

BUILDING TRUST IN AI-HUMAN PARTNERSHIPS: EXPLORING PREFERENCES AND INFLUENCES IN THE MANUFACTURING INDUSTRY

Justyna Żywiołek
Czestochowa University of Technology

Abstract:

The incorporation of artificial intelligence (AI) into industrial processes has seen substantial development, characterized by the shift from Industry 4.0 to the future concept of Industry 5.0. The article identifies a significant gap in knowledge regarding how openness in AI engagement influences consumer trust and confidence in news media. This gap highlights the need for further exploration into the relationship between transparency in AI processes and consumer perceptions. The research utilises a combination of qualitative and quantitative approaches, gathering insights from academic literature, industry viewpoints, and actual data. We conduct an extensive analysis of existing literature to investigate the process of incorporating artificial intelligence into news creation and its influence on the level of confidence consumers have in the news. We have identified a significant lack of knowledge about the impact of openness in AI engagement on consumer views and trust in news media. Expanding on this discrepancy, we suggest a systematic methodology that incorporates controlled experiments and surveys to evaluate the influence of different degrees of openness on consumer trust and involvement with AI-generated news content. In addition, the paper examines the difficulties in establishing confidence in artificial intelligence (AI) inside the European Union, including several aspects such as technological, ethical, social, and legal considerations. The document presents a thorough plan to guarantee the secure development and execution of AI, with a focus on the significance of transparency, ethics, and teamwork. The study's results provide vital insights for politicians, news organisations, and industrial businesses as they navigate the intricate process of integrating AI. Comprehensive Plan for Secure AI Development, to address the challenges outlined, the article presents a thorough plan for ensuring the secure development and execution of AI within the European Union. This plan emphasizes the significance of transparency, ethics, and collaboration in building trust and confidence in AI technologies.

Key words: artificial intelligence, human-AI cooperation, artificial intelligence in the manufacturing industry

INTRODUCTION

The relentless march of technology has cemented artificial intelligence (AI) as a cornerstone of manufacturing processes, signifying a major paradigm shift in industrial evolution [1]. The advent of Industry 4.0 marked the beginning of smart manufacturing, integrating AI, the Internet of Things (IoT), and cyber-physical systems to revolutionize production [2, 3]. This era has been characterized by the seamless merger of digital and physical worlds, leading to unprecedented levels of efficiency, productivity, and cost reduction in manufacturing. However, as the industrial landscape braces for the emergence of Industry 5.0, a new chapter in industrial innovation is being written, focusing on the symbiosis between human intelligence and machine precision [4].

Industry 4.0 has laid the groundwork for a data-driven manufacturing environment, where networked machines and AI-driven analytics have transformed production floors into ecosystems of autonomous, interconnected devices [5, 6]. The outcomes of this transformation have been remarkable, with substantial gains in operational efficiency, reduced overheads, and enhanced product quality. The role of AI in this phase has been pivotal, automating complex processes, optimizing supply chains, and facilitating predictive maintenance to minimize downtime [7].

In contrast, Industry 5.0 heralds a shift towards a more profound collaboration between humans and machines. It underscores the concept of "co-bots" (collaborative robots) powered by advanced AI, working alongside humans

to augment their abilities [8, 9]. This era is characterized by the integration of technologies such as 5G connectivity, edge computing, digital twins, quantum computing, and sophisticated AI algorithms [10, 11]. The essence of Industry 5.0 lies in leveraging the unique strengths of both humans and machines, aiming for a production environment where creativity, flexibility, and complex problem-solving are enhanced by AI's analytical prowess and operational efficiency [12].

Our comparative analysis delves into the evolution of AI from Industry 4.0 to Industry 5.0, highlighting the transition from automation and efficiency to collaboration and innovation [13]. Through a blend of qualitative and quantitative methodologies, drawing from academic literature, industry insights, and empirical data, this study aims to dissect the nuances of these industrial revolutions. We explore the shifting dynamics of industrial automation, the evolving role of AI, and the potential benefits and challenges that accompany this transition [14]. The journey from Industry 4.0 to Industry 5.0 represents more than just technological advancement [15, 16]; it signifies a fundamental shift in how industries conceptualize production and innovation. By fostering a closer human-machine partnership, Industry 5.0 not only aims to enhance manufacturing processes but also to reimagine them, making them more adaptable, sustainable, and human-centric. This comparative study seeks to illuminate the path of AI development in manufacturing, offering valuable insights for businesses poised to navigate the complexities of Industry 5.0 [17]. Additionally, it contributes to the broader discourse on the future role of AI in shaping industry and society, emphasizing the importance of an inclusive, collaborative approach to technological advancement [18]. Our objective is to unravel the dynamic interplay between technological progress and industrial practices, shedding light on AI's transformative potential for the future of manufacturing [19].

