

The relationship between critical success factors, internal control and safety performance in the Malaysian manufacturing sector



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ABSTRACT

There is a lack of conceptual models that explain the relationship among critical success factors, internal control and safety performance, especially in the manufacturing sector of Malaysia. The enforcement of internal control is linked to safety performance, and more research is needed to validate this relationship. Unless management identifies the critical success factors that have significant impact on safety and health, safety management systems such as OHSAS 18001 compliance auditing will have little impact on organizations' safety performance. This study measured organizations' perceptions on six critical success factors and enforcement of internal control by conducting a survey using a questionnaire given to 300 organizations in Malaysia's manufacturing sector. Hundred and five organizations participated in this survey with a response rate of 35 percent. The reliability and validity of all the scales were found acceptable. The internal control was found to be the key mediator in the relationship between critical success factors and safety performance. Path analysis using Partial Least Squares (PLS) version 2.0M3 showed that Management Commitment, Employee Involvement, Safety Training and Government Regulation are related with Safety Performance through enforcement of internal control. This study emphasizes the need for enforcement of internal control to achieve outstanding safety performance.

1. Introduction

Manufacturing industry in Malaysia is among the most hazardous industries due to its unique nature. Factory workers are required to have some basic safety awareness to be sensitive to potential hazards in their workplace. Gherardi and Nicolini (2000) observed that knowledge is handed down from one generation of workforce to another. Therefore, unsafe acts and unsafe conditions any working culture comprises are also passed down, and slowly become part of the organizational culture. In a manufacturing line, the conveyor belting, lifting of materials, performing repetitive work—either standing or sitting throughout the shift, usage of forklifts, and working with machineries are some of the significant sources of potential accidents to workers, if these aspects are not properly supervised and controlled. Furthermore, the attitudes and practices involved in rushing to meet aggressive customer deadlines and attempts to maximize productivity have made manufacturing companies very hazardous workplaces.

Workplace accidents result in losses to the economy of Malaysia. Based on Malaysia Social Society Organization (SOCISO) annual report 2012, the statistics showed that the direct cost of accidents amounts to

RM 2.02 billion, which is about 0.5 percent of Malaysia Gross Domestic Product (GDP); indirect costs could be much higher (Social Security Organization, 2012). It was an increase of 16.91 percent from the 2011 benefit payment (RM 1.7 billion) (Social Security Organization, 2011) while the figure in 2013 further experienced another 11 percent increase from the figure reported in 2012, amounting to RM 2.2 billion in losses (Social Security Organization, 2013). The recent statistics indicate that the figure in 2014 has seen an 11.2 percent increase from the figure reported in 2013, amounting to RM 2.4 billion in losses (Social Security Organization, 2014). Such an increase in compensation indicates that working conditions in Malaysia have not improved to such a degree as to significantly reduce workplace accidents. According to Biggs et al. (2005), manufacturers tend to have a low awareness of implementing long-term safety practices, and safety issues usually receive the least priority due to cost control. It is similar in Malaysia where employers were constantly reminded not to implement cost cutting measures at the expense of their employees (“Don’t cut costs at expense of safety, companies told”, 2015). An effective safety management system is understood as a set of critical success factors associated with safety, health programs, and activities (Kirwan, 1997).

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In the next section of this paper, the research context and conceptual model in relation to existing literature on effective safety management system—comprising critical success factors—will be discussed. This is followed by an explanation of the research method used, and an assessment of goodness of measures, namely, reliability and validity of the constructs. Subsequent sections deal with the analysis of structural models, namely, path analysis, hypotheses testing, and predictive relevance. The last section is on discussion and conclusion with suggestions for future research.

2. Research context and research model

This paper is part of a larger research which examined critical success factors that have the greatest effect on a safety management system based on the enforcement of internal controls. We used the term safety management system in a broader sense following the Input-Process-Output system theory, whereby we visualize the critical success factors (enablers as the input), the Internal control (as the process), and safety performance (as the output).

2.1. Safety management system

The safety management system plays an important role in the growth of firms in the manufacturing sector, because many firms have reached a conclusion that effective safety management system implementation can improve safety performance. Makin and Winder (2008) supported the idea that critical success factors of an effective safety management system can be described as best practices or ways in which firms and their employees undertake safety activities in all key processes.

2.1.1. Management Commitment

The management commitment is the foundation of an effective safety management system. Zohar (1980) revealed that management's commitment to safety is a major factor that affects the effectiveness of internal control and contributes to the success of an organization's safety management system. It is an important ingredient in employees' perception of the importance of safety in their company (Fernandez-muniz et al., 2007). The safety commitment of the management is an observable element where employees can witness and feel what the management is demonstrating as well as preaching in terms of ensuring the workplace safety (Hofmann et al., 1995). Managers should demonstrate their commitment through their behavior and practices by involving safety-related operations, so that their workers can perceive it unambiguously (Neal and Griffin, 2002).

The positive perception will be created when they believe that safety is being valued in the organization (Griffin and Neal, 2000). In most of the high risk industries like the manufacturing sector, management commitment has been repeatedly highlighted (Cox and Cheyne, 2000; Cox and Flin, 1998; Vinodkumar and Bhasi, 2010). Consequently, the greater the managers' commitments to safety, the more workers are encouraged to carry out safe practices through enforcement of internal control. Based on the above discussion, one of the hypotheses of this study will be:

H1: Management Commitment has a direct positive effect on Internal Control.

