



Konferencja: Nauki Społeczne i Techniczne – Zakres Współpracy
Conference: Social and Technical Sciences – The Scope of Cooperation

X MIĘDZYNARODOWA KONFERENCJA NAUKI SPOŁECZNE I TECHNICZNE – ZAKRES WSPÓŁPRACY NA RZECZ POSTĘPU SPOŁECZNEGO I TECHNOLOGICZNEGO

MIEJSCE I TERMIN: Gliwice, 19 czerwca 2020 roku

GODZINA: 9.00 – 20.15

FORMA WYDARZENIA: wideokonferencja

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- język konferencji: polski i/lub angielski, w zależności od panelu i referenta
- wszystkie abstrakty referatów dostępne będą w języku angielskim
- artykuły pokonferencyjne również wydawane są w języku angielskim
- dla chętnych zapewnione jest tłumaczenie konsekutywne w trakcie referatu

X Międzynarodowa Konferencja „Nauki humanistyczno-społeczne i techniczne – zakres współpracy na rzecz postępu społecznego i technologicznego” jest finansowana w ramach programu Ministra Nauki i Szkolnictwa Wyższego pod nazwą „DIALOG” w latach 2016–2019”. Konferencja jest realizowana w ramach projektu Międzynarodowego Centrum Badań Interdyscyplinarnych.

Projekt przyjęty do finansowania w drodze konkursu ogłoszonego w dniu 1 lipca 2016 r. przez Ministra Nauki i Szkolnictwa Wyższego w ramach programu pod nazwą „DIALOG” ustanowionego Komunikatem Ministra Nauki i Szkolnictwa Wyższego z dnia 27 czerwca 2016 r. o ustanowieniu programu pod nazwą „Dialog” (M.P. poz. 596).



Ministerstwo Nauki
i Szkolnictwa Wyższego



DIALOG

Harmonogram wydarzenia:

9.00 – 9.15	Uroczyste otwarcie	
9.15 – 16.00	Panel 1: humanistyczno-społeczny (reprezentanci dyscyplin nauk społecznych oraz humanistycznych Panel 1a: aplikacyjny (reprezentanci świata praktyki)	
Część 1:	Człowiek i technologia	09.15 – 10.15
Część 2:	Różne oblicza postępu	10.15 – 11.45
Część 3:	Rola otoczenia społeczno-gospodarczego w kreowaniu zmian	11.45 – 12.45
Część 4:	Projekty wdrożeniowe i implikacje praktyczne	12.45 – 15.00
Część 5:	Postęp społeczny i technologiczny – rozważania międzynarodowe	15.00 – 16.00
16.00 – 19.45	Panel 2: techniczny (reprezentanci dyscyplin technicznych) Panel 2a: aplikacyjny (reprezentanci świata praktyki)	
Część 6:	Wskaźniki prakseologiczne i technologia	16.00 – 17.00
Część 7:	Przeszłość, teraźniejszość i przyszłość przemysłu	17.00 – 18.15
Część 8:	Przyszłość technologiczna – podejście międzynarodowe	18.15 – 19.45
19.45 – 20.15	Dyskusja, podsumowanie obrad i zakończenie konferencji	

Uczestnicy będą mieli okazję zadawania pytań pod koniec każdego panelu.

Możliwy będzie również kontakt z moderatorem poprzez panel czatu dostępny w trakcie trwania poszczególnych sesji i wystąpień.

Wydarzenie będzie nagrywane, docelowo powstanie materiał informacyjno-ekspercki w formie zmontowanego filmu z wybranymi fragmentami wystąpień referentów, który zamieścimy na stronie konferencji. Zachęcamy do udziału w konferencji z użyciem kamery i mikrofonu, byśmy mogli stworzyć atmosferę najbardziej zbliżoną do wszystkich, naszych wcześniejszych spotkań w fizycznej przestrzeni.

ABSTRAKTY I WYSTĄPIENIA:

1. Przewiduje się 12-15 minut dla każdego z referatów. Osoby, które będą wygłaszały referat po polsku, prosimy o przygotowanie slajdów swojej prezentacji w wersji dwujęzycznej (polsko-angielskiej).
2. Moderator każdego z panelu będzie koordynował technicznie i merytorycznie każdą z sesji.

PUBLIKACJE:

Dziękujemy za zgłoszenia artykułów w podanych przez nas terminach. Przypominamy, że bezpłatna forma upowszechnienia artykułów naukowych przewidywana dla aktywnych uczestników konferencji (spikerów), dotyczy wyłącznie osób, które uczestniczyć będą w całości obrad dnia 19.06.2020, co będzie potwierdzone logowaniem na stronie wideokonferencji.

Z UWAGI NA LICZBĘ OSÓB ZGŁOSZONYCH NA KONFERENCJĘ ORAZ ZAREJESTROWANYCH PUBLIKACJI NA DZIEŃ 28.04.2020- BRAK JEST MIEJSC W TOMACH PONOSZONYCH Z OPŁAT KONFERENCJI.

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W POZYCJACH MONOGRAFICZNYCH – CAŁKOWITY BRAK MOŻLIWOŚCI ROZSZERZENIA DLA KOLEJNYCH AUTORÓW

KONTAKT:

Pytania prosimy kierować do sekretariatu Międzynarodowego Centrum Badań Interdyscyplinarnych na adres: mcbi@polsl.pl lub telefon +48 32 400 30 95, +48 885 951 905.



ON THE NEED FOR SOCIOLOGICAL RESEARCH ON ARTIFICIAL INTELLIGENCE (AI) – PERSPECTIVE OF INDUSTRY 4.0 AND SUSTAINABLE DEVELOPMENT

Małgorzata Suchacka, University of Silesia in Katowice

In the last few decades, a wider application of innovative technologies can be observed in numerous sectors of economy and fields of civil life. This is due to the unavoidably progressing, complete digitalisation of production processes, implementation of new technologies and the enormous social interest in these technologies. The contemporary developed societies rapidly adapt themselves to the fourth industrial revolution by learning new information and communication methods and creating new business models. The implementation of these solutions provides tangible benefits to economy, society and natural environment.

The analysis will be divided into several parts:

- explanation and definition of basic notions for the purpose of this presentation – artificial intelligence, industry 4.0 and sustainable development,
- presentation of a report on the sources of scientific interest in artificial intelligence,
- presentation of potential sociological areas of research on artificial intelligence considering the interdisciplinary relationships.

In order to achieve the aim of the presentation, three research questions have been formulated:

- What are the sources of scientific interest in AI and relationship of AI with the concept of industry 4.0 and sustainable development?
 - What is the state of research on AI in the science sector in Poland?
 - What are the potential directions of sociological research on AI?
- It can be said with certainty that it is difficult to identify a single significant source of interest in artificial intelligence. There are a couple of impulses which are of various origin and which drive each other:
- practice of contemporary business and social life,
 - concepts of industry 4.0 and sustainable development,
 - free, futuristic considerations of philosophical nature conceived by culture creators and thinkers.

Considering the aim of the presentation, it is worth to focus on the first two sources, although the last one can also provide much inspiration for sophisticated research.

The author's attempt to define the notion of artificial intelligence will take into consideration sources referring to business practice and, predominantly, the research concepts mentioned above. The ways in which AI operates within society are still not sufficiently investigated. Defining this notion requires solid foundations and in itself seems to be a good foothold for further, thorough analyses.

Practice of contemporary business and social life – dangerous experiments or technological curiosities.

An example of such unsuccessful experiment is a test of artificial intelligence named Tay, created by Microsoft Corporation. It had to be shut down only after one day after its launch due to a series of controversial tweets it posted on Twitter. Within 24 hours, on the basis of data from the virtual reality, Tay had started to simulate a teenage girl and had transformed from an easy-going fan of humanity into a robot telling offensive jokes and even praising Hitler for the genocide of the Jewish people. It developed itself based on contacts with real people.

An example of AI application which brings serious hopes is the cooperation between business and science in research on xenobots. Tiny robots owe their name to the cell donor – a species of frog called *Xenopus laevis*. Researchers at Harvard, Tufts, and the University of Vermont studied regularly contracting heart muscle cells and passive skin cells. Using evolutionary algorithms thousands of candidate life forms were created and evaluated.

In the future, the xenobots may find application in medicine – build from patient's cells they could transport and administer drugs or destroy cancer cells with no risk of being rejected by the body.

Major ethical questions are raised by using artificial intelligence – for example Amazon Echo devices – in the widely understood social control. Amazon assures that Alexa does not record users' conversations unless they issue a particular command. However, there were media reports in the past indicating that the assistant can be activated accidentally.

The concepts of sustainable development and industry 4.0

The concept of sustainable development has been incorporated into the principles of building knowledge-based economy which was promoted by the Lisbon Strategy launched in 2000. A sustainable, knowledge-based economy



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defined this way facilitates efficient knowledge management as well as introduction and dissemination of the results of innovation activity. The aim of adopting the assumptions of the concept of industry 4.0 is to accelerate the transformation of production businesses into smart factories in which networks based on information and communication technologies connect machines, processes, systems, products, customers and suppliers. It should be stressed that meeting those requirements is particularly important for management staff of production businesses because at the foundation of the industry 4.0 are, among others: cyberphysical systems, internet of things, information and communication infrastructure, organisational learning processes and open innovation.

Author's attempt to define the notion of artificial intelligence from the sociological perspective

For the purpose of further research, it was assumed that artificial intelligence is a technological creation designed by human which is capable of self-learning and self-improving using available information resources constituting the domain of its operation. AI is able to independently acquire and accumulate knowledge using accessible databases and, on that basis, improve optimal values of decision variables taking into account interactions with humans or other intelligent agents. AI has a social value, usefulness and potential ability to formulate rational and irrational forms of behaviour. For this reason, AI displays social nature and ultimately affects social phenomena occurring within groups of real people. As a human creation, AI is always focused on a specific target and its behaviour should always be possible to foresee. However, the effects of its behaviour on humans are not so obvious because they are a result of interference with human actions. At this point, one issue should be clarified – irrationality of AI behaviour is apparent because it is always a result of uploaded algorithms which may not be perfect and contain errors. They are potential source of danger which in the future can be posed by the existence of bots with a wide range of duties.

AI as the subject of research in Poland – analysis of report prepared by OPI

The report consists of several parts:

- results of the Polish Scientific Bibliography (PSD) database queries conducted using a list of key words, on publications of researchers representing all disciplines of science,
- analysis of the output of researchers representing computer and information sciences under natural sciences or information and communication technology,
- statistical data based on PSD database queries on articles published in top AI-focused computer science journals,
- maps presenting centres employing researchers who publish studies on AI or articles in top AI-focused computer science journals,
- analysis of publishing strategies of selected research centres
- appendix with methodological remarks

Majority of the report concentrates on achievements of researchers from information and computer technology, however, it contains many useful guidelines for researchers from the field of the humanities and social sciences. It is worth to analyse the contents of the report in more depth to learn about research topics, localisation of research centres and search for research collaborators.

Potential topics of research on AI in the social sciences

- Danger of dehumanisation – The ability to make logical associations and draw proper conclusions will characterise a narrow group of people and machines. This may bring changes in social structure, social positions of individual members of a society and may even lead to granting social status to machines.
- Anomie in social and interpersonal relations – Contact with a real person may soon become extremely stressful and the ability to handle such situations will be one of the most highly demanded skills. Behaviour of machines will be easily predictable while that of a human still not. Perhaps a new kind of human-intelligent machine-social group relation will develop which may have its psychological and social consequences for individuals.
- Surveillance – the spectre of Big Brother – ways of using information on groups of people and individuals should also be considered. Political regimes can collect and exploit specific pieces of information using certain software. Some doubts may be raised with regard to the purpose of processing such data.
- Education – in the area of education pressure should be exerted on developing practical skills related to life outside the virtual reality, for example managing in situations such as power outage. The concept of sustainable development and its assumption of harmony between the spheres of economy, natural environment and society can facilitate development of global sensitivity which can constitute an interesting



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research subject.

- Issue of the digitally excluded – humanity does not develop everywhere at the same pace and global picture of this problem raises a number of questions. Disparities in wealth between counties may not be as significant as the differences in the degree of their network coverage and technologisation. Less developed countries or regions will avoid a number of dangers posed by AI.
- Labour market and corporate digital responsibility – Changes in labour market induced by introduction of new technologies will have an enormous impact on making some professions extinct and on the emergence of new ones. Despite appearances, it will not be related to the level of required education but to possibility of technologisation of a given job.
- AI in various areas related to law – although legal systems are unstable or even internally contradictory, AI allows to search databases for solutions of simple legal problems. Such assistance can find application in less complicated cases.

Conclusions

The epoch of industry 4.0 gave humanity chance to introduce many improvements into everyday life. The degree of their technological complexity had social significance because it resulted in the emergence of new interpersonal relations, new social phenomena, dangers and new directions of positive changes. A sociologist, as a social life observer following the thoroughness principle of research ethics, should start from defining this notion and determining potential directions of research. Until now, the research on AI conducted by various research centres has been focused within the area of information and communication technology. The conducted analysis constitutes an incentive to direct sociological research towards the area of artificial intelligence and search for support from interdisciplinary teams. Extremely important in this context is the concept of sustainable development which allows to present the complete picture of this issue.



SOCIAL PROTESTS AGAINST 5G TECHNOLOGY DURING A PANDEMIC. CASE STUDY

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Poland, following Europe and the rest of the world, faces an implementation of next generation mobile networks technology – 5G. Internationally standardized technology enters the implementation and commercialization phase – first as the network for business services (B2B) and for general customers services (B2C) later on.

5G technology is used to describe fifth generation of mobile telecommunications network systems providing (phone) voice calls and data communication, including an access to the Internet. As such 5G is not a new technology. It is a newest upgrade to a technology path, which started at the beginning of 80's with a mobile analogue telephony (1G), upgraded in 1991 to digital mobile telephony with short text messages (SMS) feature added (2G). Key development for this technology path appeared at the beginning of XXI century, when 3G release provided fast data transmission and Internet access (from 14Mb/s to 28 Mb/s), which was yet more upgraded and released for commercial use in 2009 as the 4G version allowing data transmission rate even up 300 Mb/s in lab tests. The 5G release, currently implemented after 10 years from the previous one, will provide not only 60x faster data transmission rates (up to 20Gb/s), but will also allow for much more devices per square kilometre (up to 1 million for 5G comparable to up 1 thousand for 4G) and will radically reduce delays in transmission in the radio network (from 50 milliseconds in 4G down to 1 millisecond in 5G).

The technology of 5G mobile communications networks will constitute the base for innovations for other industries, eg. manufacturing automation, autonomous transportation, smart cities and homes and the Internet of Things, telemedicine or agriculture. Products and services enabled on the basis of 5G technology will have to be invented.

At the same time as the discussion on 5G starts social protests are rising. The protesters demand to completely ban the 5G technology.

Protesters' main concerns are related to the fact that the 5G network can be used to track people and control minds, chip the population, cause cancer, and recently there is a growing concern that 5G masts may distribute coronavirus or other diseases. In addition, there are allegations against the public administration that the introduction of the new technology was not consulted with citizens. Organized protests are global and take place, among others, in many European countries as well as in the United States of America. Most often they are initiated by organized opposition groups such as "Koalicja – Polska wolna od 5G" or the Lithuanian "Referendumas dėl 5G ryšio diegimo Lietuvoje". Such groups bring together people, who are really afraid of new technology, but also those, who are trying to earn on a social fear. Some scientists are also joining the protesters.

On September 2017, 180 scientists published an open letter against 5G – „5G Appeal”. The letter contains general warnings, focusing on potential health and environmental risks of the 5G technology and it calls for a memorandum for worldwide development of the 5G networks. Despite the number of signatures suggesting scientific character of the letter it contains information, which are not actual, not completely true nor accurate. The language is emotional and fear relating not scientific one and proof relating. The 5G Appeal triggered Polish City of Cracow activists, who organized official city magistrate conference to warn that 5G technology will increase emission of an invisible enemy – electrosmog – a short word created from electromagnetic smog, which tries to compare electromagnetic waves used to transfer information to a real pollution from pollen and dust; sulphur oxides, volatile organic compounds (VOCs), nitrogen oxides (NOx) and ammonia gas. People who presented themselves as “independent scientists” alert against 5G as „a strategic network to transmit torsion fields in order to implant it to organism of unaware consumers” (dr. Diana Wojtkowiak, Gdańsk, “independent scientist”), or as „a tool for massive mind control” (Ewa Paweła, Witold Hake, “mind control whistleblowers in Poland”). During the same „international scientific” conference Mieczysław Chorzempa, from „StopZET” society warns against electromagnetic tortures (February 20019).

