

**Background research paper**

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# **The link between productivity and health and safety at work**

## **Hesapro**

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**Hesapro partners**

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**April 2013**

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## FOREWORD

This background research study which is also available on [www.hesapro.org](http://www.hesapro.org), has been produced as an output of an EU funded LdV partnership project '*Health and Safety at Work in relation with Productivity*' –HESAPRO- in collaboration with the project partners under coordination of Ministry of Science, Industry and Technology of Turkey Directorate General for Productivity. Project Partners can be enumerated as PREVENT - Institute for Occupational Safety and Health, Belgium; ANACT - French National Agency for the Improvement of Working Conditions, France; SLCP - Slovak Productivity Centre, Slovakia; TTS - Work Efficiency Institute, Finland and Çankaya University, Turkey.

The aim of this research is to study the link between productivity and health and safety. Not disregarding the fact that, first of all, protection of human life is a matter of human rights issue, selected data are given related to occupational accidents and diseases on both macro and enterprise levels. The research stresses the importance of implementing health and safety interventions at workplace. These interventions have impact not only on enterprise level but also on individual and social levels. The report points out that interventions support company goals and performance and thus health and safety interventions at workplace can be considered as a key to business excellence. Not only the literature survey but also the case studies representing partner countries of HESAPRO Project provided at the end of this report support the idea that health and safety management programmes have positive impacts on productivity.

The other important concepts studied in this report are well being, workplace development and work organisation. A new model is introduced by this report integrating productivity and well-being into one concept: workplace development. The model shows that work organisation has a significant impact on the relationship between health and safety at work and productivity. The model is based on integrating work organisation and health and safety programmes. Occupational safety and health programmes together with the other organizational projects contribute to the workplace development. The case studies summarized in Chapter 5 also illustrate the benefits of OSH programmes, participatory approaches involving employees in organizational projects and workplace development approaches involving organizational measures and programmes. Case studies from partner countries support the idea that OSH measures and programmes impact company performance.

The report ends with a recommendation that companies should be encouraged to integrate OSH programmes/measures to work organisation and health and safety issues should be considered to be crucial for workplace development as a way to performance and productivity.

We wish this report contributes to the studies in this area and to the perception of employers' about the importance of implementing health and safety management programmes. In addition we desire both researchers and also training providers working on the related concepts benefit from this study.



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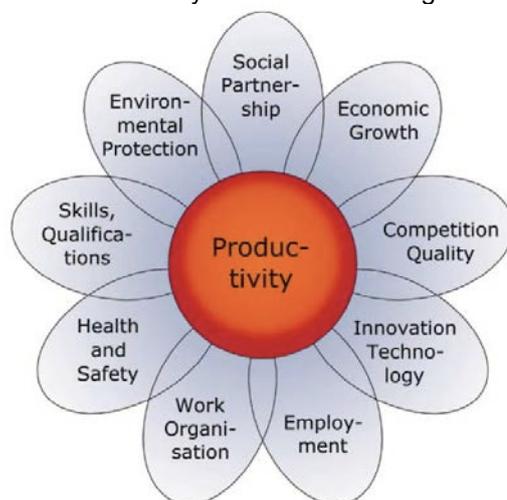
## 1. Introduction

This paper looks into the links between productivity and health and safety at work. The International Labour Organization (ILO) estimated that, globally, about 2.2 million people die every year from occupational accidents and diseases, while some 270 million suffer serious non-fatal injuries and another 160 million fall ill for shorter or longer periods from work-related causes. This represents an enormous toll of suffering for workers and their families. Furthermore, the ILO estimated that the total costs of such accidents and ill health amount to approximately 4 percent of the world's GDP. Other organisations have estimated that about 5 percent of the burden of diseases and injury in established market economies can be attributed to work, which corresponds roughly to the ILO's figure. It is also worth mentioning a recent study by the European Commission which estimates that the costs of occupational accidents in the EU15 (15 European Union Member States) in the year 2000 was €55 billion a year (ILO, 2006).

These figures represent a considerable loss that has a negative impact on economic growth and puts a burden on society. Thus preventing occupational accidents and diseases should make economic sense for society as well as being good business practice for companies. The EU Community strategy 2007-2012 on health and safety at work improving quality and productivity at work states that *guaranteeing quality and productivity at work can play in promoting economic growth and employment*. This is due to the fact that the lack of effective protection to ensure health and safety at work can result in absenteeism, in the wake of workplace accidents and occupational illnesses, and can lead to permanent occupational disability. This not only has a considerable human dimension but also has a major negative impact on the economy. The enormous economic costs of problems associated with health and safety at work inhibits economic growth and affects the competitiveness of businesses in the EU. A considerable share of these costs also falls upon social security systems and public finances.

This statement derived from the EU strategy on health and safety at work confirms the interaction between health and safety at work on the one hand and productivity on the other hand. Investing in health and safety at work has to be looked upon as an investment rather than a cost. The European Association for National Productivity Centres ([www.eanpc.org](http://www.eanpc.org)) issued a memorandum in 2005, The High Road to Wealth, looking upon productivity from the perspective of value creation. Several factors contribute to this value creation (figure 1). Health and safety at work is one of these factors. Human capital is a prerequisite for a future-oriented development. This is why companies increasingly need qualified, motivated and efficient workers who are able and willing to contribute actively to technical and organisational innovations. Healthy workers working in healthy working conditions are thus an important precondition for the enterprise to work smoothly and productively.

Figure 1 - Productivity and its contributing factors



Source: The Finnish Work Environment Fund (EANPC, 2005)

## 2. Definitions

For the purpose of the paper, definitions are given of health and safety at work and of productivity.

### 2.1. Health and safety at work

According to the International Labour Organization (ILO) and the World Health Organization (WHO), health and safety at work is aimed at:

- the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations;
- the prevention among workers of leaving work due to health problems caused by their working conditions;
- the protection of workers in their employment from risks resulting from factors adverse to health;
- the placing and maintenance of the worker in an occupational environment adapted to his or her physiological and psychological capabilities;
- and, to summarise, the adaptation of work to the person and of each person to their job.

Health and safety is given a wide definition in the European Union context, going beyond the avoidance of accidents and prevention of disease to include all aspects of the worker's well-being. The competence of the EU to intervene in the field of health and safety at work is defined by the provision in Article 153 of the European Treaty, which authorises the Council to adopt, by means of directives, minimum requirements as regards 'improvement in particular of the working environment to protect workers' health and safety' (a provision originating in the Single European Act 1986). The significance of this broad scope of 'health and safety' is immense, as it underpins the potential of EU health and safety policy to prescribe minimum standards to protect all aspects of the worker's well-being. (<http://www.eurofound.europa.eu/areas/industrialrelations/dictionary/definitions/healthandsafety.htm>).

### 2.2. Productivity

The Memorandum of EANPC defines productivity in a broad sense. Productivity *contributes to value creation or added value by making continuously better use of resources to contribute to growth, innovation and employment; it is not seen just as a statistical ratio.*

*Productivity is an expression of how efficiently and effectively goods and services (i.e. goods and services which are demanded by users) are being produced. Thus, its key characteristics are that it is expressed in physical or economic units - in quantities or values (money) - based on measurements which are made at different levels: on the level of the economy overall, that of a sector or branch of the economy, that of the enterprise and its individual plants/units and that of individuals (EANPC, 2005).*

Moreover, productivity is not only measured by quantity and quality, but also by the benefit the customer obtains. This is especially true for the service industry.

The concept of productivity is also increasingly linked with quality – of output, input and the process itself. An element of key importance is the quality of workforce, its management and its working conditions and it has been generally recognized that improving quality of working life and rising productivity do tend to go hand in hand.

Generally speaking, productivity could be considered as a comprehensive measure of how organizations satisfy the following criteria (Prokopenko, 1987):

- Objectives: The degree to which they are achieved.
- Efficiency: How effectively the resources are used. (Doing things right)
- Effectiveness: What is achieved compared with what is possible. (Doing the right things)
- Comparability: How productivity performance is recorded over time.

Mental, physical and social conditions of workplaces and the adequacy of health and safety measures are the main indicators of quality of working life. In this context, to include health and safety measures to the list of productivity improving techniques at work places is gaining popularity in recent years. Similarly, as shown in Figure 1, the Productivity Flower of EANPC consists of contributing factors which have considerable effects on the productivity levels of work places. These factors determine the approaches and techniques for improving productivity.

### 2.3. Global performance

As a finding of a study (Lamm, Massey, Perry, 2006) there is increasing and compelling evidence that providing a healthy and safe working environment has the potential to increase labour productivity and in turn increase business profits. Lamm et al (2006) also refer to the argument of some commentators that productivity gains are often at the expense of workers' health and safety. Businesses typically strive to become more productive and in doing so are driving their workers to work longer, harder and with higher utilization often in extremely hazardous conditions, and only implement health and safety measures to keep compensation costs down (Massey and Perry, 2006; Mayhew and Quinlan, 1999; Dorman 2000; Quinlan, 2001). As noted by Lamm et al (2006), James (2006) observes that while exposure to risks associated with machinery and manual labour are being reduced, other risks related to the increase in labour productivity are on the rise. Lamm et al (2006) also suggest efforts to increase productivity through occupational safety and health can have contradictory results and point out the gaps in literature that while there is evidence that occupational injuries and illnesses impact on productivity losses, it is not clear whether or not reducing injuries and illnesses will automatically influence productivity gains.

Findings of another study (De Greef and Van den Broek, 2004a) demonstrate that health and safety measures have a positive impact not only on safety and health performance, but also on company productivity. However, identifying and quantifying these effects is not always straightforward. In addition, although experience shows that in many cases proof of profitability can be given, it might be rather difficult in a certain number of cases to develop solid evidence. The authors also state although the literature survey was fairly limited, research findings support the existence of an important link between a good working environment and the performance of a company. Thus, the quality of a working environment has a strong influence on productivity and profitability. The study also suggests that poor OSH performance can lead to a competitive disadvantage impairing the firm's status among stakeholders. This is a motivating factor to company management to invest in OSH. The findings of the literature survey (De Greef and Van den Broek, 2004a) were also supported by the collection of case studies. By making the link between health and safety and the performance of the company, the case studies demonstrate that OSH should no longer be seen as purely a cost, but also as an instrument to improve the overall performance of a company, meaning that OSH should be an integral parameter in general management. Therefore, investment in OSH becomes profitable. Investment of 1 euro in well-being at work produces 3 - 7 euros return (Yrjänheikki, 2011).

