

Factors Affect Safety and Health Behavior of Logistics Workers in Malaysia: A Conceptual Framework

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ABSTRACT

Workers in the logistics industry suffer high rate of occupational accidents as reflected in considerable share of occupational fatalities and lost-time injuries. Workers should be integrated into the management plans so as to yield the benefits of high efficiency workforce. This paper discusses the current safety and health status of the logistics industry. Previous studies of the organizational psychology have been developed to test factors influencing the acceptance of information technology. Similarly, while safety climate has been studied in numerous industrial settings, few studies limited attention has been given to the logistics sector. In the background of limited previous studies focused for injuries and fatalities in the logistics sector, the current studies will try to extend the findings in relation to the application of Decomposed Theory of Planned Behavior (DTPB). This paper proposes the decomposed theory of planned behavior to explain the relationship between safety behavior and performance. This paper provides a framework that identifies the factors affect safety performance. The framework will be tested empirically using data collected from logistics companies in Malaysia.

Keywords

Occupational Safety and Health, Safety Behavior, Decomposed Theory of Planned Behavior, Logistics and Accident.

1. Introduction

Logistics services span over sea, air, road and rail transport, and involve various services areas, including facilitation services, distribution, integrated services and business support services. In 2008, the transport and storage industry has contributed 8.4% of Gross Domestic Product (GDP) in Malaysia. According to the Labor Force Survey, by second half of 2008, they were 11.1224 million employed persons. The number of employed persons data show that the manufacturing sector employs 1.9576 million persons (17.6%), construction sector employs 1.0142 million persons (9.1%) and Transport, Storage and Communications sector employs 0.5337 million persons (5.1%) of the work force. The Occupational Safety and Health (OS&H) policy framework includes regulations enacted in response to the need to counterbalance the negative effects of the industrial revolution. With emergence of industry activities, Factories and Machinery Act (FMA) 1967 was enacted to protect workers working with machineries. The major policy concerning OS&H was Occupational Safety and Health Act (OSHA) 1994 formulated that includes a general duty for employers.

The Ministry of Human Resources was quoted in the Harian Metro that there were 55,208 workplace accidents reported in 2009, where 20,814 cases happened during commuting to or from workplace, and 35,394 cases happened at the workplace [1]. There is a declining trend but the OS&H level need to be further improved to be on par with advanced nation and more need to do to curb occupational diseases. The Deputy Ministry of Human Resources was quoted in the New Straits Times that there were 669 occupational disease cases recorded in 2009, most of the cases

were related to problems involving the lungs, skin, hearing and musculoskeletal structure, caused by chemical and biological agents[3]. The Deputy Ministry of Human Resources was quoted in the *Harian Metro* that the Fatality Rate was 211 per 100,000 workers recorded in 2009 [2]. The Occupational Death was 1,046 in 1998 and dropped to 733 in 2006 but climbed to 981 in 2008. In 2006, there were 64 cases of occupational death in the construction industry i.e. 8.7% of occupational death cases in construction industry representing 1.7% of the industry's reported cases with 9.1% of workforce while there were 78 cases of occupational death in the transportation industry i.e. 10.6% of occupational death cases in transportation industry representing 2.2% of the industry's reported cases with 5.1% of workforce [58]. The un-proportionately high occupation death in the transportation industry in contrast of the construction industry is probably due to the latter's better OS&H management and practices as compared to the fragmented authorities in the transportation industry. There is increased attention being devoted to the area of fleet and work related road safety due to an awareness of workplace health and safety issues and the overall impact in Australia [27, 35].

