

Incorporating attitudinal parameter in assessing sustainability of Malaysia manufacturing industry

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Abstract. Numerous companies are accepting sustainability as an organizational peremptory. There is, however, little convergence on how organizations become sustainable. The previous study suggests that a paradigm shift is necessary to incorporate more sustainable ways of thinking, while others advocate that sustainability requires only moderate behavioural changes as in attitude. In addition, it is also suggesting that sustainability develops most effectively when a singular view of sustainability is applied throughout the company; others contend that differentiated views of sustainability emerge within the various subcultures of an organization. The aim of this paper is to analyse the aftermath of considering attitudinal parameter into the initial data, portraying the true nature of personality during the survey. The research presented was carried out with employees from various manufacturing companies with different branches of knowledge and attitude. Survey methodology was employed by building a questionnaire combining Likert-type items, Sustainable Development Goals (SDGs), Green Project Management (GPM) P5 Integration and multiple-option items. The results allow identifying the knowledges and attitudes of the employees in Malaysia context, contributing relevant data in regard to future engagement relating to sustainability and attitudinal parameter.

1. Introduction

Sustainability has commonly been regarded as a crucial goal for organizations. Mostly refers to longevity, continuity, and capability to be maintained. According to the World Commission on Environment and Development, sustainability means to ‘meet the needs of present without compromising the ability of future generations to meet their own need’ (United Nations Documents 1987, no page) [1]. Sustainability seems to be agreeable proposal because of its meeting points among environmental concerns, manufacturing, and product design activities.

Over the last decade, the number of sustainability indicators and their use in decision-making has greatly increased [2]. However, the existing sustainability evaluation still do not integrate a nature-economic-society aspect, some of these tools are focused on just one or two dimension(s) of sustainability, product sustainability perspective [3], environmental aspect [4-5]. Moreover, some others focused on all three dimensions [6-8], but there is a same gap in all of these methods which is limited attempts at bringing Green Project Management (GPM) P5 method to use in sustainability practices. Besides that, there is no present research that has been attempted from the viewpoint of focusing on sustainable parameters toward achieving a more systematic assessment model which can contribute to sustainability reporting.



Encouraged by Bursa Malaysia, sustainability view can be referring as crucial point to a successful business in this present-day. Every companies in the auspices of Bursa Malaysia also required to embed the sustainability concept as a vanguard of their business [9]. Besides, each company also need to provide a sustainability report as a requirement of Bursa Malaysia Securities Berhad while currently, every single company that under the auspices of BURSA Malaysia is required to yield the sustainability reporting. The concept of P5 Integration matrix will conclude all major sustainability standard refer to the Triple Bottom Line of sustainability: people (society), profit (financial), and planet (environment), whereas another two are process and product [10].

In principle, attitudes refer to a person's feeling, opinions and general approach towards a person or object [11]. By contrast to personality, attitudes are often influenced by situational and circumstantial factors and hence, they are believed to be less stable than personality traits [12]. Technically, the word risk refers to situations in which a decision is made whose consequences depend on the outcomes of future events having known probabilities. When it comes to the psychology of risk, "there is still a lot of room to go and businesses are only at the beginning in terms of understanding that there are coherent frameworks available that could help them improve the practice of risk management," aforesaid by Hersh Shefrin [13]. Besides, psychology has likely played a larger role in crisis response than many people realize. "Every single risk management disaster in the last 15 years, including financial disasters, has had psychological issues at the root." "Whether it's an earthquake, natural catastrophe or a financial disaster, it is often compounded by our psychological imperfections."

This study aimed to evaluate the influences of a persons' attitude affected their every aspect of risk management in making the decision regarding sustainability practice of their company. The results allow us to identify and analyze the impact of using attitudinal parameter into the data also affected the nature of someone's personality during the survey.

2. Methodology

The proposed research has six steps as follows:

- Step 1: Data sources – case company, existing research
- Step 2: Criteria selection – Weighing criteria
- Step 3: Data collection – analysis
- Step 4: Evaluating attitudinal rating (resolution)

2.1. "Sampling" / Data sources.

