Living with Risks: Sharing the Good Practice

June 12-15, 2022, Novi Sad, Serbia
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ISBN

ISBN 978-86-6022-440-0

Manuscript Submitted for Publication

June, 2022.
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All of papers in this Proceedings are reviewed under control of Scientific Committee of 30th Annual Conference of Society for Risk Analysis – Europe: Living with Risks – Sharing the Good Practice
Society for Risk Analysis – Europe and Disaster Risk Management Centre, Faculty of Technical Sciences, University of Novi Sad, organize 30th Annual Conference with the general subject “Living with Risks – Sharing the Good Practice”.

The scientist and risk professionals from all areas were invited to share their knowledge and experience of applied risk analysis and science, including risk assessment, risk characterization, risk perception, risk communication, risk management, risk governance and policy, relating to risks which are of concern to individuals, organizations in the public and private sector, or to society at local, regional, national, or global levels.

This conference, as well as the previous ones, contribute from all fields dealing with risk: Environment, Disaster Risk Reduction, Fire Safety, Health and Safety at Work, Urban Safety and Security, Insurance and Finance, Project Management Risks, Cyber Security, Terrorism and all other risk topics from practice.

Members of the International Scientific Committee actively participated in the preparation of the conference, both as reviewers and authors. Annual meetings/conferences are an opportunity for risk analysts to come together to discuss issues, problems, goals and future research questions. New areas for risk analysis are emerging and new disciplines are contributing to the ongoing debate about risk analysis in its various facets.

This year the authors from 27 countries participate in the conference, and the Book of abstracts contain 116 abstracts. The editors are sincerely grateful to all the authors for the contribution to this event.

Editors
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SRA-E 2022
KEYNOTE LECTURES
How can Risk Preparedness Practices be Fostered?

Helene Joffe
University College London (UCL), United Kingdom

Abstract
This talk will focus on what we have found works to increase risk preparedness practices in cross-cultural settings. The focus will be on an intervention to change earthquake and fire preparedness but the principles pertain to other risks too. The starting point for devising any such intervention should be discovering how the target population represents the risk. Once the range of thoughts and emotions pertaining to the specific risk have been discerned, an intervention can be devised to improve preparedness practices and therefore, people’s safety should the event occur. Such an intervention also draws on the specific cultural nuances of the context in which it is implemented as well as being seeped in the empirical evidence concerning what works to change the particular behaviours that are being targeted. In our work it is often people’s emotional engagement with the risk and their sense of control over a potential disaster’s outcome that must be targeted. A sense of having a measure of control over behaviours that can prevent one from harm plays a crucial role in fostering disaster preparedness practices.

Keywords: preparedness, earthquake, fire

The role of evacuation modelling in dynamic wildland-urban interface fire vulnerability assessment

Enrico Ronchi,
Department of Fire Safety Engineering, Department of Transport and Roads, Lund University, Sweden

Abstract
Wildland-urban interface (WUI) fire incidents are likely to become more severe and will affect more and more people. Given their spatial and temporal complexity, WUI fires require a multidisciplinary approach to assess their impact and the effectiveness of any mitigation efforts. This talk introduces the role of evacuation modelling in WUI fire vulnerability assessment. A multi-layer simulation platform for WUI fire evacuation called WUI-NITY is here presented. The concept of dynamic vulnerability is at the core of the platform and is enabled by the integrated simulation framework and the emergent conditions predicted. This allows users to construct rich incident narratives, and also makes fewer simplifying assumptions regarding interactions between the three core modelling layers. Its goal is to simulate and visualize human behaviour and wildfire development during an evacuation of WUI communities. The aim of the platform is to enhance the situational awareness of responders and residents in evacuation scenarios by providing information on the dynamic evolution of the events. WUI-NITY represents the three key modelling layers of a WUI fire evacuation, namely fire, pedestrian and traffic in a coupled
manner. This allows a projection of evacuation behaviour over time. WUI-NITY has been developed using a popular game engine (Unity) and it allows considering wildfire propagation, and implements dedicated pedestrian response, pedestrian movement and traffic evacuation models. The key modelling assumptions of WUI-NITY are presented along with a discussion on the use of the outputs generated by the platform in the context of fire vulnerability assessment.

Keywords: wildland-urban interface (WUI), evacuation, vulnerability assessment

Influence of fire load and ventilation factor on fire risk in buildings

Meri Cvetkovska
Ss. Cyril and Methodius University, Faculty of Civil Engineering, Skopje, North Macedonia

Abstract
Fire in buildings, as a result of high temperatures and smoke, represents one of the greater risks because it causes not only damage to the building, but also to human casualties. The level of risk depends on the intensity of the fire that can occur in the building, ie on the maximum temperature that can be developed in the fire compartment, the time when that maximal temperature will occur and the time of the total duration of the fire. The current ISO 834 fire curve has been used in previous regulations, but it is quite conservative. New regulations for structural design introduce the so-called Parametric Fire Curve, which is a "temperature-time" curve and which includes both the heating phase and the cooling phase of the fire compartment. This curve takes into account the amount of combustible material in the fire compartment, the dimensions of the fire compartment, the characteristics of the wall coverings (envelope of the fire compartment) and the characteristics of the ventilation openings. These factors directly affect the development of fire in the fire sector and the damage that fire can cause to the structure itself, which is one of the parameters used in defining fire risk in all existing methods. Unlike a standard fire, when using a parametric fire curve, it must be proven that the structure will withstand not the prescribed time given in national regulations, but the entire duration of the fire, ie the heating phase and the cooling phase. This approach is especially important when analyzing steel structures.

The methods used to define the level of risk are mainly grouped into 3 categories: qualitative, quantitative and semi-quantitative methods. Each of these methods requires the definition of the fire resistance of the building, ie the bearing structure of the building, which means that this analysis is very important in the phase of defining the fire risk.

A parametric analysis of the influence of these factors was performed. Fire curves were defined for different values of fire load and ventilation factor and a conclusion was made about their influence on the fire risk of the building.

Keywords: fire load, ventilation factor, parametric fire curve, fire risk
The catastrophic forest fire season of 2021 in Greece, and its aftermath: Lessons to be learned

Gavriil Xanthopoulos
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Abstract

The forest fire season of 2021 in Greece was characterized by the third largest annual number of hectares burned historically, and by serious fire-caused damages to the environment, private property and infrastructures. Significant fires started early in the fire season. The Fire Service fought to keep fires small with the support of the large fleet of national and contracted aerial resources. However, as the fire season progressed, a ten-day heat wave in the beginning of August, with temperature reaching 45°C in parts of the country, air relative humidity dropping below 20%, but winds being relatively mild, caused fire behavior that exceeded the capacity of the firefighting mechanism. Starting on the 3rd of August and lasting for a week, numerous fires grew aggressively causing serious damages. Many fires affected villages, towns and even the suburbs of Athens. Within a few days, substantial international help that included aerial and ground resources, arrived and helped bring the situation under control. However, this was possible only after the conditions became milder. The total burned area reached 128,426 ha. A large fire in the north of Evia Island, that burned actively for nine days with much of its perimeter stopping at the sea, burned 51,185 ha, mainly of Pinus halepensis forest, becoming the largest fire on record in the country. All this, in a year that the country had assembled the strongest ever fleet of contracted aerial resources and had received sizable international help.

The disaster led to heated debate in the parliament and the media about the country’s fire-management organization, which has failed repeatedly to deliver as promised, in spite of an ever-increasing strength in numbers and rising costs since 1998, when the responsibility of firefighting passed from the Forest Service to the Fire Service. Climate change has been conveniently blamed by politicians and the Fire Service for this failure, while more knowledgeable scientists point to two important additional reasons: a) Fuel buildup and landscape homogeneity due to a diminishing and aging agricultural population and abandonment of the land, and an aging and underfunded Forest Service unable to do proper forest management, and b) Development of extensive wildland urban interface (WUI) areas in the last decades. However, neglect of fire prevention, a poor firefighting doctrine that relies too heavily on aerial resources and a new dogma of indiscriminate evacuation of villages and WUI areas when a fire erupts in the vicinity, the latter being in response to 102 fire fatalities in 2018, should also be added to the causes of the 2021 disaster.

Keywords: forest fire, Greece, climate change, wildland urban interface (WUI)
SRA-E 2022
ROUNDTABLE
Does risk analysis have a future in Europe?

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The idea for this round table came from a discussion that the main organizer had with Prof Renn back in the fall of 2021. We both found that compared to twenty or so years ago it appeared that there was less risk research being funded in Europe and that this was made worse by the fact that many of the senior risk professors who had retired were not properly replaced with upcoming new talent. As a result, countries that had been on the forefront of risk research such as for example, Sweden and to a certain extent Netherlands, had arguably lost their competitive edge. At the same time, it appears that a number of regulations coming out of Europe are also not rooted in risk science. The European Green Deal is one such body of regulation that is very much based on hazard classifications and precautionary thinking. In this round table panellists will provide 5-10 minute interventions discussing whether they feel that risk analysis has a future in Europe or not, by covering a wide range of risks across all European regions.
Seeing household chemicals through the eyes of children - Investigating influential factors of preschoolers’ behavior and risk-perception

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Abstract

Parental and environmental strategies to safeguard households could be effective ways to prevent unintentional injuries (e.g., supervision or locking away household chemicals). However, children will encounter household chemicals eventually because parent’s safety measures are not adapted to the child’s mobility. Or parents’ perception of the risks of household chemicals is misguided by unfamiliarity with warning labels or misinterpretation of other packaging attributes. Hence, it is important to understand which factors lessen children’s risk-perception or misguide their behavior concerning household chemicals.

We hypothesized that product attributes (e.g., label, packaging, closure types), storage context and parental beliefs might play a role in this context and conducted a laboratory study with N = 114 children (M = 45 months, SD = 6.5) and their parents (M = 38 years, SD = 4.92). During the study, children completed three behavioral tasks, where they either had to choose between products with different attributes, identify products in different storing contexts and sort household chemicals.

Results confirmed that children preferred products with comic style labels compared to products without such labels. However, children did not differ between products with different closure types (child-resistant vs. sprayer-type closure). Regarding the storage context, we found that children particularly struggled with correctly identifying dishwasher tabs in a setting where they were stored with other food items. And finally, we found that most children were not able to categorize household chemicals correctly and that their categorization significantly differed from their parents’ categorization, regardless of the parents’ belief’s concerning household chemicals. These results give further insights on the multi-causal problem of child-poisonings in a household setting. As an implication, parents should rather buy household chemicals with neutral labels and pay attention on how their household chemicals are stored, especially the ones that are usually used in the kitchen.

Key words: unintentional injuries, preschoolers, household chemicals, consumer behavior, policy-making
Closing the cycle in urban agriculture: Acceptance of human-sourced fertilizers by urban farmers and residents

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Abstract

In order to meet future food demand, a global transformation in food production is currently ongoing. Global urbanization comes with a steady decline in the total area of available farmland, since agricultural land is transformed for other purposes such as for housing and industry. Agricultural production that takes place within urban boundaries and in which input (i.e. fertilizers) is sourced from the local area could offer a solution. Urban farming may become a more dominant production system because it combines several advantages over conventional farming: less transport, less intensive production, added value because urban consumers increasingly demand local products. Urban farm initiatives have proven to be creative in setting up local nutrient cycles, like making fertilizer products sourced from human waste (i.e. urine and feces) and use these human-sourced products as input for urban farming. However, the implementation is limited by the legal context, and also contingent upon the decisions of key actors – urban farmers and urban residents. For product development and the scaling-up of innovations it is essential to map the (risk) perceptions and decisions of actors along the food production chain. We conducted semi-structured interviews with urban farmers (N = 11) and a survey with urban residents (N = 276). Both consisted of questions on risk perception, trust, attitudes, and acceptance. Results showed that urban farmers generally accepted human-sourced fertilizer. Reasons were mostly related to the fertilizer being interesting, and about being part of the innovation and its positive effects. Some were worried about the acceptance among consumers, but this was not a reason not to accept the fertilizer. Farmers generally believed that many people would be reluctant in accepting the recycling of nutrients from human excreta. However, farmers believed that the only way to change the publics' opinion is by starting the practice anyway and they were willing to play a role in this. Farmers’ risk perceptions of the fertilizer with recycled nutrients appeared to be one of the biggest limiting factors for acceptance; farmers also worried that these substances would negatively affect the soil and the crops read the research reports on the food safety and the effects on the plants and soil for themselves. The survey showed that risk perceptions of the technology negatively, and trust and attitudes of the technology positively predicted general acceptance of this new technology. These results will be discussed against the background of current developments in sustainable food production systems.

Key words: urban farming; circular agriculture; consumer acceptance; risk perceptions; behavioral analysis
Regulatory science and the diversity of criteria for methodological choice

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Abstract

In our contribution we argue that methodological choices in regulatory science are not necessarily driven by explicit scientific or policy criteria. Rather, at least in certain cases, such choices can be influenced by underlying, implicit assumptions. We show this with the help of a case study from benefit assessment: the European regulation of health claims.

Health claims are statements, usually in the form of food labels, regarding the health benefits that a food may confer upon its consumer. They are subject to regulatory authorization on the basis of scientific knowledge.

We show that in European health claim regulation the scientific assessments conducted by the relevant regulator (the European Food Safety Authority EFSA) rely on implicit, unproven suppositions about consumer values and preferences.

EFSA has implicitly adopted a particular definition of a “standard consumer” of foods with health claims, whose overarching preference is presumed to be the protection, at all costs, from incorrect or fraudulent health claims. This underlying assumption heavily influences the regulators’ choices regarding scientific methodology for data generation and analysis. The regulation’s efficacy depends on this underlying premise being correct. If, however, the preferences of actual, real-world consumers do not correspond to those of EFSA’s “standard consumers”, then the regulatory process might not be able to generate trust among consumers.

We conclude that in regulatory science close engagement of the regulators with the relevant stakeholders (in this case, consumers) is recommendable to prevent possible gaps between real-world stakeholder (consumer) preferences and regulators’ assumptions.

Our research is based on a qualitative analysis of legislative and regulatory documents relevant to European health claim regulation, particularly as to the regulators’ interpretation of the regulation’s objectives and their implementation of the regulation in practice, as well as the effects of their choices on consumers. The results of our study contribute to the further development of the regulatory framework that enables and supervises the European market for foods (particularly functional and novel foods) with health claims. The relevance of our research lies in highlighting the importance of close interrelation between regulators and stakeholders in all steps of the regulatory process.

Key words: methodological choice; benefit assessment; health claim regulation; consumer preferences;
Emergency managers' and first responders’ seismic risk perception – a public survey in Greece

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Abstract

It has been widely documented that the general public on the one hand and emergency managers (including scientific advisors) and first responders on the other perceive risk differently. People involved in crisis management and communication are assumed to make objective assessments and their decisions to be based on operational plans and frameworks stemmed from research results and scientific evidence. However, emergency managers and first responders are not expected to be knowledgeable of all the aspects of seismic risk meaning that they occasionally rely their actions and recommendations on intuition. Greece as an earthquake-prone country has experienced a great number of significant earthquakes, often with devastating impact. In this regard, understanding seismic risk perceptions of emergency managers and first responders is fundamental for entrusting pre-disaster policy making (prevention and preparedness) and emergency communication strategies and practices.

The basic research query of the present work refers to the role that knowledge plays in seismic risk perception-building of emergency managers and first responders as compared to the role of other factors such as fear, experience, age, family status etc. The authors conducted an online survey in Greece, in order to (a) access the level of knowledge, worry, experience and other factors impacting on seismic risk perceptions of people engaged in seismic disaster mitigation and emergency management and (b) present and analyze their judgments on the quality, comprehensibility and sufficiency of the emergency information that is released after earthquakes. The results show that while seismic risk perception is high, participants’ knowledge on earthquakes and seismic disasters needs to be improved. Moreover, the answers indicate that emergency managers and first responders are highly concerned about coordination-credibility of the crisis communication and management mechanism. They highlighted inappropriate allocation of responsibilities, insufficient information and lack of information clarity and pointed to the need to improve prompt warning methods and modernized communication practices.

Key words: seismic risk perception, online survey, emergency managers, first responders, crisis communication, Greece.
Concern for the environment or human health? The influence of risk information and personal values on the acceptance of pesticide use

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Abstract
Environmental pollution is one of the most pressing challenges of our time, threatening human life and wellbeing directly and indirectly. Research on psychological distance suggests that people are mostly concerned about mitigating environmental risks that involve direct health risks rather than environmental risks that threaten primarily the environment and nature. Yet, motivation to mitigate risks could also be influenced by personal values, as different values could firstly lead to both over- and underestimation of different risks and secondly modulate the importance people assign to a risk.

We investigated the influence of risk type and personal values on people’s willingness to mitigate potential environmental risks. As a case in point we chose the acceptance of the use of a pesticide in agriculture. We conducted an online experiment (N = 795) that varied the information about the risks of the pesticide (no risks, risks for the environment only, risks for human health only, and risks for both the environment and human health). In addition, we measured participants’ personal values (biospheric values, egoistic values, and personal security values), perceived risks of the pesticide, acceptance of the use of the pesticide and acceptance of its ban.

In line with research on psychological distance, participants who had learned that the pesticide posed health risks rated its use as significantly more unacceptable than those who had learned that the pesticide posed only environmental risks. The latter, in turn, rated the use of the pesticide as significantly more unacceptable than participants who had been told that there were no risks at all. Values partly coloured these effects. Biospheric values (i.e., concern about the wellbeing of nature) were directly related with acceptance, egoistic values (i.e., concern about personal wealth and status) moderated the effects of risk information on acceptance, and personal security values (i.e., concern for personal health and wellbeing) were related with perceived risks of the pesticide, but not with acceptance of its use. We discuss the implications of our findings for risk communication and value research.

