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How do employees perceive the impact of health and safety policies on logistics delivery performance? A case study of a cement manufacturer based in Malaysia

Abstract

Objective: The study explores the perception of the impact of health and safety policies on the delivery performance of a cement manufacturer in Malaysia. **Methods:** Data was collected by adopting a case study methodology approach which involved interviewing staff at senior (2), mid (3) and operational (2) levels followed by a survey of 48 truck drivers, 8 observations and the intranet data. **Results:** Senior Management believe that a rigorous adoption of health and safety policies will result in long term competitiveness and beneficial for the organisation as a whole whereas operations, mid-level management and truck drivers believe that the health and safety policies are restricting delivery flexibility and responsiveness to customer's requirement. Health and Safety policies can have a negative impact on delivery flexibility on short term basis but in the long term it has reduced the time lost due to injuries which will positively impact delivery performance. **Practical applications:** The findings of this study will enable organisations to gain a deeper understanding about the impact of health and safety policies on delivery performance.

Keywords: work place safety, logistics delivery performance, truck drivers, logistics management, Malaysia, Cement Manufacturer

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1. Introduction

Gunasekaran *et al.*, (2001) states that ever increasing trend in globalization and customer orientation requires a logistics-sensitive organisation. Logistics has evolved from a classic transport function to a strategic, cross-functional and global discipline (Grant *et al.*, 2006). With logistics gaining increasing attention, a variety of measures (financial and non financial) has been developed to measure and monitor logistics performance and it has now become a powerful source of competitive differentiation (Mentzer *et al.*, 2001; Chapman *et al.*, 2003). Simultaneously, customer's emphasis towards "on time delivery" and techniques like 'Just in Time' is putting pressure on the logistics operations who are under constant pressure to reduce costs and provide better service quality.

Mayhew *et al.*(2006) argue that road transport operators are responding to competitive pressures largely by opting for larger trucks, using fleets more intensively, reducing driver payments by renegotiating rates or opting for trip/incentive based pay, shifting to self employed drivers, engaging cheaper drivers or getting drivers to work longer hours for the same pay. This can result in excessive work demands on employees resulting in work place accidents and lost productivity. Chatterjee (1996) cited by Rodriquez *et al.*, (2004) conclude that direct pressure from dispatchers forces drivers to work long hours under unsafe conditions. Kemp *et al.* (2013) supports this view by stating that professional drivers face a number of stressors while performing the job that includes internal pressure from management, time pressure and environmental factors, which can affect their attitudes and behaviours towards safety.

Long distance truck drivers in Australia tend to use psychostimulant drugs to manage fatigue with drivers on productivity-based systems are twice as likely to use drugs compared to normal drivers (Williamson, 2007). Based on study involving truck drivers in United States Beilcok (1995) concluded that driver fatigue is an important causational factor in accidents involving long range truck drivers and the assignment of difficult or unreasonable delivery schedule is the main contributing factor. Through a review of past studies related to sleepiness and driving, MacLean *et al.*, (2003) concluded that sleepiness may be a factor in about 20% of motor vehicle accidents.

In Malaysia, the setting of this study, commercial drivers are paid a basic salary and the rest is based on the number of deliveries which motivates them to work long hours which can result in fatigue and violation of safety regulations (Mohammed *et al.*, 2011). Statistics from Malaysian Institute of Road Safety Research (MIROS) indicates there were 414421

accidents, 68272 casualties and resulted in 6872 deaths in the year 2010 (MIROS, 2012). This equates to 3.43 deaths per 10,000 which is far higher than advanced nations like United States where the fatalities are 3.5 per 100,000. Between 2007 and 2010, MIROS crash investigation team investigated 439 fatal road accidents and of these around 30% of cases involved lorries (Abidin *et al.*, 2012).

Although the above context calls for a comprehensive and robust health and safety policies, Croucher *et al.*, (2013) argue that smaller firms are at a competitive disadvantage due to the costs and time involved in compliance with regulations by citing Lancaster *et al.*, (2003). Lancaster *et al.*, (2001) confirms that the costs of Occupational Safety & Health compliance to be disproportionate across different sizes, with large organizations being more likely to report that benefits outweighed costs. Moreover, businesses in Low Income Countries / emerging economies are dominated by informal economy and can result in lack of adherence to OSH regulations. For e.g. the fire at Rana Plaza clothing factory in Bangladesh (More than 1100 people were killed) is an example of the lack of compliance to health and safety policies (FCO, 2014). For logistics industry, Mayhew et al (2006) refer to a report published by the EU Directorate-General for Research, Division for Agriculture, Regional Policy, Transport & Development (2001, p.3) which paints a stark picture regarding health and safety practices.

... falling company profits will result in radical changes in wage structure and downward pressures on pay levels and social benefits ... Market observers describe the haulage industry as being riddled with illegal practices ... The restructuring of the transport sector which has been under way for several years now is likely to become an even more painful process when the Community is enlarged to include more countries with low wage levels ... Another problem is the threat to road safety that these poorly paid drivers could pose through fatigue or lack of food. There has been an increase in the number of detected cases of failure to comply with prescribed rest period ..."

