



## The social amplification and attenuation of risk on occupational safety and health levelling - the case of Greece

Ioannis D. Anyfantis<sup>a</sup>, Alexandros Karageorgiou<sup>b</sup>

<sup>a</sup>School of Science, European University Cyprus, CY (i.anyfantis@external.euc.ac.cy) ORCID: 0000-0003-2134-8287.

<sup>b</sup>National Labour Inspectorate, Greek Ministry of Labour, EL (kwnio@otenet.gr).

### Article History

Received 19 January 2020

Accepted 13 May 2020

Published 30 November 2020

### Keywords

Social amplification of risk

OSH levelling model

Media and safety

Risk communication

Risk perception

Lay public

OSH

### DOI:

10.24840/2184-0954\_004.002.0002


### ISSN:

2184-0954

### Type:

Research Article

 Open Access

 Peer Reviewed

 CC BY

### Abstract

While economic slowdown challenges stock-markets and the wider economic and financial system, significant pressure is posed to labour market challenging also working conditions. Occupational Safety and Health (OSH) is not given the appropriate importance, especially in small and medium-sized enterprises (SMEs). This study attempts to describe and analyse the complex interactions between some of the factors that determine occupational safety and health, based on previous models of social risk amplification/attenuation as well as the risk perception factor. The model is applied for the case of Greece during recession. The proposed approach explains the lack of measures taken during a variety of challenging situations and the reasoning behind the regarded significance that is given or not given to specific situations. This case study identified the dominant factors that predispose and trigger or casually affect the amplification/attenuation of risk and can significantly affect the lay public. Those were found to be the media, the National Labour Inspectorate (NLI) and legislation. Social media were also found to have the potential for supporting both proactive regulatory actions and capacity-building for social dialogue.

## 1. INTRODUCTION

More than ten years have passed since the Lehman Brothers' crisis (2008) and the effects of that tidal wave in the global economy are still visible in some countries. The resulted world-scale economic slowdown had significant impact in most European countries, especially to those of the South. Greece was probably the one most hit by recession, since internal economic distortions were also concurrently brought into the light, leading to austerity measures.

Occupational Safety and Health (OSH) was crash-tested, especially in SMEs which constitute the backbone of most countries' productive force while, for the case of Greece, employ 87.9% of country's workforce (EUROSTAT, 2019). Issues like flexible work, and subcontracting were mainly brought into the foreground, affecting OSH in unexpected ways (Anyfantis and Boustras, 2020), while new forms of occupational risks emerged.

Economic slowdown can provide a great opportunity for research, since some phenomena can be observed on their torn-down state, clutter free and enlarged. The number of occupational accidents per 100.000 workers on an annual basis, can be an index providing valuable information. The larger the differences in occupational accidents' rates between periods of growth and recession, the more flaws are revealed (Anyfantis et al., 2018).

During the last few years, several models have been proposed to explain pillars of occupational

safety and health either in a socio-political or an organisational context (Waring, 2019). One of them identified eight major pillars that establish and define the level over which OSH is laying, forming a safety net in developed societies (Anyfantis et al., 2018). Those pillars are legislation, National Labour Inspectorate, Employers' and Employees' Organizations, Public expenditure and lay public. According to that model, OSH is lying on a level supported by those eight pillars, which are interacting, adapting and defining OSH's levelling, position, flexibility and strength against pressure posed by external factors like recession. So, a network is formed, and each one of the pillars interacts with OSH, which holds a central position in the network. The density of the stakeholders' network and OSH's centrality influence the degree of resistance to external forces. The financial crisis is an external force that pushes OSH at a lower level, so the network needs to adapt resisting in this push as an opposing force. In that terms, the network acts as a safety net safeguarding OSH. Even though all these pillars are interacting with OSH and with each other, the mechanism describing those interactions, especially with each other is considered as complicated while little research has been conducted in that area.