The boundary of this study is limited to the manufacturing industry, and the target population was employees who work in the top management of the industry. Hence, the studies from the existing research is done to analyse the frequently used parameters in sustainable assessment and the tools used to measure the sustainability. The case study will be conducted in any company in Malaysia. Thus, five companies from the manufacturing sector that covers in Nilai, Shah Alam, Pekan, Kuantan and Port Klang is selected during the data collection.

2.2. Criteria selection – weighing criteria.

The scale between +3 – -3 as depicted in Table 1 was developed to ease the respondents' group for rating the evaluation criteria, which initially selected by the design engineers based on technical documents and the results of a prior survey.

Table 1. Scale of "Weighting criteria".

Numerical rating	Description
3	Negative Impact High
2	Negative Impact Medium
1	Negative Impact Low
0	Neutral
-1	Positive Impact Low
-2	Positive Impact Medium
-3	Positive Impact High

The other fairly important in this method is where the questions are generated by using the green project management (GPM) that serves as a reference. The green project management (GPM) concept integration matrix is describing below:

- a) People – labor practices and decent work, society and customers, human rights, ethical behaviour
- b) Planet – material and procurement, energy, water, transport, waste
- c) Profit – return on investment, business agility, economic simulation.

2.3. Data collection – analysis.

In this case study, owner of the company, chief executive officer, general manager and a system manager were selected as the expert decision makers. This will be assumed as an act of a field study including in-depth interviews with selected experts. The experts' opinions are used for providing a sufficient data to fulfil the research objectives. The GPM P5 checklist is being modified with respect of Malaysia industry context for each parameter before the respective checklist is used in the interview (data collection).

The process of gathering the data has been conducted in several departments of the companies using the same research questions which are: Department of Production (Parts), Department of Production (Assembly), Department of Engineering, Department of Environmental Quality, Department of Quality Control. From here, the questionnaire has been assigned at the stated departments where the results are then transmitted into the scoring board that has used the green project management as the guideline.

3. Result and Discussion

Below is the initial result concluded from the data analysis that have been done. The graph consists of three different parameters: people, planet and profit with their respected sub-parameter from operational management, showing the relationship between each parameter with sustainability compliance index as stated in scale of 'weighing criteria', Table 1. The data (value) from the graph is already been calculated using min formula in the excel and the equation is developed using polynomial equation: second order in Matlab, also considering 5% error in plotting the graph (95% confidence level). Figure 1 and 2 show the pattern of each sub-parameter before considering the attitudinal parameter revolving the raw data only, which divided into risk averse and risk seeker personality respectively.