The above discussion highlights the competitive landscape of the transportation industry and how health and safety is being compromised due to costs and maintain delivery performance. Cantor (2008) argues that the existence of supply chain risks such as workplace accidents induces a level of nervousness and chaos that makes it difficult to make sound supply chain decisions and is an area that is 'under researched'. Existing research focuses on the reasons behind high truck driver turnover (Suzuki, 2007), truck driver working conditions (e.g. Sabbagh-Ehrlich *et al.*, 2005), truck driver compensation (e.g. Belman & Monaco, 2005, p.44), employee perception of health and safety (e.g. Arboleda *et al.*, (2003), the bureaucratic impact of safety (Dekker W.A, 2014). The present paper adds to the existing literature by

investigating the perceived impact of work place safety standards on delivery performance. Hence we would like to propose the following research questions:

How do employees perceive the impact of workplace safety standards on delivery performance?

Rest of the paper is structured as follows: The discussion starts with a review of the indicators used for measuring logistics performance which is followed by a critical review of health and safety and its impact on delivery performance. The discussion then moves towards the case study organisation wherein a brief overview of the organisation is provided is followed by Research Methodology and finally discussion and conclusion.

2. Transport planning and scheduling

Transportation is the physical link connecting the fixed points in a logistics supply chain hence is a key integral process in contributing to the overall goal of successful supply chain management, the planning and control of material flow (Mason et al, 2007). According to Potter and Lalwani (2008) transport is more commonly treated as a discrete process and as derived demand, where cost has to be minimized within the constraints imposed upon it by supply chain. However, transportation has become a more critical business function and with raising transport costs, it now accounts for a larger percentage of cost of goods and also there is a strong correlation between customer satisfaction levels and transportation performance (Zhang *et al.*, 2005).

Transport planning and scheduling refers to the process of locating and allocating trucks to customer's orders. The biggest challenge is to strike a balance in the utilisation of resources when there is constant change in demand which calls for a flexible distribution system. Physical distribution flexibility is the ability of a firm to adjust the inventory, packaging, warehousing, and transportation of physical products to meet customer needs, quickly and effectively (Zhang *et al.*, 2005). This is an important capability as it is visible to customers.

A variety of measures and classification has been developed to measure, monitor and improve the transportation performance. Caplice and Sheffi (1995) argue that a single set of metrics capturing every nuance of every company's logistics operation is difficult to develop, however a set of common characteristics of "good" measurement systems can be developed. They argue that a good logistics performance measurement system should be comprehensive, causally oriented, vertically integrated, horizontally integrated, internally comparable, and

useful. Banomyang & Suptan (2011) propose a framework for measuring logistics performance by adopting Grant *et al.*, (2006) key logistics activities as the general framework. They identified a set of KPIs derived from CSCMP process standards and classified the metrics in three dimensions i.e. cost, time and reliability. They included reliability so that non financial metrics can be measured. Garcia *et al.*, (2012) propose a framework for measuring logistics performance in the wine industry. Based on the logistics activities identified by Frazelle (2002), they defined 6 key logistics processes: supply, production and bottling, inventory management, warehousing, transportation and distribution and customer response. They then identify four performance attributes for these activities which are Quality, Timeliness, Logistics and Productivity & Capacity. All the three studies have focussed on the entire logistics function and have identified transportation as a subset of logistics. Hence we short listed the KPI's that are relevant only for transportation and is summarised in table 1. We have grouped the metrics into Costs, Speed, Reliability, Resource Utilisation, Customer Satisfaction and Safety which combines the dimensions identified in the literature. In doing so, we have combined both financial and non financial metrics and most importantly we have identified safety as one of the metric. As indicated earlier, a good performance management system should be causally oriented which means the management of one metric will have an impact on other. With this assumption, we will investigate how employees tend to relate safety practices with delivery performance.

---Insert Table 1 here---

Truck drivers play a vital role in achieving the above metrics however the trucking industry is plagued with high driver turnovers and hence the forthcoming section will discuss about the challenges faced in the management of drivers. Suzuki (2007) analysed several studies that investigated the reason behind high driver turnover and concluded that Work condition and Compensation are the dominant factors. It is worth emphasising that the work conditions and compensation play a vital role in shaping the perception of health and safety.

3. Truck Driver Work Conditions

The trucking industry is highly competitive that operates on slim profit margins and with little differentiation, the customer loyalty is dependant on the quality of service. Under these circumstances, dispatchers are pressured to fulfil customer demands and the decisions they take will have a ripple effect on driver's work loads (Fournier *et al.*, 2012). In a research

carried out with 160 Israeli truck drivers, Sabbagh-Ehrlich *et al.*, (2005) identified that 38.1% of truck drivers have worked more than the 12 hours of legal limit, 30.6% worked more than 68 hours during the last working week, 13.8% were fined or fired for late arrival to a destination and 23.1% were verbally abused for being late to a destination. (Cantor, 2008) argues that in United States motor carrier industry some drivers are provided with questionable work schedules and become pressured to work beyond acceptable limits resulting in driver fatigue. Braver *et al.*, (1999) interviewed 270 dispatchers and found two thirds of dispatchers use rule of thumb average speeds while assigning schedules resulting in tight delivery slots for drivers and they end up violating safety regulations. Many studies have identified the role of dispatcher as a key factor in driver turnover (Richard, LeMay and Taylor, 1995; Stephenson and Fox, 1996; Keller, 2002; Morrow *et al.*, 2005; Paillé *et al.*, 2011).