2.1.2. Employee Involvement

It has been acknowledged that a successful safety management system has a high level of employee involvement, particularly to create line ownership for embedding safety and health values and developing safety and health awareness. Employee involvement has been recognized as a behavioral modification technique that involves upward communication flow and decision-making process in an organization (Vinodkumar and Bhasi, 2010). This strategy is appropriate as the

employees are the ones who are closest to the risks. Vredenburg (2002) further posited that employees who are close to the work are the best qualified personnel to promote workplace improvements through internal control of risk assessment and risk control. Punnnett et al. (2009) stressed that organizations should adopt employees safety and health activities such as self-inspection, accident investigation, worksite analysis, hazards prevention & control and training.

The essence of getting the employees involved is to empower them with authority, responsibility, and accountability in decisions (Vinodkumar and Bhasi, 2010). Such an initiative would enable employees' involvement in setting organizational safety goals and developing mechanisms to achieve them. In a similar vein, Vecchio-Sadus and Griffiths (2004) observed that workers will be more committed to the safety management system if they are actively involved in decision making and problem resolution. Workers who are required to take initiative and achieve safety improvement through internal control, consider themselves to be responsible for their own actions, and are concerned about their organization's safety performance. Similar to management commitment, the aspects of involving employees in improving safety levels in an organization is seen as a decisive factor (Cox and Cheyne, 2000; Dedobbeleer and Beland, 1991; Lee, 1998; Rundmo, 1994; Shannon et al., 1996). In the Malaysian Occupational Safety and Health Act 1994 (Occupational Safety and Health Act 1994: Incorporating all amendments up to 1 January 2006, 2006), the involvement of employees are recognized and therefore the law allocates a provision for employee's involvement in safety committee (Section 30 of the Act 514). This committee comprising representatives from management and employees will identify and be consulted regarding safety problems and matters. Therefore, it is hypothesized that:

H2: Employee Involvement has a direct positive effect on Internal Control.

2.1.3. Safety communication

It is essential to provide a platform to communicate on safety issues at the worksite. The communication intends to ensure that everyone understands their roles and responsibilities concerning workplace safety and health. Neal and Griffin (2002) supported the idea that the greater the level of open communication with a focus on problem solving and learning, the more workers become involved in safety management, and they offer more suggestions on potential improvements to their jobs. Such worker involvement implies a greater level of safety performance. Vinodkumar and Bhasi (2010) further stressed that the coverage and impact of communication will be enhanced when a two-way communication approach is adapted, which in turn could lead to behavioral modification in personnel.

Vredenburg (2002) revealed that consistent and forthright communications through internal control is an essential characteristic of any strong organization. These regular communications pertaining to safety issues among the management, supervisors and employees would be an effective safety management system that could enhance workplace safety. Mearns et al. (2003) supported the idea that communication of safety and health issues in the workforce can be viewed as a key stage of organizational learning that proceeds from accident investigations, safety audits, or changes in procedures in which enforcement of internal control is required. Previous attempts by Cohen (1977), Vredenburg (2002), Cox and Cheyne (2000) and Mearns et al. (2003) among various category of workers have demonstrated that safety at workplace is influenced by the level of communication in an organization. Therefore, based on the above discussion, the third hypothesis of this study will be:

H3: Safety Communication has a direct and positive effect on the Internal Control.

2.1.4. Safety training

Safety training is a major component of a safety management system; this training is aimed at increasing the awareness of potential hazards and risks. A key element in every successful organization, in any success of the safety and health program, is effective safety training. In general, training helps to improve employees' behavioral skills, knowledge and/or attitude. Specifically, in safety, O'Toole (2002) supported the concept that training serves to develop of employee competence to improve abilities, skills and aptitudes in terms of risk prevention. As such, Vinodkumar and Bhasi (2010) stressed that safety training is an effective safety management system that provides the means to make workplace accidents more predictable. Competency of employees is a key feature of safe operation in the manufacturing sector.

Gordon and Dilys (2011) revealed that no matter how successful training is in meeting safety objectives, its effect will deteriorate with time if enforcement of internal control is not ensured. Such enforcement should be the routine responsibility of supervisors, managers as well as the safety & health committee. Previous studies by Lee (1998), Ostrom et al. (1993), Tinmannsvik and Hovden (2003), and Zohar (1980) have found that those organizations enjoying lower workplace accident rates were the ones providing good safety training for their employees. Therefore, based on the above rationale, it is hypothesized that:

H4: Safety Training has direct and positive effect on Internal Control.

2.1.5. Safety champion

According to Flynn and Shaw (2011), the main role of a safety champion in the implementation of safety management system is to establish a positive safety culture that helps promote employee involvement at all levels of the organization. Flynn and Shaw (2011) observed that organizations should have effective systems in place to address and manage safety. The implementation of this system should be led by the safety champion in the organization with the support of the senior management.

