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The Management of Occupational Health and Safety
Managers' Perceptions of the Challenges, Necessary Support and Organisational Measures to support Managers

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Abstract

The management of occupational health and safety (OHS) in the workplace imposes a regulatory, moral and economic obligation on organisations, while the successful management of OHS contributes to both employees' well-being and organisational performance. Hence, aspects of OHS are increasingly embodied in the overall management system of organisations and included in the managerial activities. Managers at different organisational levels play a significant role in improving OHS, with their commitment to OHS being generally considered one of the most important factors that influence successful OHS management and culture. Nevertheless, the management of OHS may be very dependent on individual managers within organisations, whereas it should actually be based on regulatory requirements and organisation-specific OHS policies and procedures. There exists a need to support managers so as to achieve real advances in OHS. In order to support both organisations and managers in the continuous improvement of OHS, information regarding effective OHS management is needed. Accordingly, information is required concerning the challenges that managers face, as well as how they can best be supported in relation to OHS management.

This study discusses the management of OHS as an aspect of managerial work and from managers' point of view. The qualitative study aims to develop new knowledge regarding the challenges and necessary support associated with managing OHS, as well as to suggest organisational measures that can be applied to support managers' OHS-related work. The results are based on the prior OHS literature and three empirical sub-studies. In sub-study 1, thematic interviews (n=17) and qualitative inquiries (n=55) were carried out with top, middle and frontline managers from three public service organisations (a governmental expert organisation, a municipal social and healthcare service unit and a public vocational education organisation). In sub-study 2, thematic interviews (n=49) were carried out with middle and frontline managers from five industrial companies (a chemical processing company, an energy production company and three industrial service companies). In sub-study 3, a literature review and related categorisation were supplemented with thematic interviews (n=17) in a governmental expert organisation. The results of the sub-studies were used in the construction of a conceptual framework of organisational measures intended to support managers with regards to OHS management. The study approaches OHS management from the managers' viewpoint, which has only rarely been studied.

According to the participating managers, the most challenging OHS management situations found in public organisations are related to the psychosocial risks contained within the work environment. The managers considered their employees' mental overload, instances of negligence and the consideration of individual needs to be difficult

OHS issues to manage. Due to the current economic situation and the associated lack of resources, the managers perceived both pressure and concern in relation to their employees' well-being. In the industrial organisations, managerial overload, production pressure and role conflicts were perceived as the main factors that hinder the managers' commitment to OHS. However, the managers did not request more resources from upper management, presumably due to the tight economic situation. In order to cope with difficult OHS situations, the managers focused on individual relations and emotional support from their immediate superior, their colleagues, and OHS and human resources (HR) professionals.

The conceptual framework of organisational measures intended to support managers in OHS management includes top management support regarding OHS management, uniform and simple OHS procedures, and the systematic development of OHS management. Developing consistent OHS attitudes and commitment among all the managers requires strong support on the part of top management. An emphasis on leadership development is important for managers to be able to motivate their employees' OHS participation and compliance and, hence, improve OHS performance. Existing management development practices, for example, management training, can provide easy ways to incorporate OHS management and leadership perspectives into general management development. Developing the support, resources and understanding of managers in relation to OHS may considerably improve both employees' well-being and the performance of organisations.

This dissertation contributes to the research by providing new knowledge regarding OHS management from the managers' point of view, in the organisational context and in relation to organisational performance. Moreover, it provides a research-based conceptual framework for evaluating and developing OHS management within various organisations. The dissertation also provides a practical contribution by discussing OHS management as an integral part of general management and by pointing out the managers' central role in improving OHS. Moreover, it suggests practical organisational measures to support managers and promote their consistent commitment to OHS.

Tiivistelmä

Työterveyden ja -turvallisuuden (TTT) johtamiselle on organisaatioissa lainsäädännön asettamia, moraalisia ja taloudellisia velvoitteita, ja onnistunut TTT-johtaminen tukee työntekijöiden hyvinvointia ja organisaatioiden suorituskykyä. TTT-näkökohdat sisältyvät yhä enenevissä määrin organisaatioiden johtamisjärjestelmiin ja esimiesten tehtäviin. Eri organisaatiotasojen esimiehillä on merkittävä rooli TTT:n edistämisessä, ja heidän sitoutumisensa työterveyden ja turvallisuuden kehittämiseen on yksi tärkeimmistä tekijöistä TTT-johtamisen onnistumisessa. Kuitenkin joissain organisaatioissa TTT-johtaminen on hyvin henkilösidonnaista, kun sen pitäisi perustus lainsäädännön vaatimuksiin ja organisaation TTT-politiikkaan ja menettelytapoihin. Esimiehiä on tarpeen tukea, jotta TTT:ssä voidaan saavuttaa aitoa kehitystä. Jotta organisaatioita ja esimiehiä voidaan tukea TTT:n jatkuvassa kehittämisessä, tarvitaan tietoa tehokkaasta TTT-johtamisesta. Lisäksi tietoa tarvitaan niistä vaikeuksista, joita esimiehet kokevat ja niistä keinoista, joilla esimiehiä voidaan tukea TTT-johtamisessa.

Tämä tutkimus tarkastelee TTT-johtamista osana esimiestyötä esimiesten näkökulmasta. Tämän laadullisen tutkimuksen tavoitteena on tuottaa uutta tietoa niistä vaikeuksista ja tuen tarpeista, joita esimiehet kokevat TTT-johtamisessa. Lisäksi tutkimuksessa esitetään organisatorisia keinoja, joilla esimiehiä voidaan tukea TTT-johtamisessa. Tulokset perustuvat TTT-johtamisen aiempaan tutkimukseen ja kolmeen empiiriseen osatutkimukseen. Osatutkimuksen 1 aineistona olivat eri organisaatiotasojen esimiesten teemahaastattelut (n=17) ja laadulliset kyselyt (n=55) kolmessa julkisessa organisaatiossa (valtion asiantuntijaorganisaatio, kunnallinen sosiaali- ja terveyspalvelujen yksikkö sekä ammatillinen oppilaitos). Osatutkimuksen 2 aineistona olivat keskijohdon ja lähiesimiesten teemahaastattelut (n=49) viidessä teollisessa organisaatiossa (kemianteollisuus, energiantuotanto sekä kolme teollisten palvelujen tarjoajaa). Osatutkimuksessa 3 kirjallisuuden perusteella laadittua luokittelua täydennettiin teemahaastatteluilla (n=17) valtion asiantuntijaorganisaatiossa. Näiden osatutkimusten tulosten perustella rakennettiin viitekehys niistä organisatorisista keinoista, joilla esimiehiä voidaan tukea TTT-johtamisessa. Tässä tutkimuksessa TTT-johtamista tarkastellaan esimiesten omien kokemusten ja tuen tarpeen näkökulmista, joita on aiemmin tutkittu varsin vähän.

Esimiesten kokemat vaikeat tilanteet TTT-johtamisessa liittyivät julkisella sektorilla tyypillisesti työympäristön psykososiaalisiin riskeihin. Esimiehet pitivät vaikeina johtamistilanteina erityisesti työntekijöiden henkistä ylikuormittumista, laiminlyöntejä ja yksilöllisten tarpeiden huomioimista. Nykyisestä taloustilanteesta ja resurssien niukkuudesta johtuen esimiehet kokivat painetta ja kantoivat huolta työntekijöiden hyvinvoinnista. Teollisissa organisaatioissa esimiesten oma ylikuormittuminen,

tuotannolliset paineet sekä rooliristiriidat olivat tekijöitä, jotka vaikeuttivat esimiesten sitoutumista TTT-johtamiseen. Esimiehet eivät kuitenkaan vaatineet lisää resursseja ylemmiltä esimiehiltä oletettavasti kireästä taloustilanteesta johtuen. Selviytyäkseen vaikeissa tilanteissa esimiehet keskittyivät henkilösuhteisiin ja hakivat emotionaalista tukea omalta esimieheltään, työtovereiltaan sekä TTT- ja henkilöstöasiantuntijoilta.

Viitekehys organisatorisista keinoista esimiesten tukemiseksi TTT-johtamisessa sisältää ylimmän johdon tuen TTT-johtamiseen, yhtenäiset ja yksinkertaiset TTT-toimintatavat sekä suunnitelmallisen TTT-johtamisen kehittämisen. Esimiesten yhtenäisten TTT-asenteiden ja sitoutumisen kehittäminen edellyttää ylimmän johdon vahvaa tukea. Johtajuuden korostaminen on tärkeää, jotta esimiehet osaavat motivoida työntekijöitä noudattamaan turvallisuusohjeita ja osallistumaan turvallisuuden kehittämiseen ja siten parantamaan TTT-tasoa. Olemassaolevat johtamisen kehittämisen käytännöt, kuten johtamiskoulutus, voivat tarjota luontevan keinon sisällyttää TTT-johtamisen ja –johtajuuden näkökulmat yleiseen johtamisen kehittämiseen. Kehittämällä esimiesten tukea, resursseja ja ymmärrystä liittyen TTT-johtamiseen voidaan organisaatioissa parantaa merkittävästi työntekijöiden hyvinvointia ja suorituskykyä.

Tämä tutkimus tuottaa uutta tietoa TTT-johtamisesta esimiesten näkökulmasta organisaatiokontekstissa ja suhteessa organisaation suorituskykyyn. Lisäksi tutkimus tarjoaa käytäntöön perustuvan viitekehyksen TTT-johtamisen arvioimiseen ja kehittämiseen erilaisissa organisaatioissa. Tutkimus tarkastelee TTT-johtamista olennaisena osana muuta johtamista ja korostaa esimiesten keskeistä roolia TTT-tason parantamisessa. Lisäksi tutkimus esittää käytäntöön perustuvia organisatorisia keinoja esimiesten tukemiseen ja heidän sitoutumisensa edistämiseen.

Preface

I dreamed of working as a researcher for many years during my working life outside the university. I even had the name and number of Professor Kaija Leena Saarela in my notebook for some time. When I was finally encouraged to contact her, she offered me an assignment on a research project at the Center for Safety Management and Engineering (CSME) at Tampere University of Technology (TUT). Since then, I have embarked a long and challenging voyage as I aspired to complete this dissertation alongside all my teaching, research projects and family life. Though sometimes daunting, these other projects have provided me great inspiration and support during my voyage. I have truly enjoyed my work with my present and former colleagues at CSME and the brilliant students and enthusiastic collaborators with whom I worked at the Finnish Institute of Occupational Health (Työterveyslaitos), Seinäjoki University of Applied Sciences (Seamk), University of Tampere, VTT Technical Research Centre of Finland and numerous Finnish companies and vocational education and training organisations. I have also enjoyed fruitful relationships with the Centre for Professional Development at TUT (Edupoint and Edutech), Aalto University Professional Development, the Finnish National Agency for Education (Opetushallitus) and the Ministry of Social Affairs and Health (Sosiaali- ja terveysministeriö).

Completing a dissertation is not a one-person job; therefore, I owe thanks to the many people who have supported me during my years as a doctoral student. I gratefully acknowledge the interest, contribution and encouragement of my supervisors at TUT, Professor Kaija Leena Saarela and Professor Jouni Kivistö-Rahnasto. I acknowledge Professor Miia Martinsuo's encouragement and feedback during the internal pre-examination of my manuscript. I warmly thank Dr. Arto Kuusisto (European Commission, Joint Research Centre, Italy) and Dr. Arto Reiman (University of Oulu), the pre-examiners of my dissertation, for their valuable comments. I also want to thank the first round pre-examiners of my manuscript, Professor Riitta Viitala (University of Vaasa) and Dr. Antti Simola (3T Results Ltd) for their constructive feedback on the manuscript.

The dissertation is based on several independent research projects. I extend my warmest thanks to the scientific leaders of the projects and everyone who was involved in them. Special thanks are due to the co-researchers of the sub-studies and co-authors of the related articles for their contributions. I particularly want to thank Dr. Päivi Hämäläinen, Dr. Minna Päivinen and Dr. Sirpa Syvänen for being such marvellous 'godmothers' to me during the first steps of my research career and scientific writing. Special thanks go to the managers of the studied work organisations who were the major informants of the research projects. I acknowledge the Finnish Work Environment Fund (Työsuojelurahasto), the Finnish Funding Agency for Innovation (Tekes), TUT and

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Definition of Key Terms

Accident

An incident giving rise to injury, ill health or fatality (BS 18004:2008). In this study, accidents are discussed in the occupational context and refer to occupational injuries.

Accountability for occupational health and safety

Accountability involves the obligation on the part of management to be answerable to the controlling interests of the organisation (ISO 26000:2010). Accountability for OHS refers to the manager's responsibility for certain OHS results and what he/she reports to higher levels of the organisation.

Awareness

To be conscious of OHS risks and hazards (OHSAS 18002:2008).

Conceptual framework

A conceptual framework is constructed to organise the findings from the literature review and empirical studies in order to achieve the aim of the dissertation (see Shields & Rangarjan 2013).

Hazard

A source, situation or act with the potential to cause occupational injury or ill health or a combination of the two. Hazards include physical, chemical, biological and psychosocial hazards. (OHSAS 18001:2007; OHSAS 18002:2008)

Health

A resource for everyday life, including physical, mental and social well-being (WHO 1986, 2010a). In this study, health is discussed in the occupational context and refers to occupational health.

Health-promoting leadership

A leadership style that enhances physical and mental health and well-being and prevents ill health in the workplace (Eriksson 2011; Skagert 2010).

Ill health

An identifiable, adverse physical or mental condition arising from a work activity or work-related situation (BS 18004:2008). In this study, ill health is discussed in the

occupational context and refers to work-related ill health and diseases.

Informant	In qualitative studies, informants can be chosen because they possess special qualifications, such as particular status or accurate information for the study (Fiafua 2014). In this study, the informants are the interviewed managers in different organisations and organisational levels. They provided information on role-related aspects (Houston & Sudman 1975), namely on the managers' perceptions of the studied issues.
Injury	Injury, ill health or fatality resulting from an accident (BS 18004:2008). In this study, injuries are discussed in the occupational context and refer to occupational injuries.
Leadership	Leadership is the process of influencing others to understand and agree what needs to be done and how to do it, as well as the process of facilitating individual and collective efforts to accomplish shared objectives (Yukl 2010). In this study, Bass's (1985) transactional and transformational leadership concept is applied. Transactional leadership involves the manager establishing goals, actively monitoring the employees' performance, and providing rewarding and corrective feedback concerning the employees' performance. Transformational leadership achieves results by increasing the employees' acceptance of the established goals by managers serving as role models, inspiring commitment to achieving goals, showing an active interest in individual employees and challenging employees to overcome the obstacles that prevent them from achieving their goals. (Barling et al. 2002; Bass 1985; Kapp 2012)
Management	The process or practice of managing or the managers of an organisation. The management function is typically divided into three levels: top (strategic), middle (operative) and frontline (supervisory) management (Yukl 2010).
Manager	A manager is a person who has a formal position of authority within an organisation. He/she enables others to perform their work and achieve goals. He/she is accountable to a higher

authority in terms of work results. The differences between the levels of managers are the degree of authority and the scope of accountability in relation to their work results. (Grint 2005; Rost 1991; Yukl 2010) Here, managers refer to employees at all organisational levels, such as frontline, middle and top managers, who act as an employer representative or hold a formal position as an employer representative. Managers refer to both operational and non-operational managers, since the responsibility for OHS lies with everyone in a management position regardless of their functional area (Stricoff & Groover 2012).

Occupational health and safety (OHS)

Conditions and factors that affect, or could affect, the health and safety of employees and any other person in the workplace (BS 18004:2008; OHSAS 18001:2007). Such terms as health and safety at work, safety and health at work, and occupational safety and health may be used with the same meaning. In this study, OHS also refers to occupational safety where appropriate.

Occupational health and safety management system (OHSMS)

Part of the overall management system that facilitates the management of occupational health and safety. This includes the organisational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the organisation's occupational health and safety policy (OHSAS 18001:2007; Risikko 2009).

OHS performance

Measurable results concerning an organisation's management of its OHS risks (BS 18004:2008). OHS performance is typically measured through OHS objectives and indicators within organisations, for example, injury rate, ill health, absenteeism, safety behaviour and safety climate (Hale et al. 2010).

Organisation

A public or private company, corporation, firm, enterprise, authority or institution that has its own functions and

administration (BS 8004:2008), as well as acting as an employer (2002/738).

Organisational measures Organisation-related means or procedures, which can be developed within the organisation. In this study, organisational measures are discussed in relation to the management of OHS.

Organisational performance

The performance of the productivity, efficiency, quality or other business objectives and indicators of an organisation. Management effectiveness is usually measured by the extent to which organisational performance is enhanced and goals are attained (Yukl 2010).

Perception In this study, the term perception is used as a synonym for the understanding of the studied issues from the managers' point of view, which is the perspective of this study.

Responsibility Responsibility and accountability can be taken to mean the same thing; they are often used interchangeably. However, when it comes to fulfilling employment duties in hierarchical organisations, one is accountable upwards, but responsible downwards (Dekker 2012). In this dissertation, the word responsibility is used to describe the OHS-related duties that managers are responsible for.

Risk An effect of uncertainty on objectives (here, health and safety goals), which is often expressed in terms of a combination of the severity of the injury or ill health that can be caused by the hazardous event or exposure and the associated likelihood of occurrence (ISO GUIDE 73:2009; OHSAS 18002:2008).

Safety Freedom from unacceptable risk or harm (ISO/IEC 2004). In this study, safety is discussed in the occupational and OHS contexts.

Safety climate The surface features of an organisation's underlying safety culture. This is discerned from the employees' attitudes and perceptions at a given point in time, that is, a snapshot of the state of safety (Cox & Flin 1998).

Safety culture	The attitudes, beliefs, perceptions and values that employees and managers share in relation to safety within an organisation or workplace (Cox & Cox 1991).
Safety leadership	A leadership style promoting a safety climate, culture and performance (Wu et al. 2008). Referred to as OHS leadership in this study where appropriate (see "Safety").
Subordinate	Someone whose primary work activities are directed and evaluated by a manager. Denotes the existence of a formal relationship of authority between the person and the manager (Yukl 2010). In this study, subordinate refers to an employee.
Well-being	In this study, well-being is discussed in the occupational context. Well-being denotes safe, healthy and productive work in an organisation that is well led by competent workers and work communities who see their job as meaningful and rewarding (Anttonen & Räsänen 2008).

1 Introduction

1.1 Occupational injuries and ill health as a performance hindrance factor within organisations

Occupational health and safety (OHS) concerns the physical and mental health and safety of people engaged in work. The motivation behind this dissertation was an interest in the important role managers play in promoting OHS and the well-being of their employees, as well as a concern regarding managers' prerequisites for the effective management of OHS. This dissertation discusses the management of OHS from the managers' point of view in an organisational context in various organisations in Finland.

In recent decades, the organisation, management and nature of work have all changed, while managerial work has been further challenged by, for example, larger organisational sizes, constant changes, uncertainty, the fragmentation of work and increasing cost pressure (e.g., EU-OSHA 2007; FIOH 2013; Viitala 2005). The mental and emotional demands of work have increased, while psychosocial risks have emerged in addition to the inherent physical, chemical and biological risks (EU-OSHA 2007; Leka et al. 2011; Siegrist et al. 2004). Psychosocial risks related to, for example, job insecurity, high workload and work pressure, violence, bullying, harassment and unsolved conflicts are widely recognised as major challenges to OHS nowadays, weakening occupational health and well-being as well as organisational performance (EU-OSHA 2007; EU-OSHA 2014; Eurofound 2010; European Foundation 2007; Leka et al. 2011). Thus, a broad range of OHS-related risks should be considered when investigating OHS management in various organisations.

Within organisations, the motivation behind the development of OHS should arise from humanitarian, legal and economic objectives (Brauer 2006; Reese 2011), as is the case for other business activities. OHS is a moral obligation imposed by modern society and organisations' social responsibility, and it is commonly agreed to be a positive value for individuals and organisations (Corcoran & Shackman 2007).

Occupational injuries and ill health have been the subject of research interest since the initial stages of industrialisation in industrialised countries (Swuste et al. 2010). Despite longstanding changes in society and various technological innovations, the number of occupational injuries has not decreased as expected over the last few decades, as it did from the beginning of the 1900s until 1961 (Petersen 2000). Furthermore, the rate of workplace injury is often seen to be associated with the business cycle; a declining number of reported workplace injuries is observed during recessions (Asfaw et al. 2011;

Boone et al. 2006; Davies et al. 2009). In Finland, the number of occupational injuries has slightly decreased in recent years, mainly due to the decline in working hours, regulatory changes and development activities (FAII 2014, 2015). Although OHS records have shown some improvement, the current measures are not sufficient to achieve European and Finnish goals of reducing occupational injuries and ill health (Ministry of Social Affairs and Health 2011).

Improving OHS is certainly considered an important objective as such, but highlighting its contribution to both the national economy and organisational performance serves to motivate employers to invest in OHS development. In Finland, the national economic losses due to lost labour input were estimated to exceed 24 billion euros for employers, employees and public finances in 2012 (Rissanen & Kaseva 2014). Globally, occupational injuries and ill health continue to pose a major burden to organisations, society and injured employees (Hämäläinen 2010; ILO 2011; Nenonen 2013; Takala et al. 2014). The International Labour Organization (ILO) has estimated the total costs of occupational injuries and work-related diseases to be around 4% (ranging from 1.8–6%) of the gross national product, meaning worldwide annual costs of approximately $1.36 * 10^{12}$ USD in 2003 (Hämäläinen 2010; Safety in Numbers 2003; Takala et al. 2014).

At the organisational level, OHS issues are increasingly associated with operational efficiency, quality, competitiveness and reputation (e.g. Boyd 2003; Fernández-Muñiz et al. 2009; Köper et al. 2009; Linhard 2005). Hence, systematic OHS management is increasingly being seen as a business-to-business requirement for many organisations (Hasle & Zwetsloot 2011). OHS-related costs are often underestimated or not even calculated in organisations due to a lack of understanding of the indirect costs involved (Cagno et al. 2013; Gavious et al. 2009; Jallon et al. 2011). Since management effectiveness is usually measured by the extent to which organisational performance (e.g. productivity, efficiency or quality) is enhanced and goals are attained (Yukl 2010), greater attention should be paid to managing OHS in organisations striving to meet these objectives. Moreover, managers who trade OHS for short-term operational benefits put not only their employees at risk, but also their business (Veltri et al. 2013).

While many organisations have achieved very high levels of OHS performance, a significant number of organisations still fail to adequately manage OHS (Fizgerald 2005; Killimett 2006). Interestingly, contextual factors, for example, the industrial sector, difficult times or a competitive environment, were not related to OHS performance in previous studies, although the management commitment to safety and the quality of leadership were (Hale et al. 2010; Killimett 2006; Veltri et al. 2013; Yorio & Wachter 2013). Hence, the high-performing organisations can be seen to share common cultural features (Fizgerald 2005; Veltri et al. 2013).

Although the essential role of managers is widely recognised, in many organisations the prevention of occupational injuries and ill health still remains mainly the responsibility of OHS professionals or individual managers (Tarkkonen 2016; Veltri et al. 2013). The tasks of OHS professionals are often determined based on their personal enthusiasm, motivation and competence (Borys 2014; Reiman 2015), meaning that prevention may be very person-centric. Moreover, assigning a central role in prevention to an individual manager or organisational unit may cause divergence and counterproductive outcomes within the organisation, while OHS may not be managed appropriately throughout the whole organisation (Tarkkonen 2016). A greater emphasis on organisational consistency and operational managers' roles is needed. Hence, it is vital that the right issues are emphasised when developing OHS management. Further research is therefore needed to identify the right issues.

In many high-income countries, including Finland, the positive OHS development has become increasingly difficult to maintain due to the improved management of hazardous work environments and the relocation of hazardous work to developing countries. Thus, a paradigm shift is required to further decrease the number of occupational injuries and diseases or the burden of diseases, while managers' commitment and leadership capabilities need to be further emphasised within organisations. (Takala et al. 2014)

Previous research on OHS has mainly focused on the behaviour of employees, although since the late 1990s, an emphasis on the work environment, the organisation of work and leadership has emerged (e.g. Hofmann & Morgenson 1999; Larsson 2015; Shain & Kramer 2004; Shannon et al. 1997; Zohar 2002a, 2002b). Nevertheless, the organisational aspects of safety and management OHS responsibilities have been recognised since the beginning of the 19th century (DeBlois 1925; Eastman 1910; Swuste et al. 2010). The prior safety research has been criticised for being too focused on structural elements, whereas organisational and social factors have been subject to insufficient attention (Hale & Borys 2013; Levä 2003; Nielsen 2000; Teperi 2012; Törner & Pousette 2009; Zohar 2002b). This underlines the need for organisationally directed measures and an emphasis on managers' fundamental role if OHS is to be further improved.

1.2 Managers' key role in promoting occupational health and safety

The current management literature has extensively addressed successful management and leadership, as well as the related frameworks and styles. However, the OHS perspective is generally overlooked in management studies (Veltri et al. 2013; Zanko &

Dawson 2012), although it is an essential part of both managerial responsibility and organisational performance. Researchers have argued that the management of OHS is a key part of general managerial work and OHS issues need to be integrated into an organisation's general business management process (Bluff 2003; Chu et al. 2000; EU-OSHA 2010a; EU-OSHA 2012a; Simola 2005). Moreover, the OHS research has rarely studied OHS practices and outcomes in the wider organisational context. Yet, the organisational context needs to be acknowledged, while OHS outcomes need to be considered as one organisational outcome in need of management (Veltri et al. 2013). These observations lead to the proposition that OHS management must be taken into account in the development of general management and, additionally, that further research is needed in this area.

OHS is regulated by legislation (89/391/EEC; 2001/1383; 2002/738) and it is guided by voluntary specifications for an OHS management system (e.g., ILO 2001; ISO/DIS 45001 2016; OHSAS 18001:2007) found in organisations. The OHS legislation charges the employer with responsibility for OHS and the adequate supervision of work. Managers represent employers based on their formal position within an organisation, and they have the ultimate responsibility for OHS. In addition to their regulatory responsibility, managers play an essential role in the development of OHS within organisations, since they have the capacity and power to make OHS-related decisions and influence the safety culture (e.g., DeJoy et al. 2004; Flin et al. 2000; Hale et al. 2010; Hofmann & Stetzer 1996; Zohar 2002a).

OHS management is widely studied and the key factors behind successful OHS management are commonly presented. The management commitment to OHS is recognised as a fundamental component of an organisation's safety culture and OHS management (Fernández-Muñiz et al. 2007, 2009; Hale et al. 2010; Reason 1997). Top management commitment and its visible demonstration are often emphasised (Clarke 1999; HSE 1999; Schein 2010), when the lower-level managers' consistent commitment receives less attention. Moreover, the importance of top management support for successful safety performance is almost universally recognised. However, top management does not always have the necessary clear vision, motivation and knowledge concerning what to achieve and how to do so (Hale et al. 2010). Thus, more information on managing OHS is needed to guide OHS-related decision making within organisations.

Supporting managers' role in, as well as their commitment to, OHS could help organisations to further develop OHS (Frick 2013; Hale 2003; Simola 2005). Since the origin of OHS problems is typically found at the organisational level, organisational structures, resources and OHS procedures should support managers in terms of their ability to focus on OHS issues (Cox & Griffiths 2005; Idris et al. 2012; Skagert 2010;

Veltri el al. 2013). Although numerous studies have investigated organisational factors and management commitment in relation to employees' safe behaviour and OHS performance (e.g. Hale et al. 2010; Jitwasinkul et al. 2016; Mearns et al. 2003; O´Toole 2002; Vredenburgh 2002), relatively few studies have investigated the kind of support that managers need. Moreover, the recent literature contains only a few papers that discuss the organisational factors affecting managers' commitment to OHS (Conchie et al. 2013; Michael et al. 2005), and even they only rarely present measures to improve that commitment. Only a few studies have investigated managers' perceptions of managing OHS and they represented only limited perspectives in relation to OHS (e.g. Biggs et al. 2013; Conchie et al. 2014; Fruhen et al. 2014a; Larsson 2015; O'Dea & Flin 2001). Very little research has focused on the empirical results and practical examples of supporting organisational factors from the managers' point of view. Thus, there exists a need for a thorough investigation of the challenges managers confront, as well as the organisational support they require, when managing OHS.

In addition to management commitment, OHS-related leadership is generally seen as an important determinant of OHS performance. Various leadership behaviours appropriate for improving OHS performance have been suggested in the recent literature (e.g. Clarke 2013; Eid et al. 2012; Hoffmeister et al. 2014; Kapp 2012). Many such studies conclude that both transformational and transactional leadership (Bass 1985) are associated with positive OHS outcomes, including increased safety behaviours and decreased occupational injuries. However, less is known about the specific leadership facets that promote OHS performance (Conchie et al. 2013; Griffin & Hu 2013; Hoffmeister et al. 2014; Killimett 2006) and how to put those behaviours into action. Thus, a more comprehensive understanding of effective leadership in the promotion of OHS performance is needed.

1.3 The purpose, scope and contribution of this dissertation

The purpose of this dissertation is to provide an understanding of the challenges managers confront and the support they require when managing OHS. Thus, the dissertation aims to increase the knowledge regarding OHS management from the managers' perspective in the organisational context. Moreover, organisational measures that should serve to support managers with the management of OHS are suggested and a related framework is constructed. The dissertation is based on three sub-studies. The first sub-study describes the challenging OHS situations managers encounter, as well as the support they both experience and require when managing OHS, based on interviews with managers working in the public service sector. The second sub-study charts the organisational factors that hinder and promote managers' commitment to OHS

based on interviews conducted with managers in various industrial sectors. The third sub-study presents a categorisation scheme and illustrates the effective OHS leadership facets based on both the literature and interviews with managers working in a public service organisation.

The present study mainly relates to the safety and OHS literature based on the objectives and OHS perspective of the study. The safety and OHS concepts are used in parallel due to their partly overlapping nature in the literature. Where appropriate, safety is referred to as OHS, while OHS is used as a wider concept to encompass safety. The concepts of well-being and workplace health promotion (WHP) offer positive (voluntary) counterparts to the negative (mandatory) conception of OHS (Carlisle & Hanlon 2008; Heikkilä et al. 2013; Larsson 2015). Their definitions are close to the OHS conception adopted in this study and they should be viewed as parallel pathways to the promotion of OHS (Hymel et al 2011; Larsson 2015; Sorensen et al. 2013), although they are not discussed as such here. Nevertheless, the concept of health promoting leadership is discussed as part of OHS leadership when reasonable.

This dissertation employs an organisationally oriented approach to OHS (Härenstam et al. 2006; Larsson 2015) because it is a rarely studied subject (Conchie et al. 2013; Larsson 2015; Veltri el al. 2013). According to Veltri et al. (2013), when occupational safety is examined in the wider organisational context, additional rationale for improving safety become visible. Moreover, organisation-related measures can be developed within organisations contrary to, for example, personality issues. This study is mainly free of context-specificity, since OHS performance is generally seen as a more cultural than contextual issue within organisations (Fernández-Muñiz et al. 2007; Hale et al. 2010; Veltri et al. 2013). The scope of this dissertation is not restricted to certain industrial sectors or sizes of organisation, although small- and medium-sized organisations are not included in the study. The proposition here is that the theoretical concepts related to OHS management remain the same, even though the OHS risks may vary between organisations and industries.

Managerial work is studied in the organisational context based on managers' formal position (Grint 2005) and their role as a representative of an employer. Here, managers are considered to be both operational and non-operational, since the responsibility for OHS lies with everyone who holds a management position regardless of their functional area (Stricoff & Groover 2012). Moreover, the management of OHS is viewed as an organisational practice that is applied alongside other management practices across different organisational levels and processes including core and support processes. OHS is not the only objective of organisations and thus it competes with other organisational goals, including production. At the same time, OHS may also be seen as a means of

better achieving other organisational goals. With its organisational approach, this dissertation adds to the previous literature on managing OHS.

The OHS-related work is an integral part of general managerial work and the management development process within organisations. Managers are often considered to be multi-talented individuals with diverse skills and personal qualities, as well as a large social conscience, which results in an unwieldy and almost overpowering list of qualities (Bolden et al. 2003). Due to its organisational approach, this study is not interested in the managers' personality, intelligence, skills or traits (Yukl 2010), even though these individual factors might have an impact on the managers' general commitment to OHS (Barling et al. 2000; Conchie et al. 2013). The focus is instead on the managers' roles and responsibilities, as well as the approaches known to be effective in the management of OHS performance and, hence, organisational performance.

The OHS viewpoint concerns management (authority) and leadership (dynamic and flexibility) roles, which are both important for managers seeking to succeed in a modern organisation (Yukl 2010). In this study, the general management and leadership literature is exploited to an appropriate extent in relation to the objectives of the dissertation. However, general management and leadership receive less attention, since the management literature covers such issues.

Based on the previous literature (e.g. Clarke 2013; Fernández-Muñiz et al. 2007; Hale et al. 2010; Shannon et al. 1997), the proposition here is that management commitment to OHS improves both employee safety behaviour and OHS performance. Thus, the effects of management on OHS performance are not studied in this dissertation. Instead, the previous literature is exploited to identify those OHS management and leadership facets that are effective in supporting the development of OHS management within organisations.

While OHS management activities are primarily associated with managers in a formal position, other organisational actors (e.g. employees and OHS professionals) may also affect OHS management. In general terms, both the active role of OHS professionals and employee involvement (Hale et al. 2010; Shannon et al. 1999; Vinodkumar & Bhasi 2011; Yorio & Wachter 2014) are related to OHS performance. The role of OHS professionals is to provide the necessary advice and consultancy to managers regarding OHS practices in order to protect employees' health and safety, as well as to enhance operational outcomes (Veltri et al. 2013). Thus, they support the day-to-day operations of an organisation. However, an examination of the other actors lies outside the scope of this study.

This dissertation contributes to the literature by discussing the management of OHS in an organisational context and suggesting organisational measures to develop OHS management. With its focus on the managers' perspective, this study builds on the previous literature concerning managers' perceptions of OHS management. The dissertation extends the OHS management and leadership theory by encompassing theoretical perspectives on leadership research, as well as by presenting empirical findings on the topic. The view of OHS management adopted here encompasses a broader perspective, not only in relation to employee health and safety, but also organisational performance and management. For practitioners, it provides new knowledge regarding OHS management, effective OHS management approaches and their interconnections with organisational performance, which can be utilised in management development. The suggested organisational measures serve as a basis for the development of organisation-specific measures.

Finally, although this dissertation is a monograph rather than a collection of articles, it does relate to three articles that the author has co-authored. The articles have been exploited with the permission of the publishers and the co-authors. The author of this dissertation wrote all three articles as a lead author in cooperation with other authors. Apart from having the principal responsibility for writing the articles, the author was responsible for an independent part of the study design, data collection and analysis, and formulating the discussions and conclusions in all the articles. First, sections 4.1 and 4.2 (sub-study 1) are closely related to Tappura et al. (2014).[1] For this paper, the author was mainly responsible for the study design, theoretical background, and data collection and analysis in one of three organisations, as well as writing the corresponding results. The results in section 4.3 (sub-study 2) have been reported in Tappura et al. (2017).[2] For this paper, the author was responsible for the study design, data collection and analysis, and formulating the discussion and conclusions of the article. The co-authors participated in writing the theoretical background and undertaking an overall review of the article. The results in section 4.4 (sub-study 3) have been reported in Tappura and Nenonen (2016).[3] For this article, the author was mainly responsible for the study design. The data analysis and discussion of the results were conducted by both authors in cooperation.

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[1] Tappura, S., Syvänen & S. Saarela K.L. (2014). Challenges and Needs for Support in Managing OHS from Managers' Viewpoints. Nordic Journal of working life studies.
[2] Tappura, S., Nenonen, N. & Kivistö-Rahnasto, J. (2017) Managers' viewpoint on factors influencing their commitment to safety: an empirical investigation in five Finnish industrial organisations. Safety Science.
[3] Tappura S. & Nenonen, N. (2016). Categorization of effective safety leadership facets. Ergonomics and Human Factors in Safety Management. CRC Press.

2 Review of the Theoretical Context of the Research

2.1 Managerial work

2.1.1 Management requirements

Management can be defined as a relationship of authority that exists between a manager and his/her subordinates in order to achieve organisational goals (Rost 1991). The management function is typically divided into three levels, namely top (strategic level), middle (operative level) and frontline (supervisory level) management (Yukl 2010). Being a manager is an occupational role for people who have formal authority within an organisation (Yukl 2010). Managers often work under conflicting pressures brought about by a continual sense of urgency, an excessive workload, conflicts in the work community, fragmented work, organisational confusion and constant pressure to improve productivity and performance, achieve cost savings and implement changes (e.g. Björk et al. 2014; FIOH 2013; Skagert 2010; Syvänen 2010).

Managers are involved in different types of industry and they apply distinct requirements in order to comply with organisational goals. The organisational context, for example, the industry, location, culture and period of time, defines the social, task and physical context of an organisation, which in turn shapes the managerial work and regulates what managers can and cannot do. Managers are one of the categories of actor that constitute an organisation. Based on their organisational position, managers shape the context through their daily actions. They can influence the context and related formalities by following, neglecting or trying to change the organisation. Managers have to consider various organisational rules, norms, policies and standards, as well as the formalities that regulate how they interrelate within organisations. In their daily activities, managers relate to various formalities by adapting or opposing them. If there are conflicting formalities, managers must choose which formality to obey. (Björk 2013)

According to a review by Bolden et al. (2003), the identification of what is required of managers and how those requirements integrate with other activities is particularly important. The identified requirements serve as a basis for management development. Management competence requirements typically include technical management, process management, business management, quality management and risk management (Rose et al. 2007; Suikki et al. 2006; Viitala 2005). Similarly, the essential leadership competencies include resourcefulness, change management, problem solving, interaction, building relationships, communication, learning from difficult situations, being open to new ideas, composure, team leadership, integrity and trust

(Dainty et al. 2004; De Meuse et al. 2011; Mumford et al. 2000a, 2000b; SHRM 2008; White et al. 1996). Viitala (2005) identified the competence categories that are important in managerial work within the relevant literature (e.g. Garavan & McGuire 2001). The categories are: (1) technical competencies, (2) business competencies, (3) knowledge management competencies, (4) leadership and supervisory competencies, (5) social competencies and (6) interpersonal competencies (see Figure 1).
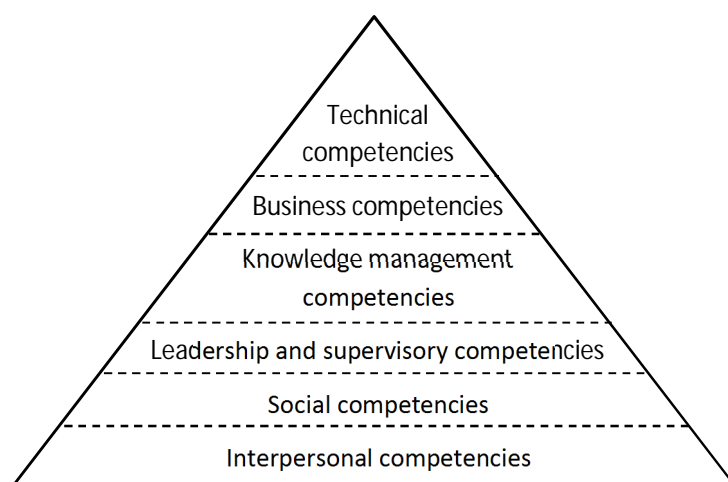
Figure 1. Management competence requirements (modified from Viitala 2005)

The upper-level competencies are connected to managers' education and specific work experience, and they are thus easier to develop. The competencies at the bottom are connected to the managers' personal traits and personal growth, and they are thus more difficult to develop. (Garavan & McGuire 2001; Viitala 2005) Moreover, technical and business skills are often emphasised, while social and intrapersonal skills are commonly neglected in managers' development intentions (Viitala 2005). According to Artz et al. (2014), there exists evidence that a manager's technical competence and workers' well-being are connected, and that such technical competence is the single strongest predictor of workers' well-being. Further, Kaplan et al. (2008) state that company success is related to both the manager's general execution skills and his/her interpersonal skills.

