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Factors Affecting the Development of Safety Management Programmes in the Construction Industry: A Systematic Literature Review

Abdallah M. O.Amslak [1*] and Eeydzah binti Aminudin[2]

1 School of Civil Engineering, Faculty of Engineering, Universiti Teknologi Malaysia, Johor Bahru 81310, Malaysia
1. **abdallahmeask@gmail.com**
2. **eeydzah@utm.my**

ABSTRACT

The construction industry has long been plagued with a poor safety record. The effective implementation of safety programmes is one of the best methods of lowering the number of accidents at construction sites. However, despite the technical and technological advances that have been made, serious accidents still occur due to human error and failure to follow safety instructions. Nevertheless, there is a lack of critical reviews and bibliographic analyses that investigate the factors affecting the development of safety protocols in the construction industry. Therefore, this study analysed the current state of safety management research as well as determined the factors affecting the development of safety systems in the construction industry via a critical literature review of the safety management field. The findings were split into six main categories that directly impact behaviour-based safety at construction sites. As each category had its own variables, there were a total of 23 variables for all six factors. The research framework that was developed facilitated the evaluation of the effectiveness of the construction industry, identified weaknesses, and established preventive measures by controlling the behaviour-based safety of employees.

Keywords: Safety management**; Management commitment** to safety**;** Construction industry**; Safety behaviour.**

1.1 Introduction

Safety shortcomings are a global issue that cause expensive losses. According to Driscoll et al. (2020), an estimated 1.53 million deaths can be attributed to poor safety management globally. This high number of occupational accidents have caused estimated losses of $2.8 trillion in gross domestic product (GDP) globally (Adei et al., 2021). Therefore, workplace safety is a top priority as it has significant social and economic implications. A review of the existing literature revealed that the integration of organisational and human factors plays a fundamental role in the development of safety in the workplace. As employees are the last barrier to risks, altering their behaviour is crucial to avoid both material and personal damages. However, the unsafe behaviours of workers are frequently caused by the latent failures of organisations and their management systems as it predisposes workers to act without regard for safety.

These failures include a lack of instructions and adequate training (Álvarez-Santos et al., 2018), a lack of motivation (Khan et al., 2021), the absence of work procedures (Størkersen, 2021), incorrectly designed tasks (Demasi et al., 2018), a lack of control (Read et al., 2019), a lack of managerial commitment to safety (Stackhouse & Turner, 2019), and the absence of adequate safety management systems (Yiu et al., 2019). As such, the focus of accident prevention has shifted from technical and human errors to the activities and processes of safety management. A safety management system reflects the level of commitment that an organisation has in preventing occupational accidents and diseases. It is considered a precedent of its safety climate, which is a set of attitudes and perceptions that its employees have about the importance that the organisation places on safety (DeJoy et al., 2004).

The more developed the safety management system of an organisation, the more positive the risk attitude of its workers, and the safer their behaviours. As a safety management system integrates a set of policies and procedures to reduce occupational risks, imparting good intentions into this system helps efficiently achieve the desired level of security as it provides a means with which to control and direct the way that employees perform their activities. Therefore, determining the method that an organisation uses to develop its safety management system is vital as it has a significant direct and indirect impact on its accident rate.

This present review examined extant studies that analysed the policies and practices of effective safety management systems and their implementation processes (Mitchison & Papadakis, 1999, Li & Guldenmund, 2018, Cheng, 2019, Makka et al., 2021). However, the organisational characteristics that facilitate the implementation of effective safety management systems have been rarely analysed, except for variables related to quality management and environmental management. Therefore, this present review aimed to identify the factors that affect the development of safety management systems in the construction industry.

