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Research paper

Safety Advice and Safety Participation in OSHMS among OHSAS 18001 certified Malaysian Manufacturing Companies

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Abstract

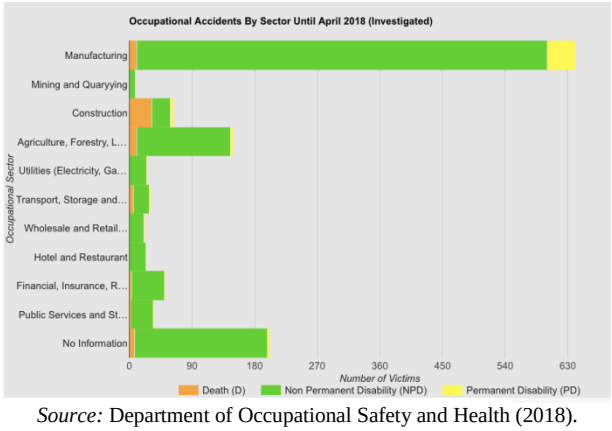
Lack of safety participation in Occupational Safety, Health and Environment Management System (OSHMS) has exposed employees to high risk of work hazards resulting in high occupational accidents. This does not only affect employee's morale towards work, but employer also needs to bear the cost of recovery and its effect to its reputation. This study was carried out to determine the relationship of safety capital (management safety commitment, safety training, extrinsic reward, intrinsic reward, employee involvement, safety communication and safety advice) and safety participation in OSHMS using the resource-based view (RBV) and knowledge-based view (KBV) theories. A total of 100 responses were collected from Malaysian manufacturing firms certified with OSHA18001. Data were analysed using the Smart Partial Least Square (SmartPLS). Results showed that safety training, extrinsic reward and employee involvement directly affect safety participation in OSHMS but not Management Safety Commitment, Intrinsic Reward and Safety Communication. However, Management Safety Commitment and Safety Communication indirectly affect safety participation in OSHMS moderated by high safety advice. As a managerial implication, this research showed that the role played by the safety officers represented by the safety advice is important in enhancing the safety practices and commitment in place to result in a successful safety participation in OSHMS.

Keywords: *Safety participation; OSHMS; Safety capital; Malaysian manufacturing*

1. Introduction

Manufacturing industry is the top three contributors towards Malaysia's GDP and recorded the highest number of occupational accident rate as shown in Figure 1. Workplace accidents not only affect employee's morale towards work, lost of talents and productivity but also means paying cost for recovery and affect to one's good reputation. Complying with the international safety standards of OHSAS 18001 is expected to help companies control accidents at work and improves organization's competitiveness in this area. However, complying with the requirements of OSHAS 18001 is not an easy tasks. Thus, as highlighted in the Malaysian's OSH-Master Plan 15, having Occupational Safety, Health and Environment Management System (OSHMS) by 2020 is the strategy to improve safety performance at the workplace and complying with OSHAS 18001 standards.

As OSHMS is a continuous improvement for safety program, the effectiveness of this safety management system depends on employees' full support through their unconditional involvement. Studies by Farouk, Richardson and Santhapparaj [1] highlighted that employee involvement still remain an important factor if we want a successful transition into the last phase of the master plan of OSH-MP 15 that envisages a systems approach. This is so important especially in the stage of implementation phase of risk control, active participation of managers, supervisors and workers is considered vital to meet the demands of OSH certification and standards [2,3,4,5]. Mansol and others [5] have explained that the transition process of adoption to the new system will involve a lot of adjustment which requires employees' commitment in term of



Source: Department of Occupational Safety and Health (2018).
Fig. 1: Statistics of Occupational Accidents by Sector until April 2018.

participation. Lack of employee participation has been identified as a major reason for the non-sustainability of the integrated management system [3].

The need to promote safety participation in OSHMS has been widely emphasised at local and global level [2,4,6,7,8]. In OSHMS, safety participation is considered an essential element. Safety participation represents the active behaviour of employees in ways that increase the safety and health of co-workers and that support an organization's stated goals and objectives [9].

