

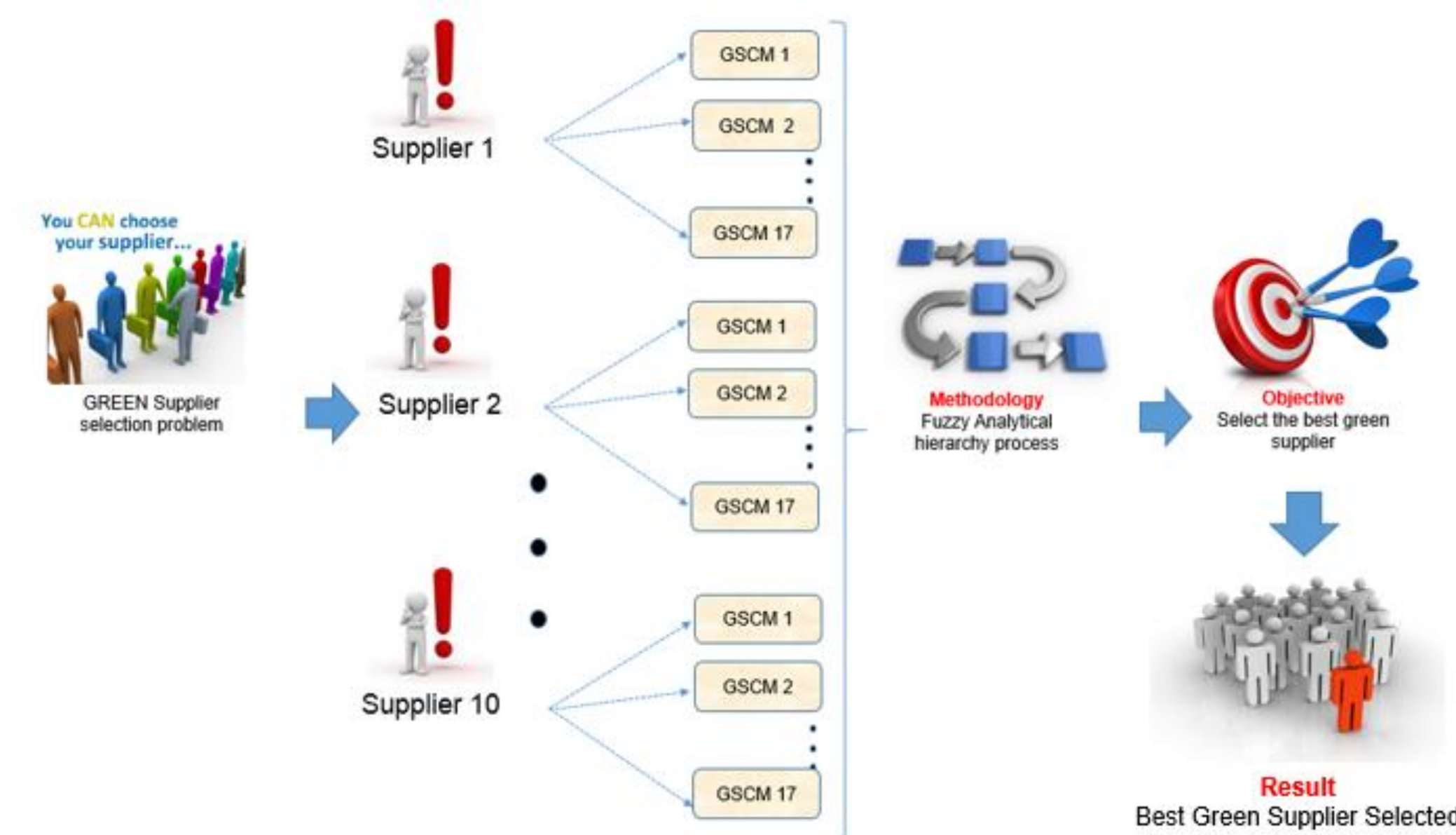
Selection of Green suppliers based on GSCM practices: Using fuzzy MCDM approach in an Indian Electronics Company



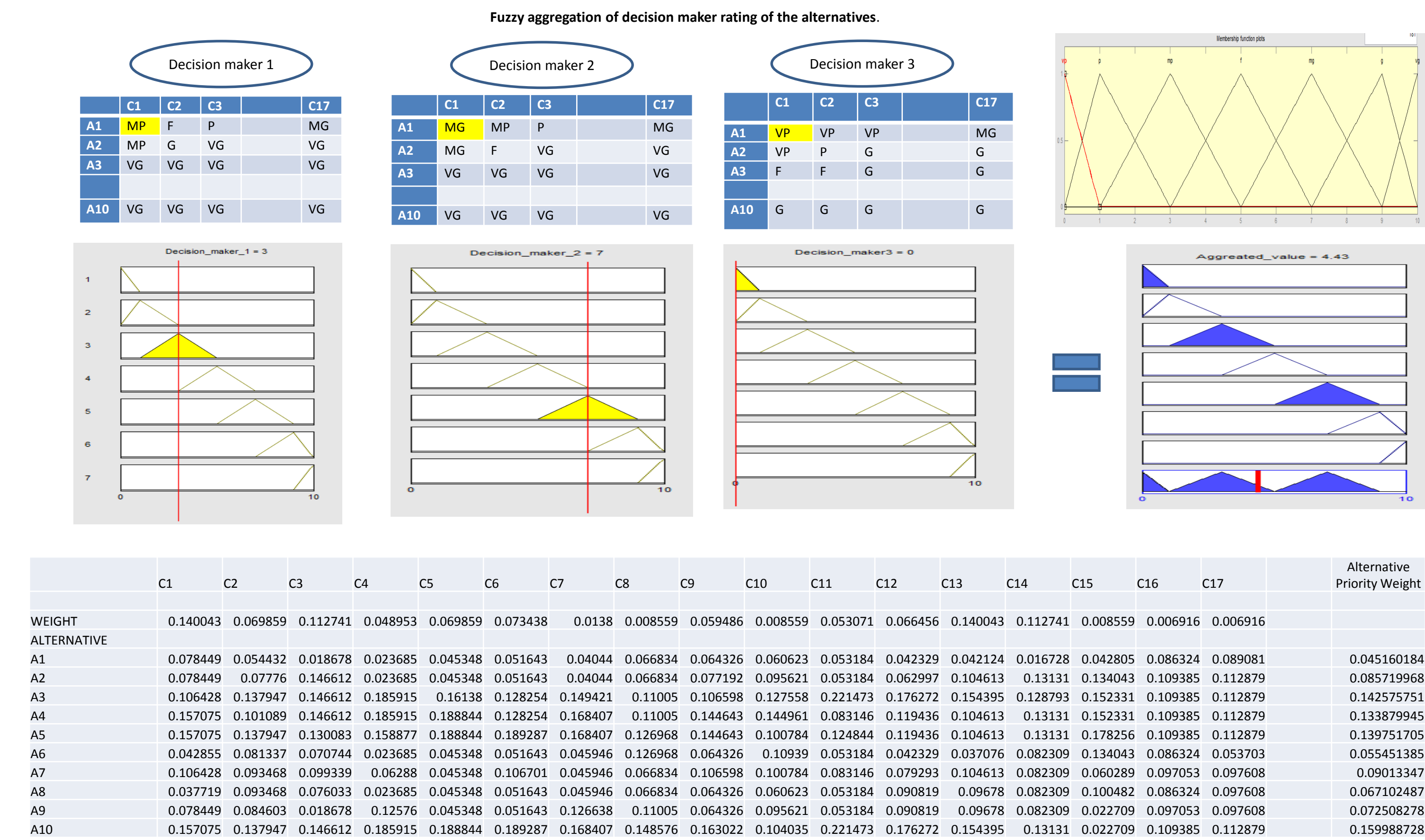
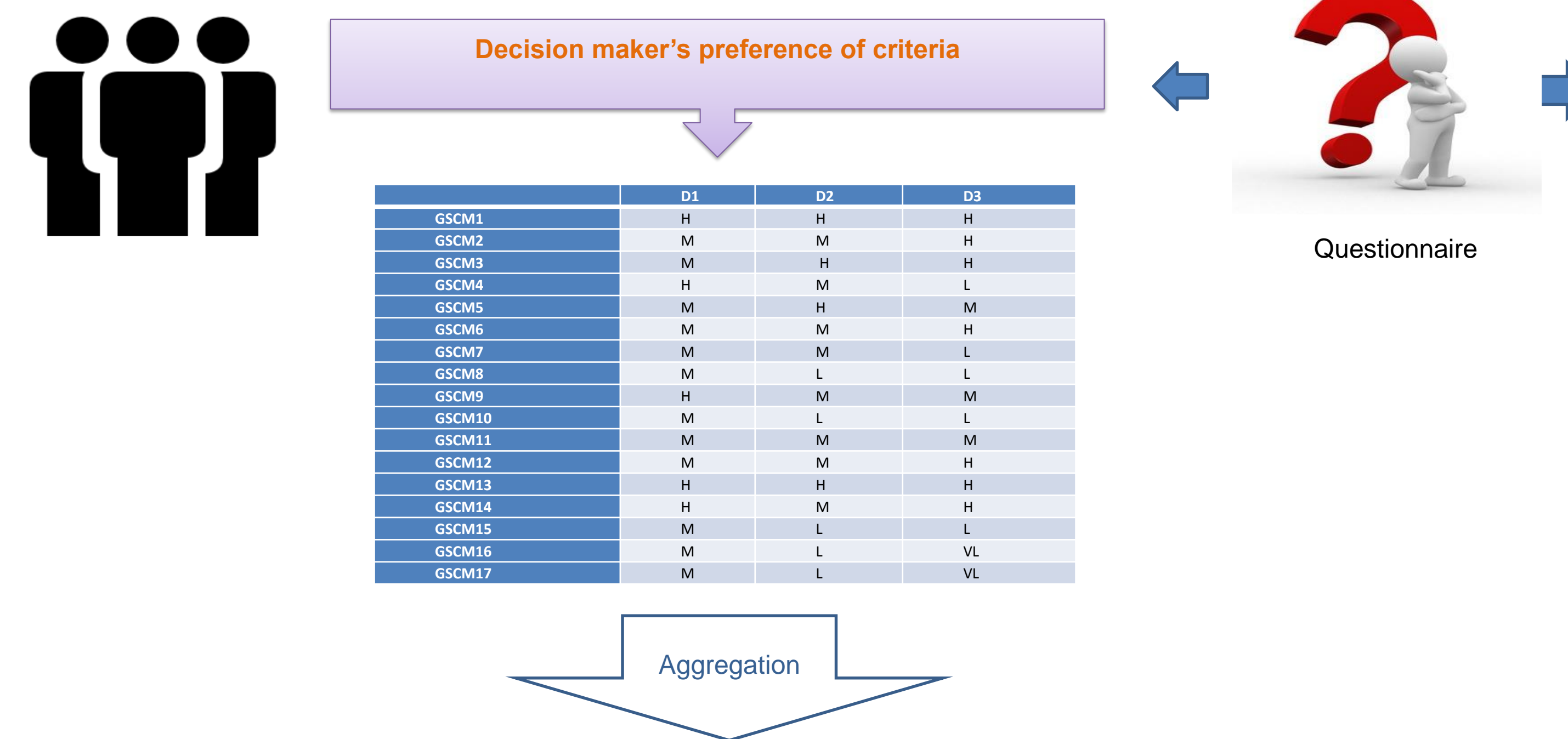
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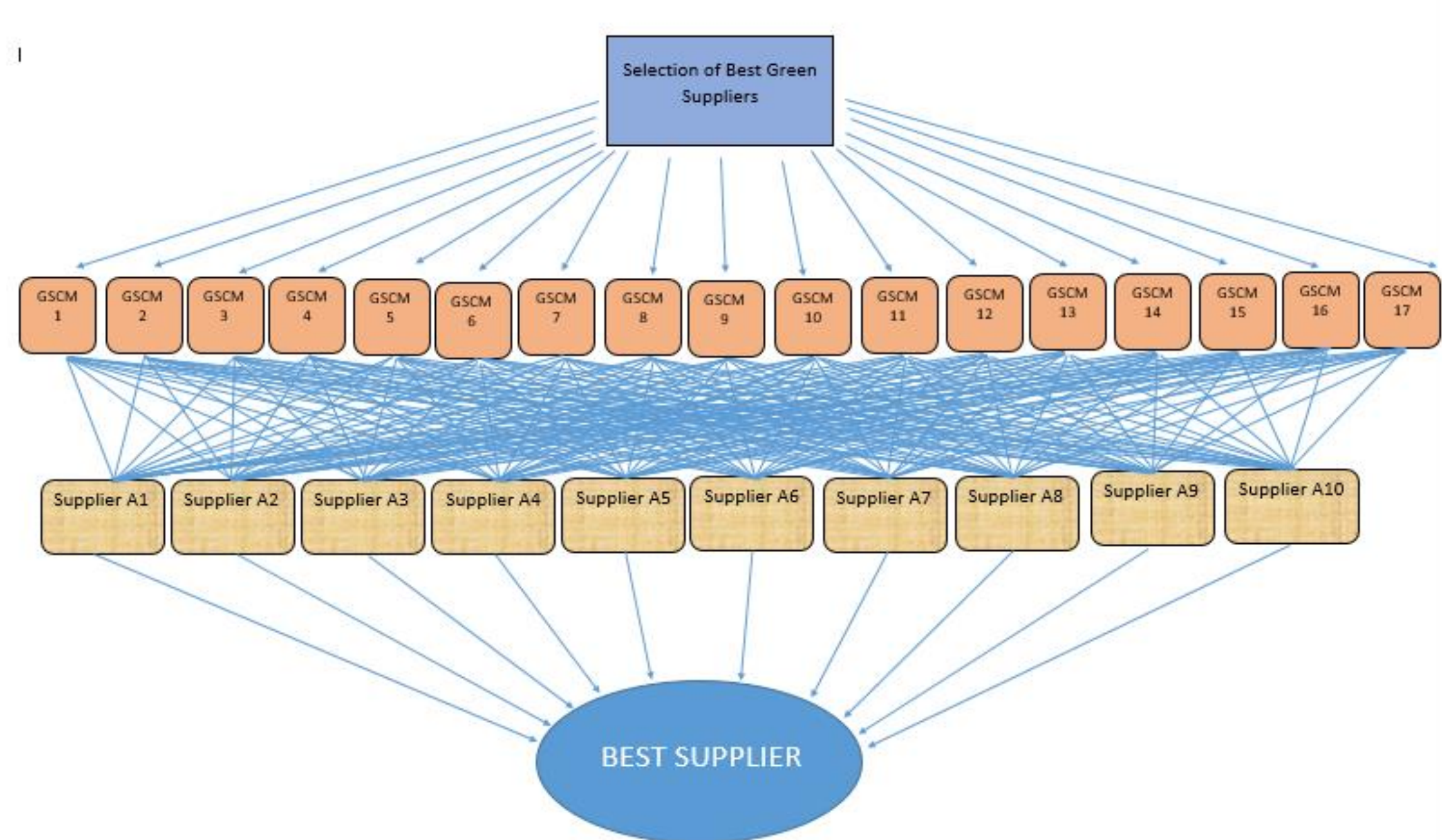
Graphical Abstract



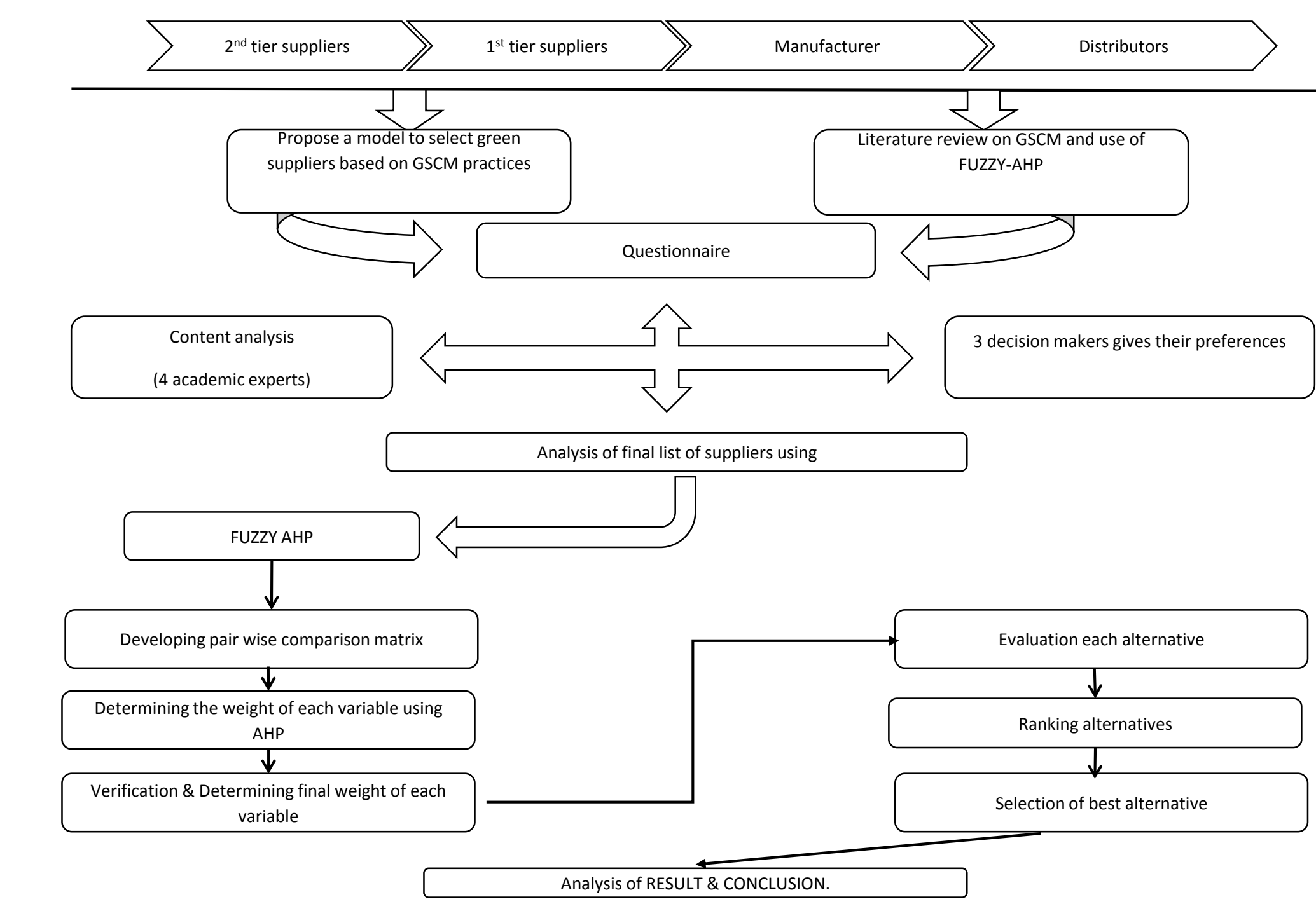
Methodology



Problem definition



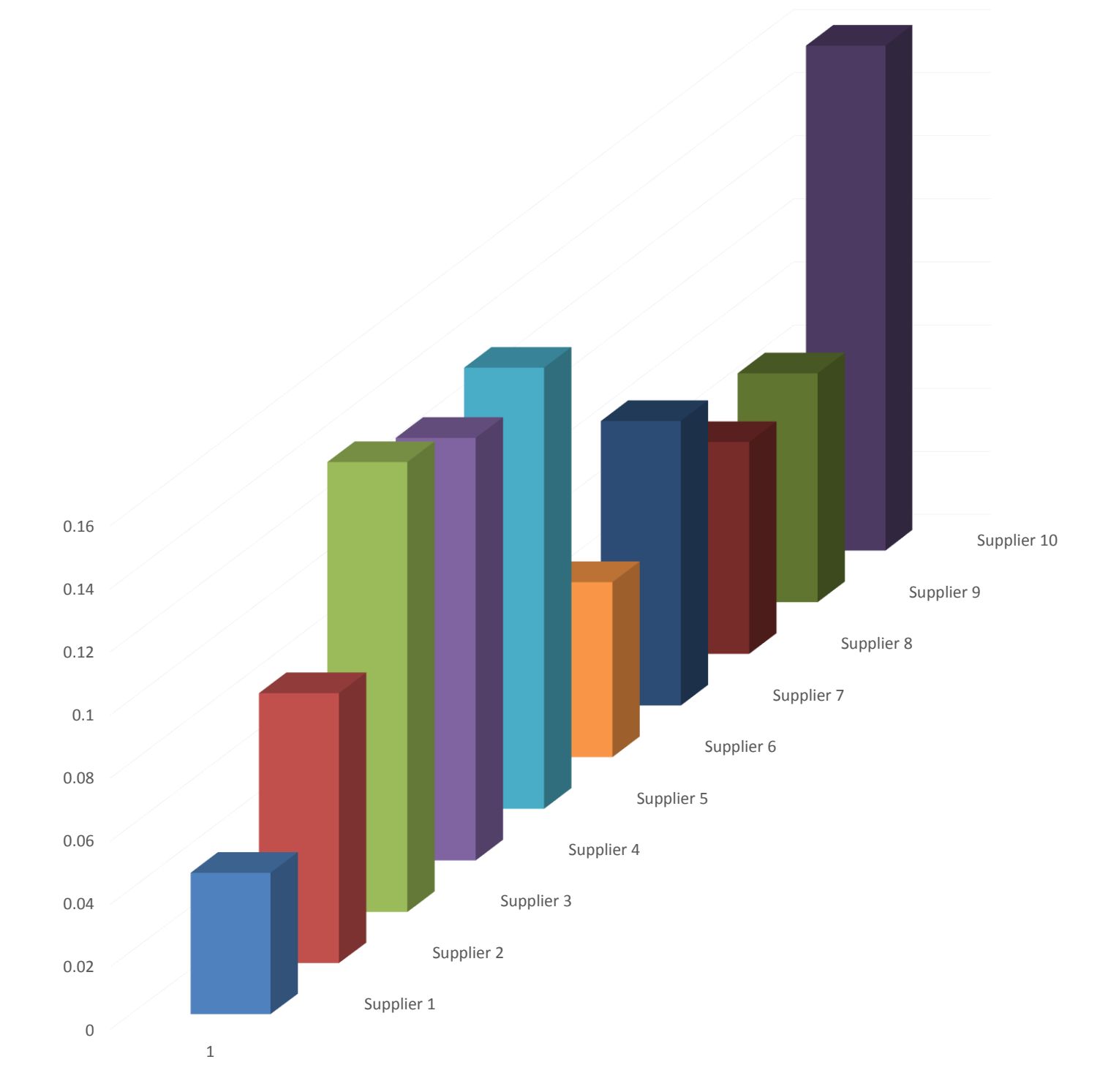
