BENCHMARKING THE PERFORMANCE OF MALAYSIA'S CONSTRUCTION INDUSTRY

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Abstract

Malaysia's construction industry particularly the provision of public infrastructure projects faces various debatable issues of the government's belt-tightening budget, abandoned public projects, shoddy workmanship, over-budgeted project procurement and unresolved debts in public project provision. The current global economic downturns as well as the fluctuation in the oil prices worldwide have exacerbated the situation. Thus, in materialising the efficiency, accountability for performance, productivity and monetary policy set in confronting those controversial issues, several actions have been undertaken by Malaysian government including strengthening approval procedures, restructuring the implementation process, enhancing viability through risk distribution, reinforcing the institutional and regulatory framework as well as increasing Bumiputera participation in public infrastructure projects. Yet, these endeavours seem not to be the best solution in tackling those problems. Hence, there is a need of benchmarking the performance of Malaysia's construction industry especially the provision of public infrastructure projects by clearly stipulating the standard regular evaluation and audition through a performance measurement technique known as Key Performance Indicators (KPIs). This paper provides a literature review of the philosophical, conceptual and functions of KPIs in improvising Malaysia's construction industry performance. The literature will guide the development of KPIs for the assessment of public infrastructure project provision in Malaysia which forms the major part of the research undertaken.

Keywords: Benchmark, Key Performance Indicators (KPIs), Public Infrastructure Provision, Malaysia.

1. Introduction

The performance measurement tools are believed to be rooted from the business intelligence (BI) who has never stopped hunting for tools that can pilot their business towards the intentional objectives. Thus, it is undoubted if these performance measurement tools have been invented abundantly in the business sector under the brand of "benchmark". Yet, in pace with the state-of-the-art globalisation era, as the benchmarking definition is subjective and the technique of performance benchmarking are varied based on the areas measured, the latest tool of benchmarking is recomposed and recapitulated by the BI, branded as key performance indicators (KPIs) (Syuhaida, 2009).

As KPIs have been invented by BI, it is not questionable if KPIs have been studied in depth within the BI and management area compared to other subjects particularly construction e.g. KPIs for automotive

industry dealership (Smith, 2001), KPIs application of business strategy management for heavyweight industry (Sondalini, 2006), web-based KPIs development (Peterson, 2007), organisation behaviour versus KPIs (Eckerson, 2006), general KPIs balanced scorecard (Parmenter, 2007) etc. As for the field of construction, Ugwu and Haupt (2005) who study the KPIs for the sustainability of South African construction industry as well as Ugwu *et al.* (2005) who carry out research on KPIs development for the sustainability appraisal are currently the only academic studies not hearted on BI yet related to this paper. Nevertheless, Constructing Excellence (2007) is perceived as the most germane study to construction industry where it is at present offered the latest construction industry KPIs through the launching of KPIs 2003 in June 2004 covering the extensive process to implement KPIs, the range of performance currently being achieved across the construction industry, all related wall charts e.g. environmental KPIs wall chart, construction industry progress report as well as case studies of the implemented KPIs in the UK.

However, none of those studies are carried out by Malaysian researchers which relate the implementation of KPIs with Malaysia's construction industry practices. Likewise, many BI KPIs academic studies have been undertaken despite construction KPIs. Thus, the lack of academic studies on construction KPIs specifically on Malaysia's public infrastructure projects has encouraged this study to be carried out. Through the evaluation of Malaysian current practice on public infrastructure projects, it is time to establish an effective model of performance assessment for the public infrastructure provision internationally and locally, which significantly affect the reward and penalty system linked to the project performance.

This paper aims to examine the theoretical frame work of KPIs in benchmarking the performance of public infrastructure project in Malaysia's construction industry. It starts with the review of KPIs' root before discusses in depth the philosophical, conceptual and functions of KPI to be embedded in the assessment of Malaysia's construction industry. The conclusion summarises the relationship between KPIs and Malaysia's construction industry performance whilst draws some expectation of this study towards Malaysian construction practice particularly in the provision of public infrastructure. The outcome will be proposed to the government as a part of its prospect realisation in 9MP towards the Vision 2020.