The efficiency of an OSHMS is heavily depended on its capacity to encourage the involvement of the workforce and decentralize decision-making in this matter [11]. Although much literature has highlighted the importance of employee involvement in OSH, there is still lack of focus on long term sustainability of safety participation in OSHMS which is fundamental to stay competitive. This implies that safety participation in OSHMS is a critical element for an organization to implement OSHMS successfully and sustains its competitive advantage in the long run. Therefore, this study raises the research question of -"*what organization factors influence safety participation in OSHMS?*" To answer this research question, this study was conducted with the following objectives:

1. Does human capital of management safety commitment and safety training, structural capital of reward system (extrinsic reward and intrinsic reward) and social capital of employee involvement and safety communication influenced safety participation in OSHMS?
2. How does safety advice moderates the relationship between management safety commitment, safety communication and safety participation in OSHMS?

2. Literature Review

2.1 Management Safety Commitment

In order to achieve safer workplace, managers need to promote safety participation [12]. The employer's participation in terms of commitment towards employees' welfare at work play a very important role to the success of a management system. Specifically, past studies have shown that employees' behaviour and involvement in safety activities is positively influenced by the managers' safety commitment and by the safety management system implemented in the organization.[13] This is because managers play a dual role in influencing employees' attitudes as well as behaviours in reducing occupational accident rates at the same time [11].

As management prioritised safety behaviour, this will indirectly create a positive effect towards an organization's safety climate. Similarly, when employees perceive that management views safety as fundamental, such safety climate influences safety behaviour [13]; and tend to reciprocate by complying to safety rules and encourage participation in OSH related activities.

2.2 Safety Training

Study by Fernández-Muñiz et al. [14] have recommended that implementing a management system capable of decentralizing the decision-making in this area will require considerable safety training in order for it to function well. In other words, workers need to be provided with the knowledge, capabilities and skills needed to carry out their tasks safely at workplace [9,14]. Training will ensure that workers have the appropriate skills to help them in identifying the risks at work, and the procedures available to prevent, correct or minimize these risks [5,14,15]. Scholars affirm that employees are most knowledgeable about their work and involving them means using tacit knowledge of the worker and it is believed that a better decision will be achieved in eliminating and minimising risk [10,18].

According to Vinodkumar and Bhasi [10], safety training has proven to be an important ingredient for a successful accident prevention programme including an occupational safety and health programme. This is because safety training helps to improve behavioural skills related knowledge and/or attitudes. Thus, safety training has a positive affect in improving behaviours in making it become a daily habitual routine [18].

2.3 Reward System

Reward system plays an important organizational role in motivating employees to perform their daily tasks [19]. In order for safety management system to influence safety behaviour, a reward system should be established to support the continuous cycle of improvement in an organization [22]. Specifically, two main categories of rewards have been identified from the literature; the extrinsic reward and intrinsic reward.

Researchers have argued that extrinsic rewards included six (6) different categories [21,22]. First, individual based performance system refers to performance appraisals and pay increases that are based primarily on individual achievements. Second, profit sharing is a bonus plan that shares a portion of profits from the corporation with the employees. Third, gain sharing refers to the portions of individual work unit gain in productivity, quality, cost effectiveness, or other performance improvements which are shared with employees in the form of bonuses based on a predetermined formula. Forth, includes the employment security. Fifth, the overtime pay and finally quantity based performance appraisals.

As for the intrinsic rewards, it included 7 different categories [21, 22]. First, a non-monetary forms of recognition to acknowledge achievement. Second, having a celebration to acknowledge achievement. Third, having regular expressions of appreciation by managers to employee to acknowledge achievement. Fourth, a 360-degree performance appraisal wherein feedback from co-workers and/or customers is incorporated into performance appraisals. Fifth, having a suggestion system available for individual to make suggestion. Sixth, covers the use of developmental based performance appraisal. Lastly, continuous improvement based promotion wherein promotions are based primarily on the achievement of continuous improvement based goals [21, 22].

2.4 Employee Involvement

Employee involvement can be viewed as a process for empowering employees to participate in managerial decision-making and improvement activities appropriate to their levels in the organization. Specifically, for employee involvement to be effective, management needs to define the level of employee involvement. This can mean asking for input before management decisions are finalized, sharing the decision making process or allowing employee to make decisions [23]. In other words, employee involvement can be observed as behavioural oriented technique that involves individuals or groups in the upward communication flow and decision-making processes within the organization [10, 11]. Research had proven that employees who are involved in their work are excited about their job, at the same time care about the future of their company and are willing to invest their discretionary effort [24].

