

Results of the project EVAPREM

Discussion

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Background

The objective of this project was to develop a universal and comprehensive model for evaluating the results of prevention measures implemented by the rescue boards in five Baltic Sea countries – Denmark, Estonia, Finland, Latvia and Lithuania. This research was carried out to guide both fire departments and policy-makers elaborating and reshaping the selection of prevention services. In addition, the project aimed to deepen the understanding of the effectiveness and efficiency of fire prevention services.

The project results in two main outputs. First, an overall index of fire safety that provides possibilities for countrywide comparisons was developed, based on a fire safety awareness index used by the Estonian Rescue Board. The index provides input data to future fire prevention planning activities. The second output is a classification framework for the prevention measures. These outputs rely both on quantitative and qualitative data. It is based on the feedback from the participants. Although the developed index and classification framework also present the possibility for international comparisons, it has to be noted that despite the systematic and scientific approach used to develop them, no direct causality conclusions can be drawn.

The framework of the model consists of three interrelated components:

- the impact measurement of the preventive activities – characterizes the impact of a prevention activity
- population survey – characterizes the general knowledge and the level of development of the fire prevention in the country at a certain point of time
- fire safety statistics – characterizes the long-term impact of fire prevention in the surrounding society.

In addition, as the main outcome of this project, the active communication between the partners from five Baltic Sea countries has increased the awareness of fire safety in the context of pedagogics. This area of interventions is also called *safety pedagogics*. A short description of research activities will be provided in this overview.

The general overview of the fire prevention activities in the participant countries

The Fire and Rescue Service of **Denmark** (FRS) is decentralized and more than half of Danish FRSs are privatized. The Frederiksborg Fire and Rescue Service (FBBR) participated in this project from Denmark.

At the local level, the Danish prevention activities are organized by 322 fire brigades and at the national level, the Danish Emergency Management Agency is providing various campaign materials. The number of fire fatalities has remained low in Denmark. There were 1.19 fatalities per 100 000 inhabitants in 2015. Denmark has carried out several evaluation studies on fire safety and prevention

activities. For example, an evaluation on fire safety in public housing and on fire behavior and smoke detector use was carried out in 2015.

Denmark provides event-based activities that are focused on the risk behavior during public holidays, such as Fireproof Midsummer, Fireproof Christmas and Fireproof New Year. Every year the 40th week is a themed week for fire safety. The prevention activities are teaching events for children, for instance, Junior Fire Corps and courses to private companies. An online course called “Fire-ready” is offered at the national level. Counselling type, personified preventive activities are offered for instance during the fire inspections and through two programs: Fireproof Home and Fireproof Residential. These programs are aimed at risk groups such as the elderly and activities are carried out in collaboration with the municipality home care.

The **Estonian** Rescue Board (ERB) unites 72 fire and rescue services brigades in Estonia with the total personnel of 1700 people. The aim of ERB has been to reduce the number of fire deaths and change the focus from responsive to preventive activities. The number of fire fatalities was 2.9 per 100 000 inhabitants in 2016. The ERB has a service-oriented approach that includes continuous feedback collection. The gathered information is analyzed and an Awareness Index is calculated biannually.

Standardized prevention activities are aimed at different age groups. For example, fire safety for pre-school children, for students in grades 2-3, for the youth. Also safety training for the elderly and for military servants. In addition to that, The Estonian Government provides counselling type personified preventive activities for homeowners and cooperation partners.

Rescue services in **Finland** are divided into 22 regional fire departments that design and implement fire prevention activities. The Southwest Finland Emergency Services (SWFES) participated in this project. The Ministry of Interior, Rescue Services Department directs, steers and supervises the rescue services and the municipalities are jointly responsible for them. Part of the budget for the preventive activities comes from the Finnish Fire Protection Fund. The number of fire deaths is approximately at the level of 1.5 per 100 000 inhabitants. There are no countrywide qualitative assessments of evaluation activities carried out in Finland but the fire departments evaluate their activities occasionally.