CRITERIA VS. CRITERIA MATRIX					WEIGHTS OF CRITERIA	
	GSCM1	GSCM2	GSCM3	GSCM17	GSCM1	0.140043
GSCM1	EP	FSP	WP	AP	GSCM2	0.069859
GSCM2		EP		AP	GSCM3	0.112741
GSCM3			EP	AP	GSCM4	0.048953
GSCM17				EP	GSCM5	0.069859
					GSCM6	0.073438
					GSCM7	0.0138
					GSCM8	0.008559
					GSCM9	0.059486
					GSCM10	0.008559
					GSCM11	0.053071
					GSCM12	0.066456
					GSCM13	0.140043
					GSCM14	0.112741
					GSCM15	0.008559
					GSCM16	0.006916
					GSCM17	0.006916



Mathematical Formulation

- Fuzzy synthetic extent with respect to the i^{th} object is
$$F_i = \sum_{j=1}^n N_{ij} \otimes \left[\sum_{j=1}^n N_{ij} \right]$$
- The value of $F_i \otimes N_{ij}$ is
$$\sum_{j=1}^n N_{ij} = \left(\sum_{j=1}^n n_{1j}, \sum_{j=1}^n n_{2j}, \sum_{j=1}^n n_{3j} \right)$$
- The value of $F_i \otimes N_{ij}$ is
$$\sum_{j=1}^n N_{ij} \otimes \left(\sum_{j=1}^n n_{1j}, \sum_{j=1}^n n_{2j}, \sum_{j=1}^n n_{3j} \right)$$
- Then,
