

Occupational Safety & Health Risk Immunity Index for the Sustainable Development of OBOR Enterprises

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ABSTRACT

The scope of this research is to investigate the OSH Risk Immunity Index affecting the Sustainable Development of an Enterprise in HK. In addition, it also seeks to find out whether the current trend of OSH-RI is compatible with the SD of enterprises in HK. Survey via the 7-point scale questionnaire was conducted through 139 participants and their responses were received and analyzed using the statistical tool SPSS-14 software computer program. A number of statistical methods of testing for significant difference in samples were adopted to carry out the analysis of the data received. Statistically speaking, the 139 respondents totally agreed with all questions in the questionnaire.

The Key Findings are:-

1. The OSH issues pertinent to the enterprises in HK are as shown in the 1st set of questions.
2. The elements contributing to the RII are as shown in the 2nd set of questions.
3. The relationships between RII and SD for enterprises in HK are as shown in the last set of questions.

Keywords: OSH, Risk Immunity, Sustainable Development, OBOR Enterprises

1. Introduction

Occupational Safety & Health (OSH) is an area concerned with protecting the safety, health and welfare of people engaged in work or employment. The goals of occupational safety and health programs include the fostering of a safe and healthy work environment. OSH may also protect co-workers, family members, employers, customers, and many others who might be affected by the workplace environment. Risk Immunity (RI) is, by deduction, the pen-ultimate result of risk reduction. To achieve risk reduction, a sound risk reduction strategy is required. Risk reduction strategies are the most effective strategies because they reduce the likelihood that an accident or incident will occur in the first place. Sustainability Development (SD) offers an enterprise conception of sustainability, which effectively addresses what has been called the 'equity deficit' of environmental sustainability. It generates a definition of sustainable development: "the need to ensure a better quality of life for all, now and into the future, in a just and equitable manner, whilst living within the limits of supporting ecosystems".

The scope of this research is to investigate the OSH Risk Immunity Index affecting the Sustainable Development of an Enterprise in HK. In addition, it also seeks to find out whether the current trend of OSH-RI is compatible with the SD of enterprises in HK. Survey via the 7-point scale questionnaire was conducted through 139 participants and their responses were received and analysed using the statistical tool SPSS-14 software computer program. A number of statistical methods of testing for significant difference in samples were adopted to carry out the analysis of the data received. Statistically speaking, the 139 respondents totally agreed with all questions in the questionnaire.

2. Terminology

2.1 Occupational Safety and Health (OSH)

As defined by the World Health Organization (WHO) "OSH deals with all aspects of health and safety in the workplace and has a strong focus on primary prevention of hazards." Health has been defined as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (WHO, 2014). Occupational health is a multidisciplinary field of healthcare concerned with enabling an individual to undertake their occupation, in the way that causes least harm to their health.

Since 1950, the International Labour Organization (ILO) and the World Health Organization (WHO) have shared a common definition of occupational health. It was adopted by the Joint ILO/WHO Committee on Occupational Health at its first session in 1950 and revised at its twelfth session in 1995. The definition reads:

"The main focus in occupational health is on three different objectives: (i) the maintenance and promotion of workers' health and working capacity; (ii) the improvement of working environment and work to become conducive to safety and health and (iii) development of work organizations and working cultures in a direction which supports health and safety at work and in doing so also promotes a positive social climate and smooth operation and may enhance productivity of the undertakings. The concept of working culture is intended in this context to mean a reflection of the essential value systems adopted by the undertaking concerned. Such a culture is reflected in practice in the managerial systems, personnel policy, principles for participation, training policies and quality management of the undertaking."

—*Joint ILO/WHO Committee on Occupational Health (ILO, 2012).*

Those in the field of occupational health come from a wide range of disciplines and professions including medicine, psychology, epidemiology, physiotherapy and rehabilitation, occupational therapy, occupational medicine, human factors and ergonomics, and many others. Professionals advise on a broad range of occupational health matters. These include how to avoid particular pre-existing causing a problem in the occupation, correct posture for the work, frequency of rest breaks, preventative action that can be undertaken, and so forth.