Managerial responsibilities typically include supervising, planning and organising, decision making, monitoring, controlling, coordinating, consulting and administering activities. The relative importance of these activities depends on the particular managerial position. (Yukl 2010) Moreover, the managerial competence requirements vary across organisational levels due to the differing nature of work across management positions (De Meuse et al. 2011; Mumford et al. 2000a, 2000b; SHRM 2008; Yukl 2010), which should be considered in relation to management development. The management

function is typically divided into three levels (Yukl 2010), and the relative importance of the technical, interpersonal and conceptual skills varies with the managerial level (see Figure 2).
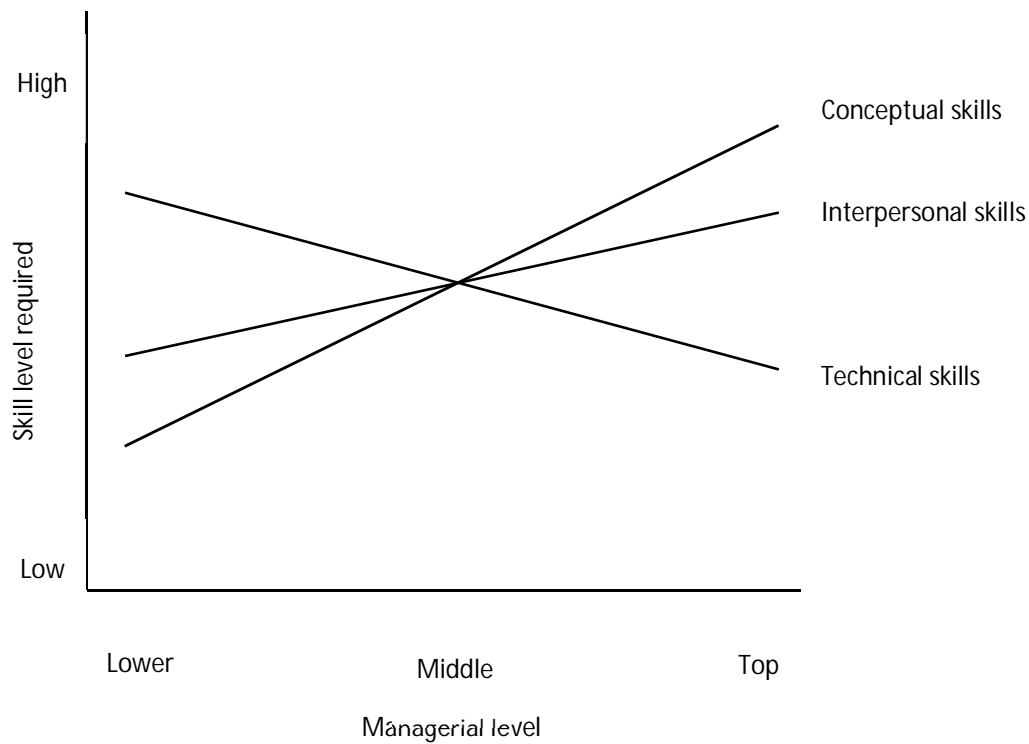
Figure 2. Relative importance of skills for different levels of management (modified from Yukl 2010, p. 69)

According to Yukl (2010), top management is responsible for establishing and implementing the overall objectives and strategies in relation to the organisational environment. The higher managerial levels typically require the management of complexity and strategic decisions and, thus, involve more conceptual and interpersonal skills. The middle management is responsible for organising and managing the activities needed to implement these objectives and strategies, which requires an equal mix of technical, interpersonal and conceptual skills. The frontline management coordinates and supervises the actual work, which requires more technical skills than the other levels of management.

2.1.2 Management and leadership

In the literature, the distinct processes or roles between management and leadership are often highlighted (e.g. Bass 1990a; Grint 2005; Kotter 1988, 1990; Yukl 2010). Management is concerned with organising, directing, controlling and maintaining workplace activities and order. Leadership is more concerned with influencing

subordinates and creating a shared culture and values in order to inspire and motivate employees. Leadership is more important for promoting change and development within an organisation (Daft 1999). Managers may also be leaders, but only if they have an influential relationship with their subordinates (Rost 1991). Managerial authority is seldom a sufficient basis for obtaining a commitment from subordinates: success as a manager involves leadership (Yukl 2010). Both the management and leadership roles are necessary, and problems can occur if the roles are not balanced. However, their emphasis depends on the situation with a particular organisation. The importance of managing and order increases when an organisation becomes larger, while the importance of leadership and flexibility increases when the external environment of an organisation becomes more uncertain and dynamic (Grint 2005; Kotter 1990; Yukl 2010; Yukl & Lepsinger 2005). Nevertheless, in his study, Kotter (1990) found that very few major companies operating in a dynamic environment had executives who were able to effectively carry out both the management and leadership roles. The management and leadership distinction is still effective in the management literature, and it is also applicable to OHS studies (Lu & Yang 2010). Thus, leadership is worthy of emphasis in managerial work to this day.

Leadership may be broadly defined as follows (Yukl 2010):

> Leadership is the process of influencing others to understand and agree about what needs to be done and how to do it, and the process of facilitating individual and collective efforts to accomplish shared objectives.

This definition includes influencing, for example, by articulating visions, embodying values and creating an environment in which things can be accomplished, as well as enabling employees to contribute to the success of the organisation (House et al. 1999; Richards & Engle 1986). The leadership theory often emphasises rule following, extrinsic incentives and monitoring and rewarding employees based on desired outcomes, but at the same time, visionary managers are seen to inspire employees to contribute towards organisational goals (Bass 1985; Lord 2008). In addition to the direct influence, effective leadership usually denotes managers' attempts to indirectly influence employees and their attitudes, beliefs or behaviours. This may happen, for instance, by means of management systems or leading by example, communicating via e-mail, participating in orientation or training sessions, or cascading down the authority hierarchy of an organisation. By consistently using both direct and indirect forms of influence, the effectiveness of leadership may be increased. (Yukl 2010)

Based on his review of the leadership literature, Grint (2005) presents four approaches to leadership, namely:

- Leadership as a person: Who are leaders and how do their qualities make them leaders?
- Leadership as results: What do leaders achieve that makes them leaders?
- Leadership as a position: Where do leaders operate that makes them leaders?
- Leadership as a process: How do leaders get things done that make them leaders?

All these approaches are ideal types; none of them exists in a pure form (Grint 2005). In this dissertation, the positional approach is relevant because leadership is studied with regards to a manager's formal position within an organisation. Thus, the position provides the manager with the resources necessary to lead, as well as authority and positional control over his/her subordinates (Grint 2005). The trait perspective (Yukl 1989) or managers' personality are not of interest to this study.

Numerous leadership theories have been used in prior OHS studies, including authentic leadership (Eid et al. 2012; Gardner et al. 2005), leader-member exchange theory (Dansereau et al. 1975; Hofmann & Morgeson 1999; Hofmann et al. 2003; Michael et al. 2006) and empowerment leadership (Arnold et al. 2000; Martínez-Córcoles et al. 2011). However, Bass's (1985) transactional and transformational leadership concept has been most widely utilised in previous OHS studies (e.g. Barling et al. 2002; Christian et al. 2009; Conchie & Donald 2009; Kapp 2012; Kelloway et al. 2006; Michael et al. 2006; Mullen & Kelloway 2009; Zohar 2002a), and it is applied in this study. Transactional leadership is oriented towards satisfying employees through adequate transactions, whereas transformational leadership is oriented towards transforming the organisation (Yukl 2010). Transactional leadership involves the manager establishing goals (e.g. OHS-related goals), actively monitoring the employees' performance with regards to those goals, and providing rewarding and corrective feedback concerning the employees' performance (e.g. safe behaviour).

Transformational leadership achieves results by increasing the employees' acceptance of the established goals. Managers serve as role models, inspire commitment to achieving goals, show an active interest in individual employees and challenge employees to overcome the obstacles that prevent them from achieving their goals (Barling et al. 2002; Bass 1985; Kapp 2012). Both the transactional and transformational leadership styles are related to effective leadership, with the best leaders demonstrating both styles (Bass 1985; Hoffmeister et al. 2014). Improving health, job satisfaction and motivation has positive effects on performance, and these factors may be influenced by a transformational leadership style (Bass & Avolio 1990). Transactional and transformational leadership consists of theoretically distinct multidimensional constructs that can be divided into more specific leadership facets (Bass 1985), which may affect safety in different ways and for different reasons (Hoffmeister et al. 2014). The

characteristics of the major leadership facets related to both transactional and transformational leadership are summarised in Table 1.

Table 1. Characteristics of transactional and transformational leadership facets

Transactional leadership	Transformational leadership
Contingent Reward: Providing appropriate rewards and recognition for positive behaviours (Bass 1985). Clearly communicating desired behaviours and reward contingencies to employees, and actually recognising accomplishments so as to reinforce the desired behaviours (Bass 1985, 1990b).	*Idealised Influence:* Instilling pride and evoking integrity, trust and respect in employees (Bass 1990b; Bass & Riggio 2006), who ultimately view leaders as role models (Bass & Riggio 2006).
	Individualised Consideration: Providing personal attention (Bass 1990b). Attends to the individual differences in the needs of employees. Coaching and mentoring employees in order to help them reach their full potential (Avolio 1999; Bass & Riggio 2006).
Management by Exception: Discouraging negative behaviour. Active management by exception is proactive and focused on prevention (Bass 1985). Employee performance is actively monitored to detect deviations from necessary rules and standards, and corrective action is taken. Passive management by exception involves reactive interventions, but only if standards are not met (Bass 1985, 1990b).	*Inspirational Motivation:* A leader's clear articulation of a compelling vision and the need for employees to work towards that vision, resulting in more inspired employees. Encouraging employees to strive for something beyond their individual goals (Bass 1985).
	Intellectual Stimulation: Promoting intelligence, rationality and careful problem solving (Bass 1990b). Reflects the extent to which a leader solicits employees' perspectives on problems and considers a wide variety of opinions when making decisions. Inspiring employees to think creatively and innovatively (Bass 1985).

According to Lord (2008), both the transactional and transformational leadership styles view managers as initiating social organisation forms and having the right to influence employees (top-down hierarchical structure). However, in complex systems (bottom-up hierarchical structure), the transactional and transformational leadership concepts may be insufficient, since patterns emerge within individuals that lead to the emergence of interpersonal structures and less manager-centred leadership. In this study, the top-down perspective on leadership is appropriate because of the formal and positional approach to managerial work.

2.1.3 Managerial influence on organisational performance

Organisational performance is based on the understanding how results are produced by the management system, including all its processes, resources, controls and interactions (Purushothama 2014). The process approach is often emphasised in obtaining a desired result, by managing activities and related resources as a process. The purpose of the process approach is to enhance an organisation's effectiveness and efficiency in achieving its defined objectives. (ISO 9001:2015)

According to Yukl (2008), organisational effectiveness consists of an organisation's ability to survive, perform its mission, and maintain favourable earnings, financial resources and asset values. Organisational effectiveness depends on performance determinants, namely the efficiency of the internal processes and adaptation to the external environment. Efficiency refers to the extent to which the organisation minimises the cost of the people and resources needed to carry out essential operations. Reducing unnecessary costs (such as occupational injury costs) can therefore improve a company's performance. In addition to the type of industry and any turbulence in the external environment, managers' actions and decisions influence the determinants. Top managers can improve performance by means of specific management and leadership behaviours, as well as deciding on an appropriate organisational structure, processes and competitive strategy. Moreover, advancing managers' relations with employees can improve employee outcomes (Bass & Avolio 1990; Michael et al. 2006; Stinghamber & Vandenberghe 2003; Yukl 2008).

In the leadership research, the most commonly emphasised types of variables relevant to understanding leadership effectiveness include: (1) characteristics of the leader, (2) characteristics of the follower (employee) and (3) characteristics of the situation (Yukl 2010). Yukl (2010) suggests that a manager's management skills impact on that manager's behaviour, which in turn influences employees' attitudes and behaviour and, hence, organisational performance (see Figure 3). Nevertheless, both the influence and situational variables should be considered when such a pathway is followed. Moreover, Yukl (2008) argues that previous studies are too narrowly focused to explain how top management influence the financial performance of large corporations, meaning that a more extensive view is required. In this study, the focus is on certain characteristics of managers, namely their OHS management skills and behaviour, and certain characteristics of the situation, namely organisational factors related to effective OHS management.
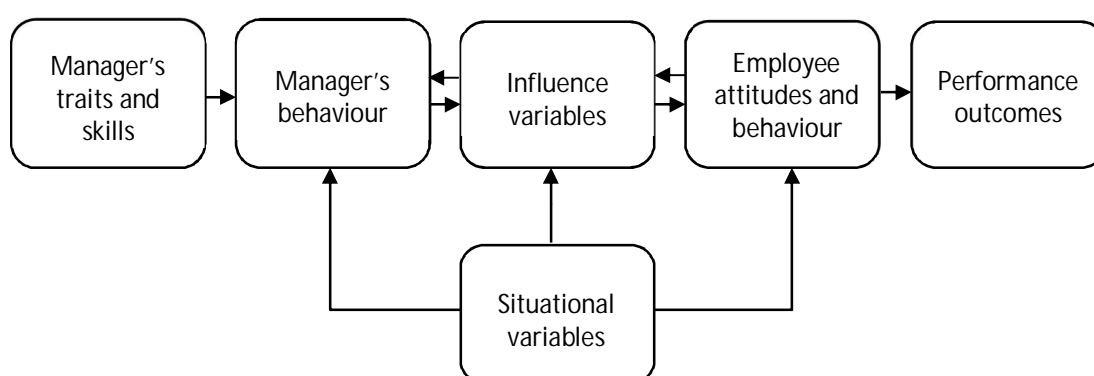
Figure 3. Causal relationships among the primary types of leadership processes (modified from Yukl 2010, p. 31)

Managerial effectiveness is usually measured by the extent to which organisational performance is enhanced and goals are attained. However, the evaluation of leadership effectiveness is difficult due to the many different and contradictory measures. Moreover, immediate results can be seen, although delayed effects take longer (months or years) to occur and may be influenced by extraneous events. (Yukl 2010)

There are three types of leadership behaviour that have implications for organisational effectiveness (see Table 2). Task-oriented behaviours are most useful for improving efficiency and change-oriented behaviours are most useful for improving adaptation, while relations-oriented behaviours are most useful for improving human resources and relations (Bass 1990a; Yukl 2008, 2010).

Table 2. Effective leadership behaviours (Bass 1990a; Yukl 2008, 2010)

Type of leadership behaviour	Objective	Tasks	Effects
Task-oriented behaviour	Improve efficiency Improve productivity and reduce costs by eliminating - unnecessary activities - duplication of effort - wasted resources - errors - accidents	Short-term planning and scheduling of work activities Determining resource and staffing requirements Assigning tasks Clarifying objectives and priorities Emphasising the importance of efficiency and reliability Directing and coordinating activities Monitoring operations Dealing with day-to-day operational problems	Enhance the performance of individual subordinates and small groups
Change-oriented behaviour	Improve innovative adaptation	Monitoring the environment in order to identify threats and opportunities Interpreting events and explaining why major change is needed Articulating an inspiring vision Taking risks to promote change Building a coalition of supporters for a major change Determining how to implement a new initiative or major change	Enhance individual and team performance Enhance innovative adaptation by encouraging and facilitating collective learning, diffusion of knowledge and the application of new ideas within the organisation
Relations-oriented behaviour	Improve human resources and relations	Showing support and positive regard Providing recognition for achievements and contributions Providing coaching and mentoring Consulting with people about	Is related to higher job satisfaction and lower turnover Can reduce stress and build mutual trust and cooperation Increase the collective

Type of leadership behaviour	Objective	Tasks	Effects
		decisions that will affect them Delegating and empowering subordinates Encouraging cooperation and teamwork Building a network of information sources inside and outside the organisation	identification with the team or organisation Facilitate performance by individuals and teams

According to Bass and Avolio (1990) and Bass et al. (2003), effective leadership is based on transactional leadership, while transformational leadership builds on this by broadening the leader's effect on performance. Dvir et al. (2002) and Lowe et al. (1996) argue that transformational leadership can enhance employees' motivation and performance. Even though the research identifies effective leadership styles, many managers lack an understanding of performance determinants and their related leadership behaviour (Yukl 2010; Yukl & Lepsinger 2005). Nevertheless, there is no formula that will guarantee organisational performance (Yukl & Lepsinger 2005). Moreover, related studies are often too narrow or of poor methodological quality, which means that they should be considered with caution (Yukl 2008). Thus, leadership is worth emphasising in the research.

2.1.4 Management development

Management development studies have suggested that improving self-knowledge is the basis for all true management development (Lord & Hall 2005; Pedler et al. 1986; Viitala 2005). Based on Viitala's study (2005), managers' own interpretation of their development needs should be supported within organisations. Development activities may involve formal (such as training) and informal learning and work experience (Pfeffer 1998; Schoonenboom et al. 2007; Suikki et al. 2006). According to Viitala (2005), in organisations where management development is well organised and connected to strategic management, managers are more aware of their development needs. However, the managers' development intentions differed from the ideas presented in the literature regarding management competencies and "good management". Interestingly, the managers specified important management development areas at a general level, although they did not express any development needs at a personal level. This may reflect deficiencies in competence development procedures at the organisational level. The competence development process, however, is outside the scope of this study, and it is therefore not discussed here.

Leadership typically involves a complex mix of behavioural, cognitive and social competencies that may develop at different rates and require different learning experiences (Lord & Hall 2005; Mumford et al. 2000a, 2000b). Developing leadership requires a manager's active role, motivation and interest in leadership (Chan & Drasgow 2001; Lord & Hall 2005). Lord and Hall (2005) suggest that the development of leadership skills needs to go beyond the traditional standpoint of training or self-directed learning to a deeper level. They point out that when leaders progress from novice to expert, they become increasingly capable of flexibly drawing on internal resources such as identities, values and mental representations of employees and situations.

Lord and Hall (2005) argue that in order to further his/her leadership skills, a manager needs both a sense of identification with the role and sufficient self-confidence to attempt developmental leadership activities. Furthermore, opportunities to develop leadership skills may require proactive steps on the part of a potential manager, rendering the manager's own motivation and interest in leadership a critical requirement for leadership development (Chan & Drasgow 2001).

2.2 OHS performance

2.2.1 Performance effects of OHS

OHS performance refers to the OHS-related actions and behaviours that employees exhibit in all kinds of work in order to promote the health and safety of themselves and others (Burke & Signal 2010). Hence, employees' behaviour is often seen as a predictor of injuries (Hofmann & Stetzer 1996; Martínez-Córcoles et al. 2011; Neal & Griffin 2006), while employees' safety compliance and safety participation are often considered to be distinct aspects of safety (or OHS) performance (Griffin & Neal 2000). Safety compliance refers to the core safety-related activities that employees must perform to maintain their safety in the workplace, whereas safety participation refers to their voluntary participation in safety-related activities and the development of safety in the workplace (Borman & Motowidlo 1993; Griffin & Neal 2000). Consequently, OHS performance may be seen as a result of an organisation's ability to manage its OHS risks (BS 18004:2008) and develop OHS in the workplace.

OHS performance is typically evaluated through occupational injuries and ill health, as well as predictive measures (e.g. behavioural observations, safety climate surveys, audit scores and expert judgement) and how well the OHS management system is functioning (Barling et al. 2002; Basso et al. 2004; Hale et al. 2010; Neal et al. 2000; Reiman & Pietikäinen 2012). In the study by Hoffmeister et al. (2014), safety climate scores were

considered to be the most important safety performance indicators. As for the safety climate, it is influenced by the managers' actions and leadership style (e.g. Eid et al. 2012; Hoffmeister et al. 2014; Kapp 2012; Wu et al. 2008). Safety leadership and the safety climate are important predictors of both safety and OHS performance, and they should both be improved with regards to OHS performance (Barling et al. 2002; Blair 2003; Clarke 2013; Killimett 2006; Wu et al. 2008; Zohar 2010).

In this study, the organisational and management practices that contribute to OHS performance are of interest. The importance of top management support for successful OHS performance and change is almost universally recognised (e.g. Hale & Hovden 1998; Shannon et al. 1997). Organisations with a strong management commitment to OHS may reduce OHS-related events, as well as increasing other outcomes, including job satisfaction, organisational commitment and job-related performance (Michael et al. 2005). The major organisational practices that support OHS performance, based on the previous research, are presented in Table 3. In numerous studies (e.g. Geldart et al. 2010; Hale & Hovden 1998; Hale et al. 2010; Mearns et al. 2003; O'Toole 2002; Shannon et al. 1997; Vredenburgh 2002; Zacharatos et al. 2005; Yorio & Wachter 2013), management practices (e.g. management commitment, rewards, communication and feedback, employee involvement and collaboration) are related to OHS performance, typically injury rates. According to Yorio and Wachter's (2013) research, all the studied OHS management practices were negatively associated with the rate of injuries and illnesses, although the wide use of such practices was more effective than any one of the individual practices (see also Hale et al. 2010).

Table 3. Examples of studies providing evidence on the major organisational practices that support OHS performance

Reference	Industry	Major organisational OHS practices
Chen et al. 2009	Printed circuit board manufacturer in Taiwan	Top management's commitment and support Collaboration among company personnel Completion rate of corrective and preventive measures
DeJoy et al. 2004	Large retailer in the USA	Safety policies and programmes Communication Organisational support
Geldart et al. 2010	Manufacturing companies in Canada	Managerial policies, for example, - encouraging career commitment on the part of workers - expression of concern regarding safety Collaboration Attitude and values of top management and the manifestation of that attitude
Griffin & Neal 2000	Manufacturing Mining	Management values Safety communication Safety practices (e.g. safety training and inspections)

Reference	Industry	Major organisational OHS practices
Hale et al. 2010	Several	Number of independent interventions Top management's active role Active role of the safety professional(s) Dialogue between workforce and frontline management, for example, - active encouragement of the reporting of dangerous situations Top management training

Mearns et al. 2003	O□shore oil and gas installations in the UK	Proficiency in safety management practices, for example,
		  - management commitment
		  - employee involvement
		  - safety audits

O'Toole 2002	Concrete producer in the USA	Management commitment Leadership
Shannon et al. 1997	Several	Empowerment of the workforce Delegation of safety activities Active role of top management Level and use of discipline for safety violations
Vinodkumar & Bhasi 2011	Chemical companies in India	Management commitment Safety communication Safety training Safety rules and procedures Workers' involvement in safety

Vredenburgh 2002	Hospitals in the USA	Management practices, for example,
		  - management commitment
		  - communication and feedback
		  - participation

Yorio & Wachter 2014		Employee involvement Safety training Pre- and post-task safety reviews

According to Petersen (2000), various barriers may prevent companies from attaining better results and excellence in safety-related matters despite the existence of ample research in this regard. However, excellence in safety is possible, regardless of any barriers. Based on the safety research, Petersen (2000) suggests the following criteria for safety excellence, which reflect management's commitment to safety at different organisational levels:

1. A safety system mandating supervisory performance.
2. Middle managers involved in their threefold role of:
    a. Ensuring supervisory performance;
    b. Ensuring the quality of that supervisory performance; and
    c. Doing something that shows commitment.
3. Top executives visibly demonstrating that safety is a value.
4. A system in place to activate employee involvement.

5. A safety system that is flexible in that units, managers and supervisors have some choice as to their defined activities.
6. A safety system perceived as positive by all.

Achieving sustainable OHS performance requires attention to be paid to both OHS management and leadership practices and cultural change within organisations. Some organisations have achieved very high levels of OHS performance, while many organisations fail to effectively manage OHS. Although the situation is quite complicated, it is vital that the right issues are emphasised and effective interventions are managed (Fitzgerald 2005; Killimett 2006). Moreover, there is still little evidence concerning how OHS management and leadership should be approached in order to have a positive impact on employees' health (Dellve et al. 2008).

Management commitment, accountability and leadership are often seen as important in delivering breakthrough OHS performance (Bryden 2002; Hale et al. 2010; Jitwasinkul et al. 2016; Killimett 2006). Killimett (2006) argues that managers who can get their subordinates to do the right work in the right way and maintain a successful relationship with employees are effective at fostering high levels of safety performance. According to Petersen (2000), management performance is determined by the accountability system within the organisation, expectations in terms of performance at each level of the organisation, adequate competencies to fulfil these expectations, measuring whether the expectations are fulfilled, and ensuring performance is rewarded. Once a management accountability system is in place, the rest is easy to achieve. Recently, some development has taken place regarding these points (Tappura et al. 2015b), although there is still room for the further development of the prerequisites of excellence.

2.2.2 Influence of OHS performance on organisational performance

Organisations nowadays operate in the context of increasingly stringent legislation, the development of measures intended to foster good OHS practices and increased concern on the part of interested parties regarding OHS issues. The valuation and prioritisation of OHS are increasingly being evaluated by organisations' customers, employees and collaborators. (Biggs & Biggs 2013; Montero et al. 2009) Hence, in many industrial organisations, safety is both a value and a strategic objective (Nenonen et al. 2015). Moreover, many industrial organisations nowadays procure services from external service providers and operate at multiemployer worksites where safety is of common interest (Nenonen 2012).

OHS issues are increasingly associated with the operational efficiency and competitiveness of organisations (Boyd 2003; Fernández-Muñiz et al. 2009; Köper et al. 2009; Linhard 2005). According to Fernández-Muñiz et al. (2009), OHS management

has a positive influence on the OHS performance, competitiveness performance and economic-financial performance of an organisation. In addition, Köper et al. (2009) link OHS to overall business performance and competitiveness by reporting the connection between health-related issues and key performance factors such as quality, productivity, cost reduction and absenteeism. The results of their study support a correlation between health-related issues and organisational performance, whereas adverse work conditions negatively affected business issues. Thus, good OHS management can have a positive effect on not only OHS indicators, but also on competitiveness variables and financial performance (Fernández-Muñiz et al. 2009; Green 1994). OHS performance may therefore be considered a subsystem of organisational performance (Wu et al. 2008).

An understanding of the positive performance effects of OHS encourages organisations to implement effective OHS policy and practices (European Commission 2011). Moreover, management effectiveness is typically measured by the extent to which organisational performance (e.g. productivity, efficiency or quality) is enhanced and the related goals are attained (Yukl 2010). When an organisation has a high frequency of accidents, maximally effective productivity and quality are unlikely (Carder & Ragan 2003). The development of OHS has been found to have a positive influence on, for example, decreased absenteeism and presenteeism, medical costs, work-related early retirements, occupational injuries and related administrative costs, while it was seen to increase working capacity (e.g. Aaltonen et al. 2006; Berger et al. 2012; Chhokar et al. 2005; Clarke & Cooper 2004; DeRango et al. 2003; Gavious et al. 2009; Hlobil et al. 2007; Nelson et al. 2006; Yeow & Sen 2003). Thus, emphasising positive OHS outcomes represents one means of supporting management effectiveness and organisational performance.

To encourage organisations to invest in the development of OHS, information should be provided on both the non-financial and financial consequences of OHS (Risikko 2009; Tappura et al. 2015a). However, the OHS-related costs are commonly underestimated within organisations, since they are typically not included in management accounting systems and they are not systematically calculated due to a lack of understanding of the compensation system and the indirect costs involved (Cagno et al. 2013; Gavious et al. 2009; Jallon et al. 2011; Tappura et al. 2013; Tappura et al. 2015a). According to the review by Tappura et al. (2013), the costs of occupational accidents are typically divided into direct (e.g. absence, medical and insurance) costs and indirect (e.g. overtime, administrative, loss in productivity and legal) costs. The direct costs are easily identifiable and they are often insurable costs that can be derived from the accounting system of an organisation. The real challenge is to estimate the indirect costs, which are usually uninsured (Cagno et al. 2013; Jallon et al. 2011). The indirect costs are typically estimated to be notably higher than the direct costs (Tappura et al. 2013).

At the same time, many organisations underestimate the economic benefits of OHS improvements (Tappura et al. 2013). However, studies concerning the economic effects of OHS interventions have typically resulted in very positive outcomes, for instance, the reported payback periods are typically months rather than years (e.g. Chhokar et al. 2005; Kemmlert 1996; Lyon 1997; Oxenburgh & Marlow 2005). Yet, the positive effects have also been challenged by, for example, Tompa et al. (2010) and Uegaki et al. (2010), who argue that little empirical evidence actually supports this assumption, in addition to the methodological quality of the studies having been poor. Moreover, how the productivity increase is measured remains questionable, as does how much of the productivity increase is caused by OHS actions and improvements (Sievänen et al. 2013). The effectiveness of an OHS investment (i.e. whether it contributes to better performance) is not self-evident and it depends on the OHS culture of an organisation (Feng 2013; Veltri et al. 2013).

A great deal of research has been conducted in recent decades in the field of occupational stress and its relationship with physical and mental illness (Clarke & Cooper 2004). In addition to other OHS risks and the related occupational injuries, psychosocial risks are widely recognised as major challenges to OHS due to their weakening both occupational health and well-being and organisational performance (e.g. EU-OSHA 2007; Eurofound 2010; European Foundation 2007; Leka et al. 2011). Psychosocial hazards threaten employees' health, as well as influencing accident causation and occupational injuries (e.g. Bonde 2008; Clarke 2010; Clarke & Cooper 2004; De Jonge et al. 2000; Godin & Kittel 2004; HSE 2007a; Karasek et al. 1981; Leka et al. 2011; Lundberg & Melin 2002; Sutherland & Cooper 1991; Theorell & Karasek 1996; Vahtera et al. 2000). Psychosocial hazards are related to the design and management of work and its organisational contexts, which have the potential to cause psychological or physical harm to employees (Cox & Griffiths 2005). They are linked to work-related stress, as well as workplace violence, harassment and bullying (EU-OSHA 2007).

High strain and psychological demands (high demand) coupled with low decision-making latitude and personal freedom (low control) are associated with ill health, including emotional exhaustion, psychosomatic health complaints and cardiovascular diseases (e.g. Alfredsson et al. 1982; De Jonge et al. 2000; Karasek et al. 1981; Kivimäki et al. 2006; Theorell & Karasek 1996). Moreover, work-related stress influences accident involvement, affecting employees' behaviour either directly or indirectly via psychological and physical strain (Clarke & Cooper 2004). Law et al. (2011) found a significant relationship between adverse psychosocial work environments (PSWEs), including those featuring inappropriate behaviours such as bullying and harassment, and related psychological health problems. Work-related stress accounts for a high proportion of illness-related absences due to, for example, mental, cardiovascular and

musculoskeletal symptoms (e.g. Alfredsson et al. 1982; Bonde 2008; European Foundation 2007, Godin & Kittel 2004; Karasek et al. 1981; Kivimäki et al. 2006; Lundberg & Melin 2002; Theorell & Karasek 1996). It is estimated that 40–60% of all work absences are related to stress (Clarke & Cooper 2004; Earnshaw & Cooper 2001; Schabracq et al. 1996), while occupational stress is involved in 60–80% of work accidents (Clarke & Cooper 2004; Sutherland & Cooper 1991). Based on a study concerning emerging OHS risks in Europe (EU-OSHA 2014), the role of managers after periods of austerity, as well as how they can be engaged and trained to effectively manage psychosocial risks, is extremely important.

Difficult OHS management situations and deficiencies in PSWE can also be seen from the perspective of internal inefficiency (Leibenstein 1987; Syvänen 2010) or organisational slack (Bourgeois 1981; Leibenstein 1969; Singh 1986), which results from an organisation's failure to utilise the full potential (quantity and quality) of its available resources. Different problems associated with individual-, group- and organisational-level factors can potentially undermine the efficiency of an organisation. These include the individual features of the work (workload, pace, quality and timetable), work-related effort, under- and overload, problems with work control, individual work behaviours, and group function, interaction, cooperation, management and leadership (e.g. Alfredsson et al. 1982; Frantz 1988; Karasek et al. 1981; Leibenstein 1987; Siegrist et al. 2004; Syvänen 2010; Theorell & Karasek 1996; Tomer 1987). Due to these problems, efficiency remains below the maximum level, while internal inefficiency is present in the organisation and its production processes.

Unresolved conflicts generate costs due to increased stress, frustration and anxiety, as well as sleeping problems, mistakes, accidents, long and short sickness leaves, premature retirement and job changes (e.g. Clarke & Cooper 2004; Dana 2001; Earnshaw & Cooper 2001; Schabracq et al. 1996; Sutherland & Cooper 1991). The costs associated with PSWE-related illnesses and accidents are enormous; hence, the successful management of PSWE risks is highly beneficial for organisations (e.g. Clarke & Cooper 2004; Dana 2001). Moreover, the employer should minimise the time and effort dedicated to processing PSWE problems and conflicts due to productivity demands (Clarke & Cooper 2004; Leka et al. 2011). Good OHS management and active conflict resolution promote occupational well-being and the achievement of performance objectives (Leka et al. 2011). It is important to point out and enhance the managers' own understanding of the necessity of their role in managing OHS (Idris et al. 2012), as well as their effects on both the OHS of their employees and the performance of the organisation.

OHS management is an integral part of business management and managers' tasks and, hence, it should be closely integrated into the general business management processes

of organisations (e.g. Bluff 2003; EU-OSHA 2010a; EU-OSHA 2012a; Hale 2003; Hyttinen 1994; Simola 2005; Veltri et al. 2013). According to Veltri et al. (2013), organisations that trade OHS for business gains generally lose out in both regards. The promotion of OHS could also be seen as an element of corporate social responsibility, which is an active, voluntary responsibility built upon economic, environmental and social principles (ISO 26000:2010; Montero et al. 2009; Risikko 2009). Concerns regarding the OHS and well-being of employees constitute one of the main aspects of any organisation's social responsibility (Montero et al. 2009). Nevertheless, the OHS management perspective is generally overlooked in management and HR studies (Boyd 2003; Veltri et al. 2013; Zanko & Dawson 2012).

According to Veltri et al. (2013), if an organisation's OHS professionals adopt primary responsibility for OHS, it is not prioritised by operational managers. In which case, the managers might attempt to mitigate OHS risks when they have time, although it is not their top priority. Operational managers should have ultimate responsibility for OHS. This should appear as an organisational commitment to follow processes and implement rules regardless of how much production pressure there is. While operational priorities tend to be negotiable and change over time, OHS is always paramount and non-negotiable. When an organisation has achieved the full integration of OHS with operations, it becomes part of the overall job and the operational practices that are used to manage operations are jointly used to manage OHS. This serves to reduce risks without the need for formal practices led by OHS professionals. Moreover, organisations that positively link the management of operations and the management of OHS can bring about simultaneous improvements in operational and OHS outcomes. On the contrary, poor OHS management is typically part of poor management in general.

2.3 OHS management and leadership

2.3.1 OHS management regulations

In the 1970s, many industrialised countries introduced detailed OHS regulatory initiatives in order to reduce occupational injuries and ill health. This strategy, however, did not prove sufficiently effective and it was therefore replaced by a new strategy emphasising OHS management and managers' role in reducing occupational injuries and ill health. (Frick & Wren 2000; EU-OSHA 2012b) In the Nordic countries, OHS regulations have changed from a descriptive definition of OHS as a gradually increasing list of risk factors to a definition of the work environment that emphasises every aspect of work and its conditions that may affect employees' health (Bluff 2003; Frick 2013; Frick & Wren 2000). In addition to regulations, many countries have instituted programmes that emphasise

the employer's voluntary improvement of OHS (Frick et al. 2000; Ministry of Social Affairs and Health 2011; Robson et al. 2007).

In Europe, the OHS Framework Directive (89/391/EEC), as well as further OHS directives, forms the foundation of health and safety legislation. In Finland, the OHS Framework Directive has been transposed into the Occupational Safety and Health Act (2002/738), the Occupational Healthcare Act (2001/1383) and their supplementary regulations. The OHS regulations state the requirements for both employers and employees. In this study, the focus is on the employers' responsibilities and the managers' role as a representative of the employer. Based on their formal authority, managers represent their employer in relation to OHS legislation, which provides detailed responsibilities on the part of employers (2002/738). The OHS regulations provide the foundation for OHS management requirements; hence, managers at all levels should be aware of those requirements.

According to the OHS legislation (2002/738), the employer should improve the working environment in order to ensure the working capacity of employees, prevent occupational accidents and diseases, and eliminate hazards to the physical and mental health of employees stemming from work and the working environment. The employer should put OHS procedures in place regarding the continuous monitoring of the working environment, as well as systematic hazard identification and assessment. Hazards include hazardous events or situations with the potential to cause occupational injury or ill health, for example, physical, chemical, biological and psychosocial hazards (OHSAS 18001:2007).

Due to changes in the work environment, the mental and emotional demands of work have increased, while psychosocial risks have emerged in addition to the physical, chemical and biological risks, which pose a major challenge to OHS (EU-OSHA 2007; EU-OSHA 2014; Eurofound 2010; Lehto et al. 2015; Leka et al. 2011; Siegrist et al. 2004). According to Abildgaard and Nickelsen (2013), however, the current work environment research inadequately divides the elements of working conditions into separate physical and psychosocial domains, whereas the concept of a psychosocial work environment should be expanded to include a wider range of phenomena.

Psychosocial risks are related to the design and management of work and its organisational contexts (Cox & Griffiths 2005; Cox et al. 2000; Lehto et al. 2015), job insecurity, work-related stress, as well as workplace violence, harassment, bullying and unsolved conflicts (EU-OSHA 2007; EU-OSHA 2014). OHS regulations actually require employers to respond to work-related psychosocial risks in a way similar as to other OHS risks (Ertel et al. 2008). However, some studies suggest that the OHS legislation is not very effective in managing a work environment's psychosocial risks (Leka et al. 2011).

The employer has a responsibility to promote good relations with and among employees, which involves improving collaborations and encouraging appropriate interactions in the work community (2006/44). According to the review by Nielsen et al. (2010), communication and a collaborative climate are of central importance when employers are struggling to improve the psychosocial work environment. Employers are responsible for actively solving problems in the work community. For example, when harassment or other inappropriate forms of employee treatment occur and pose risks to the employees' health, the employer should impose any measures necessary to remedy the situation (2002/738). If necessary, the manager has both the power and the obligation to take action.

However, in practice many managers lack such power because upper management often ignores its legal duty to manage OHS risks and instead delegates issues to frontline supervisors without providing any resources, support, guidance or monitoring of the results (Frick 2013). Therefore, organisational structures and OHS procedures should support managers in their ability to focus on the OHS risks found in their workplace, since their origins are often at the organisational level (Cox & Griffiths 2005; Idris et al. 2012; Skagert 2010). For example, psychosocial risks are often related to an imbalance between workload and time, or problems regarding relations, leadership and trust. These are mostly high-level issues and, thus, frontline managers are not able to resolve them without support from upper management (Frick 2013). According to studies conducted by Hasle et al. (2008) and Saksvik et al. (2002), clarification of the roles and responsibilities of middle management and the continuous support of top management are critical to success, especially in terms of stress management interventions. Thus, effective organisational interventions are required to support managers, as well as to develop procedures to assist managers in protecting the health and safety of employees (Law et al. 2011).

The OHS legislation obligates the employer to provide adequate prerequisites such as resources, competence and orientation for managers (2002/738). In addition, voluntary OHS management systems (e.g. ILO 2001; OHSAS 18001:2007) presume that managers are aware of their responsibilities and have sufficient competence to carry out OHS-related tasks. In order to show commitment to OHS, managers require the competence to act appropriately and communicate necessary facts to employees. Managers who are able to effectively engage with OHS-related problems are likely to make decisions that will positively affect OHS and reflect a commitment to OHS. This can be achieved, for example, by developing their skills, knowledge and ability to understand OHS problems, show active involvement and communicate effectively. (Fruhen et al. 2014a)

According to Rundmo and Hale (2003), managers must have the competence to carry out the tasks necessary to prevent work-related injuries, and they must assign and prioritise the resources (time, money, competence and equipment) associated with the related tasks. They have to apply effective management control methods in order to ensure that the tasks are carried out successfully and on schedule. Moreover, they have to know who to collaborate with if a need should arise. According to Simola (2005), managers' awareness, competence and commitment are important in achieving positive results regarding the promotion of OHS. Thus, managers require both knowledge and tools to manage their responsibilities.

2.3.2 Effective OHS management systems

In addition to the OHS regulations, voluntary standards and guidelines (e.g. ILO 2001; OHSAS 18001:2007) for OHS management systems (OHSMSs), as well as definitions of an effective OHSMS (Frick et al. 2000; Gallagher et al. 2001), provide guidance on good management practices concerning OHS. In recent decades, OHSMS concepts and standards have been internationally applied (Fernández-Muñiz et al. 2009; Frick et al. 2000, Hasle & Zwetsloot 2011; Robson et al. 2007; Zutshi & Sohal 2005), and they are used alongside other management systems, for example, quality and environment management systems, and their integration within organisations (Zutshi & Sohal 2005). In recent years, having OHSMSs in place has increasingly become a business-to-business requirement for many organisations (Hasle & Zwetsloot 2011). The upcoming new OHSMS standard ISO 45001 (ISO/DIS 45001:2016) emphasises that the OHS aspects should be embodied within the overall management system of the organisation, which requires a much stronger buy-in from its management and leadership than the earlier OHSMS specification OHSAS:2007. This could represent a significant change for standard users who may currently delegate responsibility to a safety manager rather than integrating it into the organisation's operations.

Modern OHS management denotes the enforcement of systematic and formalised principles and procedures in order to improve OHS within organisations (e.g. Bluff 2003; Frick & Wren 2000; Frick et al. 2000; Gallagher et al. 2001; OHSAS 18001:2007; Saksvik & Quinlan 2003). The OHS management system of an organisation rely on the policy defined by the management and the resources they allocate (Gunduz & Laitinen 2017). The OHS management concept involves the establishment, implementation and follow-up of organisational policies, acceptance criteria and goals related to safety and health (Kjéllen 2000). A distinction between OHSMSs and safety management systems (SMSs) should be considered, since SMSs focus on controlling a process, often in high-reliability operations, and the general physical work environment (Robson et al. 2007), while OHSMSs focus on employees' health and safety, which is the subject of this dissertation.

Many definitions of OHSMSs exist (e.g. Gallagher 1996; ILO 2001; ISO 18001:2007; Robson et al. 2007). However, for the purpose of this study, the following definition (based on Gallagher 1996) is used: An OHSMS is a combination of the management's organisational arrangements, including planning and review, the consultative arrangements and the specific programmes that combine to improve OHS performance. Hence, OHSMSs are seen as systematic and effective managerial procedures intended to reduce occupational injuries and ill health in the workplace (Frick & Wren 2000). Nevertheless, there exist no clear boundaries between OHS activities, OHS management and OHSMSs (Nielsen 2000).

The presence of an OHSMS is a necessary prerequisite for OHS excellence, although the mechanical implementation of OHSMS requirements is not sufficient. Certain management practices that emphasise employees' engagement and performance should be strongly embedded into the implementation of the OHSMS. (Wachter & Yorio 2014) The mechanical approach needs to be supplemented by organisational measures intended to promote an understanding of the psychological and social factors inherent in the work environment (Törner & Pousette 2009). Management's responsibility and accountability for OHS are often seen as key to OHS excellence within organisations (Biggs et al. 2013; Bryden 2002; IOSH 2010; Petersen 2000), while the managers' role in OHS management is emphasised to reduce occupational injuries (Frick & Wren 2000).

