Investigation of Safe Behaviors in Small, Medium, and Large Food Companies in Thailand

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Abstract

Thai food industry employs a massive number of skilled and unskilled workers; this causes the industry high incidences and accident rate. To improve safety, this paper investigates safe behaviors in small, medium, and large food companies in Thailand. Four factors, including 'management commitment', 'workers and partners' role', safety information and communication', and 'risk', are found important in improving safety. The small, medium, and large sized companies agree that 'risk' is the important factor in improving safety. Safety communication and safety resources should, on the other hand, be encouraged in the small and medium sized companies. Management should also promote a supportive environment to improve safety.

Keywords: food companies, safe behavior, safety factor, Thailand

Introduction

The food industry comprises a complex network of activities pertaining to the supply, consumption, and catering of food products and services across the world. The industry employs a massive number of skilled and unskilled workers. According to the Board of Investment (BOI, 2010), Thailand has become one of the world's largest and most advanced producers and exporters of processed food products, and is currently the world's largest producer and exporter of the canned pineapple, pineapple juice, processed chicken, canned and frozen seafood, rice, flour and starch, and processed shrimp. Thailand's export-oriented food industry brings in about $10 billion dollars annually, and comprises up to 28.3% of Thailand's gross domestic product (GDP) (BOI, 2010). However, the number of injuries and fatalities in the manufacturing industry, including food industry, in the last seven years was raised by 17.65% (Department of Industrial Works, 2006). This, in turn, de-motivates workers and affects the overall cost, productivity, and reputation of the industry.

According to the Department of Industrial Works (2006), most of the accidents derived from unsafe behavior and unsafe equipment. Improving safe work behaviours can undoubtedly help organizations to control and reduce their costs, and increase the efficiency of their operations in the long term.

Safe Behavior

Behavioral safety is a process that creates a safety partnership between management and the workforce by continually focusing everyone's attention and actions on their own, and others, safety behavior. It typically involves creating a systematic, ongoing process that

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clearly defines a finite set of behaviors that reduce the risk of injury within an organization, collects data on the frequency and consistency of those behaviors, and then ensures feedback and reinforcement to ensure support of those behaviors (Langford et al., 2000).

The safety of the workplace is influenced by a number of factors such as the organizational environment, management attitude and commitment, the nature of the job or task, and the personal attributes of the individual (Rowlinson, 1997; Mullen, 2004; Aksorn and Hadikusumo, 2008). Safety related behavior at the workplace can be modified by addressing these major influences. The successful introduction of a behavioral safety process, focusing on identifying and reinforcing safe and reducing unsafe behavior, is one means of improving safety performance. Moreover, the similarities and differences in perceptions regarding safe work behaviors in small, medium, and large organizations must be investigated to effectively plan for safety improvement. This paper, thus, aims to investigate key factors influencing safe behaviors, as well as perceptions of safe behaviors in small, medium, and large food companies in Thailand.

Key Factors Influencing Safe Behavior

Based on a number of manufacturing and food-related literatures, a total of 26 items, associated with safe behaviors, are extracted as follows.

1. Role overload (ROL): Workers who experienced role overload tend to focus on performance rather than safety (Mullen, 2004).
2. Safety training (STN): Training should be used to motivate and assist workers to work safely (Langford et al., 2000).
3. Safety resources (SRS): Abudayyeh et al. (2006) mentioned that the goals of safety program cannot be accomplished without adequate safety resources.
4. Perceived risk (PCR): The nature and amount of risk perceived by a worker dictate a particular work action (Mullen, 2004).
5. Risk assessment (RAS): Risk assessment, including all potential risks (such as accidents and injuries, regulatory issues, and environmental releases) should be included in safety-planned activities (McDougall, 2004).
6. Workers' capability (CPT): Mohamed and Fang (2002) stated that workers' adequate knowledge, skill, and ability to their works, especially toward risks and dangers in their work, may minimize accidents.
7. Workers' relationship (WRL): Olcott (1997) stated that workers who continually interact with coworkers also rely on them to a great extent to provide a safer work environment.
8. Work environment (WEV): Suitable mechanical plant on site is a recipe for safety (Langford et al., 2000).
9. Safety information (SIF): Chan et al. (2004) described that an inadequacy of the safety data collection leads to the lack of focus in safety campaign, and the inability to measure the effectiveness of the efforts.
10. Communication (CMN): Two-way communication is one of the key factors in improving safety culture (Little, 2002).
11. Management support (MGT): It is not just management participation and involvement in safety activity that is important, but also the extent to which management encourages the involvement of the workforce (Meshkati, 1997).
12. Top management commitment (TMC): An effective safety program requires top management commitment to safety (Akiner and Tijhuis, 2008).
13. Supervision (SPV): Supervisors should closely control all the workers activities. To ensure safety and prevent accidents (Akson and Hadikusumo, 2008).