Cantor (2008) calls for improvement in truck scheduling practices by incorporating ways to minimise the time that drivers spend away from home which can result in reduction of driver turnover and fatigue and improvement in overall delivery service.

4. Truck driver compensation

Truck drivers are generally paid on per metric tonnes basis, number of trips made (Sabbagh-Ehrlich *et al.*, 2005) and mileage (Belman & Monaco, 2005, p.44). Based on a survey involving 473 truck drivers, Sabbagh-Ehrlich *et al.*, 2005 concluded that only 10% of drivers are paid on hourly basis. They also calculated that typical drivers work around 3000 hours per year to earn a middle class income which is equivalent to 1.5 full time jobs. They argue that the low hourly wage is compensated by frequent violation of the hours of service rules, inadequate rest resulting in drowsiness while driving. Cantor and Terle (2010) supports this view by stating commercial drivers routinely violate rules governing maximum allowable work hours, thus are highly susceptible to highway collisions and near misses. Indeed driver fatigue is repeatedly cited as major contributor to motor carrier crash across the globe USA, Malaysia, (USDOT/FMSCA, 2006; Abidin *et al.*, 2012). Despite this, dispatch schedulers do not take into account the repercussions of assigning tight schedule to drivers, and in some instances drivers report feeling pressured by schedulers to continue driving even when they are fatigued (Arboleda *et al.*, 2003). Various studies have identified the role of dispatchers as a key factor for driver turnover (Richard *et al.*, 1995, Stephenson & Fox, 1996; Keller, 2002; Min and Lambert, 2002; Morrow *et al.*, 2005, Paillé *et al.*, 2011) Given the above issues

surrounding driver safety and performance, health and safety policies play a vital role in logistics forthcoming section will focus on the employee perception of health and safety policies.

5. A review of past employee perception studies

Employee perception studies are useful when there are diverse groups of employees affected either directly or indirectly due to the same policy. Various studies have been undertaken to capture the employee perception of safety. Toole (2002) identified the relationship between employee perception of safety and injury rates and highlighted the role of management commitment in creating a safety culture. Arboleda *et al.*, (2003) identified the role for fatigue training, driver opportunity for safety input and top management commitment to safety in strengthening the perception of safety culture. Fernandez-Muniz *et al.*, (2007) in their comprehensive study involving 455 Spanish businesses across various sectors proposed a model for positive safety culture and again established the role of managers in reducing the number of unsafe acts by employees. Some studies have identified the difference in perception between management and workforce (Cheyne *et al.*, 1998, Huang *et al.*, 2012). Huang *et al.*, (2012) explains the difference in perception by applying Gatekeeper model, increased opportunity to observe, social desirability and self assessment bias. They conclude that truck driver's perception of safety climate is derived from supervisor's interaction i.e. Dispatcher. Hence supervisor's interpretations about safety climate were higher than the truck drivers. Gyekye (2005) investigated the relationship between safety perception and job satisfaction of 320 Ghanaian industrial workers. By applying social exchange theory and reciprocity theory they established that workers who are satisfied with their job tend to score higher on work place safety. The study also identified those workers who scored negative on job satisfaction tended to report higher injury rates. Chen & Jin (2014) undertook perception studies of safety programs amongst 350 construction workers in U.S.A. More than 60% of the respondents felt safety programs slowed down the work progress.

Existing studies focus on the effectiveness / perception of health and safety programs, however there is no study that captures health and safety perception on a specific business function i.e. delivery performance. Fig 1 summarises the factors that can shape the employee perception of health and safety on delivery performance.

---Insert Fig 1 here---

6. Health and Safety: The other side

Although health and safety policies aim to improve work culture, there is a growing perception that it has become too bureaucratic and act as a constraint for growth. A quote from David Cameron, UK prime minister:

“Businesses are in the stranglehold of health and safety red tape... We are waging war against this excessive health and safety culture that has become an albatross around the neck of businesses”. David Cameron, UK Prime Minister, in meeting business owners (PMO, 2012)

Dekker, S.A. (2014) argues that the bureaucratization of safety has provided an array of benefits such as reduction of harm, standardisation, transparency, control and a reduction in favouritism. However it has also introduced pettiness, an inability to predict unexpected events, structural secrecy and a focus on bureaucratic accountability, qualification and “numbers game”, perceived constraints of employee’s freedom, diversity, creativity and has even hampered innovation. Hallowell and Gambatese (2009) undertook Delphi analysis with construction workers and concluded that the bureaucratic aspects of safety programs i.e. record keeping, accident analyses and emergency response planning were the least effective in improving employee safety. Besnard and Hollnagel (2014) critiqued six commonly held assumptions about safety related to human error, procedure, compliance, protection and safety, root cause analysis, accident investigation and safety first. Citing relevant examples, they argue that reliance on these assumptions makes safety management easier but they also make it flawed and ineffective. In some instances, they create more damage than benefit. There are several reports on main stream media highlighting the behaviour of people due to procedural and compliance issues. E.g. GP refuses to help 88 year old as he is not a ‘first aider’ (Chapman, 2014); Man drowned in shallow lake after fire service were not allowed to rescue him due to health and safety reasons (Quinn, 2012) and many more. Hence we argue that health and safety policies can create a positive working environment but can also hamper productivity.