Key words: environmental risks, health risks, risk information, risk perception, values
Perceived personal risk of COVID-19 in relation to other determinants of vaccination likelihood

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Abstract

Vaccination has been a major countermeasure used against the spread of COVID-19. Some people have resisted vaccination. Better understanding of the determinants of willingness to be vaccinated against COVID-19 is needed. We report results of an online survey (conducted in the UK and Portugal in collaboration with Prof Luisa Lima and Dr Cristina Camilo at ISCTE Lisbon Portugal) during February/March 2021 involving a non-representative sample of 1,134 adults. Measures were taken of respondents’ likelihood of being vaccinated, attitudes to vaccines, trust in science, fear of COVID-19, perceived personal risk of infection and identity resilience (indexed in terms of high self-esteem, self-efficacy, positivity distinctiveness, and identity continuity). We used structural equation modelling to test a theory-based model of the relationship between these measures, taking into account country-based differences. The goodness of fit indices of the model were acceptable. Compared to the UK sample, the Portuguese reported less positive attitudes to vaccines, less trust in science, greater fear of COVID-19, greater perceived personal risk, and greater identity resilience. Country had no direct relationship with vaccination likelihood. Identity resilience was negatively related to perceived risk of infection and fear of COVID-19 but positively related to science trust. Perceived risk was positively related to fear of COVID-19, to positive attitudes to vaccines, and directly to vaccination likelihood. Perceived risk, fear of COVID-19, and positive attitudes to vaccines were each greater in those who trust science more. Fear of COVID-19 was positively related to positive attitudes to vaccines and directly to vaccination likelihood. The path analysis shows that vaccination likelihood has three direct determinants: perceived risk, fear of COVID-19 and vaccine attitudes. However, trust in science is pivotal in predicting these three determinants. Moreover, identity resilience is positively related to trust in science and negatively associated with perceived risk and fear. Our study identifies some of the complex system of determinants that shape vaccination likelihood. It suggests that there are no simple, unidimensional interventions that will modify vaccination likelihood.

Key words: COVID-19; vaccination; perceived risk; trust; identity; social psychology
Does communication of uncertainty influence people’s emotions and public participation intention? A psychophysiological study

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Abstract
Communication is a crucial aspect of life. Nowadays, when we are surrounded by risk and uncertainty, communication helps the receivers of the information make informed judgments and decisions. Until now, a lot of attention has been paid to risk communication and its effects. However, research on uncertainty communication still remains scarce. This research addresses the impact that uncertainty communication can have on emotions and participation intention. To test this, we focus on the case of decommissioning of nuclear installations which is now a pertinent energy-related matter since most of the nuclear reactors built during nuclear renaissance will soon need to be shut down due to their limited operational lifetime.

The method consists of a 2x2 experimental design, combining a survey with psychophysiological measurement of emotional arousal, using a sample of 134 participants which are employees of nuclear-related institutions in Belgium.

Results show that participation intention is directly influenced by attitudes towards participation, moral norm and time constraints, whereas familiarity with the topic of decommissioning influences participation intention indirectly, through attitude towards participation. Uncertainty communication, our main variable of interest, does not influence participation intention. It does influence, though, emotional arousal (concerning the public acceptance of the remaining radioactivity resulting from decommissioning), but it does not generate negative feelings such as anger or fear.

Given that in the literature there is a debate on whether or not uncertainties should be communicated, the findings of this study imply that the concern that uncertainty communication leads to negative feelings should not be used as a reason not to communicate uncertainty anymore. Further implications and limitations are discussed in the article.

Key words: uncertainty, emotions, participation intention.
Understanding the Influence of Risk on the Decision to Act Dishonestly during the COVID-19 Pandemic

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Abstract

For millions of individuals, accessing resources such as vaccinations and furlough payments has been vital for managing the risks attributable to the COVID-19 pandemic. However, obtaining these resources has often proved difficult. For example, in some countries, the demand for COVID-19 vaccinations has outstripped supply. We considered the possibility that the greater the (perceived) risk posed by the pandemic, the more likely it could be that individuals would engage in unethical behaviours to obtain these risk management resources. More specifically, we posited that individuals would be more likely to lie about their health or financial status in order to increase the probability of obtaining, respectively, vaccinations or furlough payments.

Using purpose-made scenarios based on the COVID-19 pandemic, we conducted three experimental studies that examined whether objective risk, perceived risk and other factors would influence our participants willingness to be dishonest in order to increase their chances of accessing pandemic risk management resources. Study 1 (N = 302) assessed the extent to which the objective and perceived risk of the pandemic disease influenced individuals to provide false information about their health status in order to access a vaccination. Study 2 (N = 201) assessed whether the extent to which individuals provided false information varied according to whether the information would help them access a vaccination or access to furlough payments. Study 3 (N = 270) assessed the extent to which the willingness of individuals to provide false information in order to access furlough payments was influenced by the risk (probability) that their dishonesty could be detected by the government.

Across all three studies, we found that approximately one third of all participants lied in an effort to access vaccinations or furlough payments. Study 1 showed that the perceived risk, but not the objective risk, of the disease significantly predicted dishonesty when attempting to access vaccinations. Although Study 2 found no difference in levels of dishonesty between those attempting to obtain a vaccination and those attempting to obtain furlough payments, the results showed that perceived risk significantly predicted dishonesty for vaccinations but not for furlough payments. Study 3 identified a significant negative relationship between dishonesty and the risk of being detected. Taken together, our findings have important implications for ensuring that, during a pandemic, risk management resources can be allocated in a fair and judicious way and that fraudulent behaviours can be reduced.

Key words: COVID-19, decision-making, dishonesty, pandemic, risk perception
Perceived costs, risks, and benefits of decentralised wastewater treatment systems and their relation to public acceptance: Findings from Bangalore, India

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Abstract

Worldwide, rapid urban population growth and increasing water scarcity raise the need for complementing the prevalent centralised wastewater treatment systems with alternative systems and for reducing potable water consumption, for example by means of decentralised treatment plants that treat wastewater for non-potable reuse. While these systems have several benefits, they also come at some costs and risks, for example monetary costs for investing in the system, but also health or environmental risks in case of a system failure. To increase the use of these systems, the local government of Bangalore has issued a policy that mandates their adoption for part of the population, while the rest of the population continues using the centralised system. This may lead to increased costs and risks for some stakeholders (e.g. people who are covered by the policy or people with low incomes) while for other stakeholders benefits may increase (e.g. future generations or people vulnerable to water insecurity). This might reduce the perceived distributive fairness of the policy and of water services (i.e. the fair distribution of their costs, risks, and benefits), which is an important prerequisite of public acceptance and a successful implementation. To shed light on these interrelations, we conducted an online survey with both residents of Bangalore who are covered by the policy and residents who are not covered (N=300). We assessed perceived costs, risks, and benefits of the systems and the policy, their perceived distribution among different stakeholders as well as the perceived fairness of this distribution. We investigate: (i) the perceived costs, risks, and benefits of the systems and the policy, (ii) how they are perceived to be distributed among different stakeholders, and (iii) whether and how these perceived distributions are related to perceived distributive fairness. Moreover, we examine whether this relationship differs between residents covered by the policy and those who are not. We discuss the implications of our findings for future policies on urban water management and beyond.

Key words: risk perception, benefit perception, decentralised wastewater treatment, water scarcity
Abstract
While prolonged exposure to radon is one of the biggest risk factors for lung cancer, public awareness and willingness to mitigate the risk are typically low, even in regions with high radon concentrations. Given this, it has been voiced that health protection agencies should follow a more targeted risk communication approach that addresses various stakeholder groups in different ways (Perko & Turcanu 2020). While targeted and tailored risk/health communication approaches have been shown to be successful in various areas, especially regarding so-called lifestyle risks (smoking, alcohol consumption, unhealthy diet, etc.), the effects of targeted radon risk communication from a health protection agency perspective have not been analysed thus far. To this end, we conducted an online experiment. Four different, targeted web pages were created for four stakeholder groups, i.e. (1) tenants and (2) house owners in municipalities with high radon concentrations, (3) tenants and (4) house owners in areas adjacent to municipalities with high radon concentrations. The content of the web pages was designed based on the German Federal Office for Radiation Protection’s (BfS) materials and experiences. After completing an initial questionnaire, participants of all four groups were randomly assigned to either read their version of the targeted web page or a generic page that was the same for all groups. Afterwards, we assessed information comprehension, risk perception, behavioural intention, perceived efficacy of measures against radon, and (personal) uncertainty regarding radon. Data were collected in two federal states in Germany in July and August 2020. Of an initial 316 participants, 293 remained in the sample after data quality control. In a MANOVA including all five dependent variables, the null hypothesis could not be rejected (Wilk’s Λ = 0.9980, p = .99). Given an achieved statistical power of 1-β = .93 for effects of medium size according to Cohen (1988), it is quite unlikely that medium or large effects can be achieved by targeting risk communication to the stakeholder groups described above given our data. As the statistical power to detect small effects was low (1-β = .21), these cannot be precluded. Potential reasons for this finding and implications for risk communication practice are discussed.

Key words: radon, risk communication, targeted communication
Exploring public perception and reaction to the national weather warning system in Ireland

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Abstract

This study examines public perception and reaction to severe weather warnings in Ireland. The data for this study was collected using an online questionnaire, completed by 4,451 households, and a series of eight 90-minute focus groups with urban communities, rural dwellers, marine users, farmers, students, and an island community.

Met Éireann, the Irish National Meteorological and Hydrological Service (NMHS), uses a threshold weather warning system with three escalating categories: Yellow: Be Aware, Orange: Be Prepared, and Red: Take Action. This study shows that participants are familiar with the NMHS colour-coded weather warning system. Furthermore, it is well-received by survey respondents, with 88.2% indicating they are at least somewhat satisfied with the system.

The NMHS warnings are issued to cover county or sea areas. As a result, more people may receive the warnings than will experience the weather event. This lack of granularity, and the resulting false alarms, may result in individuals not reacting to future warnings. Consistent with this hypothesis, several focus group participants suggested a false alarm would result in them ignoring subsequent warnings. Overall, our results highlight the need for localised warnings that take account of the variation in risk within a county.

Weather warning systems focus attention on an imminent risk and drive preparedness action. As set out in Protection Motivation Theory, individuals must be aware of the threat, determine it poses a danger to them (threat appraisal), and believe they can reduce the threat (coping appraisal) if they are to take action. Focus group discussions indicated low threat appraisals when an orange warning is issued, with many waiting to see how the situation unfolds before taking action. Similarly, 55.4% of survey respondents reported waiting for a red warning before taking preparedness action. Overall, participants confirmed higher threat appraisals and greater preparedness action following a red warning. This suggests motivation to take protective action is driven by threat appraisal.

The research findings support the transitioning to an impact-based forecasting and warning system and the adoption of probabilistic forecasting in Ireland. These changes should increase the impact of the NMHS services and drive more appropriate protective action against severe weather.

Acknowledgement: This research was supported by the Irish Research Council and Met Éireann [COALESCE/2020/32].

Key words: weather warnings, risk communication, protective action
The use of nudges to properly storage food in domestic refrigerators: results from a behavioural study

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Abstract
The responsibility for the safe handling of food at home strictly depends on consumers, being the final line of defence against foodborne diseases. Previous studies found that the majority of home refrigerators contains microbial populations, suggesting the need for regular cleaning and disinfection. Moreover, the right placement of food on the fridge shelves serves as an essential practice to prevent cross-contamination and ensure food safety at home.

The present study used digital nudges to improve the proper storage of food in domestic refrigerators, chosen as the target behaviour to be nudged. A nudge is any suggestion or indirect aid that can lead people’s behaviour towards a particular direction and it encourages positive choices rather than restricting or banning negative behaviours. Thus, an online experimental study was designed to:

- explore the consumers’ use of the refrigerator in terms of knowledge of the refrigerator functioning, food risk knowledge and perception, and target behaviour; and
- test digital nudges to boost participants’ behavioural change.

The study was delivered via a smartphone app for 11 days. Participants (Italian consumers, N = 183) were randomly assigned to one of three experimental conditions presenting each one a different type of intervention (basic information, GIFs, feedback intervention) that differed for the following aspects:

- activities to be performed: at given times, participants were asked to fill in a questionnaire to collect data on the aforementioned dimensions and to self-report where they placed foodstuffs in the refrigerator during the day;
- amount of information provided (nudges), either in form of animated GIFs (reminding the correct placement of foodstuffs on the shelves) or emoticons (a positive/negative/neutral feedback was given according to whether the reported food placement was correct or not; participants with negative feedback were also shown a short video explaining how to properly arrange food in the refrigerator).

Although participants revealed to be quite self-confident and informed about food risks, nudges were found to help the right food placement in the refrigerator, notwithstanding the habit of this action: the average number of correctly placed foodstuffs increased over time and a significant effect of the intervention on the target behaviour was observed as well. Results suggests that communication strategies based on digital nudges may be effective intervention tool in improving behavioural change of habitual behaviours such is the management of food at home.

Key words: digital nudges; risk communication; domestic refrigerators; food safety; consumers’ behaviour
Motivated to protect humans, animals, and the environment: Communicating the risks of biocidal products

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Abstract

Biocidal products, such as disinfectants or insect repellents, are widely used, yet have a substantial potential for harm to health and the environment. Regulatory offices and the industry are collaborating closely to provide consumers with information about the involved risks and measures that should be taken when applying these products. However, prior research suggest that cognitive and behavioural barriers might sometimes prevent users from paying attention to these warnings and as a consequence do not follow necessary risk mitigation measures. For successful risk communication, it is vital to consider whether the provided information is comprehensible and practicable, whether and which risks are perceived, and under which circumstances users are willing to take protective actions. These open questions were investigated in this project within the theoretical frame of the Protection Motivation Theory. For this, a representative online survey (N = 1000) was conducted among the German public, hypothesising that risk information, threat and coping appraisal will contribute to people’s protection motivation. Moreover, an included scenario experiment allowed to investigate the effect of different variations in the communication of risks on protection motivation (e.g., framing of risks, presentation form). This study provides generalisable insights into people’s risk perception of chemical risks, which will be of direct use for risk communication of health and environmental risks.

Key words: biocide, risk perception, protection motivation, risk communication
Exploring perceptions of CDR in the Global South

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Abstract

The impacts of the climate crisis are becoming more widespread across the world but are particularly apparent in the Global South where warming temperatures, flooding and other extreme weather events are more frequent. In climate-vulnerable countries the focus tends to be on adaptation and resilience with climate engineering much less prevalent. Typically those in the Global North produce most of the knowledge in this field and little is known about perspectives of those in the Global South. Climate engineering could potentially be deployed in these regions as they are seen to be the most effective areas for some strategies. It is therefore crucial that stakeholders and communities are provided with the opportunity to share their initial insights into potential proposals helping to inform decisions around research and development of technologies.

Carbon dioxide removal (CDR) is increasingly viewed as a necessary approach to help tackle climate change alongside other measures with research into a variety of strategies ongoing around the world. This project aims to explore perceptions around CDR in the Global South with a focus on South-East Asia and particularly Malaysian Borneo, where agriculture and palm oil crops are crucial. A range of stakeholder and expert interviews were conducted with respondents mainly in Malaysia and the UK including NGOs, scientists, and government bodies to examine perspectives on the use of CDRs and the potential implications of this approach. One strategy known as enhanced rock weathering involves crushing and spreading minerals over land to absorb carbon dioxide with materials eventually ending up in the ocean thus removing carbon dioxide from the atmosphere. It is expected to be particularly effective in tropical regions due to the climatic conditions of high temperatures and rainfall. However, these regions are also some of the most biodiverse on the planet with a wide variety of species found only in such locations. Initial findings shall be presented setting out understanding of CDRs including enhanced weathering, issues of biodiversity and land-use, as well as concerns about long-term impacts in this region both of CDR and climate change. It is clear that adaptation, development of green technology, and so called 'nature-based' approaches like reforestation are perceived as most appropriate for this region due to the already severe climate impacts endured, however there is support for public engagement with environmental education seen as a key priority.

Key words: carbon dioxide removal, risk perceptions, Global South
Sequencing the Significance of the Risk Parameters in Chemical Industries with the Application of Fuzzy Set Theory and Deep Learning

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Abstract
With the large-scale and centralized development trend of chemical industries, the consequence and risk of multi-hazard chemical accidents are growing severe and unpredictable. Facing the challenges brought by the multi-hazard characteristics of chemical accidents, the risk assessment methods for chemical industries need to be improved and optimized. The risk parameters of chemical industries, such as accident frequency, consequence, and exposure, should be adjusted and detailed to meet the requirement of the multi-hazard risk assessment. Meanwhile, the determination of the relative significance of the risk parameters is also essential for chemical industries, which can provide guidance for risk reduction, safety management, and land-use planning. Here we constructed a framework of the multi-hazard risk parameters for chemical industries, and conducted superiority analysis on the multi-hazard characteristics of the risk parameters. Based on the framework, this research proposed a significance analysis method based on fuzzy set theory and big data deep learning. This method applies a multiple linear regression model based on Choquet integral to relate the comprehensive risk of chemical industries to the non-linear superposition of the risk parameters. With the application of deep learning based on the on-site information of multiple chemical enterprises, the sequence of the significance of the risk parameters can be determined. To verify the effectiveness and reliability of the proposed method, a case study was presented, which showed the evaluation of the relative significance of the risk parameters by adopting on-site information of three chemical enterprises. Our research results demonstrated that the influence of the multi-hazard risk parameters on risk assessment results of chemical industries is non-negligible. The multi-hazard characteristics of chemical accidents should be taken seriously in risk management and loss prevention. We anticipate our research results to be an instructive guidance for follow-on research on the risk assessment of chemical industries. With the construction of the database of on-site information involving adequate numbers of chemical enterprises, the sequence of the significance of the risk parameters can be determined properly. Based on that, not only can the safety management and loss prevention in chemical industries benefit, but the risk assessment in chemical industries can be supported by holistic and detailed risk parameters and indexes as well.