14. Employees' Attitude (EAT): Employees' attitude indicates how employees act and they are treated. It determines whether a job will be performed safety (Aksorn and Hadikusumo, 2008).
15. Safety report (SRP): A good safety culture organization would generate a substantial number of high quality incident reports (Speirs and Johnson, 2002).
16. Safety budget (SBG): To achieve safety goals, financial resources should be allocated to aid health and safety policies (Wright et al., 1999).
17. Employee empowerment (EEP): Abudayyeh et al. (2006) stated that when people feel empowered, safety becomes their own personal goal and responsibility.
18. Feedback (FDB): According to Abudayyeh et al. (2006), monitoring the performance of the workers and using reliable feedback give safety manager a tool to improve their safety programs and technique.
19. Safety goal (SGL): Realistic safety goals are needed for effective safety implementation (Aksorn and Hadikusumo, 2008).
20. Safety documentation (SDM): Pasman (2000) identified the main elements of a safety management system as process knowledge and documentation, the records of design criteria, and the records of management decisions.
21. Safety accountability (SAC): To have an effective safety program, safety responsibility must be transferred to individuals at lower levels of authority (Akson and Hadikusumo, 2008).
22. Workers' involvement (WIN): Workers' involvement is very important in building workers awareness of safety program and accident or unsafe act investigation and reporting (Andi, 2008).
23. Teamwork (TMW): A safety program succeeds when all concerned parties from top to bottom hierarchical levels realize that preventing accidents is everyone's responsibility (Akson and Hadikusumo, 2008).
24. Safety incentive (SIN): Langford et al. (2000) suggested that reward system that compensates the workers for safe working whilst achieving desired levels of productivity must be devised.
25. Organization learning (ORG): ICAO (1992) claimed that organizations that learn from their experiences are found having better safety score and safety performance.
26. Stakeholders' involvement (PIN): Cooper (2000) stated that success in occupational health and safety management can only be achieved through teamwork especially between all project stakeholders.

These 26 attributes are used in developing the questionnaire survey to gather data for the analyses.

Questionnaire Survey and Preliminary Analyses

The questionnaire survey is developed based on the 26 extracted items. Targeted respondents are worker and management levels in the small, medium, and large sized food companies. A total of 450 questionnaires are launched, with 383 returns, representing 85.11% in the response rate. From the returned responses, 23 are unusable due to data incompleteness, resulting in a total of 360 questionnaires for further analyses. Among the respondents, 72% are in worker level. Moreover, half of the respondents have working experience of at least 5 years, both in their current organization and in the food industry. This indicates the reasonably high working experience of the respondents.

After the data is gathered, the normality test and the outliers test are performed to increase confidence in the data. The results reveal that no skewness and kurtosis values exceed limits, thus concluding the normal distribution of the data collected. However, the outliers test leads to reduction of one data, thus resulting in 359 data for the exploratory factor analysis.

Exploratory Factor Analysis

After conducted preliminary analyses for increasing confidence in the data, an exploratory factor analysis is performed. This analysis is used to explore relationships among variables, in effort to generate theory or facilitate construct formulation. The results help inform construct development (Stevens, 2002).