LITERATURE REVIEW

The integration of artificial intelligence (AI) into the fabric of news media operations is gaining momentum, reflecting a broader trend across various industries towards digital transformation. This shift, spanning from the aggregation of information to the production and distribution of content, and even analysing consumer interactions, signifies a pivotal moment for news organizations [20, 21]. Recent dialogues between AI providers and journalistic entities underscore a growing recognition of AI's potential to reshape news production processes [22, 23]. Empirical studies have started to document the tangible incorporation of AI within segments of media production, underscoring a trend towards operational efficiency and the alleviation of human workload from routine tasks [24]. However, this technological evolution sparks a spectrum of consumer perceptions, ranging from ambivalence to outright scepticism or fear towards AI-driven content [25].

Trust in news media, a cornerstone of consumer engagement and a reflection of societal values, emerges as a critical lens through which the implications of AI integration must be viewed [26, 27]. The dual imperatives of maintaining societal trust while navigating financial sustainability render the integration of AI into news processes a complex endeavour [28, 29]. Despite ongoing research into the public's perception of AI within media production, there remains a gap in understanding how this integration impacts consumer trust, particularly when dissected across various production tasks and the extent of AI-human collaboration [30, 31].

This study aims to delve into the nuances of consumer trust in AI-enhanced news production, dissecting the intricate web of perceptions across different production stages and collaboration models between AI and human journalists. By examining how factors such as AI familiarity, perceptions, and news consumption motivations influence trust and the willingness to engage with AI-generated content, this research seeks to offer nuanced insights into the evolving landscape of news production [32]. The findings aim to contribute to the broader discourse on journalism and technology, offering strategic insights for news organizations navigating the integration of AI technologies. This exploration is pivotal for understanding how to balance technological innovation with the imperative of building and maintaining trust in an era of rapidly evolving news consumption paradigms [33]. The literature review on consumer perception of AI integration into news production underscores a nuanced understanding of trust in media, emphasizing the shift from traditional credibility assessments to a more consumer-centric view. This analysis reveals the complexities of integrating AI into news production and its impact on consumer trust and perception. Building on the highlighted studies and their findings, we can propose new analyses and research questions to further explore this emerging field.

The literature review provided offers a comprehensive examination of the dynamics between consumer perceptions of AI integration into news production and their trust in the resulting news products. It highlights a critical gap in understanding how different levels of AI involvement in various news production phases-ranging from discovery and information gathering to writing and editing-affect consumer trust and preferences. This gap presents an opportunity for a new analysis that could significantly contribute to both academic knowledge and practical applications in the field of digital journalism and AI technology integration.

METHODOLOGY

A comprehensive survey was developed to assess consumer attitudes towards various levels of transparency in AI-generated news. The survey would measure trust, perceived credibility and willingness to engage with the news. A controlled experimental environment has been

created in which participants will be exposed to news articles created using artificial intelligence. The level of transparency about the role of AI will vary by group. For example, one group may be informed that the AI was involved in the initial analysis of the data but not in writing, another group may be informed that the AI was involved in both the analysis and writing of the data, and a third group may not receive any information about the involvement of artificial intelligence. Use statistical methods to analyse the impact of transparency levels on consumer trust, perceptions of trustworthiness, and engagement rates. Advanced analytics such as sentiment analysis and behavioural data tracking can also be used to understand deeper nuances in consumer responses.

The study may reveal the optimal level of transparency that news organizations should strive for to maintain or increase audience trust and engagement in the context of AI integration. Understanding how different demographics and consumer segments respond to AI transparency can help you tailor your communication strategies. The findings could inform best practices for incorporating artificial intelligence into news production processes, particularly in how the process is communicated to consumers.