Charles (2009) revealed that in organizations which have established a safety culture, safety champions model the desired culture and lead by example. The safety champion approach will enable employees to be more safety conscious; moreover, this awareness would come about when employees feel that management has an open attitude when safety issues are arised and discussed openly in the organization (Hofmann and Morgeson, 1999). In other words, a safety champion would allow employees to raise safety issues with the intention that it will improve their physical well-being at the workplace. In a similar vein, when the safety champion atmosphere is instilled through initiatives to improve safety, employees will develop beliefs that the organization has a serious orientation toward ensuring safety at the workplace; therefore employees will instigate, or participate in, the enforcement of internal control (Michael et al., 2005). As such, safety champions should be actively engaged in questioning, assessing and resolving safety hazards and issues to continuously improve safety performance. One key role of the Safety Champion is to manage operational hazards & risks through internal control to ensure safety and health of workers at the workplace. Stacey et al. (2013) found that the engagement of the supervisor as a Safety Champion exerted positive influence on workplace safety through enforcement of internal control. Therefore, the following hypothesis is formulated:

H5: Safety Champion has direct and positive effect on the Internal Control.

2.1.6. Government Regulation

The most important practices involving rules and regulations concerning safety and health are the extent to which such rules and

regulations are followed, and the thoroughness with which management enforces these rules. Anthony (2011) supported the premise that the legislative framework must be effectively translated into practices at the level of the enterprise, such as compliance with standards governing safety practices, ranging from acceptable methods of machinery guarding to publicizing tables that give the limits of exposure to hazardous substances.

Saksvik et al. (2003) revealed that a systematic approach to safety management system implementation, which includes the co-operation between the government and employers, is important to the safety issue. They stressed that the enforcement of compliant safety regulations should be the priority of both the employers and employees. In the Malaysian Occupational Safety and Health Act (Act 514), both the employer and employees have their own duties of care that they need to adhere to. In addition, the Act 514 will be regularly reviewed and made relevant to the contemporary hazards. This act stipulates the appointment of competent safety officers who are responsible for ensuring that the management is constantly ensuring the safety, health and welfare of the organization's employees. In addition, the safety and health officers are also responsible for creating awareness among the employees about what the employees' roles are in ensuring others' safety at work and that of their own. Besides, the Act also requires that a safety and health policy committee be established with the aim of enhancing the workplace safety standards. These are some of the examples how the government regulations in Malaysia are being enforced with regards to occupational safety and health. Vinodkumar and Bhasi (2010) found that government regulations and their enforcement through internal control management can improve safety behavior of workers, and result in reduction of accident rates and working days lost. The studies by Cox and Cheyne (2000) and Mearns et al. (2003) showed that government regulation has a significant correlation with safety performance. Therefore, based on the above literature, it is hypothesized that:

H6: Government Regulation has direct and positive effect on Internal Control.

2.1.7. Internal control

Internal control is one main principle in controlling safety and health in an organization. According to Hovden and Tinmannsvik (1990), internal control leads to increased efforts and attention to monitor and improve occupational safety and health standards. Key characteristics of internal control are the requirement of an independent function in the organization to specifically monitor the safety control system through an internal audit system. Through this approach, each organization will be responsible for its own safety and health as mandated by the Occupational Safety and Health Act in Malaysia, which emphasizes "self-regulation". "Self-regulation" stresses that the responsibility for managing safety and health lies with those who create the risks and those who work with the risks. Gunningham (2011) defines self-regulation as the controlling of a process or activity by the people who are involved rather than an external organization such as the government. This clearly indicates that the critical success factors identified in the study would influence internal control where employees adapt and practice self-regulation with regards to safety at work. This in turn results in better safety performance in organizations, thus justifying the relationship between these critical success factors of safety performance indirectly and internal control. In essence, these critical success factors shape the internal control of an organization to ensure superior safety performance.

Internal control concept aims to manage safety and health through safety assessment and control by the management of the production line (Tinmannsvik and Hovden, 2003). A systematic internal control strategy can help manufacturers put an essential risk management control in place. The enforcement of internal control is necessary to monitor and follow-up closely the preventive measure on hazards and risks in avoiding the occurrence of a workplace accident. Vinodkumar

(2005) supported the postulate that internal control identifies the areas of risk in a machine or within a facility, and helps to minimize those risks by implementing a safety management system. He further observed that supervisors and managers must ensure that controls are enforced. They must be able to monitor the employees to ensure that the controls are effective and modify them as necessary to maintain a high level of safety performance. Torp et al. (2000) revealed that firms implementing adequate mechanisms to control occupational safety and health interventions show a higher awareness of safety and health, reduced injury rates, and a stronger safety culture and climate.

Kjellen et al. (1997) and Bottani et al. (2009) observed that the lack of internal control damages the firm's internal working routine, and thus causes poor safety performance. Burke et al. (2011) found that by focusing on execution of critical success factors through enforcement of internal control, organizations are most certain to reap benefits in terms of safety performance. The above discussion leads the authors to formulate the following hypotheses:

H7: Internal Control is positively related to Safety Performance.

H8a: The relationship between Management Commitment and Safety Performance is mediated by Internal Control.

H8b: The relationship between Employee Involvement and Safety Performance is mediated by Internal Control.

H8c: The relationship between Safety Communication and Safety Performance is mediated by Internal Control.

H8d: The relationship between Safety Training and Safety Performance is mediated by Internal Control.

H8e: The relationship between Safety Champion and Safety Performance is mediated by Internal Control.

H8f: The relationship between Government Regulation and Safety Performance is mediated by Internal Control.

