# IDENTIFYING BEST PRACTICES IN SUPPLIER SELECTION USING A COMPREHENSIVE BENCHMARKING FRAMEWORK

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**ABSTRACT** - Supplier selection is highly industry specific with the industry specific regulations and requirements, making gauging the quality of the process difficult. This arises the requirement for industry practitioners and quality institutes to benchmark the Supplier Selection Process (SSP) to identify where the process adapted currently stands and what are the good practices within the industry. To cater to that need, this study has three objectives: to identify current supplier selection practices adopted by Sri Lankan practitioners, to derive a base benchmarking framework to assess the SSP of a firm and to identify best practices adapted by industry practitioners using the framework. This is achieved through a two-phase methodology: framework derivation and framework validation. From the validation phase it was discovered that employing such benchmarking framework creates opportunities for firms to improve existing SSP.

**Keywords:** Supplier Selection; Supply Chain Management; Quality Standards; Process Benchmarking

## 1. INTRODUCTION

Supplier selection is often viewed as a Multi Criteria Decision Analysis (MCDA) or just a decision-making problem [1]. Similarly, in the past literature supplier selection has been explored in a MCDA approach with the intentions of identifying the best Operations Research (OR) method to be used in supplier selection. Looking at literature throughout the years, Table 1 shows how such methods have been used in past literature.

**Table 1.** Evolution of MCDA Models in Supplier Selection Literature

| Year | Researcher | Proposed Model |
|---|---|---|
| 2015 | James Freeman, Tao Chen | AHP + Entropy + TOPSIS |
| 2016 | A Fallahpour, EU Olugu, SN Musa | Fuzzy DEA |
| 2017 | Segura and Maroto | PROMETHEE + MAUT |
| 2018 | Ghadikolaei and Parkouhi | Fuzzy ANP |
| 2019 | S Hosseini, AA Khaled | Hybrid ensemble + AHP |

Recent literature has been towards identifying the best criteria [2], how green supplier selection affects supply chain management [3] and technological approaches towards supplier selection such as big data analytics [4]. But past and recent literature lacked any approaches to assess the supplier selection as a process. As an example, with the recent growth of need for green supply chain practices [5], the extent to which the practitioners adhere to sustainable practices cannot be gauged if the SSP itself is not evaluated. Through literature review it was discovered that such perspective has not been adapted regarding supplier selection among scholars, especially while taking quality standards to consideration. ISO 9001 has been used in supplier selection [5], but as a guide for shortlisting suppliers, not to assess the SSP. Since benchmarking is a form of comparison, it requires to set a standard guideline to compare

the two aspects that are being assessed. This study has employed ISO9001:2015 as a basic guideline to derive the base benchmarking framework to benchmark SSP and to identify best practices through that.

## 2. MATERIALS AND METHODS

### 2.1. Study Procedure

This study employed a two-phase methodology (see figure 1). In the 1$^{st}$ phase, the initial requirements for the framework development are compiled. The 2$^{nd}$ phase was started: the finalized framework was applied on industry organizations to assess them based on the framework and to identify good practices. Further to assess consistency of the responses in the AHP study, the consistency ratio was assessed and for all the expert opinion responses, the ratio was below the maximum threshold 0.01.
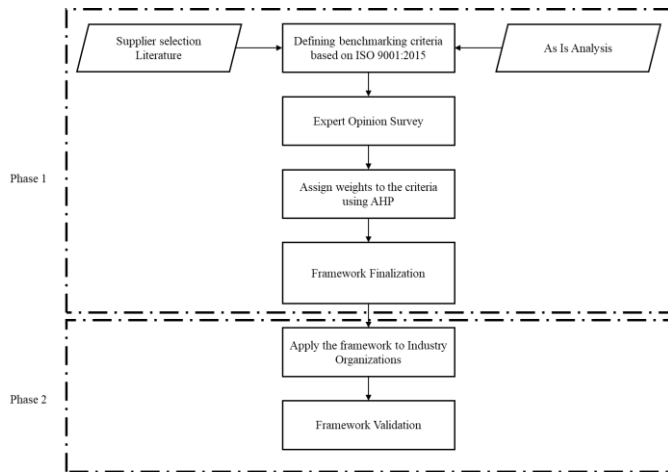


**Figure 8.** Two-phase methodology

Framework validation was also done in the 2$^{nd}$ phase based on the application and from an experiment where the as-is and to-be states were assessed by experts and a paired Wilcoxon signed rank test to assess whether there was any significant difference between the responses provided by them. And the validation provided that the framework derives results that are significantly improved from the current state.