The proposed analysis focuses on a critical and under-researched aspect of AI integration in news production: the role of transparency. By focusing on how AI engagement transparency impacts consumer trust and engagement, the analysis can provide actionable insights for news organizations navigating the complexities of digital transformation. The findings will not only contribute to the academic discourse on media trust and AI, but will also provide practical guidance for increasing consumer trust in an increasingly AI-driven media landscape.

Challenges for AI trust in the European Union involve defining the theoretical framework of AI in many ways, such as replacing people and employees with physical, environmental, and political considerations. AI security can be understood by considering different aspects and situations, including technical, ethical, social, and legal dimensions. AI technical security focuses on ensuring that AI systems operate as planned and do not result in unforeseen damage. This involves safeguarding against flaws in algorithms that could result in inaccurate judgements or actions. AI operational security aims to prevent AI systems from being utilised for illegal or unethical activities like cyberattacks or information manipulation. Data security in AI is strongly linked to safeguarding privacy and personal data handled by AI systems. Ensuring data is acquired, kept, and used securely and in compliance with relevant legislation. It is important to acknowledge that the advancement of AI has other facets that society typically views in a negative light.

Security's ethical aspects pertain to moral and ethical concerns surrounding the creation and use of AI, including

justice, accountability, and transparency of systems. AI social security examines how AI affects society, such as its possible risks to employment, bias, and impact on political and social choices.

MATERIALS AND METHODS

AI security is a complex issue that necessitates a comprehensive strategy involving technology, ethics, law, and politics to guarantee the safe advancement and implementation of artificial intelligence in society.

The study aimed to discover the constraints that individuals perceived as hindering their ability to gain more understanding and trust in AI. The study included individuals from Poland, the Czech Republic, and Germany, which are three European Union countries. The use of AI varies among nations, hence the knowledge level of individuals should also vary.

The study design incorporated a literature review, focusing on similar studies undertaken in other countries, with a specific emphasis on the EU. The poll was performed from November 2022 to April 2023 through an online form.

Three countries were chosen based on varying degrees of renewable energy utilisation, assuming that adult citizens would take part in the research. Countries anticipated that a study would be considered representative if it comprised a similar number of people and that the studies would be valid, even though the demographics in each nation varied significantly. The authors had minimal impact on the composition of the sample as it was an online survey that only relied on the respondents' participation.

The study consisted of three sections: Recognising the Impact of AI Integration (A), Understanding AI in Manufacturing (B), and Challenges and Obstacles (C). Each of the three sections comprised five statements. If the respondent agrees with the statement, he is instructed to indicate his answer. Evaluation comments were assessed using a five-point Likert scale, with 1 representing complete disagreement and 5 representing entire agreement.

A. Acknowledging the Impact of AI Integration

A1. I recognize the importance of selecting AI technologies that are compatible with ethical manufacturing practices, affecting both workers and product quality.

A2. My choices regarding AI deployment in manufacturing processes directly influence the efficiency and safety of the workplace.

A3. Manufacturers have a responsibility to prevent adverse outcomes from AI use, such as job displacement without adequate training or support.

A4. In a progressive society, leveraging AI for manufacturing is seen as a way to enhance competitiveness while maintaining high safety and ethical standards.

A5. Access to advanced AI technologies offers unprecedented opportunities to improve environmental sustainability in manufacturing processes.

B. Understanding of AI in Manufacturing

B1. AI technologies can significantly reduce waste and improve energy efficiency in manufacturing processes.

B2. The adoption of AI can lead to the creation of safer work environments by automating hazardous tasks.

B3. Awareness and education about the benefits and applications of AI in manufacturing increase its acceptance among workers and management.

B4. AI applications in manufacturing are designed to be safe for human interaction and augment human capabilities.

B5. Utilizing AI in manufacturing processes demonstrates a commitment to innovation and sustainability, benefiting the broader ecosystem.

C. Challenges and Obstacles

C1. High initial costs and investment requirements can be a significant barrier to adopting AI technologies in manufacturing.

C2. The complexity and expense of setting up, maintaining, and updating AI systems can deter small and medium-sized enterprises.

C3. There is often a lack of infrastructure to support the seamless integration of AI into existing manufacturing systems.