7. Brief overview of the case study organisation

The case study organisation is a global leader in building materials with operations in 64 countries. They employ around 680,000 people and for the FY 2011, their revenues were 20 Billion USD. Their Malaysian operations focus on manufacture and sale of cement, ready

mixed concrete and other building materials and they employ around 1300 people. Due to confidentiality issues, the authors are unable to divulge the name of the organisation and hence will be represented as Organisation XYZ.

7.1 Road transport safety in the case study organisation

On time delivery is very important for this business as they transport ready mix cement which hardens with time. Moreover, they are delivered to building sites where storage space will be low hence the need for frequent replenishments. On 2011, the trucks covered on average of 140,000 Kms per day to from 800 to 1000 delivery points. They emphasize on four major occupational safety initiatives and standards which are confined space, working at height, energy isolation and transport safety. Occupational safety is given high priority within XYZ and it's embedded in their vision and mission statements. Zero accident and zero fatality is always the target set by XYZ in their safety objective. To achieve this excellence, XYZ strongly believes in the contribution from all employees; therefore it's committed to engage all employees in its Occupational Health and Safety improvement efforts. Employee participation in Health and Safety activities are encouraged and promoted through various activities such as annual driver safety day targeting truck drivers and their families. This event aims to create awareness about road safety. On the other hand, management is responsible for health and safety implementation, communication and compliance. The Health and Safety policy articulates senior management's health and safety philosophy, commitments and expectations, providing a visible guide for the entire organisation.

XYZ aggressively implemented safety standards starting year 2005. The immediate impact of the implementation in year 2005 was zero fatality for three year consecutive years. The fatality rate from two in year 2005, dropped to zero in the following year after safety policy, standards and advisories were introduced, rolled out and implemented nationwide. XYZ with three integrated plants, one grinding mill and four warehouses managed to roll out the standard across to all the sites. Table 2 depicts the health and safety performance of the case study organisation. In order to develop a better understanding of the data, the indicators were standardised against the number of trucks that were deployed for delivering goods. It can be inferred that there is a gradual drop in lost time injuries but a dramatic increase in the number of near miss incidents. This statistic highlights the development of safety aware culture within the organisation which has changed the mindset of drivers who are becoming safety aware and compliant.

----Insert Table 2 Here----

Safety Excellence Club (SEC) was launched at group level to encourage every business units (BU) to maintain clean safety record continuously for minimum two years. By maintaining zero fatality record between years 2006 to 2008 SEC membership was awarded. However they were automatically disqualified after fatality in year 2009. A comprehensive group Health and Safety management system (HSMS) was drawn to promote a safe and healthy working environment by providing a framework that can be used for identifying and controlling health and safety risks. It reduced the potential for injuries and occupational illness, improved overall performance. The HSMS is a overarching framework from which all other Health and Safety initiatives and documents such as Health and Safety Policy, Health and Safety road transport policy, Health and Safety engagement, Health and Safety roadmap and many more flows.

Transport is therefore viewed as a problematic area that specifically affects logistic performance and company's reputation in general. Furthermore it was quoted, "as of October 2011, there is an average of one road accident every 13 days and more than 70% of fatal accidents that occur in the group are road accidents. A very clear "driving policy" and "mobile equipment advisory" was developed and communicated throughout the organisation so that all employees, contractors, drivers and suppliers can understand and comply accordingly. The management believes that adoption of appropriate policies will result in reduced work place accidents and lead to a safe working environment.

8. Methodology

This research aims to capture employee's perceptions of the impact of road safety policy on delivery performance. With the research focussing on a single organisation, case study methodology was deemed to be appropriate (Yin 2003). An in-depth case study based approach involving document analysis; interviews, surveys and observation were adopted to address the research questions.

8.1 Driving policy analysis

Existing driving policy of the organisation was evaluated in line to identify the bureaucratic aspects of safety as argued by Dekker W.A. (2014). Being an international firm, the driving policy adopted by this case study organisation was on par with international standards. One

such policy that warrants discussion is the need for documenting the preoperational safety inspection walk prior to the journey. This specific policy requires drivers to complete a form after undertaking a visual check at the start of the shift. This will require additional five minutes but for a firm having thousands of truck movements can have a significant cost implication. Moreover it can result in a possible delay in the loading process. United States Government has recently amended this policy which means drivers will have to document only on cases if the drivers find some defects. They estimate this amendment will result in an annual savings of \$1.7billion and save 47.2 million man hours (Foxx, 2013).

8.2 Interviews

Seven employees at operational (5) and strategic level (2) were interviewed to understand their perception of health and safety policies and its impact on delivery performance. They were chosen based on their involvement in the development, execution and monitoring of health and safety policies, delivery performance. Table 3 provides the profile of the respondents who participated in the interview.

----Insert Table 3 here-----

A brief overview of the research and the purpose of the interview were communicated to the interviewees while seeking for an appointment. The interviews were semi structured which allowed us with some flexibility for collecting information on the field (Yin, 2003). The discussion was centred on two broad themes – Health and Safety policies, Relationship between policy and delivery performance. The entire conversation was recorded and transcribed for further analysis. General line-by-line analysis was undertaken.