In this paper, the principle components analysis, together with the eigenvalue over 1, factor loading of 0.35, and the varimax rotation method, are used to perform the exploratory factor analysis (Tabachnick and Fidell, 2007). The first run leads to the removal of the 'teamwork' item, as it has factor loading less than 0.35. The remaining 25 items are then reanalyzed, and the results extract seven factors. The reliability test is then performed to measure the internal consistency of the factors extracted. Cronbach's alpha value of 0.6 or more is considered acceptable for the reliability test (Garson, 2009). The result reveals two factors with alpha values less than the lower limit. As the result, the four items associated with these two factors are deleted. The exploratory factor analysis is, then, performed again to reconfirm the remaining 21 items within the five factors. The results are as shown in Table 1.

Factor 1 consists of six items describing mainly on management commitment to safety; therefore, it is called 'Management Commitment' (MCM) factor. This is confirmed by Rowlinson (1997) that successful safety program should be initiated from top management of an organization. Factor 2 is associated with four items that explain mainly on stakeholders' role of safety. According to Abudayyeh et al. (2006), workers who participate in policy making are more motivated to carry that policy and improve on it through personal responsibility and continuous feedback. This factor is, then, called 'Stakeholders' Role' (STR) factor. Factor 3 has three items describing on safety information and communication; it is thus called 'Safety Information and Communication' (SIC) factor. Factor 4 consists of four items explaining on supportive environment to improve safety. Therefore, it is called 'Supportive Environment' (SUE) factor. Lastly, factor 5 has four items detailing mainly on risks. It is thus called 'Risk' (RSK) factor. The five factors extracted are confirmed with the reliability test. The results, as shown in Table 2, are considered acceptable.

To investigate the similarities and differences of safe behaviors in small, medium, and large sized food companies, the analysis of variance (ANOVA) is next performed.

Table 1. Factor Analysis of the 21 Items

Item	Factor				
	MCM	STR	SIC	SUE	RSK
SPV	0.65				
EAT	0.64				
EEP	0.63				
MGT	0.55				
SRP	0.50				
TMC	0.48				
ORG		0.70			
PIN		0.69			
WIN		0.60			
SGL		0.42			
SIF			0.72		
CMN			0.68		
FDB			0.63		
CPT				0.66	
STN				0.62	
ROL				0.57	
SRS				0.49	
RAS					0.70
WRL					0.61
PCR					0.55
WEV					0.55

Table 2. The Reliability Test Results

Factor	Cronbach's Alpha
Management Commitment (MCM)	0.69
Stakeholders' Role (STR)	0.61
Safety Information and Communication (SIC)	0.65
Supportive Environment (SUE)	0.60
Risk (RSK)	0.62

Analysis of Variance

The analysis of variance (ANOVA) is the most widely used method of statistical analysis of quantitative data. It calculates the probability that differences among the observed means could simply be due to chance (Festing, 2006). In this paper, the one-way ANOVA is performed to test if the small, medium, and large sized food companies perceive differently on the five safe behaviors factors. According to Lund Research (2010), if the significance value of a factor is less than 0.05, then there are statistically significant differences between groups. The results in Table 3 reveal that only the 'Risk' (RSK) factor bears higher significance value than 0.05. This can be explained that the food companies with different sizes hold different perceptions of safe behaviors on 'Management Commitment', 'Stakeholders' Role', 'Safety Information and Communication', and 'Supportive Environment' factors. To confirm this finding, turkey test is performed. Linton and Harder (2007) stated that the turkey test is a single-step multiple comparison procedure and statistical test, generally used in conjunction with an ANOVA to find which means are significantly different from one another. The test results are illustrated in Table 4.

