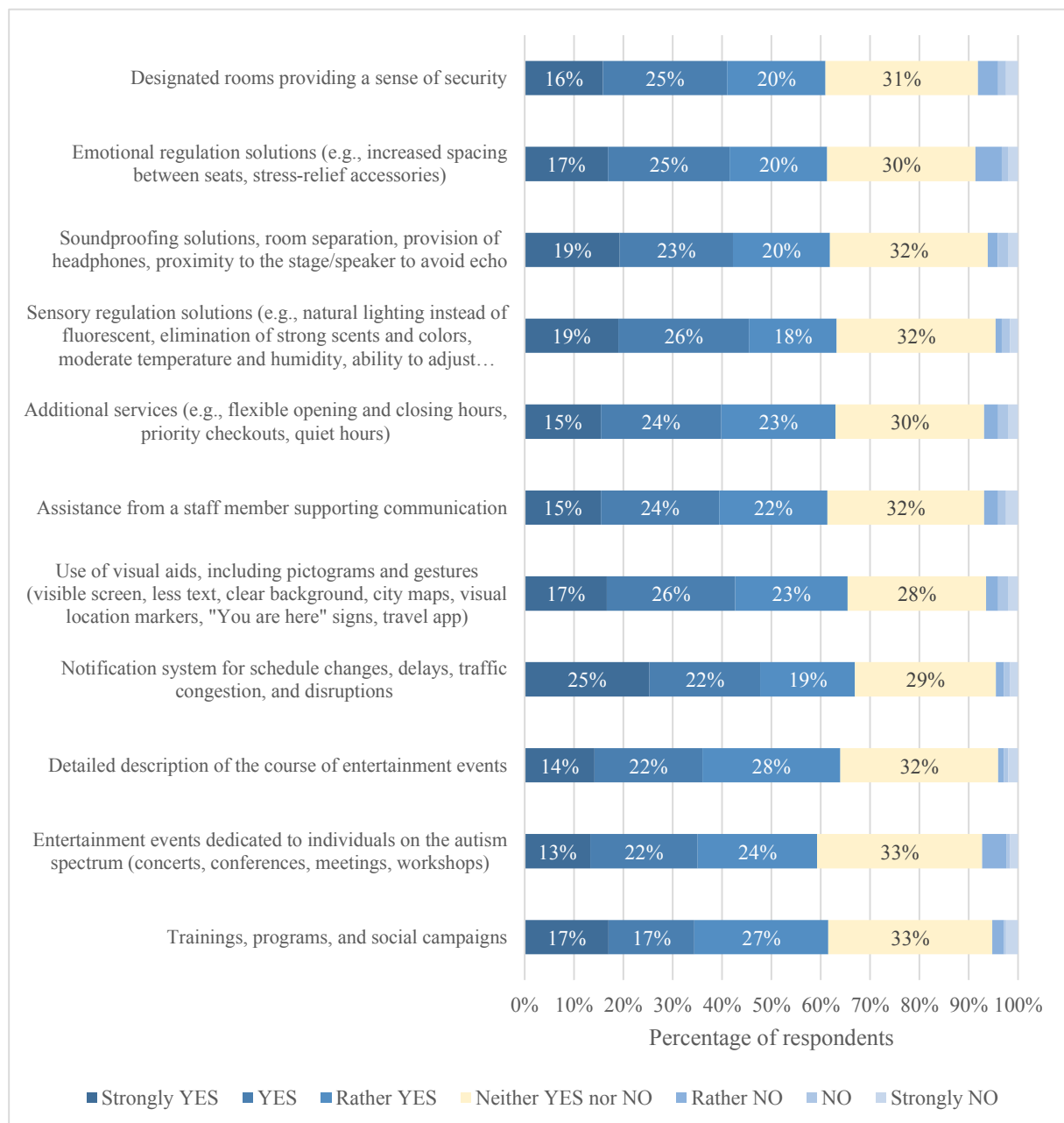


Figure 4. Responses to the question: Which actions implemented by MPK Kraków and Tauron Arena Kraków for individuals on the autism spectrum require improvement? (N = 260).

Source: Own elaboration based on survey research.

In the assessment of accommodations implemented in Krakow's transport and entertainment services, only the opinions of students who had encountered autism-related issues and had some knowledge on the topic were considered. There were 260 such individuals in the surveyed group. Students were asked to identify which measures implemented in Krakow's public transport services (MPK Kraków) and entertainment services (Tauron Arena) require improvements. Respondents could choose from 11 different measures, ranging from awareness campaigns and additional visual aids to architectural solutions, such as designating special spaces. The responses to this question are illustrated in Figure 4.

The survey results indicate that the majority of respondents recognize the need for improvements in all the measures for neurodivergent individuals included in the questionnaire. Notably, opinions on individual solutions are very similar – the percentage of respondents who selected "strongly yes", "yes", or "rather yes" ranges from 59% to 67%. The number of respondents who see no need for changes in any of the analyzed aspects is relatively low, never exceeding 10%. Meanwhile, around 30% of respondents remain undecided, regardless of which solution is being assessed. The only area that stands out from the rest (though not significantly) is the notification system for schedule changes and urban traffic management. In this case, 25% of respondents stated that improvements are definitely needed, while more than 75% expressed support for their implementation (combining responses "strongly yes", "yes", and "rather yes"). These findings, particularly the similar assessments of different measures, suggest that ensuring effective accommodations for neurodivergent individuals is a systemic challenge. Therefore, a comprehensive approach is required, one that encompasses both the standards for implementing accommodations and mechanisms for their ongoing evaluation and adaptation to the actual needs of users.