The effectiveness of an OHSMS depends on the manner in which the guidelines (such as ILO 2001 or OHSAS 18001:2007) are implemented rather than on certain implementation guidelines (Drais et al. 2008). Moreover, the organisational practices associated with OHSMSs vary based on the organisational context and culture, as well as the size, work environment and economic activities of an organisation (Drais et al. 2008; EU-OSHA 2012b; Gallagher et al. 2001).

Many OHSMS concepts have fairly similar structures and elements, with an emphasis on continuous improvement (Fernández-Muñiz et al. 2009). Redinger and Levine (1998) have constructed an integrative OHSMS model based on public management systems for OHS, environment and quality. They identified the following 16 primary elements:

1. Management commitment and resources
2. Employee participation
3. Occupational health and safety policy
4. Goals and objectives
5. Performance measures
6. System planning and development
7. OHSMS manual and procedures
8. Training system

9. Hazard control system
10. Preventive and corrective action system
11. Procurement and contracting
12. Communication system
13. Evaluation system
14. Continual improvement
15. Integration
16. Management review

These elements of successful OHSMSs or good safety management that predicts OHS performance are widely presented and agreed upon (e.g. Hale 2003; Levä 2003; Robson et al. 2007; Shannon et al. 1997; Vinodkumar & Bhasi 2011; Vredenburgh 2002). Thus, the functional elements of a good OHSMS are well known, and they are applicable to various organisations. According to Hasle and Zwetsloot (2011), however, OHSMSs are still more focused on safety than on health, although the OHS regulations (89/391/EEC; 2002/738) address safety and health equally, while OHSMSs are developed for a broader approach.

The success of OHSMSs depends on the nature of the intervention, the characteristics of the organisation and the external environment (Robson et al. 2007). Nevertheless, there exist limitations in terms of the quality and quantity of the studies concerning OHSMS effectiveness (Hale 2003; Robson et al. 2007). Such studies cannot illustrate the likely effect of a particular type of OHSMS intervention in a particular type of organisation (Robson et al. 2007). In addition, some criticisms and doubts regarding OHSMSs have also emerged (Robson et al. 2007), including the effectiveness of mandatory OHSMS strategies (Quinlan & Mayhew 2000) or a false sense of security due to the existence of a formal OHSMS (Gallagher et al. 2003).

The success of an OHSMS depends on commitment from all employees of the organisation, but especially from top management. According to OHSAS 18001:2007, top management have ultimate responsibility for OHS and the OHS management system. Hence, top management should:

- Define and authorise the organisation's OHS policy and ensure its appropriate implementation.
- Establish procedures for:
    o hazard identification and risk assessment;
    o recording, investigating and analysing incidents; and
    o identifying legal and other OHS requirements.
- Establish OHS objectives and programmes for achieving those objectives.

- Provide the resources necessary to establish and improve the OHS management system, as well as to monitor OHS performance.
- Define roles, allocate responsibilities and accountabilities, and delegate the authority to facilitate effective OHS management.

Due to their responsibility for establishing OHS management, managers should be able to understand and manage it, uphold and control it, propagate it, and improve it (Guldenmund 2010). Top management should also ensure that all employees who perform tasks that could impact on OHS are competent and have the appropriate education, training or experience. Internal communication with regards to OHS hazards and the OHS management system should be established among the various levels of the organisation. The participation of employees in OHS matters should also be encouraged. (OHSAS 18001:2007)

In relation to managers at different levels within an organisation, top management should (OHSAS 18001:2007):

- Identify managers' responsibilities with respect to the management of OHS.
- Document managers' responsibilities and authority for, for example, job descriptions or OHS procedures.
- Ensure that managers are aware of their responsibilities and accountability for OHS.
- Ensure that managers have the necessary authority to fulfil those roles.
- Clarify the responsibilities between different functions and levels of management, especially between the managers and OHS professionals, in order to avoid ambiguity.

At the middle management level, major OHS task is to create, maintain, develop and follow-up consistent OHS procedures according to the organisation's safety policy as well as provide support to their subordinates (frontline managers). Moreover, they intervene in non-safety activities and report the necessary development needs to top management. The frontline managers supervise and monitor the daily work, and when necessary, intervene in non-safety activities. They also report the deficiencies and development need to upper management levels. (Tappura et al. 2016)

Dellve et al. (2008) found a connection between organisational and leadership strategies (as an element of systematic OHS management) and occupational disorders. When OHS management is well organised and the related routines and structure are clear, the long-term work attendance is higher. Nevertheless, the leadership perspective is generally not emphasised in OHS management studies.

OHSMSs, when successfully implemented, may have positive effects on both OHS and economics. The effects may arise, for example, from a reduction in injuries, material damage and absenteeism (Fernández-Muñiz et al. 2009), a decrease in premium rates (Alsop & LeCouteur 1999; Yassi 1998), a decrease in employee compensation costs (Bunn et al. 2001; Yassi 1998) and enhanced productivity (Dufour et al. 1998). Moreover, positive effects on competitiveness were identified due to positive influences on the company's image, reputation, productivity and innovation, which contributed to the company's sales, profits and profitability (Fernández-Muñiz et al. 2009). However, there is ongoing debate regarding whether or not OHSMSs are effective. An OHSMS can be understood as a tool for management, a tool that can be used for different purposes and with different ambitions and applications (Hasle & Zwetsloot 2011). There is a lack of research concerning the effectiveness of OHSMS interventions on employees' health and safety and economic outcomes. Moreover, the OHSMS studies lack generalisability due to the small number of studies and their weak methodological quality (Robson et al. 2007).

In addition to widely used OHSMSs (e.g. ILO 2001; OHSAS 18001:2007), some examples of broadening the scope of OHSMSs in order to consider the full range of OHS risks have recently been presented (Hasle & Zwetsloot 2011). The World Health Organisation (WHO 2010b) developed a model for "healthy workplaces" featuring many characteristics similar to an OHSMS, while the Health and Safety Executive in the UK (HSE 2007a; Mellor et al. 2013) developed a Management Standards approach to managing stress. Moreover, a publicly available standard for the management of psychosocial risks has been developed, which can be considered as a supplement to the OHSAS 18001:2007 specification (Leka et al. 2011).

2.3.3 Safety culture

A positive safety culture is often seen as a pathway to both improved OHS and enhanced organisational performance (e.g. Dingsdag et al. 2006; Hale et al. 2010; HSE 1997; Michael et al. 2005). The concept of a safety culture can be defined as a reflection of the attitudes, beliefs, perceptions and values that employees and managers share in relation to safety (Cox & Cox 1991; Hale 2000). Good safety culture is essential for safe operation (Blair 2003; Mearns et al. 2003). A safety culture can be seen as a subset of an organisational culture and can be affected by nominant organisational culture (Clarke 1999; Cooper 2002). The cultures cannot be separated, since they involve and interact with the same organisational systems, employees and managers (Cooper 2002; Veltri et al. 2013). Antonsen (2009) and Veltri et al. (2013) suggest that the organisational culture and its relationship with safety should be the focus of safety researchers, rather than the safety culture. In this study, the foundation is the safety research tradition, while the focus

is on the safety culture as far as the concept is used. The organisational culture is therefore not discussed separately here.

According to Guldenmund (2000), the safety culture comprises those aspects of the organisational culture that will impact attitudes and behaviour related to increasing or decreasing risk. The safety culture is determined by what the organisation pays attention to and what it considers important, but also by what it ignores (Weick 1998). Safety performance is affected by these socially transmitted beliefs and attitudes toward safety in the organisation (Ostrom et al. 1993). Technical, physical, or engineering controls and safety management systems are important, but they are insufficient if the organisational culture is not conducive to safe work (IOSH 2004).Moreover, the broader sociotechnical work environment and its organisational and psychosocial factors should be considered in order to improve workplace safety (Carayon et al. 2015; Smith & Sainfort 1989). Cayon and Smith (2000) suggest that the sociotechnical approach may be a way to discuss, integrate and balance various goals, including safety, in organisations.

According to Rollenhagen (2010), the safety culture often implies a moral aspect, although such an aspect is not typically considered in safety culture models. The safety culture is often seen to only apply to safety-critical or safety-oriented organisations (Robson et al. 2007), but in this study, the concept of a safety culture is seen in how different organisations take into account OHS issues related to their work.

According to Reason (1997), a safety culture should be socially engineered, since it arises from shared practices. The process concerns collective learning and doing many things while focusing on the prevention of occupational injuries. He defines four critical subcomponents of a safety culture: a reporting culture, a just culture, a flexible culture and a learning culture. It is necessary to socially engineer an effective reporting culture and encourage people to report relevant matters. A just culture is needed to encourage people to provide essential safety information. At the same time, people should be aware of the line between acceptable and unacceptable behaviour. A flexible culture is essential to being able to effectively adapt to changing demands. It depends on the skills, experience and abilities of the workforce, especially the frontline managers. This requires training and a learning culture in order to foster an adequate willingness and competence to draw the right conclusions concerning safety information and perform the right safety actions when necessary.

Management commitment to safety is recognised as a fundamental component of an organisation's safety culture (Hale et al. 2010; HSE 1999; Reason 1997). Managers' ability to effectively communicate the organisation's safety vision, values, expectations and standards is critical to a positive safety culture (Biggs & Biggs 2013; Hale et al. 2010; Hardison et al. 2014). The way senior managers instruct, reward, allocate attention and

behave is salient in shaping the organisational culture (Schein 2010). Thus, employees' perceptions of senior managers' OHS attitudes and behaviours form the basis for their safety behaviour and, therefore, OHS performance (Clarke 1999). Employees typically do not have direct contact with senior management; thus, they base their perceptions on local managers and supervisors (Clarke 1999). According to Zohar (1980), employees' perceptions of personal risk are related to their safety behaviour, although the cognition that guides employees' behaviour is substantially related to their perceptions of management attitudes concerning OHS. Cooper and Phillips (1994) argue that employees' perceptions of management attitudes and actions have a direct effect on their behaviour. Moreover, there exists evidence that the perceived management commitment to OHS is predictive of incident reporting by employees (Clarke 1996).

High-performing organisations share common cultural features (HSE 1997; Veltri et al. 2013), while safety performance improvements can be achieved through cultural change (Fizgerald 2005). Two factors, namely management commitment to safety and employees' involvement in safety matters, have been replicated in many studies (e.g. Cox & Cheyne 2000; Dedobbeleer & Béland 1991; Fernández-Muñiz et al. 2007; Flin 2003; Guldenmund 2007; Hofmann & Stetzer 1996; Mearns et al. 2003). Moreover, safety communication has been emphasised in various studies (e.g. Hale et al. 2010; HSC 1993; Kines et al. 2010; Simola 2005; Vredenburgh 2002). According to the UK Health and Safety Regulator (HSE 1999), the organisational factors associated with a safety culture include senior management commitment, management style, visible management, good communication and a balance between health and safety and production goals. The development of a safety culture depends on the managers' role in the promotion of employees' safe behaviour, both directly through their attitudes and behaviour and indirectly by developing the OHSMS (Fernández-Muñiz et al. 2007).

A safety culture could be seen as the organisational potential for safety when an organisation appropriately performs certain key control functions (Reiman et al. 2012). A safety culture is principally established and maintained by management through its actions with regards to OHS. Management's role as an attitude-setter and good example has been emphasised in numerous studies (HSE 1997; McDonald et al. 2000; Reason 1997). The Health and Safety Executive (1997) emphasises control, cooperation, communication and competence as the key characteristics of a safety culture. According to Reiman et al. (2008), other widely accepted elements of a safety culture include competence, resources, quality of instructions, personnel risk perceptions, organisational learning practices and the effectiveness of a safety management system.

The three most important features of an organisation, namely structure, culture and processes, interact to generate the desired level of safety (and OHS) performance (Figure 4). Thus, a holistic approach is needed and an organisation's culture should not

be isolated from its structure or its processes. OHS management is primarily a process, although it is also present within the organisational structure. Hence, a more explicit focus on the development of OHS management will ultimately influence the organisational culture. (Guldenmund 2010)
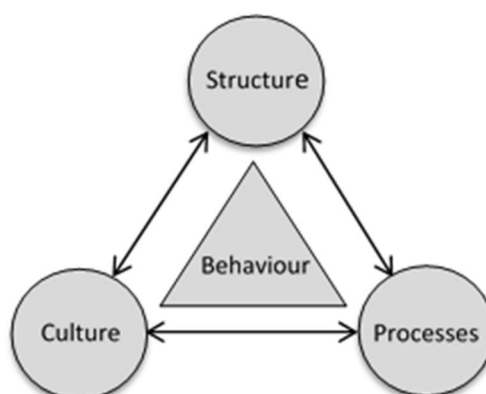
Figure 4. The interaction between an organisation's structure, culture and processes to generate the desired level of safety performance (modified from Guldenmund 2010)

Examples of successful safety culture interventions guide OHS management. In their comprehensive study, Hale et al. (2010) studied interventions within companies that introduced changes aimed at reducing occupational accidents by changing their safety culture and aspects of their safety management. The most successful interventions included fostering constructive dialogue between shop-floor staff and frontline management, providing motivation for line managers and strengthening the monitoring and learning loops within the safety management system. The amount of energy and creativity injected by top management and the OHS professionals also appeared to be a distinguishing factor between the interventions. Safety leadership is increasingly seen as important in the development of a safety culture, climate and performance, and it has therefore been actively studied in recent years (e.g. Killimett 2006; Künzle et al. 2010; O'Dea & Flin 2001; Wu et al. 2008; Zohar 2002a, 2003).

In their study, Veltri et al. (2013) found a supportive culture for safe operations in some of the studied facilities (see Table 4). Those facilities are committed to safety, are disciplined in terms of how work is conducted, have a prevention focus, are participatory and tend to adopt a long-term perspective on the management of both OHS and operations. The top performing facilities in terms of the operational outcomes were also the top performers in relation to safety outcomes, and these facilities all featured supportive cultures. According to Veltri et al. (2013), there exists a positive relationship between managing safety and managing operational outcomes.

Table 4. Four dimensions of a supportive safety culture (Veltri et al. 2013)

Dimension	Description
Facility is committed to working safely	The organisation is committed to safety as an integral part of operations. Safety is a core value influencing the behaviour of employees.
Facility is disciplined in terms of how work is conducted	Rules and processes are created and followed as a means of achieving business and safety outcomes.
Employees participate in managing their work environment	Employees are engaged as stakeholders in the organisation and thus have input in the execution of the work.
Facility has a prevention focus	The facility is managed in a proactive and preventative fashion with the goal of zero variance.

Interestingly, Veltri et al. (2013) found that the nature of the work or competitive environment was not predictive of either the culture, OHS practices or outcomes. Thus, the contextual factors did not predict the organisational practices and culture, while the adverse operating environment did not prevent safety and operational performance. Similarly, Yorio and Wachter (2013) suggest that the industrial sector of an organisation is not related to the effectiveness of its OHS management practices. According to Killimett (2006), when successful and unsuccessful safety performance interventions are compared, more than any contextual factor, the quality of the organisation's leadership and its influence on the culture determined the level of success. Hale et al. (2010) argue that difficult times concerning, for example, reorganisations, lack of investment, redundancies and other major disturbances cannot be used as an excuse for failing to improve safety performance. Further, high work pressure is actually more commonly present in successful companies than in unsuccessful ones. Based on these examples, there seems to be something else (e.g. leadership) that distinguishes successful interventions and organisations from unsuccessful ones.

The safety culture is expressed through the organisational climate, while the climate can be taken to mean the manifestation of culture within the organisation (Guldenmund 2000). The safety climate could be defined as the surface features of an organisation's underlying safety culture. This is discerned from the employees' attitudes and perceptions at a given point in time, that is, a snapshot of the state of safety (Cox & Flin 1998; Flin 2003). The safety climate is one of the main indicators of OHS outcomes, including safety behaviour, injury rates and health problems (Zohar 2003, 2010). Empirical links have been found between safety climate perceptions and actual safety behaviour, although their relationship is complicated (Cooper & Phillips 2004). Work environment conditions, safety-related policies and programmes, and the organisational climate all contribute significantly to the safety climate (DeJoy et al. 2004).

2.3.4 Management commitment to OHS

Based on the literature presented in sections 2.3.1, 2.3.3 and 2.3.3, managers' commitment to OHS is commonly considered to be one of the key elements of successful OHS management, safety climate and culture (e.g. Biggs et al. 2013; Fernández-Muñiz et al. 2007; Flin 2003; Guldenmund 2000; Hale et al. 2010; Robson et al. 2007; Wu et al. 2008). Moreover, several studies have suggested that an organisation's industry or operating environment is not predictive of OHS performance, although the management commitment to safety is important (Hale et al. 2010; Killimett 2006; Veltri et al. 2013; Yorio & Wachter 2013).

Managers' commitment to OHS can be defined as the extent to which they place a high priority on OHS, as well as how effectively they communicate and act regarding OHS issues (Neal & Griffin 2004, as cited in Fruhen et al. 2014a). Engagement is often synonymous with commitment (Conchie et al. 2013) and it is defined as the extent to which a person shows energy, enthusiasm, a sense of inspiration and full concentration in her/his role, that is, as a manager (Schaufeli & Bakker 2004, as cited in Conchie et al. 2013). In this study, commitment refers to managers' commitment to OHS as linking both the management and leadership perspectives on the managerial role, which widens the concept of Conchie et al.'s (2013) study on engagement in safety leadership.

According to the historical review conducted by Swuste et al. (2010), the organisational aspects of safety were stressed as early as the beginning of the 19th century by DeBlois (1925), Eastman (1910) and Greenwood (1934). Greenwood (1934) considers safety as a line responsibility of the foremen because of her/his responsibility for the direct supervision of safe behaviour. Moreover, process disturbances are the main cause of accidents, and it is the managers' responsibility to ensure safe production lines. At that time, changing employees' behaviour by means of training and enforcement was the common practice, although managers rather than employees should have been blamed if the occupational injury records of an organisation remained on a plateau.

Employees' perceptions of managers' commitment to safety is one of the most significant predictors of accidents and near accidents (Christian et al. 2009; Cohen 1975; Hale et al. 1997; Rundmo 1992; Smith et al. 1978), as well as predicting their reporting (Clarke 1996). Moreover, managers' visible commitment is essential if employees are to accept changes to their working routines (Clarke 1996; Huse & Cummings 1985). Managers who successfully demonstrate the honest and consistent prioritisation of employee safety can promote the development of employees' trust in the importance of safety, which may motivate workers to behave more safely (Conchie et al. 2012; Jitwasinkul et al. 2016; Törner 2011). However, despite managers' essential role, some still show low levels of commitment to OHS and instead prioritise production criteria. Thus, the level of

implementation of OHS management procedures may be low, resource allocation for preventive actions could be limited and managers may only seek the avoidance of legal responsibilities when adhering to formal compliance with regulations. (Fernández-Muñiz et al. 2009) These findings highlight the value of managers exhibiting a strong commitment to safety. Therefore, managers' commitment to OHS should be supported within organisations in order to achieve real improvements in OHS (Simola 2005). In her study of managers' and employees' perceptions concerning the importance of safety, Clarke (1999) found that positive attitudes and shared perceptions of the importance of safety are not a sufficient basis for the development of a positive safety culture. If a collective concern is not recognised at all hierarchical levels or intergroup perceptions reveal biased views regarding the safety attitudes of other levels, it may influence employee-management communication, confidence in management and the commitment to safety, which could hamper OHS development. Thus, the management commitment should be consistent among the different management levels and organisational units.

Previous research concerning managers' OHS commitment has focused on the different managerial actions that demonstrate commitment from the employees' viewpoint (e.g. Michael et al. 2005). Conchie et al. (2013) studied supervisors' engagement with safety leadership from the managers' perspective, whereas Huang et al. (2012) examined the interconnection between employees' and supervisors' perceptions of management safety commitment. However, studies investigating managers' commitment from the managers' own viewpoint remain scarce (Conchie et al. 2013; Fruhen et al. 2014a).

Despite the general understanding of the importance of managers' commitment to OHS, relatively little attention has been paid to the factors that influence such a commitment (Conchie et al. 2013). Research conducted in the non-safety domain has shown that individual factors (Barling et al. 2000) and contextual factors in the work environment (Arvey et al. 2006) significantly affect organisational commitment. Individual factors such as personality or emotional intelligence are beyond the scope of this study and are hence not investigated here. This study is interested in the contextual factors because they are less frequently studied (Bommer et al. 2004; Conchie et al. 2013; Porter & McLaughlin 2006) and can be developed within organisations. Physical, social and organisational demands (such as a hazardous work environment) and resources (such as peer support) may affect engagement positively or negatively depending on the context and whether they are perceived as a hindrance or a challenge (Conchie et al. 2013; Crawford et al. 2010; Demorouti et al. 2001). Examples from the safety literature of the organisational factors that affect managers' commitment to OHS are presented in Table 5.

Table 5. Organisational factors identified in the literature that may hinder or promote managers' commitment to OHS

Study	Industry	Hindering factors	Promoting factors
Conchie et al. 2013	Construction	Role overload Production pressure Formal procedures Workforce characteristics	Social support Perceived autonomy
Fruhen et al. 2014a	Air navigation services		Senior management training and guidance concerning problem-solving abilities and perceptions of others
Michael et al. 2005	Wood products manufacturing		Developing management's knowledge of the manufacturing process Emphasising managers' role in showing personal concern for employee safety Developing consistent safety attitudes and actions among production managers
Simola 2005	Metal manufacturing		Management training Safety improvement programmes
Tappura & Hämäläinen 2011	Several		Management training and workshops incorporating dialogue and company-specific examples
Tappura et al. 2013	Several	Underestimation of occupational accident costs	Knowledge of overall occupational accident costs

Conchie et al. (2013) identified several contextual factors that either hinder or promote supervisors' commitment to safety leadership. Multiple and often conflicting role responsibilities and production pressures reduced the time supervisors had available for safety activities and impeded their commitment to safety. Formal procedures related to administration and discipline, as well as conflicts between formal discipline procedures and their preferred style of leadership, were also regarded as hindrances. Workforce characteristics, which include subcontractor safety attitudes, inadequately skilled employees and language barriers, likewise emerged as a hindering factor. For some supervisors, a lack of management training or experience was regarded as a hindrance.

Consequently, supervisors exhibited coping mechanisms such as adopting a directive approach of telling rather than consulting and adapting their leadership approach to the situation or employee, which helped them to meet the role's demands. Meanwhile, social support and autonomy were perceived as the main resources for promoting engagement. Providing organisational support, conveying the message that safety is a top priority that

is expected of supervisors, equipping supervisors with adequate safety knowledge and providing supervisors with the necessary tools all supported the supervisors' safety commitment. The importance of peer support, as well as both professional and personal relationships with co-workers, was emphasised. Support and 'backup' from managers was also perceived as crucial. Most of the supervisors agreed that managers could provide more support, for example, verbal recognition.

According to Michael et al. (2005), developing managers' knowledge and understanding of the manufacturing process helps them to identify unsafe working conditions, equipment and behaviours, as well as to take corrective actions reflecting their commitment to safety. Emphasising managers' and supervisors' responsibility to show personal concern for employees' safety and health, to implement work training programmes, to participate in safety committees and to consider safety in job design may all help to improve their commitment to safety. Furthermore, developing consistent attitudes and actions, for example, not allowing safety to be compromised, among production managers and supervisors helps them to demonstrate such a commitment.

Managers' commitment to OHS arises from increased safety awareness, which may be induced by an accident or other crisis or by a training or OHS improvement programme (Simola 2005). According to Tappura and Hämäläinen (2011), such commitment can be promoted by workshops and training consisting of a joint dialogue that builds a shared understanding of OHS issues. Fruhen et al. (2014a) suggest that training and guidance designed for senior managers should focus on their problem-solving abilities and perception of others in order to support their demonstration of a commitment to OHS.

Tappura et al. (2013) state that estimating the overall occupational accident costs could increase managers' OHS awareness, as well as helping them to focus on optimal OHS investments and the introduction of preventive actions; that is, it could help managers to internalise the importance of OHS measures from the economic perspective. However, these costs are often underestimated, which may negatively influence managers' commitment to OHS. At the same time, instead of seeing safety as an economic or business issue, many managers perceive safety to be a value in itself, as well as a moral obligation (Nenonen et al. 2015). Nevertheless, both perspectives must be considered when developing different managers' commitment to safety.

2.3.5 Health- and safety-promoting leadership

In recent decades, the mental and emotional demands of work have increased, while managerial work has been challenged by changes in working life (e.g. FIOH 2013; Leka et al. 2011; Siegrist et al. 2004; Viitala 2005; White et al. 1996). In addition to the OHS risks to physical health, risks to mental health have also emerged, and they are widely

recognised as posing major OHS challenges for organisations, weakening OHS and well-being, as well as organisational performance (e.g. EU-OSHA 2007; Eurofound 2010; European Foundation 2007; Leka et al. 2011). At the same time, the role of leadership is gaining attention in the OHS literature (e.g. Barling et al. 2002; Clarke & Flitcroft 2008; Dellve et al. 2007; Eriksson 2011; Hofmann et al. 2003; Skagert 2010; Zohar 2002a, 2002b; Zohar & Luria 2003, 2004). Although the positive effects of leadership are widely recognised, less is known about the specific leadership facets that promote OHS performance (Conchie et al. 2013; Griffin & Hu 2013; Hoffmeister et al. 2014; Killimett 2006). In Table 6, examples of health- and safety-promoting leadership behaviour are presented, which are further discussed in the following sections.

Table 6. Examples from the literature providing evidence of leadership behaviours that support OHS performance

Reference	Industry	Leadership behaviour
Biggs et al. 2013	Construction	Demonstrating a commitment to safety Encouraging employee involvement Communicating a clear vision and shared safety values Listening to employees' ideas and concerns about safety Supporting employees in practice and in difficult situations
Clarke 2013		Active transactional leadership Transformational leadership
Eriksson 2011	Public services	Creating a health-promoting culture and values Motivating employee participation in health promotion
Griffin & Hu 2013	Different occupations	Safety inspiring Safety monitoring
Hoffmeister et al. 2014	Construction	Idealised attributes Idealised behaviour
Hofmann & Morgenson 1999	Manufacturing	Providing employees with a clear understanding of safe procedures and the consequences of unsafe behaviours Supporting safe behaviours
Kapp 2012	Manufacturing and construction	Contingent reward Transformational leadership
Mearns & Reader 2008	Offshore oil and gas industry	Support reflecting care and concern for the well-being of employees
Offermann & Hellmann 1996	Multinational bank	Encouraging employee participation Providing emotional support Removing control Supporting employees in work facilitation Building trust
Shain & Kramer 2004		Providing a personal example Supporting employees in health promotion activities Managing work in a health- and safety-promoting way by balancing the demands placed on employees, encouraging participation, clarifying employees' role and recognising employees' performance
Skagert 2010	Public services	Acting as shock absorbers of workplace stress Leading continuous change Maintaining trust

Reference	Industry	Leadership behaviour
Wu et al. 2008	University	Safety control
		Safety coaching
		Safety caring

According to Mearns and Reader (2008), appropriate social exchanges within an organisation may lead to unanticipated benefits when employees' safety behaviour moves beyond normal compliance. Nevertheless, the influence of leadership variables on occupational injury and pain is often minimal (e.g. Christian et al. 2009; Hoffmeister et al. 2014). According to Hoffmeister et al. (2014), more proximal safety outcomes (such as the safety climate) are more strongly related to leadership than more distal outcomes (such as injuries and pain).

2.3.5.1 Health-promoting leadership

Research suggests that leadership influences employees' health and related sickness absences (e.g. Corrigan et al. 2002; Dellve et al. 2002; Kuoppala et al. 2008; Nyberg et al. 2008), as well as playing an important role in creating health-promoting workplaces (Chu et al. 2000; Eriksson et al. 2010; Gilbreath & Benson 2004; Shain & Kramer 2004). According to Mearns and Reader's study (2008), the supervisor's concern for the employees' well-being and support in relation to health issues appeared to have a positive impact on the employees' safety performance outcomes.

For example, occupational stress has major effects on both physical and mental illness and the related absenteeism (Clarke & Cooper 2004; Earnshaw & Cooper 2001). However, managers' understanding of what relates to employee stress may be inadequate (EU-OSHA 2014; Offermann & Hellman 1996). Managers occupy a position where they can affect the presence or degree of stress factors, and they hence need to understand the leadership practices that remediate employee stress. Numerous management behaviours have been empirically linked to the reduction of stress, including support, individualised consideration and fair interpersonal treatment (HSE 2007b). Based on the results of Skagert's (2010) study, managers handle stress in the workplace by acting as shock absorbers or leading continuous change while maintaining trust. Offermann and Hellmann (1996) suggest that delegating, encouraging participation and providing emotional support are associated with reduced stress, while control is associated with an increased risk of stress being experienced by employees. Manager support in terms of work facilitation, approachability, team building, interest in employee growth and building trust were all shown to be significantly related to employee stress. However, the different categories of staff members (e.g. clerical or professional tasks) should be considered, since the relationships between leadership and perceptions of stress vary between occupations. Professional orientation, greater ability, experience, training, knowledge and more intrinsically satisfying tasks may serve as substitutes for

leadership (Kerr & Jermier 1978). These characteristics are typical of professional work, which may weaken the impact of leadership on professional tasks (Offermann & Hellmann 1996).

In Sweden, the concept of health-promoting leadership is used when leadership and its effects on health in the workplace are studied (Eriksson 2011; Eriksson et al. 2008, 2010; Skagert 2010). Health promotion may be seen as enhancing health and well-being, as well as preventing ill health at work (WHO 2002). Health includes physical and mental well-being (WHO 1986) and, thus, health promotion should target both the physical and psychosocial work environments (Kuoppala et al. 2008). According to Marmot et al. (1995), the physical, mental and social well-being of employees correlates with the rate of sickness absenteeism.

Workplace health promotion presumes organisational support, for example, balancing the demands placed on employees, encouraging employees' participation and clarifying their role, as well as recognising their performance (Eriksson et al. 2010; Gilbreath & Benson 2004; Shain & Kramer 2004; Väänänen et al. 2004). Accordingly, workplace health promotion has evolved from individual-oriented activities to a more holistic approach (Chu et al. 2000). Skagert (2010) claims that managers' leadership qualities and health promotion strategies have important effects on employees' health and work attendance. The managers' perception of an organisation as being responsible for its employees' health and a focus on change affects their health promotion strategies. However, managers need supportive organisational structures and communication concerning everyday dilemmas in order to practice such leadership.

Eriksson (2011) concludes that health-promoting leadership aspires to create a health-promoting culture and values in the workplace, as well as to motivate employee participation in related development. It presumes managerial knowledge and skills, in addition to adequate organisational practices to support managers in health promotion. To support health-promoting leadership at the organisational level, a preventive view and the promotion of organisational interventions, such as management training designed to change the system that produces the stress before it occurs, are recommended (Offermann & Hellmann 1996). Thus, researchers emphasise the contextual factors when evaluating the role of leadership (Björk 2013; Eriksson 2011; Offermann & Hellmann 1996).

2.3.5.2 Safety-promoting leadership

Safety leadership is seen as important in the development of the safety culture, climate and related performance, and hence it has been actively studied in recent years (e.g. Barling et al. 2002; Biggs et al. 2013; Clarke 2013; Clarke & Ward 2006; Conchie et al.

2013; Eid et al. 2012; Griffin & Hu 2013; Hoffmeister et al. 2014; Hofmann & Morgeson 2004; Hofmann et al. 2003; Kapp 2012; Künzle et al. 2010; Lu & Yang 2010; O'Dea & Flin 2001; Wu et al. 2008; Zohar 2010). Lately, safety leadership has been studied in relation to systems thinking (Donovan et al. 2017; 2018).

In order to promote OHS performance, leadership is a key factor in motivating both the safety participation and compliance of employees (Borman & Motowidlo 1993; Griffin & Hu 2013; Griffin & Neal 2000; Kapp 2012; Mullen et al. 2017). Moreover, safety leadership may also affect the productivity of an organisation via the employees' motivation and commitment, fluency of work, and costs related to accidents, absences, conflicts or quality (e.g. Biron & Bamberger 2012; Lewis 2009; Sievänen et al. 2013). Thus, an understanding of the key role of leadership and the related behaviours in improving OHS is essential (Biggs et al. 2013). O'Dea and Flin (2001) studied site managers' experience and preferred style of safety leadership. They concluded that organisational improvements need to be made, including the harmonisation of OHS practices and processes, in order to support managers in safety leadership.

The safety leadership research leans on the leadership theory. Previous studies suggest various leadership styles as being suitable for OHS performance improvements (e.g. Barling et al. 2002; Clarke 2013; Eid et al. 2012; Griffin & Hu 2013; Hale et al. 2010; Kapp 2012; Martínez-Córcoles et al. 2011). Both the transactional and transformational leadership theories have been shown to have positive impacts on employees' safety compliance and participation, as well as the safety climate (Barling et al. 2002; Clarke 2013; Griffin and Hu 2013; Hoffmeister et al. 2014; Kapp 2012). Moreover, leader-member exchange relations influence subordinates' performance and outcomes (e.g. Bass & Avolio 1990; Michael et al. 2006; Stinghamber & Vandenberghe 2003). Specific leadership facets, however, are rarely studied within the safety leadership literature, although determining the relative contributions of the different leadership facets to safety can aid researchers and practitioners in developing better interventions (Hoffmeister et al. 2014).

According to Hofmann and Morgenson (1999), employees' safety performance improves when they have a clear understanding of safe procedures and the consequences of unsafe behaviours, as well as when their safety behaviours are supported by their supervisors. Safety coaching and control have both been identified as important elements of safety leadership (Blair 2003; Williams 2002; Wu et al. 2008). They affect the safety compliance and safety participation (Griffin & Neal 2000) of employees, resulting in enhanced compliance with safety rules and procedures, as well as improving workplace safety (Kapp 2012). Similarly, transactional leadership (Bass 1985) impacts safety compliance, while transformational leadership (Bass 1985) impacts safety

participation and the overall safety performance of employees (Clarke 2013; Griffin & Hu 2013; Kapp 2012), as presented in Figure 5.
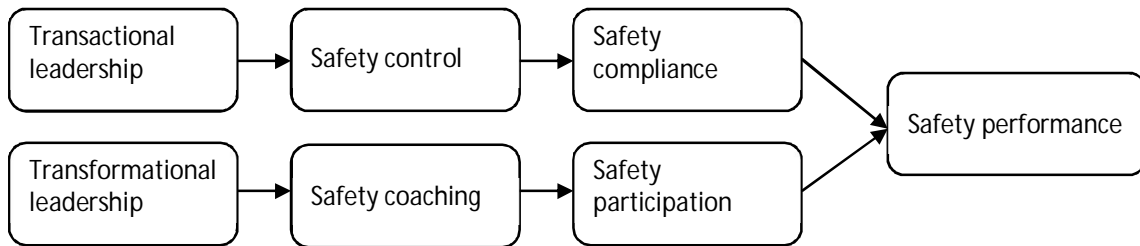
Figure 5. The relationship between leadership style and safety performance (modified from Tappura et al. 2015b, p. 19)

Hoffmeister et al. (2014) found that different leadership facets relate to different outcomes. Managers' demonstration of idealised attributes and idealised behaviours consistently emerged as the most important predictor of safety in the workplace. Nevertheless, idealised attributes and behaviours are the most abstract facets of transformational leadership, which means it is difficult to define them in behavioural terms (Hoffmeister et al. 2014). Kapp (2012) found that both contingent reward leadership and transformational leadership practices were associated with safety compliance when the safety climate was strong. Under a weak safety climate, however, such evidence was not found. Both the transformational and contingent reward leadership practices had a direct positive relationship on employees' safety participation.

Griffin and Hu (2013) found that safety-inspiring leadership behaviour is related to the safety participation of employees, while safety monitoring is related to safety compliance. According to their study, monitoring might be positively associated with safety participation, but only if the manager encourages employees to learn from their mistakes. Moreover, safety compliance may be supported by managers demonstrating the high value ascribed to safety (Griffin & Neal 2000; Kapp 2012; Mullen et al. 2017). This is in line with the findings of Hoffmeister et al. (2014), who suggest that a manager's values and the way a leader is perceived by employees may be more important than particular behaviours.

Leadership has been identified as a major factor in the safety climate (Barling et al. 2002; Zohar 2010). Developing a positive safety climate requires that managers visibly and regularly demonstrate their commitment to and actions regarding safety (Wu et al. 2008). The transformational leadership style has been shown to be associated with a positive safety climate (Barling et al. 2002), while passive leadership has been demonstrated to be associated with a poor safety climate (Kelloway et al. 2006). Blair (2003) argues that both the safety climate and safety leadership must be improved with regards to safety

performance; thus, the quality of leadership impacts safety performance in two ways (see Figure 6).
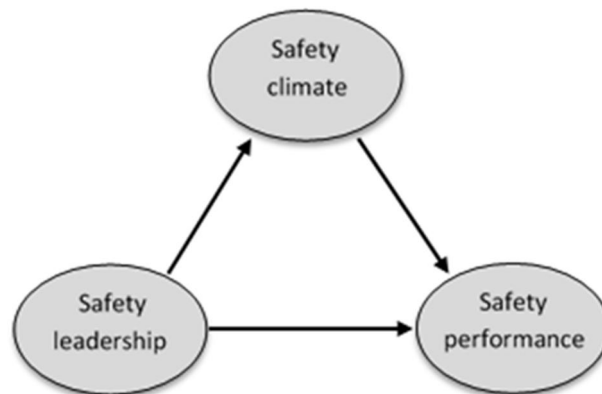
Figure 6. The relationship between safety leadership, safety climate and safety performance (modified from Wu et al. 2008)

According to Biggs et al. (2013), the leadership factors that contribute to a positive safety culture are:

- Managers demonstrate a commitment to safety.
- Managers encourage personal accountability in relation to safety.
- Managers support workers so they can ''take safety on'' in difficult situations.
- Managers have a clear understanding of the safety culture.
- Managers can articulate a clear vision and shared values regarding safety.
- Managers provide practical support for safety.
- Managers listen to workers' ideas and concerns regarding safety.

Among the safety researchers, there has been a greater focus on transformational leadership than transactional leadership (Clarke 2013; Griffin & Hu 2013; Mullen et al. 2017). According to Bryden (2002), a transformational leadership style is the most effective way for senior managers to communicate their commitment to safety in a believable form. Moreover, the trust built by a transformational leadership style is crucial when employees are expected to strictly obey the rules in case of emergency (Hannah et al. 2009). However, in order to motivate employees' favourable behaviour, it is important to understand how managers engage different motivational processes (Clarke 2013; Griffin & Hu 2013). A combination of both the transformational and transactional leadership styles appears to be the most beneficial for safety (Clarke 2013).

Understanding managers' safety leadership behaviours and the contextual factors that impact managers' engagement in safety leadership is essential to being able to adequately support managers. According to a study by Conchie et al. (2013), role overload, production pressure and certain workforce characteristics may hinder safety

leadership behaviours, while social support and autonomy promoted engagement in safety leadership. Moreover, an organisation's safety culture was related to managers' level of engagement.

2.3.6 OHS management and leadership development

Developing OHS management competence presumes the identification of the required competencies (Biggs & Biggs 2013; Tappura & Kivistö-Rahnasto 2017). The determination of managers' OHS competence requirements is based on their roles and responsibilities in the workplace. Specific consideration should be given to the competency requirements of those managers who perform OHS-related tasks, for example, audits, risk assessments, observations or incident investigations. Competence deficiencies should be addressed through management training or other development actions. Those development actions should focus on both competency requirements and the need to enhance managers' awareness (OHSAS 18002:2008; Tappura & Hämäläinen 2012; Tappura et al. 2016). The OHS management system specification OHSAS 18001 (OHSAS 18001:2007), however, does not emphasise managers' training or illustrate the kinds of development actions that are appropriate for managers.

Given the key role that managers play regarding OHS performance (Christian et al. 2009; Hale et al. 2010; Shannon et al. 1999; Zohar 2010), it is logical to focus on leadership training as a means of developing OHS performance (Kelloway & Barling 2010; von Thiele-Schwarz et al. 2016). Kelloway and Barling (2010) suggest that leadership development, usually in the form of training, is an effective intervention in occupational health psychology. Thus far, relatively few studies have evaluated how leadership training actually impacts safety (Kelloway & Barling 2010; von Thiele-Schwarz et al. 2016). According to Kines et al.'s (2010) study, coaching construction site foremen to include safety in their daily verbal exchanges with workers has a significantly positive and lasting effect on safety levels. Moreover, Kaskustas et al. (2013) suggest that safety behaviours are improved by the increased frequency of daily mentoring and toolbox talks, as well as those talks becoming more interactive and focused on hazardous daily work tasks. In their study, von Thiele Schwarz et al. (2016) evaluated the change in safety climate and productivity among employees whose managers took part in a leadership training programme. They concluded that transformational leadership training positively affected the safety climate and the productivity was sustained.

The Institution of Occupational Safety and Health (IOSH 2010) has defined the main themes involved in managing OHS training as follows: (1) management accountability for safety, (2) assessing risks, (3) controlling risks, (4) understanding safety responsibilities, (5) identifying hazards, (6) investigating accidents, (7) measuring performance, and (8) protecting the environment. Fruhen et al. (2014b) indicate six

attributes of senior managers as relevant for their safety intelligence, particularly social competence and safety knowledge, followed by motivation, problem solving, personality and interpersonal leadership skills.

Biggs and Biggs (2013) studied the safety competencies of safety-critical positions within construction companies, namely senior managers, safety professionals, project managers and site managers. They developed a safety competency framework to identify the knowledge, skills and behaviours needed to effectively complete tasks and develop the necessary competencies in safety-critical positions. However, the implementation of the framework requires extensive resources, customisation and better indicators of safety performance within organisations. The implementation of the framework may be assisted by answering three questions concerning the current status of the organisation:

(1) Has the organisation defined the necessary safety management tasks in their documentation?
(2) Has the organisation appointed a position holder responsible for a particular safety management task?
(3) Does the organisation have an education development programme concerning safety management tasks?