The health behavior is related to the psychology in prevention of the diseases. Health Belief Model (HBM) is used in health behavior applications to help explain a variety of factors which influence health behaviors and actions [13]. Theory of reasoned action (TRA) was developed to explain individuals' voluntary or volitional behaviors [29]. This theory has been adopted in a variety of health promotion programming settings. TRA argues that social behavior is motivated by an individual's attitude towards executing that behavior. Hence, the change of behavior is a function of one's beliefs about the outcomes of the behavior and an evaluation of the value of each of those outcomes [45]. Theory of planned behavior (TPB) is an extension of TRA that it offers room to address those behaviors considered somewhat questionable with regard to being under volitional control of the individual [7, 8]. Decomposed Theory of Planned Behavior (DTPB) is an extended model of TPB. It contributes to the theoretical body of knowledge on safety by providing a new dimension for solving the issues and looking at the safety issue from a managerial and psychological perspective [59].

Safety is an important management aspect in the all companies. Both employer and employee have the responsibilities towards the safety at their workplace. According to International Labor Organization [38], an estimated 4% of gross domestic product (GDP) is lost with the costs of accidents and diseases through absenteeism, medical treatment, disabilities and survivor benefits. Social Security Organization (SOCO) paid out RM1.354 billion in compensation for all industrial accidents and occupational diseases in 2009 [58], for which the amount has crossed one billion Ringgit Malaysia mark in 2007 for the first time.

This study will focus at the distribution and warehousing services in Malaysia. Conventionally, the performance of logistics focuses on service quality and cost effectiveness. Safety is essential in order to protect the people at work from accident. It will be of concern if its safety standard is sacrificed with recruitment of local or foreign workers in the workforce who may have limited safety awareness due to cultural or education background. The targeted study focus is the logistics functions involved such as transportation and warehousing. The objective of this study is to contribute to occupational safety and health by looking at organizational internal factors, and external factors and safety performance outcomes. In this research, a number of considerations will be tested in order to improve occupational safety in logistics. This study is primarily conducted to ascertain the criteria used to measure the safety performance, and the factors that contribute to safety excellence in the logistics sector.

2. Literature Review

Many safety studies can be found in the construction industry, being generally the high-risk industry with the disproportionate high fatality rate among the industries. Researches related to the safety and health of the logistics workers are found in the Commonwealth countries especially Australia including Wishart and Davey [64], Wills, Biggs and Watson [62], Davey, Freeman, and Wishart, [21] and Newnam [46]. On the other hand, there is a large volume of studies has been carried-out in health behavior related to the psychology in prevention of the diseases comparing the suitability of various health theories and models especially among the healthcare professionals. Janz and Becker [40] reviewed critically forty-six studies in Health Belief Model (HBM) dimension for which the model has continued to be the focus of theoretical and research in the past one-decade until 1984. Their summary results provide substantial empirical support for the HBM with findings from prospective studies at least as favorable as those obtained from retrospective research. "Perceived barriers" was proved to be the most powerful of the HBM dimensions across the various study designs and behaviors. While both were important overall, "perceived susceptibility" was found a stronger contributor to understanding Preventive-Health Behavior (PHB) than Sick-Role

Behaviors (SRB), while the reverse was found true for "perceived benefits." "Perceived severity" was found the lowest overall significance ratios; however, while only weakly associated with PHB, this dimension was strongly related to SRB. Prentice-Dunn and Rogers [54] compared the organization and research of the Health Belief Model (HBM) and Protection Motivation Theory (PMT). DeJoy [23] reviewed the applicability of theoretical models of health behavior to workplace self-protective behavior, the value-expectancy, environmental/contextual, and behavior change models. Then, an integrative framework was proposed that conceptualizes four stages of self-protective behavior, and five general constructs were identified as being of either primary or secondary importance at each stage. The author proposed a framework that highlighted the need to target interventions to each of the four stages with emphasis assigned to environmental or situational factors in enabling and reinforcing self-protective behavior. Noar and Zimmerman [48] examined the understanding of health behavior theory (HBT) and reflected on ways that the field might move forward by suggesting a new agenda for HBT research. Dutta-Bergman [28] reviewed the health communication campaigns that represent the dominant cognitive approach, namely TRA, HBM, and the extended parallel process model (EPPM). The author summarized new directions in theory, methodology, and application of health communication campaigns with a polymorphic approach. Godin et al. [33] reviewed the studies of intentions and behaviors based on social cognitive theories (SCT). They concluded that the TPB appears to be an appropriate theory to predict behavior whereas other theories better capture the dynamic underlying intention.