Information proliferated by the people opposing 5G technology are aimed to raise fear, as they connect the new technology to health, environment or even life hazards. Typical communications base on a lack of expert knowledge of addressees, often connected with their social alienation. The disinformation often targets people socially excluded or marginalized, very often left aside in the course of social changes or generally not up to date with adaptation to new technologies.

Growing fear causes violence to occur. In many European countries, telecommunication masts have burned or destroyed in other ways in recent months. Usually they did not serve even the 5G network. Such cases have been, among others, in Poland, Italy, Great Britain or the Netherlands. Advices on how to destroy the infrastructure are proliferated via Internet, many times in closed groups using social media. How can this escalation be prevented?

The proper answer to prevent anti-5G protests is through strengthening social skills to evaluate information and its sources, especially on the Internet. It should be accompanied by education on practical individual and social benefits of efficient mobile connectivity, which wcan be seen s especially during the pandemic lock-in at homes. In order to achieve the above goals an evaluation and potential adjustments to the process of technology assessment are recommended. Results of TA should be socially accessible. Such results should be presented in plain and understandable language and communications should be based on facts and be conclusive.



THE EFFECTS OF THE BIG FIVE PERSONALITY TRAITS ON STRESS AMONG ROBOT PROGRAMMING STUDENTS

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The implementation of modern technologies at work, especially industrial robots, is accompanied by a debate on the threats they bring [1] and ways of guaranteeing their human operators' safety [2]. Two particularly important issues in the debate are those of physical and psychological safety. The former is ensured by avoiding direct contact between the human and the robot or by using the lowest levels of robot power when the contact is necessary [2]. Psychological security concerns the fact that robots should neither scare or surprise humans nor dissatisfy them [3] or induce stress with the robot's appearance, gaze, speech or sounds, posture, or other qualities [2,4]. Therefore, stress evaluation is an essential requirement for human-robot interaction.

The aim of the research, which we would like to present, was to determine whether the personality traits of the Big Five model [5] are predictors of stress defined in the transactional theory [6]. The research was conducted from the perspective of psychology, which constitutes a valuable complement for considerations undertaken in the field of technical sciences [7].

According to the transactional approach to stress, stress can be defined as "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" [6, p.19], making a cognitive appraisal of a situation essential in determining the stress experience. The appraisal process consists of two stages. In primary appraisal, the person refers to the significance of a given situation to themselves. In secondary appraisal, the individual assesses the chances of coping with the requirements of the situation, basing the assessment on their own abilities and the control they have. Basing on primary and secondary appraisal, the individual undertakes actions aimed at coping with stress [8, 9]. Personality is an important concept in discussions of stress [9-11]. It determines how individuals assess a situation as harm, a threat, or a challenge [7]. We used the Big Five model, which is considered to be the most universal and often employed as a theoretical framework in human-robot interaction studies focused on the role of personality of robot operators [13]. In the Big Five model, the structure of personality consists of the following dimensions: (a) extraversion; (b) emotional stability (vs. neuroticism); (c) openness to experience; (d) agreeableness; (e) conscientiousness [5]. Results of studies on the highly conscientious people and with high scores in Extraversion and Neuroticism scales indicate that they assess the situation as stressful more often [15, 9, 10, 16, 14, 17]. Simultaneously highly agreeable people are more resistant against stress in sudden or chronic situations [9, 18].

The premise of personality theories in HRI is that human traits can determine the presence or absence and the quality of the interaction between the robot and its human operator [13]. To the best of our knowledge, only one study so far has discussed the issues of personality and stress in HRI. Takayama and Pantofaru [19] proved that agreeable individuals moved closer to a robot, whereas highly neurotic people (ones with low emotional stability) maintained greater distance both from a teleoperated robot and from an approaching autonomous robot.

Despite the significant research results concerning objective and subjective reactions to a robot, no analysis so far has been conducted using the transactional stress theory and the Big Five model of personality traits. These theories are valuable psychological complements for technical studies and enable an application of validated tools, which in turn enable comparisons between groups and replication of studies [20]. For this reason, and taking into account the analysis conducted so far, we propose the following hypotheses:

H1: Extraversion, emotional stability, openness to experience, and agreeableness have are negative predictors of primary stress appraisal, and conscientiousness is a positive predictor of primary stress appraisal.

H2: Extraversion, emotional stability, openness to experience, agreeableness, and conscientiousness are positive predictors of secondary stress appraisal.

There were 105 participants in the study. They were recruited among fourth-year students who had to complete the mandatory classes in automation and robotization. These were the first project-based classes in the study program, during which the students were commissioning and programming several types of robots of different brands. None of the participants had familiarity with industrial robots before the time of the course.

The study procedure assumed measurement in three waves, during the second meeting of the course and six weeks after the first measurement, and after the next six weeks. Using TIPI and PASA questionnaires, we gathered information about the students' personality, the level of anticipated stress, and the stress experienced while working with a robot after six and twelve weeks.

The obtained results prove that emotional stability is significant for secondary appraisal of anticipated stress. The results also show that openness to experience is a negative predictor, whereas conscientiousness is a positive predictor of primary stress appraisal. The ability to cope with stress after 12 weeks of work with a robot is appraised as higher by older, more conscientious, and introverted people.

The results are discussed from the psychological perspective of stress and personality, which complements earlier studies in technical sciences. Among the limitations of the study, we indicated the size of the sample as well as its inhomogenous character (students, mainly men). The final limitation regards to focusing exclusively on the direct relationship between The Big Five personality traits and psychological stress, and we did not include any potential



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mediators and moderators. Therefore, future explorations should include other personality traits (e.g., core self-evaluations, the propensity to trust, or resiliency), attitudes towards robots, and state-like variables (e.g., positive and negative emotions or trust towards robots). These constructs could be examined as having the potential to explain the mechanism of the relationship between personality traits and psychological stress among humans who operate robots.

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JUST TRANSITION OF SILESIA – ECONOMIC TRANSFORMATION OF THE POST-INDUSTRIAL REGION IN ACCORDANCE WITH THE SENSE OF SOCIAL JUSTICE – BASED ON RESEARCH PROJECT FOR THE WWF POLAND

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Introduction

At the beginning of the 1990s, the Katowice voivodship (after January 1, 1999 – Śląskie Voivodship), as well as other regions of the country, faced dramatic challenges related to the need to transform and modernize the Polish economy.

After three decades of transformation, the Śląskie Voivodeship still remains the most industrialized region in Poland and one of the most industrialized areas in Europe. The number of people employed in the industrial sector in this region accounts for over 17% of all people working in the Polish industry. The pillars of the economy of the Śląskie Voivodeship are both old, traditional industries strongly inscribed in the history and tradition of the region, as well as modern industries related to new technologies and a different organizational culture.

The restructuring of the once dominant branches of industry (mainly mining and metallurgical) has resulted in many unforeseen negative phenomena, such as destabilization and pauperization of workers' environments, degradation of urban space, the emergence of extensive urban fallow lands and the destruction of post-mining or former buildings, the emergence of poverty enclaves, dependent on social aid institutions, threatened by social exclusion (Wódz, Wódz 2006).

At COP 21 in Paris, countries committed to keep global warming well below two degrees Celsius compared to pre-industrial levels. These commitments imply that the collective ambition of the world is now to shift to carbon-neutrality within a few decades. To reach that goal, the Paris agreement has created a global system made of national policy planning and multilateral review will lead countries to design mid-term and long-term economy-wide low-carbon strategies and to carefully monitor their implementation. (Involving trade unions in climate action to build a just transition – project coordinated by the ETUC, 2018).

The shift from a high-carbon to a zero-carbon economy and to one that is also resilient to the physical impacts of climate change should have far-reaching implications for growth, employment and investment. Governed well, this shift will deliver significant economic, environmental and social gains. But there will still be significant transitional implications for key sectors, regions and countries. The task is to manage this process so that the transition is not just environmentally effective and economically efficient, but also socially inclusive. (Robins, Brunsting and Wood, 2018 p. 2).

Methodology

This article is based on the results of sociological empirical research being the result of the project entitled Fair Transformation Eastern and Southern Europe co-financed by the European Initiative for Climate Protection (EUKI) implemented by WiseEuropa – Fundacja Warszawski Instytut Studiów Ekonomicznych i Europejskich commissioned by WWF Polska. The report was prepared by a team of researchers from the Institute of Sociology of the University of Silesia: Prof. zw. dr hab. Kazimiera Wódz, dr Witold Mandrysz and mgr Maciej Klimek.

The research was qualitative and used the in-depth interview method, which is similar to the free interview due to the lack of a rigid interview questionnaire. It allows a lot of independence for the interviewer, but also a lot of freedom in how the respondent answers. The subjects discussed in the interviews with experts were adapted to the profile and scope of expert knowledge resulting mainly from professional experience, social status or the role of a privileged observer of a given respondent.

Discussion

Evaluation of the existing heavy industry restructuring programs in Silesia and the Dąbrowa Basin:

Referring to the overall assessment of actions taken in the field of industrial restructuring, respondents express the difficulty of providing a clear opinion. It is noted that when assessing such activities in retrospect, they are burdened with the simplification trap. Simple comparisons of restructuring processes implemented in Poland with similar processes implemented in more developed countries such as Germany, France or Great Britain cannot be made either.

It is noted that industrial restructuring cannot be treated as a naturally occurring economic process, which is determined only by economic factors – there is a high level of politicization of this type of decision. And the factor that



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further complicates these processes in Poland is the lack of political decision continuity in the context of restructuring activities and even in the scope of continuing long-term directions of economic development.

A trade union representative points out that we are dealing not so much with the restructuring of industry as with the liquidation of production plants. He even claims that the use of the term liquidation is unauthorized, since in many cases mining plants were only closed/excluded from production and the scope of their actual liquidation was only symbolic. Very often, the problem of unused and unprotected mining excavations remained unresolved.

Potential directions of regional development

In connection with industrialization, whose tradition goes back several generations, we have great human potential in the region, both in the context of competences, abilities and work culture. At the same time, the process of urbanization was running along with the industrialization process, which, apart from the factor building population strength, influenced the development of intra-regional communication. Both of these factors constitute a very favorable situation for the development of consumption.

The development potential of the region based on the development of industry and energy is emphasized – hard coal mining as a guarantee of the country's energy security. As coal resources are limited, it should be mainly resources for the functioning of the energy sector and not fuel for heating individual households.

The energy industry is a particularly sensitive industry where multi-year strategic planning is necessary, which in our country has and cannot be treated in an experimental way.

There were also voices of respondents who believe that the development of the region can be implemented as part of innovative ideas for the restructuring of heavy industry, especially the mining industry. This innovation can to a large extent be associated with the constantly increasing demand for electricity while limiting its current, traditional forms of production due to their harmfulness to the environment:

- energy storage as part of pumped storage hydro power plants;
- use of degraded post-industrial area (e.g. heaps) as space for solar farms
- creating complementary sets consisting of photovoltaic farms and hydro-pumped storage;
- an industry of innovative solutions in the field of pro-ecological technologies, where a post-industrial degraded area can constitute a natural experimental laboratory;
- greater use of coal in the modern chemical industry seeking innovative ways to use it based on new original technologies that could become a driving force for regional development;

Conclusions – the necessary conditions for just transformation

The basis for planning and then implementing transformation programs should be a broad consensus that goes beyond particular political or industry interests. However, this requires an appropriate attitude on the side of politicians, decision-makers, trade unions, the local government and other actors of this process. These programs must be based on permanent agreement as to their implementation. This consent should consist in continuing the planned intentions regardless of the changing balance of political forces.

The condition for recognition, by broad social groups, of planned transformation programs as fair is the possibility of becoming familiar with the inevitability of upcoming changes. However, these changes should be seen in terms of positive change, improvement of the situation and hope for a better tomorrow. Just Transformation should create solutions acceptable for those who directly touch them, based on the competences they possess and values that allow them to see their place in the new planned situation in accordance with their identity.

All these elements require time, the consent of all social actors and the maintenance of consistency in action. At the same time, this logically related action plan should be subjected to successive qualitative evaluation that allows verification of the level of achievement of assumptions and monitoring the need for any corrections.



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CARE FARMS IN RURAL DEVELOPMENT IN THE FACE OF DEMOGRAPHIC CHALLENGES – THE PROJECT ASSUMPTIONS

Dr hab. Wioletta Knapik, prof. UR, University of Agriculture in Krakow

European societies are aging rapidly and nothing indicates that this process will slow in the next several decades. The number of individuals of productive age will decrease, while there will be increasing numbers of elderly individuals. This problem poses an enormous challenge to the state, as it will be its task to create a better system of care that will ensure elderly people decent living conditions (Kurek, 2011; Greenawalt, 2014; Sykes & Robinson, 2014).

If the health status or social conditions of an older person do not permit care to be given at home, he or she can be placed in a social care facility. In such facilities, individuals are placed who suffer from symptoms of dementia or high degrees of physical disability that prevent them from completing even the most basic actions. Generally, the waiting time for a place in a care home is long, and so efforts must begin quite early to seek a place for an elderly person in a facility.

In Poland, 1% of the elderly in total are in the care of social care homes. These places play an important role in their lives. First, they ensure that they have decent living conditions, and secondly, sustenance. They also guarantee medical care, appropriate therapeutic rehabilitation, and maintain the activity of those in their care. This happens mainly thanks to the wide cultural and educational services offered by these institutions. They also organize occupational therapy, care for recreational activities, and positively shape interpersonal relationships. On the other hand, older individuals who do not need around-the-clock care can take advantage of social adult day care centres. These facilities, aside from providing basic medical care, provide the opportunity to make the most of seniors' free time. They can take part in various kinds of activities, such as day trips, lectures and talks, or group trips to the cinema or theatre. Such offerings are often free or charge only a token fee. Seniors also receive meals (also as take-away) as well as care. These facilities provide support for solitary individuals. A certain novelty (operating in Poland since 2001) are family care homes, which are reminiscent of foster homes, with the difference that those receiving care are older individuals. Like in social care homes, seniors receive around-the-clock care and meals, but the carers can provide more time to each person, because in such a home there are only between three and eight people under care. Another form of social care is assisted living. This is a form of community-based care, in which assistance is provided to older individuals who remain in their homes. Deserving of mention also are facilities which rely on the initiative of volunteers, who themselves are more and more often older people themselves. The motive that moves seniors to volunteer to provide assistance to those in need is their own need for contact with others, as by helping others, they feel useful and needed. They then begin to believe in themselves and do not remain closed in their own world. They open up to others. This work, even though there is no financial reward, provides seniors with a deep sense of inner satisfaction. This testifies to the great desire older people have to help others (Leszko et al., 2015).

The author presents the project assumptions entitled "Care farms in rural development in the face of demographic challenges"; ID 381773, co-financed by the National Center for Research and Development under the program "Social and economic development of Poland in the conditions of globalizing markets", Gospostrateg Contract No. 1/381773/17/NCBR/2018.

The main objectives of the GROWID project are to develop a model of a care farm and to prepare a system for its implementation. These actions are a response to the syndrome of problems constituting the demographic trap phenomenon diagnosed in the Strategy for Responsible Development. The proposed project will also contribute to the elimination of other barriers to development that are important for Poland, such as:

- inequalities between cities and rural areas in access to social services,
- problems with the organisation of public services at local level,
- poor quality of social capital and social inequalities,
- insufficient coordination of public policies.

In the first stage of the project research tasks will be carried out, the results of which will become the basis for the model of a care farm. The second stage consists of work related to the preparation for the implementation of the model: developing the necessary legal regulations and building political, and social support for their introduction.



