Safety and Health in Company Management. Towards a System Dynamics tool for training and policy making

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Abstract

The paper focuses on safety and health in the workplace and on how it can be integrated into the overall business management. A System Dynamics model is illustrated, pointing out that company's policy on safety must not be considered as isolated and uncoordinated interventions. We thought to exploit the potential of the model as a teaching tool and, therefore, to add it in the curriculum of courses on safety. In this context, the aim of the model is raising awareness of safety among decision makers and showing also the potential economic benefits. Future works for the model will include testing, improvements on the mathematical-functional side and adjustments so that it can be used for policy making too.

Keywords: occupational safety and health, OSH, training, policy analysis, policy making, system dynamics, simulation.

1. Introduction

Our research was performed within the Italian Workers' Compensation Authority and was contextualized inside a specially created working group, composed of internal professionals on safety at work and modelers from universities. It's aimed at both countering some mental models rooted in public opinion as well as helping entrepreneurs and all those working in the 'occupational safety and health' world (OSH, sometimes referred to as also 'WSH') so to understand that safety costs are not pointless. In fact, as discussed later, nowadays people still consider accidents at work, occupational diseases and work-related disorders as a result of the unavoidable productive activity.

Thus, it's not trivial acquainting companies with the competitive advantage offered by the well-being of workers and we know that programs and policies concerning health and safety in the workplace could have a big, positive impact both in lowering the frequency and severity of accidents and in improving cost-effectiveness (EU-OSHA, 2001).

In analyzing this matter, we used a System Dynamics (SD) approach in order to design a tool that shows how occupational safety and health could integrate within company management.

Our work so far has produced a qualitative model that is described in this paper and a project for its use in training courses.

2. The challenge: raising awareness of the benefits of occupational safety and health

A fundamental problem in different sectors is to make people understand that, in the face of certain costs, there may be benefits under strict economic terms.

In particular, many managers and safety professionals in companies do not have a clear

understanding of the economic benefits that may result from direct or indirect expenditures aimed to increase health and safety in the workplace.
Yet, scholars have witnessed the advantages of a good OSH (occupational safety and health) management, especially in terms of reducing costs related to accidents in the workplace: the lower the accidents occurring the fewer are the costs that companies need to face.

Most of the costs related to OSH, however, are *hidden* so that their quantification is difficult too. To give a few examples, such costs relate to worker's well-being, company's image, administrative activities resulting from the occurrence of accidents and turnover rates (US Department of Labor, 2012). These factors obviously also involve other aspects of company management, and not only OSH.
It is therefore useful to suggest a vision that may allow OSH to become part of the business management model.
In addition to the costs (and their increase or reduction), we also find very important to stress the possible higher or lower revenues related to the decisions regarding OSH. At constant prices, revenues in monetary terms depends largely on supply and demand, respectively intended as required quantities and produced quantities of a good or service.

Among the factors connected to decisions related to OSH, corporate image can affect demand, while supply is dependent on condition of plants and facilities and on productivity of human resources, due to the reduced productivity of an employee who returns to work after a serious accident or an occupational disease.
As far as the advantages of proper OSH management are concerned, there is also the reduction in absenteeism (also linked to productivity) as well as the economic incentives that in many States are granted to companies that behave in a virtuous way (EU-OSHA, 2015).
Previous studies (Cigna, 2008) have showed the usefulness of providing tools for businesses in order to understand how OSH-related investments affect company's budget, so that employers are more aware about the critical points of their production and above all they are themselves more sensitive to the improvement of the working conditions.

The main purpose for realizing our model was born out of the above consideration.
In the model we show the integration of OSH within general company management and it is intended for all companies, but has to be primarily consistent with the dynamics of small and medium-sized enterprises: we are concerned with the way OSH works, regardless of the existence of a structured OSH management system.
The model we have designed so far is more like an abstract system. Anyway, we do not exclude that, in the future, the model could be adapted to specific cases, since we acknowledged that, in previous experiences describing OSH through SD, models representing specific 'real worlds' have been particularly appreciated (Moizer, 1997).

Although our work is still in progress and could be naturally used as a policy making tool, the qualitative model has been envisaged to be included in training paths that European laws impose regarding OSH.
Both the European directives (Directive 89/391 EEC and others) and the Italian law (Legislative Decree 81/2008) include information and training among the general

protection measures and, according to a continuous learning process, they provide a mandatory training and updating of all those people involved in the management of health and safety (employer, managers, experts in risk assessment, representatives of workers' safety, workers) of company's prevention system.
We will use our models based on System Dynamics (the one we are talking about and others) for exercises, group work and individual work, in order to combine the need to use methods based on problem solving with the need to transfer managerial and organizational skills.