2.1.8. Safety performance

Safety performance is a representation of major dimensions of task-related behaviours (Neal et al., 2000). According to Fernández-muñiz et al. (2012), the role of management in safety-related works is key to ensuring the safety standards of an organization. In view of the above statement, researchers and industrial practitioners have given high importance to the need for identifying and implementing organizational practices that have the potential to shape worker's behaviours to improve safety performance outcomes (Cigularov et al., 2010; Vinodkumar and Bhasi, 2010). Thus, in the present study, safety performance was measured through how well the initiatives adopted helped in reducing workplace accidents and the consequent losses. The aspects of safety performance were extracted from Wu et al. (2008), and were subsequently applied in safety audit assessments.

DuPont's world class safety management's beliefs, as shown in the following Table 1, are well-suited to the explanation of the linkage between beliefs of safety management and its relevant concepts, of that demonstrating safety practice which have strong correlations with the safety management systems.

An effective safety management system comprises critical success factors that positively affect the employees' attitudes and behaviours with regard to hazard and risk. Hence, the critical success factors can be regarded as antecedents to the company's safety performance. The literature lends support to the formulation of the research framework for examining the relationship between critical success factors—internal control and safety performance (refer Fig. 1).

3. Research method

The unit of analysis comprises manufacturing organizations having business relationships with the authors' working company in Malaysia. Only one person in-charge of safety and health was chosen from each organization. Each representative organization's perception of the critical success factors will be treated as a unit of data source. As we could

not obtain a listing of all the elements of the population, we used a non-probability purposive sampling, whereby only the authorized manufacturing organizations throughout Malaysia were selected to administer the questionnaires. The targeted sample size is 300 authorized organizations in the manufacturing sector throughout Malaysia, and the estimation of questionnaires received is in the range of 80–100 respondents based on the acceptable ratio of ten-to-one of the nine variables to be tested in this work, as proposed by Hair et al. (2010). The person in-charge of safety and health from a surveyed organization can be at any level—such as non-management, lower management, middle management, or senior management—in the organizational hierarchy. As such, the sampling technique is based on a non-probability sampling method.

A total of three hundred questionnaires were distributed to compile data from the respondents. A multiple method of data collection was employed whereby some questionnaires were mailed to the respondents. Some were emailed and some were personally collected from the respondents. A total of 105 completed questionnaires were received and used for this analysis with a response rate of 35 percent. The data collection was completed over a two-month period. In the next section, the assessment of the goodness of measures of these constructs in terms of their validity and reliability within the research framework is presented.

3.1. Analysis and results

To analyze the research model, we used the Partial Least Squares (PLS) analysis using the SmartPLS 3.0 software (Ringle et al., 2015). Following the recommended two-stage analytical procedures by Anderson and Gerbing (1988), we tested the measurement model followed by an examination of the structural model (see Hair et al., 2014; Ramayah et al., 2013). To test the significance of the path coefficients and the loadings, a bootstrapping method (5000 resamples) was used (Hair et al., 2014).

3.1.1. Measurement model

For a measurement model, we first assessed the convergent validity and then the discriminant validity. The convergent validity of the measurement is usually ascertained by examining the loadings, average variance extracted, and the composite reliability (Gholami et al., 2013). The loadings were all higher than 0.5, the composite reliabilities were all higher than 0.7, and the AVE were also higher than 0.5, as suggested in the literature (see Table 2). The discriminant validity of the measures (the degree to which items differentiate among constructs or measure distinct concepts) was examined by following the Fornell and Larcker (1981) criterion of comparing the correlations between constructs and the square root of the average variance extracted for that construct (see Table 2). All the values on the diagonals were greater than the corresponding row and column values, indicating the measures were discriminant.

3.1.2. Structural model

To assess the structural model, Hair et al. (2014) suggested looking at the R^2 , beta, and the corresponding t-values using a bootstrapping procedure with a resample of 5000.

Table 3 illustrates the results of the test of the hypothesized structural model. The explained variance R^2 , to ensure a minimal level of explanatory power, has been achieved for the variance explained of a particular endogenous construct to be deemed adequate. The R^2 value was 0.706, indicating that 70.6 percent of the variance in extent of 'Internal Control' can be explained by independent variables of 'Management Commitment', 'Employee Involvement', 'Safety Communication', 'Safety Training', 'Safety Champion', and 'Government Regulation'. The R^2 from 'Internal Control' to 'Safety Performance' was 7.4 percent. In sum, the model exhibits acceptable fit and a high-predictive relevance.

Table 1
DuPont world class safety management beliefs, concepts and practices.
Source: Stewart (2002): “Managing For World Class Safety”.

| No | DuPont’s world class safety belief | Concept | Practice | Relevant critical success factors |
|----|--|------------------|---|---|
| 1 | Top management must be committed to excellence and drive the agenda by establishing a vision, values, and goals; by seeing that all line managers have safety improvement objectives; by auditing performance; and by visible personnel involvement | Leadership | Top Management Participation Policies & Principles Safety Personnel | Management Commitment Government Regulation Safety Champion |
| 2 | Safety is line responsibility. Each executive, manager, or supervisor is responsible for and accountable for preventing all injuries in his or her jurisdiction, and each individual for his or her own safety and, in a less direct sense, for the safety of co-workers | Structure | Line Management Accountability & Responsibility | Employee Involvement |
| 3 | Involvement of everyone in “doing things in safety” is the most powerful way to embed safety values and to build safety communication for high level of awareness | Process & Action | Effective Communication Incident Investigation and Workplace Observation & Audit | Safety Communication Internal Control |
| 4 | Safety training is an essential element in developing excellence. It complements but cannot replace “learning by doing” | Process & Action | Training and Development | Safety Training |
| 5 | An organization committed to safety excellence will have a broad array of safety systems and practices, thoroughly and conscientiously implemented by the trained knowledgeable workforce | Structure | Motivation and Awareness | Safety Knowledge |