2.2 Risk Immunity (RI)

RI is, by deduction, the pen-ultimate result of risk reduction. To achieve risk reduction, a sound risk reduction strategy is required. Risk reduction strategies are the most effective strategies because they reduce the likelihood that an accident or incident will occur in the first place. However, not all risk reduction methods will eliminate all accidents all of the time. For this reason, in order to defend against possible negligence, individuals and organizations must be familiar with legal doctrines (assumption of risk, immunity statutes, and comparative negligence) that limit liability and with transfer strategies (waivers, insurance, and contracting programs to others) that help protect organizations from being found negligent or that limit their liability.

2.3 Sustainable Development (SD)

The United Nations World Commission on Environment and Development (WCED) in its 1987 report *Our Common Future* defines sustainable development: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Under the principles of the United Nations Charter the Millennium Declaration identified principles and treaties on sustainable development, including economic development, social development and environmental protection. Broadly defined, sustainable development is a systems approach to growth and development and to manage natural, produced, and social capital for the welfare of their own and future.

The concept of sustainable development was originally synonymous with that of sustainability and is often still used in that way. Both terms derive from the older forestry term "sustained yield", which in turn is a translation of the German term "Nachhaltiger Ertrag" dating from 1713 (Finn, 2009). Sustainability science is the study of the concepts of sustainable development and environmental science. There is an additional focus on the present generations' responsibility to improve and maintain the future generations' life by restoring the previous ecosystem and resisting to contribute to further ecosystem degradation.

3. Aim of this Research

The AIM of this research is:

“The study aimed at identifying the Occupational Health Risk Immunity Index for the sustainable development of enterprises in Hong Kong.”

Specifically, this research study sought answers to the following Research Questions.

1. What are the OSH issues that are pertinent to the enterprises in HK? (RQ-1)
2. What are the elements contributing to the RII? (RQ-2)
3. What are the relationships between RII and SD for enterprises in HK? (RQ-3)

The overall relationship is graphically presented in **Figure-1**.

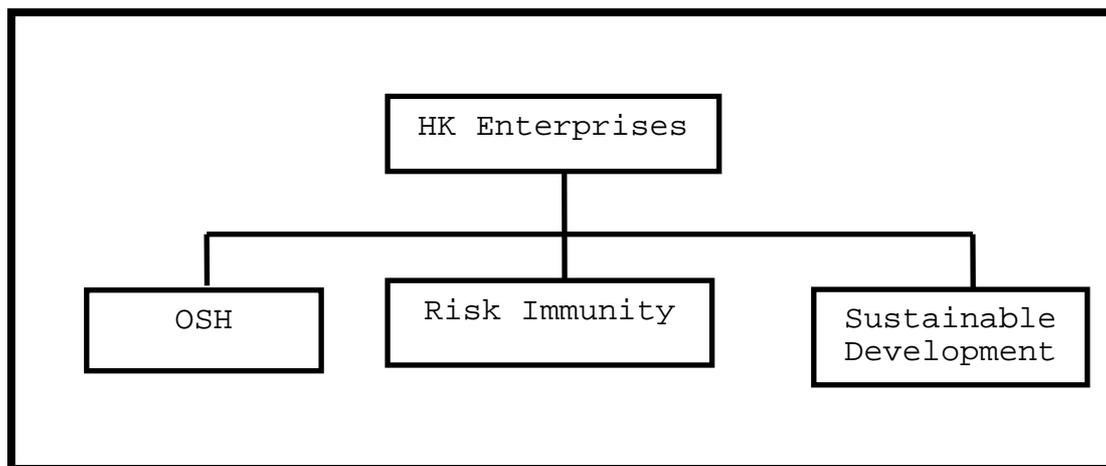


Figure-1: Overall view of the Research Questions

4. Significance of the Study

The importance of the study is that it will identify the OSH factors which are essential to Risk Immunity. This will in term affect the long-term SD of the enterprise in question. The RII will also help enterprises to assess themselves in terms of OSH risks, and be prepared to rectify and improve themselves in order to ensure SD.