C4. A gap in understanding AI applications and a scarcity of skilled professionals for installation and maintenance hinder widespread adoption.

C5. Personal knowledge about the potential and limitations of AI in manufacturing needs improvement, with most information coming from industry contacts or superficial sources.

RESULTS

The survey includes a portion designed to collect data on the fundamental traits of the study participants, offering insights into the composition of the sample. A five-point Likert scale was used to ensure reliable replies and enable standardised examinations. Cronbach's Alpha tests were used to assess the internal consistency of the questionnaire items, both for each group of questions and for the total survey. Cronbach's Alpha is commonly used to evaluate the reliability of scales or surveys by measuring internal consistency. Cronbach's Alpha values above 0.7 were deemed to indicate excellent data quality, confirming the responses' eligibility for further research. This method aligns with the known recommendations provided. A scale analysis was undertaken after assessing reliability to determine the ratings most commonly given by the respondents. This research offered useful insights into how responses were distributed among the Likert scale categories. The evaluation outcomes were carefully analysed and processed, including basic statistical analysis and the computation of percentages for each evaluation category. The study utilised rigorous statistical processes, including Cronbach's Alpha testing and scale analysis, to ensure the robustness and validity of the acquired data. The analytical methodologies helped achieve a thorough comprehension of the survey results, enabling significant interpretations and insights into the research objectives.

Identifying areas for enhancement is a vital aspect in strategizing and implementing new projects, as evidenced in the literature. Long-term goals can be achieved by advanced analysis and various management strategies as referenced. The writers attempted to identify the hurdle that needs to be eliminated for society to view new energy technologies positively. Questionnaire responses were validated in advance. 6,729 individuals participated in responding to the survey's inquiries. As all questionnaires were completed accurately and fully, further analysis of the surveys was required.

The respondents' organisational structure was initially analysed in Table 1. Percentage for each individual answer was calculated. Despite variations in the responders' organisational structure, certain aspects were consistently present. The survey's poor completion rate was likely due to the survey's complex topic matter. This also implies a deficiency in knowledge and skills.

Table 1
Criteria Of The Responders (Personal Research)

Feature	Answer	Percentage
Age	under 20 years old	0%
	21-30 years	26%
	31-40 years	40%
	41-50 years	37%
	51-60 years	7%
	over 60 years old	0%
Gender	male	68%
	female	32%
Country	Poland	38%
	Germany	36%
	Czech republic	26%
Education	primary education	0
	secondary education	9%
	higher education	91%
Residence	village	6%
	city up to 50k residents	13%
	city up to 100k residents	17%
	city up to 200k residents	24%
	city of 200k – 400k residents	22%
	city over 500k residents	28%
using any AI	yes	100%
	no	0%

The structure was gender-balanced, with a majority of male respondents. Respondents from different nationalities filled out an online form to ensure a balanced representation of countries. The study included participants aged 19 to 70, with the average age falling between 31 and 40. All participants in the study were required to be actively involved in their profession. Test takers having at least a secondary education were included, which could be pertinent to the questionnaire's topic. Most respondents were from large cities with populations over 500,000. Analysed the primary study's findings. The initial step was calculating the overall number of ratings for each statement. The data were utilised to conduct a study on the relationship between individual summaries, taking into consideration the ratings provided (Table 2).

Table 2
Individual question correlation matrix (personal study)

	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	C5
A1	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A2	0.91	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-
A3	0.51	0.67	1.00	-	-	-	-	-	-	-	-	-	-	-	-
A4	0.24	0.51	0.59	1.00	-	-	-	-	-	-	-	-	-	-	-
A5	0.17	0.24	0.61	0.54	1.00	-	-	-	-	-	-	-	-	-	-
B1	0.22	0.17	0.67	0.61	0.54	1.00	-	-	-	-	-	-	-	-	-
B2	0.34	0.29	0.48	0.27	0.13	0.19	1.00	-	-	-	-	-	-	-	-
B3	0.37	0.17	0.29	0.45	0.17	0.19	0.31	1.00	-	-	-	-	-	-	-
B4	0.34	0.29	0.34	0.43	0.28	-0.02	0.18	0.13	1.00	-	-	-	-	-	-
B5	0.21	-0.04	0.26	0.47	0.11	-0.06	0.61	0.17	0.51	1.00	-	-	-	-	-
C1	-0.04	0.26	0.47	-0.04	0.26	0.47	0.11	-0.06	0.37	0.08	1.00	-	-	-	-
C2	0.13	0.02	0.24	0.13	0.02	0.24	0.01	0.11	-0.08	0.18	0.11	1.00	-	-	-
C3	0.03	-0.09	0.12	0.03	-0.09	0.12	0.18	0.32	0.16	0.25	-0.03	-0.11	1.00	-	-
C4	0.17	0.31	0.16	0.17	0.31	0.16	-0.08	-0.12	0.21	-0.16	0.18	0.22	-0.06	1.00	-
C5	0.05	-0.08	0.27	0.06	0.18	0.38	-0.19	-0.07	-0.12	-0.16	-0.05	0.08	0.12	0.18	1.00