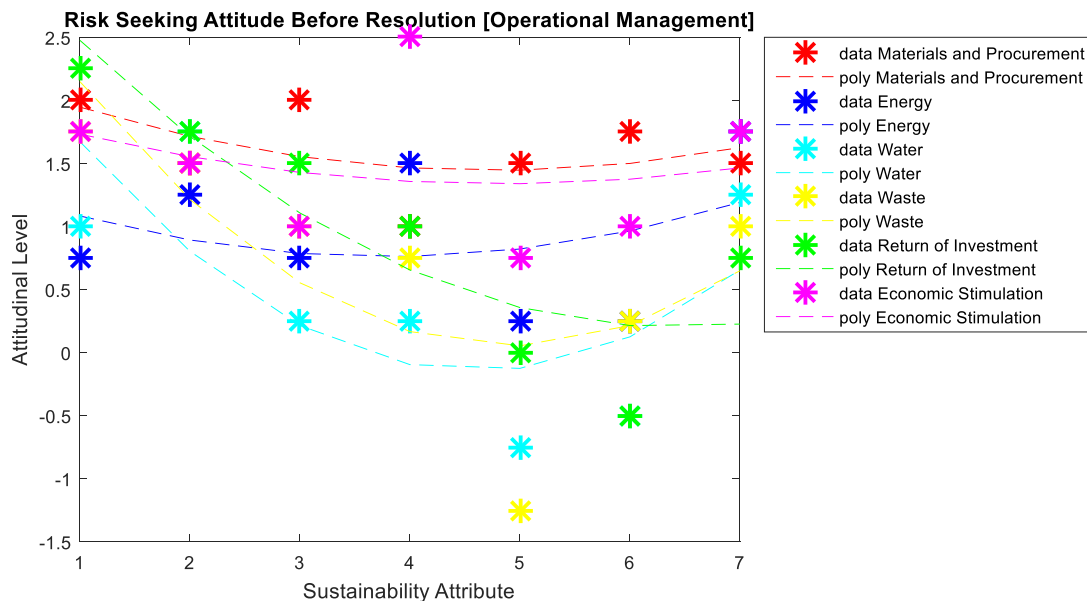


Figure 1. Risk seeking's parameter before resolution.

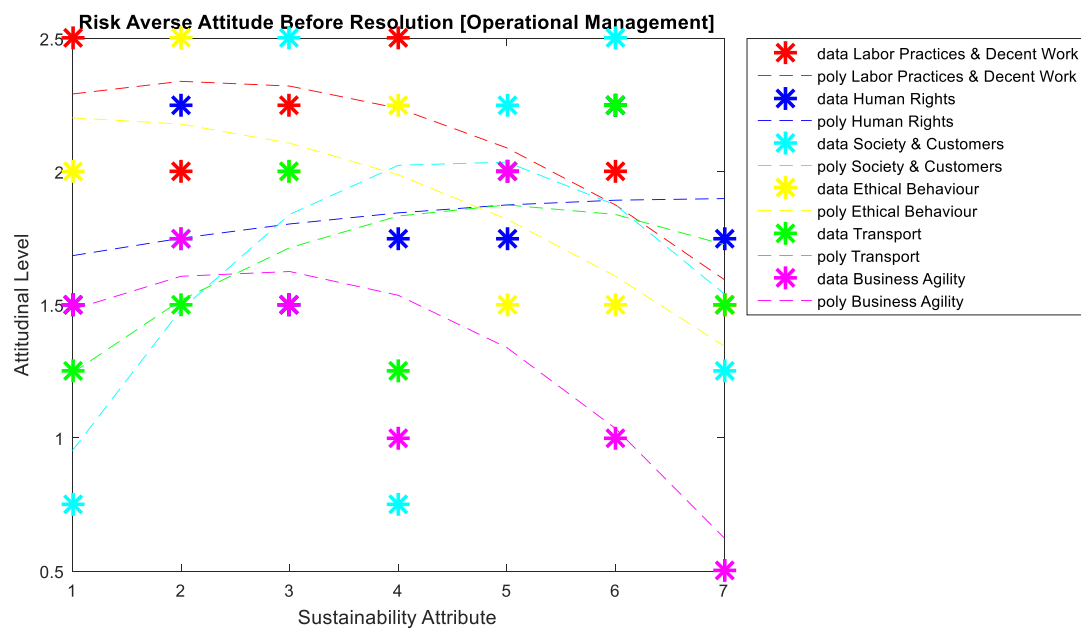


Figure 2. Risk averse's parameter before resolution.

3.1. Evaluating attitudinal rating (resolution)

In this step, a new resolution based on attitudinal parameter is proposed. All crisp data that are gathered in step 3 are being multiply by the proposed resolution. By principle, there is a point of neutral sustainability for every measured aspect of a system. In the measurement of sustainability, there is a tipping point where a system is either sustainable or unsustainable, which we concluded it as impact high, medium and low. Table 2 below presented the proposed resolution based on attitudinal parameter [14], which the author believe could be effective in tackling the complex; ill-defined and human-oriented decision problems in the assessment of product reliability. The attitudinal parameter (λ) is within the

range $[-0.9, 0.9]$, hence, if $0.1 < \lambda \leq 0.9$, then it's said to be risk-averse. If $\lambda = 0$, it is risk neutral and finally, if $-0.1 < \lambda \leq -0.9$, then it is risk-seeking.