Global competition, requirements of the sustainable development, building innovative economy or the Industry 4.0 develop the needs for creating new or changing the legacy business models. Competences adequate to new working possibilities play significant role in these changes. The key role played here is the assessment of fit to work in the Industry 4.0. The objective of the paper is to analyse the fit to work in the business models using the features and elements of the Industry 4.0. There are specific antecedences identified for creating and changing business models in the aspect of implementing the Industry 4.0 with particular attention paid to the meaning of competences and their adaptation for the 4.0 requirements. Quantitative studies have been performed on the sample of 472 employees of the Industry 4.0 in 3 countries: Germany, Poland and Slovakia. Theoretical and empirical considerations use the four-factor model differentiating the supplementary and complementary fit, organizational identification and satisfaction from work.

A FRAMEWORK OF ACTION FOR IMPLEMENTATION OF INDUSTRY 4.0. AN EMPIRICALLY BASED RESEARCH

Authors: Artur Pollak, Agata Hilarowicz *, Maciej Walczak, Damian Gąsiorek

Background.

(Def.) I4.0 can be defined as a real-time, intelligent, horizontal, and vertical networking of people, machines, objects, and information and communication systems with the aim of dynamically controlling complex systems. It is often defined by the prism of consolidated modern technologies, which at the same time allow for convergence between industrial and business components and production models and internal processes of enterprises.

Industry 4.0 (I4.0) is becoming increasingly important both as a construct and a trend toward technological changes in industry and the economy as a consequence of digital transformation.

The transformation towards I4.0 is a noticeable phenomenon in many countries, but its range and intensity vary. In managerial practice, detailed research has not yet been documented to a sufficient extent, as a comprehensive implementation of I4.0 is still in works. In Poland empirical studies on constraints and challenges relevant to the implementation of I4.0 in companies are scarce. This reflects the relatively low level of I4.0 development despite the increasing digitization of the economy and industry. At the current stage of development, it is still difficult to talk about the unequivocal consequences of implementing I4.0.

Aim of the article.

The purpose of the article is to present the results of the research regarding industry specifics and attributes, issues related to the preparation of companies for I4.0, including limitations appearing early on in the process, and difficulties arising in the later stages.

Materials and Method.

The advantage of the study is its empirical nature. A quantitative, empirical study design was chosen. To explore the potential constraints and challenges of I4.0, a diagnostic survey method using a well-structured questionnaire was applied.

The research involved 39 subject matter experts: managers, business owners and specialists responsible for the process of implementing innovations in enterprises, including those actively involved in the creation of I4.0. Respondents come from Upper Silesia – the most industrialized region in Poland, where the automotive industry is dominant. They were recruited from among MBA students with I4.0 focus and from the members of the Industrial Transformation Team at the Ministry of Development of the Republic of Poland, participating in the New Economy Forum.

Research Questions.

The study answers the research question of how manufacturing companies in the region of Silesia (Poland) perceive the constraints and challenges in the context of transformation toward I4.0?

More specifically the following research questions (RQ) have been formulated:

RQ1: Which of the perceived constraints of I4.0 implementation are critical?

RQ2: Are there differences in the perception of difficulties at the different stages of development of I4.0 (implementation phase and subsequent feasibility)?

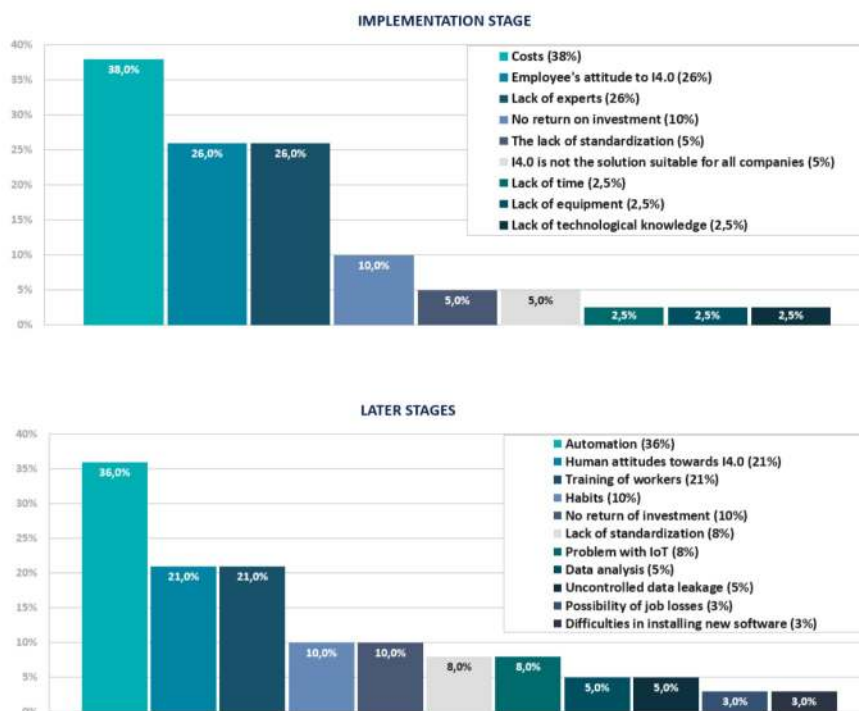
RQ3: Is it necessary to use all I4.0 pillars to include the company in I4.0?

RQ4: Which technology is the most important from the point of view of I4.0 development?



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Results: Q1. Q2



Attributes of I4.0.

Q3. Perception of I4.0 framework

Respondents closely identify the concept of "I4.0" as well as its attributes with modern technologies. When asked "what best describes I4.0" the vast majority (59%) indicates IoT, slightly more than half 51% points to BDA, and 26% mentions automation and robotization. Part of the respondents refers to innovation (10%) and about 8% draws attention to the aspect of cooperation between people and machines. Interestingly, the smallest percentage described I4.0 through AI.



Innovativeness
Adapted to companies AI
Data Analytics
Human-machines cooperation
IOT Automatization
Digitalization

Q4.



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Impact of digital transformation on the business ecosystem

Indicated Response	Frequency	Percent
3 – to a small extent	1	2,6
4 – average	3	7,7
5 – to a relatively large extent	10	25,6
6 – to a large extent	16	41,0
7 – to a very large extent	7	17,9

Conclusions.

- Due to the uneven level of development of I4.0 in Poland and to the fact that this is a relatively new phenomenon, it is difficult to clearly indicate its consequences at the moment.
- When creating the I4.0 development strategy, one should take into account the constraints and to conduct research on the possibilities, difficulties and challenges I4.0 may offer in various aspects, taking into account variables from a wide range of areas, including technological, economic and social.
- The results of the study show some constraints and challenges that arise in the implementation of I4.0 in the context of SMEs, and they can be relevant for both industry researchers, practitioners and managers
- The paper creates a framework for future research in order to analyze the implementation of I4.0
- The conducted type of research has its limitations, which need to be mentioned. The sample size was small, which is largely due to the low level of I4.0 development in Poland and the difficulty in reaching respondents.
- Further analysis of barriers and challenges could include a more accurate measurement of the importance of each factor.



PERSONALITY TRAITS AND MOTIVATION AS PREDICTORS OF SYMPTOMS OF PROBLEMATIC BINGE-WATCHING

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Advance in new technologies created a new form of consuming television. Binge-watching can be highly entertaining behaviour, but its excessive forms could lead to development of risk of addiction. The aim of the study was to identify psychological predictors of symptoms of problematic binge-watching and to establish on what devices and platforms young people tend to binge-watch. The result of the study indicate that young Polish adults usually binge-watch on laptops and smartphones by using the Internet – streaming platforms or other websites. The low consciousness was the strongest predictor of symptoms of binge-watching from all the personality traits. Furthermore, low Agreeableness, low Emotional Stability and low Intellect were also significant predictors of problematic binge-watching. Moreover, escape motivation was the stronger predictor from all motivational variables.



EMPATHY AND OXIDATIVE STRESS IN HEALTHY ADULTS

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Empathy is crucial for normal and effective social functioning, enabling to comprehend and to predict actions in social environment. Despite its importance for maintaining social relationships in human groups, the physiological correlates of empathy are not fully known. The aim of this study was to test whether empathy is related to oxidative stress level, that may result both from internal disturbances and influence of external adverse factors. Seventy four healthy women ($M_{age}=26.23$, $SD_{age}=2.88$) and one hundred and one men ($M_{age}=28.09$, $SD_{age}=3.03$) took part in the study. Participant's empathy was evaluated with self-assessment questionnaire – Empathy Quotient (EQ). Oxidative stress level was measured with serum 8-OHdG, a product of oxidative DNA damage. The results showed that empathy is negatively related to oxidative stress level in men but not in women, also when controlled for testosterone level. Revealed sex differences may be explained by men's greater vulnerability to various adverse conditions and harmful factors. Men, compared to women, seem to be more susceptible to behavioral changes, induced by increased oxidative stress level. The study adds to growing evidence showing that many physiological mechanisms, other than hormonal factors, that may be also related with environmental harmful factors, are related to behavioral, affective and cognitive phenomena.



CAN INFORMATION ABOUT PANDEMIC INCREASE NEGATIVE ATTITUDES TOWARD FOREIGN GROUPS? A CASE OF COVID-19 OUTBREAK

Dr hab. Piotr Sorokowski prof. UWr, mgr Marta Kowal, Uniwersytet Wrocławski, Wrocław

Pathogen threat can translate into a willingness to distance oneself from others on a psychological level. Building on this notion, we predicted that the ongoing coronavirus pandemic can affect attitudes toward foreign nationalities. We explored the intergroup consequences of the current epidemiological situation in two studies involving a total of 652 participants. In correlational Study 1, we showed a positive relationship between media exposure in the United Kingdom (UK) and in Poland, and prejudice to four foreign nationalities. Study 2 showed that negative affect toward Italians (i.e., a nation struggling with the most severe COVID-19 outbreak at the time of the study) was indirectly predicted by exposure to news about coronavirus through the increase in anxiety, but this effect was not observed when a generalized measure of prejudice was considered. Overall, our studies revealed that prejudice and anxiety are sensitive to the current epidemiological situation, and our findings suggest that the outbreak of COVID-19 may translate into severe social consequences and increased psychological distancing to nations most affected by the pandemic.



ONSET OF AN OLD AGE IN TRADITIONAL AND MODERN POPULATIONS – COMPARISON BETWEEN HADZA AND POLAND

Mgr Marta Kowal, dr hab. Piotr Sorokowski, prof. UWr, Uniwersytet Wrocławski, Wrocław

Despite a relatively clear physiological indicators of an old age little is known about psychological perception of elderly people and cross-cultural differences with this regard. Recent studies suggest consistency between modern countries, however a subjective perception of timing of an old age in traditional societies remains poorly explored. To this end, we examined the perception of timing of an old age among the traditional tribe of hunter-gatherers – the Hadza, and compared it with Polish sample representing a modern, industrialized population. Results of our investigation point to the significantly earlier beginning of an old age among Hadza than among Poles. Furthermore, we found between-gender difference in the Polish sample wherein men set lower threshold of an old age as compared to women. No between-gender difference was found in Hadza. We discuss these findings from cultural and demographical perspective.



MODERNIZATION AND PERCEPTIONS OF AGING AMONG THE DANI IN PAPUA: THE ROLE OF URBANIZATION AND LITERACY

Mgr Marta Kowal, dr hab. Piotr Sorokowski, prof. UWr, Uniwersytet Wrocławski, Wrocław

It has been hypothesized that – among indigenous and rural populations – modernization is associated with more negative perceptions of aging and older adults. The present study empirically tested this premise among the Dani society (Baliem Valley, West Papua) with respect to the macro-level factor of urbanization and the individual-level factor of literacy. Sixty-one Dani people were asked to nominate two individuals they knew within each of the following categories: (1) most respected, (2) best source of life and problem-solving advice, and (3) most satisfied with life. They also reported the age and gender of the nominees. Urbanization was associated with nominating younger targets in the respect category, whereas literacy was associated with nominating younger targets in the life advice and life satisfaction categories. This suggests differential effects of modernization on specific aspects of aging perceptions.



CLIMATE AND TIES IN WORKPLACE VERSUS SENSE OF DANGER AND STRESS, BASED ON EMPIRICAL RESEARCH IN AVIATION INDUSTRY

Dr Magdalena Ślęzyk-Sobol, Uniwersytet Wrocławski

Mgr Maria Flakus, Uniwersytet Śląski

Dr hab Małgorzata Dobrowolska, prof. PŚ, Politechnika Śląska

The climate of workplace as well as the issues of relations and ties in the professional environment have long aroused considerable interest among psychologists and management practitioners. The organisational climate, which is defined as a set of beliefs about the organisation, its relations, the atmosphere of workplace, circulation of communication, development opportunities, etc., has often been associated with well-being and job satisfaction. Performing work related to numerous stress factors and difficult situations may significantly affect how both the professional environment and employees' well-being are perceived. Ties in the workplace are defined as the quality and depth of relations between members of an organisation. The aim of the empirical research presented herein is to verify the assumption about mutual relations between such variables as: the perceived climate of the workplace and interpersonal bonds as well as experiencing negative emotional states, such as the sense of danger and stress. Additionally, in the course of statistical analyses, models were built to predict the sense of danger and stress among the surveyed population – aviation industry workers. A hierarchical regression analysis was carried out in order to determine which of the variables allow to predict the sense of danger and stress in the examined occupational group. The interest in employees from the aviation sector stems from the lack of empirical data on how people working in this industry are functioning psychologically. This branch of industry is currently developing extremely dynamically and is expected to evolve even more in the wake of the industrial revolution 4.0. Meanwhile, in the light of automation and specificity of the industry in question, not much attention is paid to human resources, who – while cooperating in various teams (organic and inorganic) – experience various challenges as well as difficulties resulting from their professional work.

The study included 326 persons working in the aviation sector (holding posts such as security specialist, aircraft mechanic, assistant mechanic, aviation engineer, manager, manual worker, aircraft structural repair technician, rescue firefighter, chemical technician, etc.). The average age of the subjects was 39.3 (SD = 10.7). Their total professional experience amounted to an average of 16.7 (SD = 11.3) and their professional experience at the given post amounted to an average of 9.01 (SD = 2.5). All the subjects were notified about the goal of the research and they agreed to participate in the research.

With regard to the aim of the research, the following research questions were formulated:

- 1) Are there any and what are potential correlations between the perception of ties and climate of organization and the sense of stress and the sense of threat of aviation sector employees?
- 2) Which of the variables subjected to the study (constituents of the climate of the workplace and the quality of ties in the workplace) allow forecasting the level of the sense of threat and perceived stress in the researched professional group?

The research applied The Feeling of Threat at Work Questionnaire by Mamcarz (15). The tool helps to measure the sense of threat understood as experiences of concerns related to the consequences of current / potential dangers in the workplace. It consists of 54 statements assessed on a 5-point Likert scale. It allows measurement of three indicators: internal discomfort, concerns about current threats and striving to avoid the danger.

The tool applied to measure the perceived stress was The Stress Perception Questionnaire by Plopa and Makarowski [24]. This tool consists of 27 items assessed on a 5-point Likert scale. Particular questions of the questionnaire create the following scales: emotional tension referring to experiencing high level of anxiety, insecurity, extreme fatigue and resource depletion. The next scale measures the level of external stress, referred to as experiencing stress in situations exceeding the abilities of the individual (such as mismatched tasks, work area), as well as the sense of being unjustly assessed and rated by others. This aspect is characterized by experiencing the sense of helplessness and solitude. The third studied aspect is the level of intrapsychic stress, expressed by the lack of ability to deal with experienced emotional states. This scale expresses pessimism, negative perception of oneself and the external world.

The quality of ties in the workplace was measured by the Scale of Ties in the Workplace based on the Social Ties Scale of Skarżyńska [25]. Six items from the original version of the scale were used. The subjects expressed the level of satisfaction from the ties with reference to professional environment and people they cooperate with on a 5-point Likert scale.

The workplace climate is assessed by means of the 29-item Areas of Worklife Questionnaire by Izwantowska and Terelak [26] which, also on a 5-point Likert scale, facilitates the assessment of the following areas: workload, sense of control at work, perception of social support, organizational support assessment, and compliance of the employee values with the organizational values.