This research study will contribute to the following related fields:

- 4.1 To the industrial undertaking on how to minimise OSH risks;
- 4.2 To the OSH Council as a measure to review the risk factor of a particular enterprise;
- 4.3 To the OSH professionals to focus on the potential risk areas when conducting site inspection and OSH design; and
- 4.4 To the insurance companies to review the current OSH insurance policy for RI benefits to their clients.

5. Related Theories

Google Search (including Google Scholar), Websites, journal papers, and other references relevant to the research study were reviewed and summarised in **Table-1**.

Search from Google & Google Scholar Websites:-

Table-1: Search Results from Google & Google Scholar Websites

Keywords	Google	Google Scholar
A = "OSH"	9,890,000	48,700
B = "Risk Immunity"	4,140	115
C = "Sustainable Development"	47,100,000	1,370,000
D = "HK Enterprise"	375,000	2,180
1 = "A" & "B"	10	0
2 = "A" & "B" & "C"	0	0
'1' Related	<u>4</u>	<u>2</u>
'1' Academically related	0	0

It is seen that, whilst there are nearly 10 million sites on OSH and 47 million sites on SD which are both very popular topic, RI only came up with 4,140 sites. As a result, when combining OSH & RI, only 10 sites were found. If SD is added in, there are no site available neither in Google nor Google Scholar addressing all 3 OSH, RI & SD. The overview of the relationship between OSH, RI & SD for HK Enterprises is shown in **Figure-2**.

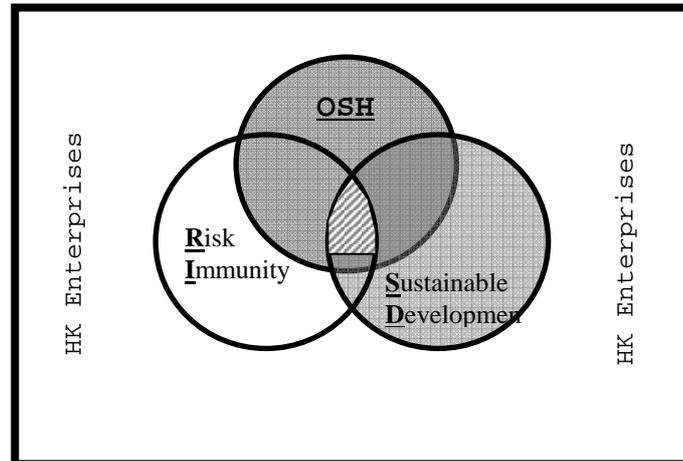


Figure-2: Overview of the relationship between OSH, RI & SD for HK Enterprises

6. Conceptual Framework & Research Methods

Based on the scope of the present research and above literature review, the research model is developed and is shown in **Figure-3**. This self-explanatory model is important and critical to the present research effort, as the objective is to validate this model which is called OSH Risk Immunity Index Model (**OSHRIM**).

The SPSS results are analysis using Cronbach's Alpha, t-Test, Correlation Analysis, and ANOVA, as discussed in Chapter 3. The qualitative results are also discussed. Meaningful deduction are drawn for the Research Questions and Hypotheses, with the aim to build up the OSHRIM.

7. Research Questions

RQ-1: What are the OSH issues that are pertinent to the enterprises in HK?

The findings under the t-Test, Correlation Testing & ANOVA in Chapter 4 has proven that the following leading questions are essential for OSH development for enterprises in HK:

- A1: Top management's full commitment to minimise OSH Risks
- A2: To allocate adequate resources i.e. staffing, knowledge, skills & equipment in managing the identified OSH Risks.
- A3: To clearly define from top management to employee & vendor's responsibility & accountability in dealing with OSH Risks.
- A4: To have well-established standard & procedures to assess the OSH Risks.
- A5: To have competent staff / external-support to assess their OSH Risks
- A6: To have good understanding of OSH Risk profile in their associate activities.

RQ-2: What are the elements contributing to the RII?

The findings under the t-Test, Correlation Testing & ANOVA in Chapter 4 has proven that the following leading questions are essential for the elements contributing to the RII for enterprises in HK:

- B1: We have adequate procedures to meet the challenges from the OSH Risks.
- B2: We have been adequately trained on the relevant procedures & standards in handling OSH Risks.
- B3: Our staff are competent & capable of managing the identified OSH Risks.
- B4: We have effective inspection programme to ensure OSH standards are met.
- B5: We have conducted regular drills and practices to familiarise our staff to handle the OSH Risk.
- B6: We have adequate promotional programme to embrace & foster the OSH Risks awareness.