Each one of OSH determinants as described by Anyfantis et al. (2018), interact with OSH in a direct way that has been extensively investigated in the past. However, there are also interactions between each one of these, which are forming a non-linear and complicated model. Such interactions do not always have an action and reaction relationship, while a slight change in one pillar can significantly affect another area of the whole system. Previous research provides evidence that interactions and acts can be significantly affected by perception (Argyle, 2007).

The way that humans perceive risk, may have a significant effect on safety and consequently on occupational accidents (Taylor and Snyder, 2017). Carving workers' perception of risk may be considered as an initial step in developing procedures to minimise occupational risks and the respective risk management approaches to be performed.

While a hazard may be always there, it is the risk that has to be managed for enterprises and installations to operate in an effective and profitable way. The way that humans perceive risk, may have a significant effect on occupational accidents. Risk perception may be considered as an initial step in developing procedures to minimise occupational risks and the respective risk management approaches to be performed.

According to Slovic (2016), perceived risk is quantifiable and predictable. While most people tend to view high-risk levels as unacceptable, when they perceive a benefit, they can raise their internal risk tolerance level. Risk perception could also be highly dependent on intuition and emotions (Rougemont-Bücking and Grivel, 2014). Additionally, risk perception can be significantly biased according to specific parameters such as voluntary/mandatory basis of hazard, familiarity, perceived control over it, how memorable/forgettable it can be among others (Slovic, 2000).

At the level of the individual, risk perception can be the result of many factors, as opposed to rational judgements based on the probabilities. Some of the reasons that could explain why the perception of risk is not based on these rational judgements can be systematic biasing of risk information, the use of mental shortcuts, and the way that risk information can be presented. Previous research of risk perception is increasingly rejecting single theoretical perspectives, especially in cases that risk is perceived not through direct experience, but mediated, e.g. via the media (Paek and Hove, 2017). There is evidence, according to which the public responds to media coverage of hazards in a more rational and active way.

Petts et al (2001) suggest that the link between the mass media and the perception of risk is not as direct. According to them, the public actively interprets media, from many sources, while public views on risk are dependent and continually negotiated. Breakwell et al. (2001) also identify factors associated with the production of news that can contribute to the biased perception about a risk. These factors include commercial pressure to promote stories that secure increased audiences; the lack of reporting of 'real science'; the use of templates to pre-frame a story; and the private agendas of individual journalists and editors (Breakwell et al., 2001).

According to Kahneman (2011), people have a natural tension to assess the relative importance of issues based on the easiness to retrieve them from their memory. The media can play a determinant role in that. In that sense, topics that are frequently mentioned by the media can easily get our full attention by populating the human mind. At the same time, other issues of equal importance for an independent observer could easily slip away from awareness. However,

this situation can easily become a vicious circle since the media would usually report what would probably be in the public's mind for any given time to increase their ratings. Of course, this would be the situation, if we take for granted that no external forces will attempt to steer the public's mind.

Media can also play a crucial role in the way that risk is communicated, as they are the transmission medium. One of the most used and recognized frameworks that facilitate a greater understanding of the social processes that can mediate between a hazard event and its consequences is the Social Amplification of Risk Framework (SARF) (Kasperson and Kasperson, 1996; Renn et al., 1992). According to SARF, that was originally proposed by Kasperson in 1988, as amplification occurs at two stages: in the transfer of information about the risk, and in the response mechanisms of society (Kasperson et al., 1988). Considering this conceptual framework amplification and attenuation indicate both intensifying and attenuating signals about risk (Kasperson and Kasperson, 1996). That amplified conception of risk leads to behavioural responses that, in turn, lead to secondary impacts.

Interconnections and relations between determinants are governed by complexity and obey to development procedures based on sociology, communication theories and political considerations. However, the key feature that controls the above procedure, is the way that risk is communicated through the society, either on a neutral or in a biased way, since this can trigger or not social reflexes and mobilize or hypnotize selected stakeholders.