This enables the organisation to identify the responsibilities held by different positions in its particular context.

Tappura and Hämäläinen (2012) suggest an outline for the OHS management competence requirements based on the experiences of two OHS management training cases in Finland (Table 7). According to the feedback, the training was found to be very advantageous for managers' work. The participants obtained an overview of their OHS responsibilities, as well as the knowledge and tools necessary to emphasise and promote OHS in their areas of responsibility. They emphasised systematic OHS management, especially risk assessment, accident investigation, an analytic approach and the continuous improvement of OHS issues. The training helped them to better outline their duties, to commit themselves to the company-specific OHS practices and to further develop those practices. The peer communication fostered during the training was found to be very important and the participants felt it should continue after the training as well. However, the managers called for even more information regarding regulatory OHS requirements and interference in cases of misconduct. Moreover, understanding the economic aspects of OHS would help the managers to prioritise competing goals, as well as motivating them to improve OHS in their area of responsibility. Alongside the managers' OHS management competence, general management and leadership skills should also be improved in order to promote OHS.

Table 7. OHS management competence requirements based on two Finnish OHS management training cases (Tappura & Hämäläinen 2012)

OHS management competence requirements
OHS regulations and their mandatory requirements
Managers' role, responsibilities and authority to intervene in violations of OHS
Motivation and justification for OHS from the economic and ethical perspectives
OHS policy, goals, programmes and procedures of the organisation in question
Continuous monitoring and improvement procedures for the working environment, the work community and work practices
Hazard identification, risk assessment and information sharing in order to prevent risks from being actualised
OHS orientation and training
Occupational injuries and near-miss reporting, investigation and subsequent learning
Work-related health problems in the work community and psychosocial work environment
Safety performance measurement and reporting
Corrective actions control
OHS communication (meetings, inspections rounds and discussions)
Encouraging employee participation
OHS cooperation, supporting organisations and professionals

Based on the study of Tappura and Hämäläinen (2012), a framework for developing managers' safety management competence was constructed (Tappura & Kivistö-Rahnasto 2017). The framework consists of definition of safety management competence requirements, self-assessment of the competence, definition of development needs, and implementation of competence development activities. The study concluded that safety management competence should be developed as an integral part of management competence development in organisations.

In their study, Eriksson et al. (2010) present an example of developing health-promoting leadership in the public service sector. The aim of the intervention programme was to support managers developing in health-promoting leadership in order to reduce the sickness rate and increase the work attendance of employees. The programme was intended to provide knowledge concerning health promotion and influence the attitudes and behaviour of the managers in relation to health promotion. However, the organisational aspects, which are often seen as crucial for health promotion (Chu et al. 2000; Eriksson 2011; Hellmann 1996; Offermann & Skagert 2010), were not emphasised. The actual development also required the wider participation of upper managers and the support of top managers. One important outcome of the programme was the production of action plans for workplace health promotion. They were integrated into the existing management groups and, thus, were followed up within the ordinary work of the management group. Another positive outcome of the programme was the

opportunity for reflection and the sharing of experiences with other managers. (Eriksson et al. 2010)

The UK Health and Safety Executive (HSE 2007b) has defined effective management competencies for reducing stress in the workplace in order to implement the HSE management standards. According to the HSE's (2007b) study, the competencies were consistent across the five studied sectors (education, healthcare, central government, local government and finance) and all data sources (line managers, employees and HR practitioners). The most frequently mentioned competencies were managing the workload and resources, a participative approach and communication. Moreover, the presence of positive behaviours appeared to be more important than the absence of negative behaviours. Nevertheless, the managers evaluated their behaviour much more positively than their employees did in relation to each competency. The HSE (2007b) study concludes that many stress management competencies overlap with existing "good" management behaviours and could therefore be integrated into general management practices.

Fruhen et al. (2014a) propose that senior managers' training and guidance should focus on their problem-solving abilities and perception of others in order to better support them in demonstrating their commitment to safety. However, leadership skills development needs to go beyond training and self-directed learning, since it involves a complex mix of behavioural, cognitive and social skills that require different learning experiences (Lord & Hall 2005).

Despite the widespread awareness of the importance of OHS management, managers tend to have little safety training and only a limited understanding of their important role (Hale et al. 2010; Griffin & Hu 2013). Moreover, managers' OHS competence requirements are often unclear (Hardison et al. 2014). Thus, the current research concerning OHS management development is deficient, especially in relation to effective OHS management practices for prioritising development activities (Conchie et al. 2013; Hoffmeister et al. 2014).

3 Research Design

3.1 Research gap

The starting point for this study was the supposition that managers at all levels within an organisation play a key role in promoting the OHS of employees due to moral, regulatory, economic and organisational effectiveness obligations. In order to succeed in this role, managers need organisational support, which is the main focus of this study. The theoretical context of the dissertation consists of reviewing three aspects that influence organisational performance, namely managerial work, OHS performance and OHS management and leadership (see Figure 7), as discussed in Chapter 2.
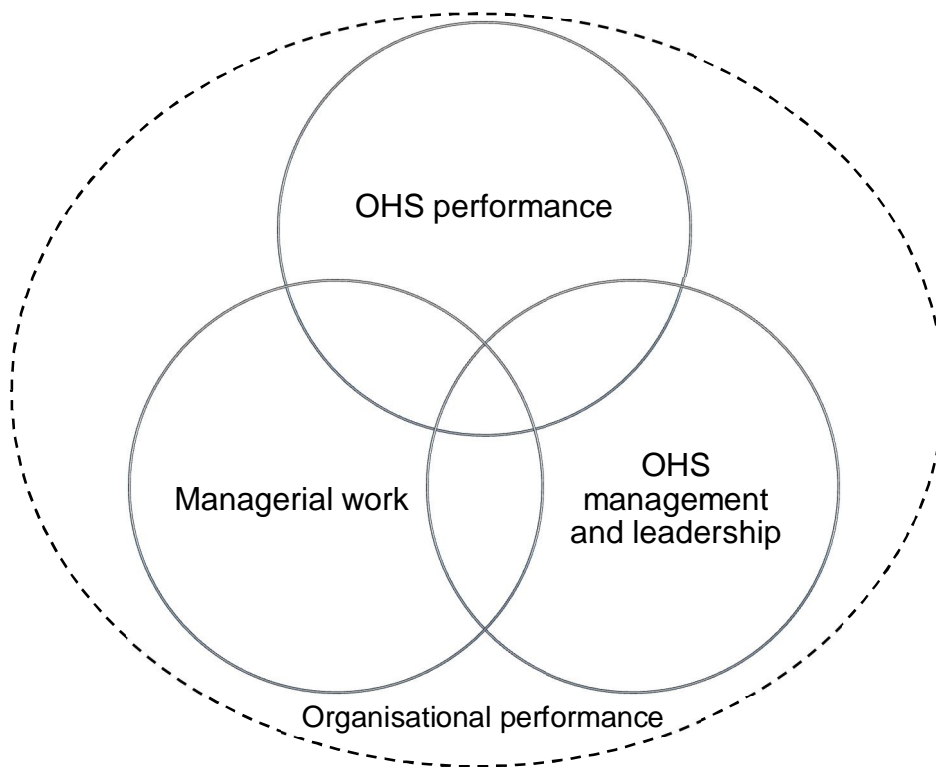
Figure 7. Theoretical context of the dissertation

Based on the literature reviewed in Chapter 2, there exists a gap in the research that is outlined in Figure 8 and discussed as follows. Much of the literature presented in Chapter 2 emphasises the importance of managers' commitment and leadership style in improving both the safety culture and OHS performance. However, it is crucial to convert that knowledge into worthwhile frameworks and practical actions intended to improve OHS performance (Biggs & Biggs 2013). Relatively few frameworks exist that are applicable to the development of OHS management in every kind of organisation (ILO

2001; OHSAS 18001:2007). Nevertheless, they are quite general and theoretical in nature, as well as being too difficult to adopt (Matthews & Rowlinson 1999; Nenonen 2012). They do not offer practical guidelines or measures to support managers in OHS management. Thus, there exists a gap between the frameworks that are available and those required to develop OHS management from the managers' point of view.

1. Previous literature presents the essential elements of OHS management systems for improving OHS	Available frameworks are too theoretical and general, and they do not present practical guidelines to support managers in OHS	Practical frameworks and actions are needed to help organisations develop OHS management based on empirical research
2. OHS issues need to be integrated into general management and studied in the organisational context	Managing OHS is not sufficiently integrated into management. OHS research has a limited organisational perspective	Information and examples of OHS management in the organisational context and as a part of managerial work are needed
3. Managers' active role and commitment to OHS is crucial for employee OHS and operational effectiveness	Research on managers' OHS work has been limited in perspective, extent and scope	Empirical studies on managers' OHS work are needed from the managers' viewpoint, a broader perspective and in different industries
4. Managers need organisational support in managing OHS as part of managerial work	Suggested organisational measures to support managers in their OHS work are too general and inadequate	Information on organisational measures is needed to support managers' in their OHS work
5. OHS leadership is an important determinant of OHS performance	The importance of effective OHS leadership to the success of OHS development is not fully understood and related studies have been limited in terms of their profundity	Information on effective OHS leadership facets is needed to develop OHS management

Figure 8. The identified research gaps

OHS issues are increasingly associated with the operational efficiency, quality, competitiveness and reputation of an organisation (Fernández-Muñiz et al. 2009; Hasle & Zwetsloot 2011; Köper et al. 2009; Linhard 2005). More attention should be paid to OHS issues when striving to achieve organisational goals, since good OHS performance

supports organisational performance (Fernández-Muñiz et al. 2009; Veltri et al. 2013; Wu et al. 2008). Nevertheless, the OHS perspective is overlooked in most management studies (Veltri et al. 2013; Zanko & Dawson 2012). At the same time, the OHS research rarely studies OHS management in the wider organisational context (Veltri et al. 2013). In OHS studies, the organisational context needs to be acknowledged, while OHS issues need to be considered as one organisational outcome that needs to be managed (EU-OSHA 2010; EU-OSHA 2012b; Veltri et al. 2013). This dissertation discusses the management of OHS in the organisational context in various organisations in Finland.

Although the importance of the managers' active role and commitment to OHS is almost universally recognised (e.g. Fernández-Muñiz et al. 2007; Hale et al. 2010; Shannon et al. 1999), prior studies concerning managers' OHS work have been limited in terms of their perspective, extent and scope. Top management commitment and its visible demonstration are often emphasised (Clarke 1999; HSE 1999; Schein 2010), while the lower-level managers' consistent commitment receives less attention. Only a few studies have investigated managers' perceptions of managing OHS (e.g. Biggs et al. 2013; Conchie et al. 2014; EU-OSHA 2010b; Fruhen et al. 2014a; Larsson 2015; O'Dea & Flin 2001) and even they present only limited perspectives and scope in relation to OHS.

Moreover, previous studies have called for organisational support for managers in relation to OHS (Conchie et al. 2013; Frick 2013; Hale et al. 2010; Larsson 2015), although they rarely present or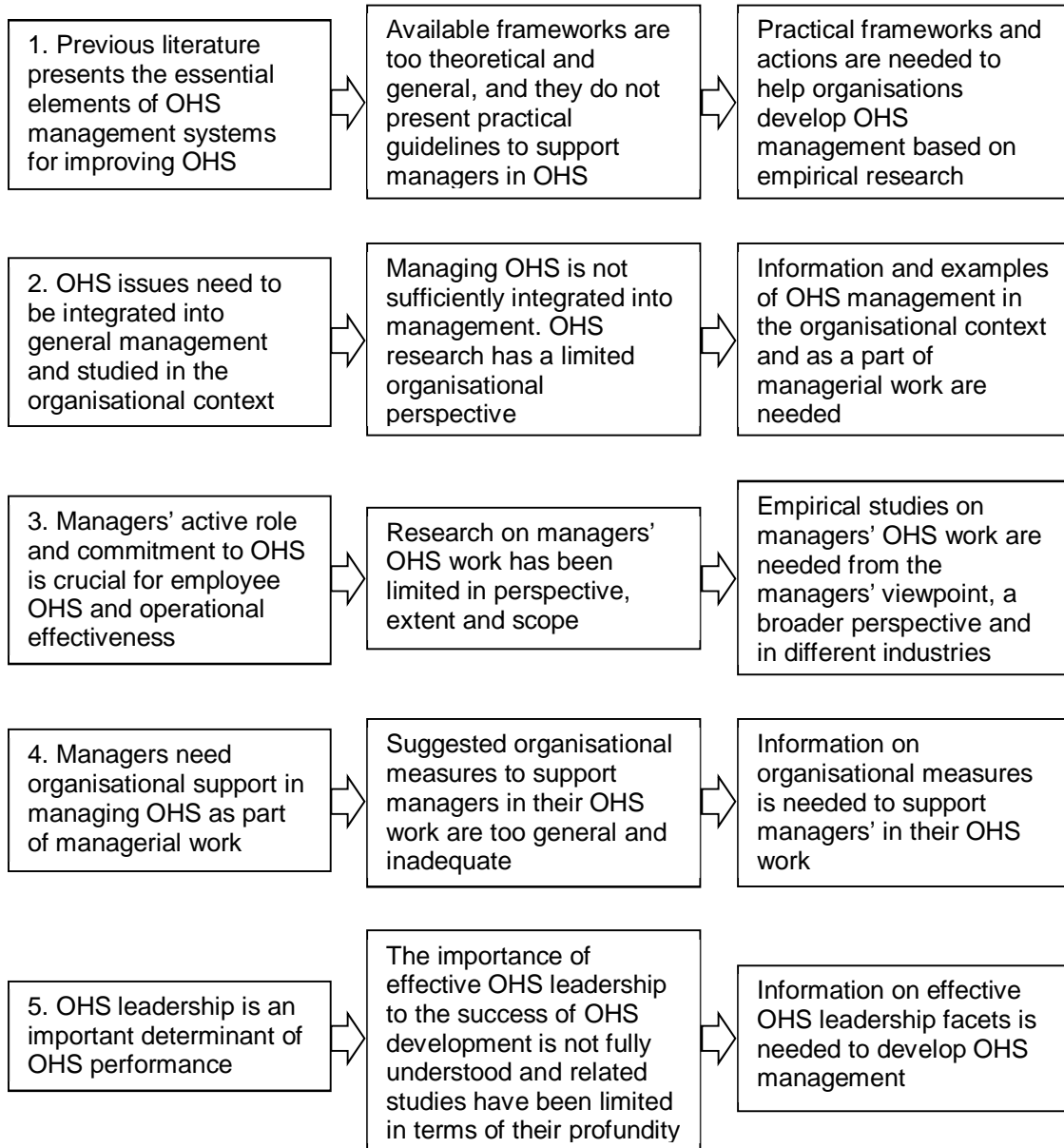ganisational measures to provide such support. Support is especially called for in relation to managers' commitment and the training necessary to manage psychosocial risks effectively (EU-OSHA 2014). In order to be able to identify the organisational support that managers' require, difficult situations related to the management of OHS, as well as the factors that hinder or promote managers' commitment to OHS, must be clarified from the managers' perspective. Thus, there exists a need for a thorough investigation of the challenges managers confront and the organisational support they need when managing OHS as a part of their other managerial responsibilities.

Managerial authority is seldom a sufficient basis for fostering subordinates' commitment to OHS, since success as a manager also involves leadership (Yukl 2010) and an understanding of the human factors (Teperi & Leppänen 2011) that can improve OHS. OHS-specific leadership is generally seen to be positively associated with employees' OHS compliance and participation, two common forms of employees' OHS performance-related behaviour (Clarke 2013; Griffin & Neal 2000; Hoffmeister et al. 2014; Kapp 2012; Mullen et al. 2017). According to Mullen et al.'s (2017) cross-sectional and longitudinal study, when employers are perceived to have fulfilled their OHS obligations, employees tend to reciprocate with positive OHS performance behaviours, and these relationships are stronger when the OHS-specific leadership is high. Thus, managers' leadership

behaviour and skills should be supported in order to generate positive effects on OHS performance (Hoffmeister et al. 2014; Zohar 2002b).

Previous research suggests that both transactional and transformational leadership are important determinants of OHS performance (Barling et al. 2002; Clarke 2013; Griffin and Hu 2013; Hoffmeister et al. 2014; Kapp 2012; Mullen et al. 2017). Nevertheless, the leadership studies related to OHS have been limited in terms of their theoretical nature and scope. The specific leadership facets that influence OHS performance are rarely considered within OHS leadership studies (Conchie et al. 2013; Griffin & Hu 2013; Hoffmeister et al. 2014). Information regarding effective leadership approaches is needed in order to develop OHS management and integrate OHS management development into the general management development within organisations. Moreover, it is needed in order to emphasise the right issues when managing OHS, since management resources are of course limited.

Previous studies concerning OHS management have often covered only certain industrial sectors, for example, the construction industry (Biggs et al. 2013; Conchie et al. 2013), air traffic management (Fruhen at el. 2014a), the offshore oil and gas industry (O'Dea & Flin 2001) or municipal organisations (Larsson 2015). Most of these studies have focused on OHS management in non-Finnish organisations, except for Simola (2005), who studied OHS management interventions in a Finnish steel company. At the same time, many Finnish industrial organisations currently place a strong emphasis on managers' OHS work in order to advance to the next level of OHS performance (Tappura et al. 2015b). As only a few studies have been carried in this field in Finland, deeper insight into the topic is needed, particularly from the managers' viewpoint and within Finnish organisations. Furthermore, information regarding organisational measures is needed to support the management of OHS and the continuous improvement of OHS in other countries, as well as to further decrease the rate of occupational injuries and ill health.

3.2 Objectives of the research

The main motivation behind this research was an interest in managers' important role in the promotion of OHS and the well-being of employees within organisations. Moreover, a concern regarding managers' prerequisites for the effective management of OHS motivates this research. The dissertation aims to provide new information on OHS management from the managers' viewpoint and in the organisational context. By means of that knowledge, the dissertation suggests how managers can be better supported in successful OHS management, which should result in improved OHS performance and

enhanced organisational performance. Consequently, the dissertation aims to provide a conceptual framework for evaluating and developing OHS management within organisations.

In order to achieve that aim, the following research objectives have been formulated:

Objective 1: Yield new information regarding the challenges faced and support needed in the management of OHS

Objective 2: Construct a conceptual framework of organisational measures to support managers in OHS management

The first objective is approached through research questions 1 to 4. The information generated when answering those questions is then used to answer research question 5 and, consequently, construct a conceptual framework of organisational measures to support managers in OHS management (objective 2). The research questions are:

RQ1: What difficult situations do managers confront when managing OHS?

RQ2: What kind of support do managers experience and need when managing OHS?

RQ3: What organisational factors hinder or promote managers' commitment to OHS?

RQ4: What kind of leadership is effective in promoting OHS performance?

RQ5: What kind of organisational measures can be used to support managers in OHS management?

Answering these research questions entails achieving the stated objectives by exploring the methods of data collection and results presented in the related sub-studies (see Table 8). In addressing objective 1, this dissertation relies on an examination of the OHS literature and several empirical studies (sub-studies 1–3) in order to attain a profound understanding of the challenges and support related to the management of OHS. Both the literature and the results of the sub-studies (interviews and workshop) were used in the construction of a conceptual framework of organisational measures intended to support managers in OHS management (objective 2).

Table 8. The links between objectives, research questions, methods of data collection and sub-studies

Objective	Research question	Methods	Sub-study
1	1. What difficult situations do managers confront when managing OHS?	Interview Inquiry	1
1	2. What kind of support do managers experience and need when managing OHS	Interview Inquiry	1
1	3. What organisational factors hinder or promote managers' commitment to OHS?	Interview	2
1	4. What kind of leadership is effective in promoting OHS performance?	Literature review Interview	3
2	5. What kind of organisational measures can be used to support managers' in OHS management?	Literature review Interview Workshop	1-3

This dissertation focuses on managers and how they can be supported in the management of OHS within their organisations. The managers' work in the organisational context and organisational culture and objectives define the expectations for managers' in relation to OHS management. In addition, organisations provide resources and possibilities, but also limitations for OHS promotion. The personality of managers and their individual capabilities are not of interest to this dissertation. Moreover, the perspectives of other actors also striving for OHS promotion, such as OHS professionals, occupational healthcare professionals and OHS committees, are not included in the study. Instead, they are seen in this study as a source of support for managers.

3.3 Research strategy

The prior safety and OHS research has generally relied on the multidisciplinary research tradition, typically exploiting organisational and applied studies. The ontological position of this study serves to consider the researched phenomenon, namely the management of OHS, as a social construction, while the epistemological concept of this study serves to increase the understanding of OHS management by studying the success factors for OHS management and managers' perceptions. The scientific research approaches adopted in the dissertation are the qualitative and constructive approaches, which are suitable approaches for multiple scientific disciplines (Denzin & Lincoln 2011; Oyegoke 2011), including safety and OHS research.

The qualitative research approach was chosen due to the contextual and situational nature of the studied phenomenon and the research questions (Nelson et al. 1992). The research task was approached qualitatively by addressing the managers' own

understanding of the topics, which was often dismissed in the prior OHS literature. Qualitative methods were used due to the descriptive nature of the study. The research interests include both the managers' own experience and conception of OHS management and the organisational procedures that support managers in OHS management. The study is based on several projects and sub-studies, as well as qualitative research questions. The dissertation provides qualitative descriptions and in-depth knowledge related to OHS management. It strives to deepen the understanding of the studied phenomenon, namely OHS management, and hence exact hypotheses were not stated. The qualitative approach is particularly useful for this kind of study.

The constructive research approach (Kasanen et al. 1991, 1993; Olkkonen 1994; Rohweder 2008) was used in the construction of the conceptual framework of organisational measures intended to support managers in OHS management. The constructive approach typically aims to create theory-justified solutions for practical situations and problems. The solutions are based on both existing knowledge and the heuristic research process. The constructive approach presumes a deep understanding of the research problem in order to carry the research results into practice. (Olkkonen 1994; Rohweder 2008)

To develop the conceptual framework, the constructive research phases (Kasanen et al. 1991, 1993) were followed to an extent appropriate for the purpose of this dissertation. First, a practically relevant research problem was specified, as was the associated research strategy. The aim of the conceptual framework was to provide practical information for the development of OHS management in different kinds of organisations. In order to create a novel, theory-justified solution to this research problem, both qualitative and constructive research approaches were used. Second, the research subject and previous research were studied to obtain a general understanding of the subject. The researcher (author) had a pre-understanding of the OHS management concepts and practices based on her previous research experience. In order to be able to achieve an adequate understanding of OHS management within organisations for the purpose of this dissertation, the researcher's pre-understanding was deepened by studying the OHS management research and relevant literature (see Chapter 2). Third, the preliminary requirements for the concept were defined based on the literature and sub-studies 1 to 3. Fourth, the interview and workshop data (sub-studies 1–3) were used to construct a final concept. Finally, the theoretical connections and the research contribution of the concept were presented and its usefulness was evaluated.

The researcher participated in the sub-studies, had a pre-understanding of the OHS management concepts and industries based on her previous research experience, and deepened her understanding of the studied phenomenon, which are all important elements of both qualitative studies (Stenbacka 2001) and the constructive approach

(Rohweder 2008). Moreover, a qualitative approach enabled the exploration of the managers' perceptions in an organisational context and within their own operating environment. The managers were asked to freely provide their own opinions on OHS management by using qualitative methods rather than having to comment on previous findings (for example, through a survey), which is valid in terms of qualitative research (Stenbacka 2001). According to Thomas and Magilvy (2011), the quality of qualitative research is typically evaluated by the qualitative rigor to establish trust or confidence in the findings of a study. Moreover, the validity of the study was improved by choosing an adequate amount and quality of informants (interviewees) from different organisations, by closely interacting with company representatives, and by using several researchers to analyse the data and review the findings (Stenbacka 2001). Qualitative data analysis was used because it allows the generation of new knowledge regarding the studied phenomenon (Patton 2001). Moreover, it made it possible to build theory upon empirical data.

This dissertation applies the triangulation of data collection (mixed methods, including qualitative inquiries, a focus group and individual interviews, and a workshop) and data analysis (several researchers analysed the data) methods to confirm an in-depth understanding of the studied phenomenon (Denzin & Lincoln 2011) and increase the quality of the qualitative study (Patton 1999). By using a variety of empirical material, perspectives and researchers, the rigour and depth of the study were augmented (Denzin & Lincoln 2011). The descriptive multi-method approach was adopted because the sub-studies, research questions and research tasks presumed a variety of approaches.

3.4 Material and methods

This dissertation is based on two independent research projects conducted between 2012 and 2015. The dissertation explores the three sub-studies carried out as part of those research projects. The sub-studies, related projects, schedules and funding are presented in Table 9. All the projects were conducted at the Center for Safety Management and Engineering, Tampere University of Technology (TUT), in cooperation with the participating organisations and informants (managers and OHS professionals). They were funded by the Finnish Funding Agency for Innovation (Tekes), the Finnish Work Environment Fund (TSR), TUT and participating organisations. The data collected during the original research projects are utilised to an appropriate extent relative to the objectives of the sub-studies and this dissertation.

Table 9. Sub-studies, related projects, schedule and funding

Sub-study	Related project	Schedule	Major funding
1, 3	Research project Dinno—Dialogic leadership promoting innovativeness	2012–2014	Tekes
2	Research project Tujo—Managers' safety leadership, competence and commitment	2014–2015	TSR

Four kinds of research method were principally exploited, namely interview studies (sub-studies 1–3), qualitative inquiry (sub-study 1), a workshop and a literature review (sub-study 3). The organisations and participants involved in the sub-studies are presented in Table 10.

Table 10. Organisations and participants in the studies

Sub-study	Studies	Organisation	Participants
1	Interview study Qualitative inquiry	Public expert organisation	17 line managers
		Public social and healthcare services	24 top, middle and frontline managers
		Public vocational education organisation	31 top, middle and frontline managers
2	Interview study	Chemical processing and energy industries, industrial services	41 middle and frontline managers
	Workshop		9 OHS professionals
3	Literature review Interview study	Public expert organisation	17 line managers

The materials and methods utilised are presented in detail by sub-study in the following section.

Sub-study 1

Sub-study 1 used data collected by means of thematic interviews (n=17) and qualitative inquiries (n=55) with top, middle and frontline managers from three Finnish public service organisations, namely a governmental expert organisation, municipal social and healthcare service units, and a public vocational education organisation. Sub-study 1 is part of a larger interview study focusing on dialogic leadership development. The results of this sub-study are based on the following interview questions:

1. What kind of situations and matters related to OHS management do managers perceive to be particularly difficult?
2. Where do managers receive support from in these situations?

3. What kind of support do the managers expect and need to help them in the management of OHS?

A total of 72 managers participated in the study, with their amount of supervisory experience varying between 1 and 30 years. The interviews with 17 line managers were conducted in autumn 2012 and they focused on the governmental expert organisation (a total of 18 line managers and about 200 employees). Within the expert organisation, work is oriented toward significant results and complex problem solving in various fields of expertise (e.g. chemicals, construction products, electrical equipment, measuring instruments and pressure equipment). The interviewees were chosen based on their managerial role; they were the immediate superiors of the experts in their group. All 18 managers were invited to the interviews and all but one of them participated, which reduced the self-selection bias of the population. The interviews were semi-structured and one pilot interview was conducted to test the interviewer guidelines. One researcher conducted all the interviews, which were recorded and then transcribed. Confidentiality was emphasised during the interviews in order to facilitate the interviewees' free and open responses despite the intimate nature of the theme (difficult OHS management situations).

The qualitative inquiries focused on social and healthcare organisations providing services for the elderly (about 1,100 employees), as well as a vocational education organisation (about 1,050 employees). The inquiries were conducted using the digital Webropol survey tool in 2013. Invitations to participate were sent to 76 managers, with 55 managers choosing to answer the inquiry (a response rate of 72%).

Due to the nature of the study, the phenomenology methodology (Patton 2001) was selected as the theoretical framework for the qualitative analysis. In a qualitative analysis, the main categories are formed by means of the basic concepts, while the subcategories emerge according to the specific features of the data. The objective of the qualitative research was to understand the difficult situations that managers encounter and their need for support. A qualitative analysis progresses from details to a more general level, and through this progression, collective features are sought from the individual experiences. In the analysis of the qualitative data, the main stages of a phenomenological analysis (Patton 2001) were followed, with the researchers modifying them to some extent. The qualitative analysis is based on original material obtained from the research sites. The qualitative data derived from the interviews and inquiries were analysed and thematically classified separately by two researchers. The results of both the interviews and inquiries were conjoined and then categorised under thematic result categories. Some quotations from the data were then selected to illustrate the essential experiences of the respondents. The interpretations of the results and the discussion are

based on the selected perspectives and emphases in accordance with the nature of the participating organisations and the theoretical framework of this study.

Sub-study 2

In order to chart the managers' perceptions of the factors that hinder or promote their commitment to OHS, sub-study 2 was conducted as part of a larger interview study focusing on managers' safety leadership, competence and commitment. A specific hypothesis was not set, although decreasing hindering factors and increasing promoting factors were regarded as measures that positively influence managers' commitment to OHS. The results of the study are based on the following interview questions:

1. What factors hinder managers' commitment to OHS?
2. What factors promote managers' commitment to OHS?

Sub-study 2 was carried out in five industrial organisations (in the energy and chemical processing industries and three industrial service providers; see Table 11). All these organisations emphasise safety as a strategic goal and they have all carried out successful work to improve occupational safety. The motivation behind studying the participating organisations arose from their need to better support managers in their safety role in order to improve occupational safety. Managerial work is studied in the organisational context based on the managers' formal position (Grint 2005). Thus, the focus is on the managerial viewpoint, as well as the organisational factors and measures that support the managers' safety role. The study is based on thematic interviews with managers (n=49) concerning the five participating companies. It used a qualitative research strategy, which is suitable due to its exploratory nature and its focus on the managers' perceptions of the topic (Creswell 2013; Palys 2003). Moreover, it strives to deepen the understanding of the studied phenomenon (Patton 2001; Stenbacka 2001). Interviews were considered the most appropriate way to derive sincere insights into the managers' perceptions. The validity of the study was improved by choosing an adequate number and quality of interviewees from different organisations (Stenbacka 2001).

Table 11. Background information about the participating organisations (2014)

Company	Industry	Turnover	Number of employees	Number of interviewees
A	Energy production	€819 million	1,500	15
B	Industrial services	€640 million	7,800	14
C	Chemical processing	N/A	550	7
D	Industrial services	€100+ million	700	7
E	Industrial services	€13 million	320	6

Purposive sampling was applied to recruit interviewees from different organisational levels and different business units within the participating organisations. The organisations' designated safety professionals were asked to identify and invite interviewees who represented different levels of OHS experience, awareness and attitudes in order to avoid self-selection bias in the original population. The number of interviewees per organisation varied depending on the size of the organisation and the interviewees' availability. The interviewees were middle frontline managers, including production managers, maintenance managers, project managers and supervisors. One of the two researchers (either Tappura or Nenonen) scheduled and conducted each interview. In the larger interview study, thematic interviews were used to explore the managers' perceptions of their safety competence, leadership and commitment. In the current study, the interviews were used to explore the organisational factors that managers perceive to either hinder or promote their commitment to safety.

The interviews were conducted either individually or in focus groups of two to three participants. Three interviews were conducted by telephone due to scheduling difficulties. At the beginning of each interview, occupational health and safety was defined as the perspective on safety adopted in this study. The anonymity and confidentiality of the responses was emphasised during the interviews in order to facilitate the interviewees' free and open responses, which helps to improve the validity of qualitative research (Stenbacka 2001). Moreover, the managers could freely express both OHS management and leadership related issues in the interviews. The interviews were conducted between May 2014 and January 2015 and they lasted between 30 and 60 minutes.

The interview data were recorded and transcribed with the participants' permission. A qualitative data analysis was used to create new knowledge of the studied phenomenon (Patton 2001) and build theory upon the empirical data. In the qualitative data analysis, a phenomenological approach (Patton 2001) was applied, since it emphasises the participants' perceptions and experience of the studied subject. An inductive approach (Boyatzis 1998) was used to categorise the hindering and promoting factors under main themes in accordance with the thematic analysis. The transcriptions of the interviews were thoroughly explored, and all mentions relevant to each theme were summarised in a data table. Quotations that illustrated the findings were selected from the data. The researchers then compared the theme categorisation with the findings of previous studies (Conchie et al. 2013). Similar categories were named accordingly and several new categories were found. Moreover, typical examples of each factor were presented.

The interview data were reviewed during a workshop held in March 2015. The workshop participants (n=9) were OHS professionals from the participating companies and the research organisation. The researcher (the author of this dissertation) presented the

interview data table with the theme categories to the participants, who then reviewed the results. The participants were asked the following questions:

1. What kind of organisational measures are used or could be used to reduce the factors hindering managers' commitment to OHS?
2. What kind of organisational measures are used or could be used to increase the factors that promote managers' commitment to OHS?

The participants added to the data by expressing organisational measures that could be used to support the managers' commitment to safety in each category. The data table was completed using these expressions.

Sub-study 3

Sub-study 3 is based on a literature review and empirical findings from the managers' interviews. The literature review was carried out using the electronic databases of scientific journals (e.g. ScienceDirect Elsevier). Studies related to safety leadership were browsed and those studies associated with safety or OHS performance measures were included in the review. Moreover, the safety management literature was reviewed to determine the interconnections between good practices of safety management and safety leadership. A couple of major reviews (Shannon et al. 1997, as cited in Hale et al. 2010; Hale & Hovden 1998, as cited in Hale et al. 2010), which identified organisational factors affecting safety management and performance, constituted the major sources. A theoretical framework of leadership facets was constructed based on the leadership theory for the purpose of sub-study 3 (see Table 1 in section 2.1.2). The framework was used to categorise the literature review results and the results from the interviews.

The interviews were carried out at a Finnish governmental expert organisation (a total of 18 line managers and about 200 employees) in order to empirically supplement the findings from the literature review. All 18 managers were invited to the interviews, with 17 choosing to participate, which reduced the self-selection bias of the population. The interviewees were mostly senior, experienced managers, and they were asked about their understanding of effective OHS leadership as part of a larger interview study focusing on dialogic leadership development. The interviewees were asked the following question:

- What kind of leadership is effective in relation to OHS?

The results of the literature review and interviews were compared and structured according to the transactional and transformational facets of leadership (Bass 1985) and examples of each facet were presented. Some quotations from the interviews were selected to illustrate the perceptions of the respondents.

4 Results

4.1 Difficult situations when managing OHS

Different kinds of OHS-related management situations were perceived as being difficult by the respondents in sub-study 1 who work in public organisations, especially when they occurred for the first time. Some issues had been dealt with in previous management training, but when such incidents actually occurred, the training was not current and the manager had not learned the necessary lesson. The results of the qualitative inquiries and interviews with the managers were categorised according to the following thematic categories: 1) administration, 2) managing and evaluating the workload, 3) conflicts, and 4) social relations and interaction. The range of results among the thematic categories is presented based on the response group in Table 12, where the most commonly cited themes are marked with multiple x. The results are presented in detail as follows.

Table 12. Range of results among the thematic categories

Thematic category	Administration	Managing & evaluating the workload	Conflicts	Social relations & interaction
Respondent group 1 (vocational education, n=31)	xxx	x	xx	xx
Respondent group 2 (public social and healthcare services, n=24)	xx	x	xx	xx
Respondent group 3 (public expert organisation, n=17)	x	xxx	xx	x

Administration

The high economic and efficiency pressures, as well as the lack of resources in relation to performance targets, were found to be the most significant factors affecting managers' ability to design and administer work in all the organisations. In the public expert organisation, one line manager stated the universal challenge to be:

> 'How can the increasing assignments be made with decreasing resources so that the employees do not become exhausted, cynical or quit their jobs?'

The constant changes within the work community negatively affected the managers' ability to support their employees' well-being and cope with their workload. Almost all the managers in all the studied organisations felt it was challenging to comply with the

bureaucracy and rules of a large organisation, especially during times of major change and economic cutbacks. Decision making, explaining decisions to the staff, operational planning and organisation, enforcing common rules, agreeing on common policies and implementing assertive operational methods were considered to be difficult tasks, especially in the vocational education. Supporting employees' well-being and motivation in an environment of constant change was found to be difficult, as one manager stated:

> 'It's hard to keep people happy in an environment of constant change and motivate them to be enthusiastic about new challenges and procedures when resources are being cut.'

At the same time, employee availability, recruitment, diversity, non-alignment and demotivation were considered to be challenges in the social and healthcare services, as one manager commented:

> 'How do you maintain good quality in care work and decent orientation when new personnel and temps are being recruited?'

The managers experienced multiple conflicting pressures, organisational confusion and incompleteness of the organisational structure, and they found economic changes to be stressful and complicating to their work. In the expert organisation, some managers were concerned about their own ability to cope and having the time to carry out all their required assignments. They perceived that managerial work is not sufficiently resourced, but should instead fit in with other activities. Additionally, in the vocational education provider, these factors created fragmentation and confusion in the managerial position, as well as in relation to their overall work and responsibilities:

> 'The problem is the extent of my job description: the playing field is not clear at the moment. This is due to the extent and lack of definition of duties.'

Almost all the managers highlighted the cooperation procedures related to redundancies to be the most difficult and challenging aspect of their work, especially regarding its effect on staff and operations. In the vocational education provider, encountering and interacting with employees in order to explain personnel cutbacks and the reorganisation of the work from a broader point of view were considered particularly challenging during the cooperation process. The most acute burden on managers working in educational and expert organisations in the midst of extensive economic cutbacks was felt to come from finances, reduced resources and adjusting operations to a tightened economic framework:

> 'The biggest challenge is adjusting operations to match dwindling financial resources.'

Nevertheless, everyone understood that the changes were necessary for the organisation and that they were imposed as a consequence of governmental decisions related to public sector organisations.

Managing and evaluating the workload

In the expert organisation, the managers felt it was especially difficult to plan and design the employees' workload in ways that were individually tailored, fair and balanced, particularly when everybody had ample work and pressure. Moreover, they felt that one important and difficult area was the evaluation and management of mental and physical overload related to time and work pressures, since the experts work highly autonomously. They found it difficult to evaluate and prioritise the workload in such situations. At the same time, they recognised that the workload should be individually tailored to suit every employee. In the social and healthcare organisation, for example, those employees with reduced working capacity may be fully taken into account in the work design. In the other organisations, many managers felt that taking into account individual factors and burdens caused by employees' life situations, health and personal matters is a difficult proposition. According to one interviewee from the expert organisation, the aim is to achieve a fair and balanced distribution of work, as well as to tailor the workload to suit each employee:

> 'What's difficult is a fair allocation of work according to the individual employee's work ability and organising a lighter workload.'

The interviewed managers from the expert organisation had little means of assessing their employees' burdens, particularly if the employees did not choose to disclose details themselves. Furthermore, even if they did disclose such matters, the managers had little or no means to reduce work pressures due to limited resources. Often, the managers were concerned about their subordinates' well-being, but they could not help due to a lack of time and organisational support.

Due to the high efficiency pressure found in the public sector, there was a constant need for prioritisation and discussion of what should be done by whom and whether something could be left undone in order to improve employees' control over their work. Many managers believed that it was important to support this control, although they did not have enough time to deal with their employees individually or to be present and available in the midst of their own time pressures. Urgency and impossible schedules of their own hampered the managers' ability to address many important issues or else they had to be left half-finished, especially in the vocational and expert organisations. One line manager from the expert organisation pondered whether resolving personnel issues should even be considered the managers' responsibility:

'One can even question whether they are the right tasks for us.'

Conflicts

Conflicts with and between employees were considered to be particularly difficult situations by almost all the managers in all the organisations. The most difficult situations concerning conflicts and the related shortcomings experienced by the managers are the following:

- Conflicts caused by change situations and crises, for example:
  - Cooperation negotiations and processes, economic cutbacks, mergers, changes to job descriptions, changes to power and responsibility relations, termination of services and functions, work communities in crisis with multiple conflicts, strong personalities, aggression, or other forceful emotional expressions.
- Conflicts related to work underload or overload, as well as problems stemming from individuals, for example:
  - Stress, difficult personalities, conflicts with one's own superior, intervening in situations with inappropriate behaviours, disciplinary situations, unauthorised absences and a non-commitment to work, as well as the work community, its rules and its clients.
- Problems of collaboration, for example:
  - Difficult interrelations in the work community, organisation-wide conflicts and conflicts between employees.

The most challenging managerial situations mentioned during the interviews exist in the presence of workers with difficult personalities and in dealing with their inappropriate and unprofessional behaviours. In public sector organisations, careers are typically long and inappropriate behaviour may be permitted for longer than in the private sector. According to one manager from the vocational education provider:

'If we were operating in the private sector, these difficulties would not exist, but we could just choose suitable employees for variable situations.'

Difficult issues in the area of conflict management on the individual level include providing negative feedback, solving disagreements between employees, intervening in unpleasant, difficult and complicated matters, indicating appropriate work behaviour, solving individual employee problems that affect their work, disciplinary matters and instructing compliance with common rules and agreements. When such situations recur, it is difficult for the manager, as one manager from the social and healthcare organisation noted:

> 'People who, time after time, despite active and appropriate intervention, don't comply with common rules: that's frustrating.'

Many managers pointed out the importance of actively solving problems and the fact that the work community should be open and willing to confront difficult issues and identify solutions. According to the managers, they should actively raise conflict awareness and discuss situations with the work community in order to clear the air and reinstate a focus on work. Situations of conflict often demand the active role of top management. This is the case in conflicts between a line manager and his/her superior:

> 'Nobody (from top management) dares to make the decision and say that enough is enough and that in my opinion this is bad management.'

Furthermore, conflicts between a line manager and his/her supervisor are perceived as stressful situations for the line manager, as well as absorbing valuable resources from the OHS management of the group.