Health related studies using TPB have been reported by Cooke, Sniehotta and Schu"Z [18], Giles et al. [32], Housman [36], Pawlak et al. [52], Tolma et al. [60] and Whitby, McLaws and Ross [61]. In particular, the TPB has been applied extensively in exercise or physical activity related studies reported by Blue et al. [14], Blue, Wilbur and Marston-Scott [15], Bostick [16], Courneya and Bobick [19], Courneya, Nigg and Estabrooks [20], Hamilton and White [34], Kraft et al. [42], Levy, Polman and Marchant [43] and Yoo [65]. Application of TPB on occupational safety and health was made known by DeJoy [22], Downey and Sharp [26], Fogarty and Shaw [30], Johnson and Hall [41], Quick et al. [55], Sheeran and Silverman [57], and Zeydi et al. [66]. In recent years, the TPB also been applied in traffic related safety studies analyzed by Brijs et al. [17], Diaz [25], Newman, Watson and Murray [47], Paris and Van den Broucke [49], Parker et al. [50], Parker, Stradling and Manstead [51], Poulter et al. [53], and Wills, Watson and Biggs [63].

Within the industrial context of Malaysia, the literatures focused safety at the construction including Abdul Hamid et al. [4], Bakri et al. [12], Ismail and Torrance Abdullah [39], Ghani et al. [31], Ahmad [5], Misnan and Mohammed [44] and Idrus et al. [37]. In Malaysia, there is rather limited literature on OSH in logistics. Aini et al. [6] examined the emergency preparedness and response plans of the transportation companies, and they found that the common problems found in the companies were that they did not have a proper management system of safe management, had inadequate training of personnel, and the machinery was not provided with appropriate tools and equipment for emergency response during mishaps while the employees lacked general awareness and principal knowledge of emergency response. Rashid [56] developed transportation risk analysis, Smart Advisory System, a decision supporting system, as a risk management technique that analyzed the risks and its uncertainty of accidents during the transportation of hazardous material.

3. Methodology

The theoretical framework is depicted to investigate the influential factors or independent variables that may affect the safety outcome the dependent variable. Causal attributions reflect an important link between OSH problems and the actions that are taken to manage them, where the actions to manage safety may derive more from attributions than from actual causes. It is hypothesized that an understanding of the beliefs employees hold about safety and health risks and the causes of accidents, as well as their perceptions of risk targets and the need for safety, are important precedents to effectively manage risk and design preventive measures, and ultimately reduce the occurrences of accident. Previous studies of the organizational psychology have been developed to test factors influencing the acceptance of information technology. Similarly, while safety climate has been studied in numerous industrial settings, few studies limited attention has been given to the logistics sector context. In the background of limited previous studies focused for injuries and fatalities in the logistics sector, the current studies will try to challenge to extend the findings in relation to the application of Decomposed Theory of Planned Behavior (DTPB).

The model will contribute to identifying effective ways to promote safety behaviors and awareness of the logistics workers. The TPB will be applied to organization i.e. at company level in the context of workplace safety. The purpose of this study is to measure logistics employees' safety intention. Three dimensions affect attitudinal beliefs;

they are relative advantage, complexity, and compatibility [59]. Subjective norm comprises of normative beliefs which include significant referents like family and friends while factors such as facilitating conditions and self-efficacy are expected to have an effect on perceived behavioral control [10]. Examples of key facilitating conditions are budget allocation, time or other facilities that are needed for usage of a technology. Four hypotheses based on the TPB were used to confirm the effectiveness of this study. The data will be decomposed each belief, as described for each behavior. The variables will be tested in these hypotheses:

- Hypothesis 1: Perception of the effectiveness of safety behavior (attitude) would be positively correlated with intent to adapting and maintaining to safety behavior.
- Hypothesis 2: Perception of adopting and maintaining safety behavior by people important to the individual (subjective norms) would be positively correlated with an individual's intent adopting and maintaining safety behavior.
- Hypothesis 3: adopting and maintaining safety behavior and intent to adapting to this behavior would be positively correlated with the degree of perceived control over the ability to adopting and maintaining safety behavior.
- Hypothesis 4: adopting and maintaining safety behavior would be positively correlated with intent to adopting and maintaining safety performance.