3. Literature review: previous studies

In order to realize our model, we based substantially on three types of experiences and studies. Particularly, we based on

- studies that illustrate the economic impact of OSH;
- research works on quantification and measurement of OSH-related phenomena;
- applications of System Dynamics to occupational safety and health.

The issue of safety in the workplace and its economic impact is particularly taken into account in some specific economic sectors, where there is a strong feeling that accidents will have a more serious downfall than in other sectors. In this context, there are studies proving that the implementation of safety actions and standardized procedures leads to a reduction of business costs (ISF, 2015). Other studies underline the leverage of informal aspects: general perception, social and cultural processes (Cooke and Rohleder, 2006; Stringfellow, 2010). In addition, the importance of subjective factors (perceived risk and acceptable risk) is pointed out (Shin et al., 2013).
There are several influential institutions that are dedicated to the safety in the workplace, but we relied primarily on publications of the European Agency for Safety and Health at Work, since the context in which we operate is the European Union.
By dealing with the economic impact of occupational safety and health, this Agency suggests that it should be highlight the cost of lost production among costs of accidents (EU-OSHA, 2014), the participation of workers which makes measures concerning OSH effective (EU-OSHA, 2012) and the well-being of workers which increases their productivity (EU-OSHA, 2000; EU-OSHA, 2004).

Besides, studies about quantification of OSH-related aspects can be found. Among them there is 'Mimosa' system (Fondazione Alma Mater, 2012), that establishes a set of indicators for health and safety at work. This criterion consists of a large group of indicators (both for efficiency and effectiveness) and algorithms used for their calculation. The 'Mimosa' indicators, therefore, have given inspiration for some variables of our model.
Moreover, a PhD thesis by Moizer (Moizer, 1999) describes an analysis that meets our needs in terms of quantification and modeling. It deals with a SD model that emphasizes the safety culture, the reporting of accidents and, above all, the management of hazards.
It clearly shows an attempt to integrate health and safety in the workplace with other business subsystems.
Few simulations and modelling development, however, have been dedicated to the integration of occupational safety and health in the business system and, among them, it is hardly spoken explicitly of financial results, even though references to the costs are made.

In general, literature about System Dynamics regarding OSH (or particular aspects related to it) displays four categories of subjects:

- the incidents analysis related to human and organizational factors;
- the deviations that lead to accidents;
- the possible self-learning resulting from the occurrence of accidents;
- the industrial disasters, the major accidents and the emergency management.

Time after time, these studies reveal non-appropriate organizational-management contexts (Swuste, 2008), lost production time affecting profit (Goh, 2012) and many other aspects. Anyway, not many insights were made to understand costs and benefits of OSH for individual companies.
Also archetypes of many of the previous models have been detected (Kontogiannis, 2012): they involve coordination of decision makers, monitoring, communicating, actual safety state and perceived safety.

If we broaden the scope beyond the SD, we can find additional literature dealing with economic benefits of OSH management and plant management. For example, some studies emphasise the importance of preventative maintenance (Gupta et al., 2001). Other research papers will be cited during the description of our model.
In all of them, the risk and occurrence of occupational diseases do not appear, if not implicitly when it is discussed of the well-being of workers.

4. The qualitative model and the run-up to the quantitative approach

So, we decided to build a model that, with a systemic view, would allow entrepreneurs and safety professionals to understand the impact of the management of OSH (occupational safety and health) in companies. Future developments will allow us to use it as a tool to help them answer some classic questions: how much does it costs for companies investing in safety? What benefits (mainly economic benefits) can derive from these investments? How can they be quantified?