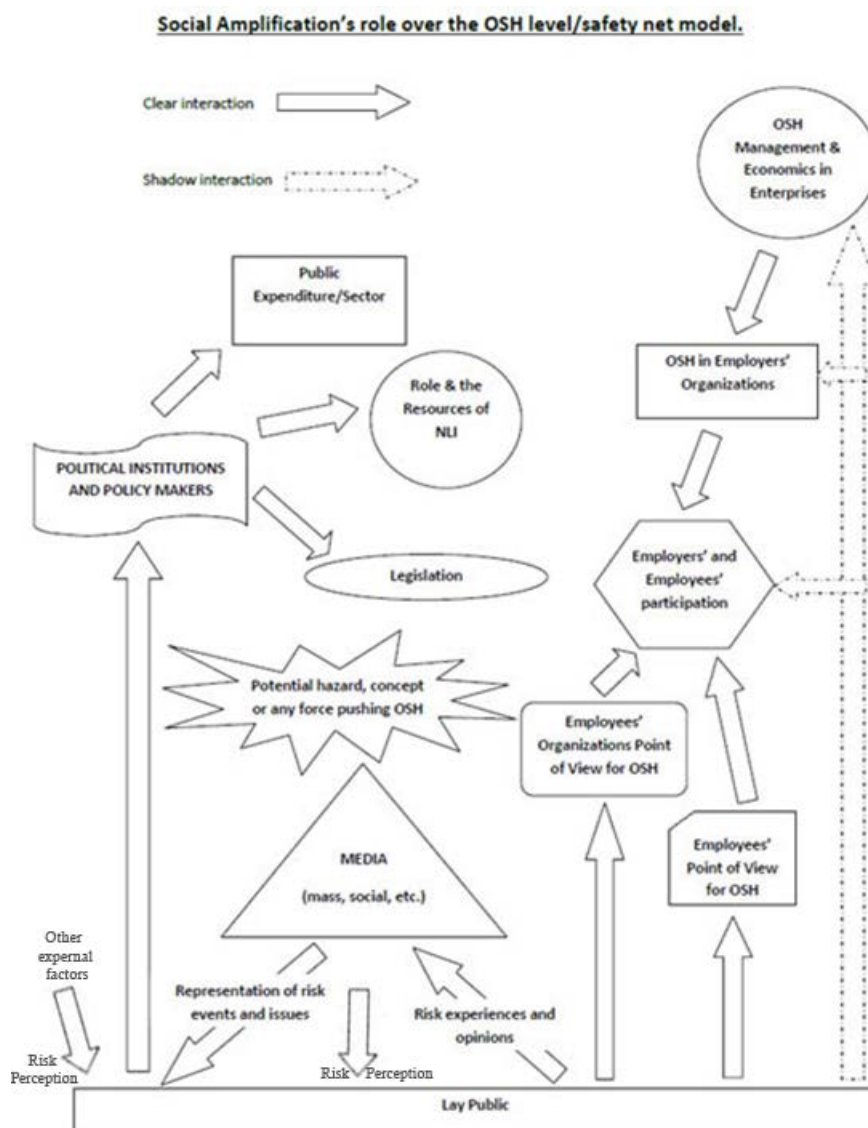
Communication theory fully describes the process and mechanisms of transmitting a signal through a respective channel from point A to point B (Dodd, 2019). Just like a stereo receiver, a social information system uses the same principles to amplify risk events in two ways. The first is the amplification of signals that are part of the information which individuals and social groups receive about risk. The second way is based on filtering specific sinusoids of the signals (of different "frequencies" like a Fourier transform) in respect to the attributes of the risk and their importance.

Emerging signals are initially evaluated in respect to personal experience or through further reception of information about the triggering event. Consequently, these signals are processed by social, as well as by individual, amplification stations like institutions, media, social groups, opinion leaders, public agencies and the above-mentioned determinants. External noise could also play a significant role in that.

Furthermore, when risk is communicated, its relative importance can also be attenuated, reducing the magnitude of the perceived risk. In that sense, there could be cases on which risk communicators might seek to increase awareness over emerging risks, while on others their aim might be to avoid escalation of public reactions (Panagiotopoulos et al., 2016). According to that, a potential risk of significant magnitude, could not be given the appropriate attention by the media, while niche voices could be treated as outliers.