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The main results concerning all researched connections will be presented during the presentation. In this abstract only analysis of regression will be presented.

The analysis of regression indicated that some variables related to the assessment of the climate of organization allow foreseeing the level of threat ($R^2 = .119$; $F [6, 319] = 7.211$; $p < 0.001$). Including the assessment of ties in the workplace to the regression model caused a small, but statistically meaningful increase of the explained variance of the model ($\Delta R^2 = .013$; $F [1, 318] = 4.671$; $p = .031$). The final model explained 13% of variability regarding the sense of threat ($R^2 = .132$; $F [7, 318] = 6.921$; $p < .001$). In this model the significant predictors of the sense of threat were the assessment of workload ($\beta = -.184$; $s.e. = .29$; $t = -3.297$; $p < .001$), assessment of community ($\beta = -.272$; $s.e. = .52$; $t = -3.916$; $p < 0.001$) and assessment of ties in the workplace ($\beta = .115$; $s.e. = .51$; $t = 2.162$; $p = .031$). The lower the rating of workload and the rating of community and the higher the rating of ties in the workplace, the subjects were characterized by the higher sense of threat.

Another analysis of regression showed that some variables related to the assessment of the climate of organization allow foreseeing the stress level ($R^2 = .067$; $F [6, 319] = 3.822$; $p = .001$). Including the assessment of ties in the workplace caused a statistically meaningless increase of the explained variance of the model ($\Delta R^2 = .006$; $F [1, 318] = 1.991$; $p = .159$). In the last step, the sense of threat was included in the model, which caused a statistically meaningful change regarding the variance explained by the model ($\Delta R^2 = .042$; $F [1, 317] = 14.891$; $p < .001$). The final model explained 12% of variability regarding the sense of stress ($R^2 = .115$; $F [8, 317] = 5.122$; $p < .001$). In this model the significant predictors of the sense of stress were the assessment of workload ($\beta = -.120$; $s.e. = .11$; $t = -2.079$; $p = .038$), sense of justice ($\beta = .160$; $s.e. = .20$; $t = 1.965$; $p < .001$) and the sense of threat ($\beta = .219$; $s.e. = .02$; $t = 3.859$; $p < .001$). The lower the rating of workload and the higher the rating of the sense of justice and threat, the subjects were characterized by the higher sense of stress.

Summarizing all results, it should be underlined that, inadequate workload (in terms of quality as well as quantity), the lack (or unsatisfactory) sense of control while performing professional tasks, as well as weak – i.e. rather negative and critical rating of interpersonal relations – “community” in the organization, coexist with the sense of higher stress level of persons employed in the aviation sector. This result does not differ from expectations of employees of other sectors concerning the satisfaction of basic needs and quality of cooperation. Practically speaking, all aspects of professional environment – the sense of control, workload rating, awards in the workplace, compatibility of work with professed values, etc., are meaningfully related to the sense of lower emotional tension. However, in the aspect of experiencing external stress, attention should be paid to the significance of the community assessment in the workplace and in the context of experiencing intrapsychic stress – the significance of adequate workload. A significant consequence of lacks related to crucial aspects of work is the coexistence of the sense of threat and the professional stress. The presented statistical analyses did not focus, however, on other dependencies between these variables.

The analysis of predictors of the sense of threat indicated that primarily the experiencing of excessive workload and negative rating of social environment quality in the workplace (mutual support, cooperation and showing positive feelings) is significantly related to the perception of the higher sense of threat by aviation sector employees.

The result which seems controversial is the increasing of the sense of threat by high ratings of interpersonal ties (which remains somewhat contradictory to the assessment of community in the field of workplace climate). The confirmation of this dependency, according to authors, requires further verification, particularly with regard to the direction and impact of dependencies. It results from the fact that the assessment of ties refers to a much deeper intimacy and the sense of close relationship with co-workers, than the assessment of social relations treated as the element of workplace climate.

A significant predictor of the sense of stress in the researched professional group is excessive and inadequate professional workload and the perception of sense of threat in the workplace. Moreover, the professional stress in the researched professional group is increased by one of the aspects of organizational climate, which is the sense of justice in the workplace. This is an interesting result showing the tendency to generate higher psychological costs in the form of stress and its benchmarks due to particular commitment to fair management of workplace. This result suggests further hypotheses: the area of the sense of justice, which is measured by the tool The Areas of Worklife Questionnaire, refers mainly to the sensations of employees concerning fair treatment, fair division of goods and awards and the promotion opportunities in the organization. The presented results would suggest that the higher rating of employees in this field is related also to the sensation of higher stress level. This result should inspire the managerial staff which sets trends and has a real influence on personal processes in the organization.



Podczas wystąpienia zostaną opisane najnowsze trendy badawcze we współczesnej psychologii moralności, która intensywnie rozwija się od wielu lat (Doris, 2010), a także najnowsze wyniki serii badań własnych.

Psychologia moralności, zwana też filozofią eksperymentalną, bada to jak ludzie w różnych sytuacjach postrzegają filozoficzne problemy związane z dobrem i złem, z wykorzystaniem metod statystycznych.

Pierwszym z aktualnych trendów jest tzw. kontekstualizacja badań (Schein, 2020), która polega na odejściu od badania abstrakcyjnych dylematów moralnych (jak słynny dylemat zwrotnicy) ku bardziej codziennym etycznym problemom ludzi. Przykładowo, badałam to jak obserwatorzy katastrofy postrzegają moralność osób odpowiedzialnych za śmierć górników w Kopalni „Wesoła” (Paruzel-Czachura & Dobrowolska, 2018) lub jak ludzie oceniają mordercę swoich rodziców lub osoby odpowiedzialne za zestrzelenie samolotu Boeing – czyli jak oceniają pod kątem moralnym faktyczne wydarzenia o jakich słyszą w mediach (Paruzel-Czachura & Białek, w recenzji).

Drugim trendem jest badanie specyficznych prób, a nie tylko członków platform internetowych lub studentów, na jakich przeprowadzono większość badań w psychologii moralności. W Centrum Psychologii Moralności badam np. więźniów (w tym morderców), dzieci w wieku szkolnym i przedszkolnym, osoby, które dopuściły się czegoś nieetycznego jak zdrada partnera czy nielegalne pobieranie plików z Internetu (i dla „dobrej nauki” wzięty udział w badaniu na www.mojamoralnosc.pl), osoby z różnych kultur, osoby dwujęzyczne, bardzo religijne czy pod wpływem alkoholu.

W trakcie wystąpienia przedstawię moje najnowsze wyniki badań, dotyczącego tego, że:

- Więźniowie bardzo specyficznie rozumieją dobro i zło, np. uważają, że z miłości i troski o partnera należy dopuścić się przemocy fizycznej (Vecina, Marzana, Paruzel-Czachura, 2015). Pokazuję też, że są różnice w myśleniu moralnym między samymi więźniami, wcale nie związane z popełnionym przestępstwem. Wyróżniłam pięć typów więźniów ze względu na ich moralne myślenie: Nieposłuszni (nisko cenią autorytety), Krzywdzący (nisko cenią troskę o innych), Święci (wysoko cenią sobie wszystkie wartości), i Moralni Outsiderzy (w ogóle nie cenią żadnych wartości) (Paruzel-Czachura, Blukacz, Vecina, Everett, & Graham, w opracowaniu). Wyniki te wyjaśniają problem przestępczości od zupełnie innej, nowatorskiej strony. Dotychczas naukowcy pokazywali, że są to osoby zaburzone psychicznie, a jako pierwsi na świecie bazując na teorii fundamentów moralnych pokazujemy, iż są to osoby „zaburzone moralnie”. Wyniki już są stosowane w resocjalizacji w Hiszpanii wśród osób skazanych za przemoc partnerską.
- Osoby dwujęzyczne, które podejmują decyzje moralne w języku obcym, decydują inaczej – język obcy sprawia, że normy moralne są mniej dostępne, a więc stają się zarazem mniej utylitarystyczne (np. w mniejszym stopniu godzą się na torturowanie osoby mogącej pomóc w zatrzymaniu terrorysty) i mniej deontologiczne (np. w mniejszym stopniu są przeciwne przeszczepieniu narządu od starszej osoby osobie młodszej, która ma większe szanse na przeżycie), wbrew pierwszym doniesieniom na ten temat (Białek, Paruzel-Czachura, & Gawronski, 2019). Uzyskane wyniki są pomocne tam, gdzie ludzie używają języka obcego np. w polityce czy biznesie. Ogólna nasza wskazówka dla praktyki jest taka, że lepiej używać języka ojczystego, gdy podejmujemy kluczowe decyzje dla państwa lub naszej firmy.
- Odkryłam efekt moralnej synergii, który polega na tym, iż gdy ktoś zrobi coś złego (np. zdradzi partnera czy coś ukradnie) i powie, że czuje się winny oraz uważa, że nie akceptuję tego, co zrobił, to wtedy inni zobaczą go jako znacznie bardziej dobrego (także w porównaniu do sytuacji, gdy nie powie nic lub tylko wypowie jedną z tych rzeczy). Oba te pozytywne komunikaty mogą bardzo pomóc nawet mordercom własnych rodziców czy terrorystom (badałam różne typy morderstw za każdym razem uzyskując te same wyniki) (Paruzel-Czachura & Białek, w recenzji). Badania mają wiele zastosowań w życiu codziennym, wszędzie tam, gdzie ktoś zrobił coś złego i będzie musiał się z tego tłumaczyć, czyli zwłaszcza w sądownictwie.



THE ORGANIZATIONAL ASPECT OF HUMAN RESOURCE MANAGEMENT AS A DETERMINANT OF THE POTENTIAL OF POLISH HOSPITALS TO MANAGE MEDICAL PROFESSIONALS IN HEALTHCARE 4.0"

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Abstract: Industry 4.0 solutions have penetrated the healthcare sector, thus creating challenges that healthcare entities should meet. For this, a proper relationship between HRM within healthcare entities and Healthcare 4.0 is needed. In addition, the organizations mainly focus on HRM practices, yet organizational issues are overlooked. In this context, the aim of the article was to analyze and evaluate the involvement and roles of key HRM actors, such as line managers and HR specialists (HR departments) within strategic healthcare entities, namely hospitals. It was also important to identify a potential of hospitals to encounter Healthcare 4.0 requirements. A study was performed on a group of 285 Polish hospitals. Five respondents were recruited from each hospital. The total population amounted to 1425 interviewees. Due to the complexity of the research, it was outsourced. The results of the analysis identified that hospitals largely engage line managers in medical personnel management. However, a lack of managerial competences may become a major barrier in coping with challenges created by Healthcare 4.0. Organizational solutions do not support the strategic role of HR specialists; their anchoring in the organizational structures limits the possibility to support changes required for the transformation towards Healthcare 4.0.



MULTIPLE PROBABILISTIC TRAVELING SALESMAN PROBLEM IN THE COORDINATION OF SUSTAINABLE DRUG TRANSPORTATION

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Dr Martyna Wronka-Pośpiech, Uniwersytet Ekonomiczny, Katowice

This paper demonstrates the above average and utilitarian significance of the Multiple Probabilistic Traveling Salesman Problem (MPTSP) in the coordination and modelling of Industry 4.0, which is a novelty at the theoretical, conceptual, methodological and empirical level. The study focuses on the issue of planning routes using example of companies providing drug distribution services, with particular emphasis on the changing demand of customers. It should be stressed that this work may be of interest to researchers but also to management practitioners.



HOW TO SUCCESSFULLY IMPLEMENT NEW SECURITY PROCEDURES? CASE STUDY BASED ON GPW S.A.

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In connection with the entry into force of the Anti-terrorism Act, administrators of many production facilities are required to prepare a number of anti-terrorism procedures called anti-terrorist/AT attachment (Security plan related to facilities and equipment subject to mandatory protection in respect of terrorist threats). This presentation is a case study of the AT attachment implementation in several production plants belonging to one enterprise. It characterizes the strategy adopted in this company and the solutions developed in 2017–2019 in several production plants. The purpose of the article is to show why the implementation of this procedure is a challenge for the company. The theoretical system of reference is based on the issues regarding security culture and sociology of work.

A workplace is a social system that is bound by organizational culture, which is created by employees. The organizational culture of the enterprise is made up of social norms and systems of values stimulating employees, the proper organizational climate, management methods, shared meanings and symbols, cognitive patterns, and behavioral requirements. Organizational culture is a system of thinking patterns and actions that are embedded in the social environment of the organization and are important for achieving its formal goals. The culture of the enterprise as a system of the most important meanings and beliefs of its members over the years is not only shaped by human views, ways of thinking and behavior, but also defines and controls the behavior of the organization's participants. Each organization produces certain specific, internal procedures, ways of communicating its members and symbols that modify the way it functions.

Between 2017–2018, AT attachments for a dozen or so production plants included in the characterized enterprise were prepared and accepted by Internal Security Agency (ABW). In 2018–2019, a training system for employees (about 1,000 people) was designed and developed, and then these trainings were carried out. In 2018, AT exercises were also held as part of an undertaking implemented in cooperation with law enforcement agencies and institutions reporting to the voivode. The analysis of the circumstances of developing, elaborating and then implementing AT attachments in a dozen or so production plants allows for the following conclusions and presentation of good practices. The obligation to prepare AT procedures requires the company/enterprise to develop AT procedures. For many companies, this obligation was a new impulse in thinking about security and safety. In the context of the implementation of the procedures specified in the AT attachment, communication with the employees of a given facility is a very important element. Frequently the personnel is not aware of the existence of a terrorist threat and reacts with condescending smiles when asked to participate in an AT training stressing the pointlessness of such preparations in a safe country. Lack of proper security education on the above-school level means that people conducting training related to the AT attachment procedures should not only have necessary general competence for training but above all specialist knowledge of security, anti-terrorism, activity of terrorist organisations and modus operandi of potential attackers to make people aware that the threat is real and following the AT procedures can save their lives. The presentation shows how it was done in productions plants.



GOOD PRACTICES IN APPROACH TO EDUCATION

Piotr Podgórski, EMT – Systems Centrum Szkoleń Inżynierskich

The aim of the lecture is to present a model of course training for technical employees. The socio-educational mission of education companies will be presented. Factory and various manufacturing processes are complex organisms. We will show the immediate surroundings of factories in the area of providing specialist staff and technology delivery – machines, lines. This will determine the place of training services throughout the entire manufacturing process and the place of training companies in this environment. The way of educating technicians and engineers in positions – machine operators, technologists, programmers, mechanics, constructors. The case studies presented will show the business model of a modern training company and the way of extracurricular education, using real equipment identical to the production process. The training model for technical and engineering staff that will be presented, shows the possibility of repeated mistakes or collisions without consequences. Training in factory on functioning machines and equipment is often impossible and any errors made by technical services are associated with large economic consequences. The epidemiological situation has also forced a new approach to teaching – distance education. The lecture will show, it was prepared by a training company – the use of technological process simulators, digital twins.



Nowadays knowledge has become a source of competitive advantage and education is one of the factors which determines economic growth and society development. Education opportunities have extended the area of skilled people across countries. People having high competences are better equipped for the labour market. Nowadays students, employees are responsible for acquiring and developing competences and adjusting them to the labour market. The mentioned trends have triggered significant changes in higher education and on the labour market at the international level.

The European governments have noticed that combining education and training system can provide people with competences and skills which are required on the labour market and for economy. Erasmus programme (1987-2013) and its successor Erasmus+ programme (2014-2020) which were established as programmes of mobility studies support efforts to equip European citizens with the competences needed to increase employability and contribute to economic growth at the EU. Since their introduction, the above mentioned programmes have become very popular among the students. The first exchange of students for studies (academic year 1987/88) included more than 3 000 people from 11 countries, . Currently, 34 countries participate in Erasmus+ programme. The number of Erasmus+ participants has already exceeded 10 million people.

At the same time, the employers' expectations towards the students/graduates on the labour market are growing and graduates are faced with the challenge of meeting these expectations. That is why it is important to identify, analyse and prove significance of competences of Erasmus students for mobility study. The main thesis of the research is: "Students who participated in Erasmus mobility study acquired/developed personal/social competences which were demanded by employers and increased students' attractiveness on the labour market".