8.3 Surveys

Forty Eight truck drivers were surveyed to capture their perception of health and safety policies and its impact on delivery performance. The group has three integrated manufacturing plants and one grinding plant scattered across Malaysia. For the purpose this research, the grinding plant located in southern Malaysia was chosen. This plant employs sixty five staff, thirty contract workers and about one hundred sub contracted drivers. This sample represents the entire sample of the group's Malaysian Operations.

After explaining the purpose of research, 48 questionnaires were distributed on a random day and drivers starting a specific shift. The questionnaires were distributed in English after we

established the driver's language skills. Since drivers are time pressed, we ensured that the questionnaire did not require more than 15 minutes of their time and did not have any open ended questions. The questionnaire had four broad themes: General background information about the driver, average working hours and the perceptions about health & safety policy, culture and logistics performance.

8.4 Observation

In order to obtain a clearer picture about the driver's adherence to driving policies, eight random participant observations were carried out. The observation was carried out under the pretext of a casual conversation with the drivers as revealing the real motive would alter the behaviour of the drivers. Prior to the observation, the purpose of the observation was discussed with the transport manager and appropriate internal clearance was obtained. The university's research ethics committee approved on the basis that no personal data of the drivers will be collected / divulged to the management and outcome of the observation will not be discussed with the drivers. By these means we sought to minimise the drivers' exposure to potential retaliation from management. Oliver and Eales (2008) acknowledge that rich data that can be collected through covert observation and debate about the ethical issues associated with this methodology. By presenting two case studies, they conclude that covert observation is the most appropriate method to investigate that specific phenomenon. Likewise, we believe covert participant observation is the best technique for observing drivers behaviour in their natural settings. This is similar to mystery shopping techniques adopted by retail chains.

9. Findings & Analysis

9.1 Management Interview:

All the respondents are aware about the role of safety culture and they believe it is crucial for long term success of the organisation. They believe safety standards, policies and practices lead to the creation of safety culture within the organisation. This is inline with the research undertaken by Small man & John (2001) who interviewed eight business leaders of FTSE companies and found that they perceive occupational health and safety as an important concept that could potentially impact on corporate reputation and profits.

When asked about its impact on the logistics delivery performance, all the respondents believe safety standards positively contribute to logistics performance. Respondents 1, 2, 3, 4

& 7 view logistics as a holistic business function whereas 5 & 6 view logistics from truck driver's perspective. This could be because of respondent's role and close relationships with truck drivers. They all believe that safety standards implementation is related to KPIs such as Safe and on time delivery of goods to customer sites, Reduction in damage to property (Trucks), Improve driver satisfaction, Reduction in truck breakdown and Minimising delivery failure.

Moreover, respondent 7 (Supply chain performance metrics manager) believes attainment of the above KPIs can result in overall competitive advantage as this will create a good impression and act as a confidence booster amongst customers. It was also identified that health and safety policy development and implementation has been a corporate wide initiative with senior management commitment and support. With regard to the relationship between safety standards and transport planning and scheduling, senior management stated that it lead to the procurement of new trucks and resulted in insufficient resources during the transit period. Respondent 6 (Supply Chain Executive) quoted capacity planning and scheduling issues especially when there is a surge in demand.

Respondent 6 (Supply Chain Executive)

“Availability of trucks and drivers will certainly affect logistics planning and scheduling. This is because those trucks found not complying with the standards will not be allowed to enter XYZ's premises until the problem is rectified. The main problem arises during sudden order surge period where additional pool of resources is required to support the additional order requirement. Supply chain department has to look around for additional trucks from other transport owners to fulfil customer requirement and the additional trucks normally doesn't comply with our safety standards. Besides that new drivers have to be trained on XYZ's safe practices as they know nothing. This will cause delay in the process hence customers will be unhappy”.

When asked about the impact of health and safety polices on time delivery and lead time, there is a mismatch on the views between senior management and logistics planners. Senior management were unsure about the connection between on time delivery and safety standards apart from occasional instances where a truck or driver has been suspended due to safety offences. However, supply chain coordinators (Respondent 4) who deal with the truck drivers on a day to day basis quote

Respondent 4 (Supply Chain Coordinators)

“Road safety guideline says drivers are not allowed to use mobile phones while driving. In practice the driver may need to answer the planners call and on the other hand customers sometimes will follow up directly with the driver by calling them also. Under such circumstances the driver either has to stop and park the truck before can answer the call or just ignore the call. This will create unnecessary problems and customers may not be happy when they do not know the status of their order”.

Similarly there is a mismatch in opinion between senior management and operations when they were queried about the relationship between safety standards and delivery flexibility, reliability and speed.

Quote from respondent 1 (Safety Manager)

Delivery flexibility, reliability and speed very much dependant on order and resource management. Delivery can be flexible if there is sufficient transport capacity to support and at the same time, delivery speed is also achievable with good planning. Doesn't mean that driver must be speeding on the road to arrive customer site on time. Therefore there are not related.

Quote from respondent 2 (Safety Coordinator):

“Safety standards implementation and delivery flexibility, reliability and speed do not have any relation. They are logistics performance indicators which depend on truck and driver performance. Also reflects customer service where there isn't any relationship between these attributes”.