In Anyfantis et al. model of OSH levelling (Anyfantis et al., 2018), it was proposed a mechanism that effectively communicates risk between the eight pillars of OSH, based on the social amplification model (Kasperson et al., 1988). According to that a station, that could be a scientist, a firm, a journalist, the government, an organization or any of the above-mentioned determinants, triggered by an event or a potential hazard, generates and transmits information via any communication channel. Such communication channels can nowadays be websites, social media, mass media, blogs, newsletters, direct conversations, or other and each one of the recipients engages in the amplification process. The model can be further improved by the introduction of a public risk perception factor that can be affected, by media or external factors in a positive or negative way, so that risk conditions or events may not receive the required attention, Figure 1 (Anyfantis et al., 2018).

A potential hazard, a concept, an emerging occupational risk or any force putting pressure on OSH, triggers an event initiating the process. The media provide each one of the actors with the necessary public stage that allows them to 'socially amplify' their views and concerns, affecting determinants and developing social awareness/disregardance (Kasperson et al., 1988; Petts, 2001; Wirz et al., 2018).



**Figure 1.** Model of risk communication across the OSH levelling determinants

In that way, the communication channels affect not only each one of the determinants but also public conscience which either clearly or shadowy regulate their position and inter-connections.

This study attempts to analyse complex interactions between OSH pillars proposed in Anyfantis et al. (2018) OSH levelling model, based on the social amplification/attenuation model of risk with the addition of public risk perception formed by the media and external factors. Examples derived from the case of Greece will be used to outline and support the model.

## 2. METHODS

The research study was carried out in Greece, a country that was significantly hit by recession and fiscal consolidation during the previous few years, and OSH was crash-tested. The current study was designed to explore the complex interaction of pillars that support OSH during periods of economic slowdown, taking into consideration factors such as risk perception, risk communication and social amplification. The model proposed by Anyfantis et al. (2018) was used to define OSH determinants as well as describe the complex interactions between them. Because of the complexity and cognition involved with those factors, interactions are mainly approached in a qualitative way. In that context the data used were based on fieldnotes written by the researcher in the course of observation, during the crisis period, documents of various kinds, websites, media and legislation (Silverman, 2016).

Our approach to the challenge of rigour is embedded in the research decisions made while planning the study, as well as resilience in responses to quality threats they occurred.

'Methodological rigour' concerns the degree to which systematic and random error is minimised, representativeness and generalisability maximised, and scientific uncertainties accounted for.

Data regarding the number of accidents, were taken from the National Labour Inspectorate (NLI), that is a governmental agency but also one of the models' determinants. NLI has also provided information about legislation as well as campaigns during the previous years.

The websites and social media of the major policymakers (ministry of labour), employers' organisations (Chamber of commerce, Association of Greek Industries, Hellenic Confederation of Commerce and Entrepreneurship) and employees' organisations (General Confederation of Greek Workers, Supreme Administration of Civil Servants' Trade-Unions) were also assessed in terms of provided information, news and reports.

As with regards to the media, their approaches to hazard stories were assessed on a methodological framework, based on pre-defined factors, such as framing factors including internal (editorial policies, values, among others) and external (sales, audience, among others) which are considered by news communicators in media, affecting the way they report stories about hazards and risks (Vreese, 2005). Those factors have been identified in previous research and include significance, level of risk, scientific details that are avoided, interactions between the media etc. (Fombrun et al., 2000; Kasperson et al., 1988; Peters, 1995). A range of media were selected for our study, from well-respected organisations to websites and social media channels and groups. The same event was then assessed, regarding presentation for each one of the communication channels.

This approach gave us the opportunity to assess both triggering events as well as events that affected public perception of risk. Moreover, it allowed us to assess the different communication channels transmitting signals to lay public.