Key words: fuzzy measure; Choquet integral; risk parameter; chemical industry; risk assessment
On the impact of the social environment on risk perception and worry

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Abstract

Dealing with COVID-19-patients is an ongoing challenge for hospitals and their employees. In addition to the medical aspects, acknowledging the risk perception of health care workers (HCWs) could be a crucial aspect of coping with the pandemic, as a high perception of contagion risk can be associated with a decreasing willingness to work. As Sobkow et al. (2020) have shown, worry can be another affective factor in decision making, which relates to risk perception and behavioural intentions. Additionally, the interaction of risk perception, worry and behavioural intentions might be influenced by other perceptions and experiences during the pandemic, such as families’ and friends’ support or strain (Humburg 2001).

Derived from these considerations, the willingness to work in a high-risk situation should not only be based on one’s own perceptions and experiences but also on perceived situation assessments of the social surroundings. Therefore, not only HCWs worry about getting infected with COVID-19, but also worrying about their social environment and as well worries of the social environment might influence HCWs risk perception and behavioural intentions.

To elaborate on this, I will present key findings from a German-wide online survey (N=1710) on HCWs perception of the COVID-19 pandemic in 2020, which investigated on the addressed aspects of risk perceptions, behavioural intentions, HCWs worry about themselves and their social environment as well as the perceived worry of their social environment. In my presentation, I will briefly introduce the theoretical framework, before presenting the methodological approach. Afterwards, I will show and discuss the findings on perceived worries as well as the interaction of risk perception, worry and behavioural intentions.

Key words: risk perception, worry, social environment, COVID-19
Identifying good practices in capacity-building for futures literacy: climate change and AI risks

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Abstract

Capacity-building in futures literacy for policymakers grappling with complex global risks has gained growing prominence in recent years (Miller 2018; Poli 2021; OECD 2019). Structurally, the importance of strategic foresight ecosystems and socio-cultural and government contexts has been identified as a key factor (Bowers and Glenday 2021). Meanwhile, examining the perceptions of global risks held by the relevant global policymaking community has emerged as another aspect of the interface between policymakers and risk (Nathan and Hyams 2021). Using narratives to build futures literacy in government points to the broad interdisciplinary scope that exists on this topic (Lively, Slocombe and Spiers 2021). However, the existing literature remains largely silent on how governments have built specific futures capacities on two existential risks high on the agenda: climate change and AI. Based on field interviews, document analysis and stakeholder mapping, this paper deploys a case study of two countries that have developed futures capabilities in their government institutions: Singapore and the United Kingdom. In terms of theoretical and conceptual frameworks, this paper evaluates how far the futures ecosystem in both countries exhibit features of the matrix system of government and whole-of-government approaches (Christensen and Per Lægreid 2006). It also asks how far futures literacy should not be confined to governmental agencies only, but also extend to include other institutions concerned with the economic, financial, social and political ramifications of risk (Renn & Klinke 2014). Preliminary findings from the Singapore and British cases corroborates the recommendations of the OECD (2019) that it is crucial to address issues relating to demand; capacity; institutions; and embeddedness; and feedback mechanisms. In particular, both cases demonstrate the central importance of “policy champions” (Marsh and Rhodes 1992) at a senior level such as permanent secretaries or chief scientific advisors. Both cases also emphasise building centralized futures units to encourage and embed futures thinking across government agencies on AI and climate change issues. The British eco-system differs somewhat from Singapore however, in that the former has evolved more extensive networked relationships through public-private partnerships with non-profit companies and academic institutions on AI and climate change.

Key words: Risk governance, risk-blind and risk-sensitive policy-making
Modeling response styles
in radiological risk perception scales

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Abstract
Surveys enable us to assess people’s opinions on a range of radiological risks. However, survey responses cannot be taken at face value. Response style bias, such as tendencies to agree or to disagree with every survey item irrespective of the actual content, or only choose moderate or extreme categories of scales, are found to distort survey estimates (Van Vaerenbergh and Thomas 2013). Research suggests that acquiescent and extreme response styles are dependent of age, education and socio-economic status (Greenleaf 1992). Furthermore, the tendency towards acquiescent and extreme response behavior is context dependent and may thereby bias cross-national comparisons (Smith 2004). Lastly, survey design aspects, such as the position and clarity of scale questions, also stimulate acquiescent behavior (Krumpal 2013). Usually researchers cope with these measurement issues by balancing the question wording of the items. However, some of the standard items measuring risk perception cannot be balanced. In this paper we demonstrate how acquiescence biases can be accounted for in unbalanced risk perception items.

First, using structural equation modeling we identify a latent response style factor based on Belgian and French risk barometer data regarding radiation risk perceptions. Second, we demonstrate that this response style factor impacts risk perceptions and highlight how response biases may distort regional and national risk perception comparisons. Third, we evaluate whether specific risk characteristics and particular cultural differences can account for the response set bias, by controlling for socio-demographic composition and survey design. Based on this last analysis we will propose some practical diagnostic tools that also in less formalized survey settings can be used to assess response style biases.

Key words: surveys; response bias; response styles; structural equation modelling; risk perceptions
Anchor-Cue Effects on Hazard Identification in Risk Assessments

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Abstract

Risk assessment requires hazard identification as a first step prior to potential harm mitigation or control. Failure to identify hazards is problematic for risk management, however existing research suggests that experts and non-experts alike fail to identify many hazards (Carter & Smith, 2006; Bahn, 2012; Gaines & Schwebel, 2009). Anchor-based goal-setting is one potential avenue to improve hazard identification (Fleming & England, 2020). Setting challenging goals is known to increase performance, e.g. in idea generation (Hinsz, Kalnback & Lorentz, 1997). Goal setting is believed to be effective via self efficacy (Zimmerman, Bandura & Martinez-Pons, 1992). This paper reports two studies to examine the effect of anchors on goals and hazard identification performance.

In study 1 student volunteers were asked to identify hazards in three contexts and to complete two measures of self-efficacy. There were four conditions: prior to all three hazard identification tasks participants either received no-cue (control), or were told “Experts typically find 2 / 8 / 100 hazards”. The number of independent, legitimate hazards identified were manually coded from the free-text response boxes for each of the three contexts. Participants who were in the ‘100 hazard’ anchor cue condition identified more hazards than the un-cued control condition in two of the three tasks. Specific self-efficacy was also a significant predictor of hazard identification for two of the tasks.

In study 2 there were two hazard identification tasks and two anchor conditions (control / 50 hazards) and participants were additionally asked to estimate their goal for hazards to be identified prior to hazard identification. The use of the high anchor predicted increased hazard identification and increased task goals in both tasks. Task goal and specific self-efficacy also successfully predicted hazards identified. For one of the two tasks a mediation analysis found that the anchor effect was mediated by task goal.

Anchor cues were effective in altering risk identification across a variety of contexts and there is convincing evidence that they at least partly operate via goal setting. Very high anchors appear to be most effective – even when unrealistically high and avoid ceiling effects. Specific self-efficacy is also independently associated with hazard identification. Anchor goals may be an efficient way of improving the hazard identification stage of risk assessment.

Key words: risk assessment
Concern about water, weather and climate: Evidence from the World Risk Poll

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Abstract
The World Health Organization warns that the sustainable availability of safe drinking water is a growing global challenge, with water stress projected to affect up to 5 billion people by 2050. Climate change is expected to bring more severe weather events (e.g. floods, violent storms), which will only exacerbate the threats posed to water safety globally. However, the degree to which people around the world perceive connections between water safety and climate change is not clear. Studies of public perceptions of water safety, climate change and severe weather have mostly been conducted in the Global North, including the United States and other wealthy nations.

Theories treating “risk as feelings” posit that risk perceptions are informed by people’s first-hand experiences with the impacts of climate change. Indeed, studies conducted in the Global North suggest that concerns about climate change are on average stronger among people who perceive that the weather has become more severe in their area. Therefore, we hypothesized that public concerns about water safety would be more strongly correlated to public concerns about severe weather than to public concerns about climate change.

To understand the extent to which concerns about water safety are predicted by climate change and severe weather concerns, we analyzed data from the 2019 Lloyd’s Register Foundation World Risk Poll covering 142 countries, including 21 low-income, 34 lower-middle-income, 43 upper-middle-income and 44 high-income countries. Representative samples were drawn from each country. Gallup interviewed participants in person or over phone, using the prevailing survey mode in each country.

Using mixed effects logistic regression, we found that, globally and across country income categories, people’s water safety concerns were more strongly predicted by their concerns about severe weather than by their concerns about climate change. Both concerns were positively and independently associated with water safety concerns. These findings held when including or excluding controls for participants’ mental health concerns (which tend to be associated with general concerns about multiple topics) and demographic variables.

Following “risk as feelings” psychological theories, our findings suggest that water safety communications will resonate more widely if they draw links to severe weather compared to climate change. Specifically, such communications should explain that climate change is expected to bring more severe weather events that pose threats to water safety.

Key words: Water security, climate change, risk perceptions, severe weather, World Risk Poll
Do privacy and safety as values influence emotions towards a smart home device?

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Abstract
It has been suggested and found that values influence emotions towards new technologies, depending on characteristics of the technology. This has however not yet been tested in the smarthome context. As smarthome devices can be cyber-attacked, privacy and safety can be considered important values that users should take into account when adopting and using them. The question is, however, whether consumers realize that these values are at stake, and thus whether these values indeed influence consumers’ emotions about the technology. To test this, the Schwartz and colleagues’ 19 value measurement scale that measures amongst other personal security as a safety value measurement has been used, and extended with the value privacy. A part of the respondents received a cyber-security warning mentioning either a privacy or safety consequence, to test whether that would increase the effect of the privacy and safety values on emotions. The initial analyses on data of 643 UK participants indeed show that the value privacy negatively influences positive emotions and positively influences negative emotions, but that the value personal security does not. This was found to be independent of the respondents being warned or not. While UK consumers thus perceive the value privacy to be threatened by a smart device, they do not appear to think that the value personal security is, even after being warned about it. Finally, we explored the role of other values and found that the values power-resources, tradition, hedonism and stimulation were also predictive of positive emotions towards the smart device, while no additional values explained negative emotions towards the smart device. This study provides additional support for the theory that argues that values influence emotions, and shows that the extension of the value scale with privacy is very valuable to understanding consumer emotions in the digital context.

Key words: privacy, safety, risk perception, emotions
Determinants of flood risk awareness and preparedness among citizens – The case of Jordan

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Abstract
Developing countries natural disasters’ preparedness levels is often minimal and the determinants of such levels are understudied. To address this issue, this study assessed the relationship between self-efficacy, sense of community, past experience and flood risk preparedness in the developing country of Jordan. The study employed a quantitative, cross-sectional, correlational research design with 300 adult participants. All participants were citizens in the four Jordanian cities (Amman, Madaba, Ma’an and Balqa) that were most impacted by flooding disasters in 2018 and 2019. Multiple regression analysis indicated that all three independent variables had positive significant relationships with Jordanians’ flood risk preparedness. The strongest of these relationships was with self-efficacy, which had a correlation of \( r = 0.481, p < 0.01 \). We argue that self-efficacy may have a particularly strong relationship with flood risk preparedness because individuals with higher self-efficacy are those who are better empowered to instigate a greater quality and quantity of actions against disasters. Also, individuals with higher self-efficacy may have a greater ability to self-regulate their behaviours, they may have more confidence to participate in riskier situations and, therefore, may be better equipped to handle the negative emotions that might arise during the flooding disasters. The results of the study also indicated that many individuals in this sample of Jordanians did not take flood risk warnings seriously and often overlooked governmental risk communications. This may be because trust in governmental entities and the perceived effectiveness of risk warning and communication systems are relatively low in this region. These findings indicate that flood risk preparedness in Jordan could be improved by increasing self-efficacy and risk awareness. This might be achieved via a variety of communication channels and training approaches, as well as through the development of local and national flood emergency plans that can be established and implemented by individuals and regional communities. Recommendations for further research include quantitative or qualitative studies to understand better the connection between flood risk preparedness training, and determining how to improve disaster risk warning systems for individuals and communities in developing countries such as Jordan.

Key words: developing countries; experience; flood risk; self-efficacy; sense of community
Defining responsible AI communication of emerging technologies

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Abstract

Communicating about a topic contributes to creating a certain narrative around it, which influences the perception of the topic in the present and influences the vision we or some of us have regarding the future. The narratives, positives and/or negatives, influence the decision-making process and have an impact on how various actors debate on specific short and long terms implications of a topic. Considering artificial intelligence (AI) as an example of a technology being largely used in various sectors of applicability raises the question of responsibility regarding its use and communication regarding the opportunities and benefits it offers and the known and emerging risks it can represent. The literature is vast regarding what effective communication should be considered from a risk management and public policy perspective. However, there is a gap regarding responsible communication regarding emerging technologies. The risk governance experts highlight the importance of communication in the risk governance process. Still, there is a lack of recommendations on what this means in practice when the topic of concern is an emerging technology. It is believed that looking into what various actors communicate gives insights into what responsible communication should be. Depending on the field of expertise, some communicate about technological impacts, others about the regulatory responsibilities, and others about the negative social impact. The question regarding the communication of the positives and negatives associated with the use of AI entails the question of a responsible communication valid for all the stakeholder’s group could positively contribute to the good practices to follow in risk communication, as part of the risk governance process.

It is acknowledged that being part of certain groups of stakeholders influences the discourse that one may have. In this context, the question regarding the good practice for risk communication will be addressed by five presentations with representatives from the following stakeholder groups: regulation, technology, academia, business and risk governance.

Key words: communication, artificial intelligence, responsibility, risks, opportunities
What indicators should be considered when assessing and/or comparing industrial major risk prevention policies? Paving the way towards an assessment framework

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Abstract

The occurrence of industrial major accidents, controversies, and new strategies and regulations enables the questioning and assessment of what makes a "relevant" industrial risk prevention policy. In particular, when dealing with public policy assessment, the "actions' ecosystem" perspective is an important starting point as it reflects the multipolar and interactive characters of society and its institutions. In this regard, several methods are identified and compared in the public policy assessment literature; they can be grouped under impact assessment methods (related to "effectiveness") and/or strategy selection methods (related to the "efficiency"). The latter category includes cost-benefit analysis, cost-effectiveness analysis, and multi-criteria analysis aiming to describe, assess and relate the potential effects with respect to the engaged means. Thus, when it comes to risk policies, this raises an important question: what explicit and implicit indicators should be considered when assessing and/or comparing industrial major risk prevention policies? This goes beyond the number of major accident occurrences. To answer this, an overview of policy/regulatory assessment studies of risk prevention policies reveal three main research corpus categories: (i) studies assessing the effectiveness of major risk prevention policies through the examination of the number of accidents, fatalities, etc.; (ii) studies addressing the inspection figures and practices which say more about the inspection systems performance in achieving the set objectives rather than examining the effectiveness of the policy and the associated role of inspection; and (iii) comparative studies of risk regulatory regimes where the indicator selection is variable depending on data accessibility, policy related parameters, previously selected issues to be targeted, etc. Therefore, for the purpose of building a “holistic assessment framework” for major risk policy, this study reviews governmental risk policy assessment studies as well as comparative risk regulation assessment studies. As a result, the relevant criteria for risk policy assessment are identified and then grouped under three categories: contextual indicators, means indicators, and effects indicators. Considering the variability in data accessibility and data type needed for each indicator, further discussions and interviews are planned to complete this assessment framework for major risk policies.

Key words: policy assessment, industrial risks, risk policy, assessment framework, and major accidents.
Defining responsible AI communication of emerging technologies

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Abstract

Background: The medical professionals were the frontline workers during the COVID-19 pandemic and their psychological and physical well-being has been severely affected by work overload and continuous exposure to health threats.

Aim: In the context of the five COVID-19 pandemic waves in Romania, our research aims to investigate the mediating role of the pandemic stress on health workers in relation to their work engagement and performance.

Methods: A cross-sectional study was conducted on a sample consisting of over 600 healthcare employees, approached during the different COVID-19 pandemic waves in 2020 and 2021. Participants filled out self-report questionnaires online on their stress levels during the coronavirus outbreaks, their psychological basic need satisfaction, work meaningfulness and engagement, and quality of care.

Results: Those with concerns about their level of health tend to have a higher level of perceived stress in COVID-19 situations that predict specific coping strategies in work engagement and patient care.

Conclusions: The performance and work engagement of health-care workers during the COVID-19 pandemic and in the event of future public health crises can be increased by meeting their psychological needs.

Key words: healthcare, risk, pandemic, safety
Abstract

Although the ubiquitous use of smartphones and social media poses serious risks to the privacy of users, little is known how users perceive these risks. We present a study investigating the perception of privacy risks when using social media, employing a facet theory approach (Guttman & Greenbaum, 1998) to define and analyze privacy risk perceptions.

Specifically, we define three facets, that is, three logical aspects, that characterize a privacy risk: Facet A refers to the type of data disclosed, distinguishing three types: A person’s identity information, information about health, and information about private activities. Facet B refers to the type of actor obtaining and misusing the information, distinguishing commercial organizations, public authorities, social networks, and criminal actors. Facet C distinguishes three kinds of harm that might be experienced as a result of data disclosure: Financial losses, physical harm, and negative psychological/social experiences. A privacy risk is defined as a combination of one element from each facet, for example, the experience of a financial loss caused by a commercial organization misusing private health information.

Questionnaire items were systematically constructed by creating fictitious but realistic scenarios, each representing a combination of one element from each facet, yielding 36 (3 × 4 × 3) scenarios. For each scenario, respondents rated the two core dimensions of risk perceptions: A likelihood rating (how likely they thought the scenario might happen to them), and a negativity rating (how bad they thought the experience would be). Following the facet theoretical paradigm, item intercorrelations were analyzed via ordinal multidimensional scaling (Borg & Groenen, 2005). We hypothesized that each facet corresponds to a distinct pattern in the resulting empirical configuration.

