

# Derivation of a Decision Model on Outsourcing in Sri Lanka Using Analytic Hierarchy Process

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## 1. Introduction

Supply chain outsourcing has become one of the most lucrative and popular trends in the contemporary business world. Firms experience relative cost reductions through economies of scale, flexibility and scalability, better technological expertise and potential to expand business through outsourcing. Global trends such as the unpredictability of the markets and hyper-competitive environments characterised by frequent fluctuations are embedded with risks to outsourcing [1]. In a few instances in literature decision criteria that affect the outsourcing decision are highlighted: for instance, complexity, asset specificity, contestability [2] asset specificity, core competency and sunk cost [3].

## 2. Objectives

In order to devise a decision model pertaining to outsourcing supply chain functions, this study concentrates on identifying the key decision criteria affecting the supply chain outsourcing decision and the extent to which each criterion affects the outsourcing decision.

## 3. Methodology

The research process was conducted in three stages. In the initial stage through the data gathered from literature sources and direct interviews with veterans in the industry, a set of decision criteria was formulated. An online questionnaire was prepared to evaluate contemporary tendencies of the industry and assess the extent to which each criterion would affect the outsourcing decision through pair-wise comparisons of the decision criteria. In the second phase of data analysis the data was grouped according to supply chain functional area or industry sector type and then evaluated the current tendencies in the industry. In the third phase of the analysis the pairwise comparisons were assessed using Analytic Hierarchy Process and the relative importance of each decision criteria were evaluated.

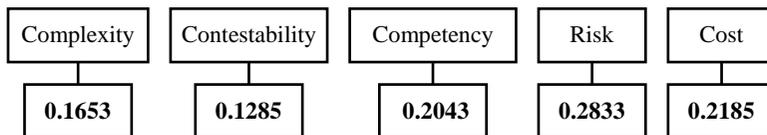
#### 4. Data Analysis

Through a meta-analysis, five decision criteria that would have the most impact for the outsourcing decision of a supply chain functional area were shortlisted as shown in Table 1.

**Table 1: Shortlisted Decision Criteria**

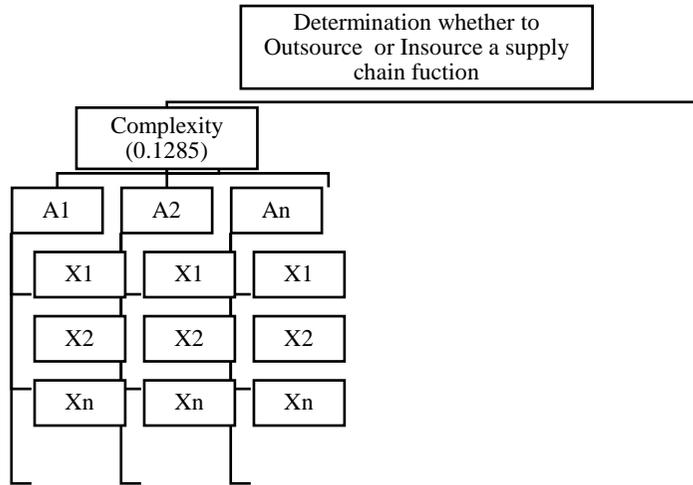
Decision Criteria	Meaning
Complexity	Process is highly complex and specialized assets used
Competency	Competitive advantage due to the skill or knowledge pertaining to the specific function
Contestability	The quality performance and availability of suppliers to perform the specified function
Risk	Risk due to the loss of control, poor performance by the supplier or outlay of valuable information
Cost	Over all financial costs incur when in-sourced or out sourced the respective function

Decision criteria were assessed pairwise using Likert scale and the relative importance of each criteria were analysed using Analytic Hierarchy Process. The AHP weights of the decision criteria are shown in Figure 1.



**Figure 1: AHP values of the decision criteria**

In AHP analysis highest priority is gained by the decision criteria of risk and cost (Figure 1). However, it is observed that all the decision criteria are valued with no significant difference in their weights. This depicts the criticality and the importance of all the decision criteria for making the sourcing decision. A decision model was formulated for a company to decide which supply chain functions in their firm are to be outsourced as depicted in Figure 2.



**Figure 2: Decision Model**

Where sub criteria are represented as A1, A2, A3...An, Supply chain functional areas as X1, X2, X3.....Xn and AHP Weights as  $W_x$ , such that aggregate weight for alternative X1 for decision criteria Complexity ( $W_{X1}$  Complexity) is:

$$W_{X1} \text{ Complexity} = 0.1285 \times \{(W_{X1} \times W_{A1}) + (W_{X1} \times W_{A2}) + (W_{X1} \times W_{A3}) \dots + (W_{X1} \times W_{An})\}$$

Similarly, for alternative X1 for other decision criteria also the weights can be calculated in the manner  $W_{X1}$  Contestability,  $W_{X1}$  Competency,  $W_{X1}$  Risk,  $W_{X1}$  Cost etc.