RQ-3: What are the relationships between RII and SD for enterprises in HK?

The findings under the t-Test, Correlation Testing & ANOVA in Chapter 4 has proven that the following leading questions are essential for establishing the relationships between RII and SD for enterprises in HK:

- C1: We have established OSH targets & objectives and continuously monitor to see if they are achieved.
- C2: We will evaluate & learn from drills, practices, near misses, incidents & accidents.
- C3: We have established reactive performance indicators e.g. accident/ incident number, rate & data etc. to measure our OSH Risks level
- C4: We have established effective proactive performance indicators e.g. training hours, inspection frequency & findings, substandard act & condition reporting, observations etc to measure our OSH Risks level.
- C5: We will carry out in-depth analysis to our inspection and accident findings in order to find out the root cause of the problem.
- C6: We have effective mechanism to regularly review our OSH Risks profile and the effectiveness of the control programme.

Amongst them, the more significant questions for the 3 RQs are:

RQ-1: A2, A3, A4, A5, A6

RQ-2: B1, B4, B5

RQ-3: C4, C5

8. Hypotheses Testing

H_{1,1}: RI is applicable to OSH

H_{2,1}: RI can be measured effectively by RII

H_{3,1}: RII can help SD

H_{4,1}: RII is important to HK Enterprises.

The Risk Immunity Index (RII)

In view of the above highly positive research findings, it is concluded that EACH of the 18 leading questions A1 – C6 are relevant and important for RI. It can therefore be concluded that the set of questionnaire in **Appendix-A** can be deployed as a measure of the effectiveness of RI for the Utilities, Construction Industry & Other IU.

It is hereby suggest that the results of the 139 respondents can be used as a yardstick, and their Overall Mean Value = **5.22**. In other words, **5.2** (round-off figure) is the **RII Pass Mark** for industries in the HKSAR. The use of the 139 respondents as the peer group for OSH excellence standard is justified, as the Researcher has 36 years of solid OSH experience, starting from an OSH Officer in a construction company to become the Principal Consultant and Director of a renown OSH consultancy firm in HK. As a result, the respondents in this research are carefully selected for those with outstanding OSH experience only. Therefore, their response to the questionnaire can be used as a yardstick for the measurement of RII. Of course, the higher the Value towards the maximum of 7, the higher the RII. In order to achieve higher value, the industry concern should review the 18 questions and ensure that they are improving on all aspects!

9. Conclusion

This research has identified the OSH factors which are essential to Risk Immunity. This in term affects the long-term SD of the enterprise in question. The RII will also help enterprises to assess themselves in terms of OSH risks, and be prepared to rectify and improve themselves in order to ensure SD.

Proper use of the research finding will contribute to the following related fields:

- 9.1 To the industrial undertaking on how to minimise OSH risks;
- 9.2 To the OSH Council as a measure to review the risk factor of a particular enterprise;
- 9.3 To the OSH professionals to focus on the potential risk areas when conducting site inspection and OSH design; and
- 9.4 To the insurance companies to review the current OSH insurance policy for RI benefits to their clients.

As a result of the above finding, the Research Model is revised as the ‘Validated OSHRII Model’ as shown in **Figure-3** below.