### 3. Economic impact of occupational accidents and diseases

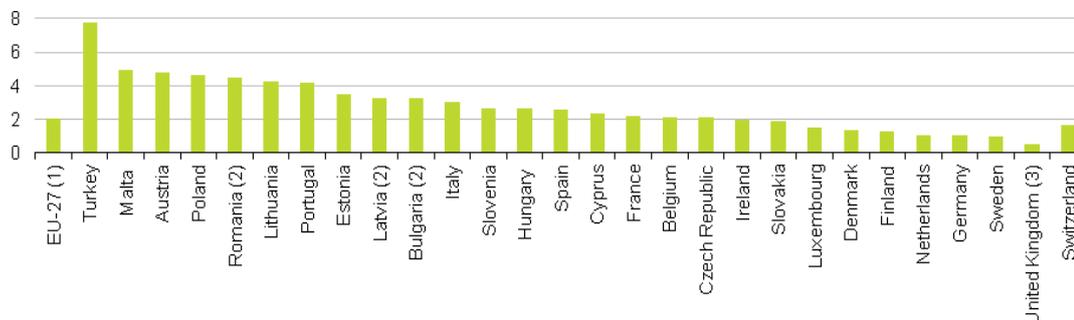
Data show that work-related risks have significant effects on workforce and productivity. The effects are considered on macro and enterprise levels.

#### 3.1. Data on work-related risks

Almost 25 % of workers in Europe (EU27) say that their health or safety is at risk because of their work. This is shown by the results of the fifth European Working Conditions Survey (EWCS 2010). These data from the European survey of working conditions on perceived exposure to work-related risks are confirmed by the statistics on health related outcomes such as accidents at work and work-related diseases. According to a Eurostat study (2010), 3.2 % of the workforce in the EU-27 reported an accident at work in the past 12 months (Labour Force Survey (LFS) data from 2007). This means that approximately 6.9 million workers were confronted with an accident at work.

The European Statistics on Accidents at Work (ESAW) show a more positive evolution for the occurrence of non-fatal accidents with more than three days of sick leave. These figures declined from 4 % in 1999 to 2.9 % in 2007 (EU-15). Also fatal accidents decreased from 5,275 in 1999 to 3,580 fatalities in 2007. More detailed data on fatal accidents is provided with the graphic below.

Figure 2: Number of fatal accidents at work, European Countries 2009. (incidence rates per 100,000 persons employed)



- (1) Estimates exclude Greece and Northern Ireland;
- (2) Data include a certain level of under-reporting
- (3) Great Britain (hence, excluding Northern Ireland); also excludes road traffic accidents at work

Source: Eurostat 2009 Yearbook, Health and Safety Statistics and Turkish Social Security Inst., 2009 Statistical Yearbook.

Accidents at work bring about a vast number of sick leave days. 73.4 % of the accidents at work result in a sick leave of at least one day and 22 % in at least one month. In total, it was estimated that accidents at work caused 83 million calendar days of sick leave in 2007 (Eurostat, 2010, LFS data). According to the data registered in ESAW every year more than 100,000 accidents at work lead to permanent incapacity to work.

For work-related health problems, the figures are even more staggering. No less than 8.6 % of the workers in the EU-27 reported a work-related health problem in the past 12 months (LFS data from 2007). This corresponds to approximately 23 million persons. Musculoskeletal problems were most often reported as the main work-related health problem (60 %), followed by stress, depression or anxiety (14%).

62 % of the persons with a work-related health problem stayed at least one day in the past 12 months at home; 22 % of the persons at least one month. It was estimated that work-related health problems resulted in minimally 367 million calendar days of sick leave in 2007. This does not yet include 1.4 million persons that expect never to work again because of their work-related health problem.

Moreover the occurrence of work-related health problems is rising. Data showed that the occurrence of work-related health problems increased from 4.7 % in 1999 to 7.1 % in 2007 in nine European countries. However, the data for these nine countries suggest that the severity of the health problems declined since the figures on sick leave decreased between 1999 and 2007 (Eurostat, 2010).

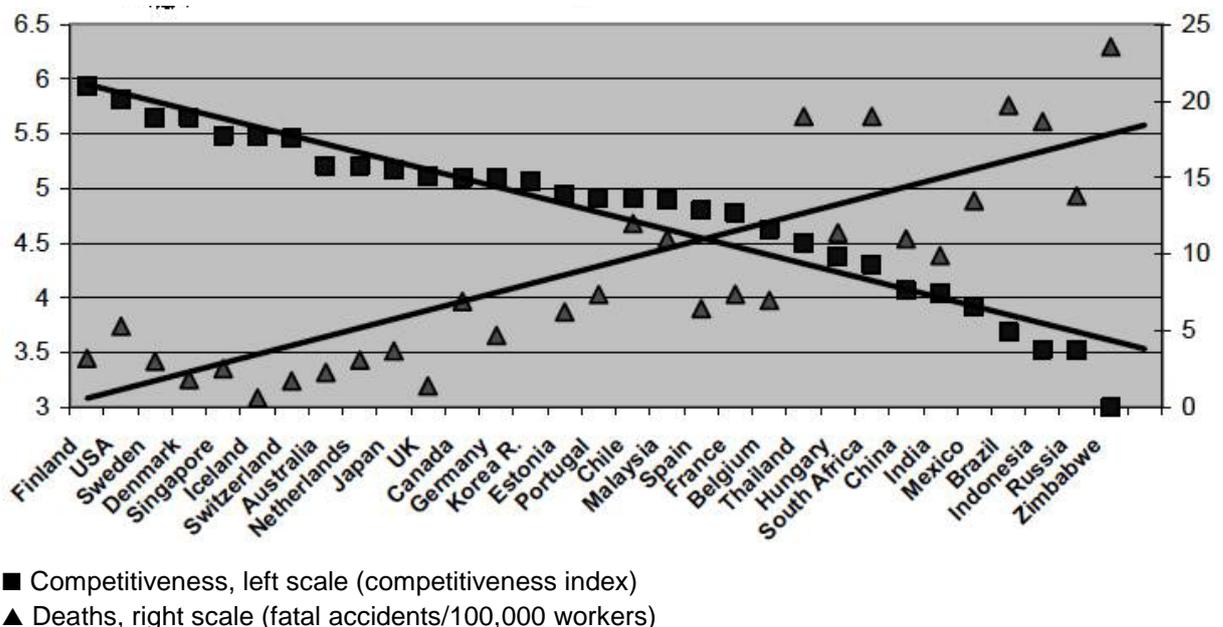
More data are available via

- Eurofound, results from ESWC 2010, <http://www.eurofound.europa.eu/surveys/smt/ewcs/results.htm>
- Eurostat, statistics on health and safety at work, [http://epp.eurostat.ec.europa.eu/portal/page/portal/health/health\\_safety\\_work](http://epp.eurostat.ec.europa.eu/portal/page/portal/health/health_safety_work)

### 3.2. The impact on macro level

Accidents at work and work-related ill-health place an important burden on global economy and hinder economic growth. The negative impact of outcomes of work-related problems is shown in the graph below (Figure 3). The graph demonstrates the strong correlation between national competitiveness and the national incidence rates of occupational accidents. The graph is based on data from the World Economic Forum and the Lausanne International Institute for Management Development (IMD), coupled with data from the ILO (ILO, 2006). Countries with the best records on accidents at work are the most competitive leading to the conclusion that poor working conditions put a heavy burden on the economy and hinder economic growth.

Figure 3 - Correlation between competitiveness and the incidence of accidents at work



Source: ILO, 2006

The major impact of work-related problems is clearly demonstrated by figures on economic losses. The ILO has estimated that the total costs of such accidents and ill-health amount to approximately 4 per cent of the world's GDP (ILO, 2006). The fact that the cost of accidents at work and work-related ill-

health accounts for 2 to 4 % of the GDP can be found in a several estimates on the economic impact. According to the European Agency for Safety and Health at Work, the costs to Member States of all work-related accidents and diseases range from 2.6 % to 3.8 % of GDP (European Agency, 1997).

A study from the Netherlands confirms this figure estimating the multiple costs incurred by workplace accidents, illnesses and long-term absence in the Netherlands at 3 % of total GDP. The estimate was based on factors such as absenteeism, occupational disability, work-related accidents, costs of risk prevention, safety at work and its enforcement and health care (Koningsveld, 2004).

According to a calculation made at the Finnish Ministry of Social Affairs and Health, the costs of work-related diseases and occupational accidents were nearly 3 billion € in 2000 or nearly 2 % of GDP. Almost half of the losses were caused by reduced production input resulting from disability. The average cost of an accident causing at least 3 days of absence was 6,900 € (Bjurström, 2009).

A Spanish study found a lower estimate. The Trade Union Confederation of Workers' Commissions (CC.OO) examined the economic costs of industrial accidents and occupational illnesses in Spain. The study puts the annual total cost at almost €12 billion, equivalent to 1.72 % of GDP. The estimate was based on the costs of lost working days and the costs of social security cover (Esluga, 2004).

These figures show the potential benefit on the macro level if these cases of accidents at work and work-related ill-health could have been prevented. Preventing occupational accidents and diseases should make economic sense for society as well as being good business practice for companies.

### 3.3. The impact on enterprise level

According to an ILO training module with the title Introduction to Health and Safety at Work (ILO, 2013), work-related accidents or diseases are very costly and can have many serious direct and indirect effects and outcomes on both the lives of workers, their families and also on the financial status of the enterprises. The costs to employers of occupational accidents or illnesses can be enormous. For employers, some of the costs can be enumerated as:

- payment for work not performed;
- medical and compensation payments;
- repair or replacement of damaged machinery and equipment;
- reduction or a temporary halt in production;
- increased training expenses and administration, insurance & pension costs;
- possible reduction in the quality of work;
- negative effect on morale in other workers.