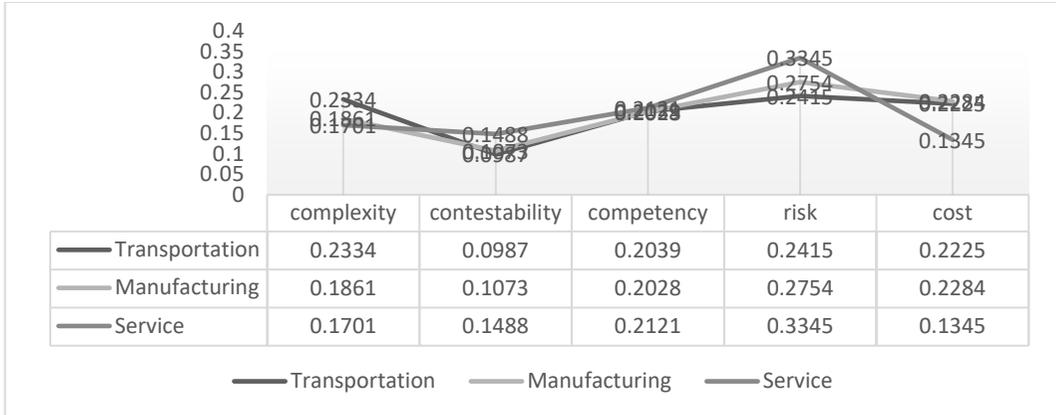
The aggregate rating of the alternative X1 can be thus derived as:

$$W_{X1} \text{ Aggregate} = W_{X1} \text{ Complexity} + W_{X1} \text{ Contestability} + W_{X1} \text{ Competency} + W_{X1} \text{ Risk} + W_{X1} \text{ Cost}$$

Similarly, Aggregates Weight of the other alternatives can also be calculated:

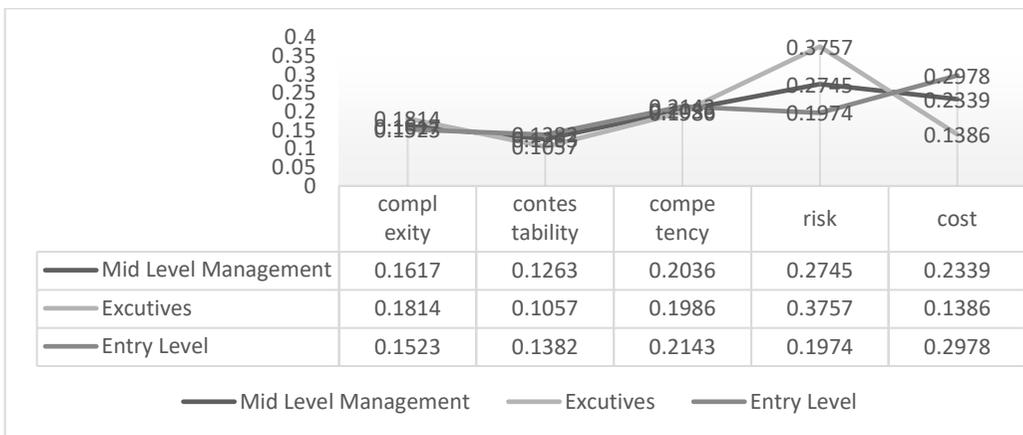
I.e.  $W_{X1}$  Aggregate,  $W_{X2}$  Aggregate,  $W_{X3}$  Aggregate.....  $W_{Xn}$  Aggregate

As per the decision model, supply chain functions can be prioritised considering their aggregate AHP weights. The supply chain function with the highest weight has to be the most likely function to be outsourced. In instances where companies outsource supply chain functions such as finance, marketing, IT, warehousing and transportation, respondents are found to not be satisfied with current arrangements. However out of the functions insourced, respondents are satisfied with the current arrangements of the company in most instances.



**Figure 3: AHP values for Decision Criteria (Industry wise)**

Figure 3 denotes the industry-wise classification of how AHP values of critical decision criteria behave according to the type of industry. A similar pattern is observed in the variation of AHP values of decision criteria irrespective of industry type.



**Figure 4: AHP values for Decision Criteria (Managerial Level Hierarchy wise)**

Perception towards the weightage of decision criteria complexity, contestability and competency act indifferently at all seniority levels of the industry. But risk and cost have different assessment for employees at different levels in the company hierarchy (Figure 4).

Future research can be conducted aiming at industry niches and assessing variations of the relative weightages of decision criteria. A case study can be done considering a single company and assessing the accuracy of its decision model.

## 5. Conclusion and Recommendations

Key decision criteria in determining the outsourcing decision are namely contestability, complexity, competency, risk and cost. Except cost and risk which have higher relative importance other decision criteria possess equal prominence.

Irrespective of the industry or the hierarchy of the respondents, weightages assigned to decision criteria remain consistent apart from few exceptions, proving that the decision model is consistent and can be used irrespective of industry type.

The hierarchy analysis of AHP values for the decision criteria with significant variations in risk and cost suggests the maturity of a person in the industry and the responsibilities of each person affects the outsourcing decision.

Many respondents denoting higher satisfaction with insourced functions does not necessarily lead to the conclusion that insourcing is a better solution in comparison with outsourcing since the satisfaction of the respondents is only a measure of smooth operations and not of the aggregate benefit to the company. Absence of proper knowledge and the edge that could have been gained through effective outsourcing may also impair the judgment of respondents.

Formulated decision model can be used by the firms to determine which supply chain functions are to be outsourced. Company-specific sub-criteria can be formulated from the inputs of employees. AHP values for the sub criteria can be determined by the pair-wise comparison inputs of employees.

## 6. References

- [1] D'Aveni, R.A., Canger, J.M., Doyle, J.J., 1995. Coping with hyper competition: utilizing the new 7S's framework 1. *The Academy of Management Executive* 9 (3), 45–60
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**Keywords:** *outsourcing, decision model, analytic hierarchy process, supply chain management, supply chain functional areas*