Social relations and interaction

By way of examples of difficult situations, many managers cited the characteristics of supervisory work that are related to collaboration, social interaction relationships and their corresponding skills and competencies. These were especially emphasised in the vocational education and social and healthcare organisations. Shortcomings were pinpointed to the interactional skills, emotional intelligences and social skills of the managers as well as the employees. Some managers considered it difficult to listen and find a common language when communicating with their employees. They felt that a lack of discussion opportunities was an obstacle to openness and that it was due to, for example, a lack of time. Some managers from the expert organisation mentioned that it was hard to change prejudicial interactions despite development activities (e.g. individual discussions). Furthermore, collaboration may also deteriorate if not all employees actively participate in development meetings.

Many managers considered the provision of any kind of feedback—positive, encouraging, critical, negative or constructive—to be difficult. They felt it to be important, but they did not always remember to provide feedback or else they did not find the time, opportunity or appropriate situation for it due to a lack of time, hectic schedules and not being present. Providing constructive feedback was considered particularly difficult by the managers from the social and healthcare and vocational education organisations. They mentioned, for example, having trouble providing feedback related to shortcomings and errors in work performance and other problems or inappropriate behaviour. The

difficulties of providing constructive feedback reflect the generation of conflicts and problems in their management performance.

To sum up, the managers perceived it to be difficult to manage the psychosocial OHS issues that arise in the work environment. The constant changes, economic pressure and redundancies negatively affected the managers' ability to support their employees' OHS and well-being in all the organisations. At the same time, the managers felt conflicting pressures and concern regarding their own ability to cope when implementing new procedures due to organisational changes. The difficult situations that arise when managing OHS include employees' mental overload due to work pressure, malpractice and conflicts in the work community, prioritisation of the workload and assessing the work ability and performance of employees. Moreover, taking the employees' individual characteristics, needs and personal problems into account was considered to be difficult to manage. A particularly difficult situation arose from the lack support provided by the manager's immediate superior for those few managers who encountered such a situation.

4.2 Experienced and expected support needed in managing OHS

Based on sub-study 1 conducted in public organisations, the managers in all the studied organisations, at all levels and in different positions, experienced high strain and they expected support in coping with their own workloads, leadership work and the different challenging situations found in the work community. The organisational support was considered especially important during difficult times, during major organisational changes and in difficult decision-making situations, for instance, redundancies. The managers mainly needed support for one-off problematic situations and solving conflicts.

When a difficult situation occurred, the managers typically looked for ad hoc help from their superiors, colleagues, HR experts and OHS experts in order to manage the situation. Surprisingly, the managers did not mention financial support from upper management, although more resources would help them to better organise the work.

The primary and most important source of support for the managers was their own superior. However, for some managers a lack of support or appreciation from their superior, distance or conflicts with their superior hindered both their own occupational well-being and productivity and that of their entire unit or department.

> 'Nowadays, I'm afraid of bringing certain matters to my superior because it will just result in malice.'

The lack of a superior's support was balanced by the support of, for example, colleagues, families and friends, although they could not replace it completely. A manager's superior is expected to point the way; to be realistic, open and appreciative; to conduct discussions; to listen; to be present; to provide feedback and support; to encourage and collaborate; to trust; to be reliable; and to provide freedom, autonomy and encouraging and constructive feedback. One of the interviewed managers from the expert organisation even mentioned that, in a difficult situation, he figuratively 'goes and cries on the superior's shoulder', and it helps.

In addition to their immediate superior, the respondents considered the support of their colleagues to be very important. The support available from colleagues (other managers) was seen as important, especially when encountering a difficult situation for the first time. In the expert organisation, the managers expected emotional support and to be able to share the experience confidentially with colleagues. They felt that it was good to be able to confidentially discuss difficult situations, exchange experiences and opinions, and learn solutions from their colleagues:

> 'During difficult times we (line managers) discuss things very frankly.'

The managers did not expect formal peer support or mentoring; instead, they sought to discuss matters on an ad hoc basis with the right people in order to obtain peer support and share experiences. It was important and sufficient that their colleagues had time to listen and that they understood the situation and the emotions caused by it. In the social and healthcare organisation, the managers considered "colleague talk" to be both encouraging and motivating in difficult situations.

Other mentioned sources of support were the managing group or board of their own unit or department, with whom difficult and private issues could be discussed confidentially. In some cases, their own subordinates supported and encouraged the managers in identifying solutions to difficult situations.

In some situations, support was expected from occupational healthcare and HR professionals. Such support was needed in dealing with the recruitment, availability and competence of employees, as well as the individual tailoring of work for employees with a reduced working capacity. In the case of managers' mental burden due to difficult situations, support was sought from an occupational healthcare psychologist. However, such support was considered to be a last resort:

> 'Must we line managers visit the psychologist every month so that we can manage here? It shouldn't be this way.'

Furthermore, the managers called for more training, individual support in coping with their own managerial work and administrative duties, opportunities for counselling and discussion regarding organisational policies and procedures at the management board level. The respondents hoped that such discussions would result in increased clarity, a systematic approach and argumentation, and a foundation for their own decision making in their area of responsibility. The respondents felt that organisational clarity strengthens the experience of being in control of their own work and coping amidst many pressures. They called for harmonised organisational OHS procedures to support their managerial work.

Examples of the mentioned types of organisational support include definitions of their mandate and responsibilities, collective rules (e.g. for appropriate work behaviour), intervention procedures, sanctions for violating directions, remote work agreements, models of early intervention and support, and department meetings and development days. Moreover, they called for a strengthening of skills in the areas of OHS management they considered to be particularly difficult, including administration, managing mental overload, inappropriate work behaviour, conflicts and social interaction. In the expert organisation, some managers perceived continual management training to be extremely important and supportive of OHS management:

> '(Management training) provides new viewpoints and confidence in my managerial work.'

To summarise, the managers expected tools and support for coping with difficult situations and conflicts within the work community. The most important source of support was each manager's immediate superior. Moreover, the emotional support of colleagues and the managing group was perceived to be especially important when dealing with confidential OHS issues. Other sources of support were their subordinates, as well as OHS and HR professionals. The most important tools for helping managers with difficult OHS issues were top management support, training and uniform organisational OHS procedures.

4.3 Organisational factors hindering and promoting managers' commitment to OHS

4.3.1 Managers' perceptions of the organisational factors that hinder their commitment to OHS

Based on the results of the interviews conducted in the industrial organisations (sub-study 2), the most important organisational factors hindering managers' commitment to

OHS were categorised as follows. Examples of each category are presented in Table 13. The relevant categories were named based on the previous literature (Conchie et al. 2013) and new categories were added. The categories are: managerial role overload, conflicting production demands, overly formal OHS procedures, inability to influence the setting of safety goals, employees' negative attitudes towards safety, and management attitudes and appreciation of safety at different organisational levels.

Table 13. Categorisation of the organisational factors hindering managers' commitment to OHS

Category	Examples
Role overload (Conchie et al. 2013)	A lot of managerial activities Lack of resources, for example, time, for OHS activities Time-consuming OHS administration and paperwork
Production pressure (Conchie et al. 2013)	Daily production activities and revenue are prioritised Office work impedes being present and supervising at worksites
Formal OHS procedures	Slow procurement process for safety equipment Complicated registration procedures and systems Too many OHS meetings
OHS goals	External OHS goals Inability to influence goal setting Tightening of OHS goals despite previous goals not being achieved
Employee attitudes	Negative attitudes during OHS meetings Negative attitudes towards OHS among senior employees Making unnecessary OHS notifications
Management attitudes	Disinterest in OHS Not perceiving safety as a necessity Overlooking OHS negligence Shooting down OHS proposals Conflicting OHS alignments between different managerial levels Unfairness and unequal treatment of managers Neglecting formal OHS procedures, for example, issuing a warning Resistance to changes and new OHS procedures

The managers' role overload was due to the need to complete numerous managerial activities in addition to OHS work, as well as a lack of resources dedicated to OHS activities. OHS work was often seen as taking time away from productive work; thus, making it appear as extra work. Sometimes, OHS work was only undertaken when it was convenient for the managers:

'Even if there was enough will, one must prioritise the most important tasks for generating euros.'

'Sometimes there are better times, when there is less work to do. One can then arrange safety work and other activities that are not performed daily.'

According to Conchie et al. (2013), supervisors perceived multiple and often conflicting role responsibilities as hindering their safety leadership. Role overload was seen to reduce the amount of time that supervisors have to focus on OHS, since OHS is generally regarded as a distinct component alongside production that is only fulfilled when other responsibilities are less demanding. Many managers recognise the importance of OHS, but they still consider it separate from operational work. In the present study, production pressure was found to hinder managers' commitment due to the perception that production is prioritised over OHS. In many organisations, however, top management emphasises OHS over production. However, this emphasis does not always appear at the supervisor level and the resources available for OHS work may be insufficient. Managers may have operative work to complete at the office and so cannot be present at worksites even if they wanted to be. This is in line with the study by Conchie et al. (2013), where supervisors perceived that they have less opportunity to supervise and coach employees during times of high production pressure.

Overly formal OHS procedures, for example, a slow procurement process or complicated registration procedures of OHS reports, impede managers' commitment to OHS work. They delay the implementation of OHS improvement activities or take time away from practical OHS work, and managers cannot do much about such procedures. Too many separate OHS meetings or an excessively formal perspective on OHS in meetings may also cause managers to become tired of OHS issues:

> 'Lack of time is the biggest problem. There'll soon be too many safety meetings.'

External OHS goals (goals coming from the outside, for example, from the corporate group level) negatively affect managers' OHS commitment, since the managers are unable to influence the setting or tightening of such goals:

> 'These safety goals are insignificant because it is not possible to personally influence them, since they come from somewhere else. They are only goals.'

Both employees' and other managers' negative attitudes towards OHS were also perceived as hindering factors. Employees' negative attitudes may appear as negative comments or passive participation during OHS meetings. They affect the safety climate of an organisation, as well as the implementation of agreed OHS procedures. They may also increase managers' tasks, for instance, when employees report unnecessary or inappropriate OHS notifications. Interestingly, many managers felt that they had the 'right' attitude, but that some other managers did not. They considered that other managers were not sufficiently interested in OHS and its necessity, neglected fixed OHS procedures or resisted new OHS procedures:

'Many of my colleagues have difficulty with their attitude towards safety. This is seen in their opinions and comments, as well as in their resistance to new things.'

'A lack of common rules and the fact that not all the managers are committed to obeying the rules weaken the safety culture.'

The existence of conflicting OHS alignments between different managerial levels and business lines were perceived as making commitment to the organisation's safety policy difficult, since some managers experienced conflicting expectations from their superiors:

'It is difficult because my own superior's and top management's safety messages conflict. I cannot do much in this kind of situation. The top management's safety message is clear and the business line manager's message should really be in line with it.'

Thus, the managers were not supported or were sometimes even encouraged to neglect the organisation's OHS procedures. According to sub-study 1 (Tappura et al. 2014), inadequate support from the managers' superiors was a key challenge for some managers, since the principal source of support was expected to be one's superior.

The top management in particular plays a significant role in hindering lower-level managers' commitment, since the top management's attitudes towards and valuation of OHS are reflected in the managers' OHS practice. Despite the lower-level managers' high level of commitment to OHS, top management's expression of disinterest in OHS was seen to affect the managers' commitment:

'If the senior managers' attitude towards safety is one of disinterest, my safety motivation decreases.'

'My safety commitment decreases when the top management sees safety issues as a cost and an extra drag on production or adopts the wrong safety attitude.'

These results are in line with the findings of Conchie et al. (2013); they confirm that the major factors hindering managers' commitment to safety are related to the managers' role overload and production demands. In addition, Conchie et al. (2013) suggested that workforce characteristics, for example, subcontractors' safety attitudes, inadequately skilled employees and language barriers, were a hindrance to supervisors' safety leadership. In the present study, the interviews showed that the managers perceived overly formal OHS procedures, external OHS goals and negative employee and management attitudes towards OHS as hindrances to their commitment to OHS.

Most of the interviewed managers were well aware of the importance of OHS and they were highly committed to it. Many managers saw OHS work as an integral part of their job and they could not separate commitment to OHS from commitment to operation. However, they perceived many organisational factors to hinder them from acting according to their own understanding of what is right. They were typically genuinely concerned about their employees' safety and well-being. Yet, the fact that they cannot always act in accordance with their understanding of OHS may unnecessarily burden managers.

4.3.2 Managers' perceptions of the organisational factors that promote their commitment to OHS

Based on the results of the interview conducted in the industrial organisations (sub-study 2), the most important organisational factors promoting managers' commitment to OHS were categorised. The categories, as presented in Table 14, are as follows: increasing OHS awareness among managers, influencing managers' OHS attitudes, recognising managers' OHS commitment, developing adequate organisational OHS procedures, encouragement and support from superiors, benchmarking others' OHS activities, and OHS improvement. According to Conchie et al. (2013), the main categories of factors seen to enhance supervisors' engagement in safety leadership were autonomy and social support, for example, organisational support and support from managers and co-workers. Support from the organisation may increase managers' personal awareness and attitudes towards safety (Conchie et al. 2013), which in this study are categorised separately in order to emphasise their importance. Moreover, other categories in the present study, for example, organisational OHS procedures, support from superiors and safety benchmarking, can be seen as distinct perspectives on social support. Autonomy did not emerge as a main category here, unlike in the study by Conchie et al. (2013). In section 4.3.1 on the identified hindrance factors, the managers' autonomy was discussed in relation to the setting of OHS goals (i.e. the inability to influence the setting or tightening of goals).

Table 14. Categorisation of the organisational factors that promote managers' commitment to OHS

Category	Examples
OHS awareness	Increasing managers' OHS awareness
	Understanding managers' OHS role
	Emphasising managers' regulatory and moral responsibility to take care of their employees
	Emphasising the effects of a positive/negative safety culture
	Understanding the economic effects of good/poor OHS and accident costs
	Personal growth in relation to OHS management

Category	Examples
	Adequate tools for accessing OHS information
	Safety communication via various channels
OHS attitudes	Improving managers' OHS knowledge
	Clear OHS goals, for example, zero accidents
	Influencing managers' attitudes through inspirational training
	Peer discussion and support
Recognition of OHS commitment	Rewarding good OHS results
	Ability to influence goal setting
	Adequate resources (time) for achieving the established goals
	Competitions, campaigns and bonuses
	Verbal recognition
Organisational OHS procedures	Top management resourcing for, appreciation of and an emphasis on OHS
	Uniform, mandatory and scheduled OHS procedures
	Instructions for OHS procedures
	Support and help in OHS activities
Support from superiors	Own superior encouraging and expressing interest in OHS
	Pressure and discussions when OHS goals are not achieved
Safety benchmarking	Visiting other units and learning from them
	Competition between units
	Wide participation in safety rounds
	Participating in forums outside the company
OHS improvement	Seeing the progress and the benefits of a good OHS level
	Ability to influence OHS improvement

The managers' understanding and awareness of their OHS responsibilities were seen as a starting point for their commitment to OHS, which is in line with the findings of Simola (2005). To develop their commitment, managers need information and knowledge concerning the expectations regarding their role. Defining and emphasising managers' OHS responsibilities makes such expectations visible and helps managers to adjust or develop their work accordingly. Furthermore, emphasising the various effects of OHS within the organisation helps to increase managers' awareness of the importance of OHS; thus, enhancing their commitment to it. They also perceived personal growth to be important in increasing awareness of OHS issues in relation to their managerial role, and it typically increased over time as they worked in a managerial position.

> 'The starting point is the manager's own sense of responsibility, that is, you understand it is part of your managerial duties to be responsible for your own and your subordinates' safety.'

> 'The manager should understand what the role of being a manager includes. If you are a manager, then you represent your company in certain issues [e.g. OHS issues].'

The managers perceived supporting their own or other managers' positive OHS attitudes to be important. Support may be provided through inspirational and participative training,

including management workshops. Other kinds of peer support and discussions were also perceived as promoting factors because they helped the managers with difficult situations and offered emotional support, which is in line with the findings of sub-study 1 (Tappura et al. 2014). Organisational support that aligns the managers' different OHS attitudes helps the highly committed managers and increases the commitment of the least committed managers, whose commitment increases along with that of the masses:

> 'The commitment rises along with that of the masses when general knowledge and procedures become safer over time.'

Recognition, for example, rewards and verbal recognition of good OHS work, was also perceived as a promoting factor, since it motivates managers to continue their OHS work and maintain their commitment:

> 'It promotes my safety commitment if there is a department-specific follow-up and reward, as well as a reward system for managers.'

> 'In the end, the economic incentives are not so important. It is more important that you are recognised, that it is said aloud or written somewhere that this work was well done.'

Uniform OHS procedures that must be followed at the organisational level were perceived as a promoting factor. In addition, top management's resources, appreciation and support for OHS work, as well as support from others (e.g. supervisors, OHS professionals and colleagues), also promoted managers' commitment to OHS. The importance of feeling that support is available when needed was emphasised. This is in line with the findings of sub-study 1 (Tappura et al. 2014), where such resources were perceived as offering support for managers during difficult situations in relation to OHS.

> 'The fact that I can receive support and help with the safety work promotes my commitment to safety.'

In addition to top management, the managers' superiors play a central role because they are typically the primary source of support. Support from the managers' superiors is crucial, particularly in situations of conflict, for example, safety versus costs:

> 'The main incentive is that my own superior encourages safe work and keeps demanding it, especially during challenging situations where different solutions must be considered. The cheapest solution is not necessarily the best, but the work must be done safely. It gives me the authority to act correctly.'

At the same time, pressure from upper management may also promote managers' commitment:

> 'There will be pressure and discussions [on behalf of the interviewees' own superiors] if the unit is very far from achieving the established goals.'

Safety benchmarking, for instance, visiting other units or companies, was also seen as important because it provides a wider view of safety and supports peer discussions and learning from others. Competition between units and teams was seen as useful in motivating managers' OHS work:

> 'People are interested in benchmarking between different units in order to hear examples and learn from best practices about how things are done elsewhere in a similar industry.'

Moreover, OHS improvement itself acted as a promoting factor for managers' commitment to OHS. The managers were typically very concerned about their subordinates and their well-being. They were also well aware of the business effects of OHS, including customer satisfaction and costs due to accidents. In addition, they had, at the very least, organisational-level OHS goals such as zero accident goals and achieving good results motivated them:

> 'It motivates me that we are able to make the work environment safer over time.'

4.3.3 Summary

To sum up, many managers perceived that due to the various hindering factors, they could not act according to their personal desire in relation to OHS management. The major factors hindering managers' commitment to OHS were managers' role overload and production pressure, too formal OHS procedures, OHS goals coming from outside the unit, as well as both employees' and managers' negative attitudes towards OHS development and organisational OHS procedures. Alternatively, there exist many organisational factors that promote managers' commitment to OHS. The main promoting factors include increasing OHS awareness among managers, influencing managers' OHS attitudes, positively recognising managers' OHS commitment, developing adequate organisational OHS procedures, encouragement and support from superiors, benchmarking others' OHS activities and OHS improvement as such.

4.4 Effective leadership traits for promoting OHS performance

Due to its importance in improving OHS performance, leadership is certainly worth discussing when the topic is effective OHS management. According to the literature, OHS-related leadership (safety leadership) is often structured according to the transactional and transformational leadership styles (Bass 1985). The results of the literature review and the interviews conducted with line managers from the public expert organisation (sub-study 3) were compared and structured according to the transactional (contingent reward and management by exception) and transformational (idealised influence, individualised consideration, inspirational motivation and intellectual stimulation) leadership facets (Bass 1985; see Table 1 in section 2.1.2). Examples of the leadership facets found to have an association with OHS performance in the previous literature are presented. Moreover, the effective leadership facets identified in the interviews are proposed and some illustrative interview quotations are presented.

4.4.1 Transactional leadership

Transactional leadership consists of the contingent reward and management by exception leadership facets (Bass 1985, 1990b). The interview results did not bring out any leadership facets related to transactional leadership. However, the safety literature contains discussions regarding transactional leadership, including the contingent reward and management by exception leadership facets (Table 15).

Table 15. Examples of transactional leadership facets from the literature

Transactional leadership facet	Example
Contingent reward	Having a reward or incentive system (Hale & Hovden 1998) Rewarding employees' safety behaviours (Lu & Yang 2010; Zohar 2002a)
Management by exception:	Monitoring employees' safe/unsafe behaviours (Griffin & Hu 2013; Shannon et al. 1997; Zohar 2002a; Zohar & Luria 2003) Correcting employees' behaviours (Lu & Yang 2010) Enforcing employees' observance of safety regulations (Wu et al. 2008) Sanctioning rule violations (Hale & Hovden 1998)

Both of the transactional leadership facets, that is, contingent reward and management by exception, were linked to lower injury rates (Hale & Hovden 1998, as cited in Hale et al. 2010; Zohar 2002a) and better safety climate scores (Zohar 2002a; Zohar & Luria 2003). Moreover, both facets were positively associated with employee safety

behaviours, including compliance (Griffin & Hu 2013; Lu & Yang 2010), participation (Lu & Yang 2010), housekeeping and the use of protective equipment (Zohar & Luria 2003).

4.4.2 Transformational leadership

Transformational leadership consists of the idealised influence, individualised consideration, inspirational motivation and intellectual stimulation leadership facets (Bass 1985, 1990b). The results of the interviews and the literature review suggest various examples of leadership facets related to transformational leadership. In relation to idealised influence, examples of leadership facets based on the literature review are presented in Table 16. Based on the interviews, the following idealised influence leadership facets were identified:

- Being present.
- Having an open-door policy to enable subordinates to discuss relevant issues when necessary.
- Speaking respectfully about employees.
- Treating all employees well and even-handedly.
- Complying with organisational procedures and rules.
- Believing in employees' expertise.
- Actively collecting information on problems in the work community.
- Broaching discussions on conflicting issues and working out problems.

Many of the interviewed line managers saw the management of OHS as an integral part of their managerial work. They perceived managers' active role as important in managing OHS:

> 'I should observe the work community with sensitive antennae. When noticing matters that affect the well-being of employees, I should take suitable measures.'

Many managers noted that it is their duty to maintain an open, interactive and supportive climate within the work community. For example, one managers stated that her role is

> 'to maintain the kind of atmosphere where everybody can ask for help from others and know that he/she will receive help.'

Table 16. Examples of the idealised influence leadership facets drawn from the literature

Transformational leadership facet	Example
Idealised influence	Stressing the importance of safety (Hale & Hovden 1998; Lu & Yang 2010)

Transformational leadership facet	Example
	Being a role model for safety (Lu & Yang 2010)
	Demonstrating the true and consistent priority of employee safety (Törner 2011)
	Managers' commitment (Hale & Hovden 1998; Hofmann & Morgeson 1999)
	Managers' active role (Shannon et al. 1997)
	Participative leadership style (Hale & Hovden 1998)
	The amount of energy and creativity injected by managers (Hale et al. 2010)
	Informal organisation (Hale & Hovden 1998)
	Good (Hofmann & Morgeson 1999; Michael et al. 2006; Shannon et al. 1997) and trusting (Hale & Hovden 1998; Kelloway et al. 2012; Törner 2011; Zacharatos et al. 2005) relationships between the management and workforce, which serve to promote cooperation (Törner 2011)
	Interpersonal communication (Hale & Hovden 1998)
	Constructive dialogue (Hale et al. 2010) between managers and employees
	Availability, openness to criticism and work as a source of pride (Hale & Hovden 1998)

Demonstrating sincere safety concerns, managers' commitment and active role, and high-quality relationships fostered through constructive dialogue have all been linked to lower injury rates (Hale & Hovden 1998; Shannon et al. 1997, as cited in Hale et al. 2010) and a decrease in safety incidents (Michael et al. 2006; Zacharatos et al. 2005). These types of leadership behaviours support trust and a position of safety as the prime organisational goals (Törner 2011), as well as supporting employees' reporting of safety concerns (Hofmann & Morgeson 1999). Trusting relationships (Törner 2011) support the realisation of safety behaviours (Lu & Yang 2010). The level of trust that employees have in managers mediates their personal safety orientations (i.e. safety knowledge, safety motivation, safety compliance and safety initiative) and it has a positive relationship with employees' psychological well-being (Kelloway et al. 2012). Constructive dialogue between the shop-floor staff and frontline management has been identified as a key factor for successful safety interventions with improvements in safety performance (a combination of several measures, e.g., accidents, unsafe behaviour, dangerous situations and safety climate) (Hale et al. 2010).

In terms of those leadership facets classified as relating to individual consideration, examples based on the literature are presented in Table 17. In the interviews, the respondents mentioned the following leadership facets related to individualised consideration:

- Asking how employees manage and feel.
- Proactively offering help.

- Accepting differences in personalities.
- Accepting different kinds of expressions.
- Creating prerequisites for working efficiently.

Many managers considered taking employees' individual characteristics and strengths into account to be important in evaluating their capability to perform certain work activities and supporting them individually. At the same time, the managers should trust their employees' ability to handle work activities. Every employee should be assigned worthwhile tasks in order to experience success at work. This affects their well-being, as one manager noted:

'I must ensure that employees have the ability to undertake those tasks that play to their strengths. If, for example, there are some education needs, I try to react to them. Thus, I can help employees to achieve success and develop in their work.'

Table 17. Examples of the individualised consideration leadership facets drawn from the literature

Transformational leadership facet	Example
Individualised consideration	A culture of caring (Hale & Hovden 1998) Providing individualised support (Törner 2011) Reflecting care and concern for the well-being of employees (Mearns & Reader 2008) Human resources planning (Hale & Hovden 1998) Modified work provision following accidents (Shannon et al. 1997)

Support that considers individual needs promotes employees' safety behaviour (Mearns & Reader 2008) and, therefore, their contribution to organisational goals (Törner 2011), including lower accident rates (Hale & Hovden 1998).

In the interviews, a few leadership facets related to inspirational motivation were brought out. They were related to the flow of information, such as informing employees about work objectives at the individual and group level. All the employees should receive uniform information regarding the organisation and relevant information in relation to their own work. One interviewed manager described the favourable OHS management of experts as follows:

'All the employees have their own scope of work tasks. When they know roughly what is within their own scope, what will be done and where we are going, it creates well-being in this kind of expert organisation.'

The findings from the literature review linked to inspirational motivation are presented in Table 18.

Table 18. Examples of the inspirational motivation leadership facets drawn from the literature

Transformational leadership facet	Example
Inspirational motivation	Promoting safety (Hale & Hovden 1998)
	Motivating and inspiring safety (Griffin & Hu 2013; Hale & Hovden 1998; Shannon et al. 1997; Törner 2011)
	Using inspirational appeals (using emotional language to emphasise the importance of a new task and generate enthusiasm) (Clarke & Ward 2006)
	Empowering leader behaviour (Martínez-Córcoles et al. 2011)
	Encouraging the workforce towards a long-term commitment (Shannon et al. 1997)
	Defining and using goals, standards and resources (Hale & Hovden 1998; Lu & Yang 2008)
	Fostering group goals (Törner 2011)
	Communicating about safety (Hofman & Morgeson 1999; Michael et al. 2006)

Promoting safety and motivating employees to engage in safety behaviours result in lower accident rates (Hale & Hovden 1998; Shannon et al. 1997) through the creation of an improved safety climate (Clarke & Ward 2006; Martínez-Córcoles et al. 2011; Törner 2011) and increased employee safety participation (Griffin & Hu 2013). The proper declaration and fostering of safety goals supports the formation of better relationships in a group climate, and they can be linked to decreased safety-related events and lower accident rates (Hale & Hovden 1998). Communicating about safety can help employees to feel freer to raise safety concerns (Hofman & Morgeson 1999) and it can be linked to the occurrence of fewer safety events (Michael et al. 2006) and accidents (Hofman & Morgeson 1999).

Examples of intellectual stimulation leadership facets identified during the literature review are presented in Table 19. In relation to intellectual stimulation, the following themes arose during the interviews:

- Encouraging employees to brainstorm and contemplate solutions with their supervisor or colleagues.
- Asking employees for their interpretations.
- Remembering that the line manager is not the centre of the work community.

According to one interviewed manager:

'it is important to share responsibility with employees and encourage them to take responsibility.'

Table 19. Examples of the intellectual stimulation leadership facets drawn from the literature

Transformational leadership facet	Example
Intellectual stimulation	Coordination, centralisation (Hale & Hovden 1998) and delegation of safety activities (Shannon et al. 1997) Empowering (Hale & Hovden 1998; Shannon et al. 1997) and consulting (Clarke & Ward 2006) with employees Adopting a problem-solving (Hale & Hovden 1998) and learning (Griffin & Hu 2013) approach to safety Using logical arguments and factual evidence (rational persuasion) to motivate safety (Clarke & Ward 2006)

According to Clarke and Ward (2006), leadership behaviours such as coalitions, consultations and rational persuasion influence employees' safety participation. Empowering the workforce in different ways contributes to safety performance through an improved safety climate (Clarke & Ward 2006; Törner 2011), trust and relationships between employees and leaders (Törner 2011). According to Griffin and Hu (2013), safety monitoring positively influences safety participation when the leader encourages safety-related learning. Both a problem-solving approach and employee empowerment are associated with lower accident rates (Hale & Hovden 1998; Shannon et al. 1997).

4.4.3 Summary

Based on the previous research, both transactional and transformational leadership are needed when OHS is to be managed effectively. They can be divided into safety control influencing employees' safety compliance and safety coaching influencing employees' safety participation, which are both related to OHS performance. The most effective leadership facets are safety monitoring, contingent reward and idealised attributes. Based on the interviews, the following kinds of leadership were considered effective in the management of OHS:

- Idealised influence:
  - Open and accessible: being present and having open doors for subordinates.
  - Appreciative and caring: trusting, speaking respectfully about employees.
  - Set a good example: treating employees with respect and fairness, following the rules.
  - Constructive dialogue: accepting diverse viewpoints, conflicts are broached and processed interactively.
- Individualised consideration:

- Helpful and supportive: establishing working conditions necessary to do one's best, asking employees' perceptions of obstacles to their work.
- Taking individual needs into account: accepting disparities and different kinds of expressions, proactively offering support.
- Intellectual stimulation:
  - Collective problem solving: encouraging collective problem reflection and solving.

4.5 Organisational measures to support managers in OHS management

4.5.1 Top management support

Based on the literature review and the findings from sub-studies 1 to 3, practical organisational measures to support managers in OHS management were explored. First, both the previous literature and the empirical findings from the interviews and workshop emphasise the importance of top management support in relation to OHS management (Table 20). Top management establishes the expectations regarding OHS management, while adequate resources, support and guidance should be provided to managers (Frick 2013). However, the available support is often inadequate from the lower managers' viewpoint (see Frick 2013). Additionally, based on the results of this study, managers at all organisational levels need to perceive constant appreciation and support for OHS work on the part of top management. Top management's noticeably expressed commitment is crucial to supporting lower-level managers' commitment to OHS. Top management should therefore recognise the importance of its role in motivating lower-level managers' commitment by providing resources, support and guidance for OHS management. This is important in improving OHS performance, but it can also lead to other positive outcomes such as fostering favourable employee attitudes and behaviours in relation to productivity (Michael et al. 2005).

Table 20. Organisational measures to support managers in OHS management in the "Top management support" category

Major section	Sub-section	Literature	Interviews	Workshop
Top management support	Providing resources, support and guidance on OHS management	x	x	x
	Power and responsibilities in sync	x	x	
	Defining OHS responsibilities and tasks	x	x	x
	Expressing OHS as a necessity and a value	x	x	x
	Expressing a visible commitment to OHS	x	x	x
	Motivating managers' OHS commitment	x		x
	Reducing managerial workload	x	x	x
	Defining OHS management expectations and goals	x	x	x
	Highlighting the economic effects of OHS	x	x	x
	Emphasising a health-promoting culture	x		
	Initiating OHS programmes and investments	x	x	x
	Actively communicating OHS issues in various situations	x	x	x
	Actively participating in OHS activities (e.g. safety walks)	x	x	x
	Ensuring managers' OHS capability	x		x
	Monitoring OHS goals	x		x
	Communicating achievements and positive effects of OHS		x	x
	Recognising good OHS work		x	x
	Emphasising managers' accountability for OHS	x		x
	Support in mandatory OHS requirements		x	x

By emphasising the importance of OHS as an embedded part of both the operation and customer expectations, as well as highlighting its economic effects, top management can reduce managers' role conflicts, including conflicts between production and OHS goals. A health-promoting culture and values should also be emphasised in organisations in order to support managers in related activities and in the improvement of OHS (see also Eriksson 2011). Thus, the management of work-related health problems in the working community and the psychosocial work environment is an essential part of OHS management. Top management's emphasis and prioritisation of OHS issues provides managers with permission to perform OHS work as a part of their other daily managerial activities despite of production pressures. This is especially true when OHS management

is seen as a means of reducing occupational injuries and ill health and, hence, improving productivity and the achievement of organisational performance goals.

Top management commitment and support can be expressed in the form of the allocation of resources for OHS activities at all managerial levels, initiating OHS programmes and investment in an adequate OHS management system. Moreover, top management can visibly demonstrate the importance of OHS by actively communicating OHS issues in different kinds of situations and participating in OHS activities, for example, safety walks and training (see Tappura et al. 2016). Management practices should be discussed and developed within organisations so as to advance a supportive and coherent (Clarke 1999; Michael et al. 2005) culture for OHS in accordance with the organisational values and strategies. Moreover, providing managers with information on the expectations related to their role and OHS responsibilities increases their awareness of their responsibilities and, in turn, their commitment to OHS (see Simola 2005). Furthermore, top management should ensure that lower-level managers are capable of fulfilling these requirements. This can be done by defining managers' OHS tasks at different organisational levels (top, middle and frontline) and developing OHS management accordingly (see Tappura et al. 2016). In particular, managers' desired leadership behaviour and related skills should be emphasised in order to have positive effects on OHS performance (see Hoffmeister et al. 2014). The definition of OHS responsibilities is also important in integrating these requirements with other managerial activities.

By means of defining clear objectives, achievable OHS goals and their follow-up, top management sends managers the message that OHS is prioritised and that fulfilling the related objectives is important. At its best, the follow-up is based on the department-level performance; hence, managers perceive that they can influence both the setting and realisation of goals. Organisational-level communication of the achieved results, success stories and positive effects of OHS plays an important role in motivating managers with regards to OHS, since the managers consequently perceive the OHS work as worthwhile and they are better able to maintain their commitment to OHS. Nevertheless, many managers perceived their subordinates' safety and well-being to be the most important factors that promote their commitment to OHS work; they felt successful when accidents did not occur and their employees were healthy. Moreover, the recognition of good OHS work supports managers' commitment to OHS, since it motivates managers to do the right thing and further maintain their commitment. The easiest and cheapest way to achieve this is to provide verbal or written recognition. This may be done, for example, by presenting good results in organisational-level meetings or bulletins.

In organisations, it is important to consider every manager's accountability for OHS. Understanding the distinct effects of OHS on the business is important for all managers

who are accountable for business results. By emphasising management accountability for OHS, top management sends the message that OHS is a core value in addition to having economic effects. Management accountability for OHS is based on known expectations for OHS performance, sufficient competencies related to those expectations, measurement and rewards; hence, motivating managers' OHS-related performance. The OHS emphasis, whether physical or psychosocial, depends on their area of responsibility. For example, when managing professional employees, psychosocial OHS issues typically become emphasised due to the nature of the work. Management accountability flows down to the supervisory level by, for instance, training, offering examples on a cost basis, safety performance measurements and evaluation, incentives and peer pressure. The more authority a particular manager has, the greater his/her accountability should be for his/her area of responsibility. If managers are not accountable for OHS, it may be difficult to motivate them amidst all the pressure they encounter in their daily work.

4.5.2 Uniform and simple OHS procedures

Uniform and simple OHS procedures and tools are needed to support managers in their OHS work (Table 21). Clear and easy to follow OHS procedures and tools help managers' in controlling their managerial workload. However, adequate instructions and training are needed in order to effectively enforce the OHS procedures. Managers can be supported by reducing the demands of the managerial work, providing uniform OHS procedures, increasing support between managers and offering OHS management and leadership development activities. Organisational measures that support managers in their OHS activities include OHS procedures that are consistent, clear and easy to follow. Managers especially require OHS procedures in situations they perceive to be difficult, for example, managing employees' workload, handling employees' work ability issues and managing conflicts within the work community. Creating uniform OHS instructions and ensuring their enforcement at all organisational levels provides managers with backup when production pressure or conflicts arise. In addition, simple procedures and tools (such as mobile reporting) help managers to execute the procedures and save time for practical OHS work such as supervising and coaching their subordinates.

Table 21. Organisational measures to support managers in OHS management in the "Organisational OHS procedures" category

Major section	Sub-section	Literature	Interviews	Workshop
OHS procedures	Advancing uniform and simple OHS procedures and tools	x	x	x
	Comprehensive enforcement of the OHS procedures		x	x
	Support to manage psychosocial risks	x	x	
	Evaluating and prioritising employee workload		x	
	Time for discussion in the work community		x	
	Handling of employees' reduced work ability	x	x	
	Handling of inappropriate work behaviour and conflicts		x	
	Giving feedback		x	x
	Support from superior	x	x	x
	Support from other managers	x	x	x
	Support from OHS, HR and legal professionals	x	x	x
	Visible OHS goals and achievements	x	x	x
	Ensuring fair treatment of all the managers	x	x	x
	Clear warning procedures		x	x
	Warning procedure also in use for managers			x
	Managers participate in internal OHS audits		x	x
	Competitions and campaigns	x	x	x

All the managers should be treated fairly across the organisation, while equal compliance with the common rules should be demanded from all the managers in order to underscore the seriousness of the rules. In the case of negligence regarding OHS responsibilities, an interference procedure should be in place. For example, the warning procedure should also apply to managers if they do not obey the OHS rules and procedures. Ideally, the OHS responsibilities and rules are regularly discussed with the manager's supervisor based on the organisational OHS values and objectives. To support managers' personal growth and express their superiors' interest in OHS, safety issues can be included in yearly development discussions and informal discussions. The starting point for this kind of discussion, however, requires a certain level of OHS commitment on the part of the superiors as well. Information regarding managers' OHS responsibilities and rules can also be offered through a discussion with safety professionals and peers or through management development activities such as safety training. Developing managers' OHS knowledge through discussions and training can

lead to a more uniform safety culture, as well as better compliance with OHS procedures at the organisational level.

Support from other organisational actors such as OHS, HR and legal professionals is important, since it helps managers when their own competence or resources are inadequate or when they need additional backup in executing the OHS procedures (see Veltri et al. 2013). The support provided could be instructions, discussions and advice in certain situations, for example, when problems arise with an employee's health. For instance, active cooperation between managers and occupational healthcare professionals helps managers in handling employees' psychosocial burden, which is typically perceived as a difficult OHS issue. The highly committed managers typically proactively ask for guidance and support from OHS professionals rather than only seeking them out in cases of urgency. Although this may burden the OHS professional in the short term, it can result in more proactive OHS work in the long term.

External OHS training and enabling managers to visit customer sites, other units and companies also support the managers' commitment to OHS because they acquire new ideas and motivation to develop OHS. Encouraging managers' participation in internal OHS audits and safety rounds across the company provides them with an opportunity to compare their OHS activities with those of other managers, learn from them and advance uniform OHS procedures. Competitions and campaigns between departments may also increase managers' commitment and help them to engage their employees in OHS work.

4.5.3 Systematic OHS management development

Finally, systematic and continuous OHS management development was emphasised in both the literature and the empirical findings (Table 22). The development of OHS management and leadership is needed in order to meet the organisational OHS performance goals and fulfil the OHS management requirements. OHS management development should therefore be integrated into the general management and leadership development. Developing OHS-related leadership was especially emphasised in the recent literature. In the empirical studies, leadership issues were discussed as part of OHS management, since the Finnish notion of OHS management includes leadership.

Table 22. Organisational measures to support managers in OHS management in the "OHS management development" category

Major section	Sub-section	Literature	Interviews	Workshop
OHS management development	Systematically developing OHS management practices as part of management development	x	x	x
	Increasing managers' OHS awareness and attitudes	x	x	x
	Orientation procedure includes OHS issues		x	x
	Development of leadership behaviour and skills	x	x	
	Development of interaction skills	x	x	
	Systematic OHS competence development	x	x	x
	Regular OHS training and workshops	x	x	x
	Development discussions include OHS issues			x

Managers typically grow into their OHS management role through gaining experience during their managerial career. It is important to highlight and enhance the managers' own understanding of the importance of their role in OHS management from the very beginning of their career in order to achieve positive OHS and performance outcomes. OHS management tasks should be defined and applied when developing OHS management as part of the general management development (see Tappura et al. 2016). In spite of this, OHS management requirements are often unclear (Hardison et al. 2014), while managers tend to have little OHS training and only a limited understanding of their important role (Hale et al. 2010; Griffin & Hu 2013). A lack of OHS management skills may impede the overall improvement actions and OHS performance and, hence, organisational performance.

Managers' attitudes, competence and commitment regarding OHS can be promoted through workshops and training consisting of joint discussions with peers, which serves to build a shared understanding of OHS issues and enable peer support (see Conchie et al. 2013; Tappura & Hämäläinen 2011). Organisational support can be provided through inspirational and participative training, including management workshops (see Tappura & Hämäläinen 2011). When management training, workshops and safety meetings enable discussions concerning regulatory OHS requirements, topical OHS issues and related problem solving, they provide managers with both concrete and emotional support. This is important in helping managers to fulfil their role, particularly when they experience challenging situations for the first time. Top management workshops can support the upper management commitment to OHS when the focus is

on their significant influence as role models for lower-level managers and their problem-solving abilities (see Fruhen et al. 2014a).