1.2 Safety Management in the Construction Industry

An occupational health and safety system is a set of stages that have been merged into a continuous process that allows an idea to be implemented in an orderly manner until improvements are seen (Dahler-Larsen et al., 2020). Organisations accomplish these objectives through a series of strategies. This includes process optimisations, the focused approach of its management, the disciplinary thoughts of its members in analysing the idea, and the implementation of improvements until good results are achieved. Libyan construction projects have been found to lack adequate implementation of occupational health and safety systems (Blaou et al., 2019). This is primarily due to a lack of health- and safety-related knowledge as well as a lack of applying compulsory safety standards during construction (Hassan, 2019). An example of this would be a health and safety plan that contains the technical and administrative mechanisms necessary to guarantee the physical integrity and health of workers and third parties during the execution of planned activities. Failure to adequately implement and manage health and safety at project sites also significantly increases production costs (Omran et al., 2020), reduces productivity (Alfakhri et al., 2018), reduces quality (Abudulnabi, 2018), and increases non-compliance with the delivery deadlines of the finished work (Alfakhri et al., 2018); all of which translate into the loss of competitiveness for an organisation.

Current regulations include essential and minimum safety considerations that should be taken into account during construction activities (Alzohbi et al., 2018). However, these regulations do not fully detail the procedures to be followed nor are they compulsory. This lack of compliance is even more evident in rural areas, where the topography is very rugged; increasing the difficulty of activities and the risks associated with the project. Therefore, it is important to include the safety and health of workers when developing a project as the main objective of any organisation should be to offer its employees a safe and risk-free work environment. The cost of implementing an occupational safety and health (OSH) plan should also be estimated and included when developing the budget of a project. Furthermore, the situation and state of the OSH plan should be analysed and finalised to implement an effective system as well as determine if the proposed plan is executed, inefficient, or will remain unused at project sites.

Health in operational jobs refers to how well the implemented plan serves with responsibility, efficiency and control being predominant characteristics (Sinyai & Choi, 2020). Accidents, incidents, and other unwelcome situations that exclusively affect the normal development of operation activities may arise during construction. Therefore, the activities of a safety plan should, generally, include actions that keep the physical condition of the different elements of a project in good working order as well as anticipate and solve problems as they arise, thereby, guaranteeing a safe work environment.

An OSH plan consists of a set of multidisciplinary activities that promote, educate, prevent, control, recover, and rehabilitate workers to protect them from occupational risks and places them in a work environment based on their physiological needs. The plan must promote and prioritise the physical, mental, and social wellbeing of its worker via planned actions at establish a satisfactory relationship between the workers, the project, and the environment (Fagan & Hodgson, 2017). The OSH process emphasises identifying and controlling the risk agents of a psychosocial environment. To comply with occupational health standards, the national and private policies that an organisation formulates must adhere to the legal guidelines. Therefore, in order to develop an optimal OSH plan, the regulations of major occupational health organisations; such as the International Labor Organization (ILO), the Occupational Safety and Health Administration (OSHA), and the National Institute for Occupational Safety and Health (NIOSH); should be implemented (Yu et al., 2017).

1.3 Research Methods

Review papers are written after a systematic literature evaluation using a logical and exact structure that can be reproduced to act as a standalone document (Massaro et al. 2016; Ali et al, 2021). This reduces bias and logical errors that arise from subjective evaluations and views. Therefore, from a scientific standpoint, a systematic review is crucial to provide a basic understanding of past research, to contribute fresh information to the database, highlight existing difficulties, and propose potential future directions (Ali et al, 2021).

A literature review was conducted in several stages to identify the determinants of safety management in the

