A STUDY OF SAFETY CULTURE IN A MANUFACTURING INDUSTRY

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A STUDY OF SAFETY CULTURE IN A MANUFACTURING INDUSTRY

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This project is submitted in partial fulfilment of the requirements for a Bachelor of Science with Honours in Human Resource Development.

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The project entitled 'A Study of Safety Culture in a Manufacturing Industry' was prepared by Teoh En Hwei and submitted to the Faculty of Cognitive Sciences and Human Development in partial fulfillment of the requirements for a Bachelor of Science with Honours Human Resource Development.

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Gred A
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KAJIAN TENTANG BUDAYA KESELAMATAN DALAM INDUSTRI PEMBUATAN

Teoh En Hwei

ABSTRACT

A STUDY OF SAFETY CULTURE IN A MANUFACTURING INDUSTRY

Teoh En Hwei

Safety culture is about the perception shared by the organization’s members towards safety and the effort to maintain the safety level in the organization. Apparently, accident at workplace is not controllable but preventable. To prevent accident happen in the organization, the factors of accident have to be identified. Based on past studies, researchers stated that the major contributor to workplace accident is poor safety culture. Thus, the main objective of this research was to study the safety culture in a manufacturing industry. The independent variables are management commitment, work environment, procedure at work, communication at workplace and accident and near miss reporting practices. The dependent variable is safety culture. The research method used in this research was quantitative survey method. 10 sets of questionnaires were used to run the pilot test to test the reliability of the questionnaire. The Alpha coefficient for this independent variable fall within the range of $\alpha \geq 0.90$, which is considered as excellent reliability coefficient. Then, a sample of study consisted of 42 front line workers in one of the manufacturing premises in Kuching. Safety climate questionnaire were used to gather the information for this study. The collected data were analysed by using Statistical Package of the Social Science (SPSS) version 21.0. The data were summarised using descriptive and inferential statistics. All the six null hypotheses were tested with Pearson Correlation and Multiple Regression Analysis. Based on the results, it indicated that management commitment, work environment, procedure at work, workplace communication, and accident and near miss reporting practices have significant relationship towards safety culture. All five objectives in this study have achieved. Moreover, the correlation relationship between independent variables and dependent variable is strong positive correlation. Furthermore, accident and near miss reporting practices and work environment were the dominant factors which influenced safety culture in the manufacturing industry. In this study, the frontline workers have high appraised and positive perception toward safety at workplace. Hereafter, it may be concluded that the overall safety culture level in the organization is considered as positive.
CHAPTER 1
INTRODUCTION

1.0 Introduction

Occupational accidents are not new things which will happen in all kinds of organization. According to Ludwig (2014), there is an average of 160 workers involved in and a worker dies from in work-related accident at someplace around the world in every 15 seconds. Consequently, approximately 6,300 workers die from a work-related accident in a day. By referring to these data, the reality is telling us that organizations are losing their workforce every second and this loose is giving a great impact on the organization's operation.

The impacts include low productivity, unable to achieve organization goal, an increase number in sickness absentees, and increase expenses in employees' insurance scheme (Bjerkå, 2010; Blair, 2013; M. Merrill & Grant Merrill, 2014; Siukola, Nygård, & Virtanen, 2013). Additionally, accidents are the major causal for death in workplace than occupational diseases in industry context (Safety, 2014). Thus, organization should figure out the interventions to avoid the happening of accidents.
1.1 Background of Study

Nowadays, people start to concern about the topic of safety culture. Safety culture first presented by International Atomic Energy (IAEA) after the Chernobyl disaster in 1986 (Wiegmann, Thaden, & Gibbons, 2007). Chernobyl disaster is an accident happened in a nuclear power station which due to an error in the reactor system test. This accident has destroyed one of the reactors and at least 30 workers are killed in the fire (Chernobyl Accident 1986, 2014). In the accident cause analysis, IAEA stated that poor safety culture is the main causal not only for Chernobyl disaster, but also King's Cross accident in 1987 and Piper Alpha oil rig disaster in 1988 (Eckelaert, Starren, Scheppingen, & Fox, 2011).

Safety culture is a division of organization culture, and it is meant to be how well safety has been defined in the organization and accepted by the organization's members (Hajmohammad & Vachon, 2013). Additionally, safety culture is acting as an advancement of safety plan. It is very important to create safety culture in all industry. The reason is some company might have safety plan, but the safety plan might not align with the organization's safety performance (Agwu, 2012). Or in other words, safety plan and safety performance in the organization are two different matters. Therefore, organization has to build safety culture in order achieve high safety performance.