Quote from respondent 5 (Logistics Planner):

“XYZ seems to be weak in fulfilling delivery flexibility requirement of customers when we are unable to load bag cement as per customer's requirement due to “No Overloading” standard which was in practice. Under journey management standard, XYZ also came out with a standard that stress on total number of allowed working hours which actually caused the inability of XYZ to deliver urgent loads. Therefore delivery speed seems to be affected”.

This view is also shared by respondent 6 (Supply Chain Co-ordinator) who quoted

“I can recall clearly about one of the standards which say no overloading and have caused XYZ to loose flexibility as we were unable to deliver tonnage based on customer’s different requirement”. This situation was very obvious in bag cement dispatches.

Relationship between delivery responsiveness and safety standards

There is a change in perception between respondents. Respondent 1 (Safety manager) believes that safety standard will ensure main assets drivers and trucks are maintained with appropriate care resulting in the ability to respond quickly to every customer needs. Respondent 2, 3, 4 & 5 indicate that safety standards restricts the business from recruiting new trucks during surge period resulting in inability to be responsive.

From the management interviews, it can be inferred that safety culture is recognised as a strategic initiative with top management support. All the respondents view safety standards implementation as a positive step and believe it positively contributes to logistics performance. However, there are minor differences in perceptions with regard to the impact of safety standards on delivery flexibility, responsiveness and on time delivery. Operations team seem to view safety standards as a hindrance during instances where there is a need for flexibility and responsiveness. At this juncture, the authors would like to emphasise that the fact these safety practices are not common with local transport companies in Malaysia and is relatively new to the case study organisation. Hence, it can be concluded from the management interview that there are both a positive and negative perception about safety standards implementation.

9.2 Truck Driver Survey

In order to better understand the impact of the safety standards, a survey was conducted with the truck drivers. With more than 100 drivers working at any given time, 48 truck drivers were randomly chosen and were surveyed about their understanding of safety standards and its impact on logistics performance. Likert measurement scale were used wherein respondents were asked to rate how strongly they agree or disagree with the statement on five point scale.

60% of the respondents were bulk drivers and 40% were bag drivers. This ratio was chosen to reflect the actual ratio that exists in the chosen dispatch office. With regard to driving experience, 37% of bag drivers and 51% of bulk drivers had more than 10 years of driving experience. Given the driver’s experience, it can be inferred that majority of the participants

will have a good understanding about the XYZ's safety culture and standards ensuring validity and reliability of the responses.

82% drivers are aware about the safety standards and 80% fully support the safety policies of the organisation. However, when asked about the impact of safety standards on delivery performance, 73% believe that standards are acting as a hindrance on delivery speed and restrict flexibility. 58% of drivers agree that they are under pressure to maximise the number of daily trips. 62% agree that they are unable to be responsive to customer's urgent order request due to existing safety policy, standards and practices. Another interesting finding is 79% of drivers have strongly agreed that planners do not take rest hours into account while assigning orders. Although planners schedule trips as per the regulations, drivers perceive differently. Fig 2 depicts these findings.

-----Insert Fig 2 here-----

9.3 Truck Driver Observation

83% of drivers have indicated awareness about health and safety practices and 80% fully support the regulations. In order to verify this finding, eight covert observations conducted. Table 4 provides the summary of the findings from the observation. From the observation, we identified that five out of eight drivers did not comply with the safety standards which are not acceptable as per the guidelines. The observation indicates the lack of alignment between the survey findings and the observation. Huang *et al.*, (2013) notes that trucking is as a lone worker's job which means their attitude towards health and safety can be compromised. As discussed earlier, no further actions were taken to explore the reason for non compliance due to ethical reasons.

-----Insert table 4 here-----

10. Conclusion

This study attempted to answer the question "How do employees perceive the impact of workplace safety standards on delivery performance?" Literature review uncovered health and safety policies, driving conditions, incentive system and management commitment are the main factors that shape the health and safety perception. Upon interviewing various stakeholders it can be concluded that there is a common understanding about the role and importance of health and safety policies for long term organisational growth. However, when

queried about its impact on delivery performance there is a slight change in perception. Senior management see no relation between health and safety standards and delivery performance whereas mid level management believe they are hampering delivery flexibility especially during erratic demand. Drivers acknowledge the importance and awareness of health and safety policies; however observation identified lack of compliance to the policies.

The survey feedback and observation confirms the fact that some truck drivers are not getting sufficient rest hours and planners are not taking fatigue into account while developing driver's rota. The trucking industry is extremely time sensitive and believe they generate more revenues by constantly keeping the trucks moving. Due to time pressures, they aim to reduce time devoted to loading and unloading activities by incentivising drivers to get involved in loading and unloading activities. These activities initially improve alertness by providing diversion and exercise; however, these effects wear off quickly and result in decreased driving performance after twelve hours of duty (Dawson et al, 2011). In Malaysia, truck drivers are paid a basic salary and paid incentive based on the loads / ton miles transported. The case study organisation is no exception to the remuneration structure. The incentive structure encourages drivers to work long hours / reduce break time. The Association of Malaysian Hauliers whose members control 80% of the Haulage industry has called for a minimum take home pay of RM3000 without working for long hours. It is hoped that initiatives of this kind will have a positive impact on the trucking industry in Malaysia (Hock, 2013).