In addition to these costs, one should also consider costs related to the following:

- the injured/ill worker has to be replaced;
- a new worker has to be trained and given time to adjust;
- it takes time before the new worker is producing at the rate of the original worker;
- time must be devoted to obligatory investigations, to the writing of reports and filling out of forms;
- accidents often arouse the concern of fellow workers and influence labour relations in a negative way;
- poor health and safety conditions in the workplace can also result in poor public relations.

The consequences of occupational safety and health hazards, such as accidents and ill health, do not only encompass the company but also individual workers/victims as well as their families and social networks. Society as a whole has to deal with these negative outcomes of the production process (see Table 1).

This means that the motives for developing an effective occupational safety and health policy stem from social as well as from economic objectives. If one considers health and safety to be a basic right for every worker, the economic goals have to be embedded in the social policy at company and society level. Table demonstrates the complexity of the costs of occupational accidents and diseases for the individual employee, for the company and for society as a whole.

Table 1 - Consequences of accidents at work and work-related ill-health for different groups

	<b>Non tangible</b>	<b>More or less tangible</b>
<b>Victim</b>	Pain and suffering Moral and psychological suffering (especially in the case of a permanent disability) Lowered self-esteem, self confidence Strain on relationships Lifestyle changes	Loss of salary and premiums Reduction of professional capacity Medical costs Loss of time (medical treatments)
<b>Family and friends</b>	Moral and psychological suffering Medical and family burden Strain on relationships	Financial loss Extra costs
<b>Colleagues</b>	Psychological and physical distress Worry or panic (in case of serious or frequent accidents/cases of ill-health)	Loss of time and possibly also of premiums Increase of workload Training of temporary workers
<b>Company</b>	Presenteeism (employees are present at work but limited in their job performance by physical and/or mental problems) Company image Working relations and social climate	Internal audit Absenteeism Decrease of the production Damages to the equipment, material Quality losses Training of new staff Technical disturbances Organisational difficulties Increase of production costs Increase of the insurance premium or reduction of the discount Early retirement Administration costs Legal sanctions
<b>Society</b>	Reduction of the human labour potential Reduction of the quality of life	Loss of production Increase of social security costs Medical treatment and rehabilitation costs Early retirement Decrease of the standard of living

Source: De Greef et al, 2011

For the purpose of demonstrating the productivity benefits of OSH at enterprise level, the United Kingdom's Health and Safety Executive (HSE), collected the experience of over 20 major enterprises in Business of health and safety where workers were consulted at all stages of the initiatives. For instance, a large paper company, in concert with its workers' trade unions, invested £175,000 in management consultancy and training related to OSH and soon reaped a benefit of £500,000 (ILO, 2006).

As Kirsten (2010) noted, the Survey "Working Well: A Global Survey of Health Promotion and Workplace Wellness Strategies" (Buck Consultants, 2009) which was responded by more than 10 million respondents from 45 different countries found that the most important strategic objective for offering a health promotion in most regions of the world is improving productivity and presenteeism. Reducing health care costs remains the top objective for US employers while improving workforce morale and engagement is a priority for Asian employers. Another finding of the study is that only 22 % of surveyed organizations report measuring financial outcomes of their health promotion programs. This goes in line with the number of employers from 33 % to 47 % who do not know the impact of their health promotion initiatives on their organization's strategic objectives.

## 4. A key to business excellence: Workplace development

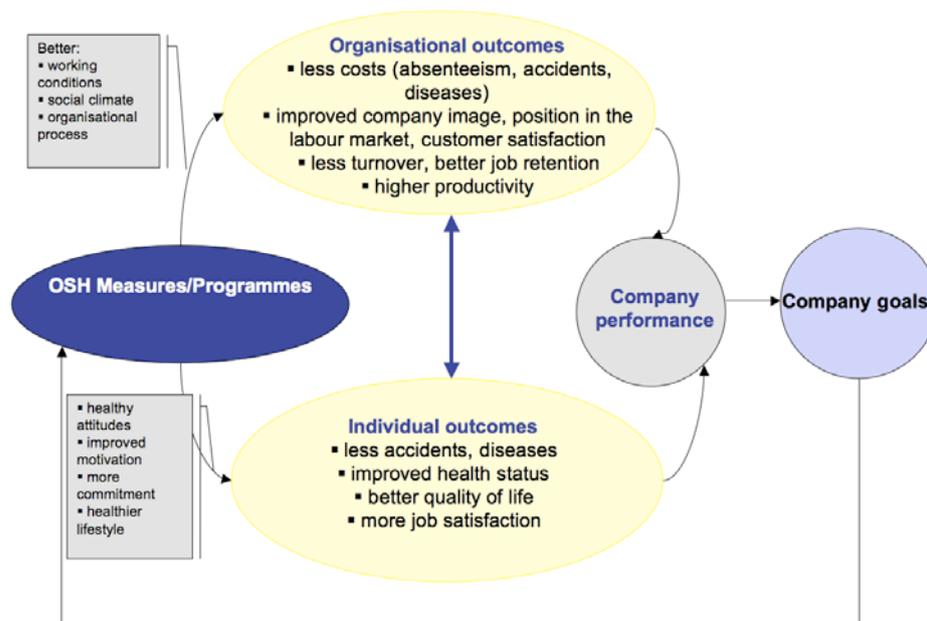
As can be derived from the data and discussions above, integrating health and safety in company strategy and policy can be seen as a key to business excellence and success, allowing businesses to contribute to sustainable growth enhancing welfare and innovation. This idea is being discussed in this section which is also introducing an approach on how to integrate OSH in company strategy and policy.

### 4.1. OSH and company goals and performance

Figure 4 offers an insight into the relationship between occupational safety and health (OSH) prevention measures and programmes, the process and the outcomes. Occupational safety and health programmes generate effects and outcomes that influence company performance positively and which contribute to the company goals. In order to have an effective influence on company performance, the occupational safety and health programme must be aligned with the company goals.

In this respect, it forms part of the business strategy and also the continuous improvement circle that drives a company towards excellence. Outcomes are noticeable on organisational level since occupational safety and health measures lead to change by creating better working conditions, improving the social climate and the organisational process. The results are positive organisational outcomes such as less cost, improved company image, less staff turnover and higher productivity. On an individual level, an occupational safety and health programme leads to greater health awareness (healthier lifestyle) and an improved motivation and commitment. These changes result in several outcomes such as more job satisfaction. Moreover the framework shows that important additional effects and outcomes can be obtained since there is a clear link between the various outcomes and between the organisational and individual level.

Figure 4- Outcomes of OSH measures and programmes in relation with company performance and company goals



Source: De Greef and Van den Broek, 2004b

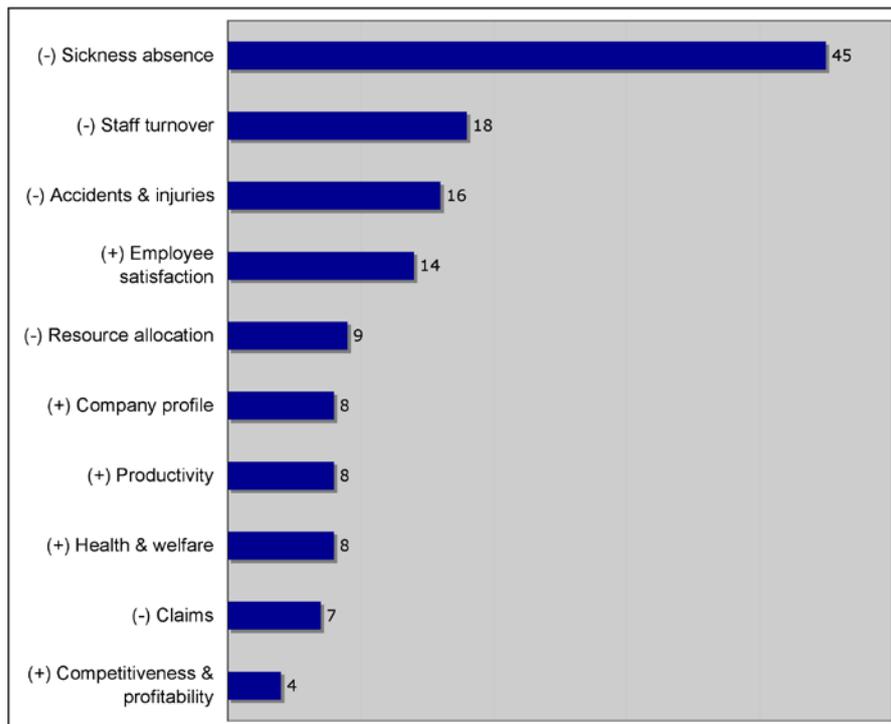
The business arguments that can be derived from this excellence model are underpinned by many studies (e.g. Kuusela, 1997; Aldana, 2001; Barling et al., 2003; De Greef and Van den Broek, 2004b, Ervasti and Elo, 2006; Sockoll et al., 2009; Pot and Koningsveld, 2009b) demonstrating the positive effects of investing in health and safety at work. Such investments result in business benefits as:

- a reduction in sickness and absenteeism rates;
- a reduction in staff turnover;
- an increase in productivity;
- an improvement in the image presented to the customers;
- keeping qualified personnel in the long term.

The IGA Report (Initiative Gesundheit & Arbeit - Health and Work Initiative) (Sockoll et al., 2009) presents the results of a comprehensive search of literature into the effectiveness and economic benefits of workplace health promotion and prevention. The study found that in the field of preventive interventions aiming at the individual, there is strong evidence that exercise programs may increase the physical activity of employees and prevent musculoskeletal disorders. For organisational and environmental interventions, the evidence-base is much weaker than for individual-focused prevention approaches but this is mostly due to the lack of reliable studies (Sockoll et al., 2009).