In past years, many studies related to safety culture have been conducted. Based on previous researches, it have been stated that there is no exact definition for safety culture. Most of the definitions and concepts for safety culture are basically based on literature review of previous studies which are done by various researchers (Hajmohammad & Vachon, 2013). Moreover, the reason why safety culture is defined different across past studies is past researchers found that different departments will have different work culture (Katz-Navon, Naveh, & Stern, 2005). The work culture is the product which formed based on the work's characteristics, connections, physical environment, and management style. Although the thoughts of safety culture have been discovered in different ways, the purpose of study is yet the same which is to explore the safety culture in organization (Eckelaert et al., 2011).

According to PERKESO (2014), the accident cases in Malaysia have increased from 54,133 cases in 2008 to 61,522, in 2012. Also, an average of 105 workers involved in accident in every 10,000 workers. Based on past studies, few researchers have suggested that
creating a strong positive safety culture in company to prevent the happening of accident (The Health Foundation, 2011).

1.2 Problem Statement

Based on past studies, there are many research on safety culture has been carry out in western countries such as USA and UK (Yule, 2003). This is because safety culture is first introduced due to the happening of serious disasters such as Chernobyl disaster, and Oil Rig disaster. Additionally, the industries involved in the accident are those high risk industries such as nuclear and petrochemical industry. Yet, there are only some researches have been done in manufacturing industry. It might be due to the major contributor industry to the accident in western is the hazardous industry, but not manufacture industry. Thus, it is crucial to carry out a study on safety culture in the manufacturing industry at Malaysia. It is because the findings from western countries may not compatible in Malaysia context. It might due to the culture difference between western and eastern country.

On the other hand, there is limited study on safety culture in Malaysia. Nonetheless, a study about safety culture has been done in a manufacturing plant in Pahang (Sukadarin, Suhaimi, & Abdul~, 2012). In the study, researchers state that it is crucial for an organization to identify the positive or negative of its safety culture. However, there might be a culture difference in Peninsular Malaysia and East Malaysia which may cause the safety culture differs in these two places. Therefore, it is crucial to examine the safety culture in the manufacturing industry at East Malaysia.

Likewise, a study on safety culture in construction sector has been done (Chai, 2010). In Chai’s study, she has carried out research to identify the fundamental factors that caused frequent accidents happened in the construction sites at Sarawak. Furthermore, she also found the factors affecting the commitment of both employer and employees towards safety management system in constructions site. However, the statistics of occupational accidents in Malaysia by sector shows that manufacture sector has the highest-reported cases in non-permanent disability and permanent disability compared to construction sector (DOSH Malaysia, 2014). Additionally, the major contributing factor for these cases is there is no work safety procedure in the organization. Enthused by the past study, this research will be carrying out to identify the safety culture in a manufacturing industry at East Malaysia.
Lately, organizations are putting much attention in building safety culture in their organization. To be successfully implant safety culture in the organization, the commitment of management and employees are equally important. However, it is hard for the organization to ensure that every member of the organization is aware of the safeness and adapt to the safety culture. Thus, it is crucial to examine the perception of employees towards safety in the organization.

According to Hon, Hinze, and Chan (2014), the probability of an accident to be happened can be lower if the employees in the organization have a positive safety attitude and show compliment towards safety policies. Thus, organization to have a positive safety culture is important. Regarding this, it is more crucial for researcher to identify the current level of safety culture in the organization. It is because safety culture has to be developed first before implementing an effective safety management system. If the safety culture is poor, organization has to design the intervention to improve the weaknesses in the safety culture. If the safety culture is good, organization has to keep up the culture.

A study will be carrying out for the purpose to identify the safety culture in the organization by using the safety climate survey. The reason for using safety climate survey is safety climate is the manifestation surface of safety culture. According to Cox and Flin, they describe safety climate as “mood”, where safety culture as “personality” (as cited in Eeckelaert, Starren, Scheppingen, & Fox, 2011, p. 17). To conclude, assessing the safety climate (snapshot of employees’ perception about safety) and make an inference on the safety culture in the organization.

1.3 Objectives

1.3.1 Main Objective

The main objective of this research is to study the safety culture in a manufacturing industry.

1.3.2 Specific Objectives

1. To study whether management commitment has any effect on safety culture in a manufacturing plant.
2. To investigate whether work environment has any effect on the safety culture in a manufacturing plant.