Some quantitative assessment figures could be drawn with the help of PRONTO - the nationwide fire statistics. There are different events organized to raise the awareness of fire safety. For example, every February a national 112 Day celebration is organized together with the stakeholders. The event is coordinated by the Finnish National Rescue Association, SPEK. In addition to this, Fire Safety Week takes place at the end of November as well as the National Injury day on Friday the 13th. SWFES organizes prevention activities for students in 2nd grade. For the 8th-graders, a nationwide Emergency Competition is organized every year. This competition, known also as Nou Hätä! (No panic!) campaign, has been organized for over ten years. This activity contains web-based materials designed by SPEK.

Furthermore, fire extinguishing lessons are organized for working-age citizens. On the other hand, counselling services for individuals are not offered widely in the area of SWFES. However, teachers have the possibility to have individual counselling for safety management issues at schools and fire inspectors counsel social care workers on at risk people and their living conditions. The inspectors sometimes also make home visits.

State Fire and Rescue Service of **Latvia** (SFRS) is responsible for prevention activities. Two target areas are the residential sector and enterprises. The number of fire deaths in Latvia is 4.5 per 100 000 inhabitants. Prevention activities are quantitatively measured with several indicators, for example, the number of relevant events held and people reached.

SFRS organizes many events as prevention activities. For example, open doors days in May. In addition, raising awareness through social media and TV and radio appearances are a part of regular daily prevention activities. Awareness campaigns “Don’t burn your land “, and “On safe use of heating devices” have been organized during recent years.

Events for employees and festivals are also organized in Latvia. At the schools, 112 number event is organized in schools amongst other educational lessons. These events contain a fire simulation exercise and an exit drill. Adding to that, counselling services are offered to residential leaseholders, heads of educational institution, and local government representatives and stakeholders.

In **Lithuania** the Fire and Rescue Department (FRD) promotes the strategy for giving greater attention to nationwide fire risks at the local and regional level. The FRD identifies fire risks in collaboration with the police department and social care institutions. There are 3.5 fire deaths per 100 000 inhabitants in Lithuania. The impact of activities carried out by the FRD is evaluated with quantitative measures, for instance through comparing the number of fires and casualties.

Fire prevention activities include social media campaigns, TV and radio commercials and appearances. In addition to this, the FRD organizes meetings for farmers, students, and working-age community representatives in order to talk about the fire safety. Fire prevention campaigns focusing on spring grass fires, stoves and pyrotechnics are organized. The fire prevention activities are carried out in collaboration with the NGOs.

Most of this kind of activities are aimed for school children, for instance, “Be safe, pupils” and “Human safety”. During these training activities and lectures, the fire risks at home and in the surrounding environment are described and discussed. Lithuania has two forms of counselling strategies. The target groups for “Burn safely” and “If I know - then home is safer” programmes include families, that are involved in the social services. During these counselling sessions, smoke detectors are installed and further practical support for fire safety is offered.

The overall aim of fire prevention activities in all five participated countries is to prevent the loss of property, damage to the environment and especially to decrease the number of fire fatalities. In all five countries, there are nationwide campaigns to raise the awareness of fire risks. This is done with the help of media, including social media and the Internet. In all five countries professionals, volunteers and NGO's collaborate with the fire departments to carry out prevention activities.

In the fire departments of five participated countries, the fire inspection activities work fairly similarly and are involved in risk management by guiding the fire safety in the buildings. The collaboration with social care is important for reaching at risk homes, as dwelling fires are one of the main causes of fire fatalities in Western societies. However, between the participant countries, the fire departments’ involvement in home safety checks is very varied. In all the participated countries, an important part of the preventive work is aimed at schoolchildren. Based on the data from the participating countries, most of the effort is put into implementation of the prevention activities but the outcome is often not

properly evaluated or is evaluated only with quantitative measures to assure the amount and not the quality of the activities.

This study has firstly provided the data and guidelines for developing the fire prevention activities in future and secondly, presenting the best practices of fire prevention in the participant countries.