The case study organisation has sought to implement uniform safety standards across the globe. However this is different to other local transport operators and they were faced with challenges in qualifying new fleet operators. This has ripple effects on transport flexibility which can be disadvantageous in times of demand surge ultimately resulting in loss of short term competitiveness.

Finally the conclusion we can derive from this research is safety standards have a positive impact on employee health as it can be inferred from the reduction in the number of days lost due to injuries. However, in the short-term health and safety policies on can restrict delivery flexibility and responsiveness.

11. Research Limitations:

This research focussed on only plant mainly due to time constraints and the geographical spread of other plants which are several hundred kilometres away. Due to the unavailability of the owners of the providers of third party logistics services, they were not included in the study. Private transport owners are also part of the XYZ's safety management system as they have to ensure that their drivers fully comply with all the safety standards.

12. Further Research

The case study organisation is a multi national enterprise and operates in environments with diverse health and safety regulations. It will be valuable to understand how different sites perceive the role of health and safety and its impact on delivery performance. These findings will help in developing effective policy development which impacts the delivery performance.

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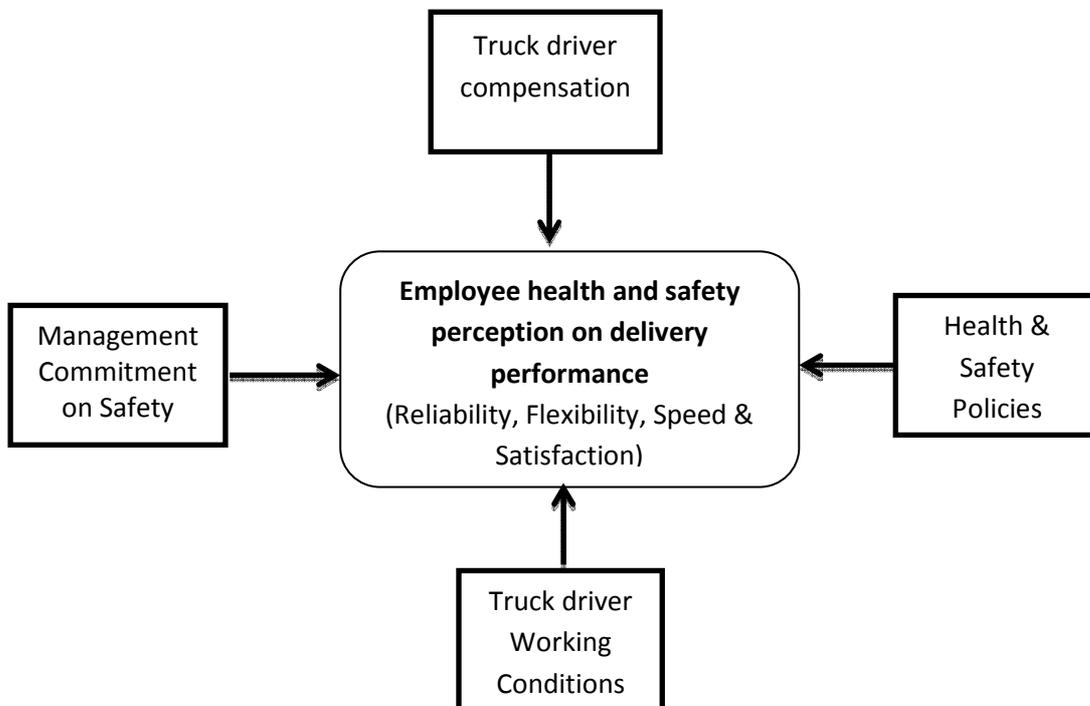
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Table 1: Key Performance Indicators for measuring transport planning and scheduling

<p>Costs Transportation Costs Per Mile Per Ton</p> <p>Delivery speed</p> <ul style="list-style-type: none"> • Average delivery cycle time <ul style="list-style-type: none"> ○ Loading time ○ Order picking time ○ Driving time • Ton miles transported • Number of trips per day <p>Delivery Reliability</p> <ul style="list-style-type: none"> • Percentage of on time and in full deliveries 	<p>Resource utilisation and Delivery</p> <p>Flexibility</p> <ul style="list-style-type: none"> • Truck idling time • Actual versus forecasted resource usage <ul style="list-style-type: none"> ○ Trucks ○ Staff (Recruitment of additional staff) <p>Customer satisfaction</p> <ul style="list-style-type: none"> • Number of complaints • Demand backlogs (E.g. postponement of the delivery date) • Damage rate <p>Safety</p> <ul style="list-style-type: none"> • Number of incidents causing lost time
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(Adapted from - (Caplice and Sheffi, 1995), Banomyong & Supatn (2011), Garcia et al., (2012))

Fig. 1: Factors that contribute to employee perception of the impact of health and safety policies on delivery performance