For the development of our case study, the seven steps approach was employed, namely: (1) Justification for the research paradigm and research methodology, (2) Justification for the case study method, (3) Criteria for judging the quality of case study design (4) Designing the case study, (5) Criteria for selecting a case design, (6) Data collection, (7) Case study analysis.

Our study was conducted in the second quarter of 2012 which, according to the Greek Statistical Authority, was the worse year of the recession period in terms of financial indexes, unemployment rates while the lowest number of occupational accidents were recorded. However, the effects of that period were obvious for the years that followed, so relative indexes of the following years provided us with the greater picture. Analysis of collected information took almost a year (November 2016 – July 2017).

### 3. RESULTS

#### 3.1 Applying the model - The case-study of Greece

Greece was among the first European Union (EU) member states to be hit by recession back in 2008 and probably the most affected due to further fiscal deficiencies of the time. In 2009 the general government deficit reached 15.5% of GDP (after incorporating data revision) and public debt climbed at 129% of GDP, 75% of which was held by non-Greek investors (Annual Report, 2015). That led to a Stand-By Arrangement in which Greece is under - since 2010 - in order to restore market confidence.

Regarding the case of Greece, mass media mainly tried to enlarge the scope of fear of unemployment and psychosocial risk at work (suicides occupational accidents, austerity is hurting workers health) not making a virtue out of continuing deregulation and reducing the burden of OHS on business (Makri, 2013), attenuating several aspects of the Greek NLI' prospects.

Despite the fact that working conditions did not improve, there was a reduction of occupational accidents' rate, since traditional high-risk economic sectors were shrunk, under-reporting increased and new emerging risks were more difficult to be identified.

Absolute numbers turned the main focus on working relations. Huge fines were established for undeclared work (about € 10500 per undeclared worker) as well as for overtime work. Mass media and social media were flooded by the new sanctions regarding violations of labour law regarding working relations. The media referred to special cases, the social media were additionally presenting the employer's point of view and so on. This particular piece of legislation

was mainly defined by the lay public pressure over policy makers, since during economic slowdown there was an apparent shift in employment composition by sex, age, type of contract (part-time or full-time) and level of education (Annual Report, 2015). As a direct effect, the major concern of both employers and NLI became this huge fine and little importance was given to OSH and new emerging risks. During the actual inspections of the workplace, everyone was relieved in case no undeclared work was found, giving minor importance to OSH related notices for improvement. However, occupational accidents increased for the consequent years (2014-2018) unnoticed, below the radar, while no special measures were taken for that (Anyfantis and Boustras, 2020).

In that sense it could be argued that this particular risk of sanctions related to undeclared work was amplified by the media. The media backed this idea, communicating the risk of getting fined instead of respecting and protecting human life. However, at the same time, little attention was given to traditional and emerging risks that employees had to face, since they were accordingly attenuated. Psychosocial risks did not have the same publicity in the lay public, even though it is the lay public itself that mainly suffers.

Coping with such risks and providing solutions could be of significant importance, since their actual cost in the national economy is huge, especially for the national public insurance that is suffering by fiscal consolidation too. Little attention was given to cope with such risks. Even though potential measures, such as psychological support by specialized professionals (free support telephone lines), training etc. are well defined in the bibliography, there was limited implementation of them. Furthermore, the number of part-time employment contracts increased significantly during the economic crisis. Specifically, increase in precarious work followed an annual increase of 21–38% from 2013 to 2018. The associated job insecurity increased work-related stress which has been associated with a number of health issues.

The amount of €10500 that was imposed as a response of the OSH network to the pressure posed by the economic crisis, shadowy dominated media and the other determinants, attenuating the importance of OSH related messages, by most traditional and social media.

#### 4. DISCUSSION

The proposed model attempts to explain the complex indirect relations between OSH determinants. It provides for the shareholders a common ground for mutual understanding and indicates that their bonds should be strengthened in order to support OSH. Additionally, it also explains the lack of measures taken during a variety of challenging situations and provides the reasoning behind the perceived significance that is given or not given to specific situations. Testing the model using Greece during the recession as a case study, revealed the factors that predispose and trigger or casually effect the amplification/attenuation of risk.