Often studies focus on intermediate benefits such as absenteeism, but it is clear that these benefits are linked with quantifiable financial outcomes that directly affect the bottom line. A reduction in absenteeism rates will lower personnel costs. Health and safety as well as economic efficiency thus go hand in hand. Demonstrating such intermediate business benefits such as lower accident and absenteeism rates is essential to show the impact on quantifiable financial outcomes and link occupational safety and health to economic performance. Evidence from 55 UK case studies (PriceWaterhouseCoopers, 2008) show that occupational safety and health programmes result in financial benefits, either through cost savings (e.g. less sickness absence) or additional revenue generation (e.g. higher productivity), as a consequence of the improvement in a wide range of intermediate business measures (Figure 5).

Figure 5 – Positive (+) and Negative (-) Effects (both effects are beneficiary) attributed to workplace health promotion programmes in the UK (scale = number of case studies, n=55)



Source:

PriceWaterhouseCoopers, 2008

There is less evidence available from studies investigating the business benefits based on thorough economic assessment methods. Verbeek et al. (2009) reviewed 26 studies on occupational safety and health interventions to assess if health and productivity arguments make a good business case. Most of the studies were ex-post cases. In seven studies the profitability of the intervention was negative but for the other studies the payback period of the intervention was less than half a year.

The relationship between health and safety programmes and company goals and performance can be looked at from a financial perspective which acts as a driver for implementing OSH programmes. Below summarized evidence from case studies also show that OSH interventions led to positive economic outcomes. In the measurement of some OSH problems the measurement of presenteeism as well as absenteeism has become a new approach in the OSH field. Successful programme implementation in big companies and SMEs help demonstrate the relationship between OSH and company performance. These titles are being discussed below.

### ***Financial costs as a driver for change***

Miller and Haslam (2008) state that prevention costs per se are a relatively low proportion of the total cost impact of employee health in many cases. They refer to a study of Loeppke et al (2007) which found that health related productivity costs were four times greater than medical costs and that the full cost of poor health is driven by different health conditions than those driving medical and pharmacy costs alone. They add however, that there is evidence that many organisations do not quantify the cost of employee ill health and refer to a national survey which concluded that most organisations found it difficult to estimate the cost impact of injuries and none of the organisations studied had attempted to measure the full cost impact of employee ill health. They explain that there are two main factors motivate organisations to initiate health and safety improvements: the fear of loss of corporate credibility; and a belief that it is necessary and morally correct to comply with health and safety regulations. They also refer to a study of Antonelli et al (2006) which advocates use of cost benefit analysis to change business attitudes towards health and safety, showing it is not simply a compliance or staff welfare issue and conclude more empirical business cases that meet the needs of decision-makers are more likely to attract investment into employee health activities.

### ***An example based on an ergonomic intervention***

An ergonomic study was conducted (Yeow and Sen, 2003) to improve the workstations for electrical tests in a printed circuit assembly (PCA) factory in an industrially developing country (IDC). The interventions implemented were simple and inexpensive (less than US\$ 1,100) but resulted in many benefits. Aside from the results like the average savings in yearly rejection cost (of US\$ 574,560), reduction in rejection rate, increase in monthly revenue, quality and enhancement in customer satisfaction, the results related to improvements in working conditions, productivity and occupational health and safety were also obtained.

### ***Case studies***

The fact that health and safety at work is positively linked with productivity can also be found through looking at case studies. Examples from companies that investing in better working conditions and an improvement of the quality of working life, show positive results.

The benOSH study (De Greef et al., 2009) assessed the costs of 56 prevention projects in companies of different sizes and sectors. The case studies show the positive results of investing in occupational safety and health. The prevention measures were evaluated using a cost-benefit analysis. A cost-benefit analysis is a method that is commonly used on corporate level to make an economic evaluation of the costs and consequences of an action. By conducting a cost-benefit analysis, in which all costs are balanced against future benefits, an economic assessment of the health and safety investment can be made. The majority of the case studies have clearly demonstrated that health and safety interventions lead to positive economic indicators. Investments with positive net present values, internal rates of return outweighing the discount rate and payback periods shorter than three years clearly indicate that occupational safety and health is not only ethically and legally necessary, but also economically sound. Especially when several measures are brought together into a comprehensive programme, a positive return can be expected.

### ***Absenteeism and presenteeism***

Many studies base their findings on the measurement of absenteeism but this indicator is in fact incomplete, if not distorted, at least in certain contexts. This is why recent studies also take presenteeism into account.

Employers have become interested in the measurement of presenteeism which will enable them to be informed about to what degree employees are present at work but limited in their job performance by physical and mental problems. Although objective measures of productivity are difficult in a service-oriented and knowledge-intensive working world, a number of validated self report surveys have been developed; Work Limitations Questionnaire (WLQ), the Stanford Presenteeism Scale (SPS) and the Health and Work Performance Questionnaire (HPQ). Using the WLQ, the authors showed significant linear trends of changed productivity associated with changes in health risks, i.e. productivity loss increased as health risks increased and productivity loss decreased as health risks decreased (Kirsten, 2010).

As Kirsten noted (2010) a finding of a study by Hertz, Unger and McDonald et al (2004) a link existed between obesity and work limitations and cardiovascular risk factors. Obese workers experience higher rates of work limitations compared to normal weight workers. These types of findings led companies develop strategies to address the presenteeism challenge and measure the impact. Dow Chemical made a study in this regard and found that the cost associated with presenteeism greatly exceeded the combined costs of absenteeism and medical treatment combined. The Harvard Business Review (2004) estimates that lost productivity due to presenteeism is on average 7.5 times greater than losses due to absenteeism and three times than expenses on direct medical costs.

### ***Successful programmes in big companies and SMEs***

Goetzel and Ozminskowski (2008) state that many employers associate poor health with reduced employee performance, safety, and morale. The organizational costs of workers in poor health, and those with behavioral risk factors, include high medical, disability, and workers' compensation expenses; elevated absenteeism and employee turnover; and decreased productivity at work (often referred to as presenteeism). In addition, one worker's poor health may negatively affect the performance of others who work with him or her. They add the results in the literature suggest that Workplace Health Promotion (WHP) Programmes can increase employees' health and productivity, when properly designed. They describe the characteristics of effective programs including their ability to assess the need for services, attract participants, use behavioural theory as a foundation, incorporate multiple ways to reach people, and make efforts to measure program impact. The authors also refer to the barriers like the perception of employers related to Workplace Health Promotion Programmes being luxurious, and their belief that the programmes during working hours may distract workers in their daily duties and negatively impact worker productivity. Small businesses complain they lack the resources necessary to implement such programmes as they do not enjoy the advantages of larger firms. The authors also state if WHP programs are implemented in accordance with the behavioural theory, implemented effectively using evidence-based principles, and measured accurately, they are more likely to improve workers' health and performance. They also conclude that successfully integrated programmes and safety initiatives can also help ensure the safety of work environments, leading to healthier and more productive employees and that more research is needed on the optimal design and cost of interventions and this research has to be disseminated for exploitation by the employers.

"As it is now recognized that methods developed specifically for large firms cannot be transferred to smaller firms" (Champoux and Brun, 2001) the policies should be developed taking the size and the sectors of the enterprises into account. A finding of the study by them suggests that "interventions with small firms, including provision of support to OHS management, be aimed at specific sub groups of small firms, based on their practices, their owner-managers' perceptions and their management styles as well as on certain organizational characteristics".

## 4.2. Participatory approach

The idea that we develop in this section is based on the fact that the design of a H & S program alone is not enough. The participation of employees in the organizational design is as important as the design itself which will have lasting effects on the overall performance. OSH programmes can only contribute in a sustainable manner to the company goals and performance if the programmes are well-designed and based on a participatory approach.

The Memorandum of EANPC defines productivity in a broad sense. Productivity contributes to value creation or added value by making continuously better use of resources to contribute to growth, innovation and employment; it is not seen just as a statistical ratio. Productivity is an expression of how efficiently and effectively goods and services (i.e. goods and services which are demanded by users) are being produced. Thus, its key characteristics are that it is expressed in physical or economic units - in quantities or values (money) - based on measurements which are made at different levels: on the level of the economy overall, that of a sector or branch of the economy, that of the enterprise and its individual plants/units and that of individuals (EANPC, 2005).

Efficiency or performance is usually viewed in terms of "productivity". Yet this notion is to be handled with care. Performance cannot be solely based on labour productivity, often understood as the execution speed or as the ability to ensure a high production volume at the lowest price. The total factor productivity must be taken into account. In some situations, increasing the cost of labour can result in increased capital efficiency. For example, the reliability of a machine park can bring a higher level of performance than purely the speed of execution. One could also consider aspects such as the quality of service, or the ability of a firm to diversify its supply, etc. These are all characteristics of a high level of business performance in today's economic environment.

Another comment concerns the relationship between the individual and the collective interest. This relationship is paradoxical. Performance is inherently collective-based: it depends on the functioning of cohesive work teams. But at the same time, performance is based on the subjective involvement of individuals in the workplace. Beyond the managerial modes, a very deep movement of individualization of job involvement is in question. This involvement is a powerful driver of business performance.

A paradox is that most of the real drivers of performance are not measured. Indeed, in today's economy performance is no more measured as producing a maximum of goods in a minimum of time. Before, when this was the case, management indicators were relatively simple to implement, which is no longer appropriate. In today's economy, two factors determine the performance. Firstly, the effectiveness depends on the ability of a group to deal with the event, to react to what was not foreseen in theory. Secondly, the efficiency is not related to resources but to quality and communicative relationship. Nevertheless, it is particularly difficult to measure the contribution of these two concepts in relation to performance. Although it is tempting and safe to stick to strictly quantitative and easily measurable indicators (as working time, for example) the risk is to measure the performance and effectiveness on an incorrect basis.