6. Conclusions and recommendations

In recent years, the needs of neurodivergent individuals have been gaining increasing attention in public policy, which is reflected in both legal regulations and nationwide accessibility initiatives. The development of the "Accessibility Plus" program and the introduction of the Act on Digital Accessibility of Public Entities are examples that highlight the growing awareness among policymakers regarding the need to eliminate barriers and create inclusive spaces for all citizens. This is undoubtedly a positive shift that paves the way for further improvements.

An analysis of the literature and expert opinions presented in this article leads to the conclusion that accommodations for neurodivergent individuals in public services should be viewed not only as a legal obligation but primarily as innovations in the public sector. Treating them solely as a top-down regulatory requirement carries the risk of implementing superficial

solutions that meet formal criteria but fail to address the actual needs of users. Achieving genuine improvements requires an innovative approach, encompassing technological and architectural solutions as well as procedural and organizational changes.

Both the design and evaluation of implemented accommodations should actively involve neurodivergent individuals. Including this group in these processes – as consultants, testers, or co-designers – will ensure that adaptations are genuinely useful and tailored to their needs. It is worth drawing on the experiences of cities implementing the smart city concept, where social participation is a key element of innovation policy. One of the most evident aspects of such participation is the effort to employ neurodivergent individuals in public administration and companies providing public services. Therefore, it is advisable to review recruitment procedures in these institutions to identify and eliminate barriers that may limit the employment opportunities for neurodivergent individuals. Enhancing the competencies of those responsible for recruitment is also of crucial importance. Training programs for managerial staff should not only focus on ensuring appropriate working conditions but also on effectively leveraging the unique cognitive and creative potential of neurodivergent individuals within organizational structures.

In the analyzed public services in Krakow (MPK Kraków and Tauron Arena Kraków), certain accommodations for neurodivergent individuals have been implemented. However, the research findings indicate that these measures are insufficient. Less than 10% of respondents considered the current solutions to be fully satisfactory, which clearly suggests a need for further improvements. Key areas requiring enhancement include, among others, the notification system for schedule changes and urban traffic management, which received particularly negative evaluations – 75% of respondents indicated the need for improvements in this aspect.

The low ratings of accommodations in public transport services can largely be explained by objective circumstances. The nature of public transportation (e.g., noise, crowding, and traffic disruptions due to construction work) makes it challenging to implement solutions that fully meet the needs of both hypersensitive and hyposensitive individuals. One possible approach is a more flexible system of visual and auditory notifications that would allow users to select their preferred level of communication intensity. Enhancements such as more intuitive maps and pictograms would serve as universal improvements, benefiting not only neurodivergent individuals but also other passenger groups, such as tourists and older adults. In some modes of transport, it may be worth considering the introduction of quiet zones or spaces designed to provide greater comfort for individuals with specific sensory needs. In the case of entertainment venues, such solutions appear easier to implement and could take the form of zones with varying levels of sensory stimulation, such as quiet rooms for hypersensitive individuals and sensory activation areas for hyposensitive individuals who function better in environments with increased sensory input.

One of the key challenges is the low level of public awareness regarding the needs of neurodivergent individuals. More than 58% of respondents reported having no knowledge on this topic. The implementation of innovations in public services should go hand in hand with educational initiatives and awareness campaigns aimed at increasing social understanding and acceptance of proposed solutions. In this context, municipal companies can utilize their informational displays at bus stops and within public transport vehicles, drawing inspiration from successful campaigns such as the promotion of tap water consumption led by Kraków Waterworks.

The research findings suggest that autism may be significantly more prevalent than indicated by official statistics. However, due to the specific characteristics of the surveyed population (students), these results cannot be regarded as definitive evidence. It is advisable to improve data collection methodologies to provide a more precise estimate of the scale of neurodiversity in Poland and its impact on public service usage.

The studies cited in this article were preliminary and conducted among students of Kraków's universities. Although this group frequently uses transport and entertainment services, it does not constitute a representative sample of the entire population. It is important to emphasize that the needs of neurodivergent individuals may vary depending on their age, lifestyle, and professional activity. While difficulties related to public transportation can be considered largely universal for this group of users, priorities may differ significantly in other areas – working adults may face the greatest challenges in accessing administrative services, whereas children and adolescents may encounter the most difficulties within the education system. Including representatives of these groups in future studies and expanding the analysis to cover additional areas of public services would provide a more comprehensive picture of sensory barriers and the effectiveness of existing solutions. Consequently, recommendations for innovations in the public sector could be better tailored to the diverse needs of service users.

Acknowledgements

The publication/article presents the result of the Project no 073/ZJP/2024/POT financed from the subsidy granted to the Krakow University of Economics.

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