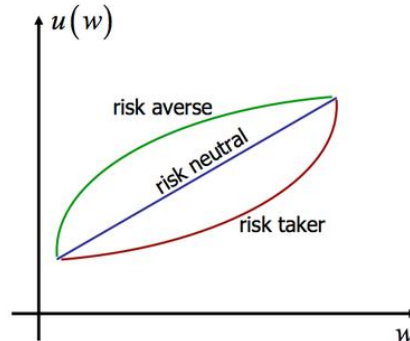


Figure 3. Risk-aversion (green) contrasted to risk-neutrality (blue) and risk loving (red).

Table 2. Proposed resolution based on attitudinal parameter.

Numerical rating	Resolution
-3	0.8
-2	0.4
-1	0.2
0	0
1	-0.2
2	-0.4
3	-0.8

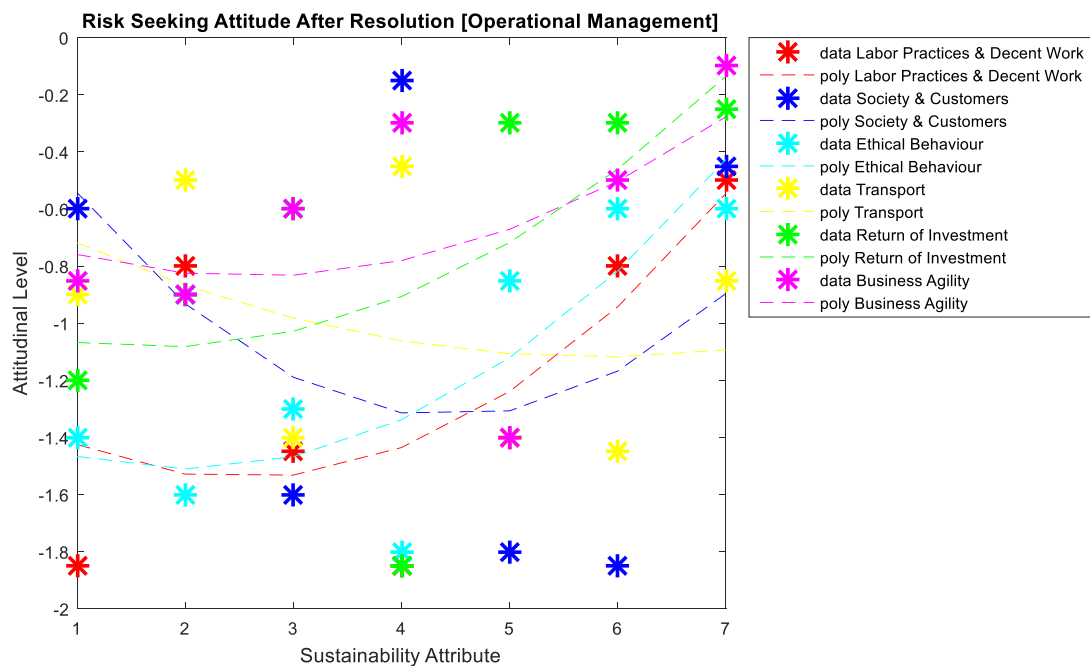


Figure 4. Risk seeking's parameter after resolution.