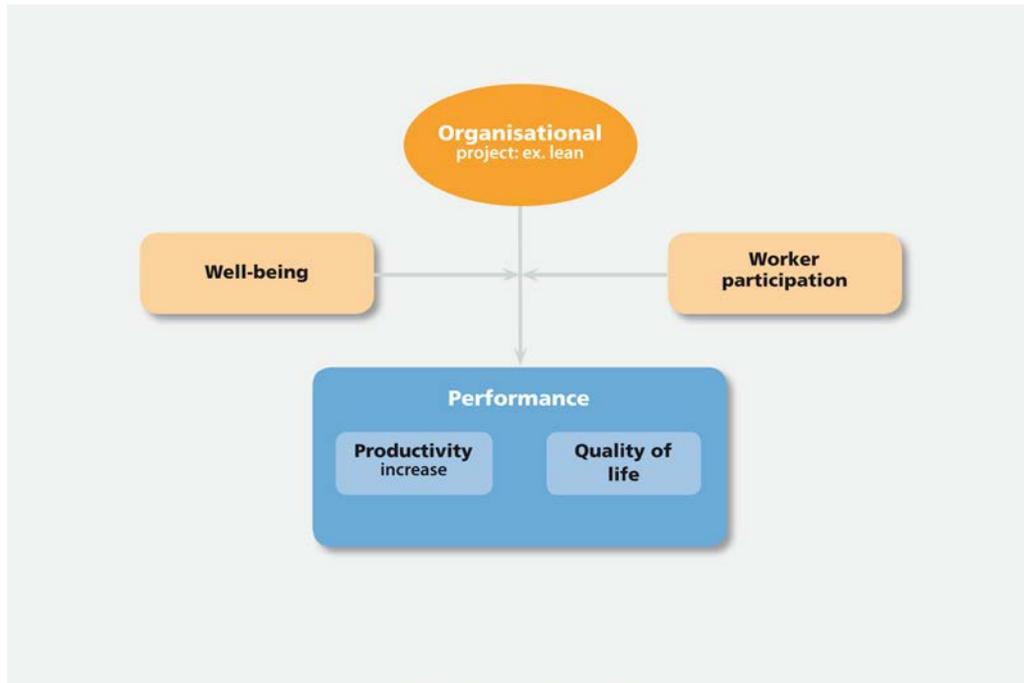
It is necessary to develop the debate in the company about the real drivers of performance. If the effectiveness of a company is increasingly depending on communication, the most appropriate means to achieve the objectives as well as the objectives themselves need to be discussed.

Empirical evidence is found of the economic advantages of adopting an adequate safety management system (Fernández-Muñiz et al., 2009). The results of the study show that a highly developed management system increases the safety performance, as well as the competitiveness and the economic-financial performance. The safety performance was related to outcomes such as injuries, material damage, absenteeism. Competitiveness performance links with elements such as the quality of products and services, customer satisfaction, reputation and image. Also, the more advanced the OSH management system, the more satisfied these organisations are with their economic and financial indicators.

The most promising results can be obtained if business performance integrates with OSH interventions. This is demonstrated by a review of eighteen cases by Koningsveld. The cases originate from TNO projects (TNO Work and Employment, NL) aiming at improving prevention and performance. The

evaluations of the qualitative and financial effects are part of the projects. The reviewed cases are diverse, ranging from ergonomically designed hand tools, via assembly work, and an integral health program, to job enrichment. Seven of the eighteen cases show a return on investment in less than 1 year, while two others have a return on investment of a little more than one year (Pot and Koningsveld, 2009).

Figure 6 - Participatory approach involving employees in organizational projects can anticipate performance risk (health and productivity)



Source: Hesapro, 2012

A survey conducted in more than 1,000 businesses, on various "working models" can update the link between performance and corporate health (Lapointe et al., 2006). This research shows the existence of four models of organizational involvement:

- The traditional model (centralization);
- The partnership model (trade union involvement in the field of work organization and change);
- The participative model (involving employees without partnership with trade unions on issues of modernization);
- The organizational democracy model (participatory and partnership at a time).

The model of democracy is characterized by a very high participation rate (twice the average) in organizational decisions, and also by a very high intensity of organizational innovation (just in time, ISO, SMED, tool management and planning production, multi skills, teamwork and group problem solving). As an indication, in this model unions have access to the financial statements of 60 % of cases (compared to the traditional model was 17 %). Similarly, in 90 % of firms in this model we find a joint quality or continuous improvement group.

In addition, the model of democracy is, according to employers, the most successful economically: with regard to turnover, quality (superior to other models) and productivity. The traditional model shows little wins on the criterion of "production costs".

Finally, in terms of social performance work intensification, skills, autonomy, and health (each of these criteria are measured using several indicators), the model of democracy is also the most effective. Indeed, if this is the model that shows the largest intensification of work over the past years, this is also where health problems decreased mostly. The solution of the paradox is to be sought in the other two

indicators: self-reliance and skills have also increased and may explain the attenuation of the intensification of work. This thinking is similar to Karasek's hypothesis. Karasek's (1979) job demands-control model is one of the most widely studied models of occupational stress (de Lange, Taris, Kompier, Houtman, & Bongers, 2003). The key idea behind the job demands-control model is that control buffers the impact of job demands on strain and can help enhance employees' job satisfaction with the opportunity to engage in challenging tasks and learn new skills (Karasek, 1979).

### 4.3. Workplace development approach

As stated in the previous section, in order to have an effective influence on company performance, the occupational safety and health programme must be aligned with the company goals.

The approach forms part of the business strategy and of the continuous improvement circle that drives a company towards excellence. Outcomes are noticeable on organisational level and on an individual level (Figure 4).

Many studies and good practices exist showing the links between health and safety at work (or well-being at work) and productivity. However, in practice, even though there is overwhelming evidence of the economic benefits of occupational safety and health, this does not necessarily result in an increase of preventive or health promoting measures in workplaces. Therefore, it could be an interesting approach to integrate productivity and well-being into one concept: workplace development.

The work organisation has a significant impact on the relationship between health and productivity. It is indeed the work organisation that effects the corporate decisions on efficiency and health of employees.

Since the 80's, efforts have been concentrated on the redesign of organizations and production processes through technological modernization (ERP, DMS, Intranet, etc.), organizational innovations (Lean, ISO, just in time, etc.), the transformation of structures (reduction of hierarchy, matrix, fusion between back and front office, etc.) and managerial innovation (reporting, management by objectives, customer focus, etc.). Meanwhile, developments in the information and communications technology changed our way of communicating and working: we do not communicate by e-mail as we do face to face; we do not seek information on the Internet the same way as we do in a catalogue; a virtual marketplace is different from face to face business; we do not work the same way with a paper file than in an interactive situation with telephone script on screen and computerized customer file.

The change in management practices - technical and organizational - affects directly the performance and introduces a new area of workforce mobilization with flexibility demands, more "subjective" commitment, a renewal of skills, etc.

At the macro level, the strong increase of these processes in the industrial sector in the last twenty years is associated with high productivity growth and a sharp decrease in jobs. However a direct causality between these factors should be avoided. On a micro level, these processes renew the forms of labour, becoming more heterogeneous, since it is necessary to adapt to specific customer requests and integrate multiple objectives and constraints (cost, quality, time, etc.). The result is that work organization has a coordination function between the market and the employee who needs to manage the demand of the customer and his workload.

The organizational innovations having consequences on working conditions and health does not necessarily mean that innovation is causing an intensification of work. On the contrary, research indicates that companies that innovate the most, i.e. those who adopt, abandon, recycle these processes at a faster rate than others or more intense, are also those that are more sustainable. The most sustainable companies are those that decentralize the most and reduce the hierarchy more strongly than others. Suggesting that innovation leads to autonomy and / or accountability is conducive to organizational learning. Under certain conditions, organizational change may improve working conditions and guarantee the continuity for the company.

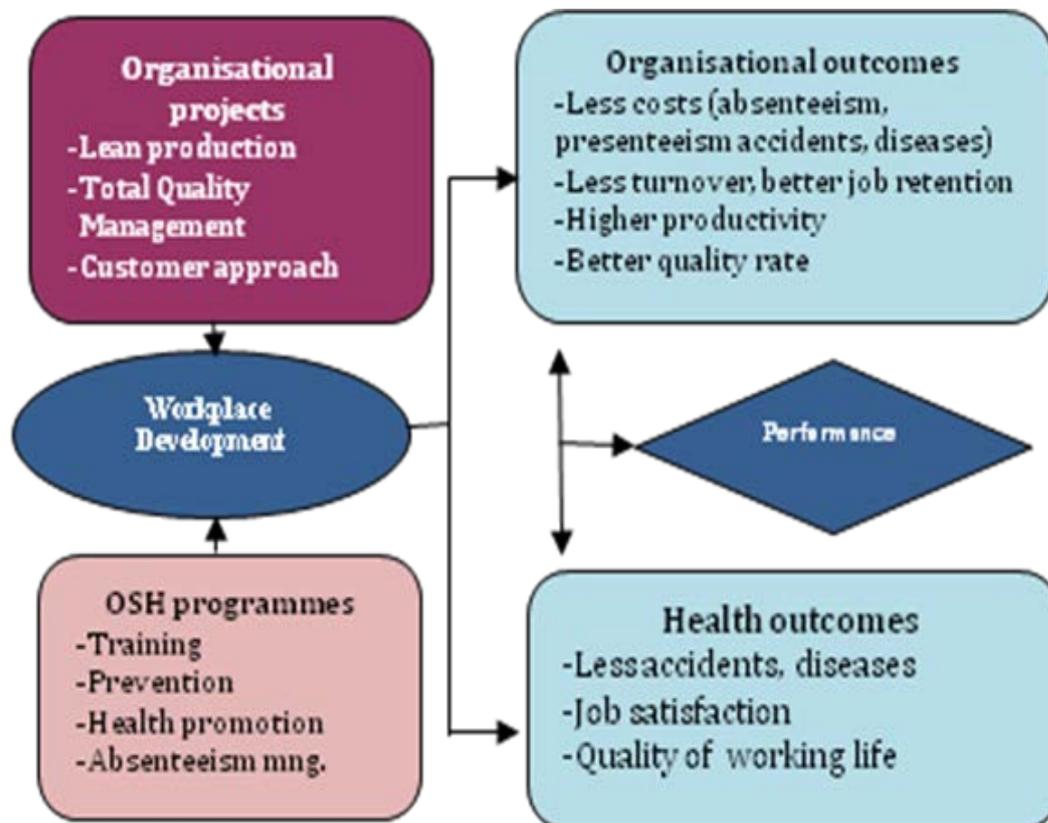
Workplace development is considering the relationship between performance, health and work organization. Workplace development is a complex concept that is not just simply a quantitative expression (amount of production, amount of served customers, amount of time spent at work). It has

several interrelated dimensions, such as the subjectivity of individuals, the patterns of work organization, the potential for mutual help and collective regulations, etc. Interventions in workplace development start with an update of its various components: the wellbeing of employees, performance and work organization.