2.5 Safety Communication

Safety communication refers to regular communication about safety issues between managements, supervisors and workforce as an effective management practice to improve safety in workplace [10]. This two-way communication can be conducted through regular meetings, trainings, briefings, regular personal contact by way of walk-about, publications in the form of newsletters, e-

mails, memoranda and others. In addition, sign posts, caution signs, and other indications of safety are also used as regular feedback to communicate to employees on their safety performance [37]. Communication that links between workers and management when are kept open will enable the flow of information especially in area pertaining to safety matters [13]. Another purpose of communication is to make sure that everyone understands their roles and responsibilities in relation to safety and health at the workplace.

2.6 Safety Advice

Safety advice refers to the competency of OSH officers to provide advice to support and assist management to fulfill their safety obligation [25]. OSH practitioners are considered an integral part of an effective OSHMS and have a significant role to play in improving health and safety at work. The expert safety advice is recognized by the Institutional of Occupational Safety and Health (IOSH) to ensure high standards are achieved and maintained [26]. Their major role is to setup and run the OSHMS which includes preparation of policy, setting realistic objectives, establishing adequate systems, monitoring performance and reporting on this to senior management for review [25].

3. Research Framework

This study adopts the resource-based view (RBV) theory [29] and knowledge-based view (KBV) theory [28] as the basis for this research to address the critical set of resources in contributing to safety participation in OSHMS. Based on the RBV theory, a firm's ability to achieve its goals depends on specific organizational capabilities that the firm possesses and the firm's level of success in putting them to use as well as maintaining them [29]. The concept of safety capital is used to analyse the creation and composition of the intellectual capital embedded in OSHMS. Based on Nuñez and Villanueva [29] findings, the safety capital model includes the human, structural and social capital components. This is depicted in Figure 2.

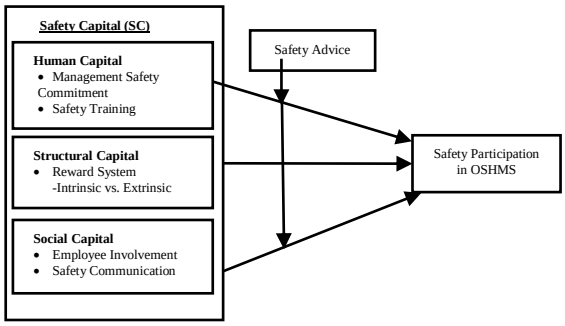


Fig. 2: The Relationship between Safety Capital, Safety Advice and Safety Participation in OSHE MS.

Based on the research framework, the following hypotheses were postulated.

H1: Management safety commitment has a positive significant relationship towards safety participation in OSHMS.
H2: Safety training has a positive significant relationship towards safety participation in OSHMS.
H3: Intrinsic reward has a greater positive effect than extrinsic reward towards safety participation in OSHMS.
H4: Employee involvement has a positive significant relationship towards safety participation in OSHMS.
H5: Safety communication has a positive significant relationship towards safety participation in OSHMS.
H6: The positive relationship between management safety commitment and safety participation in OSHMS will be stronger when safety advice is high.
H7: The positive relationship between safety communication and safety participation in OSHE MS will be stronger when safety advice is high.

4. Methodology

The sample population constitutes targeted respondents from the manufacturing firms in Malaysia that had successfully implemented the OSHMS and had received certification of MS 1722: 2011 or OHSAS 18001 for at least 3 years or more. The survey was restricted to organizations with continuous 3 years of MS 1722: 2011 or OHSAS 18001 certification as this was recommended in study undertaken by Podgorski [8] which states that a company that has implemented OSHMS with a minimum of 3 years certification can provide more reliable data as it is in a more stable functioning and improvement stage. This means that the organization had gone through the yearly audits and has been re-certified in the third year.

The list of the organization was acquired from the Federation of Malaysian Manufacturers (FMM) 2015 directory and SIRIM QAS International Sdn. Bhd registration. A total of 366 surveys were distributed, of which 100 were returned and usable for further analysis.