Results from a representative survey among 500 adult Norwegians yield a distinct partitioning with respect to facets A and B, called a radex configuration: Facet A (type of information) shows a radial pattern with identity information in the center, health information located at an intermediate region, and private activities located at the periphery. Facet B (actors) shows an angular partition, with its elements corresponding to wedge-like areas ordered from commercial to social to authorities to criminal actors. Facet C (type of harm) yields a contrast of financial and psycho/social harm, whereas physical harm is not as clearly identifiable. In sum, we conclude that our three-faceted definition provides a satisfying first approximation to people’s perception of privacy risks on the Internet.

Key words: e-privacy risks, facet theory, risk perception, social media.
Perceptions of risk and trust for autonomous technologies among mobility disadvantaged groups

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Abstract
There is a large literature about the anticipated benefits of autonomous vehicle technologies. They promise to reduce the risks of traffic crashes, improve fuel efficiency by more exacting power management, reduce congestion by optimal route choice, and better urban design through minimizing space allocated to parking.

There is somewhat less literature on how these technologies will affect people who are mobility disadvantaged. In rural areas, current TNC services (such as Zipcar, Uber or Lyft) are expensive and often involve long wait times. In urban areas, the expense associated with both owned and MaaS are especially challenging for those with low incomes. As people age, they face cognitive limits that make it harder for them to drive. People with physical and or mental disabilities also face challenges, often limiting their ability to gain employment and fully join society. The poor, in both urban and rural areas, often face not only limited employment options, but also access to wholesome food or health care as a result of their limited mobility.

In this research a survey of 1,120 individuals was conducted from May 2021 through July 2021 to evaluate their perceptions of particular risks and benefits. Respondents were selected (a stratified sample) into five groups depending on their primary mobility challenge: age, disability, income, or living in a rural area. In addition, a group which was identified as facing no challenges was constructed as a baseline. Respondents are given some flexibility as to how these services will be delivered—either as owned vehicles or through mobility as a service (MaaS). These technologies are expected to be offered first on relatively expensive vehicles where the expectation is that they will be user owned; or in urban areas where they will be owned by transportation network companies (TNC such as Uber, Lyft, or Zipcar). They are asked to rank not only the risk that this technology would mean for them, but also mean for others in their peer groups and for society in general. They are also requested to identify institutions that would potentially make transition to these technologies better. Making sense of the findings nuanced and suggests some topics for further work.

Key words: autonomous vehicles, mobility disadvantaged, perception of risks and benefits
Contaminated water? Need for enhanced risk communication practices on the water to be discharged from the nuclear reactors in Fukushima

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Abstract

Eleven years have passed since the nuclear accident in Fukushima occurred in 2011. There have been steady efforts to dismantle the troubled reactors owned by Tokyo Electric Power Company (TEPCO). Of those, disposition of reactor accident generated water containing traceable amounts of radioactive material into the ocean commenced within two-year’s time will be a milestone to proceed with the steady dismantle. According to TEPCO, the water will be discharged into the sea after carefully treated and diluted with a large amount of seawater (TEPCO Holdings’ Action in Response to the Government’s Policy on the Handling of ALPS Treated Water [Digest version])

However, there has been perceptions and concerns in Japan and beyond that the health and environmental risks from the water discharge are high, which contrasts to scientific evaluation that the risks are low. This discrepancy seems to derived partly from insufficient risk communication activities on the side of policy-makers, experts and the company. I would like to evaluate the current state of risk communication and discuss its enhancement.

Key words: Tritium, nuclides, water discharge, risk communication, Fukushima
The Effects of a Serious Game to Raise Awareness About Dark Patterns Designs

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Abstract
Dark patterns are design strategies used by websites and app developers to trick internet users into disclosing their personal data. One issue of concern is that some developers have collected excessive amounts of data from users for non-functional purposes. It is important, therefore, to educate citizens about the existence of dark patterns and the importance of protecting their data privacy. Serious games have been considered an effective strategy to train and educate users on varied topics. This study aimed to assess the effects of a serious board game developed with for familiarizing teenagers and young adults with dark patterns. A serious board game was developed by a private company following a structured approach. Self-reported questionnaires evaluated the degree of knowledge of high school students about dark patterns, privacy-protective behaviors, and concerns about dark patterns. Overall, our sample proved to be unfamiliar with dark patterns’ expressions before playing the game. Despite engaging in some types of privacy-protective behaviors, the sample reported not knowing the risks associated with dark patterns. The game was effective in raising the level of knowledge about dark patterns, but it did not produce significant effects on privacy concerns or knowledge about privacy-protective behaviors. The results suggest that the game has the potential to improve knowledge about dark patterns. The current version of the game, however, does not seem to affect privacy concerns or knowledge about privacy-protective behaviors.

Key words: serious game, dark patterns, privacy-protective behaviors, privacy concerns
Presence of chemical contaminants in bivalve molluscs: risk perception, opinion and knowledge of Italian consumers

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Abstract

Bivalve molluscs (BM), as filter feeders, are particularly exposed to the accumulation of chemical contaminants of anthropogenic and natural origin, which may be present in the aquatic environment either from industrial, civil, zootechnical discharges or from soil runoff. Moreover, by feeding on plankton containing biotoxins, they can accumulate poisonous substances that could be poisonous for consumers.

Several studies have found that consumers have a positive image of fish and molluscs. However, some researches focusing on BM consumption have shown that consumers are confused about the risks and benefits related to this food.

Starting from these assumptions, a research project funded by the Italian Ministry of Health was carried out with the aim of assessing the risks related to the presence of chemical contaminants in BM and the perception of chemical risk related to the consumption of this product in the population.

A national survey was conducted in Italy in order to investigate the consumption habits, opinions and risk perceptions of BM consumers. The questionnaire was created after a literature review and based on the experience of the research team. The collection of data was conducted between October and November of 2020 through the Computer Assisted Web Interviewing method. A sample of 1,001 BM consumers was interviewed with the support of a company that specialised in market research and opinion polling.

With regard to the respondents’ characteristics, 50% were female and 50% male. The majority of the sample was aged between 30 and 44 (31.4%), lived in the South and Islands (34.9%), had a higher secondary school diploma (50.7%) and had an occupation (62.3%). The majority of respondents reported consuming BM, specifically mussels and clams, once or more a month, especially in their home. With regard to respondents’ perception of the health risk related to the presence of chemical substances, BM were associated with a significantly higher level of risk than fish in general (t=2.215, p=0.027). Finally, the respondents’ knowledge of BM was investigated using 6 true/false questions. On average, respondents answered correctly to almost 3 questions (mean=2.78), indicating a low level of knowledge about the topic.
The survey collected important information on consumers’ perception and knowledge of the chemical risks associated with the consumption of BM. Based on the results of the research project, a risk communication strategy is being developed with the aim of improving Italian consumers’ knowledge and awareness of the risks and benefits of consuming this food.

Key words: Bivalve molluscs, risk perception, consumers’ knowledge, risk communication, online survey

Mitigating vulnerabilities with social media: a cross-national comparative study of European emergency managers’ practices

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Abstract

Emergency managers are increasingly utilising social media platforms for crisis communication, yet fail to utilise the whole spectre of possibilities that social media offers. Numerous studies about practices of using social media in emergency management have explored the usage patterns, and have highlighted good practices of institutional social media communication. However, the specific functions of social media in identifying and informing those in vulnerable situation in various phases of disaster management in the context of Europe, are understudied, whereas the shortage of cross-national comparative data is evident. Our document analysis and 95 expert interviews in eight European countries – Germany, Italy, Belgium, Sweden, Hungary, Finland, Norway and Estonia – explores European emergency managers’ actual purposes of using social media and sets it against possibilities of alleviating individuals’ vulnerability during disasters. We find seven practices that contribute to alleviating individuals’ vulnerabilities during disasters: identifying citizens’ concerns, identifying missing persons, informing and warning the public, sharing educational guidelines, sharing guidelines during disaster, organising volunteers, and sharing regular updates on institution’s activity. Practices described could be used when developing guidelines for official crisis communication in social media and demonstrate the value of using social media in crisis and risk communication more broadly.

Key words: emergency management, disaster, crisis, social media, crisis communication, risk communication, vulnerability
Abstract

Physical tipping points have gained a lot of attention in global and climate change research to help understand the system transition conditions when it comes to the atmosphere and the biosphere. Social tipping points have been framed as conditions in socio-ecological systems where a small change in the underlying elements or behaviour of actors triggers a large non-linear response in the social system. With climate change becoming more acute, it is increasingly important to know whether and how societies can adapt in the face of these changes. While social tipping points related to climate change have been associated with positive or negative outcomes, overstepping adaptation limits has been linked to adverse outcomes where actors’ objectives are strongly compromised. Currently, the evidence base is limited, and most of the discussion on social tipping points in climate change adaptation and risk research is conceptual or anecdotal. This paper brings together three strands of literature: social tipping points with a focus on systemic risks and climate adaptation limits, discusses the methods and models used in assessing them and illustrates the dynamics of social tipping points and cascading risks at different scales beyond adaptation limits. Based on two examples, the identification of tipping points in social systems is crucial for developing governance approaches to climate change adaptation policies and assessing their performance.

Key words: systemic risk, governance, adaptation limits, social tipping points, non-linear change
AI for you, human doctor for me: Re-analysis of the not in my health’s backyard effect

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Abstract

Current developments suggest that there will be an increasing number of online health care services in the future. It can also be assumed that artificial intelligence (AI) will play a central role here. To date, however, little research has been done on how patients interact with an AI’s diagnoses and treatment recommendations. Hudecek and colleagues (2022) addressed this research question. They concluded that diagnoses and treatment recommendations coming from an AI are more likely to be accepted if they are for another person than for oneself. The analysis presented here provides a more detailed look into the findings gained here. In addition, open questions for future research in this context are discussed.

Key words: AI, health, not in my backyard, trust in medical services, online medical platform
Perception of online medical platforms: AI docs are fine for others but not for me

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Abstract

Online medical platforms based on artificial intelligence (AI) that can be used directly by patients without having to consult a human doctor will be of increasing importance in the near future. However, research from the patients’ perspective on such AI-powered tools is still scarce. We therefore aimed to explore the perception of online medical platforms. In our preregistered 2x3-experiment we examined the influence of perspective (target person: self vs. average person) and source of advice (AI vs. male physician vs. female physician) on the perception of a medical diagnosis and corresponding treatment recommendations. In addition, we assessed the importance of several moderators such as health anxiety, general attitude towards artificial intelligence (GAAIS) and socio-demographic variables (e.g., social status).

A total of 276 participants were asked to imagine that they vs. an average German citizen (condition perspective) have recently been vaccinated and now have severe discomfort that also causes concern and they (the average person) wonder if this is still normal. Therefore, the participants were told that they (the average person) would seek medical advice on an online platform and then be assigned to a medical contact. This medical contact was randomized to either a female physician, a male physician, or an AI (condition source of advice), all specialized and trained in the previously described health problem.

Results show that people prefer the advice of human doctors rather than AI when it comes to their own situation. In contrast, there are no differences in terms of the source of advice for judging the situation of an average person. Accordingly, there was a statistically significant interaction between source of advice and perspective. This effect also remained stable after controlling for participants’ GAAIS. All other moderators were not associated with the dependent variables. Our study contributes to a better understanding of the patients’ perspective of modern digital health tools. As results indicate that the perception of AI-powered tools is more critical when it comes to yourself, future research should examine the relevant factors that influence this perception.

Key words: AI, health, not in my backyard, trust in medical services, online medical platform
The Impacts of Economic Sanctions on Production and Trade of Sanctioned Goods

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Abstract

It is well established that free trade generates larger gains. However, various forms of export control such as tariffs, quotas, taxes, etc. applied by developed and developing countries may substantially reduce gains from trade. In this paper we apply a unique methodological refinement of the computable general equilibrium (CGE) approach using the modified version of the dynamic Global Trade Analysis Project (GTAP) model to understand the effect of various types and levels of international sanctions on the severity and dissipation of economic losses over time.

Although the costs of international sanctions will mainly be borne by the targeted country, reducing or eliminating the exports of certain goods from sender countries entering the sanctioned market makes them relatively expensive, and spurs imports of such goods from its other trading partners (Hufbauer et al. 2007), thus also having significant impact on the choice of international transport mode. Also, the targeted goods become cheaper in sending countries due to increased domestic supply. Although, this has the effect of initially advantaging sender countries, the long run negative impacts of international sanctions may dissipate and undermine the intended effects in the targeted economy due to adjustment to sanctions through increased domestic production of targeted goods and trade substitution with other trading partners.

Key words: International sanctions; economic impacts; international trade; modal substitution; computable general equilibrium
The impact of uncertainty communication on risk perception and public participation intention? The case of decommissioning of nuclear power plants in Belgium

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Abstract
After their operational time is finished, the nuclear installations must be shut down and decommissioned. This makes decommissioning of Nuclear Power Plants (NPPs) a pertinent energy-related matter since most of the nuclear reactors built during nuclear renaissance will soon reach the end of their operational life. Such regulatory matters require consultation with the public and their involvement in the decision-making process. But to what extent is the public willing to participate and how does risk perception and uncertainty communication influence this willingness?

This paper addresses these research questions by analysing data generated from a large-scale public opinion survey in Belgium (N= 1060) by using Computer-Assisted Web Interviewing (CAWI). The method of this study consists of an experimental design where participants are divided into experimental or control group. The experimental group receives information about the uncertainties in addition to introduction to decommissioning, whereas the control group receives introduction to decommissioning only.

Based on the arguments of Uncertainty Reduction Theory (URT) and Uncertainty Management Theory (UMT) we hypothesize that respondents that will receive introduction about decommissioning of NPPs which contains uncertainty information, will be more likely to be willing to participate in decision-making procedures than those respondents that will receive introduction text only. However, this effect can be moderated by the impact of emotions and perceptions of risk that uncertainty communication can generate.

The findings of this study will contribute to studies on the field of energy policy by identifying the extent to which the public is willing to participate on energy-related procedures, as well as the factors that influence this participation intention.

Key words: uncertainty communication; risk perception; public participation; nuclear decommissioning
Natural hazard risk preparedness among Swiss households: public involvement and integration increase readiness to act

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Abstract

Building a culture of risk is an essential objective within the integrated risk management paradigm, as it is for the Strategy for Natural Hazards Switzerland to protect the population, natural resources, and material goods. Challenges arise both due to increasing damage from natural hazards, and the challenge to motivate private actors for risk preparation. This requires that all responsible actors are recognized and aware of their role. However, previous studies indicate that risk awareness and preparedness levels are rather low within the general population. In 2015, for the first time, we conducted a nationwide survey to provide empirical data on factors that influence individual risk preparedness in the general population. In 2021, we repeated the inquiry in a panel study design. Results show that attitudes towards risks are rather stable, but we found a significant increase in readiness to prepare. The main influencing factors are to prioritize hazard risks against other threats, a positive attitude towards public risk management, trust, and social integration. Further, we found that an increased feeling of insecurity due to the corona pandemic increased readiness to prepare. We conclude that social capacity building needs to maintain trust in public measures, involve private actors in risk management, and risk communication.

Key words: natural hazards, integrated risk management, panel survey study
The Republic of Serbia response to the global public health crisis Covid 19 and socio-economic impact of the event

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Abstract
The beginning of 2020 started with global public health crisis caused by a pandemic of a virus called Corona 19. Life began to take place in extraordinary conditions for which the society was not adequately prepared. At the end of the first quarter of 2020, a state of emergency was declared in the Republic of Serbia due to the health crisis. Measures to combat the epidemic which the state has declared, have reduced economic and social life to a minimum. Within two years more than 80 regulations have been adopted of which half in the period of emergency state. The paper will present the measures taken by the Government of the Republic of Serbia in order to fight and suppress the infection in short time. Then, how the local governments managed the crisis through the civil protection system, which contributed to overcoming adverse events more easily. Also, the paper will present the socio-economic impact of the epidemic on Serbia and analyze were the national measures adequate.

Key words: pandemic, risk reduction, global crisis, socio-economic impact, Covid 19.
Forever chemicals: Heterogeneity in expert’s beliefs about PFAS and what to do about it

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Abstract

The associated health risks of persistent, mobile and toxic chemicals - found to accumulate in both humans and the environment - are receiving growing media attention, prompted by high profile films and documentaries such as The Devil We Know (2018) and Dark Waters (2019). As such, the public are becoming increasingly aware of the risks of exposure to chemicals like per- and poly-fluoroalkyl substances (PFAS), and regulators are turning to the experts for advice on where PFAS is found, and how to avoid it. But how much do the experts agree with one another on this rapidly emerging global pollutant crisis? We collected data from N = 40 experts (i.e., chemists and epidemiologists specializing in such substances) regarding: a) the sorts of everyday products that they believe PFAS are found in, b) how essential these everyday products are deemed to be for personal and societal functioning, and c) how easily PFAS can be substituted in these products for PFAS-free alternatives. While analysis is ongoing at the time of abstract submission (Feb, 2022), our findings already demonstrate a surprising level of heterogeneity for all outcomes across our expert sample. A lay sample is currently being collected so that perceptions of PFAS prevalence and substitutability, and product essentiality can be compared across experts and non-experts. Such comparisons will allow us to identify critical knowledge gaps in the public’s understanding of PFAS pollution and risks. Building on insights from the climate change literature, we will discuss implications for designing clear messaging and advice for lay and policy audiences when heterogeneity among the experts is prevalent. In particular, we use our findings to discuss obstacles and solutions for overcoming expert heterogeneity in specific cases, for example, when essentiality is generally perceived to be high but substitutability is low (e.g., PFAS in facemasks recommended by policy-makers to reduce the spread of SARS-CoV-2), and ask what effective, tailored communication might look like across different demographics.