construction industry. In the first stage, extant studies that were 1) scientific and relevant, 2) published in English, and 3) subjected to peer review were gathered then evaluated according to the specific criteria required to achieve the research objectives (Ali et al, 2021). Keywords; such as "Management commitment" OR "Safety management practices" OR "Safety behaviour" OR "Safety climate" OR "Safety culture" OR "Safety training" AND "Safety regulations"; were searched on a selected few reputable databases; such as Elsevier, Emerald Insight, the Institute of Electrical and Electronics Engineers Xplore (IEEE Xplore), Springer, Taylor & Francis Online, and Wiley Online Library; as they ensured the reliability of the extracted literature with a high degree of certainty. This is because the papers published by these databases are subjected to several review phases to ensure high quality information, thereby, reducing the distortion of the information process. In the second stage, only papers published between 2015 and 2020 were retrieved as the technology used for safety management in the construction industry rapidly developed during this period. In the third stage, Publish or Perish version 7 was used to retrieve the resources of key aspects that had been identified in the study; i.e., "development construction safety management". The Publish or Perish version 7 software provides researchers with simultaneous access to the Elsevier, Emerald Insight, IEEE Xplore, Springer, Taylor & Francis Online, and Wiley Online Library databases. Furthermore, as the software saves the obtained results as a research information systems (RIS) file, it contains important information; such as the year of publication, names of the authors, the title of the publication, the name of the publisher, and an abstract of the publication. This information is ideal for further analysis as it visualises the trend of literature in the field of developing safety management systems in the construction industry. All the papers retrieved from these databases were filtered using three criteria: (1) peer reviewed and written in English, (2) primarily focuses on safety management in the construction industry, and (3) used a quantitative approach. Technical papers, conference papers, and book chapters were excluded from this present review. The key elements of the inclusion criteria are shown in Table 1.

Inclusion criteria for the literature review. (Source: Authors.)

No	Criteria	Description
1	Databases	Elsevier, Emerald Insight, IEEE Xplore, Springer, Taylor & Francis, and Wiley
2	Title	Identification as a new research, meta-analysis, or both
3	Topic	Safety management in the construction industry
4	Timeline	Published between 2015-2021
5	Research	Only empirical studies that used quantitative approaches were included
6	Transparency	Clarity of the research method and approach of previous studies, in terms of sample sizes and instruments, and tools used in the analyses
7	Reliability and Validity	Valid and reliable outcomes literature that are consistent with the type of study and publication indexes.

1.3.1 Study selection

Extant studies that were relevant to this present review were selected using the four phases stated above. Two software programmes were used to retrieve the relevant studies. Publish or Perish version 7 retrieved a total of 1,000 studies that met the reliability requirements from the selected databases. These studies were then scanned to exclude studies (1) that were not written in English, (2) that were technical papers, conference papers, or book chapters, and (3) whose scope was not the construction industry. A total of 565 studies that did not meet the required criteria were excluded. A further 352 studies were excluded as they were irrelevant to the main subject of this present review. Figure 1 depicts the review process.