The way that risk is communicated across/between OSH pillars is of significant importance. Risk communication can be initiated, either by the government or by any of the stakeholders such as employees' organizations, while the communication channel can be the media. Mass and social media can effectively and effectively communicate risk in a way that is completely novel, changing traditional models and mindsets (Rasmussen and Ihlen, 2017; Ueland, 2019). Such communication channels can nowadays be websites, social media, mass media, blogs, newsletters, direct conversations, or other and each one of the recipients engages in the amplification process.

As with regards to classical media since media portrayals can have a significant impact on public attitudes, media should be treated as an ally in communication, rather than an audience (Lang et al., 2001). Furthermore, during the last few years, a number of studies have described the way that social media can be used in order to communicate risk, mainly on emergencies or on controversial issues that cause uncertainty (Conrado et al., 2016; Regan et al., 2016).

The power of media in modern societies has been heavily criticised in the past, while steering crowd opinion has become a scientific field of increasing importance. The traditional power of mass media is nowadays backed by the tremendous power of social media that has recently considered to be involved even in national election procedures (Ueland, 2019; Yang and Xu, 2018). A central factor in predicting the sources people use to receive risk information is the age (Feldman et al., 2016). Different types of media are mainly used by people of different ages, while different types of media are used by organizations, institutes or public sector such as the

NLI.

According to Wendling et al. (2013) there are three major options for that by using social media: The first is to foster citizen-led social media use through Volunteer technology communities, the second is by developing government-led social media strategies while the third option lays in combining both approaches. Public policies are needed to sustain and implement strategies, to regulate the propagation of dangerous rumours and to assess the impact of media.

According to Ashby, only variety can destroy variety (Ashby, 1991). Provision of information regarding Occupational Safety and Health by the media can contribute to the stability and control of an Occupational Safety and Health system (e.g. that of a country). However often such a system is very complicated, included inherited hidden properties, this information is usually incomplete and there is uncertainty about the behaviour. In order to have full control we need to have full knowledge of the system and its behaviour.

In many cases, the risk is not communicated accordingly, it is often attenuated while the "optimism bias" comes to fill any uncertainty, lowering public awareness. Therefore, both proactive regulatory and capacity-building support for social dialogue at the level of the enterprise, since they tend to strengthen relations and further support OSH.

The lay public is the basis of society that can affect all determinants either on a clear or in a shadow manner. Social media further enhanced that characteristic, since it could be argued that mass media could occasionally be manipulated. In that concept, lay public and any other part, can clearly interact with political institutions and policy makers (that affect the NLI, legislation and public expenditure), employees' point of view on OSH, employees' organisations point of view on OSH and media. Additionally, it can shadowy interact with employers' organizations and OSH management in enterprises. According to the proposed model, media (either mass or social) is a key factor that can affect lay public, promote certain beliefs and interact with all other determinants in a clear or in a shadow way (Paek and Hove, 2017).

The interactions between stakeholders and especially when the lay public is concerned, are backed by the Optimism bias theory, which could also be attributed to the risk perception mechanism (Sharot, 2011). Each individual naturally believes that they are less at risk of experiencing a negative event compared to others. Usually and naturally, people tend to overestimate the probability of positive events while they underestimate the probability of negative events. Even though such an approach may initially seem problematic, it has been previously recognized to promote development since it is favouring pioneers.

However, during periods of recession this mechanism can fail and lead to an increased probability of failure due to the lack of sufficient precautions against threats as well as the development of a risky behaviour (Jofre-Bonet et al., 2018). Moreover, the extent of the optimistic bias may play a role in determining its merits. In that sense, minor biases may be more helpful whereas major ones are usually prone to be more harmful (Weinstein and Klein, 1996).