This research is conducted within the Zero Pollution of Persistent, Mobile Substances (ZeroPM) project. ZeroPM is funded by the European Union’s Horizons 2020 Research programme: Grant agreement ID 1010367756. For more details see: https://cordis.europa.eu/project/id/101036756

Keywords: PFAS; forever chemicals; science communication; environmental psychology
In search of infodemics: US media amplification of risk

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Abstract
We explore 20 years of risk discussion in US news media to demonstrate the multiple routes through which American citizens consume risk information in their daily lives. Our study draws on the Social Amplification of Risk Framework (SARF) as a theoretical basis. Starting with 271,854 news stories that contain risk discussion, we apply Latent Dirichlet Allocation topic modeling analysis to uncover the categories and topics that underpin risk discussion. We find that news media coverage over the last two decades gravitates risk discussion around seven core topics: health, business, environment, entertainment, domestic affairs, geopolitics, and technology. We also identify a series of discreet news events over the time period which exhibit an explosive growth in media coverage that we term as potential 'amplification of risk' events. We discuss the implications of these findings for academics and policymakers regarding risk communication, infodemics, and risk perception.

Keywords: risk communication; infodemics; risk perception; social amplification of risk; topic modelling
Impact of safety and health at work on registered accidents with regard to the risks that cause them

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Abstract

Occupational health and safety is characterized as a set of different activities, attitudes, behaviors and activities that help eliminate the adverse consequences of work. Eliminating problems related to safety and health at work is a long-term solution process. The paper focuses on the issue and the survey of one of the most common problems in occupational health and safety, namely occupational accidents. It also points to accidents at work in specific economic sectors. The analyzed period is from 2012 to 2021. The processed areas of economic branches in the paper allow to monitor differences in the number of accidents at work between selected types of economic sectors, such as large production plants of machinery and equipment, motor vehicles, etc., compared to smaller establishments such as retail. Several scientific methods were chosen for data processing in the paper, such as synthesis and analysis, which was used to break down the investigated problems and the data itself, also identify and compare the data so that we can single out those that have common features or find differences, we also used statistical evaluation of data. Logical conclusions were drawn by induction and deduction. In this paper, we have chosen a detailed approach to accidents at work, and we have divided the data into those that deal with registered accidents at work, serious accidents at work and fatal accidents at work. According to verified data, we have identified several recurring risks that are the main causes of accidents. These causes include, for example, shortcomings in the field of personal protective equipment, insufficient personal preconditions, etc. Based on the processing and evaluation of all data on individual accidents at work, opportunities were proposed to improve activities in the field of safety and health at work, which can contribute to reducing the number of accidents at work in selected economic sectors.

Keywords: risk, occupational safety, safety at work, work accident, economic sectors
Appraisal of the value of renewable power plants as an instrument of financial resilience to hazards

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Abstract
The crisis in the energy sector caused by population growth, high energy demand, climate change, wars, natural disasters, technology transfer, rising energy prices and other factors have resulted in the redirection of electricity production from non-renewable (conventional) sources to renewable ones. The main goal is to reduce dependence on fossil fuel imports, maintain the stability of the energy system and protect the environment. Electricity generation from renewable resources has experienced intensive growth in the last 30 years. Managing a company that generates electricity from renewable resources requires a new approach and the application of different instruments to achieve financial resilience to various hazards. Financial resilience is the ability of a company to resist and recover from temporary financial difficulties and disruptions. One of the instruments for achieving financial resilience to hazards is the appraisal of the value of renewable power plants, which is based on the theory that managing a company includes managing the company's value, considering the company's profit, asset value and growth. The topic of this paper is an appraisal of the value of renewable power plants, applying the revenue approach with the method of discounting cash flows and applying the cost approach with the cost replacement method; based on guidelines of International Standards for Valuation, considering specific market conditions in Serbia. This research is significant because appraisal of the value of renewable power plants, as an instrument of financial resilience to hazards, should be the first step that will contribute to the continued survival of companies in the energy sector by surveying business operations, increasing financial literacy, without imposing additional financial costs. The authors of this paper focused objectively to present the appraisal procedure, conditions, restrictions and purposes for performing the valuation. This paper contributes to scientific progress by assessing value, as an instrument of financial resilience to hazards, aims to timely identify all potential problems and minimize their impact on the business caused by various crises.

Keywords: value appraisal, financial resilience, renewable power plants
A Machine Learning approach characterizing patients’ movements via bed pressure and wearable sensors data

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Abstract

The movement pattern of hospitalized patients is a source of information for clinically relevant outcomes concerning the patient’s mobility, the potential risk of developing pressure injuries or falls from bed, and the sleep quality of sleep. Generally, in a clinical environment, the assessment of the bed activity is performed by visual observation. This procedure is time-consuming and difficult to manage in a hospital setting where optimizing time for patient care is crucial.

Within this general framework, this study is aimed at characterizing patients in bed dynamics accounting for clinical and anthropometric characteristics.

A sample of 40 healthy volunteers aged 18-65 years will be enrolled. The data will be retrieved by using pressure sensors directly installed in the bed and from wearable devices like smartwatches collecting kinetic signals, i.e., accelerometers and gyroscopes. Video of the experiments will be recorded to sync together the two distinct source of data and to label them (by two independent researchers).

The smart bed used for the experimentation is composed of four pressure cells collecting data at 5 Hz, and it disposes of integrated electric controls provided with a sensor panel. Wearable devices are equipped with a data collection application to retrieve and store its sensor data at a high resolution of 25 Hz.

The data will be labelled accordingly to three main categories: 1) position relative to the bed (i.e., left, center, right); 2) position relative to the subject (i.e., subject lying on their left-hand side, on their right-hand side, or on their back face-up, in transition); 3) type of dynamics happening (i.e., still, turning right, turning left).

A Machine Learning (ML) classification model will be trained accounting both for tabular subject metadata (e.g., age and weight) and sequential raw signals (e.g., weight distribution across the bed sensors) in synergy. The final model performance will be assessed by using sensitivity, specificity, F1 statistics, and Receiving Operative Characteristics values (ROC) values at the beginning, and during transitions on data collected from subject “never seen before” by the algorithms. Tests on the improvement gained by using the wearable devices signals too will be assessed to score the quality of the bed signals alone on the tasks.

An MLT automatic monitoring system for bed fall detection could be a complementary instrument in the daily routine patient monitoring and fall prevention, especially with bedridden patients. This system of detection can be useful since it could be directly incorporated in the bed and it could possibly not require to be worn by the patients.

The study will take place at the Unit of Biostatistics and clinical epidemiology of the University of Padova. The data will be collected in a dedicated environment for experimentation.

Keywords: risk fall, bed, pressure integrate sensor, predictive model
Isolation measures and state of emergency - importance for mental health (example from Serbia)

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Abstract

Mental perception of declaring a state of emergency and introducing measures of restricted movement by population largely depended on circumstances in which the respondents found themselves - such as housing, number and age of household members, type of job or profession. Restrictions imposed numerous challenges, insecurities and fears. Limited conditions of movement brought changes in the ways of communication and informing.

The paper was created as a result of research in the subject of Mental Health and Psychosocial Support in Crisis, in PhD studies in the field of Disaster Risk Management and Fire safety, Faculty of Technical Sciences in Novi Sad. 765 respondents participated in the survey. Methodology was based on voluntary participation, an anonymous questionnaire and appropriate statistical processing. Respondents were asked to complete a questionnaire via email, Viber or WhatsApp.

The largest number of respondents, about 52% lived in households with three or more members, and 9% of respondents lived alone. The dominant fear that arose among the respondents was concern for their loved ones, in about 70% of the total number of respondents. 27% of respondents during the observed period were afraid of going to the store or using public transport. Over 22% of respondents were afraid of being infected and 16% of respondents were afraid of being admitted to a covid hospital.

The communication was significantly changed in the circumstances of the applied measures. It took place through channels that were available in conditions of limited movement. The highest percentage of respondents used mobile phones (91%), 72% used applications for communication on mobile phones (Viber, WhatsApp), 64% of respondents used social networks, while chat applications (such as Skype, Zoom) used about 37% of respondents.

The way of informing was most often limited to household sources - TV and Internet. About 55% of respondents used conferences of crisis headquarters as a source, about 45% of respondents were informed through informative programs on television, 39% via Internet and about 38% of respondents followed website and announcements of the Ministry of Health.

Almost two years of pandemic crisis passed with the application of various measures depending on current epidemiological situation, and the challenges of combating fear and uncertainty among the population (overcoming infectious diseases) are still present today. The results of the research indicate the importance of further monitoring of this topic and the importance of preserving mental health in future crises.

Key words: risk fall, bed, pressure integrate sensor, predictive model
Abstract

Social and historical circumstances in the region have influenced the decline of the population’s interest in the need to prepare for and respond to emergencies. Many procedures, exercises and various good practices that were previously implemented have ceased to be organized and renewed. The first reaction of the population to the pandemic was fear. This fear for the survival of the elementary cell of society - the family and its members was presented in various ways, of which uncertainty was expressed in every environment, from the lack of basic foodstuffs, as well as the lack of basic elements of modern life (regular electricity, water, heating, stable internet connection, waste disposal, disinfection of public areas, etc.).

The difference between the resilience of communities in urban and rural areas during the state of emergency in Serbia and the measures of restraint that accompanied it was the subject of research conducted immediately after this period. The research was conducted within the subject Public Health in Emergency and Crisis, at the PhD studies in the field of Disaster and Fire Risk Management, Faculty of Technical Sciences in Novi Sad. 765 respondents participated in the survey, the research methodology was adapted to the situation and is based on voluntary participation, an anonymous questionnaire and appropriate statistical processing. Respondents were asked to complete the questionnaire, according to the situation, via email, Viber or WhatsApp.

The research showed that respondents from rural areas had less uncertainty and a better quality of life during the observed period. Out of the total number of respondents, 29% of those who live in urban areas assessed that their quality of life has changed for the worse, and 18% of respondents from rural areas gave such an answer to the same question. When asked if they were worried about the possible lack of food, 29% of respondents from urban areas answered positively, and 18% of respondents from rural areas gave the same answer. Respondents living in rural areas were more satisfied with the work of utility companies.

The public health crisis caused by the COVID 19 virus represents a major test for community resilience. The research showed that rural communities showed a higher degree of resilience during the observed period. In the future, Serbia should use new experiences from the crisis and continue the good practice of training, preparation and response to emergencies at the level of local communities and organizations.

Key words: community resilience, public health, preparation and response
The risks of microplastics: Exploring citizens’ perceptions in Germany and Italy

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Abstract

Background. Microplastics have been subject of public debate as an emerging risk to the environment and human health for several years. While risk assessment regarding microplastics is still ongoing, preliminary evidence suggests that concerns on this topic differ internationally. Since microplastics are considered a human-made problem, understanding risk perception on this topic is significant for risk communication. However, there are still knowledge gaps concerning what risks citizens associate with microplastics, what types of reasoning shape perceptions, and what role demographic characteristics play in this regard. This study aimed to fill these gaps by exploring citizens’ risk perceptions of microplastics in depth. To account for potential differences between countries, it adopted a cross-national perspective between Germany and Italy.

Method. A total of 30 citizens (Germany: n=15; Italy: n=15) between 25 and 61 years of age, stratified by gender, age, and education both within and between countries, participated in qualitative interviews. The interview guide included questions on risk perception of microplastics with regard to the environment and human health and covered aspects such as sources, pathways, impact, control options, and responsibilities.

Results. The results indicated pronounced concerns about microplastics in both countries. This was reflected in various assumed effects on the environment (e.g., pollution, lack of degradability, loss of biodiversity) and human health (e.g., short-time bodily reactions, blocking of biological processes, direct damage of organs). With regard to solutions, interviewees took a holistic view in which environment and human health are interconnected. Additionally, different overarching mental models shaped perceptions of microplastics. Individuals who expressed uncertainties or lack of knowledge about sources, pathways, and impact of microplastics tended to be more concerned. Similar patterns were found when individuals transferred their knowledge about plastics in general to microplastics or when they held strong ideas about the accumulation of microplastics in the human body (body burden). Differences between countries emerged mainly with regard to the perceived responsibility of the state in addressing the issue.

Implications. The results suggest that citizens perceive microplastics as a multi-faceted problem and view negative effects on the environment and human health as intertwined. Appropriate risk communication on microplastics should not be limited to technical information on what is considered
certain about sources, pathways, and impact of microplastics. Issue-related reasoning behind risk perception should be considered as well, e.g. by explaining the meaning of scientific uncertainty, clarifying differences between macro- and microplastics, and addressing the role of accumulation in causing effects.

**Keywords:** microplastics, risk perception, mental models, qualitative interviews, cross-national perspective

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**The determinants of COVID-19 protective behaviours in Germany and the UK**

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**Abstract**

After over two years of the pandemic, COVID-19 continues to be a cause of serious concern for governments aiming to reduce excess mortality. Throughout the pandemic, the use of non-pharmaceutical interventions (NPIs) has been vital, yet dependent on public buy-in in the absence of mandates.

This paper examines the determinants of COVID-19 protective behaviours among a representative sample of German and UK respondents using data from a survey collected as part of the PAN-FIGHT research project between April and May 2021.

This study evaluates the impact of a wide range of influential factors discussed in COVID-19 pandemic and other disaster-related literature on protective behaviours, using a structural equation model (SEM). Among others, the effects of personal health risk perceptions, economic risk perceptions and quality of official communication on the likelihood to undertake a wide range of protective behaviours were analysed. These protective behaviour measures, repeatedly asked for in official messages to the public in media and other platforms, included mask wearing, physical distancing and self-isolation. We also discuss how the governments and health authorities of both Germany and the UK communicated risks associated with COVID-19 with the public in the first year of COVID-19 pandemic.

We find that personal health risk perceptions have a significant direct positive influence on protective behaviours in both countries, while economic risk perceptions directly negatively influence likelihood to undertake protective behaviours to stop the spread of COVID-19. Further, we identify in both countries that greater belief that officials' COVID-19 communication was clear and consistent led to greater likelihood to undertake protective behaviours.

Overall, we argue that greater scrutiny on the impact of non-health related risk perceptions is vital for future pandemic risk communication strategies, and that more experimental research must be undertaken to better understand the causal relationships between risk communication and public health behaviours.

**Key words:** COVID-19; risk perception; risk communication; protective behaviours; structural equation model
Abstract

In 2015 The Petroleum Safety Authority Norway (PSA-N) modified its formal definition of risk by referring to risk as “the consequences of an activity with associated uncertainties” The uncertainty-based risk perspective provides new regulatory guidelines - with important implications for governmental enforcement practices. This paper analyses the consequences of the new conceptualization of risk in terms of regulatory status as well as management practices. To prepare for an empirical analysis we will conduct document analysis of relevant laws and guidelines and interview risk experts and key personnel from the PSA-N, the petroleum industry and consultant companies.

Rule-making related to risk has to face recurring challenges related to complexity and change. As a result, regulations frequently adopt so-called principles-based and purpose-based rules, often in conjunction with requiring the implementation of management systems. Both types of rules rely on discretionary processes and professional judgement involving communities outside formal legal contexts, e.g. through standardization or other forms of expert-based consensus. The term "legal standard" is applied in some jurisdictions to denote these types of rules. Legal standards thus refer to norms and practices "beyond" the law in the sense that they may change over time, e.g., as a consequence of new technologies, organizational procedures, best practice and scientific consensus. Legal standards tie the unchanging word of law to the ever-changing implementation of the norms and ideas embedded in that law. The use of legal standards thus plays a critical role in efforts to achieve an appropriate level of risk management in highly dynamic industries.

While detailed and prescribed rules will lag behind fast-developing technology, legal standards enable a more easily updated regulatory practice, especially for achieving appropriate regulation of complex organizational developments and fast-changing technology. However, legal standards also play a role in adapting to new and improved organizational practices and understandings of how these practices should be well informed, evidence-based, with a critical use of available knowledge. The actual content of the legal requirements embedded in the law will thus change along with changes in state-of-the art knowledge as communicated through different professional communities. The paper addresses how the new risk concept has been articulated in the interaction between these communities, including the regulator, and how the new conceptualization of risk materialize as a legal standard and as a basis for the use of regulatory instruments.

Key words: risk governance, risk-blind and risk-sensitive policy-making
Testing the mechanical, physical and chemical characteristics of the selected protective clothing

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Abstract
Background: The study is focused on monitoring the mechanical, physical and chemical characteristics of the selected protective clothing. The aim of the study to verify the stability of the material properties and to compare the materials with each other. Material and Methods: Old anti-chemical protective clothing formerly used in tactical exercises (but never during a real intervention) was selected. At the Occupational Safety Research Institute in Prague, the material has been tested to the chemical, physical and mechanical properties changes. Results: The largest decrease in mechanical stress was observed for sulfuric acid and it was as much as -23.17 MPa, which is 42.61%. For nitric acid an equally small increase of +0.01 (4.2%), for hydrogen peroxide an increase of +0.08 which amounts to 37.5% and for dimethyl sulfoxide an increase of +0.02 which amounts to 8.33% have been observed. A decrease in tensile modulus for sulfuric acid was recorded by - 90.58 MPa, which is 39.52%. A milder decrease was recorded for nitric acid by -65.12 MPa which amounts to 29.71%. For hydrogen peroxide, the largest decrease was recorded, down to -107.56 MPa which is 46.92%. For dimethyl sulfoxide it was a decrease of -75.1 MPa which is 32.76%. For UV exposure, it was a decrease of 14.74 MPa, which is 27.1%, and for 65 °C for 24 hours, it was a decrease of 7.2 MPa, which is 13.24%. Also the heat exposure of 65 °C for 24 hours had very little effect for the change, it increased the deformation only +0.02, which is 8.33%. For UV exposure it was a decrease of 59.32 MPa which is 25.88%, and for exposure to 65 °C for 24 hours it was a decrease of 43.47 MPa which is 18.96%. Conclusions: In protective clothing, the exposure to individual chemicals, UV radiation, and elevated temperature and the modulus of elasticity resulted in decrease in each case, with the largest decrease recorded in samples treated with hydrogen peroxide and the smallest in samples exposed to long-term thermal load.