A descriptive model must be proposed that incorporates the complexity of the different parameters that are involved. A collective approach involving the entrepreneur, management and group of employees should support this effort. The challenge of this approach is high: it is acceptable to perform work, which is satisfying, while balancing between performance goals and improvement of working conditions.

The excellence model offers an insight into the relationship between occupational safety and health measures and programmes, the process and the outcomes. Occupational safety and health programmes generate effects and outcomes that influence company performance positively and which contribute to the company goals. Outcomes are noticeable on both organisational (less costs, improved company image, less job turnover and higher productivity) and individual level (healthier lifestyle, improved motivation and commitment).

Figure 7 - Workplace development: integrating work organisation and OSH programmes



Source: Hesapro, based on De Greef and Van den Broek, 2004b

## 5. Good practice cases

The good practice cases that are described in the HESAPRO project are examples that illustrate the excellence model described in chapter 4. They illustrate the benefits of OSH programmes, participatory approaches involving employees in organizational projects and workplace development approaches involving organizational measures and programmes.

Each of the cases is shortly identified in this chapter, and a link is provided to the full text of the case on the HESAPRO website ([www.hesapro.org](http://www.hesapro.org)). An overview of the cases is provided together with the effects that can be associated with each of the OSH interventions at the end of this chapter.

### ▪ **Improvement of Occupational Health and Safety Conditions (Turkey)**

The aim of ISGIP Project “*Improvement of Occupational Health and Safety Conditions at Workplaces in Turkey*” is to improve the health and safety conditions of workers at work, and improve awareness on health and safety issues. In order to fulfil this aim the basic activities performed were introducing an occupational health and safety management system (OSH-MS) at some selected SMEs functioning in construction, mining and metal sectors to help them improve working conditions. As a result occupational accidents were prevented as much as possible and risks were reduced. Health and safety conditions and the capacity of health and safety professionals were upgraded; guides on related sectors have been developed and published; moreover some SMEs stated their labour productivity increased.

### ▪ **Safety Toolbox Talks at Türk Tractor and Agricultural Machinery Corporation (Turkey)**

The method “Safety Toolbox Talks” which has been used since the beginning of 2012 at Türk Tractor and Agricultural Machinery Corporation, producer of tractors and motors in Turkey, has been very effective on the training of the workers. Prior to the application of this method, other international solutions in the field of occupational health and safety issues were examined and “SafetyToolboxTalks” method was selected by the Company, because of the ease of implementation and the positive effects. The main purpose of the method is to improve the workers’ awareness on health and safety issues and give practical information in the field rather than theoretical knowledge. Some of the topics covered in training are as follows; awareness of occupational safety, the importance of using personal protective equipment, emergency evacuation plans, warning signs etc. The method is implemented for only 5 minutes before each shift starts and the results show that the accident frequency rate decreased by 14.5 %, and the workplace accident severity rate decreased by 16 % in 2012 compared to the preceding year. This result has a positive impact on OHS conditions at the factory and thus, these improvements also have a positive impact on labour productivity.

### ▪ **Toward Safer Traffic through Continuous Education and Lifelong Learning of Driving Instructors (Turkey)**

Traffic accidents cause moral and material damages. Because of traffic accidents, beyond financial losses, loss of life and a possible disability cause a lot of destruction for many people. In addition to the moral damages, traffic accidents lead to financial losses such as cars which become unusable, loss of labor and time, hospital charges, etc. These consequences clearly affect productivity at work (via temporary or permanent absenteeism) and economy in general (via additional workload for government offices, insurance system, repair shops etc.).

The aim of the project was to understand the job of Driving Instructors (DIs) in Turkey and Greece, characteristics and needs of DIs, good/bad aspects of being a DI, and determining job related things needed to be developed. Also, information on driver behaviours, skills, stress and burnout reactions of the DIs were collected throughout the study. The results of the study was aimed to be used to improve the job and working conditions of DIs through the development of a DI specific training program. Several scales have been used to collect data: A demographic information form was used as well as the Driving School Questionnaire – DSQ, , the Ministry of Education Questionnaire – MEQ on attitudes towards the courses opened by the Ministry of Education, job stress questionnaire, job burnout questionnaire, the Driver Skill Inventory (DSI); Driver Behaviour Questionnaire (DBQ) with the Positive Driver Behaviours Questionnaire. In addition, the participants were asked to answer two job satisfaction items (monetary and non-material satisfaction), and four open-ended questions about their profession.

Human factor is the main factor for most of the road traffic accidents according to various analyses. The main reason of traffic accidents is the unsafe and unpredictable attitudes of drivers who have poor driving skills. To improve and learn safe driving skills and to assimilate safe driver attitudes, driving education is very important. Traffic safety can be achieved by better driving skills, and careful and responsible attitudes of drivers. This can be achieved by giving a more intense and eligible training to the DIs, who in return will educate and train drivers. This will result in increased productivity at work and in economy. (Sürücü Eğitimcileri Sayfası, 2012)

#### ▪ **New World of Work (Belgium)**

The New World of Work is an innovative way for people to work together. Everything is based on the extended possibilities that the latest technology brings with it. Among other things, working hours and the working environment are made more flexible, enabling employees to do their work at the times when they are most productive and in settings in which they work most efficiently. The principles of the New World of Work are based on people, profit and planet: a better use of everyone's talent and a work/life balance that is suited to today's world; a better operating results achieved by motivated and engaged employees due to a better balance between work and private life; a reduction in rush-hour traffic and the promotion of alternative ways of collaborating.

Eight companies from various branches in the public and private sectors formed a coalition in 2011 for new world of work and the studies are expected continue at least 3 years. Thus, the concept is suitable for application in all sectors, public and private.

#### ▪ **Microsoft application of New World of Work (Belgium)**

The "New World of Work (NWOW)" is an alternative way of working and collaborating, supported by the latest technology. The company introduced the NWOW by focusing on technology, a flexible working environment and responsibility for all employees.

The company gives employees the responsibility to decide how, where and when they work, within the overall parameters agreed by the company and the employees. The responsibilities are on a lower level in the organization, leadership is a task for all employees. Because data is digitally available at all times and wherever they are, employees can work at any time and in any place.

Since the introduction of the New World of Work at Microsoft in Belgium, highly tangible results have been measured in terms of productivity, cost savings, office space and mobility.

#### ▪ **Human work digital design using to minimize the health impacts of the introduction of new production (Slovakia)**

The aim of the project was to provide businesses with a proactive tool for fast and effective changes in production systems with emphasis on increasing the productivity and health of workers. Procedure-based digital tools have been used to shorten the start time of the new production, thus saving money and at the same time in a virtual environment to identify and eliminate risk and allow the creation of systems that minimize harm to employees' improper implementation of work. The main requirements were related to productivity, quality processes, ergonomics and safety of the work.

The study was performed in a production unit of washing machines, with the involvement of CEIT joint stock company, Digital Factory Division (CEIT, a.s.) and the Slovak Ergonomic Association (SES). The project was financed with the benefits of productivity for the enterprise.

#### ▪ **The use of modern tools of ergonomics for identification and elimination of health risks in the process of mechanical engineering production (Slovakia)**

The aim of the project was to identify activities at risk, which affect the ergonomics and occupational health and to propose alternative solutions that eliminate the identified risks and that at the same time have a positive impact on productivity.

Analyses were focused on the following areas:

- evaluation of working postures in relation to anthropometry and workplace layout;
- evaluation of physical activity related to the handling of loads;
- evaluation of physical activity related to the cyclical repetition of activities;

- complex evaluation of the working environment.

The study was performed in a production unit of screws, with the involvement of CEIT joint stock company, Digital Factory Division (CEIT, a.s.) and the Slovak Ergonomic Association (SES). The project was financed by the enterprise.

- **Lean production at Scania (France)**

Truck manufacturer Scania was confronted with an increasing rate of musculoskeletal disorders (MSD), apparently related to the increase of aging workers at the company and the implementation of a lean production system. Interviews with operators, technicians, hierarchy, the health and safety manager, the production manager were organised. The interview was about working methods, working conditions, lean methods and productivity. A tool was developed allowing benchmarking for work transformation and organizational change. Results show that MSD can be reduced without affecting productivity and work efficiency.

- **Improving quality and reducing absenteeism at Inoplast (France)**

A manufacturing company, subcontractor in the automotive sector, with 1200 employees was confronted with a high rate of absenteeism. A participatory project, involving worker representatives and managers has been installed, in order to analyse the contributing factors and propose long-term solutions. Data has been analysed with regard to quality, competencies, work organisation and absenteeism figures. An action plan has been proposed to improve the quality of the products and to reduce the absenteeism rate.

- **Kesko management model for well-being at work (Finland)**

Kesko, a large company in the trading sector, introduced a management model for wellbeing at work. The aim was to support employees' wellbeing and the implementation of Kesko's business and HR objectives:

- to manage wellbeing at work and measure its results
- to integrate wellbeing management into everyday's activities
- to care for employees throughout their careers.

The development of wellbeing at work is monitored with the help of an index that measures the working capacity of employees and work load based on statements. According to the survey the state of wellbeing at Kesko is at a good average level, the lifestyle and health results of employees (80 % felt that their ability to work was good) above the average when compared with other Finnish reference figures. The survey revealed a clear connection between supervisors' management of wellbeing and employees' motivation and productivity. Compared to 2009 the salary costs were in 2011 3 % lower because of reduced sickness absence.

- **Vehicle simulators as a learning environment (Finland)**

Education with vehicle simulators is a safe and environmentally friendly way to practice unusual situations and circumstances in traffic. Although capital costs of full simulators are fairly high, simulation offers economically reasonable way to give versatile education. It makes it possible to practice safely situations that hardly are possible to carry out in reality. The driver could get very detailed information of his/her drive afterwards and analyze his/her performance with the simulator trainer.