As the primary objective of this study is to identify factors related to successful safety management in a logistics environment, the study is a correlation study. In this research, a survey will be carried out with the questionnaire to be distributed. There will be questions to determine safety awareness, safety perception and the current safety management importance and priorities in terms of investments. Amongst others, the questionnaire will focus on compliance assessment in the organization; policies and guidelines for safety management, safety inspections, risk prevention and emergency preparedness and response (EPR), critical economic, legislative and operational issues, accidents and injury occurrences and post accident activities. The targeted population for this study would be management and staff from logistics sector in Malaysia. The sample would be the logistics leaders and staff. The collection of data planned to be carried out by the end of 2010. In this study, SPSS software will be applied to elaborate the result of the analysis. To measure the reliability of the study, data analysis will be used including frequency distribution for several of the measures, and hypothesis testing. Factor analysis will be used to determine empirical scales of the questionnaire, and variance analysis to test the hypotheses. A pilot study involving employees of a warehouse selected through personal contacts will be carried out. The trial analysis can be performed on the pilot sample and hence the analysis procedures tested. An interview on the questionnaire's design will also be conducted to ensure that the cover letter, information sheet, questionnaire format, instructions and questions were clear and understandable by the respondents, and to detect any flaws. The average time taken to complete will also be noted. Any flaws detected in the questionnaire can be corrected prior to the main survey. Having the pilot survey completed, amendments will be made that will help to maximize the response rate and minimize error rate on answers.

4. Conclusions

As reported by AuYong [11], the last OSH regulation, the Notification of Accident, Dangerous Occurrence, Occupational Poisoning and Occupational Disease (NADOPOD) Regulation has been enacted in 2004. However, there is no more new regulation introduced since. In relation to ergonomics of manual handling, the related regulation was the aged Safety, Health and Welfare Regulation 1970. For the transportation sector, there was Code of Practice on Safety Health and Environment for Transportation Sector published in 2007. Enactment of latest regulations such as the Global Harmonized System for hazardous substances and Transportation of Dangerous Goods for road transport need to be hastened while latest issues such as mental health and metabolism syndromes are not given much attention yet. Evaluating indicators for effectiveness of the OSH policies found that though the industrial accidents cases and rate were decreased, the fatality cases and rate were not reduced as much, more so in the transportation sector. Effective protection of the worker remains a challenge and the national OSH target has not been reached that more effort is needed. In particular, greater participation of the worker is required. There is a need to further stipulate legal requirements with enhancement in safety and health management, training and medical monitoring for early detection and effective treatment to implement dynamic safety and health practices of the decent work agenda. Safety management is complex, usually required extensive and collective attention to a broad aspect of human, budgetary and technical variables. It is vital to identify factors that contribute to the successful implementation of safety management and to identify the factors' relative importance.

Previous studies of the organizational psychology have been developed to test factors influencing the acceptance of information technology. Similarly, while safety climate has been studied in numerous industrial settings, limited studies limited attention has been given to the logistics sector context. In the background of few previous studies focused for injuries and fatalities in the logistics sector, the current studies will try to challenge to extend the findings in relation to the application of Decomposed Theory of Planned Behavior (DTPB). Within the DTPB framework, the factors of motivation, subjective norm and perceived behavior control are the independent variables contribute to safety behavior. Therefore, this study will identify the influencing factors for safety excellence, particularly in the logistics context. Being a conceptual paper, this paper provides a framework that identifies the factors for excellence safety performance. The framework is expected to be tested empirically using data from firms with logistics functions in Malaysia. Overall, organizational culture and environment seem to affect safety climate and safety culture, and the success of OSH will help reduce accidents in the logistics sector.

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