3. To identify whether procedures at work have any effect on safety culture in a manufacturing plant.

4. To find out whether workplace communication has any effect on safety culture in a manufacturing plant.

5. To look at whether accident and near miss reporting practices have any effect on safety culture in a manufacturing plant.

6. To study the dominant factor that influences safety culture in a manufacturing industry.

1.4 Conceptual Framework

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
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<tbody>
<tr>
<td>Management commitment</td>
<td>Safety culture</td>
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<tr>
<td>Work environment</td>
<td></td>
</tr>
<tr>
<td>Procedure at work</td>
<td></td>
</tr>
<tr>
<td>Workplace Communication</td>
<td></td>
</tr>
<tr>
<td>Accident and near miss reporting practices</td>
<td></td>
</tr>
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</table>
1.5 Hypotheses of Research

**Objective 1**

<table>
<thead>
<tr>
<th>No.</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H_0)</td>
<td>There is no relationship between management commitment and safety culture in a manufacturing industry.</td>
</tr>
<tr>
<td>(H_1)</td>
<td>There is a relationship between management commitment and safety culture in a manufacturing industry.</td>
</tr>
</tbody>
</table>

**Objective 2**

<table>
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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>(H_0)</td>
<td>There is no relationship between work environment and safety culture in a manufacturing industry.</td>
</tr>
<tr>
<td>(H_1)</td>
<td>There is a relationship between work environment and safety culture in a manufacturing industry.</td>
</tr>
</tbody>
</table>

**Objective 3**

<table>
<thead>
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<th>No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>(H_0)</td>
<td>There is no relationship between procedures at work and safety culture in a manufacturing industry.</td>
</tr>
<tr>
<td>(H_1)</td>
<td>There is a relationship between procedures at work and safety culture in a manufacturing industry.</td>
</tr>
</tbody>
</table>

**Objective 4**

<table>
<thead>
<tr>
<th>No.</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>(H_0)</td>
<td>There is no relationship between workplace communication and safety culture in a manufacturing industry.</td>
</tr>
<tr>
<td>(H_1)</td>
<td>There is a relationship between workplace communication and safety culture in a manufacturing industry.</td>
</tr>
</tbody>
</table>
### Objective 5

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>$H_0$</td>
<td>There is no relationship between accident and near miss reporting practices and safety culture in a manufacturing industry.</td>
</tr>
<tr>
<td>$H_1$</td>
<td>There is a relationship between accident and near miss reporting practices and safety culture in a manufacturing industry.</td>
</tr>
</tbody>
</table>

### Objective 6

<table>
<thead>
<tr>
<th>No.</th>
<th>Hypotheses</th>
</tr>
</thead>
<tbody>
<tr>
<td>$H_0$</td>
<td>There is no dominant factor that influences safety culture in a manufacturing industry.</td>
</tr>
<tr>
<td>$H_1$</td>
<td>There is a dominant factor that influences safety culture in a manufacturing industry.</td>
</tr>
</tbody>
</table>

### 1.6 Definition of Terms

- **Safety culture**
  
  **Conceptual definition:**

  In past study, safety culture is defined as efforts in term of psychologically and behaviorally by the members of the organization in order to minimize the risk of the members from involved in incident and prevent injury. (Faridah, as cited in Faridah et al., 2012, p. 68).

  **Operational definition:**

  Within this research, the operational definition of safety culture will be focus on the way that the organization defined safety and the effort of organization’s members in preventing the happening of accident.
b. Commitment to safety

Conceptual definition:

Commitment to safety is referring the ways management allocate the resources (priority of safety or productivity) in order to ensure employees are secured from accident (O’Toole, 2002).

Operational definition:

In this study, commitment to safety refers to the management engagement in the safety practices and safety management system which include safety policies and safety procedure.

c. Reporting practices

Conceptual definition:

Reporting culture is referring to workers are feel free to participate from the workforce to report near misses, complete attitude surveys and engaged in the safety management in the organization (Yule, 2003).