The next step was computing the standardised Cronbach's alpha using the identified correlations (Table 3).

Table 3
Cronbach Alpha coefficients

Part of the Survey	Cronbach Alpha	Standardized Cronbach Alpha
The complete questionnaire	0,8279	0,859
A Being accountable for the environment, my town or village, and the surrounding land-scape	0,886	0,903
B Understanding of RES and their application.	0,849	0,861
C Obstacles	0,801	0,813

Statistical scaling was utilised to initiate the analysis of the results. Table 4 displays the variance, mean, and standard deviation of the scale comprising all five tested items. The scale used includes values from 1 to 75 for all components. The mean score of 54.26, which represents over two-thirds of the total, appears reasonably high and indicates the positive outlook of the respondents.

Table 4
The scale statistics

Mean	Variance	Standard Deviation
53,1537	98,15281	9,01534

The results of each question's score singly and for each group of topics were then calculated, together with the mean and standard deviation (Table 5).

The responses in Category A reflect a strong recognition of the importance of ethical considerations in selecting and deploying AI technologies within manufacturing processes. Statements such as A1 and A2 highlight the direct impact of AI deployment on workplace efficiency, safety, and product quality. Additionally, there is a notable emphasis on the responsibility of manufacturers to mitigate potential adverse outcomes associated with AI use, such as job displacement and ethical implications. Overall, respondents demonstrate a nuanced understanding of the multifaceted implications of AI

integration in manufacturing, including its potential to enhance competitiveness while upholding high ethical and safety standards.

Table 5
Statistics for topics and specific issue groupings.

Question	Mean	Standard Deviation
A	4,34	1,42
A1	3,92	1,22
A2	3,83	1,19
A3	3,75	1,38
A4	4,11	1,26
A5	4,20	1,27
B	3,97	1,24
B1	3,81	0,99
B2	3,87	1,16
B3	3,91	1,31
B4	3,76	1,20
B5	2,28	1,19
C	3,51	1,23
C1	3,11	1,27
C2	3,16	0,95
C3	2,89	1,02
C4	2,92	1,09
C5	2,54	0,81

Category B reveals a generally positive perception of AI's potential to revolutionize manufacturing processes. Respondents recognize the significant benefits of AI technologies in reducing waste, improving energy efficiency, and creating safer work environments. Moreover, there is an acknowledgment of the importance of awareness and education in increasing acceptance of AI among workers and management. The statements in this category also underscore the belief that AI applications are designed to augment human capabilities and demonstrate a commitment to innovation and sustainability within the manufacturing ecosystem.

The responses in Category C shed light on the various challenges and barriers hindering the widespread adoption of AI technologies in manufacturing. High initial costs and

investment requirements, as highlighted in statement C1, emerge as significant barriers, particularly for small and medium-sized enterprises. Moreover, the complexity and expense of setting up and maintaining AI systems, coupled with a lack of infrastructure and skilled professionals, pose additional challenges to seamless integration. Furthermore, there is a recognized gap in personal knowledge about AI applications in manufacturing, indicating a need for improved education and awareness initiatives to address misconceptions and increase understanding.

Overall, the analysis of responses across Categories A, B, and C reveals a nuanced understanding of the potential benefits and challenges associated with AI integration in manufacturing. While there is a recognition of AI's capacity to enhance efficiency, safety, and competitiveness, respondents also acknowledge the complexities and obstacles inherent in its adoption. Moving forward, efforts to address these challenges and promote responsible AI deployment should prioritize education, training, and investment in infrastructure to ensure the successful integration of AI technologies within the manufacturing sector.