2. BENCHMARKING

In comprehending KPIs to be used in benchmarking the performance of Malaysia's construction industry, the origin of KPIs i.e. benchmarking needs to be discovered beforehand as the characteristics

of benchmarking shape the emergence of KPIs. This section highlights the definition, categorisations of benchmarking which lead to the relationship between benchmarking and KPIs besides the debates on benchmarking potentials in improving performance.

2.1 Definition of Benchmarking

In essence, the appropriate measurement method for the application in the humankind's life has been comprehensively studied and introduced as "benchmarking", which is cored from the aforementioned "benchmark" of business process. Benchmarking is usually part of a larger effort, usually a process re-engineering or quality improvement initiative (Reh, 2006). Benchmarking is defined by Wikipedia (2007) as "a process used in management and particularly strategic management, in which organisations evaluate various aspects of their processes in relation to best practice, usually within their own sector." Benchmarking demonstrates the new technique of resolving problems against the current technique, where this new technique is undertaken to show how it performs as it has been used by others beforehand (Syuhaida, 2009).

2.2 Types, Categorisations and Products of Benchmarking

Generally, there are two types of benchmarking as suggested by Syuhaida (2009) i.e. the informal benchmarking which is usually coincidentally, unintentionally and unpredictably implemented by the users and the formal benchmarking which is utilised based on a well planning as shown in Figure 1. Nevertheless, seeing as the benchmarking conferred within this paper measures the performance of Malaysia's construction industry based on a specific standard well-planned regular evaluation, only the formal benchmarking is discussed deliberately throughout this section.

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                    │  Type of Benchmarking  │
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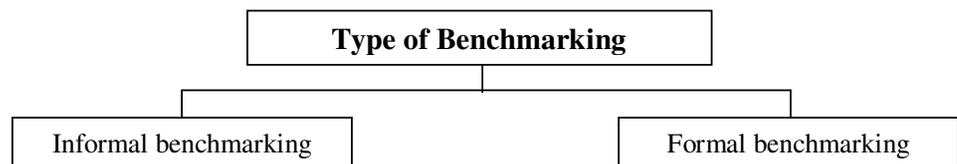
FIGURE 1 - TYPES OF BENCHMARKING
Source: Syuhaida (2009)

Under the umbrella of formal benchmarking, there are another five categorisations of formal benchmarking i.e. ordinary benchmarking which is used in business, management, construction, education and many other strategic areas; internal benchmarking which is employed within the identical organisation or company in transporting the performance of the whole company to the best level; generic benchmarking which is utilised in order to compare the same business functions or processes

regardless of industries or areas; competitive benchmarking which is implemented in competitor analysis, where in practice, in analysing the direct competitors, the organisation is also seeking for the best company in the industry simultaneously; as well as collaborative benchmarking which is undertaken collaboratively by groups of individual companies, namely the subsidiaries of a multinational in different countries (Wikipedia, 2007). The benchmarking conferred throughout this paper is categorised as the ordinary benchmarking as it assesses the performance of Malaysia's construction industry particularly the provision of public infrastructure projects i.e. apparently used in construction areas. Figure 2 concisely illustrates the categorisation of the formal benchmarking parent umbrella.
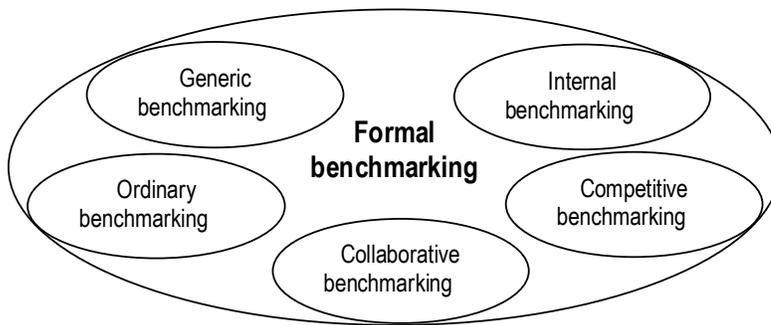