Table 3 presents the the structural model of this study. A close look at Table 3 shows that ‘Management Commitment’ was positively related ($\beta = 0.241, p < .01$) to ‘Internal Control’, and so were ‘Safety Training’ ($\beta = 0.326, p < .01$) and ‘Government Regulation’ ($\beta = 0.421, p < .01$); whereas ‘Employee Involvement’, ‘Safety Communication’ and ‘Safety Champion’ were not significant predictors of ‘Internal Control’. Thus H1, H4 and H6 were supported, whereas H2, H3 and H5 were not supported. H7 was also supported, as the R^2 value of 0.074 suggests that 7.4 percent of the variance in safety performance can be explained by the ‘Internal Control’. There was a positive relationship ($\beta = 0.273, p < .01$) between ‘Internal Control’ and safety performance. In this study, it was found that ‘Government Regulation’

is the most significant predictor of ‘Internal Control’, followed by ‘Safety Training’ and ‘Management Commitment’. The higher the enforcement of internal control, the better is the safety performance.

In order to test the mediating effect, Preacher and Hayes (2004, 2008) suggested bootstrapping the indirect effects. As shown in Table 3, the results indicate that ‘Internal Control’ mediates only the relationship between ‘Management Commitment’, ‘Employee Involvement’, ‘Safety Training’, ‘Government Regulation’ and ‘Safety Performance’. Thus the results provide support for H8a, H8b, H8d, H8f, whereas H8c and H8e were not supported.

Fig. 2 present the direct effects of the critical success factors and the indirect effects of the critical success factors. Note: Solid lines indicate

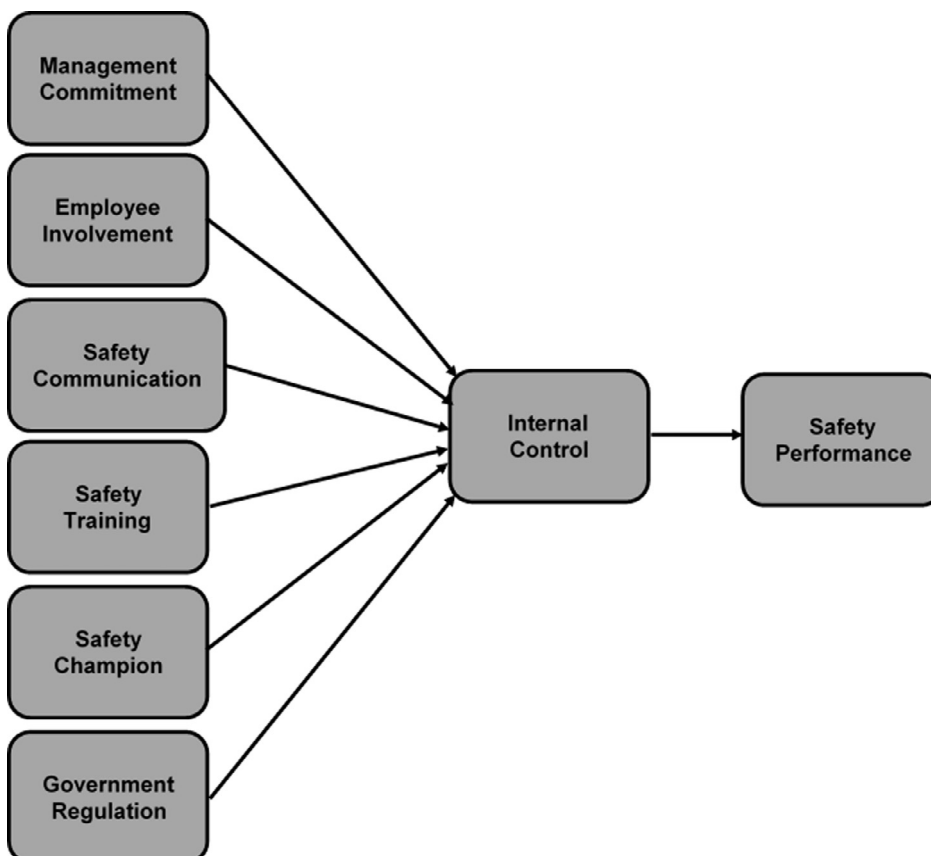


Fig. 1. Research model.

Table 2
Measurement model.

| Construct | CR | AVE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-----------------------|-------|-------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Employee Involvement | 0.882 | 0.600 | 0.774 | | | | | | | |
| Government Regulation | 0.923 | 0.706 | 0.631 | 0.840 | | | | | | |
| Internal Control | 0.868 | 0.568 | 0.659 | 0.755 | 0.754 | | | | | |
| Management Commitment | 0.909 | 0.528 | 0.766 | 0.573 | 0.679 | 0.726 | | | | |
| Safety Champion | 0.906 | 0.659 | 0.732 | 0.666 | 0.663 | 0.631 | 0.812 | | | |
| Safety Communication | 0.876 | 0.639 | 0.712 | 0.738 | 0.657 | 0.661 | 0.724 | 0.799 | | |
| Safety Performance | 0.808 | 0.515 | 0.314 | 0.413 | 0.265 | 0.236 | 0.324 | 0.438 | 0.718 | |
| Safety Training | 0.905 | 0.545 | 0.701 | 0.698 | 0.753 | 0.678 | 0.699 | 0.758 | 0.300 | 0.738 |

Note: CR = Composite Reliability, AVE = Average Variance Extracted, bolded items are square root of the AVE.