The measures of safety participation in OSHMS were adapted from Fernandez-Muniz et al. [27], safety advice were from Hinde and Ager [24] and intrinsic and extrinsic reward were adapted from Ozutku [22]. In addition, safety management commitment, safety training, employee involvement and safety communication were adapted from Vinodkumar and Bhasi [10]. All items were measured on a five-point Likert-scale, ranging from '1 = strongly disagree' to '5 = strongly agree'.

5. Results

5.1 Descriptive Findings

The breakdown of the size of the companies is shown in Table I. The majority (32.0%) of the manufacturing companies has more than 1000 employees. Table II shows that most of the companies are certified with OHSAS 18001 only for the past 3 years, which signifies new players of OHSAS18001.

In terms of job position as depicted in Table III, the respondents are distributed among the different managerial level. However, majority of them (74.0%) have been an OSH officers for more than 3 years (Table IV).

Table 1: Size of Company

No. of Employees	Frequency	Percentage (%)
1-50	1	1.0
51-150	17	17.5
151-500	28	28.9
501-1000	20	20.6
Above 1000	34	32.0

Table 2: Years Certified with OHSAS 18001

Tenure being Certified	Frequency	Percentage (%)
3 years	43	43.0
4-6 years	22	22.0

7-9 years	15	15.0
10-12 years	11	11.0
Above 12 years	9	9.0

Table 3: Respondents Job Position

Job Position	Frequency	Percentage (%)
Senior Manager	25	25.0
Junior Manager	28	28.0
Supervisor	15	15.0
Engineer	7	7.0
Safety Officer	25	25.0

Table 4: Tenure as OSH Officer

Tenure as OSH Officer	Frequency	Percentage (%)
Less than 3 years	23	26.0
4-6 years	23	26.0
7-9 years	12	13.0
10-12 years	19	21.0
Above 12 years	23	14.0

5.2 Convergent Validity

As reported in Table V, factor loadings, Average Variance Extracted (AVE) and composite reliability (CR) can be assessed to confirm convergent validity. Average Variance Extracted (AVE) is the mean variance extracted for the items loading on a construct and is a summary indicator of convergence [30]. An AVE value of .50 or higher is the rule of thumb for a good convergence [32].
Composite reliability was assessed for reliability, which is a measure of convergent validity. The composite reliability value should be above .70 in order to assure an accurate scale [30]. Table V shows that the estimates ranged from .79 to .92, indicating a good reliability result [32].

5.3 Discriminant Validity

Discriminant validity is the extent to which a construct is fully distinct from other constructs [32]. Discriminant validity is analyzed by comparing the square root of the Average Variance Extracted (AVE) with the correlations between the variables. All the square root of the AVE extracted was higher than the correlations values in the row and the column, indicating adequate discriminant validity [34].
In Table VI, the square root of the AVE is placed on the diagonal and the correlations for each construct is less than the square root of the AVE. Thus, the measurement model demonstrated adequate convergent validity and discriminant validity, confirming the construct validity and conceding to proceed for hypotheses testing.

Table 5: Result of the Measurement Model

Construct	Items	Loadings	AVE	CR
Safety Participation in OSHE MS	SPR1	.84	.78	.92
	SPR2	.93		
	SPR3	.88		
Management Safety Commitment	MSC1	.76	.75	.92
	MSC2	.87		
	MSC3	.82		
	MSC5	.63		
	MSC8	.87		
Safety Training	MSC9	.84		
	STR1	.78	.67	.86
	STR2	.81		
	STR5	.78		
Intrinsic Reward	STR6	.78		
	INR1	.66	.52	.87
	INR2	.79		
	INR3	.79		
	INR5	.71		
	INR6	.63		
Extrinsic Reward	INR7	.73		
	EXR2	.74	.56	.79
	EXR5	.86		
Employee Involvement	EXR6	.64		
	EI1	.74	.59	.81
	EI4	.85		
Safety Communication	EI5	.72		
	SCM2	.87	.67	.86
	SCM3	.75		
Safety Advice	SCM5	.83		
	SAD1	.74	.59	.88
	SAD2	.78		
	SAD3	.79		
	SAD4	.78		
	SAD5	.76		

Table 6: Discriminant Validity of the Variables

Variables	1	2	3	4	5	6	7	8
1.Safety Participation	.88	.54	.63	.47	.32	.61	.56	.50
2.Management Safety Commitment		.80	.78	.69	.50	.70	.78	.48
3. Safety Training			.79	.63	.42	.59	.68	.47
4. Intrinsic Reward				.72	.63	.62	.55	.43
5. Extrinsic Reward					.75	.46	.47	.48
6.Employee Involvement						.77	.71	.47
7.Safety Communication							.82	.53
8.Safety Advice								.77

Note. Diagonals (in bold) represent the square root of the AVE, while off-diagonals represent the correlations.