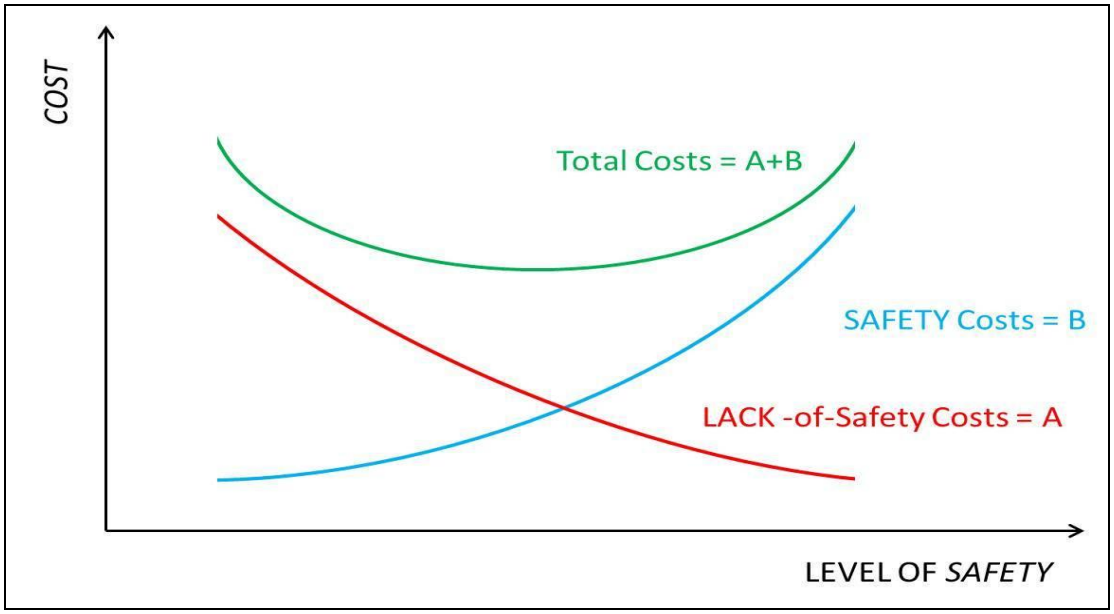

Figure 1 – Safety and costs

The original idea was to imagine there are one or more levels of safety for which the costs are minimized (see Figure 1), in fact, little or no investment in OSH leads to a low level of safety, which in turn causes high expenses (costs related to incidents and accidents, as it can be read in the next section). Investing more and more in OSH leads to a gradually increasing safety, which reduces lack-of-safety costs. Yet, normally a company should give priority to the sum of the two costs (safety costs and lack-of-safety costs).

Our work so far has produced a qualitative model and a project for its use in training courses. Nevertheless, we have already begun to carry out numerical experiments and simulations. Next steps will involve validation and testing.

4.01. Framework and definitions

The framework on which we started crafting the model is primarily based on some concepts used by the operators of prevention in the workplace.
In the OSH world, the terms 'incident' and 'accident' have a specific meaning and differ from each other. After decades of terminological disputes, the international standard OHSAS 18001 (by BSI, British Standards Institution), which deals with the management system of the safety and health of workers, defined these concepts, although they are still confused.

An incident is "*a work-related event in which an accident or ill health or fatality occurred, or could have occurred*" (BSI, 1999). While "*an accident is an incident which has given rise to injury, ill health or fatality*" and "*an incident where no injury, ill health, or fatality occurs may also be the referred to as a near-miss*". An accident that caused no accident could, however, have economic consequences (for example, when a machine malfunction happens) and is, in any case, an alarm bell giving knowledge for prevention.

It is important to understand that dealing with OSH in the company doesn't mean only to follow the legal obligations and reduce the risk of accident and illness, but it has a more relevant strategic importance. Decisions regarding health and safety in the workplace, in fact, act on different dynamic processes.
Among them, the most obvious is that the actions that reduce accidents in the workplace also reduce the cost that they could cause. But also incidents that did not result in accidents (meant as near-miss) concern the management of OSH and obviously produce costs.

The main kind of costs resulting from the occurrence of incidents and accidents include (EU-OSHA, 2014; US Department of Labor, 2012; Safety Management Group, 2015):

- production losses;
- administrative and legal costs;
- reintegration of disabled workers;
- impact on insurance premiums;
- damaged company image;
- production disturbances;
- damaged material, equipment, machinery and property.

The costs of interventions for prevention and protection counterbalance those costs.
In our systemic view, however, we consider other mechanisms that involve aspects related to OSH within the company.
Maintenance, for example, affect status of plants, which is connected with the safety in the company, and thus with the risk of incidents and accidents.
An OSH-related training, if carried out effectively, affects the safety culture that, in turn, affects the likelihood of incidents and accidents through various mechanisms.
In fact, the safety culture is the pivot on which revolve various dynamic processes that affect the company budget.