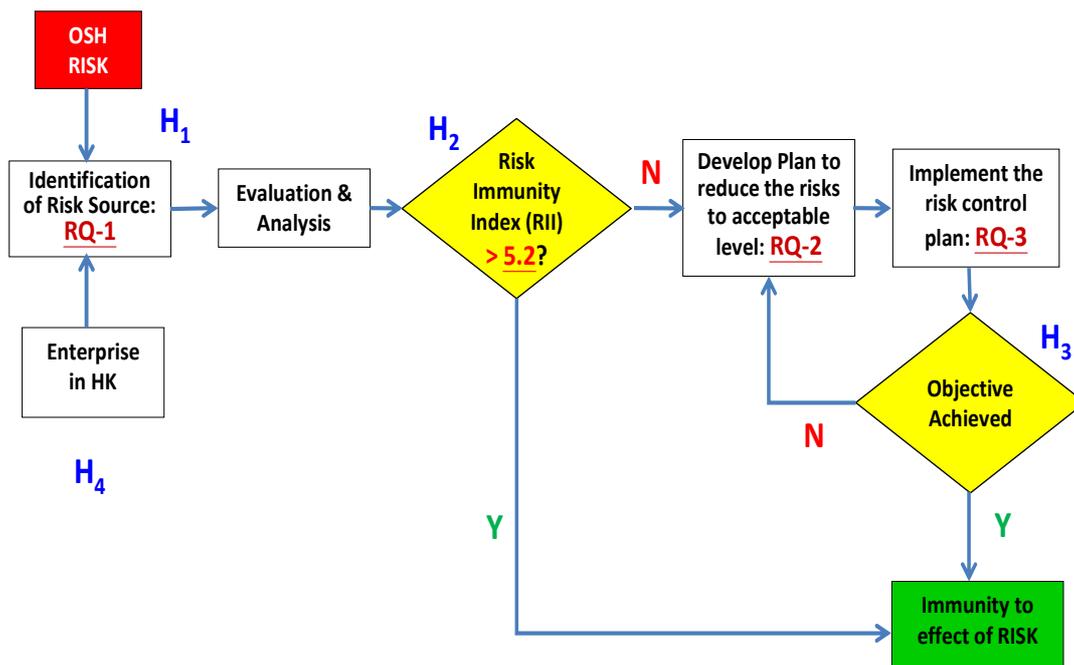


Figure-3: The Validated “OSHRII Model”

10. Recommendation to the Enterprises in the OBOR Countries

From the conclusions drawn above and due to the limitation of this research work on this topic, some further research works are strongly recommended and further investigation is required for the following items.

- To investigate the level of OSH risk for other industrial sectors, such as F&B, and Manufacturing;
- To investigate whether the current OSH code should be reviewed in order to cope with '0-Accident' design;
- To investigate whether OSH RI have correlation with business growth and development.

Overall speaking, the research findings have significant contribution to the OSH development for the enterprises in HK. The implementation of the OSH Preventive Management following the OSHRII Implementation Model is not only assured through the research finding but also proven rewarding as it is highly cost-effective in achieving the sustainable development of enterprises in Hong Kong in the long run.

With regard to the enterprises in the OBOR Countries, most of them are fast developing and hence call for stringent requirement for OSH like in the HKSAR. As a result, the research methodology and analytical methods deployed in this paper can be easily transplanted into these countries. Surely, the Author would like to share his research and extensive work experience with researchers in the OBOR countries. More exciting and interesting is to enable comparison and sharing of experience amongst various cities and countries (in particular the RIIs), as there is a common quest for OSH in terms of human life for all OBOR countries.

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Author's Background



Dr. Daron Leung is the Director of the Occupational Safety & Health & Environmental Consulting Associate Ltd. He is a well-known experienced & qualified Occupational Health & Safety Practitioner. He started his safety career early in 1981. In the past 38 years he gained solid working experience both locally & overseas in managing safety in mega-size construction projects, conducting safety training and safety auditing, handling prosecutions cases, civil liabilities litigation & Employees' Compensation procedures. He is currently the President of Hong Kong Occupational Safety & Health Association. He was the Past President of the Society of Accredited Safety Auditors from 2000 to 2004 and the Past Chairman of the Hong Kong Industrial Safety Association from 1998 to 2000. His community service also extends to sit in various safety subcommittees. He is a very popular speaker in safety and health discipline. In order to share his valuable experience to others he is also lecturing safety in the Universities & other organizations. In year 2000 he was awarded the Outstanding Safety Practitioners Award jointly issued by the Labour Department, the Occupational Safety & Health Council and The Hong Kong Polytechnic University.

Dear Director/ OSH Specialist / Managers/ Supervisors,

As part of my PhD research, I would appreciate it if you could spare about 10 minutes of your time to complete the following questionnaire. In return, I would be pleased to send you the summary of results (could be of value to you) in a few months' time.