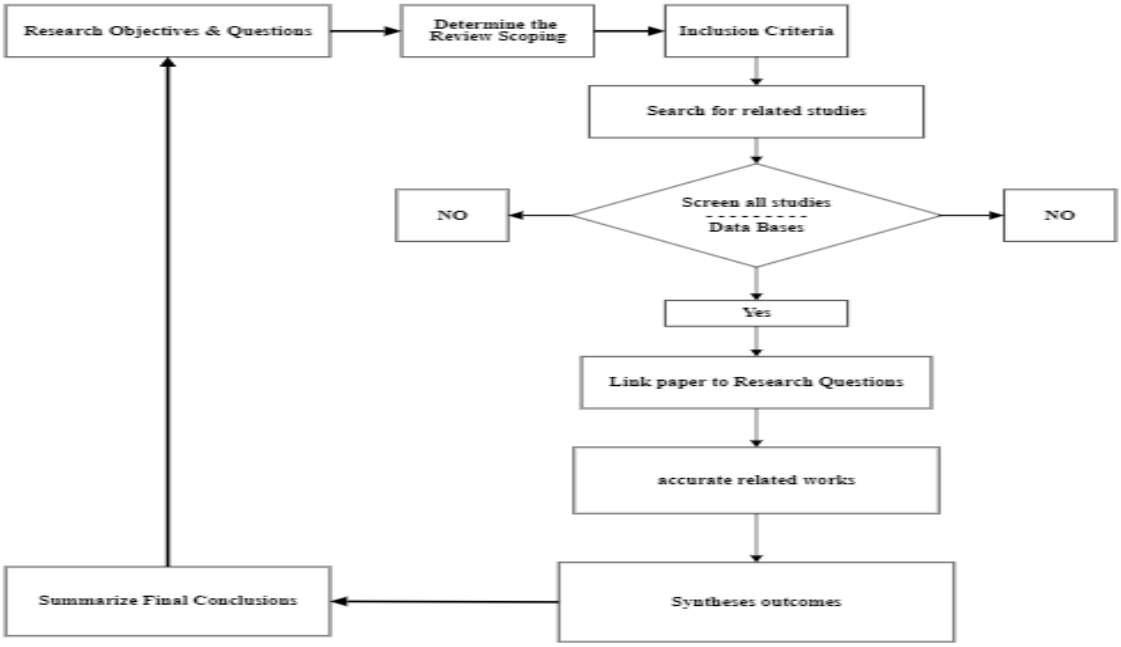

Figure 1. The review process, which was consistent with that of Ali et al. (2021).

1.3.2 Data extraction

The retrieved raw data was analysed to identify the factors affecting the development of safety management protocols in the construction industry. The primary focus of this analysis was to identify measurable determinants within the Libyan construction industry as well as determinants that have received more attention within the literature in recent times as this would help identify gaps within the current literature.

As seen in Table 1, only studies published between 2016 to 2020 were shortlisted for inclusion in this present review. These 75 studies were categorised according to the main subject investigated, which was grouped into seven determinants (Table 2). The full-text version of each study was evaluated. This helped visualise how each determinant was measured, which benefited the methodology design of this present review. Sections 1.3.2 to 1.3.8 provide a summary and discuss the studies that correlate to each determinant.

Table 1: Published studies categorised according to determinants

No.	Determinant	Dimensions	Published studies
1	Management commitment	1. Affective commitment 2. Continuance commitment 3. Normative commitment	11
2	Safety regulations	1. Formal 2. Non-formal	8
3	Safety management practices	1. Management commitment 2. Safety training 3. Workers' involvement 4. Safety communication 5. Safety regulation 6. Safety promotion policies	7
4	Safety behaviour	1. Situational behaviour 2. Compulsive behaviour 3. Cognitive behaviour	14
5	Safety climate	1. Support 2. Goals 3. Innovation	18

		4. Rules	
6	Safety culture	1. Management Demonstration 2. Planning and Organising for Safety. 3. Communication, Trust, and Responsibility 4. Measuring, Auditing and Reviewing	17
Total			**75**

1.4 Components of Safety Management

1.4.1 Management commitment

According to Amponsah-Tawiah and Mensah (2016b), management commitment refers to the amount of attention that an organisation pays to safety practices which, in turn, improves the safety of its employees. Jiang and Wong (2016) believe that management commitment towards employee safety is a responsibility that every organisation owes to society. Meanwhile, Jitwasinkul et al. (2016) posit that, as management commitment affects employee commitment towards safety practices, improving management commitment will lead to effective employee commitment. Organisations must protect their employees to develop a truly healthy work environment. This includes adopting an occupational risk system because it ensures that workers are protected when faced with work-related situations that put their health or life at risk, not because it is a legal obligation. An occupational risk system also reduces the likelihood of organisations having to make expensive payments to cover the health-related emergencies, disability, or death of its workers from occupational accidents or diseases.

Employers and contractors must adhere to high safety standards as well as enact policies and actions that a foster healthy work environment that keeps workers free from injury and illness (Newaz et al., 2018). This requires workers to change their habits and adopt self-care actions as well as healthy and safe habits at work. Management commitment is essential during this process as it strengthens the culture of prevention and controls workplace-associated risks to improve the health and quality of life of its workers which, in turn, reduces the frequency and severity of occupational accidents and diseases (Mashi et al., 2018).