There are not many studies which would provide scientific evidence, describing the acquisition/development of competences by Erasmus mobility students and whether these competences are demanded by employers and increase students' attractiveness on the labour market. Research problem has been partly formulated in international literature (and recently by research study at the Foundation for the Development of the Education System, Poland), . However, the applied methods have not included a wide group of participants and have not concerned the Polish and international, civilian-military background. No competency measurement tools had been developed that would explicitly examine whether personal/social competences, acquired/developed through Erasmus are demanded by employers and increase attractiveness of students from civilian, military universities on the labour market.

The research study was based on the mixed-method approach: theoretical methods (analysis of documents, synthesis, comparison, statistical methods) and empirical methods (observation, opinion pool).

First, the analysis of 22 research studies concerning competences required by employers on the labour market allowed to create the General Profile of Employers' Expectations. The profile shows that employers demand from employees: occupational experience, competences, education, certain character traits. In particular, personal/social competences are required by employers.

Next, the List of Competences acquired/developed during Erasmus mobility study presented competences which were enumerated the most frequently in research studies: 1. language competences 2. personal/social competences 3. intercultural competences. The list was prepared on the basis of 31 research studies. If we compare the Profile with the List, it is visible that the participants of mobility study acquire/develop similar competences as those demanded by employers: social and personal competences, language competences, intercultural competences, digital competences.

In the last phase of research the Profile and the List were compared with the results of empirical research: student's survey, expert and employer interviews. 451 students, experts, employers, from 14 countries, 25 civilian and military universities participated in the research. The analysis of students' answers showed that students enumerated different competences acquired/developed during Erasmus mobility. The majority of them were personal/social competences but also intercultural, civic, language, digital competences. From the expert and employer point of view, Erasmus gives the students a unique opportunity to leave their comfort zone, broaden their world view, create international social network. According to the results of surveys, the students perceived mobility study as an advantage on the labour market. According to the group of experts and employers, the competences acquired/developed during Erasmus programme make the employee much more attractive for employers. Results of theoretical and empirical research were gathered in the Classification of Competences and in the Final Set of Competences. The Final Set of Competences includes 14 competences demanded by employers and



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acquired/developed during mobility study.

To sum up: the research confirmed that personal/social competences are demanded by employers. Students who participated in Erasmus mobility study acquired/developed personal/social competences. Personal/social competences which are acquired/developed during mobility study are demanded by employers and increase students' attractiveness on the labour market.

The abstract presents the first study research in Poland concerning the acquisition of competences focused on participants from civilian and military universities. Acquisition/development of competences by students is important for building the new model of higher education that will meet the challenges of the 21st century and of the knowledge-based economy.

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JOB FIRST IN OUTREACH WORK AS A METHOD OF SOCIAL REINTEGRATION OF THE OUT-OF-SHELTER HOMELESS

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One of the fundamental human rights that ensure the social security is indisputably the right to housing. The deprivation of a living place that meets the minimum conditions may cause serious consequences on lives of both the individuals and the society. Being directly related to the danger of losing one's life, out-of-shelter homelessness, also known as rough homelessness, is undoubtedly the most severe type of homelessness. The multidimensional and dynamic character of this phenomenon requires the search for innovative solutions that would contribute to diminish the problems of the individuals experiencing street homelessness. Outreach workers significantly increase the safety of homeless people staying at train and bus stations, in canals, garden pavilions, abandoned buildings, staircases, and other out-of-shelter places by reaching out to out-of-shelter environments of the homeless. Vocational activation of the group of the rough homeless in Częstochowa by the outreach workers caused the development of an innovative method called Job First. Its main aim is to motivate out-of-shelter homeless to change their current life situation and to leave the non-institutional places in which they reside. The method also considers increasing employment and the scale of its maintenance in a group of the rough homeless and individuals staying in the emergency shelters, harm reduction by minimizing the negative effects of sleeping out of the shelters, improving the psychophysical well-being, and satisfying the basic need for employment and a sense of self-determination of the rough homeless.

The method is based on a regular review of the press and advertisements on websites presenting employment offers in the local area. Advertisements are then delivered by outreach workers to the hands of the homeless residing in out-of-shelter places. The individuals in crisis of homelessness contact the potential employers on their own or by using the telephone included in the equipment of outreach workers. The real employment offer motivates the rough sleeping homeless to search for a place where they may take a shower and gain relief after work. This motivation may result in proceeding to the emergency shelter, seeking a place in the regular shelter, or searching for accommodation with friends and acquaintances. The income obtained as a result of employment often enables one to rent an apartment. The author, as one of Częstochowa outreach workers, aims to demonstrate the process of the Job First method in the context of the outreach workers' tasks concerning the reintegration of people experiencing rough homelessness in Częstochowa.



PROFESSIONAL COMPETENCIES OF STUDENTS PURSUING A DUAL EDUCATION SYSTEM: A RESEARCH PROPOSAL.

Mgr Małgorzata Balewska, Uniwersytet Śląski w Katowicach

The presentation will introduce a set of research tools used to analyze the competencies of students pursuing a dual education system. It will also discuss the results of the first stage of the analysis, in which a survey was performed among students as well as their supervisors directly involved in the company induction programmes. The research comprises two diagnostic packages analyzing competencies and personal traits which may influence professional effectiveness. In the part of the survey completed by the supervisors, the conduct as well as professional qualifications of students was assessed. The analysis presented hereby is the first out of three stages planned for realization. The main research purpose is to find effective ways for students pursuing a dual education system to develop and improve their performance on the labor market.



USE OF DIGITAL TECHNOLOGIES IN WEST AFRICA AS AN OPPORTUNITY FOR BETTER INTERNATIONAL COOPERATION

Dr. Martina Kainz, Wirtschaftsakademie Zwettl, Austria

When the use of mobile phone started its rapid spread in the industrialized countries in the late 90s, only few experts thought that Africa would become one of the most important markets in this sector worldwide. And still until today the annual growth rate of internet use on the African continent is remarkable: A comparison of active internet users between January 2018 and January 2019 shows an increase of 10%. During the same period, the number of African people who are actively using social media has increased by even 12% (cf. ITU 2020). The boom of the mobile phone in Africa has exceeded even the most optimistic expectations of mobile service providers. "It is the 'miracle' of a great success." (cf. Chéneau-Loquay 2010, p.1). The growth opportunity of the digital sector on the African continent is still impressive and the local governments make great efforts to invest in digital infrastructure, as can be seen for example in West Africa, where the Republic of Benin benefits from the arrival of a second undersea cable so that the Government now aims to seize on this by integrating ICTs into the country's development strategies (cf. Arcep 2019).

The number of mobile phones or SIM-cards has tripled between 2007 and 2014 while the percentage growth was the highest worldwide (cf. Chéneau-Loquay 2010). The number of mobile phones in Africa will not cease to rise: Demographical data and prognoses (one has to consider that the average age in West Africa is about 17 years), improvements of educational systems, increasing urbanisation, as well as rising life expectancy lead to the conclusion that the number of potential new customers will stay at a constant high level for the upcoming years.

The future development regarding the use of digital technologies on the African continent in general cannot be forecasted in detail, but there will still be a significant divide between rural and urban population and there "is a high risk that the poorest will be 'forgotten' especially by mobile operators and other providers who have no commercial interest in economically very poor regions or in regions with very low population density." (Kainz 2018b, p. 138).

But what are the specific characteristics and also the benefits of the increasing use of internet, mobile phones and social media on the African continent? One of the great differences compared to the industrial countries is the fact that the mobile phone has not replaced the landline connection, because its penetration rate has not been even 1% in most of the African countries. So the technology of the fixed phone was skipped completely in the Sub-Saharan region and for the first time the mobile allowed to African people to communicate by phone with friends or family members in other regions.

Focusing on the collectivistic structure of the West African society it is evident that communication with family members or friends via mobile phone or social media is one of the reasons of the enormous success of ICT in this region. The need to stay in touch with family members living abroad and one's community is immanent to the West African society and culture and also includes a normative aspect (cf. Vieira 2015, cf. De Bruijn 2010).

One of the greatest success stories on the African continent within the sector of ICT was the creation of the mobile money transfer system M-Pesa, launched in Kenya in 2007. It was even not necessary to use a smartphone, as the transfers could also be carried out by simple mobile phones. By this technology many people who couldn't afford any bank account were able to make money-transfers, to pay their goods and services and also to receive micro-credits to establish small businesses (cf. Brauckmann 2011, Stoisser 2015). Nowadays a large part of all money transfers in African countries are not carried out by banks and credit institutions but by different services of mobile money systems without needing any bank account.

In the educational area ICT offer lots of possibilities to learn, to book courses and to communicate with other students. Without internet use it would not be possible for many African students to go to high schools or to the university, because they would not be able to pay their textbooks and other material necessary for their courses. Lots of digital apps are used also in the medical section to make diagnoses or to sensitize the population concerning health behaviour.

The results based on an empiric study carried out in the Republic of Benin (cf. Kainz 2018a, pp. 245-261), one of the poorest countries in the world, revealed that apart from a massive urban-rural gap of digital infrastructure the increasing use of digital technologies and mobile phones offers a huge number of chances for social and economic development in this region (cf. Vieira 2015).

There are recently some very promising examples of young successful entrepreneurs in the Republic of Benin and other African countries benefitting from the use of digital technologies, as for example the platform Irawotalents, an initiative of role-models for young African founders of start-ups or the company Open Si which offers very successfully digital solutions for other companies in Benin and abroad. These young representatives of new business



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could be very interesting also for European companies to profit from doing business in African countries neglected until now by the European market (cf. Hiller von Gaertringen 2014).

Therefore it is high time for European countries and the industrialized world to evaluate Africa not only as a continent of crises, diseases and disasters (cf. Sturmer 2013), but as a region worth to collaborate and cooperate at eye level. This change of attitude could offer completely new chances of international economic and cultural cooperation with the aim of mastering not only actual social and economic challenges for the African continent but also for the whole international community.

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DIGITALISATION OF WORK IN THE DOMAIN OF SCIENCE AND RESEARCH

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The presentation is based on an empirical study on the effects of digitalisation on scientific life, which was carried out last year by Verena Nitsch (RWTH Aachen) and Julia Distelrath (IQIB) in frame of the current interdisciplinary IQIB-project „Digital Worlds of Work in Research and Development. New Options and Challenges in Science“.

The point of departure is that digitalization affects researchers and scientists presumably in a specific way quite different from other groups in society. The a.m. project aims therefore at corresponding changes in the domain of science and technology. The presentation focuses here at a non-representative survey on the micro-perspective of 166 science workers from all disciplines w.r.t. changing conditions and valuations of change in their daily routine. Some of the results of this survey are summarized here as follows:

- The inquired researchers did rarely use programmes for collaborative work although being familiar with a large range of digital tools. This result might be explained by the fact that only 22% of the scientists were willing or allowed to work at home office.
- Most of the researchers (92%) felt enough qualified for their digitalized job. However, only 15% used professional trainings so far.
- They stated minor to moderate changes in workload from digitalization of work life with needs for some adaption.
- % of the researchers felt some interference of digitalized work with their private life. However, real conflicts with private life were only stated by 24% of this cohort.
- Most researchers embraced specifically artificial intelligence (AI) aside from other digital tools as helpful in their daily routine. 82% however, saw also challenges from AI. They mostly voiced concerns about in-transparency, bias and poor reflection of AI-supported research. Fears from autonomy losses and other problems were also issued. However, the survey revealed also unclear notional interpretations of AI, which might mask positive or negative perceptions on AI at work to some extent.

One might conclude from the results of the survey, that artificial intelligence and other digital tools should relief scientists from routine tasks, at first. Ambitious digital applications need for clear standards and better transparency as well as for data security and ethical compliance. It seems also plausible that the current Corona-crisis might give digitalization a strong push in the science system and beyond. That means: more home office and more digitalized collaborative work with a growing need for professional trainings. And the question of acceptable workload and private-life balance might come up again along this development.

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HOW TO GET MORE OF WHAT YOU WANT?

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What is better – collaboration or competition? Being fair and balanced and looking for mutual benefit or being tough and demanding and looking for one-sided gains at the cost of the other side? This question has been a controversial discussion in research and practice for quite some time. For B2B negotiations researchers broadly agree that collaboration is superior since most relations are long-term oriented and dominated by the collaborative realization of win-win potentials. However, does this also hold for harsh environments with a low trust level where people are generally trying to take advantage of the other side? Based on an examination of Danish and Polish managers, we show that the superiority of collaboration is robust towards culture for B2B negotiations. It is possible and advisable to build collaborative trust relationships in all environments. The stunning consequence is that a large number of people could do better if they would change their behavior. We present some surprising findings on the meaning of reciprocity for negotiations and throw new light on the challenges of relationship building. Finally, we discuss reasons that keep people away from collaboration and lead them to inefficient power struggles in B2B negotiations.



Observing contemporary trends and tendencies, senior housing in many European countries takes on a new meaning – how should we talk about it when traditional multi-generational homes, old people's homes disappear, or there are not enough of them, and if they are associated with mortality; the number of lonely people is increasing; we are dealing with the feminisation of old age; the aspirations and life requirements of the elderly are growing, who are a very diverse social group not only because of age (young-old, old-old and senior), but because of preferences or lifestyle?

In Poland, the demand for nursing homes is met in only 5%, so 95% of older people will not have anywhere to live? Shouldn't this apocalyptic vision of our old age make us think about this topic?

For years, housing has not been built with changing life needs in mind, so most of today's flats are not intended for natural growth and family changes, nor for people with disabilities and the elderly. Young families feel that they cannot leave the house with a pram, people in a wheelchair have a similar problem because of narrow doors or stairs; older people have difficulty opening windows or bending down to reach electrical outlet levels. All of this applies to design problems that can be solved by a new way of thinking about design for an aging society. (HAPPI, 2009).

One challenge is to provide adequate housing today and in the future to alleviate the projected and unbalanced burden on nursing homes, social and medical care services. Today, most of our homes and communities are not designed to meet the changing and diverse needs of people in the context of aging. Living options for the elderly are too often limited to nursing homes or sheltered housing. Simply put, there is a strong need to increase and diversify the housing offer and better quality of this offer for the elderly.

This paper addresses innovative ways of living created in European countries in the last 10 years in response to the diverse needs of an aging society. Innovative ways of housing are understood as alternative, new practices, processes, principles, forms and projects in the area of housing created to meet new social, economic and spatial needs that are not sufficiently met by current and standard practices, also responding to modern trends and tendencies. They can mean improving the availability, quality, affordability, efficiency and effectiveness of an existing housing offer or creating a new one that better meets the needs of potential residents.

In this paper, the author focuses mainly on architectural projects that bring new values, often relate to pilot projects and are an alternative to retirement homes, nursing homes, etc., promoting the independence of the elderly as long as possible in their living environment in accordance with the concept of „aging in place”.

The author would like to present selected examples of innovative forms of housing for an aging society in various spatial and social configurations, both in senior and multi-generational terms in European countries with diverse potential for the development of senior housing, these are:

- high potential: the Netherlands (Humanitas project in Deventer)
- medium potential: Great Britain (OWCH project in London)
- low potential: Poland (Multi-generation House in Łódź).

In each of these European countries, we are implementing innovative and experimental housing projects that take into account the needs of older people.

The author's intention is to define what the innovation of these projects is about:

- a) planning: – was the housing innovation created as part of a specific program? – what was the participation process like?
- b) urban planning: – where is the housing innovation located? – what are the characteristics of the nearest neighborhood? – are there any special amenities outside the building?
- c) architectural: – what does the functional and spatial program look like? – what are the characteristics of common spaces? – what are the characteristics of the apartments?
- d) other: – are there special facilities for the elderly? – what are the rules and program of the facility's functioning? – is there support for medical and social care?

The result of the article is to define, on the example of selected innovative housing projects, approaches to their implementation in terms of all spatial scales in European countries with different potential for the development of senior housing, as well as potential recommendations for Poland in the context of increasing the potential for development of senior housing in spatial issues.