5.4 Hypotheses Testing

The relationship between the direct paths among the independent variable and dependent variable are discussed in this section. Five hypotheses were postulated for the relationship between safety capital and safety participation in OSHMS. Tests of the hypotheses findings indicated safety training, extrinsic reward and employee involvement to have positive influence on safety participation in OSHMS. In addition, safety advice moderates the relationship between management safety commitment with safety participation in OSHMS and safety communication with safety participation in OSHMS. The results are presented in Table VII.

Table 7: Path coefficient for safety capital and safety participation in OSHMS

H	Relationship	Path Coefficient (b)	SE	t-values	Results
H1	MSC➢SP OSHMS	0.7	0.2	0.4	No
H2	ST ➢ SP OSHMS	0.0	0.1	3.2***	Yes
H3a	IR ➢ SP OSHMS	0.8	0.1	0.2	No
H3b	ER ➢ SP OSHMS	0.2	0.1	1.3*	Yes
H4	EI ➢SP OSHMS	0.0	0.1	3.2**	Yes
H5	SCM ➢ SP OSHMS		0.7	0.1 0.4	No
H6	MSC ➢SA ➢ SP OSHMS			0.0 0.2	2.1** Yes
H7	SCM➢SA ➢ SP OSHMS			0.1 0.2	1.5* Yes

Note. *p < .1(1.28). **p < .05 (1.65). ***p < .01 (2.33).

6. Discussion

Firstly, management safety commitment was found not to have any direct influence towards safety participation in OSHMS. This result is not consistent with previous studies [9]. Different from a study of management safety commitment in the small medium firm as reported in Hong et al. [35], where management safety commitment was found to be significant towards safety participation or compliance, for a big firm, the direct relationship is not established. The effect of management commitment is diluted by the size of the firm and other factors may play a bigger role in driving compliance and participation.

On the other hand, safety training and employee involvement were found to have significant influence on safety participation in OSHMS. Specifically, safety training encourages safety participation in OSHMS. In addition, employee involvement with decision making process helps in encouraging safety participation of OSHMS. It is possible that active involvement of employees assist the end process of OSHMS participation. Both results are consistent with the earlier findings [9,11,15].

Safety communication was found to have no direct relationship with safety participation of OSHMS. This is inconsistent with previous studies [9, 11] as well. It is possible to imply that safety communication initiatives through the usual way may not influence safety participation. The company's huge size and the complexity of the relationship among the department in a big firm gives rise to the complexity of the effect of safety communication towards safety participation in OSHMS.

Apparently, this study only found that extrinsic rewards to influence safety participation of OSHMS. Thus, no comparison analysis was conducted for both rewards on safety participation of OSHMS as only extrinsic reward was found to be significantly influencing safety participation. Employees joining big firms have expectation of receiving a fat pay and bonuses at the end of the year which may differ from those joining the small firms. These are examples of extrinsic rewards clearly associated with joining big firms. Consistently, Khoo et al. [35] have found that monetary reward does not support employees' safety compliance in the small firms. These two contrasting findings with regard to extrinsic reward reaffirms the type of reward expected by employees correspond to the size of the business establishments that they joined. Future studies should conduct a comparison study to test whether employees' motivation to comply with safety practices is influenced by the size the firms. Consequently, big firms can use monetary rewards as a motivating factor to encourage compliance with safety practices. Thus, extrinsic rewards help to reinforce and sustain safety participation in OSHMS.

Finally, safety advice moderates the relationship between management safety commitment and safety participation in OSHMS. Specifically, there is a positive relationship between management safety commitment and safety participation in OSHMS when safety advice is high. This is illustrated in the plotted interaction effect in Fig. 3. Safety participation in OSHMS is highest when there is high management safety commitment and there is high safety advice presence. As mentioned earlier, the huge size of the company presented a complex relationship between the different departments. The presence of safety advice that is competent, represented by the high safety advice, enhance the management safety commitment towards realising safety participation in OSHMS.