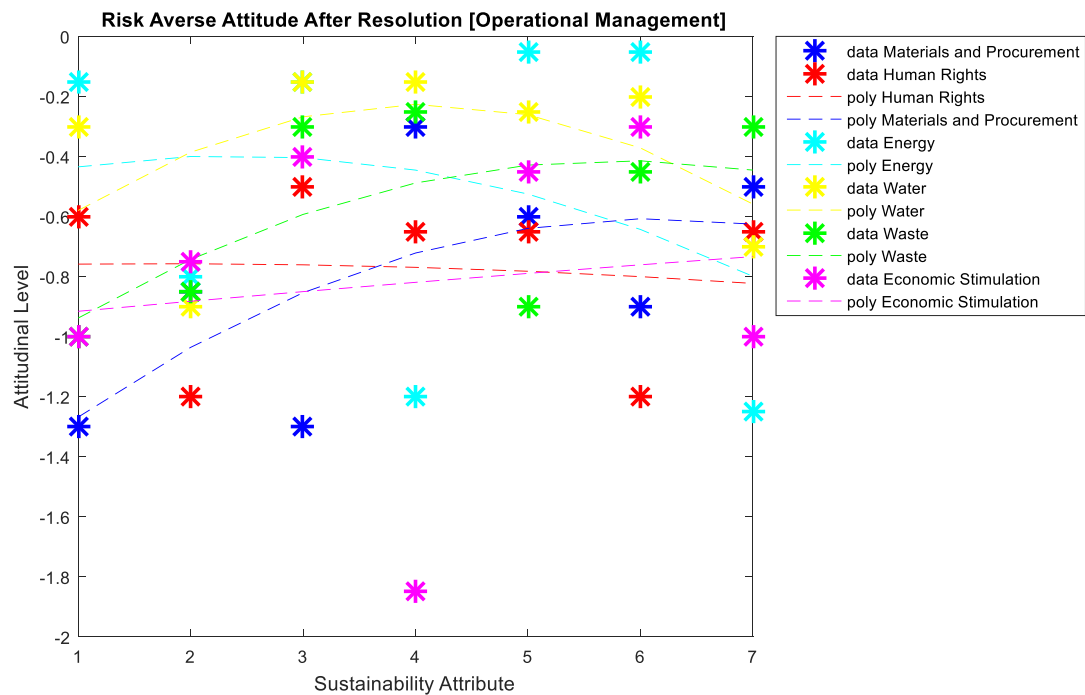


Figure 5. Risk averse's parameter after resolution.

Table 3. Type of risk for each parameter before resolution.

TYPE OF RISK	PARAMETERS
RISK SEEKING	Materials and Procurement, Energy, Water, Waste, Return of Investment, Economic Stimulation
RISK NEUTRAL	-
RISK AVERSE	Labor Practices & Decent work, Human Rights, Society & Customers, Ethical behaviour, Transport, Business Agility

Table 4. Type of risk for each parameter after resolution.

TYPE OF RISK	PARAMETERS
RISK SEEKING	Labor Practices & Decent work, Society & Customers, Ethical behaviour, Transport, Return of Investment
RISK NEUTRAL	-
RISK AVERSE	Human Rights, Materials and Procurement, Energy, Water, Waste, Economic Stimulation, Business Agility

Table 3 and 4 show the clearer comparison of all parameters between before and after considering attitudinal parameter's resolution as suggested in Table 2. As presented in Table 3, 6 over 12 parameters

show the trait of risk seeking personality, while another half parameters lead to risk averse personality. However, as far as attitudinal parameter was concerned; after multiplying by the resolution, most of the employees seemed to be more on risk averse personality, where 7 out of 12 parameters indicate the trait by considering the risk utility function as shown in Figure 4 (thus indicated by 58.33%), and each of the parameter under the respective trait is totally different compare with the trait before undergoing the resolution. In economic theories, it is assumed that risk aversion is a typical human attitude toward risk, where someone will find themselves immediately leaning toward the guaranteed results/success, and the differences between risk lover and risk averse are determined by the curvature of the utility function, Figure 3. Moreover, another 5 over 12 parameters (indicated 41.67%) show the trait of risk seeking personality. Risk seeker is assumed that someone who is naturally find themselves drawn to situations where they could win or lose in the end. The results in table 3 and 4 also showed that before considering attitudinal parameter, the employee who is said to be a risk seeker, in reality is not the same as the mentioned personality, where it is originally risk averse and vice-versa.

Nevertheless, these trait of personality as seen in Figure 4 and 5 can also fit roughly in the risk-neutral area while still being slightly averse or slightly risk-seeking if and only if the pattern of graph is to be considered. Likewise, they could be a risk seeker who leans toward neutrality, or a risk-avoider who tends toward neutrality as well. In addition, they also could have a measurable difference between instinct and behavior where he/she for example be a natural risk-seeker who forces himself or herself to make more neutral decisions in order to live responsibly. Or they could be a natural risk-avoider who trains himself or herself to take more risks to get more out of life. Lastly, the results of psychological studies have indicated, however, that people differ in how they make decisions under uncertainty and what motivates them to take economic risks.