CONCLUSION AND POLICY IMPLICATIONS

The main objective of this study was to pinpoint the specific areas in which the perspectives of potential respondents need to be enhanced regarding the barriers to knowledge sharing that affect trust in artificial intelligence. The key findings from the study are outlined below: Even in nations with limited adoption of modern technology, there is a push for societal reforms that include legal, ethical, and technological safeguards. This is driven by a significant public apprehension regarding the advancement of AI and the potential displacement of humans by artificial intelligence. Respondents express scepticism on the level of security associated with the knowledge, information, and activities performed by AI. Security, in this context, refers to both the reliability of access and the technological stability (i.e., availability). In addition, they possess anecdotal experience on the issue, a rare quality in this particular field where experts are scarce. Some respondents saw AI as a costly and hence unaffordable option that lacks the necessary infrastructure and fails to deliver substantial economic advantages. Consequently, the level of readiness for intensive AI development is low in individual countries. The study reported in this research has successfully addressed the initial research gap and provided conclusive findings. This tool can be useful for evaluating the level of societal obstacles that arise from respondents' anxieties and concerns due to their limited understanding of AI. The available tests have certain restrictions. The questionnaire, while derived from a literature review, was particularly designed for this study and may have been impacted by the authors' subjective perspectives. The study findings were presented in the context of individuals' social perception of these viewpoints. Nevertheless, it is important to highlight that this questionnaire was specifically created for individuals who may possess varying levels of

education and may not possess specialised knowledge pertaining to the subject matter of the study. Consequently, the wording and content of this survey were altered to cater to the respondents. The survey topic was not well-received. It is important to emphasise that the study mostly focused on renewable energy, which is a subject that is currently relatively unfamiliar and not widely embraced. Moreover, the sample size was inadequate, likely because of the limited number of individuals willing to participate, which might be attributed to the nature of the problem. Instead of prioritising technology, the study adopted a sociological perspective. The poll was disseminated across several social media platforms and to local acquaintances of authors specialising in the respective topic. This may have impacted the composition of the participants, thus affecting their answers. The study focused specifically on respondents from three distinct locations, including the authors' nation. The authors advocate for the inclusion of samples from diverse demographic groups in future study. The final constraint pertains to the respondents' nation of birth. The project will be further pursued and extended to more nations, with the intention of comparing the outcomes. The objective of the study is to enhance the enthusiasm and self-assurance of survey participants towards AI. According to the authors, respondents' involvement in the study may motivate them to actively pursue additional information regarding this topic. This would be perceived as a significant accomplishment by both the writers and the community, with a particular emphasis on the latter. In order to enhance the pertinent case study and perform a more comprehensive examination of the data from many perspectives, we also want to employ novel statistical methodologies that will enhance the quality, precision, and soundness of our findings.

Aside from the main discoveries outlined earlier, it is crucial to take into account the practical consequences of the study's findings. Presented below are several elaborated topics and their consequences for management. The report emphasises the immediate necessity for social reforms that encompass legal, ethical, and technological measures to protect against potential risks associated with artificial intelligence. Managers and decision-makers should recognise the significance of clear communication and proactive actions in establishing trust in AI technologies. Enforcing explicit norms and restrictions can mitigate public apprehensions and enhance the adoption of AI technologies. The study emphasises the significance of ethical considerations in the advancement and execution of artificial intelligence. Managers ought to give priority to rules and ethical frameworks that prioritise the promotion of fairness, accountability, and openness in AI algorithms and decision-making processes. Organisations can mitigate the risk of bias, discrimination, and unintended effects by including ethical standards into the design and deployment of AI. Comprehensive Plan for Secure AI Development: To address the challenges outlined, the article presents a thorough plan for ensuring the secure development and execution of AI within the European Union. This

plan emphasizes the significance of transparency, ethics, and collaboration in building trust and confidence in AI technologies.

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Justyna Żywiłek

ORCID ID: 0000-0003-0407-0826

Czestochowa University of Technology

Faculty of Management

ul. Dąbrowskiego 69, 42-201 Częstochowa, Poland

e-mail: justyna.zywiłek@wz.pcz.pl