Source: Authors

Table 2: Road Safety Performance at XYZ

Year	Fatality	Lost Time Injury	Medical Injury	First Aid	Near Miss	Number of Trucks	Lost Time Injuries / Truck	Injury / Truck	First Aid / Truck	Near Miss/Truck
2001	1	28	-	-	-					
2002	1	10	-	-	-					
2003	1	10	-	-	-					
2004	0	6	158	28	69	650	0.92%	24.31%	4.31%	10.62%
2005	2	4	172	26	86	700	0.57%	24.57%	3.71%	12.29%
2006	0	6	133	36	101	723	0.83%	18.40%	4.98%	13.97%
2007	0	7	20	48	106	747	0.94%	2.68%	6.43%	14.19%
2008	0	2	12	41	200	832	0.24%	1.44%	4.93%	24.04%
2009	1	4	16	17	250	850	0.47%	1.88%	2.00%	29.41%
2010	2	2	5	19	650	867	0.23%	0.58%	2.19%	74.97%
2011	2	3	1	8	700	903	0.33%	0.11%	0.89%	77.52%

Source: Corporate Intranet

Table 3: Profile of the Interview Participants

Respondent Code	Position	Hierarchy Level	Responsibilities
1	Safety Manager	Strategic	Implement and upkeep safety standards and practices as per the group standards and advisories. Also responsible for ensuring safety performance of the plant and at the same time provide safe working environment to everyone related directly and indirectly with their business and day to day operations
2	Safety Coordinator	Managerial	Provide assistance to safety manager
3	Safety Executive	Managerial	Implement road transport safety standards according to business unit and group requirement, ensure road transport safety compliance in all the plants by all sub contracted truck drivers.
4	Supply Chain Coordinator	Operations	Assist supply chain executive, deal with customer complaints, manage transport suppliers and driver related issues
5	Logistics Planner	Operations	Coordinate and monitor resources and order allocation process. Responsible for ensuring the effectiveness of order allocation and truck

			optimisation.
6	Supply Chain Executive	Managerial	Monitor the performance of logistics department, responsible for achieving safety and logistics performance targets set within the plant as well the business unit.
7	Supply Chain Performance Metrics Manager	Strategic	Monitor the performance of supply chain department based on existing performance dashboard specifically On Time In Full – Invoice Correctly. Propose appropriate action plan to cope with changes that happens across the supply chain.

Fig 2: Driver's response to the impact of health and safety practices on delivery performance

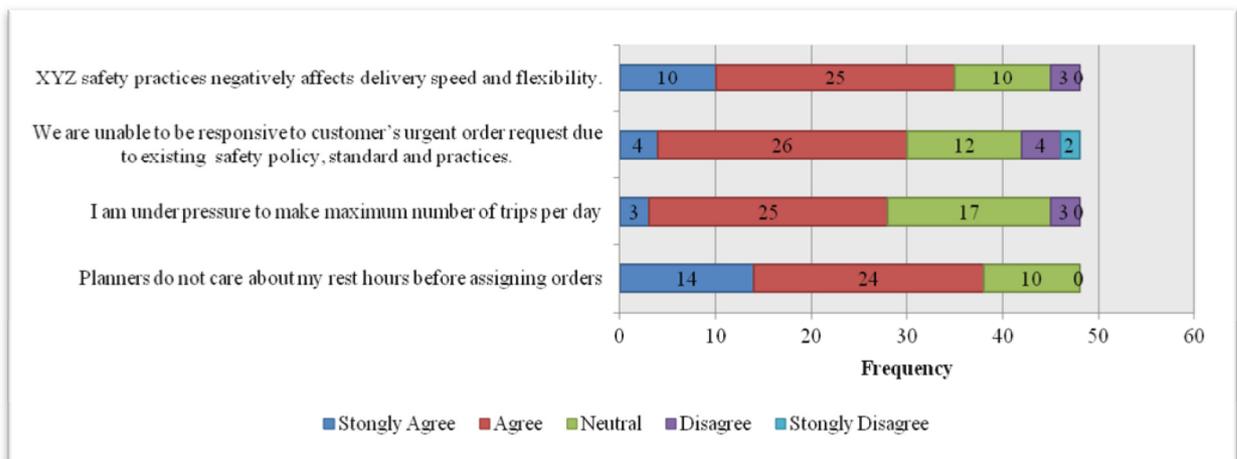


Table 4: Summary of the Observation of truck driver

Driver No	Type of truck	Purpose of the observation	Findings	Conclusion
1	Bulk tanker	Observe compliance in loading operations	Used protective equipment and safety harness before climbing the tanker to open the hatch	Fully compliant
2	Bag lorry	Observe compliance in loading operations	Wore personal protective equipment, had the safety pass, stepped outside the truck during the loading process	Fully compliant
3	Bulk tanker	Confirm driver's rest hours – Fatigue management	This driver arrived at the depot at 0700 hours after completing the previous day's shift at 2400 hours. This means this the driver rested only for five hours.	Not compliant with safety standards
4	Bulk tanker	Confirm driver's rest hours – Fatigue management	Driver made 3 trips (100 KMs) within 5.5 hours. Did not comply with the regulation which states that driver must take a short break every 2 hours of driving and a proper break after 4.5 hours of journey	Not compliant with safety standards
5	Bulk tanker	Observe compliance to road safety guidelines	Did not use seat belt while driving Used mobile phone without a hands free kit	Not compliant with safety standards
6	Bulk tanker	Observe compliance to road safety guidelines	Exceeded the speed limit	Not compliant with safety standards
7	Bag lorry	Observe safety compliance within the plant	Did not apply hand break and left the truck unattended with running engine	Not compliant with safety
8	Bag lorry	Observe truck idling time	Waited for two hours prior to the allocation of a delivery order,	Fully compliant