To successfully implement a preventive plan, it must be fully integrated into the overall action plan of the organisation. Furthermore, its objectives must be consistent with that of the organisation's general objectives and in complete coordination with the objectives and plans of other areas and functions (Jiang & Wong, 2016). A strategic plan considers the levels of the objectives to be achieved in a generic sense as well as the priorities and general lines of action within the real possibilities of an organisation. It is a long-term forecast, of five years or more, that broadly defines policies, procedures, and methods without going into too much detail. A prevention policy, on the other hand, is a documented declaration of principles that express the commitment of the management to safety and the criteria that inspire their actions (Amponsah-Tawiah & Mensah, 2016a). This also helps with decision making. A general policy that compliments the preventive function should also be defined. This general policy should also be dividable into sub-policies that cover all the actions that an organisation needs to take in this matter. For instance, basic actions; such as identifying risks, acquiring protective clothing, and drafting safety regulations; should be defined within the general policy. As these basic actions are different stages of a sub-policy and actionable by different individuals, the instruction documents should follow a standardised format and defined circulation channels. For example, a preventive inspection plan for all the dependents of an organisation or part of its accident notification system. This creates a standardised and practical method of executing an operation even if it is performed by different individuals. For instance, the method of collecting environmental samples in the field and collating accident statistics.

1.4.2 Safety regulations

Safety regulations are policies that have been set by external parties; such as government bodies or professional organisations; or internally by the management of an organisation (Oke et al., 2017). Safety regulations should define policies, procedures, and methods. Prevention policies should read like guidelines (Chang et al., 2016) and are a documented declaration of principles that express the commitment of the management to safety and the criteria that inspire their actions.

A general policy that compliments the preventive function should also be defined and be dividable into sub-policies that cover all the actions of an organisation in safety-

related matters (Wang et al., 2018). For instance, in the construction industry, basic actions; such as identifying risks, acquiring protective clothing, and drafting safety regulations; could be defined within the general policy. As these basic actions are different stages of a sub-policy and actionable by different individuals, the instruction documents should follow a standardised format and defined circulation channels (Salmon et al., 2018). For example, a preventive inspection plan for all the dependents of an organisation or part of its accident notification system. This creates a standardised and practical method of executing an operation even if it is performed by different individuals.

Fang et al. (2018) studied the factors affecting fall-related construction-worker fatalities at the tallest construction projects in China and reported that enforcing regulations improved the use of personal protective equipment among workers. Therefore, regulations in response to such incidents should be planned and implemented. Furthermore, response procedures should be tested and analysed periodically and, if necessary, reported after incidents or emergencies have occurred particularly. Health service providers must also be ready to respond to a plethora of emergency situations. According to Aryal et al. (2017), the surveillance and control of workplace safety and health regulations include the internal and external procedures of an organisation. This allow safety- and health-related results to be achieved as they are regularly evaluated.

The Libyan Ministry of Labour recommends that verification procedures should be established to monitor and measure the performance of a system to achieve the most suitable handling of non-conformities. The International Labor Organization, however, states that all procedures should be developed, established, and periodically reviewed at this stage. These procedures should also be defined at different levels of management. The process should allow the identification of failures or deficiencies in the Occupational Health Safety Management System (OHSMS) and maintain records of the review and the adoption of preventive and corrective measures to eliminate or control work-related hazards in the future.

According to Chen et al. (2017), the purpose of monitoring and measuring is to incorporate information into decision-making by effectively implementing surveillance processes; such as tracking health and environmental data; into occupational health strategy and interventions. Furthermore, information should be provided promptly to facilitate analyses with which to determine the frequency of incidences as well as support the planning of health programmes by identifying important health and disease issues that warrant specific interventions. Therefore, after priorities are generated, the causal agents of occupational risk, disease transmission, and fatal diseases should be determined.