OHS management development activities should form an integral part of general management development activities. In the future, organisational competencies and collaborations will become even more important due to constantly changing operating circumstances. Managers at different levels within an organisation play a central role in boosting the resources of the organisation and promoting OHS and the well-being of employees. The skills and resources of the managers, as well as the organisational support they receive for managerial work, affect the success of this endeavour. The managers' own interpretation of their development needs should also be taken into consideration, since it reflects their motivation to develop, as well as any deficiencies in the management development procedures (Chan & Drasgow 2001; Viitala 2005). The process may include, for example, selecting and recruiting managers with adequate OHS management knowledge, OHS orientation and training for managers, and organising OHS performance measurements, reward systems and accountability for OHS.

Further, the differing managerial requirements across organisational levels should be considered in management development (see De Meuse et al. 2011; Yukl 2010). Moreover, "good" OHS management clearly overlaps with the existing conception of "good" management behaviour and, therefore, it should be integrated into the overall management practices. From the general management development point of view, managers' technical and business skills are often emphasised, whereas their social skills and intrapersonal skills are neglected (Viitala 2005). Based on the results of this study, OHS leadership development should be particularly emphasised within organisations.

4.5.4 A conceptual framework of organisational measures to support managers in OHS management

Based on the findings from the literature review and the results of sub-studies 1 to 3, a conceptual framework of organisational measures to support managers in OHS management was constructed. The conceptual framework consists of three major sections, namely top management support, organisational OHS procedures and OHS management development (Figure 9). The detailed content of the framework is presented in Appendix 1.

Top management support	Organisational OHS procedures	OHS management development
Providing resources, support and guidance on OHS management	Advancing uniform and simple OHS procedures and tools	Systematically developing OHS mgmt. as a part of management development

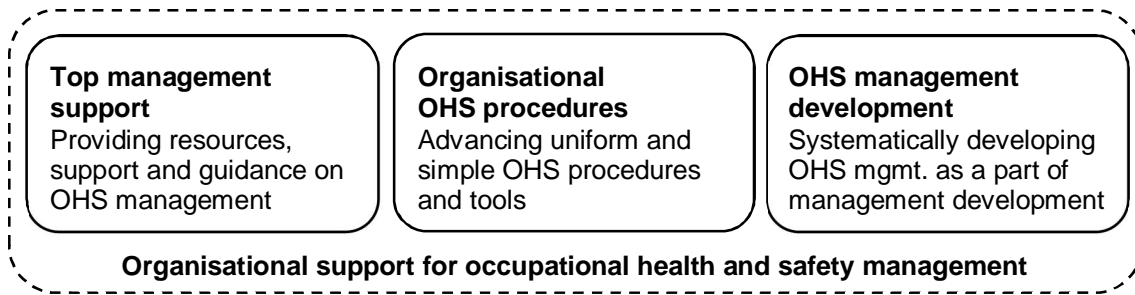**Organisational support for occupational health and safety management**

Figure 9. A conceptual framework of organisational measures to support managers in OHS management

Top management establishes the goals and expectations for OHS management within organisations. Hence, adequate resources, support and guidance should also be provided for the managers tasked with implementing those goals (see Frick 2013). Top management's noticeable commitment to and appreciation of OHS is crucial in supporting lower-level managers' commitment to OHS (see Conchie et al. 2013). Moreover, managers' awareness and accountability in relation to OHS should be emphasised in order to increase their understanding of the effect of OHS on organisational performance and the achievement of performance goals. This can be achieved through a more consistent OHS attitude (see Michael et al. 2005), uniform safety culture and better enforcement of OHS procedures at the organisational level rather than just at the individual manager's level. Moreover, it can lead to other positive outcomes such as fostering favourable employee attitudes and behaviours in relation to productivity (Michael et al. 2005).

In addition to top management support, advancing uniform and simple OHS procedures helps managers in executing OHS procedures, as well as reducing their managerial workload. In line with the results of Conchie et al.'s (2013) study, controlling managerial role overload and production pressure in general can support managers in OHS management. Conchie et al.'s (2013) study also emphasised perceived autonomy as promoting managers' commitment to OHS. Managers can be supported by providing the opportunity for peer discussions, workshops and training between managers in order to improve their OHS awareness and attitudes, as well as providing social support (see Conchie et al. 2013). Creating uniform OHS instructions and ensuring their enforcement at all organisational levels provides managers with backup when production pressures or conflicts arise. Managers typically require OHS procedures in situations they perceive to be difficult, for example, managing employees' workload or handling employees' work ability issues. At the same time, equal compliance and enforcement of the OHS procedures should be demanded from all the managers. In the case of negligence regarding OHS responsibilities, an interference procedure should also be in place for managers.

OHS management practices should be systematically developed as part of general management development in order to integrate the OHS issue into other management activities (see Tappura & Kivistö-Rahnasto 2017). In order to support managers' own understanding and capabilities of OHS management, OHS issues should be regularly discussed as part of management development activities from the very beginning of their managerial career, including orientation, development discussions and training. The OHS responsibilities and development needs should be regularly discussed with the managers' superior based on the organisational-level OHS values and objectives in order to effectively put them into action. Managers' commitment to OHS can also be supported by discussions with OHS professionals and formal training (see Fruhen et al. 21014a; Simola 2005; Tappura & Hämäläinen 2011). Based on the results of this study and the prior literature (e.g. Conchie et al. 2013; Hoffmeister et al. 2014; Griffin & Hu 2013), leadership development should be emphasised in order to effectively manage OHS performance.

5 Discussion

5.1 The challenges and support needed in managing OHS

The first research question (RQ1) asked what difficult situations managers confront when managing OHS. Sub-study 1 described the range of difficult OHS management situations, as well as the related support experienced and expected, from the managers' perspective in relation to public service organisations. According to the experiences of the managers, the most difficult OHS management situations are related to psychosocial risks within the work community. In line with the EU-OSHA (2014) study, more support is necessary for managers to effectively manage psychosocial risks. Situations related to traditional OHS risks were not seen as difficult, mainly because there are typically procedures in place to manage them. Presumably for the same reason, bullying and harassment were not cited as particularly difficult OHS issues, either. However, there are nowadays procedures, tools and expert advice available also to manage psychosocial risks at workplace. The problem appears to be their inadequate utilisation in the studied organisations.

The framing of the interview questions might also have affected the answers; the managers were asked about difficult situations, which may be more commonly associated with psychosocial than traditional OHS issues. However, in Frick's (2013) study, handling traditional risks related to musculoskeletal disorders, chemicals and accidents was considered relevant in the public sector, too. Nevertheless, it is unnecessary to divide the work environment into physical and psychosocial domains, since it is more appropriate to include a wide range of OHS issues stemming from the work community (see Abildgaard & Nickelsen 2013). At the same time, psychosocial risks are typically related to the design and management of work (Cox & Griffiths 2005; Cox 2000), which are the managers' responsibilities. The results reflect deficiencies in management and leadership skills (see Artz et al. 2014; Kaplan et al. 2008; Viitala 2005; Yukl 2010).

Constant changes, bureaucracy and multiple conflicting pressures during times of economic cutbacks were perceived as difficult situations from the managerial perspective, and they negatively affected managers' ability to manage OHS. Many managers felt that their power and responsibilities did not align, which was also pointed out by Frick (2013). Even though the managers understood the necessity of the cutbacks and redundancies, they highlighted these situations as being the most difficult part of their work. At the same time, managers should design the workload to be individual, fair and balanced, and they should strive not to overburden employees. Evaluating and

prioritising the workload in this situation were perceived as difficult, especially when the managers had little means of reducing work pressure due to limited resources and lack of time for discussions as a result of their own time pressure (see Björk et al. 2014; Syvänen 2010). Moreover, a lack of time for discussions was seen as an obstacle to openness in the work community.

Handling employees' reduced ability to work or perform at work, as well as managing conflicts, were also perceived as difficult situations from the managerial perspective. The managers considered it difficult to evaluate and individually tailor the workload in cases of reduced work capacity. In addition, inappropriate work behaviour and employees' personal problems were considered difficult to manage. Quite surprisingly, many managers considered social interaction and providing any kind of feedback, including positive feedback, to be difficult. The difficulties experienced in considering individual needs and providing feedback may reflect deficiencies in their interaction skills (see Viitala 2005). Moreover, due to the current economic and efficiency pressures, as well as the lack of resources, both managers and employees often experience significant workloads, which is seen as a major OHS problem (see Frick 2013).

The second research question (RQ2) asked what kind of support managers experience and need in managing OHS. Many OHS issues are mandatory, although managers are often inadequately supported in managing OHS issues within organisations. During difficult OHS situations, managers call for support and tools to enable them to meet their responsibilities. Based on the results of this study, the managers did not typically request more resources from upper management, presumably due to the tight economic situation. They expected tools and support for coping with difficult situations and conflicts within the work community. They mostly focused on individual social relations and emotional support in order to cope with difficult situations. The organisation, along with the developed organisational OHS procedures, should provide support to the managers in difficult situations. However, top management often ignores its legal duty and delegates work environment issues to frontline managers without providing adequate resources or support (Frick 2013). Moreover, top managers are in a position to organise the workload and resources, as well as to improve relationships, leadership and trust, which are all major factors behind psychosocial risks. However, these are mostly high-level issues and, hence, frontline managers can do little to resolve them (Frick 2013).

A lack of or inadequate support from their immediate superior was a key challenge for some managers, since the principal form of support was expected to be one's superior. If this was not possible, difficult situations became burdensome when managers had to deal with the situation by themselves. The managers perceived individual relations and emotional support to be important in coping with the challenges of OHS management.

Immediate superiors, colleagues, OHS and healthcare professionals, HR professionals, partners and friends were all seen as alternative sources of support for managers.

Based on the results of sub-study 1, organisational support needs to be developed as follows:

- Support, guidance, orientation and complementary training for managers in relation to OHS management in the areas in which they have expressed clear support needs and shortcomings in their competencies (e.g. administration, evaluation of psychosocial burden and stress, difficult situations, social interactions and providing feedback).
- Agreeing on and complying with common rules in OHS-related organisational procedures (e.g. appropriate work behaviour, reduced work ability and remote work agreements).
- Intervening in organisational conflicts and any inappropriate and unprofessional behaviours.
- Active conflict management and resolution.
- Support from one's own supervisor (positive and constructive feedback, listening, being present and available, and providing encouragement, feedback and motivation).
- Supporting employees' job-related self-determinations and reducing urgencies, excessive workloads and different types of pressures.

Previous studies conducted in the construction sector and manufacturing industry argue that there exists a need to support managers' OHS resources, roles and competences in order to genuinely improve OHS (e.g. Conchie et al. 2013; Frick 2013; Simola 2005; Tappura & Hämäläinen 2011; Törner & Pousette 2009). The results of sub-study 1 reveal similar findings in the public service sector. Thus, the results are somewhat generalised for managerial work, although that is not necessarily so for all industrial sectors. Managers should consider both the physical and psychosocial work environment in order to eliminate hazards from work and the work environment and thus safeguard the physical and mental health of employees. Nevertheless, in the manufacturing industry and construction sector for example, occupational accidents may represent the most difficult OHS issues for managers.

The third research question (RQ3) asked what organisational factors hinder or promote managers' commitment to OHS. Based on the results of sub-study 2, many managers were highly committed to OHS, although some still perceived OHS issues to be extra work and not a necessity or value even if OHS is outlined as such in their organisation. Thus, the level of implementation of OHS procedures may vary (see Fernández-Muñiz et al. 2009). Some highly committed managers also felt that they could not act as they

wished in relation to OHS due to the negative safety attitudes exhibited by upper management, peers or subordinates. This may be originating from (poor) safety culture, which is a result of top management's ability to communicate the organisation's OHS values, expectations and standards (Biggs & Biggs 2013; Hale et al. 2010), as well as reward, allocate attention and behave accordingly (Schein 2010). Consequently, the collective concern (Clarke 1999) and consistent commitment of managers at all hierarchical levels should be advanced in order to achieve real improvements in OHS performance (Hale et al. 2010).

The main factors hampering managers' commitment to OHS were related to managerial overload and a lack of resources for OHS activities. This may also reflect another challenge, namely production pressure, which may be prioritised over OHS activities. Moreover, managers often perceive multiple and conflicting role responsibilities to be challenging (see Conchie et al. 2013). In many organisations, top management express the priority of safety over production. This expression and the related resources do not, however, always flow down to the middle and line manager levels. If top management does not show visible commitment to OHS in practise, it is inequitable to expect this commitment in middle and frontline management level either. Moreover, biased views regarding the managers' OHS commitment may hamper safety culture and OHS development (Clarke 1999). The interviewed managers were highly concerned about their employees, but they could not always act according to their understanding of what is right. This may cause an increased burden to the managers, since they already encounter high strain in their managerial role.

Managers' commitment needs to be supported by various activities intended to increase managers' awareness and positive attitudes of OHS (Conchie et al. 2013; Simola 2005). Emphasising the positive effects of OHS at an organisational level may enhance managers' awareness and, thus, their commitment. Managers require information concerning the requirements and expectations related to their OHS role. Making the OHS goals and positive outcomes more visible motivates managers in their OHS work. Further, developing uniform and easy OHS procedures definitely helps managers' in their OHS work. Defining the OHS management expectations at an organisational level helps the managers to develop their OHS work accordingly. These requirements and expectations should be highlighted during the management recruitment and orientation phases. Moreover, support is needed in many forms, including dialogue and participative training, in order to establish a common understanding and uniform practices to improve OHS. In the case of difficulties, managers typically seek help from superiors, peers and OHS professionals. Even a feeling that help is available when needed fosters managers' commitment to OHS.

The fourth research question (RQ4) asked what kind of leadership is effective in promoting OHS performance. Sub-study 3 revealed some useful insights into effective OHS management from the leadership point of view. OHS-related leadership (e.g. OHS leadership, safety leadership and health-promoting leadership) has received increasing attention from researchers in recent decades (e.g. Barling et al. 2002; Eriksson et al. 2008; Hofmann et al. 2003; Zohar 2002a). A manager's leadership behaviour is generally seen as a one factor for preventing occupational injuries and ill health, as well as improving well-being within organisations, and it is thus worth developing.

Organisations need information on effective leadership in order to develop OHS-related leadership and improve OHS performance. To this day, much is known about the positive effects of leadership on OHS performance, although less is known about the specific leadership behaviours and facets (Conchie et al. 2013; Hoffmeister et al. 2014). According to the leadership research, organisational performance can be built with transactional and transformational leadership (Bass & Avolio 1990; Bass et al. 2003; Dvir et al. 2002; Lowe et al. 1996), although researchers have called for more extensive research on this association (Yukl 2008).

In relation to OHS, managers require certain leadership behaviour when motivating employees' safety participation and compliance, as well as improving the related outcomes (Griffin & Hu 2013; Griffin & Neal 2000). Previous studies have suggested transformational and transactional leadership to be suitable constructs for OHS leadership (e.g. Barling et al. 2002; Clarke 2013; Kapp 2012; Michael et al. 2006). Moreover, they are important for the motivation and justification of OHS from an ethical perspective.

Based on the findings of the current study, certain OHS leadership facets and competencies are vital with regards to OHS performance. In sub-study 3, the OHS leadership facets linked to OHS performance were found to be related to all of the studied transformational and transactional leadership facets. However, different facets may relate to different outcomes (Hoffmeister et al. 2014). This indicates that each of them is important with regards to OHS performance, although their emphasis may vary. In line with Clarke's (2013) meta-analysis, a combination of the transformational and active transactional leadership styles is the most effective means of managing workplace safety. Thus, effective interventions to improve OHS leadership require both transactional and transformational leadership development. The idealised influence leadership facet was emphasised in both the literature and the interview findings. This is in line with the study by Hoffmeister et al. (2014), who found that idealised attributes and behaviours were the most important leadership facets explaining the studied OHS outcomes (safety climate, safety behaviours, injuries and pain). Many of the findings were related to inspirational motivation, intellectual stimulation, individual consideration

and management by exception. However, Hoffmeister et al. (2014) found that individualised consideration was less important with regard to OHS performance. Additionally, Clarke (2013) argues that active management by exception has rarely been featured in OHS studies, although it should be emphasised when encouraging safety participation. Trust built through transformational leadership has positive effects on employees' safety and psychological well-being, and it helps in difficult situations and cases of emergency or empowering employees in OHS activities (see Hannah et al. 2009; Kelloway et al. 2012; Lu & Yang 2010).

These findings reveal that developing leadership behaviour is essential for improving OHS performance and, hence, organisational performance. Determining the relative contributions of the different leadership facets to OHS can also aid researchers and practitioners in developing better interventions (see Hoffmeister et al. 2014). According to Bass and Avolio (1990), general leadership training programmes are often based on transactional leadership, although many aspects of effective leadership are missing when transformational aspect is undervalued. However, both the transactional and transformational leadership are worth training, education and development.

5.2 Construction of a conceptual framework of organisational measures to support managers in OHS management

The major supposition behind this dissertation was the notion that managers play a key role in promoting OHS within organisations and that they need organisational support in order to succeed in this role. Managers' commitment to OHS is generally considered to be one of the key elements of successful OHS management regardless of the industrial sector or operating environment of an organisation (e.g. Biggs et al. 2013; Fernández-Muñiz et al. 2007; Hale et al 2010; Robson et al. 2007). Thus, managers' commitment to OHS should be supported (Simola 2005). In the previous research, however, organisational measures intended to support managers in OHS management are rarely presented (Conchie et al. 2013; Michael et al. 2005), while the organisational measures are rarely studied from the managers' point of view (Conchie et al. 2013). Furthermore, the existing frameworks and guidelines for developing OHS management (such as ILO 2001 and OHSAS 18001:2007) are quite theoretical in nature and difficult to adopt (Matthews & Rowlinson 1999; Nenonen 2012). They do not offer examples of "what to do in practice" in order to support managers in OHS management. Hence, research-based practical frameworks and actions are needed when developing OHS management within organisations.

The fifth research question (RQ5) asked what kind of organisational measures can be used to support managers in managing OHS. Based on the findings of the literature review and the empirical studies (sub-studies 1–3), practical organisational measures to support managers in OHS management were explored. Consequently, a conceptual framework of such measures was constructed. The conceptual framework consists of three major sections, namely top management support, organisational OHS procedures and OHS management development. The major sections partially overlap, but the categorisation was made to clarify the concept and improve its usefulness when developing OHS management. This study is in line with the previous research (Conchie et al. 2013; Frick 2013; Hardison et al. 2014; Hasle et al. 2008; Saksvik et al. 2002), where the importance of top management support, OHS resources, organisational support and competence development were identified as highly significant for a manager seeking to successfully manage OHS issues. Altogether, top management mainly foster cultural change to a positive safety culture and allocate organisational support for lower level managers. Hence, the role of top management is emphasised in the framework.

In constructing the conceptual framework, the preliminary requirements were defined based on the previous research and the interviews with managers conducted in sub-studies 1 through 3. All the situations and issues where the managers perceived a need for support were gathered from the interviews. The preliminary requirements were then complemented with the results of a workshop (sub-study 2). The interview results from sub-study 2 were reviewed and supplemented in a related workshop carried out with the participating organisations. The participants in the workshop (OHS professionals) suggested organisational measures to support managers' commitment to OHS in relation to both the hindering and promoting factors (see section 4.3). Consequently, they brought out measures to decrease the hindering factors and increase the promoting factors. Based on the results, effective measures to support managers in OHS management were constructed. The literature, as well as interview and workshop data, were utilised to construct a final concept.

The conceptual framework aimed to provide a simple framework and practical examples of organisational measures for developing OHS management within organisations. The framework was developed from the managers' point of view in order to emphasise their need for support. Moreover, this viewpoint enabled the construction of the framework from the bottom upwards, as well as the inclusion of practical information concerning the organisational measures in various organisational sectors. Thus, the framework can be used in organisation-specific OHS development and utilised where applicable regardless of the industrial sector.

In constructing the framework, the major elements of organisational support were sought in order to satisfy both the theoretical and practical aims. The practicality was increased

by presenting a variety of practical organisational measures in each major section of the framework. They can be utilised as a whole, but also to the extent that is useful in a specific organisation.

The constructed framework can be utilised alongside other OHS management guidelines (such as ILO 2001 and OHSAS 18001:2007) to provide a different viewpoint on the development of OHS management. The framework can be used as a baseline or check list to evaluate and discuss the status of OHS management within organisations. That is, for example, whether certain organisational measures are relevant, in use or need to be developed to support managers. The construction of the framework was based on the managers' actual needs for support when managing OHS. Hence, the conceptual framework and its sections can be considered valid for the purpose of this study.

5.3 Contribution of this research

5.3.1 Scientific contribution

This dissertation contributes to the scientific community by providing new information regarding OHS management from the managers' point of view within various organisations. The main scientific contribution relies on yielding information concerning the challenges managers confront and the support they require in managing OHS, discussing the factors that may hinder and help managers' commitment to OHS, providing information on effective leadership and constructing a conceptual framework of organisational measures to support managers in OHS management (see Figure 10). Thus, this dissertation provides a theory- and research-based framework for evaluating and developing the status of OHS management within various organisations. Further, the conceptual framework introduces a novel approach to organisational support for improving OHS.
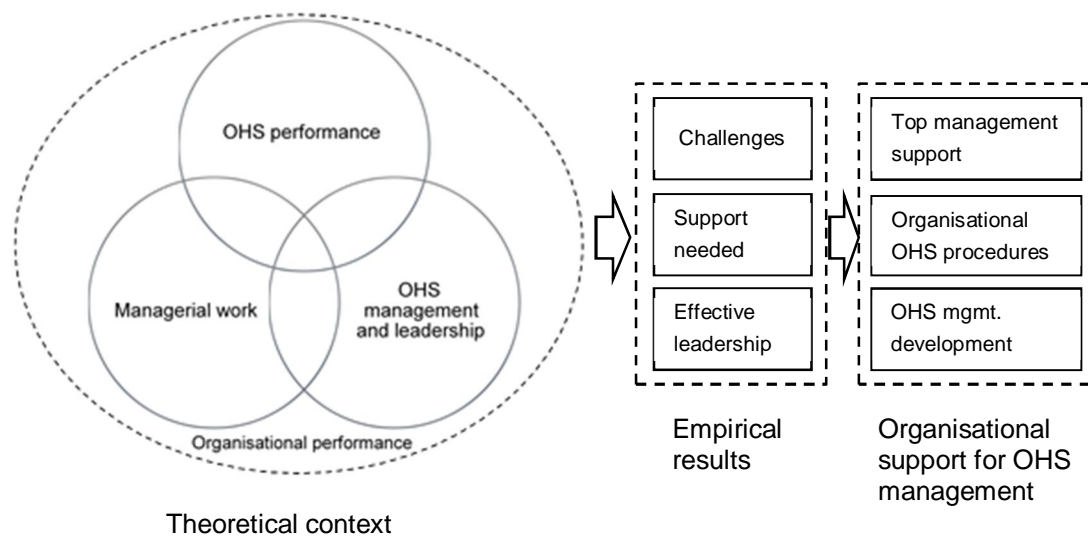
Figure 10. Scientific contribution of the dissertation

Of particular importance are the implications that the findings have for both OHS management and leadership, as well as the general management and leadership research. Although a wide range of earlier studies concentrated on management and leadership, they only rarely discussed the OHS dimension. Moreover, only a few studies have actually investigated OHS management from the managers' point of view. This study contributes to those earlier studies by incorporating OHS management into general management activities, integrating OHS management and leadership perspectives, and providing information on effective OHS management and leadership that can be utilised in different industrial sectors. The importance of leadership to OHS has been widely established, while the effective behaviours and specific leadership practices related to different leadership styles are less well known (Christian et al. 2009; Griffin & Hu 2013) and the specific leadership facets are rarely studied within the OHS leadership research (Hoffmeister et al. 2014).

This study contributes to the previous research on OHS in several ways. First, it applies the concept of commitment to emphasise the managers' key role in managing OHS according to the organisational strategies and goals. Here, commitment is seen as a reflection of a positive attitude towards OHS issues and a predictor of effective OHS management. This study aspires to promote the mindsets that managers require in order to master OHS rather than the behaviours they must exhibit. Moreover, this study focuses on the challenges and support needed in relation to OHS management in order to identify what kind of support may help managers to succeed with OHS management.

Second, the transformational and transactional leadership theory is incorporated into the OHS leadership research, extending the understanding of what kind of leadership behaviours, facets and specific practices might have positive impacts on OHS

performance. The effective leadership behaviours are defined based on both previous research and an empirical study. Determining the relative contributions of the different leadership facets to OHS can aid researchers and practitioners in developing better interventions (see Hoffmeister et al. 2014).

Third, the OHS management and leadership perspectives are conjoined to produce a comprehensive concept of organisational support for the management of OHS in general. These perspectives are often studied separately, although the leadership and management roles from the managers' perspectives should be balanced (Yukl 2010). Moreover, a clarification of how managers can influence and improve organisational effectiveness via OHS management offers benefits to management scholars and practitioners. Effective OHS leadership practices are considered to be part of leadership development in order to incorporate them into the general management development of organisations.

5.3.2 Practical contribution

According to Biggs and Biggs (2013), knowledge regarding effective OHS management approaches should be converted into frameworks and practices that are useful for organisations. The main practical contribution of this dissertation is therefore the constructed conceptual framework of organisational measures to support managers in OHS. The concept was developed from the managers' point of view in order to highlight the practical measures that directly help managers in managing OHS issues. Thus, it transforms theory into practice by presenting the results of empirical studies in a practical manner.

This study presents the effective OHS management and leadership practices that can be employed within organisations in developing their management practices based on their OHS values and emphasis. Describing the challenges related to OHS management and presenting the organisational factors that may hinder or promote managers' commitment to OHS provides guidance for organisations in relation to defining the development activities that best promote managers' commitment to OHS. This dissertation emphasises the importance of supporting managers in their OSH management in order to achieve real improvements in OHS. Moreover, the practical examples of organisational measures intended to support managers in OHS management provide information for the development of OHS management, which can be utilised in organisation-specific interventions.

This study strives to achieve a collective form of OHS management. Thus, it diverges from the traditional individualistic approach to adopt a more flexible approach (Bolden et al. 2003) that specifies a strategy for developing OHS management at all levels. This

emphasises that OHS management is an essential element of managerial tasks at different levels and within different kinds of organisations, and it should be supported accordingly. According to Bolden et al. (2003), much is already known about the general favourable qualities of managers, although the leadership qualities have not improved in line with that knowledge. Nevertheless, the organisations that have developed their own management practices have also been able to improve their leadership. Therefore, more emphasis on leadership is required in order to improve OHS and, thus, organisational performance.

Presenting new information on OHS management provides a practical contribution to organisations in different industrial sectors. Moreover, that knowledge could be utilised in professional and management education. The study presents OHS management as a part of general management, highlights the managers' central role in improving OHS and emphasises the effects of OHS on organisational performance. It discusses the central OHS management requirements and expectations for managers to be utilised in defining organisation-specific requirements and expectations. This information can be used for managers' competence development, for example, to identify their development needs, encourage personal development, assess and appraise their competence, and monitor their progress (see also Bolden et al. 2003; Tappura & Kivistö-Rahnasto 2017). Moreover, it supports managers' self-knowledge and motivation in relation to their development activities (see Chan & Drasgow 2001; Lord & Hall 2005; Viitala 2005).

The results of the three sub-studies have already been utilised in graduate studies and professional development at the university level when teaching OHS management. The results of the sub-studies have also been presented at several safety and OHS conferences and seminars, as well as published in related publications (Tappura & Nenonen 2014, 2016; Tappura et al. 2014, 2015, 2017).

5.4 Quality of the research

This dissertation utilises multiple research designs, methods and sources of data. The study adopts qualitative and constructive research approaches and it applies interview study and literature review as the major research methods. According to Stenbacka (2001), three generally accepted concepts form the basis for the quality of qualitative studies, namely validity, generalisability and carefulness, while reliability has no relevance. Reliability generally refers to a measurement method's ability to produce the same results repeatedly, and the researcher and method are seen as separate from one another. Neither the notion of the measurement method nor the differentiating between researcher and method are relevant in qualitative studies. Validity answers the question,

that is, if the intended object of measurement is actually measured. Validity in this sense is useless, since the purpose of a qualitative study is never to measure anything. Validity may, however, be evaluated by the validity of the data in relation to the purpose of the study. When generating an understanding of a studied phenomenon, a researcher is interested in understanding the reality of another person in the studied problem area. The understanding is valid if it is based on the freely expressed perceptions and knowledge of the studied person and acquired by using suitable methods with well-chosen informants. In qualitative research, the researcher's ability to use the qualitative method to its fullest and make the whole research process visible is relevant when evaluating the quality. Moreover, the qualitative rigor should be evaluated to establish confidence in the findings (Thomas & Magilvy 2011). Generalisability in qualitative research means that the results are general with respect to the theory, and an analytical understanding is based on the lifting of the empirical material to a general level. Carefulness in relation to making the research process conscious for the researcher is a prerequisite of being able to describe it for readers and, thus, making it subject to the judgement of a reader.

According to Rolfe (2006), the quality of research cannot be warranted by the rigorous application of research procedures and their reporting, although the research resides in the research report and is subject to the judgement of the reader. Thus, the quality of this study is best assessed by the potential users of the generated knowledge, including managers at different organisational levels, as well as OHS and HR researchers and practitioners. However, some quality considerations are presented below.

In qualitative studies, the researcher is part of the study, touching and reflecting on the study process in order to gain an understanding of the studied phenomenon (Stenbacka 2001). A researcher's pre-understanding and ability to come close to the studied phenomenon are important when judging the findings and quality of the study, and they must be made visible (Stenbacka 2001). In this study, the researcher had an adequate pre-understanding of the studied organisations and industries based on her previous work experience and prior cooperation with the studied organisations. She had an extensive pre-understanding of the managers' OHS role and responsibilities based on her education and research experience. In addition, her pre-understanding was based on the relevant literature. During the study, the pre-understanding was reflected upon and, thus, the level of understanding rose.

Triangulation in gathering and analysing qualitative data increases the quality of qualitative research (Patton 1999). In this study, the triangulation of both data collection and analysis is applied to increase the quality of the study. Interview was the main method used for data collection. The interview data were supplemented with qualitative inquiries to gain more informants and organisations in sub-study 1. The interview data

were also exploited in sub-studies 2 and 3. However, in sub-study 3, the main focus was on the theoretical classification of the OHS leadership facets identified in previous studies that have an association with OHS performance, and the relevant literature was exploited to achieve the research objectives. The findings from the literature review were supplemented with the interview data. The triangulation of the data analysis was based on using two researchers to analyse the interview data in sub-study 1 and using two researchers to categorise the results in sub-study 3.

In this study, the validity of the data was improved by the close interaction between the researcher and the participants in the sub-studies, as well as by choosing a suitable amount and quality of informants from different organisations. Almost all the invited managers participated in the interviews, which helped to provide diverse impressions of OHS management. The chosen informants (managers) contributed with their experience of OHS management in relation to managerial work and in the organisational context. The informants were informed about the study themes and they were asked quite explicit interview questions (see Chapter 3.4) to ensure that they were aware of what the study was about. During the interviews, the interviewees could express their perceptions confidentially and they were able to discuss the issues that were important to them, which also improves the validity of the data. The interviews were thematic and related to the objectives of the study. Thus, the gathered data were accurate and suitable for the purpose of this study.

The aim of constructive research is to create novel, theory-justified solutions for practical research problems (Rohweder 2008), which was the case in this study. The construction of the conceptual framework and the selection of its major sections were based on comprehensive research (literature, interviews and a workshop) and the researcher's understanding of the research theme. The construction was based on the managers' actual needs for support in managing OHS. Hence, the conceptual framework and its sections can be considered valid for the purpose of this study. The usefulness and usability of the conceptual framework were not validated in practice by the users, and its practical utility cannot be evaluated. The validity of research depends on the means by which the research results were produced (Borsboom et al 2004) and the framework was constructed. Hence, the validity of this study can be evaluated based on its proper conduct and rigor.

In sub-study 1, the interviewees were chosen by inviting all the line managers from the target company to participate in the interview study. All but one manager agreed to participate in the study; hence, adequate coverage was achieved in one organisation. The other informants in sub-study 1 were chosen from two organisations by means of purposive sampling due to the large size of the organisations. The informants came from different sectors and had different professional backgrounds, managerial experiences,

organisational levels and work experiences. The validity was improved by using two independent researchers to conduct the interview study and qualitative inquiry within the three different organisations in accordance with the study objectives. Moreover, the data were analysed separately, although the results were reviewed and conjoined in close cooperation between the researchers. The results were quite consistent and easy to conjoin, which improves the validity of sub-study 1.

In sub-study 2, the validity of the data was improved by employing a substantial number of informants from different organisations and using purposive sampling. The validity of the data analysis was improved by using several researchers to review the results. Moreover, company representatives were also used to review and supplement the findings in a workshop. The results were quire consistent with those of previous studies, which also improves the validity. In sub-study 3, both the literature and the interview data highlighted the importance of the studied leadership facets, which improves the validity. However, the number of informants was quite small in this sub-study.

The dissertation is exploratory and descriptive in nature, and neither causality nor explanatory studies were exploited. The generalisability of the study is improved by the strategic choice of informants relevant to the study objectives. They represent different management levels and backgrounds and different kinds of organisation, and they all hold a formal managerial position (Grint 2005), which is in accordance with the study objectives. The study is based on the regulatory OHS requirements and the extensive literature on the subject relevant in different industrial sectors; thus, the results may be applied generally. However, the organisation-specific modifications and emphasis must be recognised when applying the results. Moreover, in this study, the quality is improved by carefully utilising qualitative methods and describing the research process in detail in both this dissertation and the related publications.

The quality of research may also be evaluated based on the derived answers to the research questions and the achievement of the stated objectives. This study answered research questions RQ1 and RQ2 (*What difficult situations do managers confront when managing OHS?* and *What kind of support do managers experience and need when managing OHS?*) by presenting the managers' perceptions of the challenges and support needed in relation to OHS in three public service organisations (sub-study 1). Research question RQ3 (*What organisational factors hinder or promote managers' commitment to OHS?*) was answered by describing the managers' perceptions of the subject in several industrial organisations (sub-study 2). Based on sub-studies 1 and 2 (RQ1–RQ3), new information concerning the challenges faced and support needed in relation to OHS management was yielded (objective 1). Research question RQ4 (*What kind of leadership is effective in promoting OHS performance?*) was answered by addressing the effective leadership approaches found in the literature, studying the

managers' perception of successful OHS management and categorising the results based on the leadership theory (sub-study 3). Research question RQ5 (*What kind of organisational measures can be used to support managers in OHS management?*) was answered by suggesting organisational measures to support managers in OHS management based on the literature review and the workshop and interview results found in sub-studies 1 to 3. Consequently, a conceptual framework of organisational measures to support managers in OHS management was constructed (objective 2). Hence, the study's research questions were answered and its objectives were achieved.

5.5 Limitations and ideas for further research

While this study has made important scientific and practical contributions to the research, it does have some limitations, as well as offering some suggestions for further research. This study was explorative in nature and it exploited a limited number of organisations and participating managers. The study approached OHS management at a certain point in time and, in the interviews, the respondents were mainly asked questions about their current situation and perceptions. Thus, no longitudinal or chance process perspectives were exploited. Qualitative methods were chosen in order to gain a deeper insight into the managers' perceptions in the organisational context. A phenomenological approach was suitable for analysing the qualitative data because a new topic was studied, revealing different contextual factors. However, the analyses were based on a relatively small data set and, hence, strong conclusions cannot be drawn from the data. Moreover, the analyses were subjective. To reduce the potential limitation of having only one researcher (the author) analysing the data, the analyses were carried out in cooperation with other researchers, while the results were reviewed and discussed with the other researchers participating in the related research projects. However, more extensive studies on the subject would be valuable in order to generalise the findings.

This study utilised a constructive research approach to construct a conceptual framework based on both the previous theory and the needs revealed by the study subjects (managers). The construction is based on the researcher's own understanding of the research problem and the heuristic research process. The theoretical connections and research contribution were presented, although the construction was not tested in practice or evaluated by its users. Hence, the practical utility of the construction cannot be evaluated. In the future, the framework should be implemented in practice and its usefulness should therefore be evaluated in practice by the users. Moreover, the existing management development frameworks could be reviewed in light of this study in order to integrate relevant OHS issues into the general frameworks.

As all the data in the study have been gathered from a single country, namely Finland, it imposes some limitations on the generalisability of the results to other countries. However, the results are somewhat generalisable to other countries (e.g. in Scandinavia and the rest of Europe) with similar legal systems, organisational cultures and histories. Moreover, the findings exhibit similarities with the findings of other studies reported in other countries (e.g. Conchie et al. 2013; Frick 2013; Hardison et al. 2014; Hoffmeister et al. 2014); thus, the findings may be applied to other countries.

The managers' perceptions were studied at various organisational levels (top, middle and frontline management), although the main focus was on middle and frontline management and, hence, only a few top managers were included. The results were not analysed based on the organisational level, since no considerable differences emerged between the managers at different organisational levels in the preliminary analyses. The differences between the managers' OHS roles and tasks at different management levels were investigated in a related study by Tappura et al. (2016). In future studies, the managers' need for support and supportive measures could be further examined in different kinds of organisations and at different organisational levels.

As this dissertation adopted the managerial perspective, the data were mainly collected from managers and, hence, the other organisational actors were not included in the study. However, in sub-study 2, company representatives (OHS professionals) contributed to the study by reviewing and complementing the interview results. In future studies, employees' perceptions of effective OHS management could be investigated.

In this study, the association between OHS management and leadership practices and OHS performance was supposed based on the previous literature, although it was not empirically studied. In several studies, the link between managers' behaviour and employees' OHS performance is supported (e.g. Clarke 1996; Griffin & Hu 2013; Kapp 2012; Martínez-Córcoles et al. 2011; Skagert 2010). In the future, it would be interesting to further study OHS management at the organisational level, focusing on the managers' safety awareness and behaviour, as well as their effects on OHS performance. It would also be valuable to evaluate which organisational measures are the most important in developing OHS performance via management behaviour.

This study focused on organisational and contextual factors in relation to OHS management, and only little was said about individual factors. In addition to the contextual factors, managers' personality, self-efficacy and emotional intelligence typically influence their leadership behaviours (e.g. Barling et al. 2000; Conchie et al. 2013). Nevertheless, the individual factors are more important for the managers' personal development than for developing organisational measures intended to improve OHS. In line with Conchie et al.'s (2013) study, the interviewed managers did not mention

individual factors as having an influence on their OHS leadership behaviours. In future research, the individual factors and their interaction with the contextual factors should be studied in order to obtain new insights into this subject.

In sub-study 1, there are some limitations regarding the narrow branches of the studied organisations. The challenges related to OHS management as perceived by the managers were mainly related to psychosocial issues due to the nature of the research sites (public service and expert organisations). The framing of the interview questions may also have affected the answers; the managers were asked about challenging situations, which may be more associated with psychosocial issues than traditional OHS issues. In future studies, a wider frame for the interviews is suggested.

There are some limitations associated with the identified organisational factors that hinder or promote managers' commitment to OHS in sub-study 2. They are considered to be independent factors and their relations to each other or other organisational factors are not discussed in this study. Examples of the factors found in each category were presented to better illustrate the categories. The suggested organisational measures merely serve as examples and general guidelines for developing managers' commitment to OHS, and they are not definite solutions. Future research should examine in detail the effects of particular organisational factors or suggested organisational support on managers' commitment to OHS.

Sub-study 2 focused on the energy, chemical processing and industrial services industries, and the generalisation of the results to other sectors remains unclear. However, the results are in line with those of Conchie et al. (2013) in the construction industry, Michael et al. (2005) in wood products manufacturing and sub-study 1 (Tappura et al. 2014) in public sector service organisations, which suggests that the results can be applied to other industries. The general organisational measures intended to support managers are relatively consistent among different industries, although their emphasis may vary.

The fact that the interviews conducted in sub-study 3 were carried out in an expert organisation may also explain the fact that certain leadership styles (individual consideration and intellectual stimulation) were highlighted. The use of an expert organisation may also explain the finding that there was no support for transactional leadership facets in the interviews. This may also reflect deficiencies in transactional leadership emphasis or skills in that organisation. Moreover, the number of informants was quite small in this study. In the future, OHS leadership should be studied in other industrial sectors and in the manufacturing industry.

The classification of the OHS leadership practices into leadership facets in sub-study 3 is subjective. However, all the studied facets are related to OHS performance (Hoffmeister et al. 2014) and the knowledge concerning specific leadership practices is more important than the particular classification. In many studies, the influence of certain leadership styles on the OHS outcomes is studied, while there is less research on the specific leadership practices related to different leadership styles (Christian et al. 2009). Thus, more empirical studies regarding OHS leadership practices are needed.

The suggested categorisation of OHS leadership in sub-study 3 includes both abstract dimensions and dimensions that relate concretely to OHS knowledge and practices. Further research is needed to explore the interaction between the dimensions in order to identify the major characteristics and synergies that are relevant for effective OHS management. Moreover, the dimensions are typically developed in different ways. Therefore, further research is needed to identify and evaluate the comprehensive development strategies and activities suitable for these dimensions.

Further research is also needed to better define the contextual factors and situational flexibility of the leadership styles, as well as the efficient leadership practices in different industrial sectors. Most previous interventions have focused on transformational leadership and, according to Clarke (2013), leaders would benefit from a wider range of OHS leadership styles, as well as a more situational approach. Authentic and empowerment leadership are also interesting constructs in relation to OHS (Eid et al. 2012; Martínez-Córcoles et al. 2011) and they should be further implemented in the OHS research in the future.