FIGURE 2 - CATEGORISATIONS OF THE FORMAL BENCHMARKING

As ordinary benchmarking has been used widely in business, management, education and other strategic areas as discussed beforehand, it is indubitable if many products of benchmarking exist in those areas. One of the most usable products of benchmarking around the globe especially within the construction industry worldwide is the key performance indicators (KPIs). Despite KPIs, other prominent benchmarking product is the balanced scorecard which is used widely in the United States (US) in assessing the performance of their construction projects.

3. KEY PERFORMANCE INDICATORS (KPIs)

This session discusses the origin of KPIs before reveals the supporting reasons behind the necessitation of KPIs to be implemented within Malaysia's construction industry. As the authentic KPIs are rooted from the business intelligence (BI) area, the differences between these BI KPIs and the KPIs to be utilised in assessing the performance of Malaysia's construction industry are highlighted to promote the advantages of implementing KPIs in the construction industry, particularly for the provision of public infrastructure project in Malaysia. Finally, the categorisations of KPIs to be used in the construction industry in Malaysia are proposed which appear together with the illustrated chart simplifying the categorisations.

3.1 Business Intelligence (BI) Key Performance Indicators (KPIs)

The origin of KPIs started from the implementation of performance measurement tool known as "benchmarking" by the BI players in the 1980s. This tool, which can be presented in both qualitative and quantitative measurements, heavily quantifies the current state of the business at the particular milestone (Syuhaida and Aminah, 2007).

The input data is collected through questionnaires or surveys to employers, employees, expected or existing clients. The data obtained will be processed to produce the simplified diagram of survey's result e.g. visual chart, table and figure. This summary of the business current performance is then presented to the business shareholders. The comparison of this outcome with other internal or identical business is undertaken to make aimed improvement during the succeeding benchmarking (Swan and Kyng, 2005). Nevertheless, as the huge interest in implementing "benchmarking" has been developed, the BI players came with the ideas of diversifying the "benchmarking" product in the 1994 (Centre for Construction Innovation for Constructing Excellence in the North West, 2005) e.g. Critical Success Factors (CSFs), metrics etc of which includes the KPIs. In the BI area, KPIs are defined as "the qualitative or quantitative measurement of the activities of the project or organisation towards its objectives (Syuhaida, 2009)". As the KPIs are currently being used by many other areas around the globe e.g. in education, production etc, the definition of KPIs are varied yet the principles and concepts of KPIs remain the same.
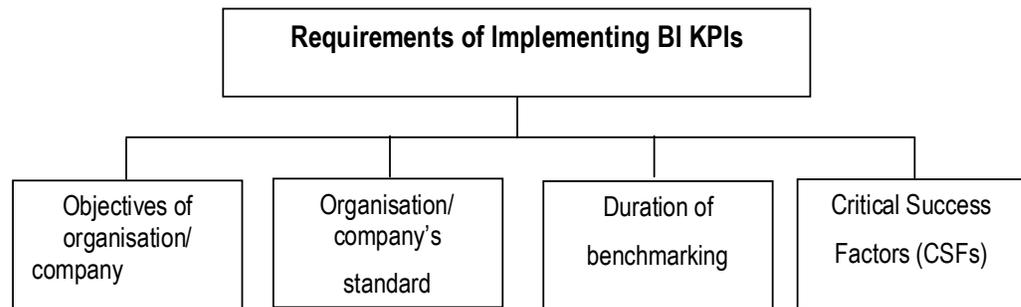

FIGURE 3 - FOUR REQUIREMENTS OF BI KPIS IMPLEMENTATION
Source: Syuhaida (2009)

Conceptually, as suggested by Syuhaida (2009), there are four requirements in implementing the BI KPIs i.e. the BI KPIs require the agreed objectives to be reached by the organisation/company, the standard set by the organisation/company to make the comparison either improvement has been taken in place or not, the determined duration of measuring the performance i.e. the milestones of specific activity as well as the critical success factors (CSFs) which drive the organisation to achieve the KPIs.