Previous research suggests that media tend to enhance the effect of this bias when most of the content presented has a negative trend, with special reference to economic terms (Sanders, 2000; Soroka, 2006), especially when referring to large groups of people (Hetsroni et al., 2014). Public perception is dynamically shaped since it supplies and receives feedback from the media. Lay public, through its risk experiences and individual opinions supply the media which generate a "filtered" representation of risk events and issues. The formed perception affects all OSH determinants more or less, either clearly, like politic institutions, employees' organizations or shadowy.

Legislation played also a key role, since the huge amount of €10500 fine, dominated all labour related issues. After all, it had so many side-effects that actually cancelled its initial purpose.

National Labour Inspectorate's (NLI) position and relation with each one of the determinants, plays a key role in the network's stability. It could be argued that this is the stakeholder that can strongly control the network's links and stability since in many cases can effectively regulate or influence the corresponding inter-relations. This can be done for example by regulatory surveillance and strong enforcement, or by raising general public awareness in OSH. However, its role can further be upgraded given that mass and social media provide an excellent opportunity for sharing information about OSH culture (Habina and Trcka, 2019).

The government, through the National Labour Inspectorate or relevant Institutions /

Organizations could play an important role in using media for risk and crisis communication. In that terms, it could be argued that NLI's should also evolve like if they would like to take advantage of new technologies and new forms of communication in order to promote safety culture. In that sense, NLI's should further cooperate with OSH organizations and operate modern and effective means of communication in order to promote safety culture.

Apart from the actual impacts that the forces pushing OSH during periods of economic slowdown may have, secondary impacts could be considered as equally significant such as political and social pressure, causing social disorder, alternation of risk monitoring and regulations, changes in training, education or required qualifications of personnel among others.

Also, more emphasis should be given on prevention rather than on reaction. During recession periods, workers experience the combined effects of the intensification and precariousness of their work. Working processes relating to safety, psychosocial risks at work and ergonomics should be redefined. This could be realized not only by just steep enforcement but also by strengthening cooperation with social partners and further development of communication channels. Communication of the involved risk is crucial in raising public awareness in OSH and this can be effectively performed through either general or personalised content, exploiting the capabilities of mass and social media.

However, all these seem hard to achieve especially for the case of SMEs which are more vulnerable due to general multifaceted resources and/or OSH culture (Stamatogianni et al., 2019). In micro-enterprises it could also be argued that the mechanism of social amplification/attenuation plays a more significant role than in larger enterprises due to lack of specialized management, recourses and adequate training procedures (Walters, 2001). Finally, there is a profound necessity to consider and remove administrative and/or bureaucratic burdens that restrict freedom of doing things more effectively in SMEs (Legg et al., 2009). Both proactive regulatory and capacity-building support for social dialogue at the level of the enterprise may strengthen relations and further support OSH (Murashov and Howard, 2009; Woolfson et al., 2003). Social dialogue could be backed by the incredible force that social-media can provide.

The proposed network is actually a very complex structure to be fully described and defined in detail, because of the complexity and the trans-disciplinary nature of the actual network as well as the lack of adequate surveys to define correlations and weighs in the relations of the shareholders. The detailed demonstration of the relationships includes factors such as human psychology, sociology and crowd manipulation that should also be taken into account.

Further research and a quantitative approach are required to determine the weight of each interaction over OSH, while the weights that define the social amplification of risk have to be further investigated. Such an approach could also identify NLI's ability to alter the correlations between determinants and the corresponding weights of interactions, combined with the social perception of risk and stations through which risk is communicated.

## 5. CONCLUSIONS

A model that explains complex indirect relations between OSH determinants, like legislation, employees' organisations, employers' organisations, legislation and NLI was proposed in the past. That model attempts to investigate the communication of risk and its social amplification/attenuation at a conceptual level and explains the lack of measures during a variety of challenging situations and the reasoning behind the regarded significance that is given or not given to specific situations. Greece during the recession was used as a case-study for the application of the model. This case study identified the dominant factors that predispose and trigger or casually effect the amplification/attenuation of risk and can significantly affect the lay public. Those were found to be the media, the NLI and Legislation. Social media have the potential to support both proactive regulatory actions and capacity-building for social dialogue.

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