Table 3. The ANOVA Results

Factor	Significant Value
Management Commitment (MCM)	0.02
Stakeholders' Role (STR)	0.02
Safety Information and Communication (SIC)	0.00
Supportive Environment (SUE)	0.01
Risk (RSK)	0.09

Table 4. Turkey Test Results

Dependent Variable	(I) Size	(J) Size	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
MCM	1	2	-.09	.06	.27	-.25	.05
		3	.08	.06	.40	-.07	.23
	2	1	.09	.06	.27	-.05	.25
		3	.18*	.06	.01	.03	.33
	3	1	-.08	.06	.40	-.23	.07
		2	-.18*	.06	.01	-.33	-.03
STR	1	2	-.17*	.06	.02	-.32	-.03
		3	-.08	.06	.36	-.23	.06
	2	1	.17*	.06	.02	.03	.32
		3	.08	.06	.34	-.06	.23
	3	1	.08	.06	.36	-.06	.23
		2	-.08	.06	.34	-.23	.06
SIC	1	2	-.25*	.08	.01	-.44	-.08
		3	-.02	.08	.95	-.20	.16
	2	1	.25*	.08	.01	.08	.44
		3	.24*	.08	.01	.06	.42
	3	1	.023	.08	.95	-.16	.20
		2	-.24*	.07	.01	-.42	-.06
SUE	1	2	-.20*	.06	.01	-.35	-.06
		3	-.10	.06	.23	-.25	.04
	2	1	.20*	.06	.01	.06	.35

Note: *The mean difference is significant at the 0.05 level.

To further investigate the similarities and differences in safe behaviors in the 'Management Commitment', 'Stakeholders' Role', 'Safety Information and Communication', and 'Supportive Environment' factors, the ANOVA is reanalyzed.

Analysis of Variance of the 'Management Commitment' Factor

Turkey results in Table 4 reveal that medium and large sized food companies hold different perceptions of safe behaviors in the MCM factor, especially in the 'supervision' item (as shown in Table 5).

Table 5. ANOVA Results of the MCM Factor

Item	Significance Value
TMC	0.05
EEP	0.10
MGT	0.99
EAT	0.24
SRP	0.28
SPV	0.03

Analysis of Variance of the 'Stakeholders' Role' Factor

Small and medium sized food companies hold different perceptions of safe behaviors in the STR factor, especially in the 'safety goal' item (as shown in Table 6). This might be because in medium sized companies, the manufacturers are forced to have safety standard in place to avoid any risks that might happen (Department of Industrial Works, 2006).

Table 6. ANOVA Results of the STR Factor

Item	Significance Value
PIN	0.27
ORG	0.10
WIN	0.07
SGL	0.02

Analysis of Variance of the 'Safety Information and Communication' Factor

Small and medium, as well as medium and large, sized food companies hold different perceptions of safe behaviors in the SIC factor in the areas of 'communication' and 'feedback' (see Tables 7 and 8).

Table 7. ANOVA Results of the SIC Factor in Small and Medium Sized Companies

Item	Significance Value
SIF	0.31
CMN	0.00
FDB	0.00

Table 8. ANOVA Results of the SIC Factor in Medium and Large Sized Companies

Item	Significance Value
SIF	0.30
CMN	0.08
FDB	0.00

Analysis of Variance of the 'Supportive Environment' Factor

Small and medium sized food companies hold different perceptions of safe behaviors in the SUE factor in the 'safety resources' item (as shown in Table 9). Due to limited budget, small sized companies might not be able to provide workers with adequate safety equipment.

Table 9. ANOVA Results of the SUE Factor

Item	Significance Value
STN	0.30
CPT	0.09
ROL	0.05
SRS	0.00

Conclusion

Safety is an important issue, and improving safe behaviors helps reduce accidents. Also, the similarities and differences in perceptions regarding safe work behaviors in small, medium, and large organizations must be investigated to effectively plan for safety improvement. It is found that different sizes of the organizations perceive and behave differently in the 'Management Commitment', 'Stakeholders' Role', 'Safety Information and Communication', and 'Supportive Environment' factors, while the organizations bear similar opinions on the 'Risk' (RSK) factor. These different perceptions should be aligned to achieve better safe behaviors.

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