Kind regards,
Daron LEUNG

Topic: OSH Risk Immunity Index affecting the Sustainable Development of the HK Enterprises							
Questionnaire (please circle your choice):-							
		<i>Strongly Strongly Disagree</i>			<i>Agree</i>		
<u>A</u> Identification of OSH Risks							
A1	Top management's full commitment to minimise OSH Risks	1	2	3	4	5	6 7
A2	To allocate adequate resources i.e. staffing, knowledge, skills & equipment in managing the identified OSH Risks.	1	2	3	4	5	6 7
A3	To clearly define from top management to employee & vendor's responsibility & accountability in dealing with OSH Risks.	1	2	3	4	5	6 7
A4	To have well-established standard & procedures to assess the OSH Risks.	1	2	3	4	5	6 7
A5	To have competent staff / external-support to assess their OSH Risks	1	2	3	4	5	6 7
A6	To have good understanding of OSH Risk profile in their associate activities.	1	2	3	4	5	6 7
A7	In addition to the above, what other factor(s) you will consider important for Identification of OSH Risks:- _____						
<u>B</u> Implementation of OSH Risks Management System (for Risk Immunity, RI)							
B1	We have adequate procedures to meet the challenges from the OSH Risks.	1	2	3	4	5	6 7
B2	We have been adequately trained on the relevant procedures & standards in handling OSH Risks.	1	2	3	4	5	6 7
B3	Our staff are competent & capable of managing the identified OSH Risks.	1	2	3	4	5	6 7
B4	We have effective inspection programme to ensure OSH standards are met.	1	2	3	4	5	6 7
B5	We have conducted regular drills and practices to familiarise our staff to handle the OSH Risk.	1	2	3	4	5	6 7
B6	We have adequate promotional programme to embrace & foster the OSH Risks awareness.	1	2	3	4	5	6 7

B7 In addition to the above, what other factor(s) you will consider important for Implementation of OSH Risks Management System:-

C Evaluate, Monitor and Review of OSH Risks (Achievement of RI → RII)

- | | | | | | | | | |
|-----------|--|---|---|---|---|---|---|---|
| C1 | We have established OSH targets & objectives and continuously monitor to see if they are achieved. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| C2 | We will evaluate & learn from drills, practices, near misses, incidents & accidents. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| C3 | We have established reactive performance indicators e.g. accident/ incident number, rate & data etc. to measure our OSH Risks level | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| C4 | We have established effective proactive performance indicators e.g. training hours, inspection frequency & findings, substandard act & condition reporting, observations etc to measure our OSH Risks level. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| C5 | We will carry out in-depth analysis to our inspection and accident findings in order to find out the root cause of the problem. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| C6 | We have effective mechanism to regularly review our OSH Risks profile and the effectiveness of the control programme. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| C7 | In addition to the above, what other factor(s) you will consider important for Evaluate, Monitor and Review of OSH Risks:- | | | | | | | |
-

Respondent's company profile (for analysis only):-

Business Nature: Utilities / Construction / Other Industrial Undertaking
 Approx. No. of Employees: _____ (Direct) _____ (Sub-con)
 Position: Director / OSH Specialist / Senior Manager / Manager / Supervisor
 In-house Full-time OSH Specialist: Yes / No
 No. of years that OSH Risk Management System has established: <5 / 5 -10 / >10
 OSH Risk Management system certified: Yes / No. →
 If Yes please state what type: OHSAS 18001 / DNV ISRS / Others _____ (please specify)
 Last 3 years' Accident Rate (2011/2012/2013): _____ / _____ / _____ (/1,000 man-year)

~ E N D ~

Thank you in advance for finding the time to complete this questionnaire. Should you require further clarifications, please do not hesitate to contact me. All data provided will be treated in strict confidence. Please note that by completing this questionnaire, your responses can be used but not cited in the completion of this project in agreement with the Data Protection Act. By completing the questionnaire and submitting it, you are acknowledging that you have read the above information and consent to the data being used as described above.

Please either send by-hand, fax or email this duly completed questionnaire to:

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