Finally, future research should consider OHS issues as part of general management development and the related activities, including management training. The general management and leadership frameworks often lack an OHS perspective. In the future, the existing management frameworks could be reviewed in light of this study in order to integrate the identified OHS issues into the frameworks. In relation to stress management, for example, there exist gaps in the research particularly related to softer practices such as managing conflicts and emotions (HSE 2007b). Moreover, information and case studies are needed regarding the integration of OHS management development into general management education and training. Integrating the perspectives of OHS and management studies would benefit both fields in furthering the understanding of the management "whole".

6 Conclusions

The management of OHS poses a regulatory, moral and economic obligation on organisations, and it adds positive value for both employees and organisations. Moreover, the valuation of OHS is increasingly being evaluated by customers and collaborators alike. Improving the health and safety of employees is an objective per se in modern society, although emphasising OHS management and its contribution to organisational performance certainly motivates employers to invest in the development of OHS. In recent decades, significant investments have been made in improving OHS, but such investments have not garnered as positive results as was expected and the development of OHS performance is still necessary. Based on their formal position, managers play a key role in promoting OHS within organisations. According to previous studies, managers' commitment to OHS is one of the most important factors behind successful OHS management and interventions. Thus, there exists a need to support managers in order to achieve real advances in OHS. In particular, organisational support for managers should be highlighted. Therefore, knowledge regarding effective OHS approaches and concepts is needed. Information is also required on how managers can be better supported in OHS management.

This study discusses OHS management as part of managerial work in an organisational context. The first objective of the study was to yield new information concerning the challenges faced and support needed in managing OHS from the managers' viewpoint in different industrial sectors. The challenges faced and support needed in relation to OHS management were identified based on interviews and qualitative inquiries conducted with managers (n=121) from three public service organisations and five industrial organisations. Moreover, the effective OHS leadership facets were identified based on both the literature and the management interviews (n=17) conducted in a public expert organisation. The second objective of this study was to construct a conceptual framework of organisational measures to support managers in OHS management. The framework was constructed based on the previous research, the managers' interviews and a workshop (sub-studies 1 to 3).

According to managers' perceptions, the most challenging situations were related to the psychosocial risks found in the work environment. For example, managing employees' mental overload, instances of negligence, and supporting employees' individual characteristics and needs were considered difficult. The managers perceived the individual relations and emotional support received from their immediate superior, colleagues and OHS and HR professionals to be important in coping with difficult situations in relation to OHS management.

This study suggests that diverse organisational measures are beneficial for improving managers' consistent commitment and ability to perform OHS activities. The conceptual framework of organisational measures intended to support managers in OHS management includes top management support for OHS management, uniform and simple OHS procedures, and systematic OHS management development as part of general management development. Developing consistent OHS attitudes and behaviours on the part of all the managers requires strong top management support. Moreover, upper management's guidance is essential for lower-level managers, especially when they encounter conflicting role responsibilities.

An emphasis on leadership development is important for managers seeking to motivate their employees' OHS participation and compliance and, hence, improve OHS performance. Good OHS management practices overlap with existing good management behaviours, and they could be integrated into the general management practices. Existing management development practices, including management training, can provide easy ways to incorporate the OHS management and leadership perspectives into general management development.

Developing managers' OHS awareness from the very beginning of their careers also supports their commitment due to increasing their understanding of their OHS responsibilities and the value of safety. A formal peer support system such as a managers' forum could be beneficial, especially for less experienced managers. The support provided by OHS and HR professionals should be suitable and available when necessary to help managers cope with challenging situations.

OHS management and leadership are often studied separately, although the studies typically include similar elements and aspects. OHS leadership is important in shaping the desired OHS culture within an organisation, motivating employees' OHS performance and influencing organisational performance. Effective OHS leadership includes both the transactional and transformational leadership styles, with the best managers demonstrating both styles when managing OHS. Based on this study, OHS management and leadership can be balanced. However, it should be noted that their emphasis varies depending on the operating environment of an organisation, for example, the type and level of the OHS risks. In many organisations, the existing OHS management practices could provide easy ways to incorporate the OHS leadership and performance perspectives into existing practices.

Many current work environment issues, including psychosocial problems, are complex and, hence, few simple solutions exist or are in use. This study suggests that developing the support, resources and understanding of managers at different levels within an organisation in relation to OHS may considerably improve the well-being of employees

and the performance of organisation. The results show that most of the challenges related to OHS within the organisations that participated in this study were related to psychosocial risks and, further, that the managers needed support in difficult situations. Organisational support is a key factor when helping managers to succeed with OHS management.

This study contributes to previous studies in several ways:

- Extending the previous literature on OHS management from the managers' perspective.
- Providing new knowledge concerning effective OHS management approaches.
- Expanding and incorporating the OHS management and leadership theory.
- Studying the challenges faced and support needed in relation to OHS management.
- Suggesting organisational measures to support managers in OHS management.
- Discussing OHS management in an organisational context and in relation to organisational performance.
- Providing information on specific leadership behaviours, facets and practices that might have positive impacts on OHS performance.
- Discussing OHS management as part of general management development.
- Providing a research-based conceptual framework of organisational measures to support managers in OHS management.

The study also offers practical contributions for employers, managers and OHS and HR professionals:

- It discusses OHS management in relation to general management and leadership and it highlights the manager's central role in improving OHS.
- It describes the challenges managers confront and the support they need in managing OHS, as well as providing relevant guidance.
- It provides information on effective OHS management.
- It provides practical information on how to better support managers in OHS management.
- It points out the effects of OHS on organisational performance in order to encourage OHS management development.
- It serves as a basis for management development.

In conclusion, due to its multifaceted and powerful effects on OHS and organisational performance, OHS management should be emphasised in all kinds of organisations. The information concerning effective OHS management can be used in management development when considering the organisation-specific requirements and operating

environment. As a result, this study suggests a variety of practical organisational measures that are valuable for managers in order to support them in the management of OHS. Top management's appreciation, support and provision of resources for OHS work best promotes lower-level managers' commitment to OHS. Moreover, the OHS-related leadership development should be emphasised within organisations in order to achieve an improvement in OHS performance.

References

2001/1383. Työterveyshuoltolaki (in Finnish). Available: https://www.finlex.fi/fi/laki/ajantasa/2001/20011383?search%5Btype%5D=pika&search %5Bpika%5D=ty%C3%B6terveyshuoltolaki. Accessed on 1 June 2016.

2002/738. Työturvallisuuslaki (in Finnish). Available: https://www.finlex.fi/fi/laki/ajantasa/2002/20020738. Unofficial English translation (Occupational Safety and Health Act) available at: http://www.finlex.fi/en/laki/kaannokset/2002/en20020738.pdf. Accessed on 1 June 2016.

2006/44. Laki työsuojelun valvonnasta ja työpaikan työsuojeluyhteistoiminnasta (in Finnish). Available: https://www.finlex.fi/fi/laki/ajantasa/2006/20060044. Unofficial English translation (Act on Occupational Safety and Health Enforcement and Cooperation on Occupational Safety and Health at Workplaces) available at: www.finlex.fi/fi/laki/kaannokset/2006/en20060044.pdf. Accessed on 1 June 2016.

89/391/EEC. Counsil Directive 89/391/EEC of 12 June 1989 on the introduction of measures to engourage improvements in the safety and health of workers at work. Official Journal L 183, 29/06/1989, 1-8. Available: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:31989L0391. Accessed on 1 June 2016.

Aaltonen, M., Oinonen, K., Kitinoja, J.-P., Saari, J., Tynkkynen, M. & Virta, H. (2006). Costs of occupational accidents – effects of occupational safety on company business. A research and development project. In: Research Proceedings of the European Productivity Conference (EPC), 2006, Hakapaino, Helsinki, pp. 47–51.

Abildgaard, J.S. & Nickelsen N.C.M. (2013). Making Materials Matter—A Contribution to a Sociomaterial Perspective on Work Environment. Nordic Journal of Working Life Studies, 3(4), pp. 62-83.

Alfredsson, L., Karasek, R. & Theorell, T. (1982). Myocardial infarction risk and psychosocial work environment: An analysis of the male Swedish working force. Social Science & Medicine, 16(4), pp. 463-467.

Alsop, P. & LeCouteur, M. (1999). Measurable success from implementing an integrated OHS management system at Manningham City Council. Journal of Occupational Health and Safety, Australia and New Zealand, 15, pp. 565-572.

Antonsen, S. (2009). Safety culture and the issue of power. Safety Science, 47, pp. 183-191.

Anttonen, H. & Räsänen, T. (Eds.) (2008). Työhyvintointi – uudistuksia ja hyviä käytäntöjä (in Finnish). Finnish Institute of Occupational Health, Helsinki. Available: http://www.ttl.fi/fi/verkkokirjat/Documents/BWW_ty%C3%B6hyvinvointi_web.pdf. Accessed on 1 June 2016.

Arnold, J.A., Arad, S., Rhoades, J.A. & Drasgow, F. (2000). The empowering leadership questionnaire: the construction and validation of a new scale for measuring leader behaviours. Journal of Organisational Behaviour, 21, pp. 249–269.

Artz, B., Goodall, A.H. & Oswald, A.J. (2014). Boss competence and worker well-being. Discussion Paper Series IZA DP No. 8559, IZA, Institute for the Study of Labor, Germany, 39 p.

Arvey, R.D., Rotundo, M., Johnson, W., Zhang, Z. & McGue, M. (2006). The determinants of leadership role occupancy: genetic and personality factors. The Leadership Quarterly, 17, pp. 1–20.

Asfaw, A., Pana-Cryan, R. & Rosa, R. (2011). The business cycle and the incidence of workplace injuries: evidence from the U.S.A. Journal of Safety Research, 42, pp. 1-8.

Avolio, B. (1999). Full Leadership Development: Building the Vital Forces in Organisations. Sage, Thousand Oaks, CA, 233 p.

Barling, J., Loughlin, C. & Kelloway, E. (2002). Development and test of a model linking safety-specific transformational leadership and occupational safety. Journal of Applied Psychology, 87(3), pp. 488–496.

Barling, J., Slater, F. & Kelloway, E. (2000). Transformational leadership and emotional intelligence: an exploratory study. Leadership & Organisation Development Journal, 21(3), pp. 157–161.

Bass, B.M. & Avolio, B.J. (1990). Developing Transformational Leadership: 1992 and Beyond. Journal of European Industrial Training, 14(5), pp. 21-27.

Bass, B.M. & Riggio, R.E. (2006). Transformational Leadership. Lawrence Erlbaum Associates, Mahwah, NJ, 282 p.

Bass, B.M. (1985). Leadership and Performance Beyond Expectation. Free Press, New York, 191 p.

Bass, B.M. (1990a). Bass & Stogdill's Handbook of Leadership: Theory, research and managerial applications. Third edition. The Free Press, New York, 1182 p.

Bass, B.M. (1990b). From transactional to transformational leadership: Learning to share the vision. Organisational Dynamics, 18(3), pp. 19–31.

Bass, B.M., Avolio, B.J., Jung, D.I. & Berson, Y. (2003). Predicting Unit Performance by Assessing Transformational and Transactional Leadership. Journal of Applied Psychology, 88, pp. 207-218.

Basso, B., Carpegna, C., Dibitonto, C., Gaido, G., Robotto, A. & Zonato, C. (2004). Reviewing thee safety management system by incident investigation and performance indicators. Journal of Loss Prevention in the Process Industries, 17, pp. 225-231.

Berger, A., Hartrick, C., Edelsberg, J., Sadosky, A. & Oster, G. (2012). Economic costs of work and productivity losses in employees with osteoarthritis. Journal of Health & Productivity, 6(1), pp. 24-31.

Biggs, H.C. & Biggs, S.E. (2013). Interlocked projects in safety competency and safety effectiveness indicators in the construction sector. Safety Science, 52, pp. 37–42.

Biggs, S.E., Banks, T.D., Davey, J.D. & Freeman, J.E. (2013). Safety leaders' perceptions of safety culture in a large Australasian construction organisation. Safety Science, 52, pp. 3-12.

Biron, M. & Bamberger, P. (2012). Aversive Workplace Conditions and Absenteeism: Taking Referent Group Norms and Supervisor support into account. Journal of Applied Psychology, 97(4), pp. 901-912.

Björk, L. (2013). Contextualizing managerial work in local government organisations. Doctoral dissertation. Gothenburg Studies in Work Science No. 13, University of Gothenburg, Sweden, 79 p.

Björk, L., Szücs, S. & Härenstam, A. (2014). Measuring capacity to perform across local government services—managers' perceptions. International Journal of Public Sector Management, 27(1), pp. 26–38.

Blair, E. (2003). Culture & leadership: Seven key points for improved safety performance. Professional Safety, 48 (6), 18–22.

Bluff, L. (2003). Systematic management of occupational health and safety. Working Paper 20, National Centre for OHS Regulation, Australian National University, 64 p.

Bolden, R., Gosling, J., Marturano, A. & Dennison, P. (2003). A review of leadership theory and competency frameworks. Edited Version of a Report for Chase Consulting

and the Management Standards Centre. Centre for Leadership Studies, University of Exeter, UK, 44 p.

Bommer, W.H., Rubin, R.S. & Baldwin, T.T. (2004). Setting the stage for effective leadership: antecedents of transformational leadership behaviour. The Leadership Quarterly, 15, pp. 195–210.

Bonde, J. P. (2008). Psychosocial factors at work and risk of depression: A systematic review of the epidemiological evidence. Occupational & Environmental Medicine, 65, pp. 438-445.

Boone, J., van Ours, J.C., Wuellrich, J.-P. & Zweimüller, J. (2006). Are recessions good for workplace safety? Journal of health economics, 25(6), pp. 1069-1093.

Borman, W.C. & Motowidlo, S.J. (1993). Expanding the criterion domain to include elements of contextual performance. In: N. Schmidt, W.C. Borman, A. Howard, A. Kraut, D. Ilgen, B. Schneider & S. Zedeck (Eds.), Personnel Selection in Organisations, Jossey-Bass, San Francisco, 546 p., pp. 71–98.

Borsboom, D., Mellenbergh, G.J. & van Heerden, J. (2004). The concept of validity. Psychological Review, 11(4), pp. 1061-1071.

Borys, D. (2014). The Value Proposition for the Occupational Health and Safety Professional. Literature review. A Report from the International Network of Safety & Health Practitioner Organisations (INSHPO), 40 p.

Bourgeois, L. (1981) On the measurement of organisational slack. Academy of Management Review, 6, pp. 29-39.

Boyatzis, R.E. (1998). Transforming qualitative information: thematic analysis and code development. Sage Publications, Thousand Oaks, CA,184 p.

Boyd, C. (2003) Human Resource Management and Occupational Health and Safety. Routledge, London, 195 p.

Brauer, R.L. (2006). Safety and Health for Engineers. Second edition. John Wiley & Sons, Inc, Hoboken, New Jersey, USA, 756 p.

Bryden, R. (2002). Getting Serious About Safety: Accountability and Leadership - The Forgotten Elements. In: Society of Petroleum Engineers International Conference on Health, Safety and Environment in Oil and Gas Exploration and Production, 20-22 March, Kuala Lumpur, Malaysia, 7 p.

BS 18004:2008. Guide to achieving effective health and safety performance. British Standards Institution, 142 p.

Bunn III, W.B., Pikelny, D.B., Slavin, T.J. & Paralkar, S. (2001). Health, safety, and productivity in a manufacturing environment. Journal of Occupational and Environmental Medicine, 43, pp. 47–55.

Burke, M.J. & Signal, S.M. (2010). Workplace safety: a multilevel, interdisciplinary perspective. Research in Personnel and Human Resources Management, 29, pp. 1-47.

Cagno, E., Micheli, G.J.L., Masi, D. & Jacinto, C. (2013). Economic evaluation of OSH and its ways to SMEs: A constructive review. Safety Science, 53, pp. 134-152.

Carayon, P. & Smith, M.J. (2000) Work Organization and Ergonomics. Applied Ergonomics, 31(6), pp. 649 – 662.

Carayon, P., Hancock, P., Leveson, N., Noy, I., Sznelwar, L. & van Hootegem, G. (2015) Advancing a sociotechnical systems approach to workplace safety – developing the conceptual framework. Ergonomics, 58(4), pp. 548-564.

Carder, B. & Ragan, P. W. (2003). A survey-based system for safety measurement and improvement. Journal of Safety Research, 34, pp. 157-165.

Carlisle, S. & Hanlon. P. (2008). Well-being' as a focus for public health? A critique and defence. Critical Public Health, 18(3), pp. 263–270.

Chan, K.Y., & Drasgow, F. (2001). Toward a theory of individual differences and leadership: Motivation to lead. Journal of Applied Psychology, 86, pp. 481–498.

Chen, C.-Y., Wu, G.-S., Chuang, K.-J. & Ma, C.-M. (2009). A comparative analysis of the factors affecting the implementation of occupational health and safety management systems in the printed circuit board industry in Taiwan. Journal of Loss Prevention in the Process Industries, 22(2), pp. 210–215.

Chhokar, R., Engst, C., Miller, A., Robinson, D., Tate, R.B. & Yassi, A. (2005). The three-year economic benefits of a ceiling lift intervention aimed to reduce healthcare worker injuries. Applied Ergonomics, 36(2), pp. 223–229.

Christian, M.S., Bradley, J.C., Wallace, J.C. & Burke, M.J. (2009). Workplace safety: meta-analysis of the roles of person and situation factors. Journal of Applied Psychology, 94, pp. 1103–1127.

Chu, C., Breucker, G., Harris, N., Stitzel, A., Gan, X., Gu, X. & Dwyer, S. (2000) Health-promoting workplaces – international settings development. Health Promotion International, 15(2), pp. 155-67.

Clarke, S. & Cooper, C. L. (2004) Managing the Risk of Workplace Stress: Health & Safety Hazards. Routledge, London, 197 p.

Clarke, S. & Flitcroft, C. (2008). Effects of transformational leadership on perceived safety climate: A longitudinal study. Journal of Occupational Health and Safety -Australia and New Zealand, 24(3), pp. 237–247.

Clarke, S. & Ward, K. (2006). The role of leader influence tactics and safety climate in engaging employees' safety participation. Risk Analysis, 26(5), pp. 1175–1185.

Clarke, S. (1996). The effect of habit as a behavioural response in risk reduction programmes. Safety Science, 22(1-3), pp. 163-175.

Clarke, S. (1999). Perceptions of organisational safety: implications for the development of safety culture. Journal of Organisational Behaviour, 20, pp. 185-198.

Clarke, S. (2010) An integrative model of safety climate: Linking psychological climate and work attitudes to individual safety outcomes using meta-analysis. Journal of Occupational and Organisational Psychology, 83, pp. 553-578.

Clarke, S. (2013). Safety leadership: A meta-analytic review of transformational and transactional leadership styles as antecedents of safety behaviours. Journal of Occupational and Organisational Psychology, 86, pp. 22–49.

Cohen, A. (1975). Factors in successful occupational safety programs. Journal of Safety Research, 9, pp. 168–172.

Conchie, S.M. & Donald, I.J. (2009). The moderating role of safety-specific trust in the relation between safety-specific leadership and safety citizenship behaviours. Journal of Occupational Health Psychology, 14, pp. 137–147.

Conchie, S.M., Moon, S. & Duncan, M. (2013). Supervisors' engagement in safety leadership: Factors that help and hinder. Safety Science, 51, pp. 109–117.

Conchie, S.M., Taylor, P.J. & Donald, I.J. (2012). Promoting safety voice through safety-specific transformational leadership: the mediator roles of two dimensions of trust. Journal of Occupational Health Psychology, 17, 105–115.

Cooper, D. (2002). Safety Culture. A model for understanding & quantifying a difficult concept. Professional Safety, 47(6), pp. 30-36.

Cooper, M. D. & Phillips, R. A. (1994). Validation of a safety climate measure. Paper presented at the BPS Occupational Psychology Conference, Birmingham, UK.

Cooper, M.D. & Phillips, R.A. (2004). Exploratory analysis of the safety climate and safety behaviour relationship. Journal of Safety Research, 35, pp. 497-512.

Corcoran, D.J. & Shackman, J.D. (2007). A theoretical and empirical analysis of the strategic value of beyond compliance occupational health and safety programs. Journal of Business Strategies, 24, pp. 49–68.

Corrigan, P., Diwan, S., Campion, J. & Rashid, F. (2002). Transformational leadership and the mental health team. Administration and Policy in Mental Health, 30(2), pp. 97 - 108.

Cox, S. & Cheyne, J. (2000). Assessing safety culture in offshore environments. Safety Science, 34(1-3), pp. 111-129.

Cox, S. & Cox, T. (1991). The structure of employee attitudes to safety: A European example. Work and Stress, 5(2), pp. 93-106.

Cox, T. & Griffiths, A. (2005). The nature and measurement of work-related stress. In: J. Wilson & N. Corlett (Eds.), Evaluation of Human Work: A Practical Ergonomics Methodology. Third edition. CRC Press, Boca Raton, FL, 1048 p., pp. 553-573.

Cox, T., Griffiths, A. & Rial-González, E. (2000). Research on work-related stress. European Agency for Safety and Health at Work. Office for Official Publications of the European Communities, Luxembourg, 169 p. Available: https://osha.europa.eu/en/publications/reports/203. Accessed on 1 June 2016.

Cox. S. & Flin, R. (1998). Safety culture: philosopher's stone or man of straw. Work and Stress, 12(3), pp. 189-201.

Crawford, E.R., LePine, J.A. & Rich, B.L. (2010). Linking job demands and resources to employee engagement and burnout: a theoretical extension and meta-analytical test. Journal of Applied Psychology, 95, 834–848.

Creswell, J.W. (2013). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches. Fourth edition. SAGE Publications Inc, Thousend Oaks, CA, 304 p.

Daft, R.L. (1999) Leadership: Theory and Practice. Harcourt Brace, New York, NY, 496 p.

Dainty, A.R.J., Cheng, M.-I. & Moore, D.R. (2004). A competency‐based performance model for construction project managers. Construction Management and Economics, 22(8), pp. 877-886.

Dana, D. (2001). Conflict Resolution. McGraw-Hill, Sydney, 169 p.

Dansereau, F., Graen, G.B. & Haga, W.J. (1975). A vertical dyad linkage approach to leadership within formal organisations. Organisational Behaviour and Human Performance, 13, pp. 46–78.

Davies, R., Jones, P. & Nuñez, I. (2009). The impact of the business cycle on occupational injuries in the UK. Social Science & Medicine, 69, pp. 178-182

De Jonge, J., Dollard, M. F., Dormann, C., Le Blanc, P. M. & Houtman, I. L. D. (2000). The demand-control model: Specific demands, specific control, and well-defined groups. International Journal of Stress Management, 7(4), pp. 268-287.

De Meuse, K.P., Dai, G. & Wu, J. (2011). Leadership skills across organisational levels: a closer examination. The Psychologist-Manager Journal, 14, pp. 120-131.

DeBlois, L. (1927). Has the industrial accident rate declined since 1913? In: Proceedings of the Casuality Actuarial Society, Arlington, Virginia, vol. XIV, pp. 84–96.

Dedobbeleer, N. & Béland, F. (1991). A safety climate measure for construction sites. Journal of Safety Research, 22, pp. 97-103.

DeJoy, D.M., Schaffer, B.S., Wilson, M.G., Vandenberg, R.J. & Butts, M.M. (2004). Creating safer workplaces: assessing the determinants and role of safety climate. Journal of Safety Research, 35, pp. 81–90.

Dekker, S. (2012). Just Culture: Balancing Safety and Accountability. Second edition. Ashgate Publishing Limited, Hampshire, 200 p.

Dellve, L., Lagerström, M. & Hagberg, M. (2002). Supportive Factors and Obstacles Prior to Disability Pension Due to Musculoskeletal Disorders. Journal of Occupational Rehabilitation, 12(2), pp. 55-64.

Dellve, L., Skagert, K. & Eklöf, M. (2008). The impact of systematic occupational health and safety management for occupational disorders and long-term work attendance. Social Science & Medicine, 67, pp. 965-970.

Dellve, L., Skagert, K. & Vilhelmsson, R. (2007). Leadership in workplace health promotion projects: 1- and 2-years effects on long-term work attendance. European Journal of Public Health, 17(5), pp. 471-6.

Demorouti, E., Bakker, A.B., Nachreiner, F. & Schaufeli, W.B. (2001). The job demands-resources model of burnout. Journal of Applied Psychology, 86, pp. 499-512.

Denzin, N.K. & Lincoln, Y.S. (2011). Introduction: the discipline and practice of qualitative research. In: N.K. Denzin & Y.S. Lincoln (Eds.) The SAGE handbook of qualitative research. Fourth edition. SAGE Publications Inc., Thousand Oaks, 766 p., pp. 1–19.

DeRango, K., Amick, B., Robertson, M., Rooney, T., Moore, A. & Bazzani, L. (2003). The Productivity Consequences of Two Ergonomic Interventions. Upjohn Institute Working Paper No. 03-95. Upjohn Institute for Employment Research, Kalamazoo, MI, W.E, 39 p.

Dingsdag, D.P., Biggs, H.C., Sheehan, V.L. & Cipolla, D. (2006). A Construction Safety Competency Framework: Improving OHS Performance by Creating and Maintaining a Safety Culture. Cooperative Research Centre for Construction Innovation, Brisbane, 36 p.

Donovan, S.-L., Salmon, P.M., Horberry, T. & Lenné, M.G. (2018). Ending on a positive: Examining the role of safety leadership decisions, behaviours and actions in a safety critical situation. Applied Ergonomics, 66, pp. 139-150.

Donovan, S.-L., Salmon, P.M., Lenné, M.G. & Horberry, T. (2017). Safety leadership and systems thinking: application and evaluation of a Risk Management Framework in the mining industry. Ergonomics, 60(10), pp. 1-15.

Drais, E., Favaro, M. & Aubertin, G. (2008). Les systèmes de management de la santé-sécurité en entreprise: caractéristiques et conditions de mise en oeuvre, Institut National de Recherche et de Sécurité, Paris, 49 p.

Dufour, C., Lanoie, P. & Patry, M. (1998). Regulation and productivity. Journal of Productivity Analysis, 9, pp. 233-247.

Dvir, T., Eden, D. Avolio, B.J. & Shamir, B. (2002). Impact of transformational leadership on follower development and performance: a field experiment. Academy of Management Journal, 45, pp. 735–744.

Earnshaw, J. & Cooper, C. L. (2001) Stress and Employer Liability. Institute of Personnel and Development, London, 208 p.

Eastman, C. (1910). Work-accidents and the Law. The Pittsburg Survey. Charities Publications Committee, New York, 458 p.

Eid, J., Mearns, K., Larsson, G., Laberg, J.C. & Johnsen, B.H. (2012). Leadership, psychological capital and safety research: Conceptual issues and future research questions. Safety Science, 50, pp. 55-61.

Eriksson, A. (2011). Health-Promoting Leadership: A Study of the Concept and Critical Conditions for Implementation and Evaluation. Doctoral dissertation. Nordic School of Public Health, Sweden, 68 p.

Eriksson, A., Axelsson, R. & Axelsson, S.B. (2010). Development of health promoting leadership – experiences of a training programme. Health Education, 110(2), pp. 109-124.

Eriksson, A., Jansson, B., Haglund, B.J.A. & Axelsson, R. (2008). Leadership, organisation and health at work: a case study of a Swedish industrial company. Health Promotion International, 23(2), pp. 127-33.

Ertel, M., Stilijanow, U., Cvitkovic, J. & Lenhardt, U. (2008) Social policies, infrastructure and social dialogue in relation to psychosocial risk management. In: S. Leka & T. Cox (Eds.), The European Framework for Psychosocial Risk Management. I-WHO, Nottingham, pp. 60–78.

EU-OSHA (European Agency for Safety and Health at Work) (2007). Expert Forecast on Emerging Psychosocial Risks Related to Occupational Safety and Health. European Risk Observatory Report. European Agency for Safety and Health at Work. Office for Official Publications of the European Communities, Luxembourg, 126 p. Available: https://osha.europa.eu/en/publications/reports/7807118. Accessed on 1 June 2016.

EU-OSHA (2010a). Mainstreaming OSH into business management. European Agency for Safety and Health at Work. Office for Official Publications of the European Communities, Luxembourg, 196 p. Available: https://osha.europa.eu/en/publications/reports/mainstreaming_osh_business. Accessed on 1 June 2016.

EU-OSHA (2010b). European Survey of Enterprises on New and Emerging Risks – Managing Safety and Health at work. European Risk Observatory Report. European Agency for Safety and Health at Work. Publications Office of the European Union, Luxembourg, 156 p. Available: https://osha.europa.eu/en/publications/reports/esener1_osh_management. Accessed on 1 June 2016.

EU-OSHA (2012a). Healthy workplaces. Working together for risk prevention. Campaign guide. Management leadership and worker participation in occupational safety and health, European Agency for Safety and Health at Work, 32 p.

EU-OSHA (2012b). Management of occupational safety and health: An Analysis of the findings of the European Survey of Enterprises on New and Emerging Risks. European Risk observatory. Publications Office of the European Union, Luxembourg, 63 p.

EU-OSHA (2014). Scoping study for a foresight on new and emerging occupational safety and health (OSH) risks and challenges. European Risk Observatory Report. Publications Office of the European Union, Luxembourg, 68 p. Available: https://osha.europa.eu/en/tools-and-publications/publications/reports/scoping-study-for-a-foresight-on-new-and-emerging-osh-risks-and-challenges. Accessed on 6 October 2016.

Eurofound (2010). European Working Conditions Survey—mapping the results. Available: http://www.eurofound.europa.eu/surveys/smt/ewcs/results.htm. Accessed on 1 June 2016.

European Commission (2011). Socio-economic costs of accidents at work and work-related ill health. Key messages and case studies. Directorate-General for Employment, Social Affairs and Inclusion. Unit B.3. European Union, Luxembourg, 55 p.

European Foundation (2007). European Foundation for the Improvement of Living and Working Conditions Fourth European Working Conditions Survey. Office for Official Publications of the European Communities, Luxembourg, 139 p. Available: http://www.eurofound.europa.eu/sites/default/files/ef_files/pubdocs/2006/98/en/2/ef0698en.pdf. Accessed on 1 June 2015.

FAII (Federation of Accident Insurance Institutions) (2014). Työtapaturmat – Tilastojulkaisu 2014. Tilastovuodet 2005-2013 (in Finnish). FAII, Helsinki, 37 p.

FAII (2015). Työtapaturmat – Tilastojulkaisu 2015. Tilastovuodet 2005-2014 (in Finnish). FAII, Helsinki, 37 p.

Feng, Y. (2013). Effect of safety investments on safety performance of building projects. Safety Science, 59, pp. 28–45.

Fernández-Muñiz, B., Montes-Peón, J. & Vázquez-Ordás, C. (2007). Safety Culture: analysis of the causal relationships between its key dimensions. Journal of Safety Research, 38, pp. 627–641.

Fernández-Muñiz, B., Montes-Peón, J. & Vázquez-Ordás, C. (2009). Relation between occupational safety management and firm performance. Safety Science, 47, pp. 980-991.

Fiafua, D. (2014). The key informant technique in qualitative research. SAGE Research Methods Cases. SAGE Publications, Ltd., London, 12 p.

FIOH (Finnish Institute of Occupational Health) (2013). Työ ja terveys Suomessa 2012. Seurantatietoa työoloista ja työhyvinvoinnista (in Finnish). Tammerprint Oy, Tampere, 252 p. Available: http://www.ttl.fi/fi/verkkokirjat/tyo_ja_terveys_suomessa/Documents/Tyo_ja_Terveys_2012.pdf. Accessed on 1 June 2016.

Fizgerald, M.K. (2005). Safety performance improvement through culture change. Process Safety Environmental Protection, 83(B4), pp. 324-330.

Flin, R. (2003). "Danger – men at work": Management influence on safety. Human Factors and Ergonomics in Manufacturing, 13, pp. 261–268.

Flin, R., Mearns, K., O'Connor, P. & Bryden, R. (2000). Measuring safety climate: identifying the common features. Safety Science, 34, pp. 177-192.

Frantz, R. (1988). X-efficiency: Theory, Evidence and Applications. Kluwer Academic Publishers, Boston, 227 p.

Frick, K. & Wren, J. (2000). Reviewing Occupational Health and Safety Management-Multiple Roots, Diverse Perspectives and Ambiguous Outcomes. In: K. Frick, P. Jensen, M. Quinlan & T. Wilthagen (Eds.), Systematic Occupational Health and Safety Management. Perspectives on an International Development. Pergamon Press, Oxford, 527 p., pp. 17-42.

Frick, K. (2013) Work Environment Dialogue in a Swedish Municipality — Strengths and Limits of the Nordic Work Environment Model. Nordic Journal of Working Life Studies, 3(1), pp. 69-93.

Frick, K., Jensen, P., Quinlan, M. & Wilthagen, T. (2000). Systematic Occupational Health and Safety Management- an Introduction to a New Strategy for Occupational Safety, Health and Well-being. In: K. Frick, P. Jensen, M.Quinlan & T. Wilthagen (Eds.), Systematic Occupational Health and Safety Management. Perspectives on an International Development. Pergamon Press, Oxford, 527 p., pp. 1-14.

Fruhen, L.S., Mearns, K.J., Flin, R. & Kirwan, B. (2014a). Skills, knowledge and senior managers' demonstrations of safety commitment. Safety Science, 69, pp. 29–36.

Fruhen, L.S., Mearns, K.J., Flin, R. &Kirwan, B. (2014b). Safety intelligence: An exploration of senior managers' characteristics. Applied Ergonomics, 45, pp. 967-975.

Gallagher, C. (1996). Health and Safety Management Systems: An Analysis of System Types and Effectiveness, Melbourne: National Key Centre in Industrial Relations, Monash University, 9 p.

Gallagher, C., Underhill, E. & Rimmer, M. (2001). Occupational Health and Safety Management Systems: A Review of their Effectiveness in Securing Healthy and Safe Workplaces. National Occupational Health and Safety Commission, Canberra, Australia, 71 p.

Gallagher, C., Underhill, E. & Rimmer, M. (2003). Occupational safety and health management systems in Australia: barriers to success. Policy and Practice in Health and Safety, 1, pp. 67–81.

Garavan, T.N. & McGuire, D. (2001). Competencies and workplace learning: some reflections on the rhetoric and the reality. Journal of Workplace learning, 13(3-4), pp. 144-63.

Gardner, W.L., Avolio, B.J., Luthans, F., May, D.R. & Walumba, F. (2005). Can you see the real me? A self-based model of authentic leader and follower development. The Leadership Quarterly, 16, pp. 343–372.

Gavious, A., Mizrahi, S., Shani, Y. & Minchuk, Y. (2009). The costs of industrial accidents for the organisation: Developing methods and tools for evaluation and cost–benefit analysis of investment in safety. Journal of Loss Prevention in the Process Industries, 22, pp. 434–438.

Geldart, S., Smith, C.A., Shannon, H.S. & Lohfeld, L. (2010). Organisational practices and workplace health and safety: A cross-sectional study in manufacturing companies. Safety Science, 48, pp. 562–569.

Gilbreath, B. & Benson, P.G. (2004). The contribution of supervisor behaviour to employee psychological well-being. Work and Stress, 18(3), pp. 255-66.

Godin, I. & Kittel, F. (2004). Differential economic stability and psychosocial stress at work: Associations with psychosomatic complaints and absenteeism. Social Science & Medicine, 58, pp. 1543-1553.

Green, R. (1994). A positive role for OHS in performance measurement. In: WorkSafe-Australia, Positive Performance Indicators: Beyond Lost Time Injuries. Part I Issues. Commonwealth of Australia, Canberra, Australia, 56 p., pp. 7-14.

Greenwood, E. (1934). Who Pays? Country Life Press, Garden City, Doubleday, Doran & Co., New York.

Griffin, M.A. & Hu, X. (2013). How leaders differentially motivate safety compliance and safety participation: The role of monitoring, inspiring, and learning. Safety Science, 60, pp. 196-202.

Griffin, M.A. & Neal, A. (2000). Perceptions of safety at work: a framework for linking safety climate to safety performance, knowledge, and motivation. Journal of Occupational Health Psychology, 5, pp. 347–358.

Grint, K. (2005). Leadership: Limits and Possibilities. Palmgrave Macmillan, Houndmills, Basingstoke, Hampshire & New York, 192 p.

Guldenmund, F.W. (2007). The use of questionnaires in safety culture research – an evaluation. Safety Science, 45(6), pp. 723-743.

Guldenmund, F.W. (2000). The nature of safety culture: a review of theory and research. Safety Science, 34, pp. 215–257.

Guldenmund, F.W. (2010). (Mis)understanding Safety Culture and Its Relationship to Safety Management. Risk Analysis, 30(10), pp. 1466-1480.

Gunduz, M. & Laitinen, H. (2017) A 10-step safety management framework for construction small and medium-sized enterprises, International Journal of Occupational Safety and Ergonomics, 23(3), pp. 353-359.

Hale, A.R. & Borys, D. (2013). Working to rule, or working safely? Part 1: A state of the art review. Safety Science, 55, pp. 207—221.

Hale, A.R. & Hovden, J. (1998). Management and culture: the third age of safety. In: A.-M. Feyer & A. Williamson (Eds.), Occupational Injury: Risk, Prevention and Intervention. Taylor & Francis, London, 277 p., pp. 129–166.

Hale, A.R. (2000). Editorial. Culture's confusion. Safety Science, 34, pp. 1–4.

Hale, A.R. (2003). Safety Management in Production. Human Factors and Ergonomics in Manufacturing, 13, pp. 185–201.

Hale, A.R., Guldenmund, F.W., van Loenhout, P.L.C.H. & Oh, J.I.H. (2010). Evaluating safety management and culture interventions to improve safety: effective intervention strategies. Safety Science, 48(8), pp. 1026–1035.

Hale, A.R., Heming, B.H.J., Carthey, J. & Kirwan, B. (1997). Modelling of safety management systems. Safety Science, 26, pp. 121–140.

Hannah, S.T., Uhl-Bien, M, Avolio, B.T. & Cavarretta, F.L. (2009). A Framework for examining Leadership in Extreme Context. The Leadership Quartely, 20, pp. 897-919.

Hardison, D., Behm, M., Hallowell, M. R. & Fonooni, H. (2014) Identifying construction supervisor competencies for effective site safety. Safety Science, 65, pp. 45–53.

Hasle, P. & Zwetsloot, G. (2011). Editorial: Occupational Health and Safety Management Systems: Issues and challenges. Safety Science, 47(7), pp. 961-963.

Hasle, P., Hvid, H., Kristensen, T.S., Limborg, H.J., Møller, N., Pejtersen, J. & Hvenegaard, H. (2008). Virksomheders indsats for et bedre psykisk arbeidsmiljø (in Swedish). Rapport fraforsknings projektet VIPS. NFA, København, 144 p. Available: http://www.arbejdsmiljoforskning.dk/~/media/Boeger-og-rapporter/vips-rapport.pdf. Accessed on 1 June 2015.

Heikkilä, J., Reiman, T., Leskinen, T., Rasa, P.-L. & Tappura, S. (2013). Well-being, Safety and Well-being at Work. In: Proceedings of the 45th Annual International Conference of the Nordic Ergonomics and Human Factors Society (NES), August 11–14, 2013, Reykjavik, Iceland.

Hlobil, H., Uegaki, K., Staal, J. B., De Bruyne, M. C., Smid, T. & Van Mechelen, W. (2007) Substantial sick-leave costs savings due to a graded activity intervention for workers with non-specific sub-acute low back pain. European Spine Journal, 16(7), pp. 919-924.

Hoffmeister, K., Gibbons, A.M., Johnson, S.K., Cigularov, K.P., Chen, P.Y. & Rosecrance, J.C. (2014). The differential effects of transformational leadership facets on employee safety. Safety Science, 62, pp. 68–78.

Hofmann, D.A. & Morgeson, F.P. (1999). Safety-related behaviour as a social exchange: The role of perceived organisational support and leader-member exchange. Journal of Applied Psychology, 84, pp. 286-296.

Hofmann, D.A. & Morgeson, F.P. (2004). The role of leadership in safety. In: J. Barling & M.R. Frone (Eds.), The psychology of workplace safety, APA, Washington, DC, pp. 159-180.

Hofmann, D.A. & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviours and accidents. Personnel Psychology, 49, pp. 307–339.

Hofmann, D.A., Morgeson, F.P. & Gerras, S.J. (2003). Climate as a moderator of the relationship between leader-member exchange and content specific citizenship: Safety climate as an exemplar. Journal of Applied Psychology, 88(1), 1pp. 70–178.

Hollnagel, E. (2004). Barriers and Accident Prevention. Ashgate Publishing Limited, Aldershot, UK, 242 p.

House, R.J., Hanges, P.J., Ruiz-Quintanilla, S.A., Dorfman, P.W., Javidan, M., Dickson, M., Gupta, V. & GLOBE (1999). Cultural influences on leadership and organisations. Advances in global leadership, 1, JAI Press, Stanford, CT, pp. 171–233.

Houston, M.J. & Sudman, S. (1975). A methodological assessment of the use of key informants. Social Science Research, 4(2), pp. 151-164.

HSC (Health and Safety Commission) (1993). Third Report: Organising for Safety, ACSNI Study Group on Human Factors, HMSO, London, 99 p.

HSE (Health and Safety Executive) (1997). Successful health and safety management. Second edition. Health and Safety Executive, HMSO, London, 98 p.

HSE (1999). Reducing error and influencing behaviour. HSE Books, Suffolk, 88 p.

HSE (2007a). Managing the Causes of Work-Related Stress. A Step-by-Step Approach using the Management Standards. Second edition. Health and Safety Executive, HSE Books, 56 p. Available: http://www.hse.gov.uk/pubns/priced/hsg218.pdf. Accessed on 1 June 2016.

HSE (2007b). Management competencies for preventing and reducing stress at work. Identifying and developing the management behaviours necessary to implement the HSE Management Standards. RR553 Research Report. Health and Safety Executive, UK, 126 p. Available: http://www.hse.gov.uk/research/rrpdf/rr553.pdf. Accessed on 1 June 2016.