### 2.2. The Framework for SSP Evaluation

For this study, the framework was derived based on ISO9001:2015, a theoretical and a practical framework that is based on Plan-Do-Check-Act (PDCA). The framework was derived from the original framework by [6] and it was altered for the suitability of the study purpose (see figure 2). For the assessment purposes a hierarchy of criteria were defined and these were weighted as mentioned in section 2.1 using an expert opinion survey. The criteria were assessed using KPIs that assess the criteria and these KPIs were derived from past literature and the as is analysis in the first phase of the two-phase methodology.
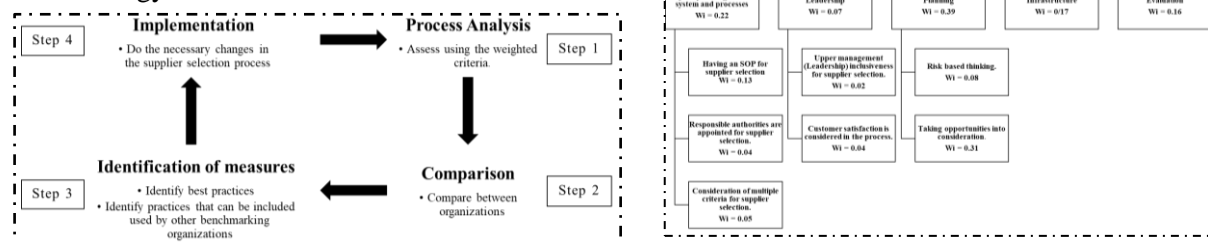


**Figure 9.** The Benchmarking Framework and hierarchy of criteria

## 3. RESULTS AND DISCUSSION

### 3.1. Process Analysis and Comparison

The benchmarking framework was initially applied to two industry organizations in the FMCG sector of Sri Lanka. The framework's output is a score that is based on the weights assigned for the assessment criteria and a set of KPIs. Figure 3 shows their respective scores for the main criteria based on the As-

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is state and based on these scores, the best practices can be identified. The framework will allocate scores to the aspects that are assessed in the process. This will happen in the first step of the framework.

$$Score\ allocated\ per\ main\ criteria = \sum weight * Actual\ KPI$$
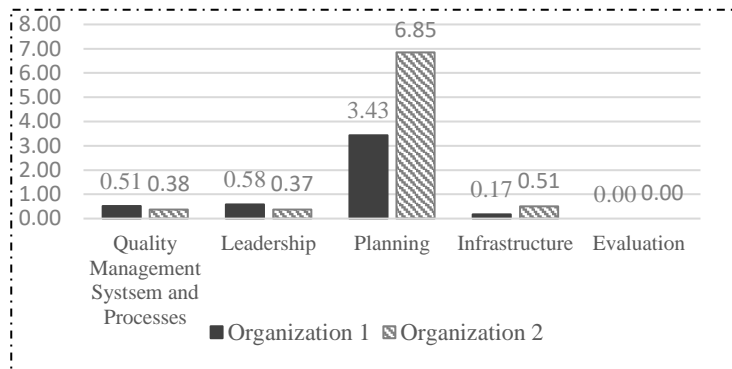
**Equation 1.** Scoring equation



**Figure 10.** Scores from the Comparison and Analysis Stage of the Framework

### 3.2. Identification of Measures

The organization that has scored well in Quality Management Systems and Processes aspect was identified to be using more criteria to shortlist suppliers when compared to Organization 2. Further they have been utilizing multiple cross functional meetings to have a much more streamlined management of supplier relationships. When considering the planning aspects, Organization 2 employs their Decision Support System (DSS) for supplier screening and selection which has enabled them to assess multiple suppliers enabling them to have a wider pool of potential suppliers to select from. Organization 1 does not possess such DSS which has limited their ability to access a wider pool of suppliers.

### 3.3. Implementation

When considering implementation of the best practices identified above in the identification of measures stage, their suitability, feasibility, and acceptability should be considered prior to implementing them within organization 1. Which will have to be done in more of a strategic level within the organization after thoroughly assessing these best practices that were identified after using the benchmarking framework derived in this study.

### 4. CONCLUSION

The sole purpose of this recommending framework is to benchmark Supplier Selection Processes in a quantifiable way and finally identify where they stand among the peers. In conclusion remarks, from the framework application on industry organizations it was found that the framework suggested in this study is applicable and provides important insights. Further, a key contribution from this study is the provision of a standardized quantifying framework of the supplier selection process evaluation. The study scope is limited to the FMCG industry in this study and expanding that scope in future studies it is recommended to further either to extend the existing scope by more generalizing across industries or to make it more industry specific (since this study recommends a base level benchmarking framework).

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