Operating costs could be clearly lower with a simulator than with a real vehicle if there are enough operating hours. An effective, well-organized and executed one-hour education with a vehicle simulator corresponds even to four-hour education in traffic with a real vehicle. According to international studies operating costs can be reduced even by 40 % compared to the traditional education. With simulators well-trained drivers are safe which means that the number of accidents decreases 18–43 % with simulator education according to international studies. Research increasingly indicates that simulator training can contribute to the improvement in novice drivers of higher order skills like hazard perception.

Table 2 - Assessment of the case studies' contributions to the efficiency level of enterprises by some related parameters

N°	Title of the Case Study	Parameters							
		Has the intervention resulted in a higher average skill level of the work force?	Has the intervention resulted in changes in the quantity of product or service for the given amount of time?	Has the intervention resulted in changes in the quality of products or service?	Have the savings (energy, raw material, time, traffic reduction, ecological footprint etc.) increased?	Has the absenteeism rate decreased?	Has any motivation increase observed?	Has the accident frequency rate decreased?	Has the accident severity rate decreased?
1	ISGİP Project "Improvement of OSH Conditions at Workplaces in Turkey	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured
2	Safety Toolbox Talks at Turk Tractor and Agricultural Machinery Corporation	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes, number of OSH suggestions per person increased 67,8 % compared to previous year	Yes, 19,5 % compared to the previous year	Yes, 14, % compared to the previous year
3	Toward Safer Traffic in Turkey through Continuous Education and Lifelong Learning of Driving Instructors	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured
4	New World of Work, Belgium	<i>Not applicable</i>	<i>Not applicable</i>	<i>Not applicable</i>	<i>Not applicable</i>	<i>Not applicable</i>	<i>Not applicable</i>	<i>Not applicable</i>	<i>Not applicable</i>
5	Microsoft, Belgium	<i>Not applicable</i>	Yes but not measured	Yes but not measured	Yes, time savings, office cost drop with 25%, savings of 92 million euros in 2011	Yes but not measured	Yes, the company has been voted as the 'Greatest Place to Work' worldwide	<i>Not applicable</i>	<i>Not applicable</i>
6	Human Work Digital Design Using To Minimize The Health Impacts Of The Introduction Of New Production, Slovakia	Yes but not measured	Yes 22,2 % (900 pcs before, 1100 pcs after)	Yes but not measured	No	Yes but not measured	Yes (increase productivity of work)	Yes but not measured	Yes but not measured
7	The Use of Modern Tools of Erg. for ident. and elim. of Health Risks in the Process of Mech. Eng. Production, Slovakia	No	No	Yes but not measured	No	Yes but not measured	Yes but not measured	Yes but not measured	Yes but not measured

8	Lean production at Scania, France	<i>Not applicable</i>	Yes but not measured	Yes but not measured	<i>Not applicable</i>	<i>Not applicable</i>	Yes but not measured	<i>Not applicable</i>	<i>Not applicable</i>
9	Improving quality and reducing absenteeism at Inoplast, France	Yes but not measured	Yes but not measured	Yes but not measured	<i>Not applicable</i>	Yes but not measured	Yes but not measured	<i>Not applicable</i>	<i>Not applicable</i>
10	Kesko Management Model for Well-being at work, Finland	Yes but not measured	Yes but not measured	Yes but not measured	Yes, 1 € produced 5.2 € return	Yes, in 2011 salary costs were 3 % lower compared to 2009 because of reduced sickness absence	Yes (clear connection between supervisors' management of wellbeing and employees' motivation and productivity revealed but not exactly reported)	Yes but not measured (lower costs of occupational accidents)	Yes but not measured
11	Vehicle Simulators as a Learning Environment, Finland	Yes, simulator training can contribute to the improvement in novice drivers of higher order skills like hazard perception	Yes, one-hour education with a vehicle simulator corresponds even to four-hour education in traffic with a real vehicle	Yes but not measured	Yes, according to international studies even 40 % compared to the traditional education	<i>Not applicable</i>	<i>Not applicable</i>	Yes, 18–43 % according to international studies	Yes but not measured

\* **Accident Frequency Rate (F)** =  $\Sigma$  Number of Occupational Accident /  $\Sigma$  Working Hour \* 1.000.000  
(Occupational accident frequency ratio (F) gives the number of occupational accidents occurring in one million working hours).

\*\* **Accident Severity Rate (G)** =  $\Sigma$  Missing Days due to Occupational Accident /  $\Sigma$  Working Hour \* 1.000  
(Accident Severity Rate (G) gives missing workmanship in one thousand working hour).

Table 3- Total assessment of the case studies' contributions to the efficiency level of enterprises by some related parameters

N°	Parameters	Assessment of the case studies			
		Number of "Yes, measured"	Number of "Yes, but not measured"	Number of "No"	Number of "Not applicable"
1	Has the intervention resulted in a higher average skill level of the work force?	1	6	1	3
2	Has the intervention resulted in changes in the quantity of product or service for the given amount of time?	2	7	1	1
3	Has the intervention resulted in changes in the quality of products or service?	-	10	-	1
4	Have the savings (energy, raw material, time, traffic reduction, ecological footprint etc.) increased?	3	3	2	3
5	Has the absenteeism rate decreased?	1	7	-	3
6	Has any motivation increase observed?	3	5	1	2
7	Has the accident frequency rate decreased?	3	4	-	4
8	Has the accident severity rate decreased?	1	6	-	4
<b>TOTAL</b>		<b>14/88</b>	<b>48/88</b>	<b>5/88</b>	<b>21/88</b>

Number of cases: 11

Number of assessment parameters: 8

Total number of assessments: 11 x 8 = 88

As the literature survey and the indicators of the case studies defined in the previous Chapter suggest, the productivity rate increases as a result of health and safety interventions. However, enterprises do not generally measure the changes after they apply interventions as the Table 2 and 3 above also display. Thus, encouraging to measure the changes after interventions and developing tools will help the enterprises to obviously realize the improvements and this will help them to understand health and safety interventions should be understood as an investment rather than a cost and it would not be that difficult to convince the employers that health and safety programmes should be integrated in the factors of company development.

## 6. Conclusion

This paper investigates the links between productivity and health and safety at work. The data given in the paper clearly demonstrate that accidents at work and work-related ill health have a negative impact both on company level as well as on macro level. The negative impact of outcomes of work-related OHS problems and the correlation between national competitiveness and the national incidence rates of occupational accidents have been illustrated. The data show the potential benefit if these cases of accidents at work and work-related ill-health could have been prevented. Thus preventing occupational accidents and diseases should make economic sense for society as well as being good business practice for companies.

Although there are some comments that productivity can be at the expense of workers' health and safety, research findings generally support that health and safety measures have a positive impact not only on safety and health performance but also on company productivity. However, identifying and quantifying these effects and developing solid evidence might rather be difficult. Research findings also support the existence of an important link between a good working environment and the performance of a company. Thus, the quality of a working environment has a strong influence on productivity and profitability. The links between occupational safety and health programmes and positive effects and outcomes on company performance have been clearly shown. The literature survey also points out that OSH should not be seen as purely a cost, but also as an investment to improve the overall performance of a company, meaning that OSH should be an integral component of general management.

Integrating health and safety in company strategy and policy forms part of the business strategy and also the continuous improvement circle that drives a company towards excellence. Outcomes are noticeable on organisational level since occupational safety and health measures lead to change by creating better working conditions, improving the social climate and the organisational process. The case studies, surveys and other studies related to some health interventions shared in this report also support the idea that OSH interventions/measures lead companies to both individual and organisational outcomes that as a result contribute to company performance.

The idea is emphasized that developing OSH programmes and measures alone is not enough; OSH programmes can only contribute in a sustainable manner to the company goals and performance if the programmes are well-designed and based on a participatory approach. Organizational democracy model based on participation and partnership is discussed to be the best model to be adopted in work design and organization.

In spite of the presence of many studies and good practices showing the links between health and safety at work (or well-being at work) and productivity, it does not necessarily result in increase of preventive or health promoting measures in workplaces. Thus, a new approach is introduced: integrating productivity and well-being into one concept: workplace development. Work organisation has a significant impact on the relationship between health and safety at work and productivity. The excellence model is based on integrating work organisation and health and safety programmes. Occupational safety and health programmes together with the other organizational projects contribute to the workplace development and this improves the performance of the company through some organizational and individual outcomes. The case studies from partner countries summarized in the report also illustrate the benefits of participatory OSH programmes, involving employees in organizational projects and workplace development approaches involving organizational measures and programmes. They support the idea that OSH measures and programmes impact company performance.

Companies should be encouraged to integrate OSH programmes/measures to work organisation and health and safety issues should be considered to be crucial for workplace development that will pave the way to performance and productivity. In order to maintain this, more research into these topics is necessary which will contribute to increasing awareness on the issue.

## Glossary

**Absenteeism:** Absenteeism is the term generally used to refer to unscheduled employee absences from the workplace. Many causes of absenteeism are legitimate—personal illness or family issues, for example—but absenteeism can also be traced to factors such as a poor work environment or workers who lack commitment to their jobs. If such absences become excessive, they can adversely impact the operations and, ultimately, the profitability of a business (<http://www.inc.com/encyclopedia/absenteeism.html>).

**Accident:** An unplanned event that results in harm to people, damage to property or loss to process ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Accident Prevention:** The systematic application of recognized principles to reduce incidents, accidents, or the accident potential of a system or organization ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Disability:** It is the umbrella term for impairments, activity limitations, and participation restrictions that results from the interaction between an individual's health condition and the personal and environmental contextual factors. Personal factors are the particular background of an individual's life and living, and comprise features of the individual that are not part of a health condition or health states, such as: gender, race age, fitness, lifestyle, habits, coping styles, social background, education, profession, past and current experience, overall behaviour pattern, character style, individual psychological assets, and other characteristics, all or any of which may play a role in disability in any level. Environmental factors are external factors that make up the physical, social and attitudinal environment in which people live and conduct their lives (World Health Organization, International Classification of Functioning, Disability and Health. Geneva, Switzerland: WHO; 2001. <http://www.who.int/classifications/icf/en/>).

