Using Scoring and Weighting Approach for Equipment Import

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Vietnam is on the path to integration in the regional economy; so how to survive and go ahead is an urgent question to Vietnamese businesses. Vietnam is taking final steps to accede to WTO in 2005. As ruled by WTO, Vietnam shall grant its MFN (Most-Favored Nation) status to other members, that is, it must open its market to foreign merchandise. In addition, Vietnam will complete its commitment to the AFTA in the following year, 2006. Then, tariff barriers will thus be removed to 0%-5%. In such a circumstance, domestic businesses are required to make preconditions for their success in the harsh competition. It is therefore inevitable that they purchase equipment and technology lines to enhance product quality, promote business performance and sharpen their competitive edge.

In the past, local companies incurred losses due to their mistakes in equipment import. The article may be a hint to their future purchase of new machinery and equipment.

When determining procurement, the business owner has to consider and compare several options based on different criteria. Moreover, among these criteria, some are measurable and assessed with figures (purchase price, operation cost, installation area, etc.), while others are not (including product quality, manufacturing design...). To solve this problem, a scoring and weighting approach should be used for optimal determination.

The following example will illuminate the approach:

An investment project plans to import a production line. There are three options having the same technical functions, and the lines are manufactured by three different companies A, B, and C in separate countries. The criteria have been identified and assessed to compare the options as indicated in the performance matrix low:

Furthermore, the consultancy has also specified:

PQ IA PP ED OC MD (1)

Criteria	Acronym	Unit	OPTIONS		
			A	B	C
Purchasing Price	PP	US$1,000	300	250	380
Operation Cost per year	OC	US$1,000	20	30	18
Installation Area	IA	M²	100	120	80
Product Quality	PQ	Rating	Very good	Good	Excellent
Equipment Durability	ED	Rating	Good	Medium	Good
Manufacturing Design	MD	Rating	Very good	Good	Very good

To solve this problem, we apply the scoring and weighting approach.

1. Identifying numerical weights:

According to (1): PQ IA PP ED OC MD

So the numerical weights are assigned to each criterion as follows:

$PQ = 6/21$; $IA = 5/21$; $PP = 4/21$; $ED = 3/21$; $OC = 2/21$ and $MD = 1/21$

Total weights are: $1/21 + 2/21 + 3/21 + 4/21 + 5/21 + 6/21 = 21/21 = 1$

2. Identifying scales

Using scales from 0 to 1,

a. For rated criteria; the scales will be:

Excellent: $(4 - 1) / 3 = 1$;

Very good: $(3 - 1) / 3 = 2/3$;

Good: $(2 - 1) / 3 = 1/3$; and

Medium: $(1 - 1) / 3 = 0$

b. For measurable criteria:

* Installation area IA: $max - min = 120 - 80 = 40$

A: $(120 - 100) / 40 = 0.5$; B: $(120 - 120) / 40 = 0$; C: $(120 - 80) / 40 = 1$

* Purchasing price PP: $max - min = 380 - 250 = 130$

A: $(380 - 300) / 130 = 8/13$; B: $(380 - 250) / 130 = 1$; C: $(380 - 380) / 130 = 0$

Operation cost: OC: $max - min = 30 - 18 = 12$

A: $(30 - 20) / 12 = 5/6$; B: $(30 - 30) / 12 = 0$; C: $(30 - 18) / 12 = 1$

We have the following matrix:

The option C has the highest score, so the production line of Company C should be chosen. ■

Criteria	Weights	Scaling			Scaling x Weight		
		A	B	C	A	B	C
SP	4/21	8/13	1	0	32/273	4/21	0
OC	2/21	5/6	0	1	10/126	0	2/21
IA	5/21	1/2	0	1	5/42	0	5/21
PQ	6/21	2/3	1/3	1	12/63	6/63	6/21
ED	3/21	1/3	0	1/3	3/63	0	3/63
PD	1/21	2/3	1/3	2/3	2/63	1/63	2/63
				(+)	0.5854	0.2857	0.6983