Model for developing fire safety

The utmost goal is to change peoples' behavior in such a manner that the fire mortality and morbidity rates decrease, and to provide information about fire prevention in such a manner that people are able to respond to emergencies, recognize risks, and act accordingly. The model presented here was established to reach this goal and to research the outcomes of the preventive activities.

The development of the model was carried out in four phases. The research is applied from the study of Magro and Wilson (2013). The process started with collecting background information to establish a holistic picture of the fire safety and fire prevention activities in each country. Short country overviews were developed based on the gathered information.

In the data collection phase, prevention activities were defined as follows: personified activities (individual teaching or counselling activities), standardized activities (training for groups with a lesson plan or curriculum), event-based activities (providing information in an open setting), media campaigns and general information (social media posts, press releases). Methods for collecting feedback were developed for distinguished activities that were chosen to serve as input to this research. In the data collection phase, a population survey was also carried out.

Statistics in the participant countries

The most complicated task was to find comparable statistics on fire safety among partners. The data that is collected on a national level, such as fire fatalities or other injury monitoring differ in definitions or collection methods and, thus most of it is directly incomparable. As a result, statistics which are more general were considered. The comparison focused on the building and other fires, arsons, fire fatalities, fire safety regulation, dwelling characteristics, demographics, socio-economic status, behavior and attitude as well as physical environment. Where deemed possible, the partners were ranked based on these characteristics.

In Fire Safety statistics, it has been observed that it is mandatory to have a smoke detector at home in Denmark, Estonia, and Finland. In Latvia as of 2017, there is a partial legal obligation to have a smoke detector at home while in Lithuania up until 2016, it was not mandatory but since 2017, it is mandatory to have a smoke detector at home. Lithuania also has a partial legal obligation to have a fire extinguisher at home while Denmark used to have mandatory to have a fire extinguisher at home until 2015 but since then it is not mandatory. Denmark, Estonia, and Finland have no rule regarding the mandatory fire extinguisher at home. In Denmark, Estonia, and Finland it is mandatory to get the chimney at home swept by a professional. Until 2015, it was also mandatory in Latvia but since then it is partially mandatory, while there is no such legal obligation in Lithuania regarding chimney sweeping. It is also mandatory in Estonia and Lithuania to have a sprinkler system in the high-risk buildings, it is just partially mandatory in Denmark, Finland, and Latvia.

In 2017, the number of building fires in the participant countries was in Denmark 3.72 per thousand people. The respective figure in Finland was 2.73, in Estonia 2.52, in Latvia 1.5 and in Lithuania 1.26. The number of arsons has increased in Denmark, Finland, and Estonia in 2017 in comparison with 2015. There has been a significant decline in the number of arsons in Denmark over the years but still, in 2017 Denmark experienced more arson than any other country in this study. Yet, it has to be noted that there is heterogeneity among countries regarding the definition of arson and other figures in the fire safety statistics. In the year 2015-2017, Latvia experienced most fire-related fatalities per million people, Lithuania and Estonia managed to decline this number significantly by 2017 while Denmark and Finland have had low and stable fire-related fatalities over the years.

Denmark is the warmest country with average temperature (mean of the years 1991-2015) being 8.67°C, followed by Lithuania, Latvia, Estonia. Finland is the coldest country with average temperature of 2.3°C.

There is a significant proportion of populace living in a dwelling with a leaking roof, damp walls, floors or foundation or rot in the windows frames. The number is almost one-fourth of the populace in Latvia with the number standing about 23%, whereas in Finland the respective percentage is about 4% of the buildings. In addition, the age of the housing stock differs significantly between the countries. Denmark has the oldest building stock in the participant countries, as 44% of the buildings in Denmark have been constructed before 1919. Respective number in Latvia is about 6% and in the rest of the participating countries about 3%. The Finns, 94%, are the most satisfied with their dwellings, the respective number in Latvia, Lithuania and Estonia is over 80% and in Denmark just over 70%. Lithuania and Latvia have the highest household size, 2.4 people per household. In Finland, the families are smaller. About 22% of the households have at least one child, the respective figure in the other participant countries is about 30%.