1.4.3 Safety management practices

Cheng et al. (2012) describes safety management practices as a process within the construction industry that is a "series of activities that help comprehend, avoid, and inspect unsafe activities and hazards". The study extracted 15 safety management practices in the construction industry and examined their correlation with the performance of construction projects. The findings of the study confirmed a significant correlation between the safety management practices and performance of construction projects. According to Subramaniam et al. (2016), good practices can be used in different contexts to recommend methods of executing an activity and can serve as a model for other organisations. The term "good practices" included any experience that was guided by characteristics or objectives and suitable procedures or prototypes that addressed a specific need. It also encompassed any experience that successfully prevented risks. This was taken to demonstrate the validity and usefulness of these good practices in a specific context.

Subramaniam et al. (2016) also identified six safety management practices; management commitment, safety training, the involvement of workers, safety communication, safety regulation, and safety promotion policies. The ability of these six practices to improve safety compliance was mediated via safety-based participation in small and medium projects. These six practices were found to have a significant impact on the safety compliance of the workers, which was partially mediated by worker participation. Therefore, promoting the adoption of good practices in occupational safety and health directly correlates with the current approaches in terms of technical relevance and efficiency of interventions. This encompasses not only the management system but satisfies the needs of an organisation in terms of the identification, assessment of hazards, and the controls that are implemented to mitigate risks.

Spurgeon et al. (2019) investigated the safety management practices of the civil aviation and the nuclear industries, both of which are critical industries with very few work-related incidents. The study examined the key strategies that these types of industries have adopted to successfully reduce the risk of incidents. The findings of the study could help other industries; such as healthcare and construction; adopt these strategies.

Therefore, organisations that adopt good practices are more successful as they indicate to their workers that they are committed to their health and wellbeing. Such

organisations also report higher rates of worker happiness, well-being, and productivity. This is accomplished by strengthening the soft skills of their workers and managing knowledge by addressing and strengthening strategic, technical, educational, and communication methods. The adoption of good practices also helps organisations remain competitive and active in the face of market demands. Therefore, by managing tacit and explicit knowledge, this knowledge is expected to be socialised, internalised, and externalised. When combined with good practices, this knowledge can be converted into a technical and systemic reality in occupational health and safety.

1.4.4 Safety behaviour

Helbig-Lang and Petermann (2010) define safety behaviour according to function and divided into three types of behaviours; situational, compulsive, and cognitive. These functions produce behaviours that correspond to situations that cause safety anxiety in the workplace.

Asilian-Mahabadi et al. (2020) developed 12 items that represent worker behaviour in the construction industry. These measurements indicate the extent to which worker behaviour affects safety development. To develop a truly healthy work environment, an organisation must protect its employees. This includes adopting an occupational risk system not only because it is a legal obligation but because it guarantees that workers are not left helpless in the face of work-related situations that put their health or life at risk. It also reduces the likelihood of organisations having to make expensive payments to cover the health-related emergencies, disability, or death of its workers from occupational accidents or diseases. Employers and contractors must adhere to high safety standards as well as enact policies and actions that a foster healthy work environment that keeps workers free from injury and illness. This requires workers to change their habits and adopt self-care actions as well as healthy and safe habits at work. Therefore, the behaviours of individuals are essential during this process as it strengthens the culture of prevention and controls workplace-associated risks to improve the health and quality of life of its workers which, in turn, reduces the frequency and severity of occupational accidents and diseases.

Mohammadfam et al. (2017) found that factors; such as management commitment, safety training, the involvement of workers, safety communication, safety regulation, and safety promotion policies; significantly improve the safety behaviour of workers within the construction industry. Therefore, all workers must be made aware of their obligations and rights within the general occupational risks system. They also need to actively participate in programmes, training sessions, and activities that their organisations design. This is because risks, injuries, and occupational accidents can be prevented by applying appropriate knowledge and strategies in the work environment. However, safety behaviour in the workplace is not a fixed concept. Over the years, its definition has evolved along with the changes in the conditions and circumstances in workplaces. Factors, such as technological progress as well as social, political, and economic conditions, have a considerable influence on the safety and hygiene objectives of each country.