Table 3
Hypotheses testing.

| Hypothesis | Relationship | Std. Beta | Std. Error | t-value | Decision |
|------------|-----------------------|-----------|------------|---------|---------------|
| H1 | MCOM → INT | 0.241 | 0.082 | 2.92** | Supported |
| H2 | EINV → INT | 0.160 | 0.100 | 1.60 | Not Supported |
| H3 | SCOM → INT | -0.132 | 0.098 | -1.34 | Not Supported |
| H4 | STRAIN → INT | 0.326 | 0.107 | 3.06** | Supported |
| H5 | SCHAMP → INT | 0.094 | 0.104 | 0.90 | Not Supported |
| H6 | GREGU → INT | 0.421 | 0.108 | 3.89** | Supported |
| H7 | INT → SPERFO | 0.273 | 0.090 | 3.02** | Supported |
| H8a | MCOM → INT → SPERFO | 0.065 | 0.033 | 1.98* | Supported |
| H8b | EINV → INT → SPERFO | 0.044 | 0.022 | 2.00* | Supported |
| H8c | SCOM → INT → SPERFO | -0.035 | 0.030 | 1.18 | Not Supported |
| H8d | STRAIN → INT → SPERFO | 0.089 | 0.045 | 1.97* | Supported |
| H8e | SCHAMP → INT → SPERFO | 0.024 | 0.034 | 0.72 | Not Supported |
| H8f | GREGU → INT → SPERFO | 0.113 | 0.049 | 2.33* | Supported |

** p < .01

* p < .05

significant effects

4. Discussion and conclusion

The enforcement of internal control has mediated the relationship between the Employee Involvement, Government Regulation, Management Commitment and Safety Training with Safety Performance. This relationship has indicated that part of the influence of ‘Employee Involvement’, ‘Government Regulation’, ‘Management Commitment’ and ‘Safety Training’ on ‘Safety Performance’ has been taken over by ‘Internal Control’. Thus, the enforcement of internal control is recognized as an important determinant in the organization’s efforts to enhance safety performance, and prevent accidents in the workplace as suggested by Neal et al. (2000). This would mean the manufacturing firms should concentrate on enforcing internal control to achieve good safety performance. Furthermore, they should make the effort to comply with government rules and regulations, demonstrate the commitment from management, encourage involvement from workers and conduct frequent training on safety to implement an effective safety management system. As revealed by Makin and Winder (2008), the identified critical success factors which have the greatest impact on safety management system, will also impact the organization’s overall safety performance.

Out of the six critical success factors, only management commitment, safety training, and government regulation were found to predict internal control. Through proper identification of hazards and risks at workplace, these three safety management systems were found to contribute to sound safety management initiatives that allow management to ensure the employees work in the safest and healthiest

environment Vinodkumar (2005). This finding is in line with the observations of Zohar (1980), Fernandez-Muniz et al., (2007), Lee (1998), Ostrom et al. (1993), Tinmannsvik and Hovden (2003), Cox and Cheyne (2000) and Mearns et al. (2003). However, the remaining three critical success factors failed to predict internal control. It can be argued that employee’s perception of management commitment gave an overall picture of the totality of employees’ assessment about the management’s concern for safety and health at the workplace. In an effort to achieve the stated intention, management could have organized many activities and initiatives. Hence, employee involvement, safety communication and safety champion may not necessarily predict the enforcement of internal control. The perception of employees on the level to which the encouragement of management in welcoming the employees’ involvement in safety related decision making and activities, open communication on safety matters and safety champion by creating positive safety culture in promoting safety at workplace did not predict internal control. These views were similarly shared by Vinodkumar and Bhasi (Vinodkumar and Bhasi, 2010) in a study of employees of large fertilizer manufacturing companies in India. In addition, the present study also supports the notion—put forward by Vinodkumar and Bhasi (2010)—that involving employees in safety matters is a traditional way of managing safety at work. As such, this study further contributes by validating the earlier claim. In a similar vein, this study has also obtained some other important findings, because fostering open communication in safety matters and championing safety practices—promoting safety by creating a positive safety culture—at the workplace are also traditional ways of managing workplace safety; this approach may produce a superior safety performance level without considerably affecting the perception of a company’s enforcement of the internal control.

In examining the relationship between a safety management system and safety performance, it is found that employee involvement did not predict safety performance directly but predicted safety performance indirectly. This finding provides evidence to show that by prioritizing safety management system implementation, organizations are almost certain to reap benefits in terms of safety performance. A plausible explanation for this argument is that employees may perceive implementation of critical success factors as a sign of organizations’ commitment towards workplace safety. This is further supported by earlier work of Mearns and Hope (2005) in the offshore sector where it was indicated that greater organizational investment in safety and health activities would lead to worker’s loyalty to safety compliance. In other words, encouragement of management in welcoming the employees’ involvement in safety-related decision making and activities would have an effect on the perception of company’s enforcement of internal control (i.e., a form of perception that the organization is committed towards workplace safety), which in turn indirectly results in enhanced safety performance.