The unemployment rate decreased in all the five countries in the year 2017 in comparison with 2015. About 30% of the people in Latvia and Lithuania live at the risk of poverty. Human Development Index has been increasing over the years (2015–2017) in all the countries except in Latvia.

In all the countries, men tend to consume more tobacco on the daily basis than women do. About half of the men in Latvia consume tobacco products daily, in Estonia and Lithuania the figure is about 40%, over 20% in Finland and just 18% in Denmark. In Lithuania, on average, a person over 15 years old has consumed 15 liters of pure alcohol per year in 2016, respective numbers are about 13 in Latvia, 12 in Estonia, 11 in Finland and 10 in Denmark. The proportion of inactive people and people with the low level of education has been decreasing in all the five countries during the period of 2015-2017. Again, it has to be noted that not all statistics are comparable to cross-country analysis as there is heterogeneity among the definition of certain parameters.

Population survey

A population survey by telephone was carried out in all five countries participating in the project. The total sample size was 5 669 people – 2 015 respondents from Lithuania, 1 722 from Estonia, 1 104 from Latvia, 428 from the Frederiksborg County, Denmark and 400 from Southwest Finland area.

The population survey gave information on the general level of fire safety competence - safety knowledge, attitudes, and self-reported behavior. For a better understanding about the main results,

a fire safety index was created. The index was calculated using thirteen questions from the survey that explain the attitude, behavior, and knowledge regarding fire safety.

The knowledge based questions touched on:

- recognizing the sound of a smoke detector;
- assessing the ability to use a fire extinguisher;
- knowing how long a sleeping person can survive in case of a fire in the same room and knowing the emergency number.

The attitude questions touched on:

- assessing the importance of owning a fire prevention gear (fire extinguisher and smoke detector) at home;
- the interest level of receiving information about fire safety.

The behavioral questions touched on:

- smoking inside the dwelling;
- installing and owning fire prevention gear.
- testing the smoke detector;
- sweeping the chimney;

It has to be noted that in the survey, the knowledge, attitudes, and behavior questions were not distinguished in sub-groups. Each country received a fire safety competence score (out of 100) and were ranked based on the answers given. In this analysis, Finland was ranked first with 65 points, Estonia second with 60 points and Denmark third with 55 points. Lithuania received 37 and Latvia 31 points. In each participating country, men scored better than women. The survey does not provide answers to this finding but it is possible, that it comes from the fact that fire safety consists largely of technical solutions and installations that are often the responsibility of men. Based on this result, more fire prevention activities should be aimed at women.

The difference of the results of the survey between respondents living in rural areas and urban areas was also analyzed. There was no data from Lithuania but in all other four countries, respondents living in rural areas got better results than respondents living in suburbs, small towns or cities. This supports the findings in earlier studies (Somerkoski 2012, Espenberg et al. 2013). It can be assumed that in the urban setting residents highly depend on the emergency services provided in the neighborhood, whereas in the rural setting, residents are more used to take responsibility for their own safety.

A novel and alarming finding in this study is that youth (people aged 15-26) scored weaker in the fire safety survey than retired or working-aged people. This may be a sign of a negative attitude towards fire safety issues amongst this age group. For example, in Finland only 4% of youth is interested in receiving fire safety information. As the youth is one of the main target groups for fire prevention activities, there is still a lot of work that needs to be done. We advise researching this issue further. New, more interesting ways of the delivery of the fire prevention messages should be developed having that specific age group in mind. Using a practical approach instead of the traditional lecturing, for instance simulations with digital devices and future technologies could be one solution.

Native speakers scored better in the survey than the non-native speakers. Relying on this information, it should be emphasized that fire prevention measures should reach people in their own language. However, it should be noted that the number of non-native speakers in this study was in the case of Finland lower than 30 and the non-native speakers were Swedish-speaking. This language group has shared the culture of the Finnish-speaking Finns.