These four essential requirements of implementing BI KPIs which are also applied in other strategic fields are drawn in Figure 3.

As CSFs are conferred in this paper, it is essential to discuss the definition and attributes of CSFs in comparison with the KPIs. CSFs are the subset of KPIs where it leads to the achievement of KPIs. In general, CSFs are the essential areas of activity that must be performed well to achieve the mission, objectives or goals (Mind Tools Ltd, 2007), where in this paper the objectives are renowned as the BI KPIs for particular business.

On the other hand, Rockhart (1981) defines CSFs as "the limited number of areas in which results, if they are satisfactory, will ensure successful competitive performance for the organisation…... [However,] if results in these areas are not adequate, the organisation's efforts for the period will be less than desired". In the context of BI, the "successful competitive performance" stated by Rockhart simply means a KPI, where the achievement of CSFs guarantees the thriving KPIs. Nevertheless, CSFs are in point of fact the "factors" that are "critical" to the "success" of the organisation (Rockhart, 1981). It is crucial to emphasize that these CSFs are emerged not only in the BI areas, but in any areas implementing the KPIs including the anticipated Malaysia's construction area.

3.2 Advantages of Key Performance Indicators (KPIs)

There are many reasons encouraging the implementation of KPIs in business areas which ultimately influence other strategic areas including the construction to use KPIs in benchmarking their performance. The clearest benefits of using KPIs measurement is its ability in benchmarking the organisation performance against other industry or organisation, where the lessons learned from the best can be exploited to make targeted improvement. KPIs are also competent in highlighting organisation and project weaknesses as well as capable in being the eyes and ears for the directors and lower personnel (Constructing Excellence, 2007).

It is noteworthy to highlight that the measurement of KPIs are undertaken through metrics. Once the metrics have been modelled, time consumed in assessing the organisation performance for a specific milestone is reduced in comparison with conventional assessment using questionnaires, surveys, close monitoring of processes etc. The KPIs metrics, which are ran via automated database, e.g. Microsoft Excel, Microsoft Access and SPSS, are self-developed data which eases the tasks of benchmarking the performance.

In addition, the time consumed in benchmarking is minimised through the utilisation of visual metrics where the bad chosen KPIs or the new good KPIs are correspondingly easy to discard and incorporate

if these KPIs do not produce suitable desired results. The KPIs are also capable in detecting changed conditions and potential problems that might be raised from those changed situation. Moreover, in theory and practice, the integration of good chosen KPIs as well as the removal of bad-affected KPIs are proven in improving the end-result without affecting the result of making the result worse. Thus, it can be concluded that KPIs focus the improvement efforts on related issues critical to the success of particular project or organisation.

On the other hand, as the KPIs are being benchmarked against the industry and other related organisations, the approximately identical portfolio of successful ongoing projects of other industry and organisation, or phases within the organisation i.e. procurement organisations, developers, local government or clients with one-off projects can be duplicated which again ultimately reduces the time consumption. This duplication encourages the industry players to work together in sharing the best practice and maximising communication while avoiding the burden of brainstorming a list of good chosen KPIs (Constructing Excellence, 2007).

Besides, the KPIs also link employee rewards and sanctions to performance measured against the standard established. As the employees are acknowledged that the project and organisation are being monitored through KPIs, KPIs by some means motivate these personnel to enhance their individual performance, which at the same time leads to the streamline of the entire organisation reputation. Eventually, the KPIs function as all-in-one tool in improving the ongoing process performances of the entire organisation and project where KPIs not only score the performance, detect changed conditions, perceive potential problems and designate a change from preliminary strategy of particular project or organisation, KPIs also offer many perspectives on a single event where KPIs permit intense focus and scrutiny as well as drive improvement within the project or organisation.