A Safety champion was expected to influence internal control directly and indirectly on safety performance. It appears that the items in safety champion scale could not capture what it was intended to. The item “Safety is everybody’s business” might have received erratic

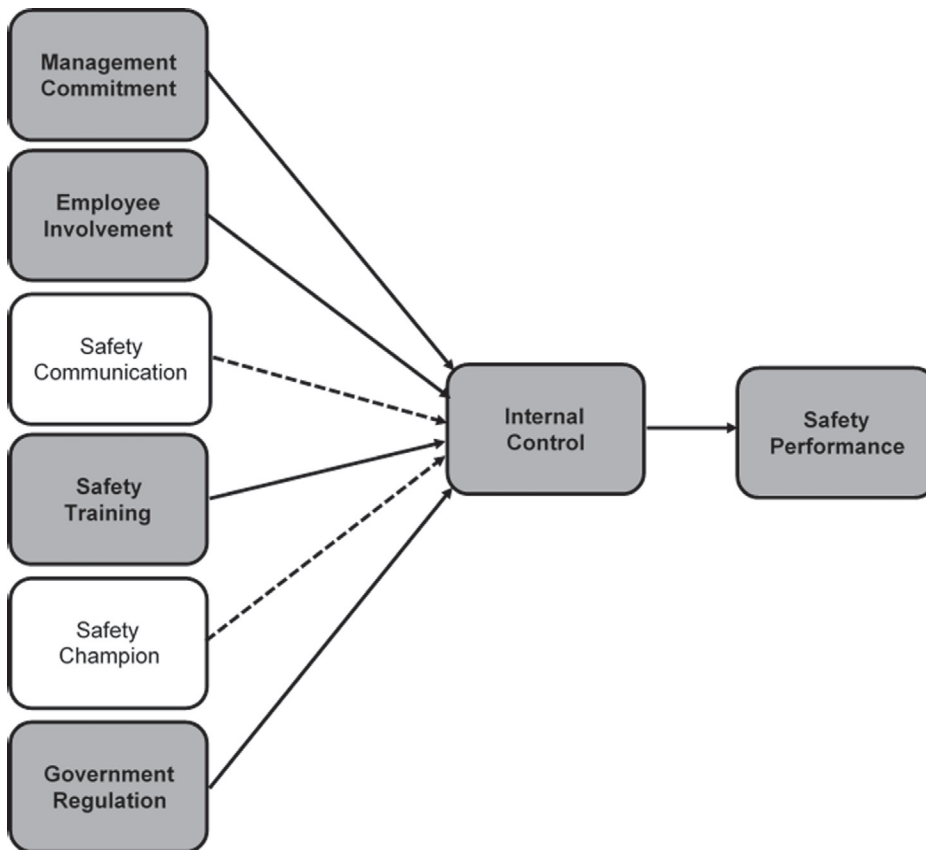
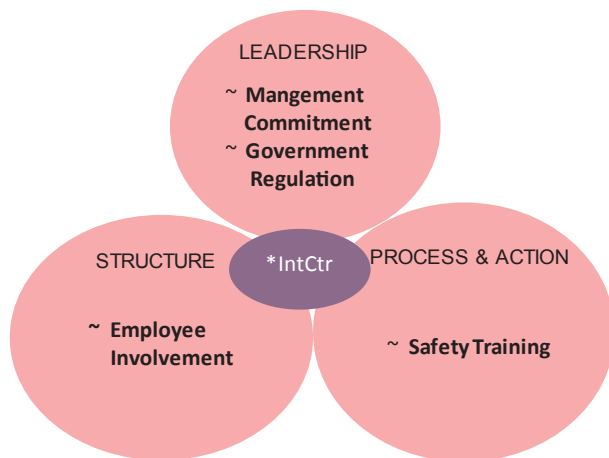


Fig. 2. Critical Success Factors (Indirect Effect). Note Solid lines indicate significant indirect effects.

Note: Solid lines indicate significant indirect effects



Source: Stewart (2002): “Managing For World Class Safety”

Fig. 3. Reference model towards good safety performance.

responses because such a policy may not be practical in small and medium manufacturing firms, which employed 500 employees or below (approximately 67% of the sample). Safety communication was also expected to play an integral role in internal control strategy—directly and indirectly—with safety performance, but the study failed to establish that relationship. Even when having a relatively stable composite reliability coefficient (=0.876), there is a chance that the predictive capacity of safety communication would have been affected. This could have happened, because only one of the four items used to measure safety communication reflected directly on safety matters. The item “Written circulars elaborated and meetings organized to inform employees about risks associated with their work and how to prevent

accidents” was related to workplace safety; however, the other three items adapted were very general. As such, there is a possibility that these items could not extract what they were expected. In addition, as the population in this study is new to such investigations, it is possible that the respondents were extra cautious in responding to the statements, resulting in errors in the process. Thus, the approach used in this study is correct and rational as illustrated in Fig. 3.

The reference model makes a significant contribution to the practical aspect as follows:

- (1) Management Commitment: A Management that is committed to safety and health activities must dedicate maximum effort to enforce internal control, and provide appropriate resources and adequate support. Members of the Management should demonstrate their commitment through their organization’s safety practice, so that their employees can perceive it.
- (2) Employee Involvement: Management should not involve employees just for safety inspection or audit. Management should encourage employees in identifying hazards in the workplace and managing risk, besides empowerment of employees to make decisions concerning safety and health matters.
- (3) Safety Training: Management should provide training on a regular and continuous basis to reduce resistance from the employees in implementing a safety management system. The training must serve a wider purpose to encourage employees in adhering to safety rules and regulation and to take an active part in making their workplace safer.
- (4) Government Regulation: Management should consult and cooperate with statutory bodies such as DOSH and NIOSH when enforcing safety rules and regulations. The enforcement of compliance with safety rules and regulations should be the priority of both employers and employees.