This study shows that sharing every-day life with someone seems to have a positive effect on the fire safety index, especially when there is a child in the household. Further on, those who have at least two family members in the household, scored better in the fire competence survey. Also, it is noticeable, that the households with a child aged 5 - 15 years are scoring better than the general population in the fire safety competence survey in all five countries. The factor affecting these results is the combination of the relatively good score in all the four parameters of knowledge, behavior, attitude, and prevention. However, in the apartment blocks with more than eight apartments, every participating country was performing poorly.

Firstly, the results of the survey encourage aiming the preventive activities at cities, single households, for instance at the block of flat dwellings with one-room apartments. The survey revealed that self-employed respondents have better knowledge in fire prevention than the national average. In Finland, the score reached 75 in this group, which is the highest score achieved in the study in any group in any country. More effort should be put into raising the awareness of students in Finland and Latvia, as their knowledge in fire safety issues was low.

When considering all the participated countries, there was not a clear trend between fire competence and education level. For example, respondents with higher education scored higher than the average in Denmark, Lithuania, and Latvia but lower in Estonia and Finland.

Income was divided into five levels for each participant country (except for Lithuania that only had four levels). In Estonia, there was the least variation of the fire safety score between people with different income levels, while for instance, in Finland there was a positive correlation between the income level and the fire safety index. Concerning the population survey as part of this study, the fire safety competence questionnaire leads us to recognize the vulnerable groups of the society who are relatively more exposed to fire accidents. These are the single person households, in the apartment buildings in an urban setting. The results set challenges for the fire department to reach all the special groups, for instance those, who are not able to get out without help in the case of the emergency. However, in this study, the groups with special needs, for instance, the handicapped or people who live in care institutions were not distinguished. Read the whole report [here](#).

Measuring the impact of fire prevention activities

The aim for this part of the assessment was to deepen the understanding about the effectiveness and efficiency of fire prevention services considering the corresponding socio-economic environment. The evaluation of different programs, actions and projects enables us to learn from experiences and gives an understanding about what works and what does not.

The first step in the framework established for the model is collecting qualitative data on prevention measures. Prevention measures were defined as follows: measures for preventing and extinguishing fires and for protecting inhabitants from any kind of (fire) catastrophe. Already decades ago

Schaenman and Swartz (1974) stated, that “Prevention or a priori action has as its objective to reduce the probability of fires occurring and help to limit losses in property and lives in fires that do occur”.

Each of the participants gathered the qualitative data of the preventive measures that are used in the respective area (Estonia, Latvia, and Lithuania on the national level, Finland and Denmark on the regional level). To gather enough background information five pilot matrixes were established with the information on the frequency and the volume of the activities, the budget, the target group, the actors, the stakeholders and the partners, the data, the method of teaching and the amount of the participants. In the end, there were two crucial criteria to choose the activities for this study: firstly, the activity needed to be in the active phase during 2016 - 2018 and secondly, the feedback collection from the participants had to be organized in a decent way.

The prevention activities were classified into five groups based on their characteristics. Two groups of activities were left out from this study. These two groups were the ones with media campaigns and social media. It was not possible to study these groups with the method that was chosen for this study. The remaining three types of activity groups were: personified activities (one-to-one activity), standardized activities (one-to-many interaction) and event-based activities (many-to-many). Feedback forms were developed for the chosen activities. The first element that was analyzed was competence: knowledge, skills, and attitudes (see for instance Baartman & Bruijin 2011). The second analyzed element was customer satisfaction (Hayes 2008, 15). The concepts that were used when developing the feedback forms for this study were:

- responsiveness (did the provider react promptly to the customer?);
- completeness (was the job finished?);
- pleasantness (did the provider use suitable behavior and manners?);
- professionalism (did the provider seem professional?);
- overall satisfaction with the service.

The fire prevention events in this study were categorized by the influence area (national, regional, local); by the main audience (children, youth, working age people, elderly); by the activity time (annual, ongoing) or the type of teaching (one-to-one, one-to-many and many to many).

