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## KEY PERFORMANCE INDICATORS FOR MEASURING SUSTAINABILITY IN HEALTH CARE INDUSTRY IN MALAYSIA

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### ABSTRACT

The health care industry in Malaysia was the fastest-growth industry over the past few years. In today's competitive business environment, companies focus on improving sustainability to reduce cost and improve well-being of the environment and society. However, there are limited published studies on the evaluation of sustainability performance for the healthcare sector. This paper aims to formulate a list of key performance indicators (KPI) for the sustainability performance. First, a literature study of KPIs from various industries was carried out. Next, an in-depth meeting was conducted to gain insights and feedbacks with the management of a private hospital. Finally, a set of 70 KPIs which can be used for measuring sustainability performance in health care industry was developed. These 70 KPIs were used to design a questionnaire which is then distributed to the private hospital.

**Keywords:** key performance indicators; sustainability; health care industry.

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## 1. INTRODUCTION

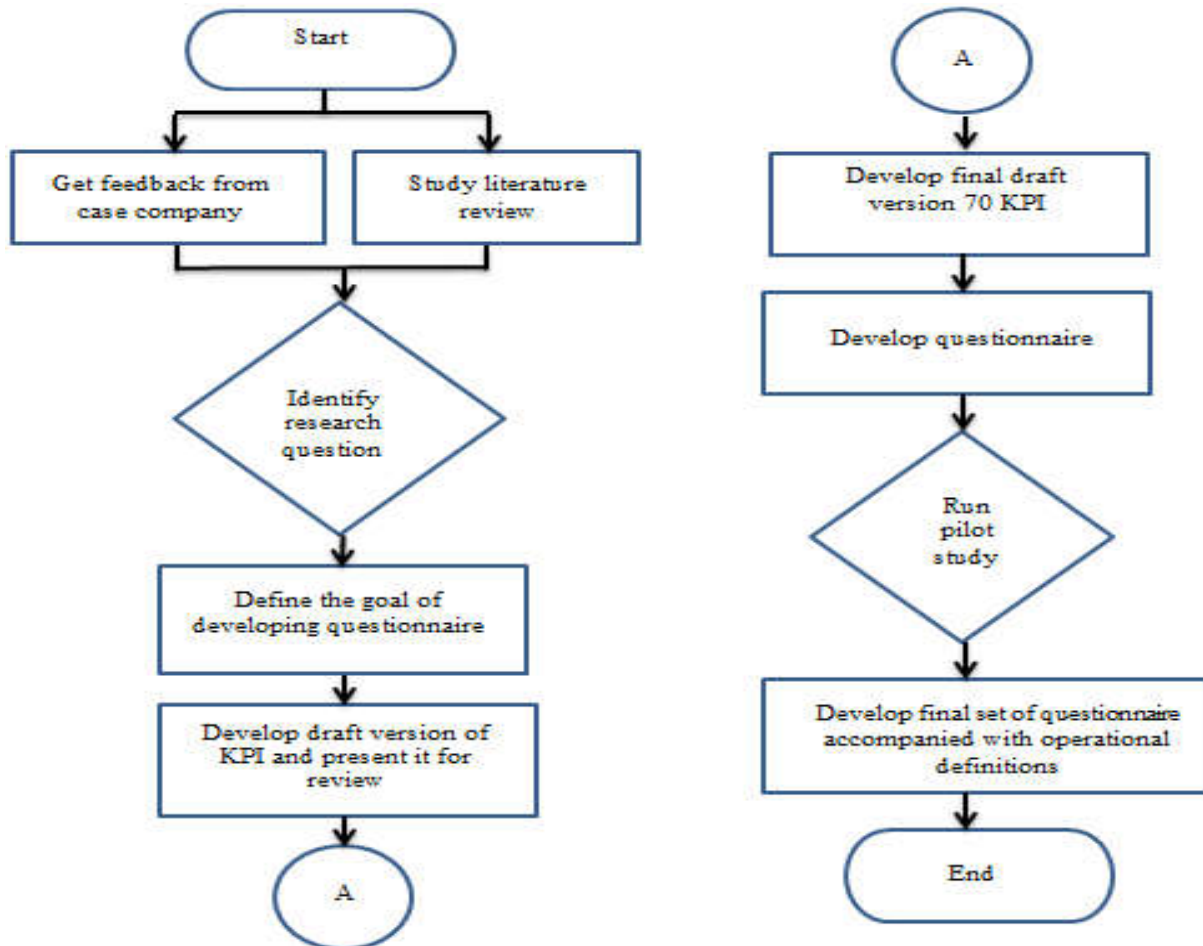
Industries are increasingly engaged in economic fundamental with a wide range of social, environment and industry governance initiatives, frequently denoted as sustainability initiatives [2-4]. This is because of the rising societal pressures for high labour standards, responsible practices, increased transparency, community involvement and various other social and environmental causes [5-6]. Sustainability has become a crucial concern in industry boardrooms whether it is for the primary industry, secondary industry or tertiary industry as sustainability dominantly impacts industry processes and performance in both short and long term with growing and prevailing spread of societal pressures.