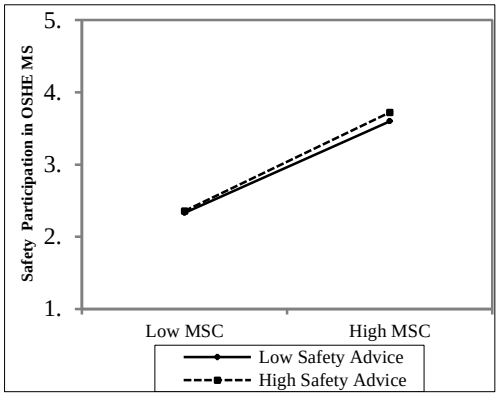


Fig. 3: Moderation effect of safety advice on the relationship between Management Safety Commitment and Safety Participation in OSHE MS.

The safety advice represents the role played by safety officers. The presence and appointment of safety officers are required in companies that are certified with OHSAS 18001. Their presence help to smoothen and connect the factors that matters in successfully achieving safety participation in OSHMS. The insignificant direct relationship of management safety commitment towards safety participation in OSHMS supports the role of competent safety officers in advising the management on safety matters to achieve safety participation in OSHMS is important. Future studies may investigate whether the role of the safety officers could replace the effect of management safety commitment. This may also lead a further understanding of the significant role of management commitment in safety practices. Hence, this implies that the role of safety advice is critical for big organisations that are implementing OSHMS. They may replace the role played by management commitment in smaller companies [36].

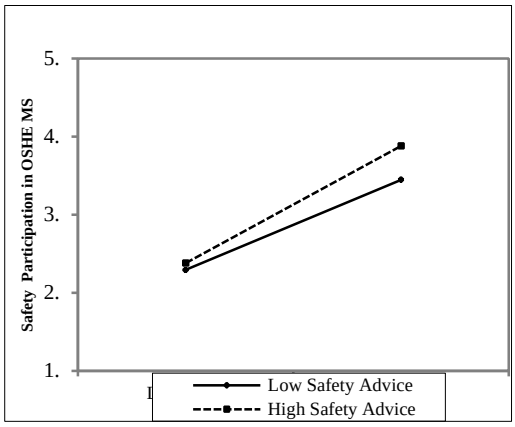


Fig. 4: Moderation effect of safety advice on the relationship between Safety Communication and Safety Participation in OSHMS.

Similarly, high safety advice moderates the relationship between safety communication and safety participation in OSHMS (Figure 4). Direct relationship of safety communication and safety participation in OSHMS is not supported. The competent safety officers presented by high safety advice in this study helps to enhance the delivery and effectiveness of safety communication to ensure that it leads to successful safety participation in OSHMS. This implies that safety advice is needed to bridge the safety communication to employees so that it could be translated into participation in OSHMS. It may be possible that without the role of a competent person, participation in OSHMS could be overwhelming or difficult to understand by others who are not specialising in safety practices. As we know from the insignificant result of safety training, safety practices applied in the workplace are very much technical. Future studies may want to investigate the different impact to safety practices or performance without the presence of a competent safety officers such as required in companies that are certified with OHSAS 18001.

7. Conclusion

The findings show that safety capital have a role to play in leading safety participation in OSHMS. Moreover, safety advice plays a very important role as a moderator to the indirect relationship between management safety commitment and safety communication with safety participation in Malaysia. Future studies may want to examine the moderating effect of safety advice for factors that are non-significant in influencing safety participation for OSHMS to substantiate the role of safety officers' competency. Employee involvement significant role also indicate the importance of knowledge held within those in the organization itself to be managed to sustain the implementation of OSHMS. Furthermore, big firms cannot depend on intrinsic rewards to encourage safety participation. Management in big firms have to look at the importance of using external rewards to encourage safety participation in OSHMS.

In conclusion, safety participation in OSHMS for big firms as studied in this study which may be different from a small firm. Thus, more studies is required to investigate the possible different effect the model may have on different size of firms. Nonetheless, safety capital is a concept where knowledge about safety is the key ingredient for organizations to influence safety participation in OSHMS. Successful implementation of OSHMS is important to sustain organizational competitiveness and business survival overtime.

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