In total, 25 prevention activities served as data input to this part of the study: eight activities from Estonia, four from Finland, one from Denmark, five from Lithuania and seven from Latvia. The results were provided in the form of [infographics](#) to give important information to the fire departments in each participating country. Additionally, qualitative data was gathered with the participant feedback forms.

It has to be brought out that each of the countries carries out these preventive events by their own design and forms of implementation, based on the safety culture, legislation and resources in each country.

Only two (n = 2) one-to-one events were analyzed in this study. These personified activities were job shadowing that enables youngsters interested in fire service professions to follow a fire service professional for one working day and home safety visits or other individual fire safety counselling activities. In the earlier studies, resources put on at risk individuals are considered informative and effective. To evaluate this type of activities in a more detailed and reliable way, more examples should

be provided. Still, there is big potential in offering the one-to-one education, especially through the home safety checks done in collaboration with the social care. With these kinds of events customer satisfaction does not appear to be as important as with standardized and event-based activities. Yet this type of events offer possibilities for new innovations and forms of activities.

In this study 15 (n = 15) one-to-many, standardized fire safety interactions were studied. A typical standardized activity had a curriculum that was aimed at a certain group of people (for example, or a certain age group). These events were fire safety lessons held in schools, initial extinguishing lessons or lessons for working age people (such as nurses or other workers in elderly care) in different fields.

Firstly, it seems that fire department has a lot of value and interest amongst all the target groups that participated in this type of activities: children, youth, working age adults and elderly. This value is partly based on the special equipment that are used in "real" situations. In addition, it seems that there is a value in professionalism, as the firefighters share about the first-hand experience they have. However, to carry out an effective and interactive learning environment, enough hands-on activities should be available. This means that the regular classroom environment is not the best possible learning environment. As some of the information delivered is technical and demands concentration, the lessons should be organized in the morning, for instance between nine and 11 o'clock. The deliverables (slides about fire safety, workbooks and exercises for students) should be available for the teachers after the lesson. The instructor (a firefighter, a fire inspector, officials, whoever it is) should be prepared to change the activities during the lesson to keep the students motivated for the tasks provided. As the school provides enough breaks during the day, this was not the case with the adults. When adults are taught, especially in the afternoon hours, more breaks or afternoon coffee should be provided to maintain the concentration during the lesson.

The study shows that practical activities lead to the best possible outcome. In addition to this, it needs to be assured that the informative content in the learning material is provided. It has to be noted that the display of fire fighters' special equipment is not a learning event of fire *safety*. Further on, events that were researched in this study were aimed at the so-called regular learner and only one activity (carried out in Denmark) was designed for the children with special needs.

The overall impact of the lessons and educational events was high. In all the cases where ex-ante and ex-post tests were carried out, the results indicated that the learning outcome (fire prevention knowledge and skills) of the person who participated in the lesson or event, was getting better. Yet, there are certain limitations about drawing conclusions about causality as the tested groups were not always similar enough and the study group was relatively small in general.

In total six (n = 6) activities were presented as event-based activities. These activities are events, that are aimed at a specific audience, but anybody could participate. Amongst the analyzed events there were festivals, open days at the fire stations and family safety events. They have adjustable, applied and themed learning content.

Social change and prevention measures of fire accidents

The developed model was complemented by a study of social change and prevention measures of fire accidents. The additional study discusses how effective the fire safety activities have been in the involvement of the groups, awareness raising and structural intervention. The analysis provides

insight, what kind of tools – awareness raising or structural intervention approach – will help to improve the fire safety activities among people with lower agency.

In the first phase, the activities that fire departments are using in fire prevention were divided in two groups: awareness raising tools (such as media campaigns, webpages, social media, public events, festivals, webinars, quizzes, lectures at schools) and structural intervention tools (such as trainings, tests, fire inspections, direct counselling, giving out fire detectors).