One of these processes concerns the well-being of workers, which is a term that over the years has taken on a wider meaning: from the meaning of mere absence of disease, disorder or accident has now evolved to mean good mental and psychic health and, therefore, balance and harmony, which is translated in practice with the perception of safety in the workplace.

4.02. The structuring

Our aim is to make the model potentially applicable in the everyday reality of small and medium size enterprises (SMEs), that usually do not have a certified safety management system.
Therefore we want to highlight the effects of safety and safe behavior in the company and do not rely only on the reduction or increase of the accidents rate, considering the fact that for the SMEs it is too variable and often it equals to zero, at least for what concerns fatal or serious accidents.
As a further matter, the rate of incidents (but also the rate of accidents) may not be a good indicator for the OSH company policy, since some processes and decisions take effect observable in the long term (Kontogiannis, 2012).

We also decided to:

- offer some insights about status of plants;
- clarify the impacts on production and sales;
- specify that accidents are caused by incidents;
- examine what influences the severity of accidents, dividing them into slight, serious and fatal accidents (for the origin of this classification see different parameters such as medical, insurance or employment).

In terms of economic impact, costs and benefits of OSH, we examine only those aspects that concern individual company, not the entire community.
Moreover, we thought that it is not suitable to represent feedbacks involving occupational diseases, a phenomenon that may occur after decades with respect to its causes. In fact, our goal is to show business decision makers how certain mechanisms operate, as well as the economic benefits of the proper management of occupational safety and health.

About quantification, we faced measurement problems for some variables; among them, for brevity's sake, we'll only talk about the 'safety culture' measurement in one of the next sections.

Our model is composed of 163 variables (of which 27 are stocks) and it has been divided into eight subsystems, always keeping in mind that, in explaining it to the learners, it is necessary to point out the uniqueness of the system, since the objective is to show how OSH integrates within general management of companies.

The eight subsystems are:

1. Plant Condition
2. Safety and Health
3. Incidents and Accidents
4. Organization
5. Culture, Training and Participation
6. Human Resources
7. Production
8. Budget

They are very interlinked (Figure 2) and all of the first seven affect the subsystem "Budget" and (directly or indirectly) the subsystem "Production".
However, we focused on the three subsystems that we consider central for OSH ("Safety and Health", "Incidents and Accidents" and "Culture, Training and Participation").

In this paper, we will describe only interactions and loops between the main variables.

In our summary causal diagram (Figure 3), we considered the relationships between the main aspects, grouped and colorized according to belonging to the various subsystems. We didn't include subsystems "Production" and "Budget", given that they are to be considered only as a model result at the moment. Anyway, we have already identified some feedbacks involving variables of the two subsystems: they will be examined throughout the future developments.