Health care industry today which is a part of tertiary industry offer health care services to customers in an enormous web of contradiction and complexity. The industry provides advanced medical treatment with up to date technology but it is at times overloaded with constraints, inefficiencies and other issues that tarnish the safety and accessibility of patient care. Over the past decade, the desire and need for healthcare industry to function more effectively and efficiently is driven mainly by economic concerns. Today, the healthcare industry needs to improve savings as the result of increasing cost of labour and supplies. The industry also attempt to abide to rules and regulations for better waste management of medical tools and toxic medicines. Today's health care industry is a complex vibrant system that must apply sustainability to stay competitive [7]. However, there is no much study done to measure sustainability in health care industry. Hence, it is very necessary that health care industry should have set of KPIs to measure sustainability performance.

This paper suggests a set of total 70 KPIs based on the triple bottom line of sustainability for measuring sustainability performance evaluation believed to be appropriate to the health care industry. Numerous literature studies were carried out for the primary, secondary and tertiary industry to identify initial potential KPIs that can used for sustainability performance evaluation. A formal discussion was carried out with a private hospital located in Malacca, Malaysia to elicit useful feedbacks from the industry experts on the level of importance for the 70 KPIs.

## 2. METHODOLOGY

The overall methodology for this study is shown in Fig. 1 and described in the following section.



**Fig.1.** Flow of methodology

### 2.1. Initial Qualitative Investigation on KPIs for Sustainability in Health Care Industry

The case company for this study was the private hospital located in Melaka. Initial discussion with the case company indicated that a set of KPIs was needed for sustainability performance measure. A literature review was conducted and revealed that no specific KPIs exist in Malaysia health care industry has been developed for sustainability performance measure. With the identified research question, the goal was to identify the importance KPIs that can be used for sustainability performance evaluation in health care industry.

### 2.2. Concept Identification

A literature review for the primary industry, secondary industry and tertiary industry was conducted to categorize the sustainability KPIs reported from previous research. From the

identified KPIs, a list of possible KPIs that can be incorporated for the health care sector was developed.

### 2.3. Concept Elicitation

The initial KPIs list was then presented for review to senior management staff of the private hospital in order to confirm the findings of the literature research and identify missing constructs. The KPIs list was shortlisted to 70 KPIs based on feedback from the experts as shown in Table 1.

Based on the literature review and also feedback from the management of the hospital, other information such as respondent knowledge on sustainability and respondent background, appropriate terminology, layout/format of the questionnaire, rating scale and other information that need to be considered when developing the survey instrument.

A draft of questionnaire was developed. A pilot study was conducted with 5 respondents from the hospital. Feedbacks of the 5 respondents were used to further refine the questionnaire. Then, a final set of the questionnaire and operation definition to accompany the questionnaire was developed incorporating to respondents' feedback with consideration to ensure all words are correctly understood, problems with wording or difficulties with response options. The purpose of the list of the operation definition was to ensure the respondents fully understand the actual meaning of each KPIs. It is anticipated that each questionnaire will take respondents 15 to 30mins to answer.

**Table 1.** Economic KPIs used in different types of industry

No	Category	KPI	Types of Industry	References
a.	Cost	1. Operating costs	1,2,3	[8-15]
		2. Setup cost	2	
		3. Overhead cost	2	
		4. Maintenance cost	2	
		5. Material cost	1,2,3	
		6. Employee compensation	1,2,3	
		7. Net cash flow	3	

b.	Market	8. Market presence	1	[11, 16-17]
		9. Market share	1	
		10. Customer retention	3	
		11. Customer segments	3	
c.	Product and service	12. Time and scheduling	2	[18-19]
		13. Innovative ideas in development of new products or service	2,3	
d.	Flexibility	14. Service flexibility, fast modification, adaptability	2	[9, 14, 17, 20]
		15. Technology	1	
		16. Hospital's age	3	
e.	Reputation	17. Number of workers from international level	3	[10, 21]
		18. Number of programs or services accredited by national or internationally recognized and applicable standards	3	
		19. Foreign customer	3	
		20. Quality assurance system	1,2	
		21. Continuous improvement	1,2	
f.	Quality of service	22. Service reliability	2	[14, 22-23]
		23. Conformance to international health care standard	2	
		24. Number of repeated problems	3	
		25. Percentage of wrong releases	3	
		26. Percentage of urgent changes	3	

**Table 2.** Environment KPIs used in different types of industry

No	Category	KPI	Types of Industry	References
a.	Utilization	1. Total energy consumption	1,2,3	[8, 13-15, 24-25]