1.4.5 Safety climate

Mohammadfam et al. (2017) defines safety climate as “an emphasis on flexibility with a focus on the internal organisation, which means that the organisation emphasises the workers' well-being, teamwork, and participation in safety issues. The main goal is to work safely”. The safety climate can be segregated into four dimensions; support, goals, innovation, and rules.

According to Kamali et al. (2018), an essential principle of the safety climate is the establishment of responsibility via a hierarchical management structure. It also requires the participation of all workers from every level of an organisation, with defined responsibilities for organisational safety and health. Employers should define the competencies required for each job position and adopt measures to ensure that every worker in the organisation is qualified to assume health- and safety-related duties and obligations. Training programmes should also be conducted to achieve and maintain the established competencies.

Zhang et al. (2016) explains that a comprehensive approach to industrial safety requires setting techniques that aim to prevent accidents. However, the emphasis on industrial safety has changed over time and little attention has been paid to safeguarding worker health. Indeed, it was long believed that an accident was the responsibility of an employee and not the employer. Construction companies with stable organisational climates have internal policies that protect workers from work-related accidents. This is because the construction industry prioritises the health and safety of its workers as they are a vital factor in the successful execution of a project. Furthermore, the physical, social, and mental wellbeing of its workers are the primary factors that guarantee stability and productive business growth.

1.4.6 Safety culture

Noort et al. (2016) describes safety culture as the “safety-related facet of organisational culture" and believes that

"conceptualisations of safety culture in literature on organisational psychology focuses on how shared norms and values shape safety practices." This definition is similar to the safety culture dimensions that Reader et al. (2015) proposes, which categorises safety culture into five dimensions; management commitment, incident reporting practices, collaborative activities, and communication on safety. Meanwhile, Gordon et al. (2007) outlined four themes with which to measure safety culture; management demonstration; planning and organising for safety; communication, trust, and responsibility; and measuring, auditing, and reviewing. These categories attempt to create a distinction between safety culture and safety climate, which remains disputed in the literature. This is because safety climate is considered the sum of common safety perceptions that the employees share.

In recent years, the prevention of occupational hazards has been recognised as one of the most appropriate methods of improving working conditions and the general quality of life in Libya. The policies that have been enacted to address these occupational hazards are also promulgated by the Libyan administration and supported by organisations. Furthermore, these policies have not only become increasingly strict over the years but have broadened the conception of risks and focus on accident and illness factors that hitherto went unnoticed. Nevertheless, construction projects, particularly those conducted "on site", continue to report the highest number of occupational accidents in Libya. This is because the necessary safety measures often remain unadopted either due to ignorance, economic factors, or the culture itself. According to Douglas and Wildavsky (1982), culture is the principle code by which dangers are recognised. It also conditions the way that risks are perceived. Apart from that, culture also highlights the role of social interaction as the subject is embedded in networks of social ties. Therefore, a reputation for recklessness, baseness, madness, or cowardice affects the strength of these ties. As such, to understand this phenomenon, we must consider that a set of customs, values, and ideas are generated and fed back into society at the different positions that a subject occupies in an organisation; i.e., the work environment. This is termed the "work culture". Seifi Azad Mard et al. (2017) is also predisposed to concrete perceptions of risk. Therefore, this present review examined the reality of these events and identified their causes by focusing on the difficulties that arise when adopting preventive measures. Figure 2 shows the architecture of the safety management components within the pertinent constructs surrounding the dominating components.