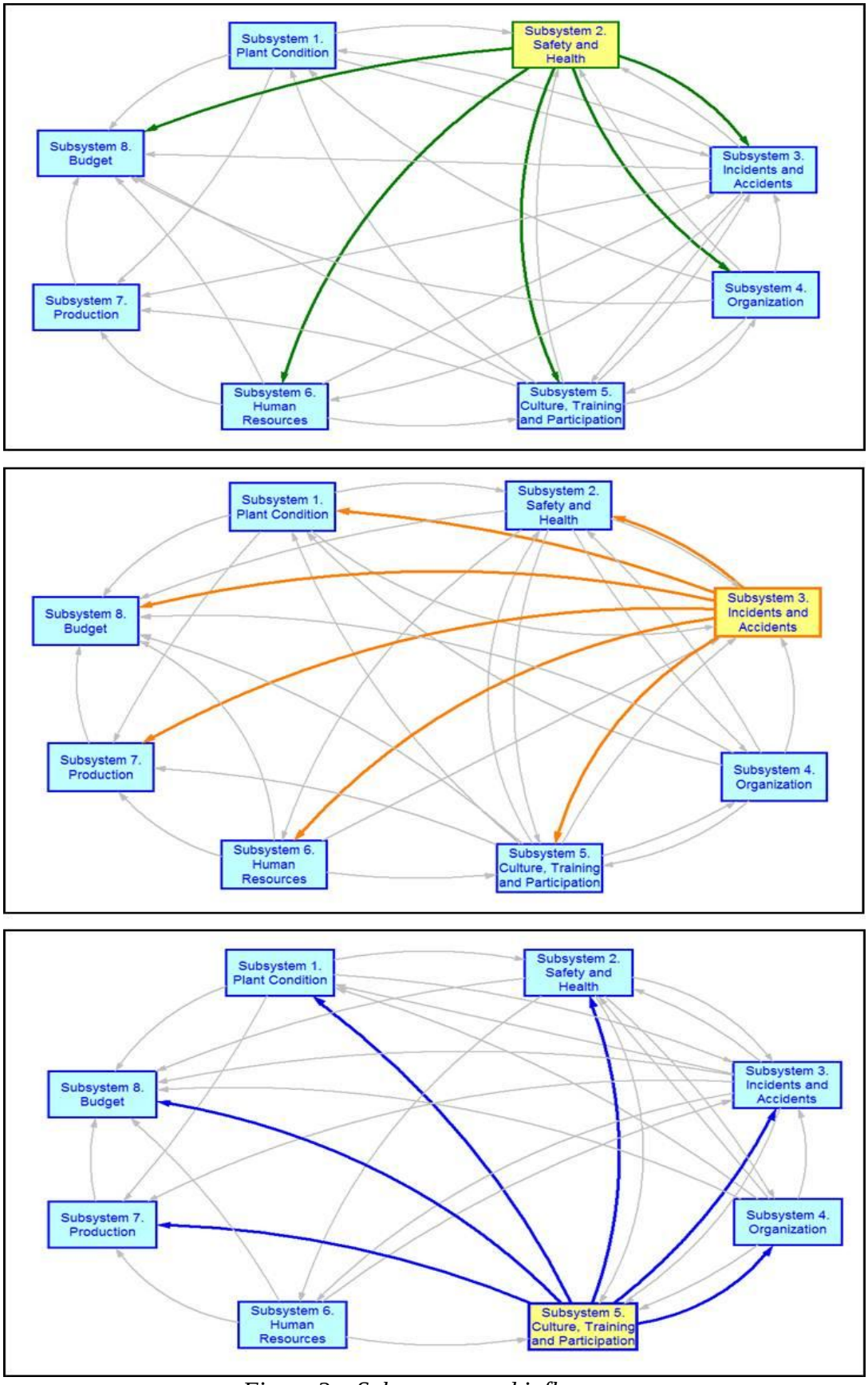

Figure 2 – Subsystems and influences

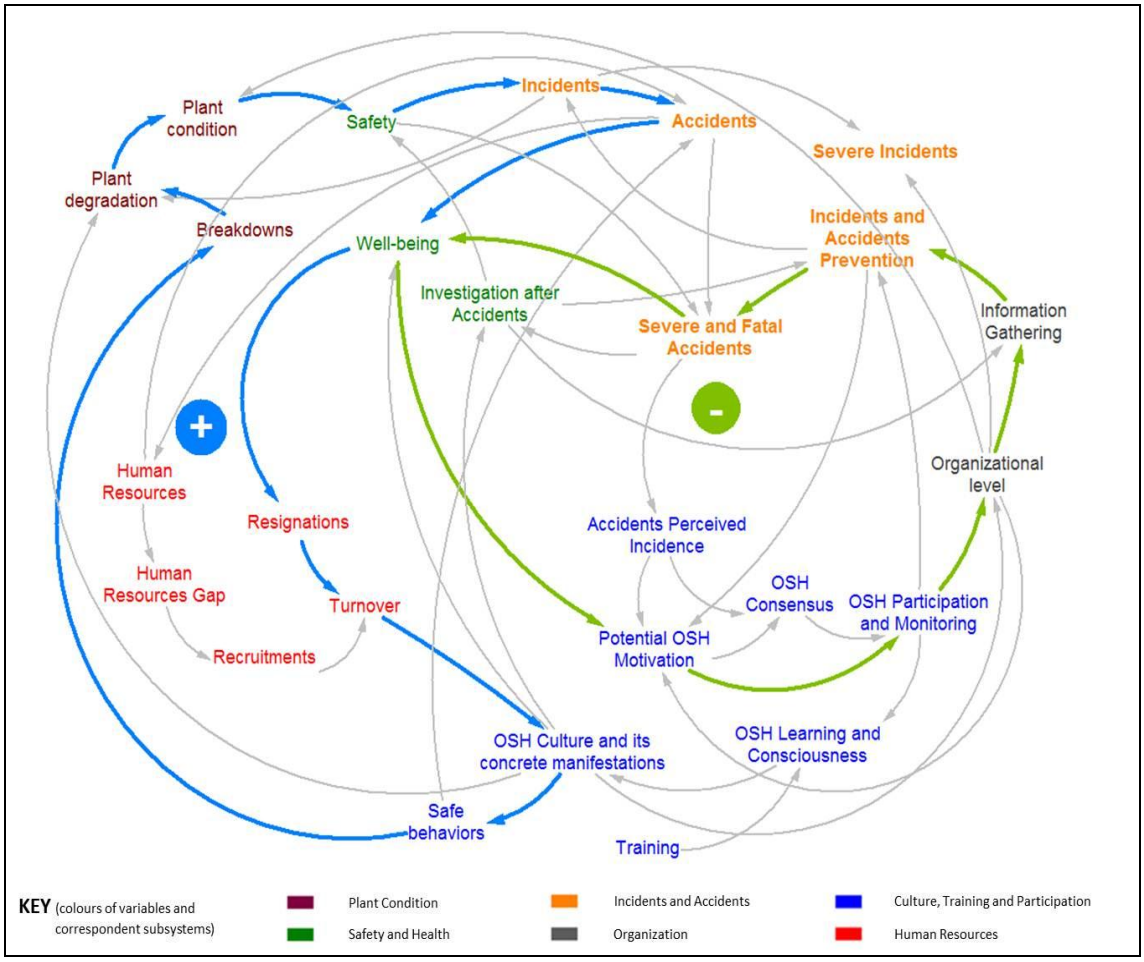

Figure 3 – Main variables and relationships

The summary scheme allows identification of some model circular processes.
Among many causal loops, we chose those that seemed to us the most characteristic.

The first circular feedback affects both safety and culture.
It is a reinforcing loop that, starting from a positive change in the level of OSH culture, reinforces the safe behavior of workers, who (in addition to reducing the number of accidents) limits failures to plant and machinery and therefore their degradation, improving general condition of plants. This leads to a better safety environment, resulting in the reduction of incidents and accidents (see section 4.01 about the difference between incidents and accidents). Fewer accidents increase the well-being of workers and reduce therefore resignations related to mental and physical conditions. The decrease of resignations implies the decline of overall turnover. This means an increase in workers' experience and it further enhances the OSH culture.

Two variables of interest of this loop are condition of plants and well-being of workers.
Regarding the first variable, it is noteworthy to consider that a smaller circular feedback that concerns it also exists: thanks to it, we can go directly from the incidents to the plant degradation, given that an incident will cause malfunctions, damage to things or interruptions in the working activity.
As far as workers' well-being is concerned, it comes into play in other circles, including

a balancing loop, which acts through motivation of workers with respect to OSH: it's inversely connected with average well-being. The loss of motivation caused by a greater well-being leads to a lower sharing and a lesser interest in OSH-related aspects.
The lower OSH participation affects the corporate organizational levels (at least those related to safety), leading to a worse information gathering and thus to a reduction of the prevention policy. The consequence leads to an increase of severe accidents and therefore a loss in well-being.
The loop also shows a counterintuitive trend regarding accidents: a decline in serious accidents would lead to a worse situation, through the explained mechanism of the lower motivation and reduction of preventive actions.
However, we should also consider that the organizational level of a company (which intervenes in the loop) has a not-so-high elasticity with respect to changes in the participation.