The social agency was researched with a statistical tool. The groups with higher agency are more willing to acquire additional activities or demands. To analyze and find these, socially more active people, additional questions were added to the questionnaire. These questions were about attending cultural events or hobbies, home improvement, choosing products by extra qualities, the frequency in following the news. Eleven questions from the questionnaire were used in the analysis. The questions concerned knowledge (such as recognizing the sound of the smoke detector), supportive actions (such as testing the smoke detectors or using the fire extinguisher) and things (such as owning a fire extinguisher or fire detector). The toolkits of the fire safety of five countries (Denmark, Finland, Estonia, Latvia, and Lithuania) were compared according to the groups of the intervention tools presented above. Media, webpages and social media (awareness raising tools) are used in every country for fire prevention communication. Fire safety communication in media is a very passive and ineffective tool – it fails in cases where the unwanted or the expected new practice is coordinated by many factors. However, communication may work well in cases that do not require behavior change. Communication may help to enhance or maintain practices that already exist or where other conditions for practice change are fulfilled

Participation of the public events, open days at fire stations, festivals and communication campaigns are also used for fire prevention in all five countries. Although the reach of these tools is narrow (usually mainly diversely active social groups are involved), these activities are more participatory and help the target group to accommodate safety instructions to their everyday life. Public events usually include hands-on activities that training that may help to develop necessary body memory for the emergency situations. Tools that enable even more involvement of the target group, such as schooling, lectures at spot, are also used in all five countries. Compared with previous ones these tools enable the target group to approach the fire safety recommendations situationally and based on personal needs, as communication in these cases is rather symmetrical. On spot schooling may also help to improve body memory of the necessary skills when practiced regularly. A remarkable share of prevention activities is done at schools. However, very little theoretical knowledge that is acquired in childhood and at school is taken account in everyday practical choices in adulthood. Yet all these are well suited to reach the target groups who are not particularly interested in fire safety (egalitarian approach). Trainings and testing activities in organizations are good to try out hypothetical situations and develop bodily abilities that people can rely on in case of emergency. In order to make the trainings useful, many hands on training and physical exercises are needed. To develop body memory and collective control, the trainings need to be practiced regularly.

The groups at risk are usually the target groups who cannot be reached by communication campaigns or other direct approaches. Their connectedness to social networks may be low and their agency (ability and willingness to change) as well. Their practices are often coordinated by other people – social workers, youth workers, chimney sweeps, etc. (for example in Finland fire prevention is

integrated in social services and elderly care, in Lithuania there are special counselling programs for people who receive social benefits). By coordinating the action of the people who are in between the communicator and the target group, the preventive action can bring more success.

Although the lists of fire prevention activities in country reports look similar, there are some remarkable differences as well. In Latvia and Lithuania there are less structural measures used and some of those have put to use just recently. For example, in Latvia new fire prevention regulations for residential buildings and enterprises came to force just in 2018. In Lithuania there have been more direct interventions in people's everyday lives, especially those in risk.

The history of Estonian fire prevention activities is longer than in other Baltic states. In Finland, the emphasis is on schools. Teachers are counselled on fire safety issues and supported in the management of safety at school. Compared with the other countries, in Denmark the fire prevention activities are more integrally linked to ordinary community life. This helps to coordinate fire prevention practices of the lay people on an egalitarian basis. The role of rules, regulations and cross-sectoral cooperation is more emphasized in the country report. They also sell training courses for companies and have regular fire inspections in buildings and homes. Both in Finland and Denmark the structure of the fire and rescue services is decentralized that enables more cooperation with communities at regional levels.

In the final phase, the agency groups were created. A cluster analysis was used to create and measure the agency groups in different countries. As expected, in Denmark and Finland the groups with higher agency were bigger and the differences between the groups are not that big as in the Eastern countries. In Finland, Denmark and in Estonia the shares of the active groups are bigger. In Finland and in Denmark, the least involved group is still involved in social practices by media. Therefore, it is easier for these countries to catch the attention of the citizens as fire departments have well-developed relations to media.