		2. Energy conservation and efficiency improvements	1,2,3	
		3. Total water usage by source	1,2	
b.	Emission and waste	4. Total direct and indirect greenhouse gas emission by weight	1,2,3	[8-9, 12-17, 20, 24-25]
		5. Reduction of air pollution	1,2,3	
		6. Reduction of water pollution	2,3	
		7. Reduction of noise pollution	2,3	
		8. Waste management	1,2,3	
c.	Green	9. Evaluation of environmental impacts	1	[8, 11, 22, 24-25]
		10. Degree of application of environmental management systems and environmental certification	3	
		11. 3R (Reduce, reuse, recycle)	2,3	

**Table 3.** Social KPIs used in different types of industry

No	Category	KPI	Types of Industry	References
a.	Occupational health and safety	1. Accident and illness investigation	1,2,3	[12-15, 22, 26-27]
		2. Rate of injury, accident, occupational diseases at workplace	1,2	
		3. Education and training for prevention workplace accident	1,2,3	
		4. Emergency management	1,2,3	
		5. Corporate health and safety systems	2	
		6. Occupational health and safety	1,2,3	
		7. Number of corrective and preventive actions carried out as a result of root causes of work related accidents, diseases and incidents	1,2,3	

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b.	Employee	8. Job security and dignity	1,2	[11, 13-14, 18,		
		9. Employee satisfaction	2	21-22, 24-26,		
		10. Employee with disabilities	2	28-31]		
		11. Total number and rate of employee turnover by age group, gender, and region	2,3			
		12. Average hours of training per year per employee by employee category	1,2,3			
		13. Diversity and equal opportunity for men and women	1,2			
		14. Employee's morale and cohesiveness	2			
		15. Employee's ability to solve problems	2			
		16. Number of existing healthcare professionals versus expected job positions	3			
		17. Percent of worker with more than 10 years' experience	3			
		c.	Customer	18. Customer health and safety	2,3	[10-11, 17, 22-23,
				19. Customer privacy	2	25-26, 28-29, 32]
				20. Customer complaint	3	
				21. Customer satisfaction on product or service	2,3	
				22. Customer loyalty	1,2	
		d.	Human rights	23. Regular measures of customer service	3	
24. Total number of incidents of discrimination and actions taken	1			[22, 26, 33]		
25. The hospital has adopted a policy statement which includes a commitment to respect the international bill of human rights	2,3					
26. General respect for human rights by the hospital according to human rights experts	3					

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e.	Community	27. Respect for people	1,3	[21, 24-26, 28]
		28. Community's complain	2,3	
		29. Community's satisfaction	2,3	
		30. Percentage of operations with implemented local community engagement, impact assessments, and development programs	2,3	
f.	Supplier	31. Supplier commitment	2	[14]
g.	Stakeholder and management	32. Satisfaction level by stakeholder	3	[25, 28]
		33. Governance, management, and leadership	3	

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### 3. RESULTS AND DISCUSSION

Table 1, 2 and 3 show the final list of KPIs that used for development of the questionnaire. There are 26 economic KPIs, 11 environment KPIs and 33 social KPIs. There are 6 categories for the economic pillar of sustainability which are cost, market, product and service, flexibility, reputation and quality of service. Each category is identified with KPIs and source of reference. For example, the cost category consists of 7 KPIs namely operating costs, setup cost, overhead cost, maintenance cost, material cost, employee compensation and net cash flow are identified from previous studies as shown in table m. The industry employed individual KPIs was mentioned in the table m. Example operating cost is used by three categories of industry such as primary, secondary and tertiary.

The environment pillar has only 3 categories i.e. utilization, emission, waste and green. Each category is also identified with KPIs and source of reference. Utilization with only 3 KPIs such as total energy consumption, energy conservation, efficiency improvements and total water usage by source. Total water usage by source only discussed in primary and secondary industry from published report.

There are 7 categories for social pillar such as occupational health and safety, employee,



customer, human right, community, supplier, stakeholder and management. Stakeholder and management with 2 KPIs namely satisfaction level by stakeholder and governance, management and leadership. These 2 KPIs are usually used in tertiary industry.

These KPIs are used in the questionnaire, which distributed to the private hospital. Respondents will be asked to rank level of importance of each KPIs for health care industry to evaluate sustainability performance.

#### **4. CONCLUSION**

In today's competitive business environment, organization has implement sustainability practices to stay competitive. Sustainability focus on the triple bottom lines, which is very crucial for economic growth, environment conservation and social concern. The health care industry in Malaysia is expanding in a prompt way, with enormous web of contradiction and complexity, getting huge role to play for providing health services to customer that aiding the growth of economics of the country.

Thus, it is necessary for all industry to have their set of KPIs for sustainability performance evaluation. This paper review the KPIs used in primary, secondary and tertiary industry to evaluate sustainability performance. At the meantime, this paper also proposed a set of KPIs that can be used for sustainable performance evaluation in health care industry. The result indicated that different industries have used different KPIs for sustainability performance evaluation.

Future work will incorporate the KPIs in a questionnaire to case company and a suitable sustainability model will be developed as the evaluation tool for health care industry.

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