$$\left[\sum_{j=1}^n N_{ij} \otimes \left(\sum_{j=1}^n n_{1j}, \sum_{j=1}^n n_{2j}, \sum_{j=1}^n n_{3j} \right) \right] = \left(\frac{1}{\sum_{j=1}^n n_{1j}}, \frac{1}{\sum_{j=1}^n n_{2j}}, \frac{1}{\sum_{j=1}^n n_{3j}} \right)$$
- $(N_1 = (n_{11}, n_{12}, n_{13})$ and $N_2 = (n_{21}, n_{22}, n_{23})$ then ordinate of D is computed by
$$V(N_1 \otimes N_2) = \frac{n_{11} - n_{21}}{(n_{12} - n_{22}) - (n_{13} - n_{23})}$$

Results



References

- Golam kabir and M. Ahsan AkhtarHasin, Multiple criteria inventory classification using fuzzy analytic hierarchy process, International Journal of Industrial Engineering Computations 3 (2012) 123–132.
- Devika Kannan- Ana Beatriz Lopes de Sousa Jabbour Charbel José Chiappetta Jabbour Selecting green suppliers based on GSCM practices: Using fuzzy TOPSIS applied to a Brazilian electronics company, European Journal of Operational Research, Volume 233, Issue 2, 1 March 2014, Pages 432–447
- Devika Kannan- Kannan Govindan- Sivakumar Rajendran, Fuzzy Axiomatic Design approach based green supplier selection: a case study from Singapore, Journal of Cleaner Production Volume 96, 1 June 2015, Pages 194–208
- Omkar Prasad S. Vaidya, Sushil Kumar, Analytic Hierarchy process: an overview of applications, European Journal of Operational Research 169 (2006) 1–29
- Ozcan Kilinci, Suzan Asli Onal, Fuzzy AHP approach for supplier selection in a washing machine company, Expert systems with applications 38 (2011) 9656-9664