4. Conclusion

Once and for all, this study is expected to assist any organizations including an engineer or project managers in producing a better sustainability reporting while incorporating the attitudinal parameter based on GPM P5 integration without neglecting the major pillar of sustainability standard.

In addition, it portrays on how a company need to consider the attitude of the employee to determine the level of sustainability's practice for their organization. From this research, the expectation of the employees' personality from the first place is not true after attitudinal parameter is considered into the raw data.

Meanwhile, due to the diverging comprehension about the sustainability compliance gained from the feedback including their diametrical attitude during the survey, their ideas regarding this assessment are restricted on the existed sustainability tool. Thence, since this assessment method not only based on triple bottom line principle, but also include process and product elements, the outcomes of the research certainly sweeping of the current assessment in the sustainability practices.

Acknowledgments

The authors would like to give special thanks to Research & Innovation Department, Universiti Malaysia Pahang for funding this research project.

References

- [1] Florea, L., Cheung, Y. H., & Herndon, N. C. (2013). For all good reasons: Role of values in organizational sustainability. *Journal of Business Ethics*, 114(3), 393-408.
- [2] Zamagni, A., Pesonen, H. L., & Swarr, T. (2013). From LCA to Life Cycle Sustainability Assessment: concept, practice and future directions. *The International Journal of Life Cycle Assessment*, 18(9), 1637-1641.
- [3] Moldan, B., Janoušková, S., & Hák, T. (2012). How to understand and measure environmental sustainability: Indicators and targets. *Ecological Indicators*, 17, 4-13.
- [4] Ghadimi, P., Azadnia, A. H., Yusof, N. M., & Saman, M. Z. M. (2012). A weighted fuzzy approach for product sustainability assessment: a case study in automotive industry. *Journal*

- of Cleaner Production*, 33, 10-21.
- [5] Bjørn, A., Margni, M., Roy, P. O., Bulle, C., & Hauschild, M. Z. (2016). A proposal to measure absolute environmental sustainability in life cycle assessment. *Ecological Indicators*, 63, 1-13.
 - [6] Strazza, C., Magrassi, F., Gallo, M., & Del Borghi, A. (2015). Life Cycle Assessment from food to food: A case study of circular economy from cruise ships to aquaculture. *Sustainable Production and Consumption*, 2, 40-51.
 - [7] Chong, Y. T., Teo, K. M., & Tang, L. C. (2016). A lifecycle-based sustainability indicator framework for waste-to-energy systems and a proposed metric of sustainability. *Renewable and Sustainable Energy Reviews*, 56, 797-809.
 - [8] Scandellius, C., & Cohen, G. (2016). Sustainability program brands: Platforms for collaboration and co-creation. *Industrial Marketing Management*, 57, 166-176.
 - [9] B. Malaysia. (2015). Sustainability Reporting Guide. Available: <http://www.bursamalaysia.com/>
 - [10] G. Global. (2015). The GPM® P5™ *Standard for Sustainability in Project Management*.
 - [11] Funder, J. W. (2012). Aldosterone and mineralocorticoid receptors: a personal reflection. *Molecular and cellular endocrinology*, 350(2), 146-150.
 - [12] Armstrong, A. C., Wakefield, A., Foy, S., Howell, S. J., & Lee, R. J. (2010). 64 The conflict between survival and fertility post breast cancer treatment—attitudes and beliefs of young women with breast cancer. *European Journal of Cancer Supplements*, 8(3), 77.
 - [13] Shefrin, Hersh. *Behavioral Risk Management: Managing the Psychology That Drives Decisions and Influences Operational Risk*. Palgrave Macmillan US: Springer, 2016. Print
 - [14] Wu, J., & Chiclana, F. (2014). A risk attitudinal ranking method for interval-valued intuitionistic fuzzy numbers based on novel attitudinal expected score and accuracy functions. *Applied Soft Computing*, 22, 272-286.