All the aforementioned advantages have been successfully proven to be achieved by the KPIs executers worldwide, which is not only limited in the BI area. Thus, these advantages are expected to assist the government in improving the performance of Malaysia's construction project particularly the provision of public infrastructure projects which are obnoxious with the abandoned public projects, shoddy workmanship, over-budgeted project procurement and unresolved debts in public project provision

3.3 Development of Key Performance Indicators (KPIs) in Malaysia's Construction Industry

KPIs to be used in the construction industry particularly in Malaysia are emerged due to the escalated interest in improving the original KPIs which are effective in the Business Intelligence (BI) practice.

Therefore, the BI KPIs, which are merely profit oriented, must be adapted with the construction nature of work and infrastructure delivery concern of providing VFM to both public user and the government in ensuring its functionality within construction industry.

Even though the construction industry KPIs has been established in 1999 (Swan and Kyng, 2005), in 2001 many British construction companies recognized the need of more objective performance measurement system that aligned to the construction industry standard (Centre for Construction Innovation for Constructing Excellence in the North West, 2005). Since then, many construction KPIs have been invented e.g. UK Construction Consultants KPIs, South African Construction Industry Indicators (CIIs) etc. Thus, for the reason of materializing this paper, the KPIs to be used in benchmarking the performance of Malaysia's construction industry is branded as "Malaysia's Construction KPIs" which becomes a part of this development effort focusing more on Malaysia's construction industry.

3.4 Malaysia's Construction KPIs versus BI KPIs

Malaysia's Construction KPIs is "the organised and characterised KPIs through careful and systematic discussion, weigh and examination, where these KPIs take advantages of public criticism about the partnerships between the government and private concessionaires as well as attain the intention of enhancing economic and social structure from the public infrastructure procurement approaches (Syuhaida and Aminah, 2007)". The significant difference between Malaysia's Construction KPIs and BI KPIs is that Malaysia's Construction KPIs allow greater public participation in its formulation. The involvement of public makes Malaysia's Construction KPIs more significant to public needs and requirement instead of beneficial mostly to profit-driven private concessionaires.

Despite value-for-money (VFM), KPIs are one of the important features of the Malaysia's government plan in streamlining the performance of Malaysia's construction industry especially the provision of public infrastructure projects, where in fact are a part of endeavour in ensuring the achievement of VFM. KPIs allow the private entities to be measured systematically in a logical sequence against KPIs and the private entities will be penalized if they do not meet these KPIs (Yong and Tay, 2004). On the contrary, the private entities which achieve the Malaysia's Construction KPIs will be awarded some incentives as the motivation for them to perform their responsibilities effectively (The Economic Planning Unit, 2006).

The penalties and incentives award, known as "a reward-penalty system", is granted according to "a performance-based delivery system" which ensures that the public infrastructure is delivered in line with the government's performance standards (Bernama, 2006). The reward-penalty system also empowers

the Malaysia's Construction KPIs users to take appropriate actions in response to their Malaysia's Construction KPIs-of-interest before being penalised by the government.

However, although the business performance in BI KPIs is quantified in the identical way of Malaysia's Construction KPIs, the business organisation will not be imposed if the KPIs are not attained. Yet, it is fully depending on the organisation's initiative to minimise the failure of achieving the business objectives. Therefore, due to lack of attempt in improving the poor performance, the BI KPIs exercisers will consequently be confronting major problems at the end of the business life-cycle. The negligence of monitoring the performance by standards set by the government also immotivates the employees from enhancing the individual and the organisation's performance.

Nevertheless, there is no difference of data collection, input processing and output presentation between BI KPIs and Malaysia's Construction KPIs. Besides, both KPIs link employee rewards and sanctions by the employer to performance measured against its KPIs. On top of that, despite all of these differences between Malaysia's Construction KPIs and BI KPIs, the succeeding Table 1 summarises 14 other different characteristics of those two types of KPIs.