Key words: anti-chemical clothing; occupational exposure; occupational safety; physicochemical factors; protective clothing.
Women’s contingency capacities at the intersection of culture, knowledge, and power

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Abstract

Humanitarian disasters tend to amplify the differences between men and women’s situational agency (Enarson & Fordham, 2001; Fulu, 2007; Gaillard et al., 2016; Scharffscher, 2011). Social conditioning often attunes women’s coping strategies to contextual circumstances such as culture, nature, local skills and networks; all of which constitute invaluable resources while rarely acknowledged as such (Enarson & Chakrabarti, 2009; Hassan & Ayub, 2019; Shabani et al., 2021). Equally at play is women’s access – or lack thereof – to knowledge, capital and power, which may further entrench societal inequalities or activate their capability of ‘empowerment’ (Parpart et al., 2002; Stromquist, 1993; Stromquist, 2015). Women in various parts of the world may therefore possess diametrically different capabilities in how they negotiate safety for themselves, their families and their communities. When mapping a disaster-stricken community’s resilience and vulnerability, we risk yielding blindsided knowledge if leaving unexplored the interplay between gender and various social factors.

Drawing on disaster-affected women’s descriptions of factors affecting their capacities and vulnerabilities, in interviews conducted in post-tsunami Sri Lanka (2005), post-earthquake Haiti (2018) and post-war Sierra Leone (2013), we will discuss intersectionality in relation to the framework of Disaster Risk Reduction (DRR). More specifically, we will relate our data to the model for progression of vulnerability and safety – also known as the Pressure and Release (PAR) model (Wisner et al., 2012; Ginige et al., 2009). The PAR Model focuses on the root causes of a given community’s vulnerability in relation to various types of disasters. As such, the DRR framework is both an analytical approach as well as a tool to direct humanitarian practice purposing to mitigate future risks (Wisner et al., 2012; UNDRR, 2015). However, the PAR model has been criticized for being too one-dimensional in addressing risks and defining sources of vulnerability (Manyena et al., 2013; Pineros, 2020; Wisner & Lavell, 2017).

Therefore, as a riposte to the critiques, we plan to adapt this model so that the conditional expression of Vulnerability (V) – or Capacity (C), in the equation (Risk=Hazard x Vulnerability/Capacity), is represented as a function of intersectionality, and vice versa. By integrating an intersectional-risk-informed approach, we aim to add nuances to “Western” and “post-Enlightenment Global North” paradigms on gender and vulnerability (Bankoff, 2001; Nygren et al., 2020) and increase the understanding of individual as well as collective agency in disaster-affected communities.

Key words: risk, intersectionality, feminist theory, disaster risk reduction, contingency capacities, crisis management, Sri Lanka, Haiti, Sierra Leone
Particle Size Influence of Combustible Food Dust Layer on a Heated Surface on Minimum Ignition Temperature

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Abstract

The paper presents an analysis of the particle size influence of combustible food dust layer on a heated surface on minimum ignition temperature. The measurements of minimum ignition temperature have been performed for selected dusts such as cocoa, dried milk, gluten – free soy flour, wheat flour. The dust particle size at which the tests were conducted were 200 µm, 315 µm and 500 µm. The study was conducted according to the method in determining the minimum temperature at which ignition or decomposition of dust layer occurs (Minimum Ignition Temperature Test of Dust Layer on Hot Plate). According to the used method the measurements were performed for 5 mm and 12.5 mm thick dust layer. The research is important for identification the threats in food industry, particularly for explosion safety of people, of their health, lives, property and industrial equipment. Determination of minimum ignition temperature helps understanding the ignition sensitivity of many food products or intermediates depending on the dust particle size when they are present as a dust layer in any facility on hot surface. The results are relevant for defining the maximum operating temperature, especially e.g. for electrical equipment in food industry facilities.

Key words: explosion, combustible dust, explosion safety, minimum ignition temperature, dust layer, hot plate
Abstract

This paper presents a general workflow of spatial data collection by Unmanned Aerial Vehicle (UAV) in the case of major floods, processing of collected spatial data and creating output reports and analysis of flooded areas. Case study of the mapping of the city of Krupanj using an UAV after the catastrophic floods that hit the Republic of Serbia in 2014 is given in the paper in order to verify applicability of proposed workflow. The aim of the research is to make an initial assessment of the flooded area, the volume of applied material, as well as records of flooded buildings and possible damage to critical infrastructure, based on mapping data. As part of the experimental research, the processing of the collected data by an UAV was first performed in order to obtain output results in the form of georeferenced point clouds and orthophoto mosaics. After that, the vectorization of the mentioned geospatial data and the development of a local GIS application in the open-source software package QGIS were performed. The final results of the research are presented graphically, numerically, and tabularly. The presented case study indicates the possibilities of applying UAV technology and proposed workflow in hazards such as floods and the contribution in obtaining valuable data for all potential stakeholders and first responders.

Keywords: mapping, floods, unmanned aerial vehicle, dana
Reconciling Risk as Threat and Opportunity: 
Managing Risk in UK Boardrooms

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Abstract
Recent research has examined a duality in understanding the practice of risk management in organisations: either as a means of exploiting opportunities, or as a way to minimise threats to business. It has led to the framing of this duality as the logics of precaution and opportunity. In this paper, we extend this literature in two ways. Firstly, we focus on board directors, an under-researched group of organisational actors, experienced in managing the duality of risk and its challenges for businesses. Secondly, we explore how the inherent duality of risk is managed at board level.

Drawing on Friedland (2012) and Friedland et al. (2014) we frame our research within an institutional logics perspective, using the notion of ‘substance’ – that source, or ‘logic’, of practice which is, at the same time, instantiated by practice. Using the testimony of 30 executive and nonexecutive directors from a range of public, private and third sector organisations operating in the UK, we explore the emphasis they place on risk as opportunity and threat, linking this to the subject identities (directorial roles), risk management practices and objects that they espouse. The interviews are thematically analysed using Nvivo and the analysis is presented to two expert focus groups as a means of validating the data.

We find that boards can struggle to reconcile the duality of risk as opportunity and risk as threat given the tensions inherent in their governance and strategizing roles. Board practices, contrasting identity roles, and variations in board expertise and resources result in a range of board outcomes that can be situated along a spectrum, with what we describe as a ‘prescriptive approach’ at one end and a ‘principled approach’ at the other. This spectrum encapsulates the duality of risk. A more prescriptive approach is rooted in a focus on threat reduction, while a more principled approach emphasises the exploitation of opportunities.

We contribute to existing literature on managing the duality of risk in organisations in several ways. Firstly, we explore the context of board directing, one that academics find hard to access. Though there is extensive prior research on the roles of board directors and the practice of board directing, little links this to the management of risk. Secondly, we provide a framework for understanding how board decision-making attempts to reconcile the duality of risk.

Key words: governance, duality of risk, risk management, board directing
Impact for smokers on risk of lung cancer by switching to Heat-Not_Burn-Tobacco (HNBT) products on the long run: a simulation study based on dose-response modeling

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Abstract
The close relationship between cigarette smoking and lung cancer was hypothesized as early as the late 30s. While nicotine itself is not considered to be carcinogenic, cigarettes combustion induces the formation of products, such as polycyclic aromatic hydrocarbons (PAHs), which are some of the most powerful lung carcinogens. At the same time, quitting smoking leads to a reduction in the risk of lung cancer. As time goes by, this reduction becomes more and more consistent yet never reaching the nonsmoker level.

Since 1988, the use of HNBT products has been adopted increasingly as an alternative to smoking cigarettes. The effects of HNBT products, advocated to be a potential help in reducing the risk of developing lung cancer in smokers, remain controversial due to the limited availability of long-term observations.

Using dose-response modeling, Slob et al. (2020) recently developed a method to determine the resulting change in cumulative exposure (CCE) associated with HNBT. The model assumes that the dose responses (for the same type of effect) of the compounds involved are parallel on the log-dose scale.

They estimated that the cumulative emission for this eight-compound mixture is somewhere between 10- and 25-fold lower when a given individual consumes the same number of HNBTs instead of cigarettes (with similar smoking behavior for both products).

The aim of the present study is to estimate the risk of lung cancer associated with switching from cigarette smoking to HNBT products. The exposure-response (smoking in pack-years and risk of developing lung cancer) was estimated using a meta-analysis of currently available published literature. A random-effect meta-regression analysis was conducted using a multivariate approach and Greenland and Longnecker covariance structure. Dose-response relationships were treated as non-linear by fitting a restricted cubic spline transform of the exposure.

Slob reduction in exposure was implemented on the dose-response model and risk for major histotypes of lung cancer was estimated by combining the meta regression with simulated reductions.

Results are presented with reference to a long-term smoking switching scenario, scenario not observable in practice due to the limited amount of time HHNBT products are on the market. Risk of lung cancer after switching in the long run is overlapped with that of those who quit. In absence of epidemiological data, such results may give some insights on the public health impact of HNBT products for current smokers.

Key words: HNBT, smoking, risk, lung cancer
Intersectional Analysis of Risk

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Abstract

This paper maps a current trend in risk research, namely intersectional analysis of risk. In the last decades the concept of risk has spread into almost all kinds of societal domains. The original focus on technical and environmental risks has transferred to areas such as health, crime, regulation, social inequality, public and social policy, and global risk as well as the management of risks in everyday life and intimate relationships. Scientific advances and the global media have together created a long string of alarms about risks of different magnitude: from more recent the Covid 19 pandemic, to terrorist threats. The distribution and impact of these risks are not equal, instead they tend to follow and reinforce already existing structural inequalities. In the wake of this development we have seen a growing body of feminist and intersectional approaches in the study of risk. The two perspectives informs each other: On the one hand, the intersectional perspective advance risk research by clarifying how new complexities in the reproduction of social inequalities brought about by globalization and the intersections between social class, gender, ethnicity, and other social categorisations, are connected to the production of risks. Risk research, on the other hand, inform intersectional analysis by clarifying the mechanisms in risk governance that are reproducing old inequalities (i.e., class and gender) and producing new inequalities. Through a systematic literature review, this paper aims to map insights and viewpoints from scholars regarding intersectional analyses of risks associated with inequality on an individual, group or community level, including analyses of individual perception and behaviour, policy, mass media and discourses.

Key words: intersectional theory, risk research, feminism, critical perspectives, systematic literature review
The closure of a maternity ward in Sweden: intersections of risk, gender and place

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Abstract
My presentation builds on results from my recently finished PhD project Risky distances: Normalisation and peripheralisation in the case of a maternity ward closure in Sweden. In the project, I explored how risk intersect with gender, place and processes of normalisation and peripheralisation in the case of a maternity ward closure in Sweden. The ward was located in a rural Swedish municipality, in the town of Sollefteå. When it closed, it sparked a debate on continuous cuts to Swedish maternity care and increased risks for birthing women, as well as a debate on the growing gap between urban and rural areas in Sweden. Between 2017 and 2019, I analysed newspaper articles and performed interviews with expectant parents in Sollefteå and midwives who previously worked at the ward. I used feminist risk theory (e.g. Giritli Nygren et al 2020 and Lupton 2012) to 1) investigate the experiences of those directly affected by the closure, and 2) explore how ‘doing risk’ – an intersectional feminist approach to risk – can be used to deepen our understanding of peripheralisation and normalisation processes. The project generated four empirical studies in which I draw attention to three peripheralisation processes that were at work in the closure of the maternity ward: peripheralisation of women’s risks, peripheralisation of people in rural municipalities from the welfare state and peripheralisation of small-ward work practices in the healthcare discourse. I also found that the closure made Swedish norms on childbirth and discourses on family visible, predominantly manifested through the ‘gender-equal nuclear family’ norm, which repeated in the material. Further, addressing the thesis’ second aim, I conclude that normalisation and peripheralisation can be seen as regulatory practices, which in different ways are structured around risk and power. In this context, ‘doing risk’ helps to theorize how these concepts intersect, and relate to ideology, and thus contributes to a better understanding of ideological processes in contemporary societies.

Key words: risk, intersectionality, gender, normalisation, center-periphery
Experiences of public safety: An intersectional analysis of (un)safety in public space

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Abstract

This study aims to examine experiences of public (un)safety in public space using an intersectional perspective. By using a quantitative approach, the study also aims to be a complement previous studies on experiences of (un)safety in public spaces. Empirically, the study uses survey data from The Swedish National Council for Crime Prevention (Brå) focusing on a local police district in northern Sweden. Theoretically, the study draws on intersectional risk theory that emphasizes how risk relates to and is co-constructed with power structures such as gender, sexuality, and ethnicity/race. By combining intersectional risk theory and quantitative method, it is possible to show the material impact of power structures and their intersections have on people’s everyday lives and society at large; in other words, study the complex interplay between structural oppression and privileges and subjective experiences of risk and (un)safety in public space. Multiple correspondence analysis (MCA) is used to explore the complex interactions between structural oppressions and privileges and subjective experiences of risk and (un)safety in public space. The result illustrates these complex interactions. The study thus concludes that feelings and experiences of (un)safety in public space are inseparable from power and people’s opportunities to claim and appropriate space – i.e. to feel included – in public space. Thereto, the study contributes with knowledge on how quantitative studies of risk and (un)safety can be further deepened.

Key words: risk, public safety, intersectionality, multiple correspondence analysis
Perception of student population on issues in the field of environmental protection and sustainable development

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Abstract

Environmental protection is an imperative of modern society. For this reason, the concept of sustainable development has been popularized in the last few decades, thanks primarily to various forms of formal and non-formal education. The population of young people is increasingly the bearer of changes in political ecology at the global level, which is confirmed by the results of numerous researches. In the theoretical sense, the consequences of the ecological crisis that manifest themselves every day, affect the quality of life of the individual and the entire community. Accordingly, the aim of this paper is an exploratory analysis of students’ attitudes as the most active part of society on basic issues in the field of environmental protection and sustainable development as well as possible solutions to overcome current environmental problems at the local level. 195 students from the Faculty of Security at the University of Belgrade participated in the research at all levels of study (undergraduate, master's and doctoral). The results of the survey questionnaire indicate the high interest of students in issues in the field of environmental protection and the need for greater involvement of institutions to solve environmental problems. Also, one of the significant results is to draw students’ attention to the need for comprehensive introduction of environmental subjects in the curriculum of the Faculty. Comparing the obtained empirical results with the results of other studies, it can be concluded that the issue of environmental protection and sustainable development occupies a high place in the everyday discourse of the youth population, which further requires a different approach to environmental issues in higher education.

Keywords: students, environmental issues, higher education.
A shape-derived machine learning approach from real foreign-bodies 3D-scans to picture-based assessment of risk of injury in children

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Abstract

Environmental protection is an imperative of modern society. For this reason, the concept of sustainable Foreign body (FB) injuries represent a serious public health issue in children, with a high incidence and a not negligible chance of dying.

Furthermore, the topic of FB injuries raises interest because of its spread worldwide and its little to no association with scientific progress; as a consequence, there is no evidence that the incidence of this kind of injury is going to decrease in the future years, even if prevention policies have proven to be somehow effective. Thus, every improvement in the diagnostic-therapeutic iter - by making it easier to deal with the broad spectrum of objects that can be ingested by the children - could potentially have a direct impact on saving lives.

The main idea of our work is to exploit the growing availability of 3D scanners in the recent past to supply an exhaustive characterization of the objects directly extracted from children undergoing a removal procedure at the hospital.

Dozens of extracted objects and the corresponding clinical data from two hospitals in Cyprus and Argentina were obtained and; working with real-world data, we aimed to reduce the possibility of errors and have a clearer picture of the distribution of the objects.

A protocol to make reliable scans of the objects was created; in this way, a standardized manner of scanning was possible to be defined. Finally, a 3D representation for each object at our disposal was finally built.

A set of parameters and characteristics for each 3D scanned object describing numerically its geometrical shape and features will be collected. Cluster analyses will be conducted to highlight groups of characteristics for creating a rank risk score for them. A prototype deep learning model will be trained on 2D photographs taken by an entry-level smartphone to investigate the possibility to have early insight on new objects directly in terms of risk prediction.

Keywords: foreign body injuries, machine learning, 3d-scan, children, risk assessment
Social media mining as an alternative approach to early detect risks related to foodborne diseases

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Abstract

Social media are continuously and rapidly expanding, making available a massive amount of information generated by users. These data can also be used for medical and healthcare applications, and social media mining for health surveillance is a growing field.

In this work, we aim to develop an automatic system for early signaling issues related to food safety in the Italian food chain using an integrated approach of big social media data (i.e., using Twitter posts) and machine learning for surveillance on food safety.

Twitter data are analyzed with R powered by the {rtweet} package as the R interface to the Twitter Application Programming Interfaces (APIs). {rtweet} is able to extract tweets based on a search query of 500 characters maximum, including booleans operators like OR and AND. The package can return tweets matching the search string posted in a time period from the past 6-9 days at a rate of up to 18000 tweets per 15 minutes, in accordance with the Twitter API rate limits.