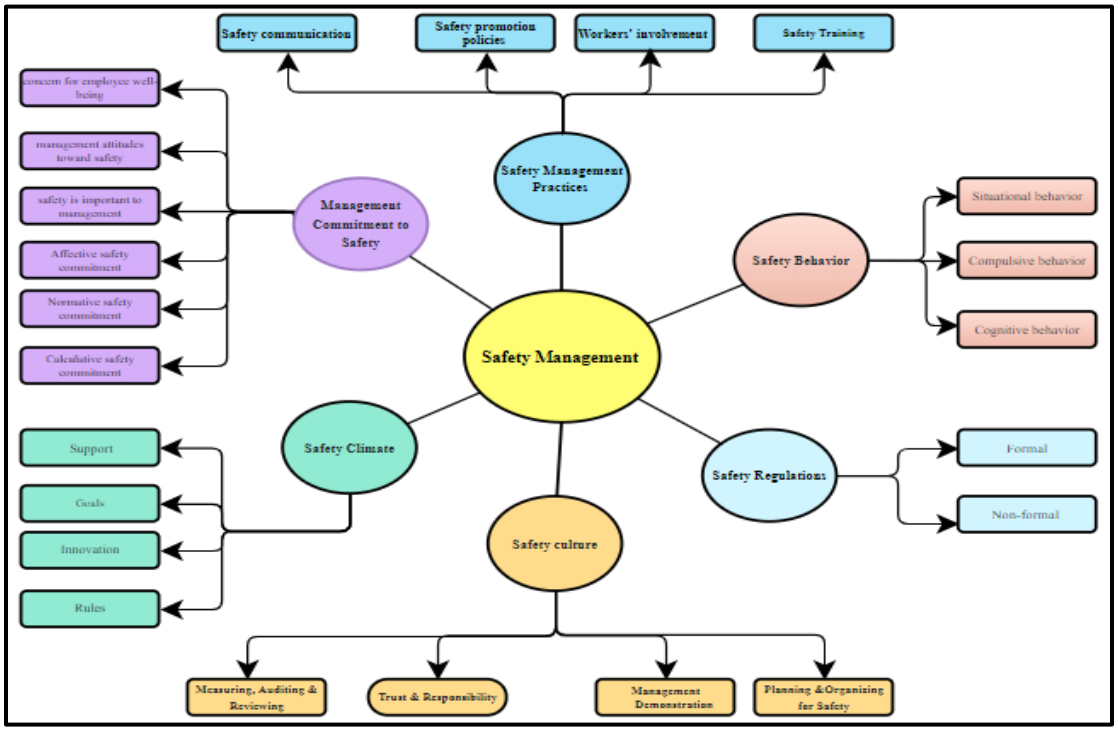

Figure 2. Structure of safety management. (Source: Authors.)

1.5 Discussion

This present systematic review considered that several construction safety practices must be considered to successfully develop construction safety as these practices create a suitable safety culture and safety behaviours at an individual level. Furthermore, workers should also be made aware of the risks that their jobs involve as these risks are not always evident. Multiple factors affect how safety is understood. Firstly, worker behaviours are motivated by the safety practices of the management, which leads to worker participation. Meanwhile, some are produced directly in the work culture and the organisation where they work. Others, however, are based on values that are culturally hegemonic.

However, when an organisation identifies potentially risky situations, there are often discrepancies between the technical evaluations of the prevention service and the opinions of members of the organisation. This occurs due to the ideas of employers, technicians, and workers and the accident history of the organisation as well as the experiences of the workers. Nevertheless, there have been evident developments in occupational risk prevention courses as well as legislative actions to raise awareness among workers that are so thorough that every possible prevention measure has been identified.

At every job in every organisation, bosses, prevention delegates, and more experienced workers impart their habits, customs, behaviours, and values to newer workers. These tend to be perpetuated over time, although with more or less significant changes; depending on the actions taken in this regard. This set of behaviours and values is a work culture which can lead to a greater or lesser degree of risk prevention.

1.6 Conclusion

The more developed a safety management system, the more positive the risk attitude of its workers and, consequently, the safer their behaviours. As such a system integrates a set of policies and procedures to reduce occupational risks, it allows good intentions to be incorporated into a programme to achieve the desired level of security efficiency as it provides a means with which to control and direct the activities of workers. Therefore, organisations should prioritise the development of safety management systems as it has a significant impact on accident rates, both directly and indirectly.

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