Besides, there are further relationships and loops involving accidents and incidents: on the psycho-social side, they refer to perception of risk of accident and consensus towards the OSH corporate policies; on the operational side, they cover the human resources.
It is to be noted that a key variable in the model is training, but it isn't involved in any loop, since it is a decision-making tool.

4.03. The model subsystems

Here we will not expand on all model variables, relationships and issues concerning quantification, but, in order to be brief, we'll quickly mention the subsystems identified and some of their aspects.
Three of the cited subsystems are seen by us as central for OSH: "Safety and Health", "Incidents and Accidents" and "Culture, Training and Participation". The latter is the core around which the effectiveness of osh actions clings.

The effect of training regarding OSH, together with its measurement, has for a long time being a topic widely debated. A European survey (EU-OSHA, 2012) would seem to suggest that the bedrock, on which the increased safety culture is based, is the active participation of workers (and in particular of their representatives) on issues related to OSH. In fact, the training will have much more effect the more there will be such an involvement.
We have expressed this idea in our model, adding both participation and training as causes of learning and awareness of OSH. Training is described in terms of 'equivalent hours', which ponder the actual training hours through other factors (programming, teachers, etc.).
Training is a powerful tool in many way, through learning, culture and safe behaviour: for instance, more trained staff leads to better plant handling, minor plant degradation, safety acquisition, greater well-being and fewer (and less severe) accidents.
Participation can also be seen from company's management point of view and, if so, its manifestation is the OSH monitoring. This, however, is influenced by the quality and quantity of communications on the subject, but especially by the accidents incidence perceived by workers.
An important aspect is also the effect that the total turnover has on OSH culture in the company (Moizer, 1999; Goh et al., 2012): when there are many new hirings and many resignations in proportion to the number of employees, it has been shown that the OSH

culture decreases due to the less average preparation and sensitivity of the workers.