In our early experiments, 29 keywords were selected based on CDC (Centers for Disease Control and Prevention) guidelines and they were queried. The keywords were related to foodborne disease (e.g. infection, poisoning), including combinations with the most frequent and the most dangerous pathogens involved (e.g. salmonella, clostridium) symptoms (e.g. fever, nausea, diarrhea), and food vehicles (e.g. eggs, fish, meat). The tweet search was also filtered in order to return only Italian language tweets. A total number of 293 tweets was retrieved, within a time period of 9 days, with 13 tweets likely related to foodborne diseases. A second search with the same criteria was conducted in a second time period after 10 days retrieving 343 tweets, with 16 of them reporting new cases of suspected foodborne diseases.

The next step will be to apply machine learning algorithms to the downloaded Twitter data, in order to automatically detect a foodborne hazard. This approach, thanks to the early detection of cases not diagnosed or traced by traditional public health surveillance systems, can prevent the emergence of foodborne disease outbreaks.

Keywords: social media; NLP; risk analysis; syndromic surveillance
Challenges within the understanding of uncertainty: 
Policymakers' and risk field perspective

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Abstract
Over the last decade, policymakers in several sectors (from food safety to environmental management) have increasingly focused their attention to the need for a more systematic approach to uncertainty management, with the aim of improving the quality of their risk assessments and risk communication. Still, despite many of their attempts being praised, challenges remain. In particular, conceptual clarity is often lacking about how uncertainty may be defined in relation to risk. This lack of clarity appears to be affecting the field of risk itself. We have been looking deeper into this issue by conducting a systematic literature review addressing the following points:

- What are the key schools of thought and conceptual tensions that exist and how can they be clarified?
- What is the policymakers' understanding of uncertainty in this context and what are their views on its position in relation to risk. Are these closely aligned with the scientific debate or not?

Finally, we outline issues and challenges that should be addressed in improving the overall understanding of uncertainty, and how the risk field can contribute in resolving them.

Key words: uncertainty, risk, policy, risk communication
Technological risk perceptions in Lithuania: cross-hazards and spatial comparisons

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Abstract
Technological development raises complex public concerns related to health, economic, social impacts. Technological risks have spatial dimension, as the impact are is defined by the proximity to the hazard or the likelihood of occurrence in certain areas.

This presentation will analyse public perception of technological risks, factors determining the differences in the perception of various hazards and the spatial distribution of technological risks.

The data for the research in collected via (1) public risk perception data is based on representative public opinion survey, conducted in 2020 (September – October) with 2007 respondents and (2) statistical data of 5 technological hazards transferred to spatial data on Lithuanian map (for 600 administrative units) . The analytical model will take into the account the place of residence of respondents (that was fixed as geolocation in the survey) and its spatial relations to the risk perception of different hazards. Technological hazards from the objective data include the breaks in power supply, roads with high risk of traffic accidents, the location of technological objects, the impact area of Astravo nuclear power plant, and the numbers of cybercrimes in different municipalities. Results indicate that the highest public risk perceptions are related to Astravo nuclear power plant and cyber threats (like data fraud or cyber-attacks) and the lowest risk is identified for disruption of power supply and traffic accidents. Besides the analysis of complexity of factors determining technological risk perception, this presentation methodologically also contributes to the spatial analysis in risk perception research.

This presentation is based on a research project “Mapping of Risk Perception in Lithuania: Spatial and Socio-psychological Dimensions” (Risk-Space), funded by Research Council of Lithuania (S-MIP-19-28).

Key words: risk perception, technological risks, representative survey
Options for recovering quality of water in the event of natural disasters using water treatment plants

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Abstract

Water is an important and irreplaceable component of the environment. Also, water has strategic importance for the security of the state, and its lack can endanger the life and health of the population.

With climate change, natural disasters such as floods, landslides, storms, or fires are accumulating in Slovakia. As a result of these events, the supply of drinking water may be interrupted, or its source may be directly polluted. At the appearance of such emergencies, the supply of suitable water for drinking and hygiene is a must. In the event of natural disasters, The Fire and Rescue Service of the Slovak Republic is the first to be deployed. Due to this fact it is necessary for the fire brigades to have suitable material and technical equipment for these purposes. To restore water quality, fire brigades have at their disposal portable mobile water treatment plants and large-capacity water treatment plants. This technical equipment is located at the Rescue brigade of the Fire and rescue services in Žilina.

The primary aim of this article is to verify the water quality before and after filtration in a portable mobile water treatment plant and a large-capacity water treatment plant. Determination of parameters of clean and polluted water properties was the foundation for meeting the set aim. Water properties were selected based on their level of impact for the water quality recovery for drinking and hygiene. The secondary aim of the article is to verify the functionality and usability of water treatment plants.

Experimental samples for water measurements were taken from the two sources. The first one was the public water supply system of the Rescue Brigade of the Fire and rescue services in Žilina. The second one was from the Rajčanka River. Furthermore, the samples were subjected to filtration in a mobile water treatment plant and a large-capacity water treatment plant. Measurements of water quality have been performed using a portable PC 70 Vio multimeter. To the measurement and comparing were chosen water properties - the potential of hydrogen, oxidation-reduction potential, conductivity, total dissolved solids, and salinity. Also, sample temperatures were recorded during each measurement.

The results of the filtered water measuring with a portable mobile device showed positive differences compared to the water before treatment.

Keywords: water quality, water parameters, water properties, Fire and Rescue Services, water treatment plants
Portugal as a case study on COVID-19 vaccination: Psychosocial, sociodemographic and contextual predictors of vaccination intention

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Abstract

Background: Portugal, among very few countries in the world, reached more than 90% of the population vaccinated against COVID-19. It may therefore function as a case study for other countries, to understand the reasons that may explain a higher uptake, particularly the antecedents of individuals’ decisions to be vaccinated, in the form of theoretically grounded psychosocial, sociodemographic and contextual predictors.

Method: A CATI telephone survey was applied in two pandemic phases in 2021 – during (February 22nd – March 2nd) vs. after national confinement (April 23rd – May 13th), to a randomly selected sample of the Portuguese population over 16 years old (n T1 = 1091; n T2 = 1013; longitudinal subsample that replied in T1 and T2, n = 316), at the time not yet vaccinated for COVID-19. Measures included, e.g., sociodemographic and health status, behaviour intention, vaccine hesitancy, risk perception, beliefs related to vaccination, social norms, trust in authorities. To further describe the case study, additional contextual socio-cultural and historical factors were identified.

Findings: Survey results showed that vaccination intention was consistently high in the two measurement periods (T1 = 79.2%; T2 = 79%), with low levels of vaccine hesitancy (T1 = 16.7%; T2 = 16.8%) and refusal (T1 = 4.1%; T2 = 4.2%). A significant decrease in perceived risk for family members occurred between T1 and T2 (co occurring with an increase of at-risk groups vaccination), while concerns about vaccine side effects increased (cooccurring with news about adverse effects). This apparently did not impact intentions as these remained stable between the two pandemic phases, potentially associated to an increase in vaccine literacy, trust in authorities and anticipated regret. Additionally, a linear regression tested different predictive models of intention (62% explained variance). When beliefs regarding COVID-19 and vaccination were introduced in the model, all other predictors ceased to be significant, except age and sex. The strongest predictors were perceived safety about vaccines, a general positive attitude towards vaccines and medical recommendation. A case study description also allowed identifying other factors such as historically high uptake rates for other
vaccines; trust in the vaccination programme management; communication of societal targets (e.g., 85% achieve the rate of 85% vaccination coverage).

Discussion: Evidence on the main vaccination barriers and facilitators allowed for evidence-based management of the vaccination process, which is crucial for timely and tailored risk communication strategies, targeting different population groups.

**Key words:** COVID-19; vaccination intentions; vaccine hesitancy; risk perception; vaccination beliefs

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**Exploring business actions to cope with disasters and climate change - Evidence from Albania**

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**Abstract**

While action towards climate change and the increased risk of disaster has gathered together governments around the world, the business sector has been slow in its action. This is particularly true for less developed countries. The purpose of this paper is explore the action taken by business sector and to investigate on the reasons behind this action. We do this by employing a case study strategy, and offering evidence from the Albanian Business sector through 3 selected case studies. We classify the actions in tangible and financial, to make a distinction between different categories of action and their impact. We investigate the actions according to the geographic, environmental, economic, social and cultural conditions under which each selected business operate. The study concludes with recommendation on the expected role of business sector in the climate change agenda of the country.

**Key words:** climate change, disasters, business sector, adaptation, Albania
Abstract
The paper analyses effects of principle build back better after floods. To successfully agree on this issue, the authors showed the situation before and after the flood that hit Serbia in 2014 and 2016, specifically the territory of the city of Kraljevo which will be shown as a case study. A comparative analysis of damages in the infrastructure sector and the reconstruction after 2014 floods, gave results that demonstrate the meaningfulness and justification for the implementation of BBB principle in order to improve critical infrastructure and reduce disaster damages. In 2014, the city of Kraljevo had 6.1 million euros damages, while in the same scenario in 2016, damages were estimated at 0.63 million euros. This was a consequence of the efficient reconstruction process that followed the 2014 floods. The works on the reconstruction of damaged and destroyed bridges and preventive infrastructure, the damages recorded in 2014 and 2016 were observed and compared. The results showed that the build back better principle in recovery contributed to the improvement of critical infrastructure, so in the same scenario in 2016 floods, the same territory suffered significantly less damage. Also, the paper shows normative and institutional improvement of the post-disaster reconstruction and recovery process, which are prerequisites for strengthening society’s resilience to disasters.

Key words: disasters, floods, damages, recovery, build back better, system
The PAN-FIGHT project: from perception to behaviour, an overview

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Abstract
The objective of the PAN-FIGHT project is to better understand how risk communication may be mobilised to improve the fight against pandemics, with a particular focus on learning from the COVID-19 context. Messages, compliance and vulnerability during the COVID-19 outbreak are central themes of the project. With the assistance of the data management company Qualtrics, we conducted a survey among members of the public in each of the five countries that took part in our project - Germany, Norway, Sweden and Switzerland and the UK. We also conducted face-to-face interviews informed by ethnographic methods as well as the Mental Model Approach, which, in the past has been successfully applied to the study of several health issues from vaccines and HIV/AIDS. (Morgan et al. 1992; Atman et al. 1994). This mixed-method approach was designed to triangulate findings about the relationship between prescriptive advice to mitigate the risks of COVID19, public perception and, ultimately, behaviour.

This paper presents an overview of these findings. Both quantitative and qualitative results point to significant gaps between government/scientific advice and common patterns of understanding that may impact significantly on compliance and behaviour. We uncovered significant variations across countries both at the level of the advice given as well as patterns of compliance. We also found that the perception of risk is far from uniform. It involves a web of considerations about personal health, personal economic risks, as well as risks to public health and to society.

Our main conclusion is that the quality of pandemic risk communication would greatly benefit from more conscious efforts to articulate the discussion about these competing risks and behavioural dilemma as opposed to a narrowly defined focus on the COVID19 disease.

Key words: Covid19; risk perception; risk communication; protective behaviour
Seismic risk of schools in Republic of Serbia – problem identification

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Abstract
The paper describes identification of the problem of the seismic risk for school buildings in Serbia, as a first necessary step in the long-term measures for risk reduction. For the collection of the reliable input data, the official GIS databases with school locations have been overlaid official seismic maps, therefore the number of buildings in the zones with the highest seismic hazard level has been detected. The other important data for overall risk assessment (number of pupils and employees, number of shifts…) has been collected from official database as well, and it has been verified through questionnaires collected from the municipalities.

In conclusion, the reliability of inputs (numerical and geospatial) has been accentuated as important precondition for the any kind of risk analysis, as well the variation of this background data through the space and time.

Key words: seismic risk, identification, data collection, GIS, risk assessment.
Pressure loss as a risk for pumping water during emergencies

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Abstract
Transport of water for emergencies is one of the basic tasks of firefighting units. Especially fires are situations where rescue units can’t work without water. Various equipment is used for transportation of water from source to the fireground, the system must reflect the condition of water transport and most importantly the parameters of individual components of said system. One of the components are firehoses and critical values of their parameters such as pressure and flow rate. In the past, numerous authors focused their work on similar specific problems. They identified and recommended several procedures to determine pressure loss and to specify critical points in water transportation. This article follows up on their research and deals with pressure loss of water transportation through firehoses, it describes new methodology for measuring the pressure loss in field condition by firefighter’s equipment.

The research itself and realization of experiments reflects basic knowledge of flow of liquid from Bernoulli’s equation for real flowing liquid to modified mathematical relationships for specific application of water transportation for firefighting units in Europe and in the world. The experiment describes method of measuring pressure loss that appears while transporting water to the fireground through firefighting equipment. Limiting conditions were specified based on the results while reflecting the flow rate in firehoses. Part of the experiments results is defining safe working conditions of water transport through firehoses by firefighters while responding to emergencies. Main goal of this article is to show and identify risk and risk factors that are part of the decision-making process of responding to emergencies, fires, accidents and natural disasters. This research provides applicable solutions for connecting science and research in the area of transporting liquids with practical use of this knowledge in crisis management and rescue operations.

Key words: water transport, firehose, flow rate, pressure loss, limiting conditions
“It feels hot today. Should I protect myself?”: an exploratory analysis of the effects of safety, threat, and challenge on heat wave protection intentions

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Abstract

Background: Research systematically provided evidence that heat waves pose serious risks to health and wellbeing, producing both short and long term negative physiological, psychological, and social effects. Because these events are expected to become increasingly frequent, intense, and long lasting due to climate change, promoting heat protection intentions and behaviours will, therefore, become increasingly important. Aiming to contribute for a better practical understanding on how to promote heat protection intentions and behaviours, the present exploratory study builds on theoretical and empirical evidence to propose and test two explanatory models using path analysis: 1) one model focused on heat wave demands and resources perceptions mobilization processes and effects on heat protection intentions; and 2) one model focused on mental processes of interaction between heat wave demands and resources perceptions and effects on heat protection intentions.

Methods: Data was collected during a heat wave that affected Portugal between 2 and 7 August 2018. A total of 304 Portuguese residents, with age between 16 and 89 years old (M = 36.98; SD = 16.06) completed the study. Participants heat wave demands and resources perceptions and heat protection intentions were assessed, together with norm deviation (i.e., perceived temperature sensation, temperature interference in daily life, risk perception, and reports of having heard heat protection recommendations), affective, and cognitive indicators. Personal and sociodemographic characteristics were also collected. This enabled testing the two proposed models using path analysis.

Main Findings: Perceived temperature sensation, perceived temperature interference in daily life, and heat wave risk perception mostly contributed for heat wave demands perceptions, whereas reporting having heard heat protection recommendations mostly contributed for heat wave resources perceptions. When both heat wave demands and resources perceptions increased, heat protection intentions also increased. High feelings of threat (i.e., appraising much more demands than resources) or high feelings of safety (i.e., appraising much more resources than demands) hindered heat protection intentions.

Conclusions: Promoting both demands and resources perceptions can be helpful for further increasing heat protection intentions. Findings suggest that this may require a combination of strategies, as some may be better suited for promoting demands perceptions, while others may be better suited for promoting resources perceptions, and others for promoting both. Implications for theory and practice will be discussed.

Key words: heat waves; safety, challenge, and threat; heat protection intentions
Development of web platform for NRA results presentation in Montenegro

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Abstract
Montenegro is among the Nations that participate in “Senadi Framework for Disaster Risk Reduction 2015-2030”. In order to meet the objectives of first Framework priority (understanding disaster risk in all of its dimensions) at the end of 2021 Department of Civil Protection (DCP) produced the document of evaluation of natural risks with the fundamental help of scientific community. DCP coordinated researchers from University of Montenegro and Seismological Institute of Montenegro in tasks related to seismic risk assessment that was done in accordance with EU guidelines and published in December 2021. It must be stated that Montenegro developed very comprehensive study on seismic risk assessment after the strong earthquake 1979, but the study was never updated. In practice the period in which the assessment needs to be updated is 3 years, since almost all the risk dimensions change over time: vulnerability, capacity, exposure of people and assets etc. Taking into account previously stated, the development of seismic national risk assessment (NRA) is a great achievement but it can also be considered as a starting point for collection, processing and presentation of data concerning seismic risk in Montenegro. All the knowledge on risk is preparatory for actions in risk mitigation, prevention and preparedness, so it is a crucial to form an information system that will store, process and present relevant information about seismic risk, new findings as well as projects aimed at mitigation and reduction of seismic risk. In the spirit of data digitalization in all spheres of everyday modern life, it is justified to consider the use of IT tools for storage and presentation of seismic risk data. One possible way is certainly the development of web platform that in theory should store and present the results in a clear way with the possibility of their visualization in space. This paper will briefly present the importance IT technologies usage in presentation of the results of NRA, as well as the advantages of using such tools for future decision-making. Basic concept of web platform developed for NRA result presentation is discussed in this paper. The possibilities and technical aspects in presentation of fundamental physical seismic risk components (hazard, exposure, vulnerability and impact) are presented. Also in accordance to the idea that the future web platform should incorporated all relevant findings in filed of seismic risk mitigation and reduction, concept of presentation of activities on structural health monitoring in Montenegro are introduced.

Key words: seismic risk assessment, web platform, data collection, data processing, data presentation
Comparative and experimental analysis of fire-resistant doors according to Serbian standards

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Abstract
Implementation of risk management is a necessity in building fire protection. Installation of fire-resistant doors guarantee the integrity of fire compartments – preventing fire and smoke spreading beyond fire compartments. Fire-resistant doors must be tested according to the specific standards in every country. The subject of this research paper is the analysis of testing methods and results according to standards accepted in Serbia.