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STRATEGIC SHIFT OF TECHNOLOGY. HOW INDUSTRY 4.0 SHAPES NEW BUSINESS MODELS WITHOUT COMPETITION.

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Industry 4.0 has shifted the mode of business strategies in many organizations. Due to the advancement in technologies, it's possible to face the path of the market growth without competing. That approach requires the forecasting approach to see the coming perspectives and long-term possibilities and at the same time, it allows the companies to build their businesses based on creation.

The article focuses on connecting the Industry 4.0 non-competing solutions with future studies. The approach allows to collect the signals of change in the external environment and build the landscape of possibilities to create new modes of the business model generation.

With that said, we can take into account the changing environment and shape the most probable trends to attract and create demand and build the future solutions focused on exponential growth. The methodologies selected for this study are strictly linked with strategic foresight, environment & horizon scanning and also scenario planning.



IFUTCAS4.0. PRODUCTION MANAGEMENT 4.0.

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Central Military Bureau of Design & Technology

In the presentation, a medium-sized national defense enterprise is used as an example to discuss theoretical and practical aspects of production management. Within the scope of presentation are examples of actual solutions – ones that are already implemented and results of which can be assessed, but also those that are to be implemented. These solutions concern diverse aspects of functioning of a company, from execution of production orders to topics of production planning. Special attention will be brought to using Industry 4.0 technologies and gaining of necessary competences and qualifications by the employees.

WCBKT S.A. was established in 1968 and originates from the Experimental Production Department of the Military University of Technology. Currently, the core areas of focus of the enterprise are design, production and servicing of aircraft ground support equipment. Production of this equipment involves an extensive network of suppliers and subcontractors and in-house Production Department. The company aims to improve products and services in offer and engages in innovative and pro-development projects, many of which involve concepts of Industry 4.0; examples of such initiatives are included in the presentation.

Implementing a remote diagnostic system into produced equipment has revolutionized managing their operation – it enabled automated collection of data and remote assessment of technical condition. The long-term goal is to use these analyses to prognose technical condition of equipment and its 'intelligent operation'.

Developing trainings using VR/AR technologies and holographic glasses enabled extension of offer targeted to users of equipment produced by the company. For instance, training of operators and servicemen can be performed at multiple stages. Also, technical support can be provided remotely, e.g. when needed during a mission outside the country. In addition, WCBKT S.A. already has broad experience in organizing effective trainings for its own production workers, as well as operators and servicemen of equipment.

Other initiatives relate to planning, organizing and preparation of production, and supervising production orders execution. To address these, the company implements ERP-class system with APS system components. This implementation, outside IT issues, causes a need to collect and analyze large amounts of data, as well as a need to develop a new approach to the process of gaining new competences by employees.

Additionally, developments concern also cooperation within Polish Armaments Group S.A., the capital group WCBKT S.A. belongs to. Interesting instances of such cooperation are launch of Shopping Platform or planned Cooperative platform. Implementing these solutions is another example of innovative approach to tackling issue overqualified employees.

Finally, an important aspect of prepared and implemented changes is constant and diversified cooperation of WCBKT S.A. with academia and science and research centers, as it is a way to acquire most innovative technical and organizational solutions.



PHYTOCOENOTIC TRACES OF ANCIENT PROCESSING OF USEFUL MINERAL ORES IN THE AREA OF TARNOWSKIE GÓRY

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One of the manifestations of intensive industrial development is the negative impact on the environment, which in extreme cases manifests on a large-scale land degradation. Such effects are caused for example by mining industry, especially surface mining. Landfill waste deposited on the landfills of various sizes also occupies significant areas. Due to their quantity and thickness, they affect the environment for many years. One of the most troublesome manifestations of environmental degradation is the long-term pollution of earth by heavy metals. The largest acreage in the Upper Silesia region is occupied by waste dumps of hard coal mining. Smaller surface is occupied by metallurgical heaps and waste dumps after exploitation of zinc-lead ores. However, it should be noted, that the mining and processing of metal ores (especially iron, zinc and lead) in this region has a tradition dating back to the Middle Ages and there is an evidence of the existence of metal mining and processing even thousands of years ago.

The long-term lack of development of post-industrial areas is conducive to spontaneous succession of vegetation, of which the forest stage is a late stage. Hence the question arises: does the contemporary developed vegetation of the region, which for millennia was under the pressure from variously developed industry, have clear traces of this (especially ancient) human activity? Examination of the vegetation on post-industrial areas of the Katowice agglomeration (especially in the area of Tarnowskie Góry town) showed a significant share of plants originating from spontaneous settlements, despite using various reclamation measures. Native plant species dominate in the spontaneous flora of brownfields. These plant species are practically always found where there are traces of industry activity (secondary industriogenic soils, post-mining and processing waste dumps. They are also called ubiquitous, occurring wherever man transforms his surroundings. Interesting, however, is the presence of plants that form specific associations in a spontaneous way, in places currently not intensively used by humans and remaining for hundreds of years without such interference.

These places are also vastly inhabited by plant species which have different habitat demands including species which prefer warm and dry habitats, as well as plant species which more likely prefer wet habitats with sufficient amount of nutrients. Nowadays, such habitats where this phenomena can be observed are forest areas, permanent wasteland (grasslands), peat bogs, water reservoirs, where specific terrain has been preserved, related to industrial activities (former opencast, excavations, mud ponds, heaps of waste material from ore mining, etc.). They usually occur where the specific relief has been preserved. The so-called 'phytocoenotic traces' of ancient human activity in these regions create specific plant associations, plant indicator species, local endemites or rare species accumulation which is not typically found in nature.

Calamine grasslands among many of the European plant communities have a particular place. They are very rare due to fact, that their range is significantly reduced to small areas around the metallic ore bearings. They can be found mainly on the natural outcrops of the rocks enriched with heavy metals (which occur scarcely) but also in the old excavations, on the waste dumps of ore processing and also in the vicinity of the rivers enriched with heavy metals. The calamine grassland sites are scattered in various parts of Europe, in places which are historically related to the excavations and further processing of zinc and lead ores. The best known places are located in the Harz Mountains in the northern part of Germany or in the Aachen-Liege industrial district which encompasses area between borders of Germany, Netherlands and Belgium. In Poland, the occurrence of calamine grasslands was noted in the southern part of country, on the area of Silesian-Cracow Upland, more closely around localities: Tarnowskie Góry, Bytom, Zawiercie, Olkusz and also Chrzanów. The communities related to the soils enriched with zinc, cadmium and lead of the Silesian-Cracow region are representing, in the syntaxonomic approach, the *Armerietum halleri* association (*Armerion halleri* - alliance, *Violetalia calaminariae* - order, *Violetea calaminariae* - class). Plants which are able to inhabit these heavy metal enriched soils create small more condensed cover which is influenced by different physiochemical properties of the soil. As a well-known rule, the more content of bioavailable heavy metals the more meager species composition of the grasslands becomes. In more condensed grasslands the domination of the vascular plants is quite visible, in case of the loose ones which are located on bare soil and rocks they are often dominated by the lichens. Mosses rarely occur on the grasslands. The species composition of the grasslands mainly consist of common species, though some rare species from local flora can also make an appearance. These grasslands are often inhabited by peculiar and exotic ecotypes, subtypes or species which can tolerate heavy metal contamination (metallophytes). Among the group of metallophytes there are plant species which exclusively occur on soils containing substantial amount of heavy metals but also plant species which can grow both on the contaminated and pollutant-free soils in the same region. The first ones are called obligatory metallophytes and the second group of plants is called facultative metallophytes or pseudo-metallophytes. The most characteristic trace of the calamine grasslands is the presence of grasses which form tufts like: Sheep's fescue (*Festuca ovina* L.), Common bent (*Agrostis capillaris* L.) or Boehmer's cat's-tail (*Phleum phleoides* (L.) H. Karst.). The example of such type of grassland can be found on the dolomite waste dump of the "Fryderyk" mine located in Tarnowskie Góry. This structure was built in place of old ore washery where the crude ore-bearing dolomites were firstly sorted and then washed to



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extract zinc, lead (with a small amount of silver) and iron ores. The slopes and top part of the waste dump are mainly dominated by various grasses which are typical for grasslands and also species such as: *Silene nutans* L., *Polygala vulgaris* L., *Scabiosa ochroleuca* L., *Pimpinella saxifraga* L., *Silene vulgaris* (SALISB.) SM., *Arabidopsis arenosa* (L.) LAVALRÉE and also *Carlina vulgaris* L.. Another group of important vascular plant species includes the *Carlina acaulis* L., *Epipactis helleborine* (L.) CRANTZ and also *Epipactis atrorubens* (HOFFM.) BESSER. In more recent years both the Scots pine (*Pinus sylvestris*) and Silver birch (*Betula pendula*) started to appear spontaneously on top of the dolomite waste dump in Tarnowskie Góry. The calamine grasslands due to their unique natural value are listed as one of the valuable and protected habitats of the European Ecological Network Natura 2000. They are placed under the name 6130 *Violetalia calaminariae*.

Heavy industry as one of the human related activities often causes various disorders in the natural ecosystem creating an opportunity for many changes which can affect local habitats and microclimate. For nature, one of the most crucial effect of these activities is process which leads into the fragmentation of habitat which is inhabited by plants and animals and also formation of a new one which more likely have different characteristics compared to the close surroundings. One of the example of such newly formed refuge with an anthropogenic origin are old residues of metallic ore excavations mainly zinc, lead and iron ores which are shaped into different structures such as: shafts, waste dumps and small reservoirs which acted as small ore washeries. Nowadays, some part of them are only present in form of shallow pits with a centered shaft but most of the residues form aboveground heaps (with shaft serving either excavating or ventilation purpose) called "warpie" which can measure from few up to several meters in height. Due to these changes in local environmental and topographic conditions, as well as due to the presence of toxic pollutants in the soil in form of heavy metals the mining residues was inhabited by specific type of vegetation which is quite distinctive comparing to the adjacent surroundings, transforming into local biodiversity hotspots. On the non-forest excavating residues which are located around the farmlands the species composition on the heaps is mainly dominated by the grasses such as *Festuca ovina* L. or *Arrhenatherum elatius* L. which are supported by various species representing fresh meadows (Molinio-Arrhenatheretea class) and also xerothermic and warm sandy grasslands (*Festuco-Brometea* and *Koelerio glaucae-Corynephoretea canescentis* classes) which serve useful role for many of the pollinating insects. They are also covered by many of the tree and shrub species such as: *Crataegus monogyna*, *Padus avium* and also *Ligustrum vulgare*, which serve as a buffer zone and protection for various animals. Among forest habitats there are also unique patterns in formation of the vegetation on the residues. Their composition is often supported by many species which represent typical woodland communities, and also on some of them the presence of the so call ancient woodland species can be noted such as: *Pulmonaria obscura*, *Circaea lutetiana* or *Paris quadrifolia*. On some of the mounds the appearance of the facultative metallophyte – *Arabidopsis halleri* was noted more frequently as this species slowly encroach on the slopes and top parts of the residues. The mid-forest habitats on the residues tend to be more diverse due to stronger influence from the surroundings, increased bioavailability of heavy metals in soils and different light conditions. Forest and non-forest residues due to fact, that they form their unique species pools which are diverted from the adjacent areas can be treated as local refuges for many of the vascular plant species reflecting on the primary vegetation of the affected area, historical processes and more importantly, facilitating the restoration and also appropriate regeneration processes.



CHARACTERISTICS OF HYDROGEOLOGICAL CONDITIONS IN FORMER ORE MINES IN THE REGION OF TARNOWSKIE GÓRY

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Ore mining in the Tarnowskie Góry area dates back to the 13th-14th century. For the development of mining in the region, the water conditions were of major importance, including: intense water inflow, quicksands, the disappearance of surface water in the area covered with permeable sediments (eg. sands). The fight with water, requiring the greatest technical and economic effort, came to the fore in the pre-industrial period of all mining technical problems in the Silesian-Krakow deposits area.

The characteristics of the hydrogeological conditions in which the exploitation was carried out determined the development of drainage methods. Initially, these were relatively primitive systems that only allowed a small amount of water to be drained. Systems allowing gravitational drainage of water by making appropriate drainage pits were more advanced. The further development of the techniques consisted in the construction of more and more advanced machines and devices, enabling the exploitation of deposits in more complex geological conditions. The presentation discusses the development of drainage techniques for mining excavations in connection with geological conditions.

The use of inappropriate techniques or failure to adapt the drainage system to hydrogeological conditions resulted in flooding the mine. Catastrophic events often occurred in the Tarnowskie Góry region. The use of the most modern drainage methods did not guarantee safe exploitation and that a disaster will not occur. One of the last recorded catastrophes in this region, resulting from geological conditions and related water hazards, took place in 1917 in the Bibiela mine (in so called Pasieki area), located east of Miasteczko Śląskie, exploiting limonite iron ore. Ongoing drainage works, aimed at restoring the functionality of the mine, did not bring the desired effect and eventually the extraction of iron ore from this deposit was stopped.

The works carried out as part of the DIALOG project, in the task: "Research on the impact of significant changes in the groundwater level in the Holocene on the degree of threat to miners extracting minerals in the studied area" and "Analysis of possible causes of sudden flooding of the mine in Pasieki" is to identify whether the cause of the mine flooding was drainage system failure. There is also a need to answer the question whether the increased - catastrophic inflow to the Bibiela mine resulted from hydrogeological conditions in the deposit, or from the possibility of inflow of surface water (hydraulic connections) and was practically unpredictable.



THE USE OF LIDAR IMAGES TO IDENTIFY REMAINS OF PAST MINING AND METALLURGY IN TERRAIN TOPOGRAPHY

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Analysis of LiDAR (Light Detection and Ranging) data has recently become an essential tool for analysing terrain topography in hard-to-reach forested areas. LiDAR images with a horizontal resolution of 15 points per square meter and with an altitude accuracy of 10 cm allows a very precise analysis of terrain topography under the forest cover. Among others, it can be applied in geomorphology and archaeology. LiDAR imaging allows the identification of traces of mining and metallurgy. Traces of former small mining shafts are the most important. Each of them consist of small oval depression in the central part (0.5-15 m in diameter) and a collar surrounding this depression. The second very common landforms are remains of charcoal hearts, i.e. traces of charcoal burning. These are small elevations (up to 0.5 m high, 5-20 m in diameter), usually surrounded by several smaller hollows (each c 2 m in diameter). Analysis of LiDAR images of the Brynica River basin (Silesian Upland, southern Poland) has demonstrated the occurrence of several thousands of such traces of charcoal hearts and mining shafts within the area of c 170 km². Such a large number of mining shafts and remain of charcoal hearts identified from LiDAR images allows for further detailed field research, among all for dating remain of shafts and charcoal hearths.



SILVER AND LEAD PRODUCTION CENTRE ON THE SILESIA-LESSER POLAND BORDERLAND IN THE EARLY MIDDLE AGES OR THE BASICS OF THE ECONOMY OF THE PIAST STATE

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What was the origin of the silver used to produce coins ordered by the Piasts in the early Middle Ages? Until recently the answer to this question was clear: the silver was either purchased or taken as war spoils. Although a possibility of native origin of some silver was considered, it was never thought to be significant. Because of the lack of archaeological evidence, the only record was the Bull of Gniezno (1136), where a mention about silver miners from a mysterious town called Zversov near Bytom occurs. The last several years brought us an entirely different image of the history and culture of the eastern part of the today's Silesian voivodeship in the early Middle Ages. It occurs that as early as in the 11th and 12th century this territory was an area of mining and steel industry oriented towards extracting silver and lead from the local ores. Along with these activities settlement and trade were developing. Also, when it comes to production, a significant role of these territories can be observed. Probably this was the place where enameled ceramics was widely used for the first time, while in other parts of Poland this technique was used only several decades later.

Given the research of the recent years we can see a new image of the territories on the border between Silesia and the Lesser Poland in the early Middle Ages. The archaeological research conducted in the past few years confirm what the written sources conveyed about the local silver and lead mining. One might assume that the production settlements discovered recently are not the only ones which used to operate in this area. Time will tell what mysteries are hidden in the local ground. What also needs addressing is the re-verification of the research done on the sites where obviously early medieval objects of glazed ceramics might have been misinterpreted. Separate studies should also be dedicated to the local sacral architecture, which until now has not been examined thoroughly.