In the “Safety and Health” subsystem the relevant factors are application of safety regulations, monitoring of the workplace and interventions made after the occurrence of serious accidents, by following a self-analysis or, in more structured situations, an organizational learning process (Cooke and Rohleder, 2006).
The well-being affects safety only indirectly. The concept of safety, however, is closely related to that of the overall health and the well-being of workers expresses well this relation if we consider it in the previously considered broad meaning.
A number of circumstances affect the overall well-being of the workers, beginning with the health surveillance. Then, various studies (EU-OSHA, 2000) show that the behavior of the management and the kind of controls adopted (which are some of the concrete manifestations of occupational safety and health culture) affect the well-being. Accidents in the workplace cause a well-being decrease, in terms of physical, psychological and financial discomfort to those injured and to their colleagues (EU-OSHA, 2012).

With regard to “Incidents and Accidents” subsystem, the 'Domino Theory' by Heinrich (Heinrich, 1932), with its many variants (Cooper, 2001), argues that every accident is the final result of a process that has five steps. In sequence, the theory covers the following aspects: environment, personal mistakes, unsafe behavior, incident, accident.
An intervention on any of these aspects may eradicate or reduce incidents or accidents or limit their consequences.
The model 'Infor.Mo.' (Campo et al., 2006) too states that it is a sequence of circumstances to cause an accident, but it also explicitly provides multiple causes.
We have tried to include in our model these ideas, starting from the fact that accidents result from incidents: a portion of incidents cause accidents to people and an accident can result only from an incident. Here it’s important to bear in mind the difference between incidents and accidents (see section 4.01)
There are factors acting on the amount of incidents (i.e., in practice, their frequency) and others on their severity when they happen.
The level of organization of the company, for example, affects the severity of incidents, while prevention programs act directly on their occurrence (EU-OSHA, 2000). The same prevention programs affect the share of accidents that are severe.
The severity of accidents, in addition, is determined by various aspects, including the use of personal protective equipment (PPE) and their supervision. These are measures of the level of protection that derive from the occupational safety and health culture.

Moving on to the other subsystems, from the OSH (occupational safety and health) point of view, as well as of the production side, plant condition is relevant and so is what contributes to modify it.
Plant condition is influenced, more or less indirectly, by damages, behaviour of employees, innovations and of course maintenance. The latter can be of three kinds: routine maintenance, preventative and predictive maintenance, emergency maintenance.

A survey (EU-OSHA, 2012) showed that when, inside companies, workers' representatives participate actively and there is a strong management commitment to safety, a documented policy regarding OSH (occupational safety and health) is much more likely. This means that, even if we take into account a number of constraints

(related to the social context external to the company size, the economic sector and the intrinsic rigidity), the participation of workers in the safety management and the level of OSH culture may in part change the organizational level of the company. It, in turn, determines the validity of occupational safety and health information gathering. This does not necessarily imply a real safety information system, which in many small and medium-sized enterprises would be difficult to achieve, but it implies the existence of any form of record that can be used for safety management.

To the classic system dynamics scheme that represents the stock and the flows relating to human resources of a company, in the corresponding subsystem we have added other elements closely related to the occurrence of accidents: in fact, they create temporary or permanent outflow. The 'slightly injured' and part of the 'seriously injured' constitute temporary outflows. This means that, after a certain period of time, they will fall among human resources again. However, there is a part of the injured who, together with the workers died from accident, will not return in the company.
The serious injured that come back in the workplace will have a reduced productivity and are part of a particular subset of human resources. This subset is used to calculate the 'equivalent human resources' for the purposes of business productivity and, therefore, of the actual production.