However, higher agency was not directly related to social change. The potential for change is bigger in the countries where the socio-economic conditions are improving, and the density of practice networks is still rather low. In well-developed countries where the network of practices is very dense, it is easier to spread information through the social networks but more difficult to provoke new changes as the time and space resources for additional activities are already used.

The pilot analysis of this report needs further development as the analysis of the toolkits of the countries can be elaborated and the index of fire safety measures mainly the existence of technical appliances at home. Also, there might be many other activities that shape fire safety. Although all five countries did have quite similar fire prevention activities, no universal tools for the fire prevention activities exist. To improve fire prevention, each desired activity should be approached separately and special attentions should be paid to the less active group of citizens. Read the whole report [here](#).

Conclusions

Based on the results of the EVAPREM project, it seems, that the fire department can motivate people especially well when gear, trucks and firefighter equipment are on display. In addition, the lecturer or presenter being a professional firefighter was received well by the audience. Interactivity and practical training were considered good ways to learn fire safety. However, the learning outcome (skills and

knowledge) was not as good as with the standardized actions carried out by the fire service. To prove causality of the results, the event should be studied in a more detailed way. That was not possible in this study design.

Furthermore, it appears so that the audience participating in these events does so primarily to see the trucks, the gear, and the professionals. Learning about fire safety comes second. On the other hand, fire services seem to have many possibilities to organize different kinds of hands-on events that can encourage learning. To analyze the events more deeply and especially to compare the events with each other, more information should be provided about the learning contents, the deliverables, and resources used to carry out these events.

The aim of this research project was to systematize the evaluation process of the fire safety activities and to describe the tools and preventive methods used for fire safety purposes. To serve this goal, the developed fire safety index was divided into three components: the general statistics, the population survey and the impact measurement of each prevention activity. In addition, the social change and prevention measures of fire accidents was researched as a part of this study.

As there are differences for instance in the culture, legislation, structures of the fire prevention policies, available resources, economic situation, nature, educational structures and in monitoring the incidents, such as fire deaths, the provided information is general. The results should be implemented in the context of each fire department rather than comparing the participant countries with figures.

The systematic analysis carried out in this project benefits the organizations responsible for planning and implementing the fire prevention measures. Yet, the model can be applied to all safety promoting organizations, at the European and global level. The project's main aim is to save lives. If the implementation of the developed model saves even one human life, the results represent a considerable value for money. The project has provided an overall model, how to measure and carry out fire prevention activities. Such analysis can be provided for all types of preventive events, such as water safety, self-harm, injury prevention or alcohol related incidents, held occasionally by the fire departments.

References (the complete list of references is provided in the original reports)

Baartman, L. & Bruijin, E. 2011. Integrating knowledge, skills, and attitudes. Conceptualizing learning processes towards vocational competence. *Educational Research Review*, 6, (2), 125–134.

Espenberg, K., Puolokainen, T. and Varblane, U., 2013. Abikaugetes piirkondades päästeala ennetustöö, ohutusjärelvalve ning päästetöö teenuste optimaalsete osakaalude määratlemine ja sellealase planeerimismudeli väljatöötamine. Lõppraport.[Online] Tartu: Tartu Ülikool, Tartu Ülikooli Sotsiaalteaduslike rakendusuringute keskus RAKE.

Hayes, B. 2008. *Measuring customer satisfaction and loyalty. The survey, Design, Use, and Statistical Analysis Methods*. 3rd Edition. American Society for Quality: Milwaukee, WI.

Magro, E. and Wilson, J.R., 2013. Complex innovation policy systems: Towards an evaluation mix. *Research Policy*, 42(9), pp.1647-1656.

Schaenman, P.S. and Swartz, J., 1974. Measuring Fire Protection Productivity in Local Government: Some Initial Thoughts. National Fire Protection Association.

Somerkoski, B. 2012. Turvallisuus ja liikenne. In: E. Niemi: Aihekokonaisuuksien tavoitteiden toteutumisen seuranta-arviointi 2010. Koulutuksen seurantaraportit 2012:1. Helsinki: Opetushallitus, 184 - 204