This research has two steps: the first step is comparative analysis of two standards by which Serbia allows testing (Serbian national standard SRPS U.J1.160 and European standard SRPS EN 1634-1). The most significant differences between Serbian and European standards are in pre-test measurements, a number of thermocouples, deformation measurements, and the way of assigning the value for fire resistance. In European standard it is necessary to measure gaps and closing force, while Serbian standard does not require such measurements. Secondly, a considerable difference is in the number of thermocouples; European standard requires measuring the temperatures on the frame. And finally, in SRPS U.J1.160 the value for fire resistance is given in minutes (for example 120 minutes), while in SRPS EN 1634-1 separate values for integrity (I), thermal insulation (I), radiation (W), and others, are given for every test procedure conducted such as E120, EI190, EI2120. Both standards are in parallel use until the official adoption of the new rulebook, which is expected in March 2022, after which it will be tested only according to European standards.

The second step of this research is experimental analysis of two different types of doors tested according to both standards, simultaneously. One type is single-leaf, steel door, and the other single-leaf, steel door with two grills. The first sample achieved the value for fire resistance E120, EI190, EI2120 (according to SRPS EN 1634-1) and 120 minutes (according to SRPS U.J1.160), while the second one achieved E120, EI190, EI290 (according to SRPS EN 1634-1) and 120 minutes (according to SRPS U.J1.160).

This implicates that European standard is more demanding in insulation criteria than Serbian standard. An improved insulation criterion of fire-resistant doors reduces the risk of flame bursts in evacuation zones. The full implementation of European standards will improve the fire safety of building occupants.

Key words: fire risk, fire-resistant doors testing, Serbian standards, comparative analysis
Role of Cultural Heritage Buildings in Disaster Preparedness and Response

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Abstract

Resilience, continuing education and different types of emergency trainings have become one of the most important parts in disaster preparedness and response phases. Trainings which include initial response, such as first aid training, knowing how to act if a disaster occurs and having well-practiced emergency plans, could impact on reduction of mortality and material damage. Cultural heritage buildings such as churches, museums, castles and other historical sites require more attention and could be at bigger risk while they are very often seen as shelter buildings in a case of a disaster. This study aimed to emphasizes the importance of emergency trainings and safety drills of staff working at cultural heritage sites such as archivists, curators, museum technicians, and conservators with special attention on regular risk assessment of these buildings which can provide and improve general safety of visitors and personnel. During the initial period of natural disaster, it can be assumed that conversance of emergency response and orderly risk assessment of cultural heritage buildings can contribute substantially to mitigation of the consequences in the early stages of disasters.

Most of the historical buildings, unlike the newly built ones, are usually transformed into the modern purpose. The vast majority of large and significant historical buildings have been built for the dwelling, and subsequently adapted into the public function, which implies the special treatment and understanding of the specific nature of the building. Most of such buildings can be classified into certain typologies, characterized by similar layouts, depending on the type of object. To use these objects correctly when a disaster occurs and in the case of an emergency, it is of exceptional importance to understand and perceive all the relevant aspects of the building - cultural and historical, as well as the technical ones such as materials and building technologies applied. Depending on the age of the building as well as its typology, these properties may differ significantly. Understanding of those differences is of exceptional importance for the correct maintenance of the cultural heritage buildings following their age and type, as well as its use in all situations, including in the case of disasters.

Key words: disaster preparedness, disaster response, cultural heritage, safety
Risk Analysis Quality of hydrogen production facilities in Northern Norway – A case study of Risk acceptance, communication, and stakeholder engagement

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Abstract

Production, transportation, and use of energy are recognized as some of main players in environmental issues including climate change. Production of green hydrogen as a fuel for green transport (e.g., shipping) has recently gained a lot of attention while we progress towards a low emission society. However, further development of hydrogen production facilities has raised issues beyond its environmental friendliness such as economic, technical, and safety factors that must be assessed accordingly. In order to prevent hazardous events and make sure that life, values, and the environment in the vicinity of the facility are preserved, risk analyses are carried out. Such analyses are also performed to provide risk-informed decisions application to the design, and operation of the production facilities in an economically justifiable yet safe manner.

Even though there are national and international requirements and guidelines for conducting risk analyses, there have not been clear criteria to ensure the quality of such analyses. Society or Risk Analysis points at a wide range of key elements in order to improve the quality of risk analyses in support of risk management decisions. Ensuring the quality of risk analyses for hydrogen production facilities becomes of critical importance, as they involve several, including private companies, the public, and municipalities. Having such a wide range of stakeholders, with often competing interests, require ensuring proper risk communications and setting risk acceptance criteria, which are among challenging elements in any risk analysis work.

The qualitative research discusses the quality of risk analyses for green hydrogen production facilities in Northern Norway, by investigating the risk communication, risk acceptance, and stakeholder engagement elements of the risk analysis process. This is achieved by comparing existing reports of risk analysis for hydrogen production facilities, national/international standards on risk management, and interview with experts within the field from both municipality and private companies. We look at how the planning phase in the risk analysis process is performed and more specifically investigate where there is a gap between what is recommended in standards and guidelines and finalized risk analysis reports regard to the scope being defined, awareness around background knowledge and risk perception with the analysis team. We also study on what basis the RAC are defined and evaluated, and how the risks and acceptance criteria are discussed and communicated with stakeholders and the public.

Key words: risk analysis quality, risk communication, risk acceptance criteria, stakeholder engagement, green hydrogen production
Seismic risk in publicly accessible areas containing steel storage racks

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Abstract

Steel storage racks are used for the storage of goods in warehouses and buildings accessible to the public. All components of racks are standardized by their manufacturers. In a way, each rack manufacturer offers unique structural solutions. Generally speaking, steel rack structures are thin-walled, meaning that their treatment is somewhat specific and more sensitive when it comes to the design, construction, utilization and maintenance. The design of steel racks for vertical loads is nowadays conducted fairly straightforward, and the codes and provisions that cover various design aspects are well-established and proven to be accurate. When it comes to racks exposed to seismic actions, there is a significant improvement in states of the art and practice, which is a consequence of an extensive work that has been done lately by numerous researchers. As a result, several modern seismic codes offer practical and useful guidelines for designers and manufacturers. However, seismic risk in publicly accessible areas containing steel storage racks is still high, primarily due to the nature of their seismic response. Namely, the seismic response of steel storage racks is controlled by the behaviour of their components and structural details which depend on the manufacturer, and can vary significantly. Therefore, it is rather difficult to make comprehensive rules and to draw general conclusions. Being produced in series, racks can be treated as prefabricated structures. Their seismic performance should be guaranteed by manufacturers, who can nowadays rely on the rules of modern seismic codes such as FEMA 460 and EN 16681, which provide a solid basis for the design of new racks. In fact, there is no real alternative to these codes. In other words, the performance-based design of new rack structures can be conducted relatively easily. On the other hand, many storage racks carrying various goods were produced and installed before the modern seismic codes, and their performance during seismic actions is generally unknown, resulting in high seismic risk. In many cases, structural members and connection details of old racks do not conform to the requirements of the current seismic codes, which makes their code-based assessment difficult. Based on the available experimental data, numerical analyses and experience from practice, this study addresses the most important issues related to the seismic design and assessment of steel storage racks, with the aim to mitigate the seismic risk in areas accessible to the public.

Key words: steel storage racks, seismic actions, seismic codes, seismic risk, publicly accessible areas
The effect of the social distancing measures against spread of COVID-19 disease on the evacuation time in case of fire

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Abstract
In Europe, 5000 fires occur every day, during which 11 people lose their lives (90% in building fires), and 190 are hospitalized. According to the data from DesInventar database, there were 279 fires in Serbia from 1980 to 2021, with 130 victims and 211 injured. It is necessary to provide safe and secure evacuation of people from building, to protect their lives and health during fire. In order to ensure this, all present people must leave the building during Available Safe Egress Time, ie. time interval from ignition moment to the point when people will be incapacitate to get out of the building. Maximum evacuation time is defined by Rolebook on technical norms for fire protection of residential and business building and public building (“Official Gazette of the RS”, 22/2019).

During Coronavirus disease (COVID-19) Pandemic, disease control measures were prescribed, which can have negative effect on the evacuation time during fire. One of them is social distance of 2 meters, which is defined by Order prohibiting gatherings in the Republic of Serbia in public places indoors and outdoors (“Official Gazette of the RS”, 60/2021). From 2020, Pathfinder enables the simulation with social distance, as a method to address pandemic safety.

The aim of this paper is to compare feasibility and efficiency of evacuation in case of fire with social distancing measures and without the measures. The evacuation of people from the building is modeled using Pathfinder software tool, on the example of the Research and Technology Center of the Faculty of Technical Sciences in Novi Sad. Simulation of the evacuation of 500 people from the building was created for two scenarios, without and with social distancing. The evacuation time in the first scenario is 3.3 minutes and it is in accordance with the time of the Rulebook. The evacuation time in the second scenario is 15.45 minutes, which could endanger people’s lives and health. The measures applied to protect people from one danger must not endanger people’s lives in the event of another danger. It is important to work on coordination and cooperation in the field of Disaster Risk Management. It is necessary to reduce the maximum number of people who can stay in the facility according to the Order, so that with the prescribed social distance, the evacuation can be carried out in a safe manner.

Key words: fire, pandemic, evacuation time
Building the Future: Applying the Industry 4.0 Concept in the Digital Transformation of Smart Buildings (Faculty of technical sciences case study)

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Abstract  
Digital transformation, accompanied by the digitalization of the environment and the establishment of a new value system, is the main driver of Industry 4.0. Relying on information and communication technologies, which are a key element of industrial and technological transformation, creates opportunities for connecting and interacting in cyber-physical systems through Internet protocols and standards. Standards which provides support for the development of concepts like a smart industry, smart cities and smart building. One of the key elements of Industry 4.0 is security aspects and the provision of on-demand services, particularly the in cases of hazardous events or other natural disasters. Based on the defined concepts, the paper presents a smart system for monitoring hazards, which is based on various sensor devices, EM ID key fobs, and RFID readers, as well as personalized mobile applications that provide possible evacuation routes, but also tips on behaving concerning active danger. Proof of the validity of the presented concept was made in the case study of Hazard alert systems for smart buildings Faculty of Technical Sciences.  

Key words: hazards, services, transformation, danger, sistem
Improvement of Disaster Risk Management and Fire Safety curricula by research of youth safety culture in the Western Balkan countries

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Abstract

Natural and manmade disasters are an important topic not only in the Western Balkan countries, but also in the rest of Europe and the whole world. In order to build a sustainable disaster risk management and fire safety environment it is necessary to develop experts in the field, who will be able to apply their knowledge in practice and raise public awareness. One of the crucial steps in this process is having high quality and up-to-date study programs that attract young people to learn about theoretical and practical principles of disaster risk management.

The aim of this research is to develop and implement curricula in the field of Disaster Risk Management and Fire Safety at Universities in Serbia, Albania and Bosnia and Herzegovina. The research was conducted via online survey method in the countries of the Western Balkan on a random sample of young people, mostly high school and university students. The first part of the survey contained an ad hoc questionnaire about respondents’ knowledge and understanding of this topic. The second part was based on their opinions and suggestions, while the third part examined their motivation and interest to study this field at universities in the Western Balkan countries or to gain basic knowledge outside of their faculty curriculum. Final sample counts 224 respondents. Two thirds, or more precisely 66.7% of respondents were university students, 23.8% were high school students and 9.5% were recently graduated students. Majority of the survey participants were from Serbia (82.1%) and Bosnia and Herzegovina (8.5%). The rest of the 9.4% survey participants were from other Western Balkan countries.

The analysis of the survey data shows that more than half of the participants already gained basic knowledge about disaster risk management, but a significant percentage expressed lack of knowledge about the field. Additionally, they stated their preferred way of learning about disaster risk management and fire safety, whether at a university or as an extra-curricular activity. Based on the acquired data we gained a clear image of youth’s level of knowledge, their interest in the field and readiness to apply this knowledge in practice, as well as their awareness of different types and levels of risks, which will enable universities to adapt and improve quality of their Disaster Risk Management and Fire Safety study programs.

Key words: disaster risk management, fire safety, youth safety culture, curriculum development, education
How satisfaction with governmental risk communication directly and indirectly affects COVID-19 mitigation behaviours

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Abstract
Over two years into the COVID-19 pandemic and intense societal and governmental response, a wealth of research has examined risk perceptions and public risk mitigation behaviours. The vast majority of this inquiry has focused on health risks. Nevertheless, as a ‘total social fact’ influencing nearly every aspect of quotidian life, the pandemic engenders a wide range of risk perceptions. Via a survey (N=4,206) of representative samples of the general public in five European countries (Germany, Norway, Sweden, Switzerland, UK), we explore perceptions of a range of personal/public health, economic, and societal risks. We also investigate the effects of perceptions of official governmental risk communication in one’s country on risk perceptions and risk mitigation behaviours. Structural equation modelling reveals that whilst perceptions of effective risk communication directly increase frequency of behaviours that mitigate COVID-19 health risks, these same perceptions indirectly decrease behaviour frequency via a mediated relationship with societal risk perceptions. This finding highlights the import of governmental authorities analysing and communicating about the range of risk perceptions citizens might have about a ‘total social fact’ such as COVID-19.

Key words: Risk communication; risk perception; COVID-19 testing; social distance; Europe; structural equation modelling
Quantitative fire risk assessment in public buildings

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Abstract

Fire, as a term, is defined as uncontrolled combustion, either of a part of a structure or of a flammable material in its vicinity, which can cause injury to people and material damage.

In order to prevent the occurrence of fire and if it happens to guarantee the safety of tenants, employees, customers, as well as the building itself and the material goods in it, appropriate measures should be taken. The measures depend on the level of risk of fire. For reliable fire risk assessment, it is necessary to conduct an appropriate analysis. The defined risk level directly influences the risk management measures that should be taken to prevent fire or reduce consequences.

According the definition given in the ISO 31000:2009 standard, risk management includes risk assessment and management.

Fire risk management is a process of developing risk control measures, improving possible existing measures and proper implementation of the envisaged measures, all in order to reduce or eliminate the risk itself.

Therefore, fire risk analysis is only one part of the fire risk management process and serves as a basis for deciding whether to take risk mitigation measures or to select appropriate measures to deal with it.

Within this research, a fire risk assessment was conducted for high school in city Kumanovo, North Macedonia. The Euroalarm, as quantitative method for fire risk assessment was applied. Based on the results obtained from the analysis, the risk is quantified with numerical data. Appropriate fire protection measures are determined depending on numerically obtained data.

Keywords: euroalarm method, hazard, risk, fire, risk assessment, risk management.
Intersectional risk theory and methods: girls and women in transit Mexico – United States

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Abstract

The conference presentation is based on fieldwork along the transit route Mexico-United States which has been forwarded as the world’s largest migrant corridor between the global south and north. An increasing number of Central American women are seeing no other option than to find refuge in the global north. At the same time, it has become impossible to enter neighboring Mexico in a legal fashion thus forcing migrants into what has become the space of la ruta migrante, the migrant route, following old cargo trains, a space that increasingly is controlled by organized crime and gangs and where impunity abounds. The gendered risks are very apparent. It is estimated that 9 out of 10 migrant girls and women making the journey will face sexual violence. I depart from my experiences in the field discussing on the one hand what it means to be a young woman doing fieldwork in a context of conflict as well as the differentiated experiences migrant girls and woman are challenged with. I mainly lean on intersectional risk theory to deepen and nuance the discussion as well as the understanding of architecture of risk introduced by critical criminologists such as Sharon Pickering. I expect my presentation to add to intersectional risk theorizing, as well as to understandings about gender and risk both in terms of theory as well as methodology. An important objective is likewise to explore what southern perspectives e.g., examples from the global south can add to contemporary debates about risk.

Keywords: intersectional risk theory, methods
Toward a logic for decision-making rationales

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Abstract
Preferences, perception of the world, memory, time limitations, and stakeholder considerations are crucial elements influencing decision-makers’ choices in selecting decision alternatives in pursuit of reaching objectives. Stakeholders and decision-makers might not share a common goal in decision-making, and their perception of when a decision is considered to be effective and optimal might not be the same. The decision-making rationale – understood as the logical system of concepts and principles used by an individual or group to decide between at least two decision alternatives – is in practice often non-transparent and can vary from highly structured to unstructured. Terminological inconsistencies with regard to what constitutes risk-based, risk-informed, evidence-based, science-based, and so on decisions and policies exacerbate potential failures in risk communication. The present research contributes to the theoretical and methodological development of a risk science as well as to the applied domain of decision- and policy-making by developing a generic taxonomic framework of a decision-making rationale and applying it as a logic for hazard identification of hazards related to the decision-making process itself.

Using a novel information-theoretic approach, a hierarchical system representation for a decision-making rationale is presented, in which principal approaches to decision-making are classified according to structured and non-structured approaches. At the next level of the hierarchy, the approaches are further disaggregated into four dialectic pairs: (i) individual/collective, (ii) participatory/non-participatory, (iii) outcome/intention-based and (iv) descriptive/normative. Finally, categories of stated, revealed and informed preferences of decision-makers and stakeholders are accounted for. Dependencies among the hierarchical systems constituents are mapped, which enables the identification of hazards related to information flows within and across the different levels.

Keywords: risk-informed decision support, decision-making rationale, system modeling, taxonomy
LIVING with risks - sharing the good practice. Conference (30 ; 2022 ; Novi Sad) Book of abstracts [Elektronski izvor] / Society for Risk Analysis- Europe 30th Annual Conference “Living with risks - sharing the good practice”, June 12-15, 2022, Novi Sad, Serbia ; editors Mirjana Laban ... [et al.]. - Novi Sad : Faculty of Technical Sciences, 2022


ISBN 978-86-6022-440-0

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   а) Процена ризика -- Катастрофе -- Зборници

COBISS.SR-ID 69801225
CONFERENCE SUPPORTED BY THE MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGICAL DEVELOPMENT OF THE REPUBLIC OF SERBIA AND PROVINCIAL SECRETARIAT FOR HIGHER EDUCATION AND SCIENTIFIC RESEARCH OF AUTONOMOUS PROVINCE OF VOJVODINA