The subsystem 'Production' is to be understood as an output of the model with regard to the goods or services that the company manufactures and sells. Among other things, the subsystem doesn't include stocks and flows and the specific variables that compose it are not involved in any circular feedback.
The subsystem is deliberately underdeveloped, since our aim is only to show the effect OSH (occupational safety and health) has on company image, demand, production and sales in physical terms.
OSH culture affects competitiveness in many ways (Cooper, 2001). We have tried to express this influence through some mechanisms. First, the demand varies according to the image (reputation) of the company, which grows or decreases depending on the health-support campaigns, on the attention to social and environmental issues and, in the case of larger companies, on the adoption of codes of ethics (all of which are a direct expression of OSH culture). Then, on the supply side, plant condition and other factors related to the productivity of workers are involved: we see the relation between safety and productivity through the equivalent human resources, which in turn depends on accidents and injuries.
It should be said, however, that others (EU-OSHA, 2000; US Department of Labour, 2012; Safety Management Group, 2015) have documented that, where the well-being of workers grows, productivity increases. In our model this relation is present, but it circulates through some variables and it's not direct.

The subsystem 'Budget' is the 'scoreboard' for OSH management. Revenues and expenditures that we examine (and, therefore, the budget itself) are only those determined by the variables internal to the model, which are directly or indirectly related to OSH. It is, in essence, to evaluate the budget fluctuations related to occupational safety and health, all other things being equal.
Revenues depend simply on sales, while the outputs are the sum of all costs in the other subsystems.
The 'Budget' subsystem too does not include variables involved in circular structures.

5. Considerations and future developments

Our project began with the idea of providing operational tools that could assist companies in the management of health and safety in the workplace.
One of our goals was to help small and medium size companies to integrate OSH (occupational safety and health) in the overall business management, and to avoid that it remained an aspect isolated from the context, or that it was considered an unnecessary bureaucracy.
Indeed, usually the levels of safety management decrease as a consequence of the size of companies. However, a favorable environments can be promoted so that even the smallest businesses would be able and willing to adopt organic measures of preventions.
In addition, we wanted to show how OSH can lead to a competitive advantage, underlining the mechanisms that make this possible.

Our study identified the dynamics related to the integration of occupational safety and health in business management. Through these dynamics, we can see that, even when company implements measures to improve OSH, if these measures are isolated and uncoordinated, their effectiveness is limited by other factors intrinsic to the structure.
An example can be seen in the activation of a procedure for investigation after accidents, that leads to better prevention and thus to minor incidents and accidents. Hence, this procedure will have a limit consisting of its well-functioning: the more it works well, less accidents occur and less investigation are possible, making its effectiveness to weaken.
Very similar feedbacks concerning other aspects can be highlighted by the model.

Interventions to improve OSH must then be coordinated and supported by other actions.
In our model we introduced a set of validated indicators for the effectiveness of safety management; thus we succeeded in bringing a static performance metric in our dynamic framework.
These characteristics lead our model to be used as a training tool and, in particular, be included within the mandatory training programs for employers and business managers: in fact, the European and Italian regulations requires these programs are able to transfer management and organizational skills and to include methods based on problem solving. Obviously, the use of our model in the training already indicates that it is a tool for helping companies. Still, we believe it can be used in the policy-making context of companies.

Anyway, in order to achieve this, several steps are still needed.
First of all, the model must be tested during those courses, verifying its effectiveness for learning. Therefore we might propose a real business game that could quantify the economic effects of certain interventions regarding OSH.
From the technical point of view, we should refine the model, optimizing equations, parameters and initial conditions, considering to cooperate with some companies: this is the reason why the present paper does not indicate the results of the simulations, or the current mathematical-functional aspects of the model.
We could also turn some stocks (plant condition and human resources) into aging chains, since they could be more suitable to the model structuring and purposes.
The collaboration with companies would allow us to assess the adequacy of the time period set for the simulation (3-5 years).

Our intention is also to consider further relationships in the model, without weighing it down too much, so that we can obtain feedbacks on the system (and in particular on issues related to OSH) that include the economic and financial variables, deliberately now described in a very simplified way, given the scope of the model.
The model represents a generic company at strategic level: this means that it is an abstract model, not an operational one, which can helps companies and decision-makers to understand cause-effect mechanisms and feedbacks which occur regardless of company size and the economic sector.

However, it will be appropriate to adapt the model on specific 'real worlds', both in terms of data and in terms of relationships and factors to consider.
This will enable us to move towards company policy making, but also (considering the mandatory courses on safety) to meet the law in a more stringent way. In fact the law governing the courses provides that they should be designed and realized by considering the specificities of the workers they are addressed to.
In this sense, we interpret our model as a possible 'good practice'.

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