The research on the silver and lead mining and metallurgy centre on the border of Silesia and Lesser Poland is still in its early stage. Many questions have not been answered yet. However, the one about the origin of the silver used in minting production in the 12th, and maybe even 11th century, can be answered as follows: one of the sources of the Piasts silver was located near today's Bytom, Będzin and Sławków.



CAPTURE AND ECONOMIC UTILISATION OF METHANE FROM CLOSED COAL MINES

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Since the beginning of 1990's, intensive restructuring of coal mine has been taking place in Poland. This process consists in closing successive coal mines, the majority of which are characterized by high methane content. Just in 2017, nearly 948.5 m³ of methane were released from underground mines under exploitation, of which only 212 m³ were economically utilized.

The majority of methane was irreversibly emitted to atmosphere. As further mines are to be closed down, the potential of discovering there methane resources is likely to grow.

This presentation describes projects for obtaining methane from closed mines of coal mines, and utilizing it for economical purposes. This paper presents geological and technical issues as well as legal and administrative requirements for projects related to capture and utilize methane.

Scientific and practical experience in methods of obtaining methane from active and closed mines and its utilization is widely presented. Moreover, demethanization brings measurable advantages not only in improving safety of coal extracting, but also in economic and ecological aspects. The process of obtaining methane is inherently connected with the current analysis of coal exploitation, mine structure, and mainly require taking into consideration geological factors, which, as examples show, present some degree of uncertainty.

This paper also pays attention to licensing authorities which conduct procedures to issue licences for long-term searching, investigating and exploiting hydrocarbons, including methane, from coal beds. Such procedures often last for a few years, which obviously restricts business activities of those entrepreneurs who could begin exploitation of hydrocarbons, including methane, from coal beds and pay resultant taxes and other fees to local government units and the State Treasury. For example, the administrative proceedings to issue licence for entrepreneurs for searching, investigating and exploiting methane in „1 Maja” and Moszczenica areas have been conducting for many (1–4) years. Such long procedures can result in resources loss caused by flooding of such areas and irreversible loss for the State Treasury.

Exploitation of methane from closed coal mines („Morcinek”, „Żory”, „Moszczenica”) has confirmed that methane from such mines can be a local source of energy. Using this valuable resource for energy purposes also requires the ongoing analysis of energy price market.

An increase in methane consumption from underground tanks in inactive mines should have a positive impact on using this type of fuel in the Upper Silesian Coal Basin.

There should be a tendency towards creating a regional market by providing adequate economic incentives for entrepreneurs and potential consumers. For example, the legal classification of methane from coal beds as „green fuel” could be an encouragement.

Climate policy of UE supporting undertakings that use low-emission sources of energy is a chance for realizing more projects on obtaining and economic use of methane.

Management of methane resources from closed mines taking into considerations geological, technical and economic conditions for methane extraction will produce significant economic effects for entrepreneurs, communes and the State Treasury as well as ecological effects.

The aim of this presentation is to demonstrate advantages of capture and economic utilization of methane from closed mines which is in the best interest of Polish economy.

Presented examples of using methane from closed coal mines in Poland and abroad confirm the economic appropriateness of such actions.



THE RESEARCH OF DRIVER'S PERSONAL DRIVING STYLE ON ELECTRIC CAR PERFORMANCE

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In the article, research was presented on the impact of driving style on the electric car's capabilities. The basis for the implementation of R&D works was the assumption that different drivers use vehicles in a variety of ways, which is the basis for further research on the repeatability of results obtained by individual virtual drivers, which are the basis for determining key parameters resulting from the "individual driving style". In order to conduct the study, a stand was developed along with software in a simulation environment. The main assumptions during the development of the station were: work comfort, mapping in the simulation environment of the urban environment using advanced computer graphics, mapping in the vehicle simulation environment, type of car: its appearance, behavior, model of movement; mapping in the simulation environment the impact of collisions and physical forces affecting the vehicle while driving, enabling vehicle control in the simulation environment, enabling testing the impact of audio-visual and haptic messages on the quality of machine-human communication. For the need for research, a diverse group of virtual drivers has been formulated, with diverse and risk-taking preferences. Ten virtual drivers took part in the research. As part of the article, the results obtained and their analysis were presented. This work has been supported by research and development project ID: WND-RPSL.01.02.00-24-035A/18-005, We do IT with Energy.



DIGITAL TWIN FOR PROPULSION DRIVE OF AUTONOMOUS ELECTRIC VEHICLE

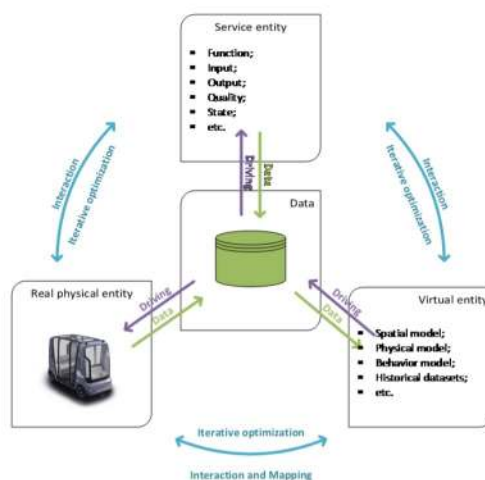
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Autonomous driving is no longer just an idea of technology vision, instead a real technical trend all over the world. The continuing development to a further level of autonomy requires more from energy optimization. The optimization of electric propulsion drive systems of self-driving electric vehicles by using autonomous and monitoring sensors are not often discussed. The goal of the presentation is to specify tasks required for a specialized unsupervised prognosis and control platform for energy system performance estimation. Final goal requires the development of several test platforms and digital twins¹.

The DT concept has been informally introduced in 2002 by Michael Grieves² since that time there are two main definitions used for DT³:

- Physical and/or virtual machines or computer-based models that are simulating, emulating, mirroring, or "twinning" the life of a physical entity, which may be an object, a process, a human, or a human-related feature;
- Part of a Cyber-Physical System (CPS) can be described as a set of physical entities (e.g. devices, objects, equipment, humans) that interact with virtual cyberspace through a communication network.

A Digital Twin (DT) is composed of three components – the physical entities in the real world, their virtual models, and the connected data/view that ties the two worlds together. Figure 1 shows the interaction of the DT components. All components are interdependent from each other. The physical entity provides the basis for the virtual entity development; the virtual entity is responsible for the simulations, control of the physical part, and optimization strategies for the service system. The service system represents an integrated service platform responding to the demands of both physical and virtual entities. DT data is the combined data from physical, virtual, and service entities; methods for modeling, optimizing, and predicting. Data acts as a driver for all entities and involved in the creation of the DT itself, more comprehensive and consistent data is formed.



Digital Twin concept of autonomous electric vehicle

The construction of physical device model can be carried out using the well-established modelling technics (ex. MATLAB). Reduced models of the physical one can be constructed using model order reduction methods. Different reduced models of the devices running parallel and in real-time can be used to assemble a DT of the EPDS. The digital twins can be used as virtual sensors, or virtual sensors can be implemented in digital twins. Combining data from actual devices and virtual sensors with machine learning routines will be able to diagnose and prognose the devices of the electric energy systems. Digital twins includes more than only a physical object emulation (data about motor components suppliers, provided services and future services schedules, data about unusual situations ant etc.). Basically emulator is created from historical data and physical/mathematical model.

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FARM 4.0 – 5G ON FARM

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This presentation aims to show an application of 5G technology in the rural areas, applied to large farms or clusters of medium and small size proprieties, allowing the farmers increase their productivity and quality of their production, by deepen the farm automation and connecting the farm to the logistic infrastructure, helping to implement the Farm 4.0 concept. As an introduction, it will be presented the Farm 4.0 concept and the 5G's principles and architecture, following by showing the architecture of a farm automation system using the 5G technology. The social and economic issues will be treated in the final remarks, as well.

The Farm 4.0 application proposed consists basically in a private 5G network installed in the farm that covers the entire propriety or the entire cluster, that will provide the connectivity among the farm equipment and sensor networks in a precision agriculture environment. The range of the 5G base station should be around 50 Km, so the frequency should be lower than 1 GHz, for this it is using the results of the 5G Range project - Remote area Access Network for the 5th Generation, an international project co-funded by the Brazilian government and European Commission.

The private 5G network has a link with a public telecommunication service provider, in order to have connection to the Internet, that provides connectivity between the farm and the customers, suppliers, logistic operators, etc. The farm based 5G radiobase also can provide bandwidth to Local Internet Operators (micro operators) that delivery wireless Internet access to the local communities, where the big telecommunication companies (normally) are not present.

In other words, with this application is possible to contribute with the public policies for widening the Internet access - broadband - in remote areas with low density populations, to create new business models for agriculture sector, and to create new opportunities for small telecommunication service providers. The adoption of the proposed system by the big farmers or by the farmer clusters will have good social and economic impacts for the region where the farms is located.

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COMMON GROUND OF INDUSTRIAL ENGINEERING AND SOCIAL SCIENCE FOR ORGANIZATIONAL DEVELOPMENT

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Common ground of industrial engineering and social science as a subject falls in the field of interdisciplinarity. Usually, methods like direct citation, bibliographic coupling, and co-authorship analysis, are very common to study the generation of interdisciplinary knowledge or to investigate interdisciplinary changes. However, the role of history and joint learning are usually under considered in these analyses. Links between industrial engineering and social sciences are explained to a great extent by "effective" joint developments along the short history of this branch of engineering, particularly in the issues related to organizational development.

This historical review of cases also shows how to structure a productive and genuine interdisciplinary engagement, mainly from the standpoint of industrial engineering. Even though there is an important number of case study that shows the interrelatedness of industrial engineering and social science, from the beginning of this branch of engineering, almost none of them has yet sufficiently explored some possible patterns for future directions of development.

This paper shows the main interaction points and cases in more than a century in the development of industrial engineering. This analysis shows that the nature of this common ground as a study field is not strictly a technical domain, a scientific field, a methodological issue or a management-related discipline, but all of them. As an applied rather than a theoretical ground, the associated knowledge of industrial engineering and social science requires realistic settings to ensure suitable learning. Besides, this knowledge area requires an integrated and interdisciplinary approach for both scholars and managers. The integrated approach also means that all the competencies, tools, procedures, and knowledge related to this common ground are deeply intertwined among them. The analysis will end with the identification of possible lines of research in the future, particularly from the industrial engineering perspective.

As a main conclusion, common ground between industrial engineering and social science is not an abstract rationale that emerges from knowledge convergence. On the contrary, it is an evolutionary rationality that must be historicized.



FUEL CONTAMINATION OF AIRCRAFT

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The written work contains a procedure for detecting aviation fuel examinations. The introduction of this work describes the types of contamination and then explains the roles in the systems and their processing.

The subject of fuel quality and the prevention of contamination has been the subject of very comprehensive attention from both the contractor and consumer parts of the industry and this activity and the purposes of it serves have been summarised in the first ICAO Document dedicated to fuel quality "Doc 9977 Manual on Civil Aviation Jet Fuel Supply" (2012). This publication acknowledges that its content does little more than highlight based on industry assistance the way that existing non statutory policies, standards and procedures have acted collectively as a fuel quality management system. The large airports, where multiple fuel suppliers are probably be present, have since the 1970s seen the sharing by fuel supply companies of storage tanks and where is installed hydrant systems. This trend was the direct release for the main oil companies to form the "Joint Inspection Group" (JIG) to develop a single set of standards to govern the operation of such shared facilities and secure that they supported the maintenance of fuel quality. The JIG is a not for profit company with over 60 members which defines aviation fuel standards and operates a quality verification inspection process which validates their application. JIG 1 covers operating standards for into plane fuelling services and JIG 2 covers operating standards for airport storage. Both groups are confirmed by IATA which along with many new entrants to the aviation fuel supply business who are not also major oil refiners is an Associate Member of the Group. Associate Members now form the majority of the JIG membership. Standards JIG 1 and JIG 2 have been complimented by JIG 3 which covers operating standards prior to airport delivery and an additional standard, JIG 4, which covers operating standards at smaller airports, has recently been issued.

Fuel is an important part of any technical device, whether capable of flying or in general, of all devices for which the use of fuel is necessary. To prevent microbiological contamination, regular preventive treatments and regular fuel contamination tests are recommended. Recommended testing intervals are given in Chapter 5, ATA 12 Fuel - Maintenance in the aircraft maintenance manual st. Cessna. It is also possible to find recommended intervals of preventive treatment in the given chapter.

Aviation fuel systems are ideal habitats for organisms. These systems are not only hot and humid but also provide food for microbes in the form of hydrocarbons that are in the fuel. If these microbes multiply, they can block the fuel filters and cause measurement problems. In fact, they can even cause corrosion to the extent that they damage the structure of the aircraft's tank.

Biocide-treated fuel must be burned by engines before the next test. For testing microbial contamination fuel, the Hum-Bug Detector Kit is most commonly used for Cessna 525C aircraft. The Hum-Bug Detector is a low cost easy to use early warning system that effectively identifies hydrocarbons through contamination by microorganisms in all hydrocarbon fuels and oils. These organisms cause fungal growth in fuels and the serious risks associated with this growth. The Hum-Bug Detector Kit detects microbial contamination in its earliest stages when used in a coordinated fuel quality control program.

Due to the mentioned risks, testing of aviation fuel for microbial contamination has become a standard operation for all users of aviation jet fuel. It is usually part of a more comprehensive fuel to end fuel management system called fuel economy.



HUMAN FACTOR DURING PROCESSING DOCUMENTATION OF AIRCRAFT MAINTENANCE

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Human factor in the field of aviation is very important, because it is responsible for many failures happened. As we know man is not a machine. When we do one thing for many times, risk of failure is minimized up to minimum. Aviation and aircraft is complex system with many opportunity make something wrong. Companies try to minimize risk of failure, if it is possible. Any incidents consume time and time due to reparation of failure. Then companies have to set up new corrective measures, establish new procedure.

Human factors are issues affecting how people do their jobs. They are the social and personal skills, such as communication and decision making which complement our technical skills. These are important for safe and efficient aviation.

Aviation safety relies heavily on maintenance. When it is not done correctly, it contributes to a significant proportion of aviation accidents and incidents. Some examples of maintenance errors are parts installed incorrectly, missing parts, and necessary checks not being performed, and misunderstanding within information channel than can cause transferred incorrect information – domino effect. Transferred errors are difficult reveal. Usually it is revealed when mechanic / engineer reads taskcard, job- card workorders and given information are not matches with his job. This situation can happen when planners are not familiar with type of aircraft. One type has many varies and it is not the same as previous serial number aircraft.

Human factors science or technologies are multidisciplinary fields incorporating contributions from psychology, engineering, industrial design, statistics, operations research.

It is a term that make the science of understanding the properties of man capability, the application of this understanding to the design, development, and deployment of systems and services, and the art of ensuring successful application of human factor principles into the maintenance working environment.

As an engineer / mechanic in maintenance as maintenance planner both of them are exposed to the similar factors. First of all is team work. When you are able to play team, probability of failure is smaller, you can ask colleagues if your knowledge or information are correct. If team works correctly probability of failure is lower. Next important factor is lack of communication. It seems similar like team work, but communication is important in team. Imagine you are working with information. You have to ask lot of question to accurate and solve the problem, when you have lack information and knowledge about issue it can lead to failure and in the end you solved problem which was not a problem. It means that communication is very important also knowledge of language of literature you work with.

Fatigue, everybody ones in work feel tiredness. We know three types: mental, emotional and physical. A person is said to be fatigued when a reduction or impairment in any of the following occurs: cognitive ability, decision-making, reaction time, coordination, speed, strength, and balance. Decision making and reaction time are important during processing documentation. Sometimes happen, you get a call from line maintenance or hangar. They ask for some favour or question regarding maintenance data required to their work, than your reaction time has to be quick and again correct communication with data is required.