(5) Internal Control: Management should put internal control in place to minimize operational risk. Management should closely follow-up and monitor the risk level, and reduce risk to an acceptable level when required.

Regarding the importance of enforcement of internal control as a mediator between the critical success factors and safety performance, this reference model—with the significant variables of Management Commitment, Employee Involvement, Safety Training, and Government Regulation through enforcement of internal control—will broaden the knowledge of management personnel in local and foreign-owned organizations. Earlier, management personnel thought that with a safety management system in place, the safety performance of the organization will be good. Thus, these study findings can guide them to further improve their organizations’ safety performance through focus on the enforcement of internal control.

In order to have a more clear and complete picture of the study, it is suggested that future studies obtain information on the employees to evaluate the effect enforcement of internal control has on safety performance. Future studies could perhaps evaluate the effect on an organization’s variable to address an industry sector categorized as comprising high-risk or low-risk manufacturing firms.

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Appendix A. Appendix: Questionnaire literature

| Variable | Questions | Source |
|-----------------------|--|--|
| Management commitment | (1) Management care about my safety and do as much as possible to make job safe (2) Worker's safety practices very important to management (3) Management regularly praised for safe conduct (4) Management regularly made aware of dangerous practices or conditions (5) I received of instructions on safety when hired (6) Management talks to me about work safety (7) Management takes my personal safety seriously (8) Management will check or inspect whether I follow safety procedures required by my job (9) Management regularly discuss work safety goals with me (10) Changes in working procedures and their effects on safety are effectively communicated to employees | Adopted by Dedobbeleer and Beland (1991) |
| Employee involvement | (1) I have personal control over safety at work (2) There are regular job safety meetings conduct (3) I will be informed when changes in working practices are suggested (4) I am encourage to support and look out for each other employees (5) I feel involved when safety procedures/work instructions are developed and reviewed (6) I am encourage to give suggestions on how to improve safety (7) My immediate superior often talks to me about safety (8) My immediate superior would be very happy if I asked for advice on safety matters | Adopted by Dedobbeleer and Beland (1991) |
| Safety communication | (1) My company has fluent communications in periodic and frequent meetings, campaigns or oral presentations to transmit principles and rules of action (2) Information system is available to affected employees prior to modifications and changes in production processes (3) When starting in new job position, employee provided with written information about procedures and correct way of doing tasks (4) Written circulars elaborated and meetings organized to inform employees about risks associated with their work and how to prevent accidents | Adapted from Fernandez-Muniz et al. (2009) |
| Safety training | (1) Employee given sufficient training period when entering my company, changing jobs or using new technique (2) My company has follow-up of training needs and of efficacy of training previously given (3) My company has training actions continuous and periodic, integrated in formally established training plan (4) My company has specific training plans elaborated according to section or job position (5) My company training plan decided jointly with employees or their representatives | Adapted from Fernandez-Muniz et al. (2009) |

| | | |
|--------------------|--|--|
| | (6) My company training actions carried out during working day (7) My company gives in-house training to employees (8) My company has instruction manuals or work procedures elaborated to aid in preventive action | |
| Safety enforcement | (1) My company implement OSH program because of government laws (2) It is part of company policy to implement OSH (3) The government body shall enforce the law in my company in order to reduce or prevent workplace injuries/illness (4) The government authority always conduct inspection in order to improve my workplace OSH (5) The government authority should introduce more regulations in order to accomplish OHS' rules | Adapted by Ahmad Nazri (1998) |
| Internal control | (1) My company has conducted periodic checks on execution of OSH plan and compliance rules and regulations (2) My company has procedures in place to check achievement of objectives allocated to every department (3) My company has systematic inspections conducted periodically to ensure effective functioning of whole system (4) Accidents/Incidents reports were investigated, analyzed and recorded (5) My company has compared pre-determined plans and actions, evaluating implementation and efficacy in order to identify the corrective action | Adapted from Fernandez-Muniz et al. (2009) |
| Safety knowledge | (1) I am informed about “lesson learnt” from incidents/accidents (2) I believe that “lesson learnt” provide a valuable means of strengthening my company's safety performance (3) My company is open and willingness to learn from the experience of other companies (4) Acceptable behaviour and unacceptable behaviour is clearly defined and understood (5) I am encourage to develop and apply my own skills and knowledge in order to enhance my company's safety performance | Adopted from Safety Regulation Division of Irish Aviation Authority (2010) |
| Safety performance | (1) Pathways of workplaces are neat and tidy in my company (2) Machinery is equipped with good safeguard in my company (3) Electrical equipment is with good safeguard in my company (4) Hazardous workplaces are equipped with good ventilation in my company (5) My company provides employees with Personal Protective Equipment (PPE) (6) My company implements measurement of hazardous environment periodically (7) My company establishes safety & health labels/signage in workplace (8) My company carries out self-inspections (9) My company keeps/saves self-inspection records properly | Adapted from Wu et al. (2008) |

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