TABLE 1 - COMPARISONS OF CHARACTERISTICS BETWEEN MALAYSIA'S CONSTRUCTION KPIS AND BUSINESS INTELLIGENCE (BI) KEY PERFORMANCE INDICATORS (KPIS)

Characteristics	Malaysia's Construction KPIs	BI KPIs
Consistently self-developed and timely available data	√	√
Continuously quantifiable and flexible valid data	√	√
Easily-understood data	√	√
Closely-monitor performance in reaching objectives	√	√
Reflect and quantify intentional value drivers	√	√
Value drivers establishment by member of the public	√	X
Implemented throughout the project or business	√	√
Graphically and visually illustrated e.g. chart	√	√
Expression in number or non-number or both	√	√
Distinguishable interpretation by different parties	X	√
Corporate standard measurement establishment	√	X
Link with reward and penalty system	√	
Improve performance and quality	√	√
All-in-one perspectives on a single event	√	√

Source: Syuhaida (2009)
Indicators: √ - possessed, X – not possessed

3.4 Categorisations of Malaysia's Construction KPIs

The proposed categorisations of Malaysia's Construction KPIs are produced by blending some doable variables used in many countries implementing the KPIs in assessing the performance of their construction projects. However, the end-products of these categorisations are being adapted with Malaysia's construction industry current practices and nature of work which are distinguishable from those practised around the globe.

In comparison with the BI KPIs which quantify merely the economic and financial aspects, Malaysia's Construction KPIs also measure the social and environment concerns despite economic aspect which fall under the functional KPIs. These functional KPIs focus on improving construction process, protecting and respecting the needs and endeavours of those functions (BSRIA Report, 2003) whilst at the same time developing an influential new structure of local governance for public infrastructure projects.

The social aspect of Malaysia's Construction KPIs is not only emphasised on customer or end-user resembling BI KPIs, but also focused on employment i.e. employer and employee as well as community. Likewise, the environment KPIs function in producing more environmental-friendly facilities and services using processes that protect the existing environment, biodiversity and habitat (Centre for Construction Innovation for Constructing Excellence in the North West, 2006).