Symptoms of fatigue may also include short-term memory problems, channelled concentration on unimportant issues while neglecting other factors that may be more important, and failure to maintain a situational overview. A fatigued person may be easily distracted or may be nearly impossible ory problems, channelled concentration on unimportant issues while neglecting other factors that may be more important, and failure to maintain a situational overview. A fatigued person may be easily distracted or may be nearly impossible to distract. He or she may experience abnormal mood swings. Fatigue results in an increase in mistakes, poor judgment, and poor decisions or perhaps no decisions at all. A fatigued person may also lower his or her standards.

Suggestions to help mitigate the problems caused by fatigue include looking for symptoms of fatigue in one's self and in others. Have others check your work.

Aviation maintenance is a stressful task due to many factors. Aircraft must be functional and flying in order for airlines to make money, which means that planning must be done within a short timeframe to avoid flight delays and cancellations. Everyone handles stress differently and particular situations can bring about different degrees of difficulty for different people. For example, working under a strict timeline can be a stressor for one person and normal for another. The causes of stress are referred to as stressors. They are categorized as physical, psychological, and physiological stressors. Following, is a list of each and how they may affect maintenance.



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A lack of resources can interfere with one's ability to complete a task because there is a lack of supply and support. Aircraft on ground (AOG) is a term in aviation maintenance indicating that a problem is serious enough to prevent an aircraft from flying. Generally, there is a rush to acquire the parts to put the aircraft back into service and prevent further delays or cancellations of the planned itinerary. AOG applies to any aviation materials or spare parts that are needed immediately for an aircraft to return to service. AOG suppliers after qualified personnel and dispatch the parts required to repair the aircraft for an immediate return to service.

Production planning summarizes all previous factors of human factor. Production planning department has responsibility for material deliveries on time to right place, efficient man – power support, customer support, maintenance support and prompt and correct communication without misunderstanding. When situation is smooth, nothing special happen, job is easy. Usually at this department man takes care approximately about 40 aircraft during the one shift. As Murphy law says: If something can break, it will break. Operator has to be ready react immediately and support customer during recovery AOG status. Every AOG recovery has instruction. Firstly contact engineer/mechanic on duty. Then contact customer regarding status of failure and what material is needed if yes. If material needed according contract check availability of material in store. In this havoc can very easily happen misunderstanding during communication and this failure of operator is transferred through. This whole scenario takes 15 minutes. So much maintenance data in short time and one wrong information is given, it can lead to financial cost and fees. Human factor is very important in the aviation.



CASE STUDY IMPLEMENTATION OF MODERN IT IN TERMS OF QUALITY IMPROVEMENT OF EDUCATION PROCESS

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Nowadays is usage of advanced Learning Management System (LMS) crucial factor in high-quality education model assurance for every learning facility. First basic level of online learning is the implementation of standard LMS system with functionalities like full-text search in all learning sources, compilation and automated evaluation of online tests or communication and problem solving interactively within the course portal. Almost every serious learning facility has some kind of this basic LMS implemented and are using these benefits on some level on regular basis. Next level of advanced LMS provide answers to questions about how students are really using LMS system, how much time students spend on various activities within the LMS, how effectively are students able to navigate within the portal or what types of devices are students working with. Advanced LMS also needs to measure feedback from students on every relevant aspect not only based on statistical methods, but also based on student's satisfaction rate. Today's trend in LMS is currently the Experience API (xAPI), it provides one data specification for tracking human performance and human progress. In fact, xAPI allows you to monitor behavior and status at a specific time and all in the context of something (e.g. "John successfully completed the health and safety test at 95%", with this announcement is associated the exact date and time of its occurrence). All kind of events can be tracked, for example, reading articles or interacting with e-books, real time spent with watching of education videos and presentations, using of mobile devices, data from flight simulation trainings, interaction with LMS, communication with mentor, quiz results, testing and answer history, physiological measurements such as heart rate, operational performance of specific tailor-made requirements, etc.

When our LMS or any other system creates such xAPI data event record, it's necessary to have some kind of data center for collecting data from our systems. Such system is generally called LRS (Learning Record Stores). Main features of LRS solution are saving of records from all kind of data types and systems, aggregation in terms of only record source in the organization (with features like scaling, on-demand querying or writing business rules to trigger data events) and sharing the results with any kind of BI tool or simple export to flat files.

The main goal of the thesis is to design the LMS system using the potential of xAPI. Process starts with selection of best suitable hardware and software for Department of Aeronautical Engineering, each combination has pros and cons in terms of budget, department preferences or real hands on experience in IT department. Modeling and implementation phase will proceed with demo application installation including simulation and verification of the suitability of its use in the university environment in coexistence with other applications in the university such as MAIS. Currently the department is using standard LMS called Moodle, which is open source educational platform that provides educators, administrators and students with a robust, secure and integrated system for creating unique learning environments. Therefore, with the application of reporting and advanced data analytics, weaknesses of the LMS system will be identified and evaluated. Sample data will be gathered on 2 student groups during 1 semester. Each group consists of 20 students and achieve the same study results in average. First group will be only monitored via xAPI features to gather statistical input and will use standard LMS. Second group will use full potential of knowledge gathered during test simulation scenarios via accessing upgraded LMS. Finally, comparison report of time savings and education efficiency of traditional LMS versus next level xAPI LMS will be provided by extrapolation to the entire department based on a limited sample of data.

It is inevitable to mention that educational distance learning and improving the quality of education on both sides-student and educational institution is especially important in the current situation caused by COVID pandemics.



CASHFLOW MODEL OF THE AIR CARRIER

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Air transport is the fastest growing sector, very dynamic and turbulent. At present, air transport is undergoing a very stormy period, not only as a result of liberalization, but also due to rapid technical and technological development forcing air carriers to satisfy customers' needs, leading to a growing competitive pressure between carriers. Current situation caused by worldwide pandemic Covid-19 is also pushing air carriers to their limits. Cashflow in simplicity is cash flow in a business for a certain period of time. In the case of enterprises that are created for profit, cash is a means of retaliation for the goods and services provided by the enterprise. Received revenue includes money that can then be used to fund further production and sales as well as an increase in the economic value of the organization. Cashflow is in today's situation bigger problem than ever before. Many air carriers are nearing the breaking point when they will be not able to repay their expenses. We explain cashflow model of the air carrier and its importance to the company. We also show fixed and variable costs along with revenue calculated for given lines.

International air transport has a major impact on the development of international relations and cooperation on two basic levels – socio-political and economic. The socio-political importance of international air transport is in its fundamental impact on the intensity of maintaining and expanding personal contacts at government level as well as national residents. Due to its high utility in conflicts, some states have legally legislated that civilian airplanes and personnel of state as well as private companies can call for the execution of power tasks. The economic importance of air transport stems from the fact that it represents the fastest and safest way of transporting people and goods. The transport of persons and certain types of goods (quickly perishable or very valuable), especially for longer distances, is virtually the only applicable option.

Cash flows reflect the movement, change and conversion of funds to other types of assets, and vice versa, within the company value chain, from the pre-production phase to the implementation phase. The analysis of cash flows in the company enables the analysis of the financial position, the analysis of resources needs and the use of funds. Cashflow in simplicity is cash flow in a business for a certain period of time. In the case of enterprises that are created for profit, cash is a means of retaliation for the goods and services provided by the enterprise. Received revenue includes money that can then be used to fund further production and sales as well as an increase in the economic value of the organization.

We have chosen the creation of a fictitious airline as a practical example of the cashflow of an airline. The cashflow indicator is important for this type of business where the cash flow is extremely fast. Using the practical model, we will gradually explain what is all about the cash flows in the enterprise is and how much this cash flow influences business.

The success of the airline in the market from the point of view of generating profit or loss depends on revenue and costs. In the period before air transport liberalization, the economic management of air carriers was more cost-oriented than revenue management, as in the regulated price environment, regulated capacities and regulated market access, revenue management was not possible, the scope for its application was limited. The liberalization of air transport has brought the competition of competing air carriers and, therefore, cost efficiency.

The principles and method of determining the prices for the basic service provided by the air carriers the actual transport, differ substantially according to the type of business (passenger transport versus the transport of goods, mail or shipments) and within these types also according to the nature of the supply of transport services (regular vs non-regular = charter carriers).

Unlike most other industries, air transport has a very problematic connection between the price of the product offered and the costs incurred in creating it, because it is often problematic to identify the costs involved in ignoring all the parameters.

In addition, air transport services are not sold in air transport at single prices depending on the type of "product", as is the case with other types of goods or services. Even ticket prices sold for the same flight and even to the same transport class may vary considerably, depending on many factors that often do not make sense from the passenger's point of view, where the price level does not have and cannot be directly related to costs (even if find some meaningful and reliable method of determining the cost of the seat).



THE IMPACT OF PROGRESSIVE TECHNOLOGIES ON WINTER AIRPORT MAINTENANCE

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The article deals with new technologies in the field of winter airport maintenance. In the introduction, the authors present modern technologies that are already used in this area or have great potential for their use to significantly help streamline and optimize winter maintenance. The authors present the possibilities of using a quality information system as a support tool for winter maintenance in combination with the described technologies. Aeronautical meteorology can be described as an exact science. However, the weather forecasts at least in the current state of forecasting and monitoring systems, they do not reach perfection. The reason is shortcomings in the global and time coverage of individual areas by ground-based observatories as well as computational constraints in the field of numerical modeling. There is more in this area a lot of research and development work to improve the data and information collected. Better and earlier information will lead to better decisions.

A key factor in every activity performed as part of winter maintenance is time. Although state-of-the-art mechanical or other means specialized in winter are available maintenance, without sufficient time in advance for their preparation and use, are ultimately unnecessary. Although several experiments with autonomous mechanics are currently underway means to perform winter maintenance, so far the reality is that without human workers there are drivers these mechanisms are insufficient. Also for the thorough and most perfect preparation of the winter plan maintenance, numerous analyzes need to be processed and evaluated. These activities also require some time without which this planning would not be possible. Weather forecasts for air transport will continue to be driven by technological progress, as a result, these predictions will become more realistic and timely. This also applies to winter maintenance airport. In order for airports to ensure smooth, safe and efficient air operations, the working procedures and systems used for this purpose must be constantly improved individual airports. To enable the airport to meet ever higher aviation requirements transport, different detection and monitoring systems need to be innovated at the same speed, how these systems are evolving.

For this reason, it is more important than ever global warming. As for the third chapter and the individual winter maintenance activities, this performance of activities is described in the working procedures developed for each airport separately at its airport specific conditions. In the absence of such procedures, the actual performance of the activities would be chaotic process. Every airport dispatcher or winter maintenance commander uses it within the organization works not only with established procedures, but also owns empirically based procedures. The basic essence however, these empirical procedures are still those set out in the worksheets. After years' practice and experience, then responsible managers in the scope of maintaining safety use these modified procedures. Many times these procedures are based on their own in practice, experience works better than basic work procedures, but on this basis these basic procedures do not change in any way. If the winter season has such potential that it will cause operational irregularities at airports of all sizes, this fact only increases the importance of not only preparations for the prevention of individual situations in winter, but also the importance of emergency procedures. The safety and smooth operation of the airport must therefore be a priority for the airport operator. The level of investment in the winter maintenance plan must be determined on the basis of severity and cost costs of individual activities of the plan. If the level of investment is decided unilaterally, it can they represent a potential source of conflict between airport operators and its shareholders. In conclusion, the authors point out the issues that need to be given increased attention in the future in order to ensure the continuous development of technologies used in the field of winter maintenance of airports.



UAV NEGATIVE IMPACT ON THE SAFETY OF AIR TRAFFIC IN THE AREA OF INTERNATIONAL AIRPORTS

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The growing popularity and widespread availability of Unmanned Aerial Vehicle (UAV) drones are causing increasing interest from aviation operators. This interest stems in particular from the increasing number of threats to the safety of air traffic by the abovementioned drones. One of the often endangered areas are airports. Currently, the number of collisions between UAVs and aircrafts is growing, and terrorist organizations are already taking advantage of the access and anonymity that UAVs offer. Based on the above, the regulation of the use of UAVs in the field of airports, as well as the use of technologies limiting the operation of UAVs, is one of the primary interests of airport operators. The article in the introductory part describes individual cases of airport security breaches by UAVs. Characterized are the most endangered parts of aircraft in a UAV collision with an aircraft. Based on the apparent safety threats to UAV operations near airports, the article further addresses three areas of analysis. Analysis of regulations dealing with the operation of UAVs in the surrounding areas of international airports, analysis of systems enabling the protection of airports and aircraft against UAVs and analysis of specific airports that actively use the protection means. The paper aims to analyze the risks and threats to the use of UAVs that arise for airports and airlines, to specify the technical and economic impact of these devices on airports and airlines and also to describe possible airport protection against UAVs in international airspace.

Currently, reports of drones near airports are increasing year by year. Flying with drones is becoming a hit of the 21st century. Every year, a number of reports of drone sightings near airports around the world are rising. The latest case of a threat to the safety of air traffic by a drone was 2.3.2020 at the airport in Frankfurt am Main, where they had to cancel several flights within half an hour. They had to temporarily close Frankfurt am Main International Airport because they spotted a drone near it. It was reported by a pilot who observed it in the southern part of the airport around 11:15. Full operation of the airport was resumed at 11:45. In 2019, the airport recorded up to 28 reports concerning drones.

October 16, 2019 – Franz Liszt International Airport in Budapest – complete disruption of air traffic after drones flew into the airport area and had to close the airport for 23 minutes. The next day, the planes did not land and take off for more than an hour, because two remotely controlled drones were moving illegally in the airspace of the airport. The airport was reopened only after its operator and air traffic control were convinced that safety was no longer compromised. Drones flew into several parts of the airport and also approached the runway and control tower. These serious incidents caused a delay of a total of 21 flights.

An unknown drone operator published a video on the Internet where he and his drone fly over a landing plane in Las Vegas. The incident took place in February 2018. According to the video, the drone came in dangerous proximity to the landing Airbus company Frontier, just a few meters above the plane. According to map experts, flying experts found that this happened about 5 kilometers before Las Vegas Airport. The US Air Force, in cooperation with the FBI, was looking for a real author who violated several restrictions and apparently also federal law. In such cases, the operator faces a fine of up to \$ 250,000 and in the extreme case, imprisonment for up to three years.

In March 2018, a pilot of a Boeing 777-200 aircraft approaching a drone just five meters from the aircraft while approaching a landing at Auckland Airport in New Zealand. The pilot successfully dodged the drone. Air New Zealand said the drone had endangered the safety of 278 people on board. In accordance with standard procedures, air traffic controllers reported the incident to the police, and after reporting a drone near the airport, Auckland Airport was closed for 30 minutes. Following a report of a drone sighting near the airport, about 20 planes circled around Auckland Airport until they were allowed to land on the ground. After reporting the drone, a police helicopter was called to the area, but the drone and the drone operator were not found. Flight NZ92 from New Zealand from Haneda, Tokyo to Auckland was diverted 500 km from Ohake Air Force Base near Palmerston North.

On September 11, 2017, the main runway 24 at Václav Havel Airport in Prague was threatened by a drone. The pilot of an airplane flying from Copenhagen reported the movement of the Drone in its flight path near the village of Červený Újezd, about three kilometers away from the airport. As a result, the main runway 24 was closed and all aircraft were redirected to the backup runway. Redirecting to the backup path took 30 minutes. The Swiss plane had to interrupt the landing, take off again and then land on the reserve runway. The airport then contacted the police, who sent a police helicopter to the area. Neither the operator nor the drone was tracked down. The closure of the main runway restricted approximately twenty arriving and departing aircraft.

Boeing 737-700 of Linhas Aéreas de Moçambique (LAM) in January 2017 was approaching a landing at Mozambique Airport when it collided with an unmanned device. The drone crashed into a Boeing 737-700 aircraft, which caused extensive damage to the nose of the aircraft. The drone caused extensive damage to the right side of the nasal dome and torso.

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Pani/Pana dane nie będą podlegały zautomatyzowanemu podejmowaniu decyzji, w tym profilowaniu. Ponadto informujemy, że w celu udokumentowania konferencji, będą wykonywane w jej trakcie fotografie, które zostaną opublikowane na stronach internetowych i w materiałach informacyjnych należących do Politechniki Śląskiej.