Operational definition:

In this study, reporting culture refers to employees in the organization is encouraged to give feedback regarding the safety problems which they noticed or come through and hence the feedback given is confidential and they will not receive any punishment for reporting it.

d. Procedure at work

Conceptual definition:

Procedure at work refers to a set of practice such as employees have to wear Kevlar gloves while they are handling with equipment at Starbucks’ roasting in day-to-day basis to ensure that they are secured from injuries (Katz-Navon et al., 2005).
Operation definition:

In this study, procedure at work refers to standard operating procedure which the operation line workers have to follow to ensure they are secured from accident or injuries.

e. Work environment

Conceptual definition:

According to Ministry of Social Affair and Health (2011), work environment refers to a workplace which is healthy, safe, and pleasant for employee to work at.

Operational definition:

In this study, work environment is referring to the working condition in the plant that front line worker deal with in terms of work load (task, environmental, psychological, and situational).

f. Communication

Conceptual definition:

According to Keyton, communication refers to a process of exchanging information between two individual that can reached common understanding (as cited in Lunenburg, 2010, p. 1).

Operational definition:

In this study, communication defined as safety information flow between employee and supervisor and among employees.

g. Safety climate

Conceptual definition:

According to Isla and Vilela, safety climate is defined as an overall perception of employees on work environment and safety policies (as cited in Yule, 2003, p. 2).
Operational definition:

In this study, safety climate refers to employee’s perception on safety practices in the organization.

1.7 Significance of Research

Findings from this research are expected in helping the organization to identify the positiveness or negativeness of safety culture. Next, organization can implement corrective action on its safety practices in order to make the organization with high level of safety culture.

Moreover, the findings could be used as one of the latest database which provides another sight of the current safety culture in manufacture sector at Malaysia. Thus, future researcher can take the result as reference and carry out a further research to study the other underlying factors that caused accident happened in manufacture sector. On the other hand, it would provide a better understanding about the culture difference in Peninsular and East Malaysia.
CHAPTER 2
LITERATURE REVIEW

2.0 Introduction

As mentioned in the previous chapter, safety culture has been first introduced in Chernobyl disaster analysis report. Additionally, IAEA has clarified that the main causal for few serious disaster is poor safety culture. IAEA also identified that poor safety culture has led to safety management system failure which put employees' safety at risk (Pidgeon, n.d.). Furthermore, disaster will happen if the organizational beliefs, norms, and values on safety have collapse (Pidgeon, n.d.).

2.1 History of Safety Culture

Before introducing the term of safety culture, there is an evolution on the causal of accident. According to Wiegmann, Thaden, and Gibbons (2007), he and his colleagues have explained the evolution history of happening of accident. There are four stages of evolution. The first stage namely technical period (Wiegmann et al., 2007). At this stage, there is a rapid development of machinery. The main causal of accident during the technical period is malfunction of machine. Additionally, machinery malfunction can be further explained as the instability of the equipment during operation.

Second stage of accident history evolution is human error period (Wiegmann et al., 2007). At this stage, employee has viewed as the main causal of accident. It is due to
insufficient knowledge and experience in operating machine. The third stage is sociotechnical period (Wiegmann et al., 2007). At this stage, the main causal for accident is failure of human to collaborate with machine. Also, poor ergonomic is one of the factors which caused employee unable work safety while handling the machine. The fourth stage is safety culture stage (Wiegmann et al., 2007). At this stage, people who involved in accident do not have the values, beliefs, and norms towards safety. Hence, employees unable to perform the work safely and caused accident.

2.2 Definition of Safety Culture

As previously mentioned, there is no exact definition for safety culture. It is due to previous researchers have clarified that safety culture might be different due to national cultural different and also organizational culture different (Coyle, Sleeman, Adams, 1995). Table 1 shows the definitions of safety culture in previous studies. Table 2 shows the definition of safety climate in previous study.

As shown in Table 1 and Table 2, there are some common ideas about safety culture and safety climate shared in past studies. The common ideas are shared values, beliefs, and norms, attitudes towards safety, surface manifestation of safety culture, at a particular time and prevention for accident.

Moreover, safety culture is always interchangeable with safety climate. It is because safety climate is viewed as a “snapshot” of safety culture within the period of time. In short, researcher can get a preliminary view of safety culture by measuring safety climate.

2.3 Issues in Safety Culture

There are numerous elements in safety culture. These elements are also known as safety culture factors or safety climate factors. In this research, issues on five elements will be discussing. The elements are management commitment, work procedure, accident and near miss reporting practices, workplace communication and work environment.

In previous study, commitment of management has been discussed as an important action in aiding organization to achieve outstanding safety performance (INSAG, 2002). Furthermore, commitment of management is viewed as actual action in terms of engagement in safety practices than in written safety policies (INSAG, 2002). The management in the