Despite functional KPIs, Malaysia's Construction KPIs are also comprised construction-related-professional KPIs i.e. civil and structural (C & S) engineer, mechanical and electrical (M & E) engineer, consultant and product, and construction phase KPIs i.e. pre-construction, construction and post-construction. The professional KPIs are enclosed as they play an important role in delivering the infrastructure thus the Malaysia's Construction KPIs must serve the need of their own suite. On the other hand, construction phase KPIs are worth-establishing as the performance of the construction can be tracked based on its sequential processes so that problem in particular phase can be detected at once before it effects the successive phase. These categorisations of Malaysia's Construction KPIs are illustrated in Figure 4.
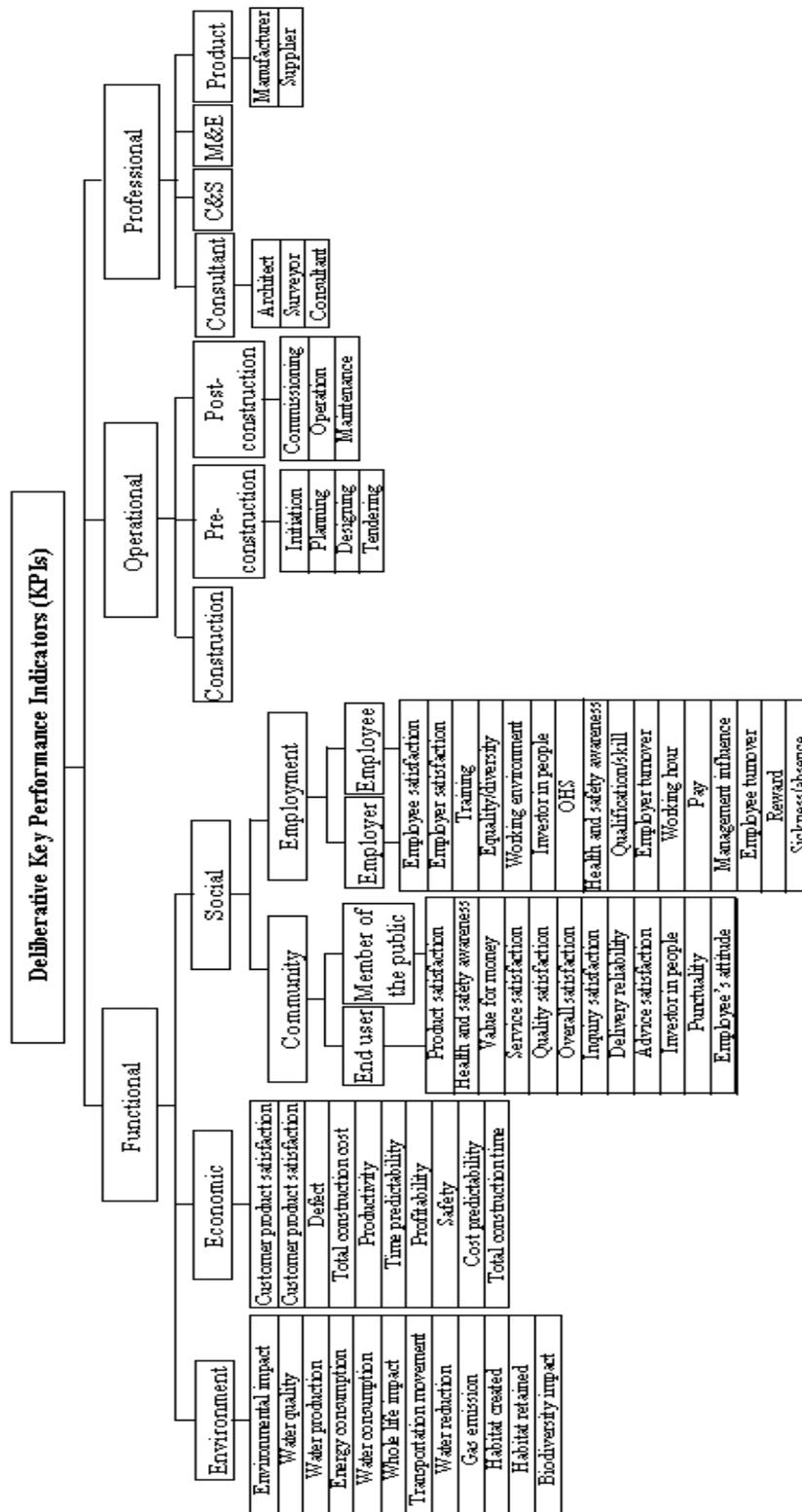
FIGURE 4 - CATEGORISATIONS AND PRIORITISATION OF MALAYSIA'S CONSTRUCTION KEY PERFORMANCE INDICATORS (KPIs)

4. CONCLUSION

These proposed set of Malaysia's Construction KPIs enable a benchmark performance comparison of the public infrastructure projects within Malaysian construction industry. As the construction players realise the potential of Malaysia's Construction KPIs, it is anticipated that working groups representing various parts of the construction industry will produce further Malaysia's Construction KPIs which address people management and environmental issues as opposed to cost-and-time-wise alone. These, together with the aforementioned largely economic performance indicators as well as the proposed Malaysia's Construction KPIs which are strategic-driven, executive defined and corporate standardisation, reflect an enterprise perspective rather than stovepiped functional or business-focused view, will begin to address the whole sustainability agenda in construction world, particularly within Malaysian construction industry. It is anticipated that these Malaysia's Construction KPIs will become the panacea of all the controversial issues within Malaysia's construction industry particularly in the provision of public infrastructure projects.

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