Huse, E.F. & Cummings, T.G. (1985). Organisation Development and Change. West Publishing Company, St. Paul Minneapolis, 583 p.

Hymel, P.A., Loeppke, R.R., Baase, C.M., Burton, W.N., Hartenbaum, N.P., Hudson, T.W., McLellan, R.K., Mueller, K.L., Roberts, M.A., Yarborough, C.M., Konicki, D.L. & Larson, P.W. (2011). Workplace health protection and promotion: a new pathway for a healthier-and-safer-workforce. Journal of Occupational and Environmental Medicine, 53(6), pp. 695-702.

Hyttinen, M. (1994). Talonrakennustyömaan työnjohtajan onnistunut esimiestoiminta (in Finnish). Doctoral dissertation. Oulu University, Finland.

Hämäläinen, P. (2010). Global estimates of occupational accidents and fatal work-related diseases. Doctoral dissertation. Tampere University of Technology, Finland.

Härenstam, A., Marklund, S., Berntson, E., Bolin, M. & Ylander, J. (2006). Understanding the organisational impact on working conditions and health. Arbete och Hälsa 2006:04. Arbetslivsinstitutet, Stockholm, 81 p. Available: https://gupea.ub.gu.se/bitstream/2077/4376/1/ah2006_04.pdf. Accessed on 6 October 2016.

Idris, M.A., Dollard, M.F., Coward, J. & Dormann, C. (2012). Psychosocial safety climate: Conceptual distinctiveness and effect on job demand and worker psychological health. Safety Science, 50, pp. 19-28.

ILO (International Labour Organisation) (2001). Guidelines on Occupational Safety and Health Management Systems MEOSH/2001/2(Rev.). Second edition. International Labour Organisation, Geneva, 28 p. Available: http://www.ilo.org/wcmsp5/groups/public/@ed_protect/@protrav/@safework/documents/normativeinstrument/wcms_107727.pdf. Accessed on 6 October 2016.

ILO (2011). ILO Introductory Report: Global Trends and Challenges on Occupational Safety and Health. International Labour Office, Geneva, 64 p. Available: http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/wcms_162662.pdf. Accessed on 6 October 2016.

IOSH (Institute of Occupational Safety and Health) (2004). Promoting a Positive Culture. A guide to health and safety culture. Institution of Occupational Safety and Heath Guidance, IOSH, UK, 15 p.

IOSH (2010). Managing safely. Don't just train… inspire! IOSH Services Ltd., UK, 6 p.

ISO 26000:2010. Guidance on social responsibility. International Organization for Standardization, Geneva, Switzerland, 106 p.

ISO 9001:2015. Quality management systems. Requirements. International Organization for Standardization, Geneva, Switzerland, 29 p.

ISO GUIDE 73:2009. Risk management. Vocabulary. International Organization for Standardization, Geneva, Switzerland, 15 p.

ISO/DIS 45001 (2016). Occupational health and safety management systems. Requirements with guidance for use. Draft international standard. International Organization for Standardization, Geneva, Switzerland, 51 p.

ISO/IEC 2004. Guide 2: Standardization and related activities – General vocabulary. International Organization for Standardization, Geneva, Switzerland, 60 p.

Jallon, R., Imbeau, D. & de Marcellis-Warin, N. (2011). Development of an indirect-cost calculation model suitable for workplace use. Journal of Safety Research, 42, pp. 149–164.

Jitwasinkul, B., Hadikusumo, B.H.W. & Memon, A.Q. (2016). A Bayesian Belief Network model of organisational factors for improving safe work behaviours in Thai construction industry. Safety Science, 82, pp. 264-273.

Kaplan, S.N., Klebanov, M.M. & Sorensen, M. (2008). Which CEO characteristics and abilities matter? In: National Bureau of Economic Research Working Paper No. 14195. National Bureau of Economic Research, Cambridge, MA, pp. 973-1007.

Kapp, E.A. (2012). The influence of supervisor leadership practices and perceived group safety climate on employee safety performance. Safety Science, 50(4), pp. 1119–1124.

Karasek, R., Baker, D., Marxer, F., Ahlbom, A. & Theorell, T. (1981). Job decision latitude, job demands, and cardiovascular disease: A prospective study of Swedish men. American Journal of Public Health, 71(7), pp. 694-705.

Kasanen, E., Lukka, K. & Siitonen, A. (1991). Konstruktiivinen tutkimusote liiketaloustieteessä (in Finnish). Liiketaloudellinen aikakauskirja, 3, pp. 301-329.

Kasanen, E., Lukka, K. & Siitonen, A. (1993). The constructive approach in management accounting research. Journal of Management Accounting Research, 5, pp. 243-264.

Kaskutas, V., Dale, A.M., Lipscomb, H. & Evanoff, B. (2013). Fall prevention and safety communication training for foremen: Report of a pilot project designed to improve residential construction safety. Journal of Safety Research, 44, pp. 111–118.

Kelloway, E.K., Mullen, J. & Francis, L. (2006). Divergent effects of transformational and passive leadership on employee safety. Journal of Occupational Health Psychology, 11(1), pp. 76-86.

Kelloway, E.K. & Barling, J. (2010). Leadership development as an intervention in occupational health psychology. Work Stress, 24, pp. 260–279.

Kelloway, E.K., Turner, N., Barling, J. & Loughlin, C. (2012). Transformational leadership and employee psychological well-being: The mediating role of employee trust in leadership. Work & Stress, 26, pp. 39-55.

Kemmlert, K. (1996). Economic impact of ergonomic intervention—Four case studies. Journal of Occupational Rehabilitation, 6, pp. 17–32.

Kerr, S. & Jermier, J.M. (1978). Substitutes for leadership: Their meaning and measurement. Organisational Behaviour, 22, pp. 375-403.

Killimett, P. (2006). Organisational factors that influence safety. Process Safety Progress, 25(2), pp. 94–97.

Kines, P., Andersen, L.P.S., Spangenberg, S., Mikkelsen, K.L., Dyreborg, J. & Zohar, D. (2010). Improving construction site safety through leader-based verbal safety communication. Journal of Safety Research, 41, pp. 399–406.

Kivimäki, M., Virtanen, M., Elovainio, M., Kouvonen, A., Väänänen, A. & Vahtera, J. (2006). Work stress in the aetiology of coronary heart disease—A meta-analysis. Scandinavian Journal of Work, Environment & Health, 32(6), pp. 431-442.

Kjéllen, U. (2000). Prevention of Accidents Through Experience Feedback. CRC Press, London, 424 p.

Kotter, J.P. (1988). The leadership factor. Free Press, New York, 161 p.

Kotter, J.P. (1990). A force for change: How leadership differs from management. Free Press, New York, 184 p.

Kuoppala, J., Lamminpää, A. & Husman, P. (2008). Work Health Promotion, Job Well-Being, and Sickness Absences—A Systematic Review and Meta-Analysis. Journal of Occupational & Environmental Medicine, 50(11), pp. 1216-1227.

Künzle, B., Kolbe, M. & Grote, G. (2010). Ensuring patient safety through effective leadership behaviour: A literature review. Safety Science, 48, pp. 1-17.

Köper, B., Möller, K. & Zwetsloot, G. (2009). The occupational safety and health scorecard – a business case example for strategic management. Scandinavian Journal of Work, Environment & Health, 35, pp. 413–420.

Larsson, R. (2015). Managing workplace health promotion in municipal organisations. Doctoral dissertation. Mälardalen University Press Dissertations. Mälardalen University, Sweden, 76 p.

Law, R., Dollard, M.F., Tuckey, M.R. & Dormann, C. (2011). Psychosocial safety climate as a lead indicator of workplace bullying and harassment, job resources, psychological health and employee engagement. Accident Analysis &Prevention, 43, pp. 1782-1793.

Lee, T. & Harrison, K. (2000). Assessing safety culture in nuclear power stations. Safety Science, 34, pp. 61—97.

Lehto, A.-M., Sutela, H. & Pärnänen, A. (2015). Työn henkinen ja ruumiillinen rasittavuus. STM:n tilaama selvitys Tilastokeskukselta (in Finnish). Sosiaali- ja terveysministeriön raportteja ja muistioita 2015:33. Available: http://urn.fi/URN:ISBN: 978-952-00-3595-2. Accessed on 20 October 2017.

Leibenstein, H. (1969). Organisational or frictional equilibria, X-efficiency, and the rate of innovation. Quarterly Journal of Economics, 83(4), pp. 600-623.

Leibenstein, H. (1987). Inside the Firm: The Inefficiencies of Hierarchy. Harvard University Press, Harvard, 304 p.

Leka, S., Jain, A., Widerszal-Bazyl, M., Zołnierczyk-Zreda, D. & Zwetsloot, G. (2011). Developing a standard for psychosocial risk management: PAS 1010. Safety Science, 49(7), pp. 1047-1057.

Lewis, C. (2009). The definitive guide to Workplace Mediation & Managing conflict at work. RoberPenberthy Publishing Ltd, Surrey.

Levä, K. (2003). Turvallisuusjohtamisjärjestelmien toimivuus: vahvuudet ja kehityshaasteet suuronnettomuusvaarallisissa laitoksissa (In Finnish). Doctoral dissertation. TUKES, Helsinki, Finland.

Linhard, J.B. (2005). Understanding the return on health, safety and environmental investments. Journal of Safety Research - ECON proceedings, 36, pp. 257–260.

Lord, R.G. & Hall R.J. (2005). Identity, deep structure and the development of leadership skill. The Leadership quarterly, 16, pp. 591-615.

Lord, R.G. (2008). Beyond transactional and transformational leadership. Can leaders still lead when they don't know what to do? In: M. Uhl-Bien & R. Marion (Eds.), Complexity leadership, Part 1: Conceptual foundations. Information Age Publishing, Inc., Charlotte, North Carolina, 448 p., pp. 155-184.

Lowe, K.B., Kroeck, K.G. & Sivasubramaniam, N. (1996). Effectiveness of correlates of transformational and transactional leadership: a meta-analytic review of the MLQ literature. The Leadership Quarterly, 7, pp. 385−425.

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Lu, C.S. & Yang, C.S. (2010). Safety leadership and safety behaviour in container terminal operations. Safety Science, 48(2), pp. 123-134.

Lundberg, U. & Melin, B. (2002). Stress in the development of musculoskeletal pain. In: S. Linton (Ed.), Avenues for the Prevention of Chronic Musculoskeletal Pain and Disability. Elsevier Science, Amsterdam, 314 p., pp. 165-179.

Lyon, B.K. (1997). Ergonomic benefit/cost analysis: communicating the value of enhancements. Professional Safety, 42, pp. 33–36.

Marmot, M., Feeney, A., Shipley, M., North, F. & Syme, L. (1995). Sickness absence as a measure of health status and functioning: from the UK Whitehall II study. Journal of Epidemiology and Community Health, 49(5), pp. 12-30.

Martínez-Córcoles, M., Gracia, F., Tomás, I. & Peiró, J.M. (2011). Leadership and employees' perceived safety behaviours in a nuclear power plant: A structural equation model. Safety Science, 49(8), pp. 1118-1129.

Matthews, J & Rowlinson, S. (1999). Partnering: Incorporating safety management. Engineering, Construction and Architectural Management, 6(4), pp. 347-357.

McDonald, N., Corrigan, S., Daly, C. & Cromie, S. (2000). Safety management systems and safety culture in aircraft maintenance organisations. Safety Science, 34(1), pp. 151–176.

Mearns, K., Whitaker, S.M., & Flin, R. (2003). Safety climate, safety management practice and safety performance in offshore environments. Safety Science, 41(8), pp. 641-680.

Mearns, K.J. & Reader, T. (2008). Organisational support and safety outcomes: An un-investigated relationship. Safety Science, 46(3), pp. 388-397.

Mellor, N., Smith, P., Mackay, C. & Palferman, D. (2013). The "management standards" for stress in large organisations. International Journal of Workplace Health Management, 6(1), pp. 4-17.

Michael, J.H., Evans, D.D., Jansen, K.J. & Haight, J.M. (2005). Management commitment to safety as organisational support: Relationships with non-safety outcomes in wood manufacturing employees. Journal of Safety Research, 36, pp. 171 – 179.

Michael, J.H., Guo, Z.G., Wiedenbeck, J.K. & Ray, C.D. (2006). Production supervisor impacts on subordinates' safety outcomes: An investigation of leader-member exchange and safety communication. Journal of Safety Research, 37, pp. 469-477.

Ministry of Social Affairs and Health 2011. Policies for the work environment and well-being at work until 2020. Publications of the Ministry of Social Affairs and Health 2011:14, Tampere, 11 p. Available: https://www.julkari.fi/bitstream/handle/10024/112065/URN%3ANBN%3Afi-fe201504223826.pdf?sequence=1. Accessed on 11 October 2016.

Montero, M.J., Araque, R.A. & Rey, J.M. (2009). Occupational health and safety in the framework of corporate social responsibility. Safety Science, 47(10), pp. 1440–1445.

Mullen, J.E. & Kelloway, E.K. (2009). Safety leadership: a longitudinal study of the effects of transformational leadership on safety outcomes. Journal of Occupational and Organisational Psychology, 82(2), pp. 253–272.

Mullen, J.E., Kelloway, E.K. & Teed, M. (2017). Employer safety obligations, transformational leadership and their interactive effects on employee safety performance. Safety Science, 91, pp. 405-412.

Mumford, M.D., Marks, M.A., Connelly, M.S., Zaccaro, S.J., & Reiter-Palmon, R. (2000a). Development of leadership skills: Experience and timing. Leadership Quarterly, 11, pp. 87−114.

Mumford, M. D., Zaccaro, S. J., Harding, F. D., Jacobs, T. O., & Fleishman, E. A. (2000b). Leadership skills for a changing world: Solving complex social problems. The Leadership Quarterly, 11, pp. 11–35.

Neal, A. & Griffin, M. (2004). Safety climate and safety at work. In: J. Barling & M.R. Frone (Eds.), The Psychology of Workplace Safety. American Psychological Association, xi, Washington, DC, US, 337 p., pp. 15-34.

Neal, A. & Griffin, M.A. (2006). A study of the lagged relationships among safety climate, safety motivation, safety behaviour, and accidents at the individual and group levels. Journal of Applied Psychology, 91(4), pp. 946–953.

Neal, A., Griffin, M.A. & Hart, P.M. (2000). The impact of organisational climate on safety climate and individual behaviour. Safety Science, 34(1), pp. 99-109.

Nelson, A., Matz, M., Chen, F., Siddharthan, K., Lloyd, J. & Fragala, G. (2006). Development and evaluation of a multifaceted ergonomics program to prevent injuries associated with patient handling tasks. International Journal of Nursing Studies, 43(6), pp. 717-733.

Nelson, C., Treichler, P.A., & Grossberg, L. (1992). Cultural studies. In: L. Grossberg, C. Nelson & P.A. Treichler (Eds.), Cultural studies. Routledge, New York, pp. 1-16.

Nenonen, N. (2013). The Finnish Occupational Accidents and Diseases Statistics Database Employed for Safety Promotion. Doctoral dissertation. Tampere University of Technology, Finland.

Nenonen, N., Hämäläinen, P., Heikkilä, J., Reiman, T. & Tappura, S. (2015). Corporate managers' perceptions of safety and its value: An interview study of five internationally operating Finnish companies. Policy and practice of Health & Safety, 13(1), pp. 3-15.

Nenonen, S. (2012). Implementation of Safety Management in Outsourced Services in the Manufacturing Industry. Doctoral dissertation. Tampere University of Technology, Finland.

Nielsen, K. (2000). Organisation theories implicit in various approaches to OHS management. In: K. Frick, P.L. Jensen, M. Quinlan & T. Wilthagen (Eds.), Systematic Occupational Health and Safety Management: perspectives on an International Development. Pergamon, Amsterdam, 527 p, pp. 99–124.

Nyberg, A., Westerlund, H., Magnusson Hansson, L.L. & Theorell, T. (2008) Managerial leadership is associated with self-reported sickness absence and sickness presenteeism among Swedish men and women. Scandinavian Journal of Public Health, 36, pp. 803–811.

O´Toole, M. (2002). The relationship between employees' perceptions of safety and organisational culture. Journal of Safety Research, 33, pp. 231-243.

O'Dea, A. & Flin, R. (2001). Site managers and safety leadership in the offshore oil and gas industry. Safety Science, 37, pp. 39-57.

Offermann, L.R. & Hellmann, P.S. (1996). Leadership Behaviour and Subordinate Stress: A 360 ° View. Journal of Occupational Health Psychology, 1(4), pp. 382-390.

OHSAS 18001:2007. Occupational Health and Safety Management Systems – Requirements. OHSAS Project Group BSI, London, 32 p.

OHSAS 18002:2008. Occupational health and safety management systems – Guidelines for the Implementation of OHSAS 18001. OHSAS Project Group BSI, London, 90 p.

Olkkonen, T. (1994). Johdatus teolisuustalouden tutkimustyöhön (in Finnish). Aalto-yliopisto, Perustieteiden korkeakoulu, Tuotantotalouden laitoksen kirjasto, 143 p.

Ostrom, C. Wilhelmsen, O.C. & Kaplan, B. (1993). Assessing safety culture. Nuclear Safety, 65, pp. 163-172.

Oxenburgh, M. & Marlow, P. (2005). The productivity assessment tool: computer-based cost benefit analysis model for the economic assessment of occupational health and safety interventions in the workplace. Journal of Safety Research, 36, pp. 209–214.

Oyegoke, A. (2011). The constructive research approach in project management research. International Journal of Managing Projects in Business, 4(4), pp. 573-595.

Palys, T.S. (2003). Research Decisions: Quantitative and Qualitative Perspectives. Thomson Nelson, Scarborough, Ontario, Canada, 473 p.

Patton, M.Q. (1999). Enhancing the quality and credibility of qualitative analysis. Health services research, 34(5 Part II), pp. 1189-1208.

Patton, M.Q. (2001) Qualitative Research & Evaluation Methods. Utilization-Focused Evaluation. Third Edition. SAGE Publications, Saint Paul, MN, 598 p.

Pedler, M., Burgoyne, J. & Boydell, T. (1986). A Manager's Guide to Self-development. McGraw-Hill, London.

Petersen, D. (2000). The barriers to safety excellence. Occupational Hazards, 62(12), pp. 37-42. Available: http://web.a.ebscohost.com/ehost/detail/detail?sid=40b2ab1e-b501-4128-aa84-cde16dbfe9a1%40sessionmgr4001&vid=2&hid=4114&bdata=JnNpdGU9ZWhvc3QtbGl2ZSZzY29wZT1zaXRl#db=bth&AN=3903754. Accessed on 10 June 2016.

Pfeffer, J. (1998). Seven practices of successful organisations. California Management Review, 40(2), pp. 96–124.

Porter, L.W. & McLaughlin, G.B. (2006). Leadership and the organisational context: like the weather? The Leadership Quarterly, 17, pp. 559–576.

Purushothama, B. (2014). Implementing ISO 9001:2015. Woodhead Publishing India Publishing, New Delhi, 163 p.

Quinlan, M. & Mayhew, C. (2000). Precarious employment, work-re-organisation and the fracturing of OHS management. In: K. Frick, P.L. Jensen, M. Quinlan & T. Wilthagen (Eds.), Systematic Occupational Health and Safety Management: Perspectives on an International Development. Pergamon Press, Oxford, 527 p., pp. 175– 198.

Reason, J. (1997). Managing the risks of organisational accidents. Ashgate, Aldershot, 266 p.

Redinger, C.F. & Levine, S.P. (1998). Development and evaluation of the Michigan occupational health and safety management system assessment instrument: A universal OHSMS performance measurement tool. American Industrial Hygiene Association Journal, 59, pp. 572-581.

Reese, C.D. (2011). Accident/Incident Prevention Techniques. Second Edition. CRC Press, New York, 624 p.

Reiman, T. & Pietikäinen, E. (2012). Leading indicators of system safety – Monitoring and driving the organisational safety potential. Safety Science, 50(10), pp. 1993–2000.

Reiman, T. (2015). Turvallisuusasiantuntijoiden roolit, toimintatavat ja tarvittavat kyvyt ja taidot (in Finnish). VTT Technical Research Centre of Finland. Grano Oy, Kuopio, 37 p.

Reiman, T., Pietikäinen, E. & Oedewald, P. (2008). Turvallisuuskulttuuri. Teoria ja arviointi (in Finnish). VTT Publications 700. VTT Technical Research Centre of Finland, Espoo, 106 p. Available: http://www.vtt.fi/inf/pdf/publications/2008/P700.pdf. Accessed on 10 June 2016.

Reiman, T., Pietikäinen, E., Oedewald, P., & Gotcheva, N. (2012). System modeling with the DISC framework: evidence from safety-critical domains. Work, 41, pp. 3018-3025.

Richards, D. & Engle, S. (1986). After the vision: Suggestions to corporate visionaries and vision champions. In: J.D. Adams (Ed.), Transforming leadership. Miles River Press, Alexandria, VA, pp. 199-214.

Risikko, T. (2009). Safety, health and productivity of cold work. A management model, implementation and effects. Doctoral dissertation. University of Oulu. Oulu University Press, Finland.

Rissanen, M. & Kaseva, E. (2014). Menetetyn työpanoksen kustannus (in Finnish). Finnish Ministry of Social Affairs and Health, Department for OSH, 13 p. Available: http://www.stm.fi/c/document_library/get_file?folderId=53630&name=DLFE-32812.pdf. Accessed on 10 June 2016.

Robson, L., Clarke, J., Cullen, K., Bielecky, A., Severin, C., Bigelow, P., Irvin, E., Culyer, A.J. & Mahood, Q. (2007). The effectiveness of occupational health and safety management system interventions: a systematic review. Safety Science, 45(3), pp. 329-353.

Rohweder, L. (2008). Konstruktiivinen tutkimusote pedagogiikan kehittämisessä (in Finnish). In: L. Rohweder & A. Virtanen (Eds.), Kohti kestävää kehitystä. Pedagoginen lähestymistapa. Opetusministeriön julkaisuja 2008:3, 146 p., pp. 11-14.

Rolfe, G. (2006). Validity, trustworthiness and rigour: quality and the idea of qualitative research. Methodological issues in nursing research. Journal of Advanced Nursing, 53(3), pp. 304–310.

Rollenhagen, C. (2010). Can focus on safety culture become an excuse for not rethinking de-sign of technology? Safety Science, 48(2), pp. 268—278.

Rose, J., Pedersen, K., Hosbond, J.H. & Kræmmergaard, P. (2007). Management competences, not tools and techniques: A grounded examination of software project management at WM-data. Information and Software Technology, 49, pp. 605–624.

Rost, J.C. (1991). Leadership for the twenty-first century. Greenwood, Westport, CT, 220 p.

Rundmo, T. & Hale, A.R. (2003). Managers' attitudes towards safety and accident prevention. Safety Science, 41, pp. 557–574.

Rundmo, T. (1992). Risk perception and safety on offshore petroleum platforms—part II: perceived risk, job stress and accidents. Safety Science, 15, pp. 53–68.

Safety in numbers (2003). Pointers for a Global Safety Culture at Work. International Labour Organisation, Geneva, 33 p Available: http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/publication/wcms_142840.pdf. Accessed on 10 June 2016.

Saksvik, P.Ø., Nytrö, K., Dahl-Jørgensen, C. & Mikkelsen, A. (2002). A process evaluation of individual and organisational occupational stress and health interventions. Work & Stress, 16(1), pp. 37-57.

Saksvik, P.Ø. & Quinlan, M. (2003). Regulating systematic occupational health and safety management: comparing the Norwegian and Australian experience. Relations Industrielles/Industrial Relations, 58, pp. 33-59.

Schabracq, M., Winnubst, J. & Cooper, C. (1996). Handbook of Work and Health Psychology. John Wiley, New York, 496 p.

Schaufeli, W.B. & Bakker, A.B. (2004). Job demands, job resources and their relationship with burnout and engagement: a multi-sample study. Journal of Organisational Behaviour, 25, pp. 293–315.

Schein, E.H. (2010). Organisational Culture and Leadership. Fourth edition. Jossey-Bass, San Francisco, 464 p.

Schoonenboom, J., Tattersall, C., Miao, Y., Stefanov, K. & Aleksieva-Petrova, A. (2007). A four-stage model for lifelong competence development. In: Proceedings of the second TENCompetence Open Workshop, Manchester, UK, 11th and 12th January 2007, pp. 131-136.

Shain, M. & Kramer, D.M. (2004). Health promotion in the workplace: framing the concept; reviewing the evidence. Occupational and Environmental Medicine, 61(7), pp. 643-648.

Shannon, H.S., Mayr, J. & Haines, T. (1997). Overview of the relationship between organisational and workplace factors and injury rates. Safety Science, 26(3), pp. 201-217.

Shields, P.M. & Rangarjan, N. (2013). A Playbook for Research Methods: Integrating Conceptual Frameworks and Project Management. New Forums Press, Stillwater, OK, 282 p.

SHRM (Society for Human Resource Management) 2008. Leadership Competencies. Society for Human Resource Management. Available: http://www.shrm.org/research/articles/articles/pages/leadershipcompetencies.aspx. Accessed on 10 June 2016.

Siegrist, J., Starke, D., Chandolab, T., Godinc, I., Marmot, M., Niedhammer, I. & Peter, R. (2004). The measurement of effort–reward imbalance at work: European comparisons. Social Science & Medicine, 58(8), pp. 1483-1499.

Sievänen, M., Nenonen, N. & Hämäläinen, P. (2013). Economic impacts of occupational health and safety interventions – a critical analysis based on the nine-box model of profitability. In: Proceedings of the 45th Annual International Conference of the Nordic Ergonomics and Human Factors Society (NES), August 11–14, 2013, Reykjavik, Iceland.

Simola, A. (2005). Turvallisuuden johtaminen esimiestyönä. Tapaustutkimus pitkäkestoisen kehittämishankkeen läpiviennistä teräksen jatkojalostustehtaassa (in Finnish). Doctoral dissertation. University of Oulu, Finland, 269 p.

Singh, J.V. (1986). Performance, slack, and risk taking in organisational decision making. Academy of Management Journal, 86(29), pp. 562-585.

Skagert, K. (2010). Leadership in human service organisations. Conceptions, strategies and preconditions to promote and maintain health at work. Doctoral dissertation. University of Gothenburg, Sweden, 66 p.

Smith, M.J. & Sainfort, P. (1989) A Balance Theory of Job Design for Stress Reduction. International Journal of Industrial Ergonomics, 4(1), pp. 67 – 79.

Smith, M.J., Cohen, H.H., Cohen, A. & Cleveland, R.J. (1978). Characteristics of successful safety programs. Journal of Safety Research, 10, pp. 5–15.

Sorensen, G., McLellan, D., Dennerlein, J.T., Pronk, N.P., Allen, J.D., Boden, L.I., Okechukwu, C.A., Hashimoto, D., Stoddard, A., & Wagner, G.R. (2013). Integration of health protection and health promotion: Rationale, indicators and metrics. Journal of Occupational and Environmental Medicine, 55(12 Suppl), S12-S18.

Stenbacka, C. (2001). Qualitative research requires quality concepts of its own. Management Decision, 39(7), pp. 551-556.

Stinghamber, F. & Vandenberghe, C. (2003). Organisations and supervisors as sources of support and targets of commitment: A longitudinal study. Journal of Organisational Behaviour, 24, pp. 251–270.

Stricoff, R.S. & Groover, D.R. (2012). The Manager's Guide to Workplace Safety. Behavioural Science Technology Inc., Ojai, California, 203 p.

Suikki, R., Tromstedt, R. & Haapasalo, H. (2006). Project management competence development framework in turbulent business environment. Technovation, 26, pp. 723–738.

Sutherland, V. & Cooper, C.L. (1991). Stress and Accidents in the Offshore Oil and Gas Industry. Gulf Publishing, Houston, TX, 227 p.

Swuste, P., van Gulijk, C. & Zwaard, W. (2010). Safety metaphors and theories, a review of the occupational safety literature of the US, UK and the Netherlands, till the first part of the 20th century. Safety Science, 48, pp. 1000-1018.

Syvänen, S. (2010). Evil eleven syndrome. Dark side of workplaces. Pressures at work and costs of non-interference. Doctoral dissertation. University of Tampere. VDM Verlag Dr. Müller Aktiengesellschaft & Co, Saarbrücken, Germany, 360 p.

Takala, J., Hämäläinen, P., Saarela, K.L., Yun, L.Y., Manickam, K., Jin, T.W., Heng, P., Tjong, C., Kheng, L.G., Lim, S. & Lin, G.S. (2014). Global Estimates of the Burden of Injury and Illness at Work in 2012. Journal of Occupational and Environmental Hygiene, 11, pp. 326-337.

Tappura, S. & Hämäläinen, P. (2011). Promoting occupational health, safety and well-being by training line managers. In: J. Lindfors, M. Savolainen & S. Väyrynen (Eds.),

Proceedings of the 43th Annual Nordic Ergonomics Society Conference (NES) 2011, September 18-21, 2011, Oulu, Finland, pp. 295-300.

Tappura, S. & Hämäläinen, P. (2012). The occupational health and safety training outline for the managers. In: P. Vink (Ed.), Advances in Social and Organisational Factors. Advances in Human Factors and Ergonomics Series, Vol. 9, Chapter 38. CRC Press, Taylor and Francis Group, 840 p., pp. 356-365.

Tappura, S. & Kivistö-Rahnasto, J. (2017). A framework for developing safety management competence. In: P.M. Arezes, J. Santos Baptista, M.P. Barroso, P. Carneiro, P. Cordeiro, N. Costa, R.B. Melo, A.S. Miguel & G. Perestrelo (Eds.), Occupational Safety and Hygiene V: Selected papers from the International Symposium on Occupational Safety and Hygiene (SHO 2017), April 10-11, 2017, Guimarães, Portugal. CRC Press, Taylor & Francis, 608 p., pp. 47-52.

Tappura, S. & Nenonen, N. (2014). Safety leadership competence and organizational safety performance. In: P. Arezes & P. Carvalho (Eds.), Advances in Safety Management and Human Factors. Advances in Human Factors and Ergonomics 2014, Vol. 10, Section 3. Proceedings of the 5th AHFE Conference, July 19-23, 2014, pp. 129-138.

Tappura, S. & Nenonen, N. (2016). Categorization of effective safety leadership facets. In: P. Arezes & P. Carvalho (Eds.), Ergonomics and Human Factors in Safety Management. CRC Press, Taylor & Francis Group, Boca Raton, 403 p., pp. 367-383.

Tappura, S., Hyytinen, T., Kivistö-Rahnasto, J., Nenonen, N. & Vasara, J. (2015b) Turvallisuuden johtajat – Esimiesten johtajuus, osaaminen ja sitoutuminen. Loppuraportti (in Finnish). Tampere University of Technology, Finland.

Tappura, S., Nenonen, N., Heikkilä, J. Reiman, T., Rasa, P.-L. & Ratilainen, H. (2013). Estimating overall costs of occupational accidents in the Finnish industry. In: Proceedings of the 45th Annual International Conference of the Nordic Ergonomics and Human Factors Society (NES), August 11–14, 2013, Reykjavik, Iceland.

Tappura, S., Nenonen, N. & Kivistö-Rahnasto (2017). Managers' viewpoint on factors influencing their commitment to safety: an empirical investigation in five Finnish industrial organisations. Safety Science, 96, pp. 52-61.

Tappura, S., Sievänen, M., Jussila, A., Heikkilä, J. & Nenonen, N. (2015a). A management accounting perspective on safety. Safety Science, 71 Part B, pp. 151-159.

Tappura, S., Syvänen, S. & Saarela, K.L. (2014). Challenges and Needs for Support in Managing Occupational Health and Safety from Managers' Viewpoints. Nordic Journal of working life studies, 4(3), 31-51.

Tappura, S., Teperi, A.-M. & Kivistö-Rahnasto, J. (2016). Safety management tasks at different management levels. In: J. Kantola, T. Barath, S. Nazir & T. Andre (Eds.), Advances in Human Factors, Business Management, Training and Education, Proceeding of the AHFE 2016 International Conference on Human Factors, Business Management and Society, July 27-31, 2016, Walt Disney World, Florida, USA, 1284 p., pp. 1147-1157.

Tarkkonen, J. (2016). "Näin on tehty ennenkin". Tutkimus turvallisuuden ja tyhyvinvoinnin kokonaishallintaa estävistä ja vaikuttavista uskomuksista (in Finnish). Doctoral dissertation. University of Lapland, Finland, 290 p.

Teperi, A.-M. (2012). Improving the mastery of human factors in a safety critical ATM organisation. Doctoral dissertation. Cognitive Science, Institute of Behavioural Sciences, University of Helsinki, Finland, 83 p.

Teperi, A.-M. & Leppänen, A. (2011). Managers' conceptions regarding human factors in air traffic management and in airport operations. Safety Science, 49, pp. 438-449.

Theorell, T. & Karasek, R.A. (1996). Current issues relating to psychosocial job strain and cardiovascular disease research. Journal of Occupational Health Psychology, 1(1), pp. 9-26.

Thiele-Schwarz, von, U., Hansson, H. & Tafvelin, S. (2016). Leadership training as an occupational health intervention: Improved safety and sustained productivity. Safety Science, 81, pp. 35–45.

de Tomer, J.F. (1987). Organisational Capital: The Path to Higher Productivity and Well-being. Praeger, New York, 205 p.

Tompa, E., Verbeek, J., van Tulder, M. & de Boer, A. (2010). Developing guidelines for good practice in the economic evaluation of occupational safety and health interventions. Scandinavian Journal of Work, Environment and Health, 36, pp. 313–318.

Törner, M. (2011). The ''social-physiology'' of safety. An integrative approach to understanding organisational psychological mechanisms behind safety performance. Safety Science, 49(8), pp. 1262–1269.

Törner, M. & Pousette, A. (2009). Safety in construction -A comprehensive description of the characteristics of high safety standards in construction work, from the combined

perspective of supervisors and experienced workers. Journal of Safety Research, 40, pp. 399-409.

Uegaki, K., de Bruijne, M.C., Lambeek, L., Anema, J.R., van der Beek, A.J., van Mechelen, W. & van Tulder, M.W. (2010). Economic evaluations of occupational health interventions from a corporate perspective – a systematic review of methodological quality. Scandinavian Journal of Work, Environment and Health, 36, pp. 273–288.

Wachter, J.K. & Yorio, P.L. 2014. A system of safety management practices and worker engagement for reducing and preventing accidents: An empirical and theoretical investigation. Accident Analysis & Prevention, 68, pp. 117-130.

Vahtera, J., Kivimäki, M., Pentti, J. & Theorell, T. (2000). Effect of change in the psychosocial work environment on sickness absence: a seven year follow up of initially healthy employees. Journal of Epidemiology & Community Health, 54, pp. 484-493.

Weick, K.E. (1998). Foresights of failure: an appreciation of Barry Turner. Journal of contingencies and Crisis Management, 6, pp. 72−75.

Veltri, A., Pagell, M., Johnston, D., Tompa, E., Robson, L., Amick III, B.C., Hogg-Johnson, S. & Macdonald, S. (2013). Understanding safety in the context of business operations: An exploratory study using case studies. Safety Science, 55, pp. 119-134.

White, R., Hodgson, P. & Crainer, S. (1996). The Future of Leadership. Riding the Corporate Rapids into the 21st Century. Pitman, USA, 252 p.

WHO (World Health Organisation) (1986). The Ottawa Charter for Health Promotion. The International Conference on Health Promotion, 17–21 November, World Health Organisation, Ottawa, Canada.

WHO (2002). Good Practice in Occupational Health Services – A Contribution to Workplace Health. World Health Organisation, Geneva, Switzerland, 92 p. Available: http://www.euro.who.int/__data/assets/pdf_file/0007/115486/E77650.pdf. Accessed on June 10 2016.

WHO (2010a). Milestones in Health Promotion. Statements from Global Conferences. World Health Organisation, Geneva, Switzerland, 42 p.

WHO (2010b). Healthy workplaces: a model for action for employers, workers, policy makers and practitioners. World Health Organisation, Geneva, Switzerland, 32 p. Available:
http://www.who.int/occupational_health/publications/healthy_workplaces_model.pdf. Accessed on 10 June 2016.

Viitala, R. (2005). Perceived development needs of managers compared to an integrated management competency model. Journal of Workplace Learning, 17(7), pp. 436-451.

Williams, J.H. (2002). Improving safety leadership: Using industrial/organisational psychology to enhance safety performance. Professional Safety, 47(4), pp. 43–47.

Vinodkumar, M.N. & Bhasi, M. (2011). A study on the impact of management system certification on safety management. Safety Science, 49(3), pp. 498–507.

Vredenburgh, A.G. (2002). Organisational safety: Which management practices are most effective in reducing employee injury rates? Journal of Safety Research, 33, pp. 259-276.

Wu, T.-C., Chen, C.-H. & Li, C.-C. (2008). A correlation among safety leadership, safety climate and safety performance. Journal of Loss Prevention in the Process Industries, 21, pp. 307–318.

Väänänen, A., Kalimo, R., Toppinen-Tanner, S., Mutanen, P. Peiró, J.M., Kivimäki, M. & Vahtera, J. (2004). Role clarity, fairness, and organisational climate as predictors of sickness absence. A prospective study in the private sector. Scandinavian Journal of Public Health, 32, pp. 426–434.

Yassi, A. (1998). Utilizing data systems to develop and monitor occupational health programs in a large Canadian hospital. Methods of Information in Medicine, 37, pp. 125-129.

Yeow, P.H. & Sen, R.N. (2003). Quality, productivity, occupational health and safety and cost effectiveness of ergonomic improvements in the test workstations of an electronic factory. International Journal of Industrial Ergonomics, 32(3), pp. 147–163.

Yorio, P.L. & Wachter, J.K. (2013). The impact of human performance focused safety and health management practices on injury and illness rates: Do size and industry matter? Safety Science, 62, pp. 157–167.

Yukl, G. (1989). Managerial Leadership: A Review of Theory and Research. Journal of Management, 15(2), pp. 251-289.

Yukl, G. (2008). How leaders influence organisational effectiveness. The Leadership Quartely, 19, pp. 708-722.

Yukl, G. (2010). Leadership in organisations. Seventh edition. Pearson Education Inc., New Jersey, 629 p.

Yukl, G. & Lepsinger, R. (2005). Why Integrating the Leading and Managing Roles Is Essential for Organisational Effectiveness? Organisational Dynamics, 34(4), pp. 361–375.

Zacharatos, A., Barling, J. & Iverson, R.D. (2005). High-performance work systems and occupational safety. Journal of Applied Psychology, 90, pp. 77-93.

Zanko, M. & Dawson, P. (2012). Occupational health and safety management in organisations: a review. International Journal of Management Reviews, 14, pp. 328–344.

Zohar, D. (1980). Safety climate in industrial organisations: Theoretical and applied implications. Journal of Applied Psychology, 65(1), pp. 96-102.

Zohar, D. (2002a). The effects of leadership dimensions, safety climate, and assigned priorities on minor injuries in work groups. Journal of Organisational Behaviour, 23, pp. 75–92.

Zohar, D. (2002b). Modifying supervisory practices to improve subunit safety: A leadership-based intervention model. Journal of Applied Psychology, 87, pp. 156–163.

Zohar, D. (2003). Safety climate: conceptual and measurement issues. In: J.C. Quick & L.E. Tetrick (Eds), Handbook of occupational health psychology. American Psychological Association, xvii, Washington, DC, US, 475 p, pp. 123-142.

Zohar, D. (2010). Thirty years of safety climate research: Reflections and future directions. Accident Analysis & Prevention, 42(5), pp. 1517–1522.

Zohar, D. & Luria, G. (2003). The use of supervisory practices as leverage to improve safety behaviour: A cross-level intervention model. Journal of Safety Research, 34, pp. 567–577.

Zohar, D. & Luria, G. (2004). Climate as a social-cognitive construction of supervisory safety practices: Scripts as proxy of behaviour patterns. Journal of Applied Psychology, 89(2), pp. 322–333.

Zutshi, A. & Sohal, A.S. (2005). Integrated management system: The experiences of three Australian organisations. Journal of Manufacturing Technology Management, 16, pp. 211-232.

Appendix 1. A conceptual framework of organisational measures to support managers in OHS management

Major section	Description	Practical organisational measures
Top management support	Providing resources, support and guidance on OHS management	Power and responsibilities are in sync Defining OHS responsibilities and tasks Expressing OHS as a necessity and a value Expressing a visible commitment to OHS Motivating managers' OHS commitment Reducing the managerial workload Defining OHS management expectations and goals Highlighting the economic effects of OHS Emphasising a health-promoting culture Initiating OHS programmes and investments Actively communicating OHS issues in various situations Actively participating in OHS activities (e.g. safety walks) Ensuring managers' OHS capability Monitoring OHS goals Communicating achievements and the positive effects of OHS Recognising good OHS work Emphasising managers' accountability for OHS Support in mandatory OHS requirements
OHS procedures	Advancing uniform and simple OHS procedures and tools	Comprehensive enforcement of the OHS procedures Support for managing psychosocial risks Evaluating and prioritising employees' workload Time for discussion in the work community Handling of employees' reduced work ability Handling of inappropriate work behaviour and conflicts Providing feedback Support from superior Support from other managers Support from OHS, HR and legal professionals Visible OHS goals and achievements Ensuring the fair treatment of all managers Clear warning procedures Warning procedures also in use for managers Managers participate in internal OHS audits Competitions and campaigns
OHS management development	Systematically developing OHS management practices as a part of management development	Increasing managers' OHS awareness and attitudes Orientation procedure includes OHS issues Development of leadership behaviour and skills Development of interaction skills Systematic OHS competence development Regular OHS training and workshops Development discussions include OHS issues