**Ergonomics:** An applied science that studies the interaction between people and the work environment. It focuses on matching the job to the worker ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Expenditure on occupational injuries and diseases:** records all cash payments such as paid sick leave, special allowances and disability related payments such as pensions, if they are related to prescribed occupational injuries and diseases (<http://stats.oecd.org/glossary/search.asp>).

**Hazard:** A dangerous phenomenon, substance, human activity or condition that may cause loss of life, injury or other health impacts, property damage, loss of livelihoods and services, social and economic disruption, or environmental damage (United Nations International Strategy for Disaster Reduction. Terminology. Geneva, Switzerland: UNISDR; 2009. <http://www.unisdr.org/we/inform/terminology>).

**Health:** It is defined in the WHO constitution of 1948 as a state of complete physical, social and mental well-being, and not merely the absence of disease or infirmity. [Preamble to the Constitution of the World Health Organization as adopted by the International Health Conference, New York, 19 June - 22 July 1946; signed on 22 July 1946 by the representatives of 61 States (World Health Organization. Basic Documents, Forty-fifth edition, Supplement, October 2006. Constitution of the World Health Organization. Geneva, Switzerland: WHO; 2006. [http://www.who.int/governance/eb/who\\_constitution\\_en.pdf](http://www.who.int/governance/eb/who_constitution_en.pdf)).

**Health and safety at work:** Health and safety is given a wide definition in the European Union context, going beyond the avoidance of accidents and prevention of disease to include all aspects of the worker's well-being (Source: website Eurofound).

**Health and Safety Policy:** A policy is a statement of intent, and a commitment to plan for coordinated management action. A policy should provide a clear indication of a company's health and safety objectives. This, in turn, will provide direction for the health and safety program ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Health and Safety Program:** A systematic combination of activities, procedures, and facilities designed to ensure and maintain a safe and healthy workplace ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Health Human Resources:** Health workers are people engaged in actions whose primary intent is to enhance health. This includes those who promote and preserve health as well as those who diagnose

and treat disease (e.g. doctors, nurses, midwives, physical therapists, pharmacists, laboratory technicians) as well as management and support workers, those who help make the health system function but who do not provide health services directly (World Health Organization. The World Health Report 2006 - working together for health. Geneva, Switzerland: WHO; 2006. <http://www.who.int/whr/2006/en/index.html>).

**Integrated Management Systems (IMS):** It is a management system which integrates all components of a business into one coherent system so as to enable the achievement of its purpose and mission. ([http://www.thecqi.org/Knowledge-Hub/Resources/Factsheets/Integrated-management systems/](http://www.thecqi.org/Knowledge-Hub/Resources/Factsheets/Integrated-management%20systems/)).

**Occupational Accidents:** An unexpected and unplanned occurrence, including acts of violence, arising out of or in connection with work which results in one or more workers incurring a personal injury, disease or death. As occupational accidents are to be considered travel, transport or road traffic accidents in which workers are injured and which arise out of or in the course of work, i.e. while engaged in an economic activity, or at work, or carrying on the business of the employer. (<http://stats.oecd.org/glossary/detail.asp?ID=3563>).

**Occupational Health:** The development, promotion, and maintenance of workplace policies and programs that ensure the physical, mental, and emotional well-being of employees. These policies and programs strive to:

- prevent harmful health effects because of the work environment
- protect employees from health hazards while on the job
- place employees in work environments that are suitable to their physical and mental make-up
- address other factors that may affect an employee's health and well-being, such as:
  - ineffective organization of work
  - harassment and violence in the workplace
  - the need to balance work and family responsibilities (e.g., elder care, child care)
  - promote healthy lifestyles ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Occupational Disability:** A condition in which a worker is unable to perform the functions required to complete a job satisfactorily because of an occupational disease or an occupational accident. (<http://medical-dictionary.thefreedictionary.com/occupational+disability>).

**Occupational Diseases:** The term occupational disease is linked to the identification of a specific cause-effect relationship between a harmful agent and the affected human organism. However, it is not easy – and considerably more difficult than in the case of accidents – to prove that a disease is occupationally conditioned, i.e. caused by conditions at, not outside work. (<http://stats.oecd.org/glossary/search.asp>).

**Occupational Safety** – The maintenance of a work environment that is relatively free from actual or potential hazards that can injure employees. (*Glossary of Occupational Health & safety Terms, Industrial Accident Prevention Association, 2007*)

**Personal Protective Equipment (PPE):** Any device worn by a worker to protect against hazards. Some examples are: respirators, gloves, ear plugs, hard hats, safety goggles and safety shoes ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Presenteeism** - being physically present but unable to perform at peak levels as a result of physical or mental illness, or because of distraction caused by a wide range of factors including dissatisfaction, external pressures, and interpersonal conflict (Workplace Wellness/Health Promotion Glossary, [http://wellergize.ca/workplace\\_wellness\\_glossary.phtml/term=Presenteeism](http://wellergize.ca/workplace_wellness_glossary.phtml/term=Presenteeism)).

**Prevention:** Activities that are directed toward achieving and restoring optimal functioning, minimising impairments, limitations, and participation restrictions, maintaining health (thereby preventing further deterioration or future illness), creating appropriate environmental adaptations to enhance independent function. (American Physical Therapy Association. Guide to Physical Therapist Practice. Second Edition. Physical Therapy 2001: 81:1;9-744).

- Primary prevention - actions to avoid or remove the cause of a health problem in an individual or a population before it arises.
- Secondary prevention — actions to detect a health problem at an early stage in an individual or a

population, facilitating cure, or reducing or preventing spread, or reducing or preventing its long-term effects.

- Tertiary prevention — actions to reduce the impact of an already established disease by restoring function and reducing disease-related complications.

**Productivity:** An expression of how efficiently and effectively goods and services (i.e. goods and services which are demanded by users) are being produced. Thus, its key characteristics are that it is expressed in physical or economic units—in quantities or values (money)—based on measurements which are made at different levels: on the level of the economy overall, that of a sector or branch of the economy, that of the enterprise and its individual plants/units and that of individuals (EANPC, 2005).

**Risk:** The probability of a worker suffering an injury or health problem, or of damage occurring to property or the environment as a result of exposure to or contact with a hazard ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Wellbeing:** Well-being has been defined from two perspectives. The clinical perspective defines well-being as the absence of negative conditions and the psychological perspective defines well-being as the prevalence of positive attributes. Positive psychological definitions of wellbeing generally include some of six general characteristics. The six characteristics of well-being most prevalent in definitions of well-being are:

- the active pursuit of well-being;
- a balance of attributes;
- positive affect or life satisfaction;
- pro social behaviour;
- multiple dimensions; and
- personal optimisation

**Wellness:** An active process of becoming aware of and making choices toward a more successful existence (National Wellness Organization: A definition of wellness, Stevens Point, WI, USA: National Wellness Institute, Inc; 2003).

**Work Organization:** A broad concept with no strict definition. It deals with the way work is organized and managed. The subjects such as scheduling, job design, interpersonal issues, career concerns, management style and organizational characteristics are among the basic elements of work organization.

There is a growing understanding that work itself - if it is poorly organized - can be dangerous to a person's health. The risks from poor work organization are quite serious. Numerous studies have shown that workers whose jobs place high demands on them while providing them with few options about how to do the work are at risk of developing heart disease and other adverse health outcomes. Poor work organization is associated with high levels of stress and psychological strain.

It is important to realize that work organization can lead to improved health. For example, workers who have a high degree of control over how their job is done and face a low level of demands have lower rates of heart disease than workers in low-control, high-demand jobs.

([http://www.mflohc.mb.ca/fact\\_sheets\\_folder/work\\_organization.html](http://www.mflohc.mb.ca/fact_sheets_folder/work_organization.html)).

Work organization also focuses on factors such as efficient use of areas, equipment and workforce, improvement of knowledge, equipment and workforce, meeting the needs of workers about their physical and mental health and security at work, improvement of relations with the customers and ensuring the flexibility of the work and workplace organisation according to the changing needs and circumstances.

The workplace organization should aim to propagate intuition, teamwork, and more importantly, provide a safe and comfortable environment. It has a profound impact on the productivity of workers. Making the best use of space through optimum placement of equipment, integrating the human factor into workplace design, and effectively aligning the workplace into the surrounding environment are important aspects of ergonomics. The integration of principles of human well-being into workplace organisation has become critical for ensuring the workers perform to their best abilities.

(<http://workspacedesignmagazine.com/2012/08/ergonomics-and-workplace-design/>).

**Work related wellbeing:** That part of an employee's overall well-being that they perceive to be determined primarily by work and can be influenced by workplace interventions.

(<http://www.workandwellbeing.com/well-being-issues/what-is-employee-well-being/>).

**Workplace Design:** The planning of workplace environments, structures and equipments so that the potential for injury and illness is reduced or eliminated. ([http://www.iapa.ca/pdf/iapa\\_glossary.pdf](http://www.iapa.ca/pdf/iapa_glossary.pdf)).

**Workplace Development:** Everything that is done to improve the ability of an organization, and its employees to meet their goals. (<http://www.nald.ca/library/research/abc/colwor/english/colwor.pdf>).

**Workplace Innovation:** It is defined as a social process which shapes work organisation and working life, combining their human, organisational and technological dimensions. Examples include participative job design, self organised teams, continuous improvement, high involvement innovation and employee involvement in corporate decision making. Such interventions are highly participatory, integrating the knowledge, experience and creativity of management and employees at all levels of the organisation in a process of co-creation and co- design. This simultaneously results in improved organisational performance and enhanced quality of working life. Workplace Innovation linked to the introduction of new forms of work organisation makes a significant impact on indicators that lie at the heart of Europe 2020, including productivity, innovation, and quality of jobs, active ageing, healthy work and the acquisition of appropriate skills. (Dortmund, Brussels Position Paper on Workplace Innovation, 2012).

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