

A two-step multivariate I-distance approach for the evaluation of Active Ageing Index



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- Aim of the paper is to overcome the problem of subjectively assigned weights

- As a remedy, it proposes **I-distance** method

- Advantages of new methodology:

- Construction of composite indices and ranking entities
- Calculation of statistically based weights
- Identification of areas in which implemented policies would contribute most to Active Ageing goals

Results:

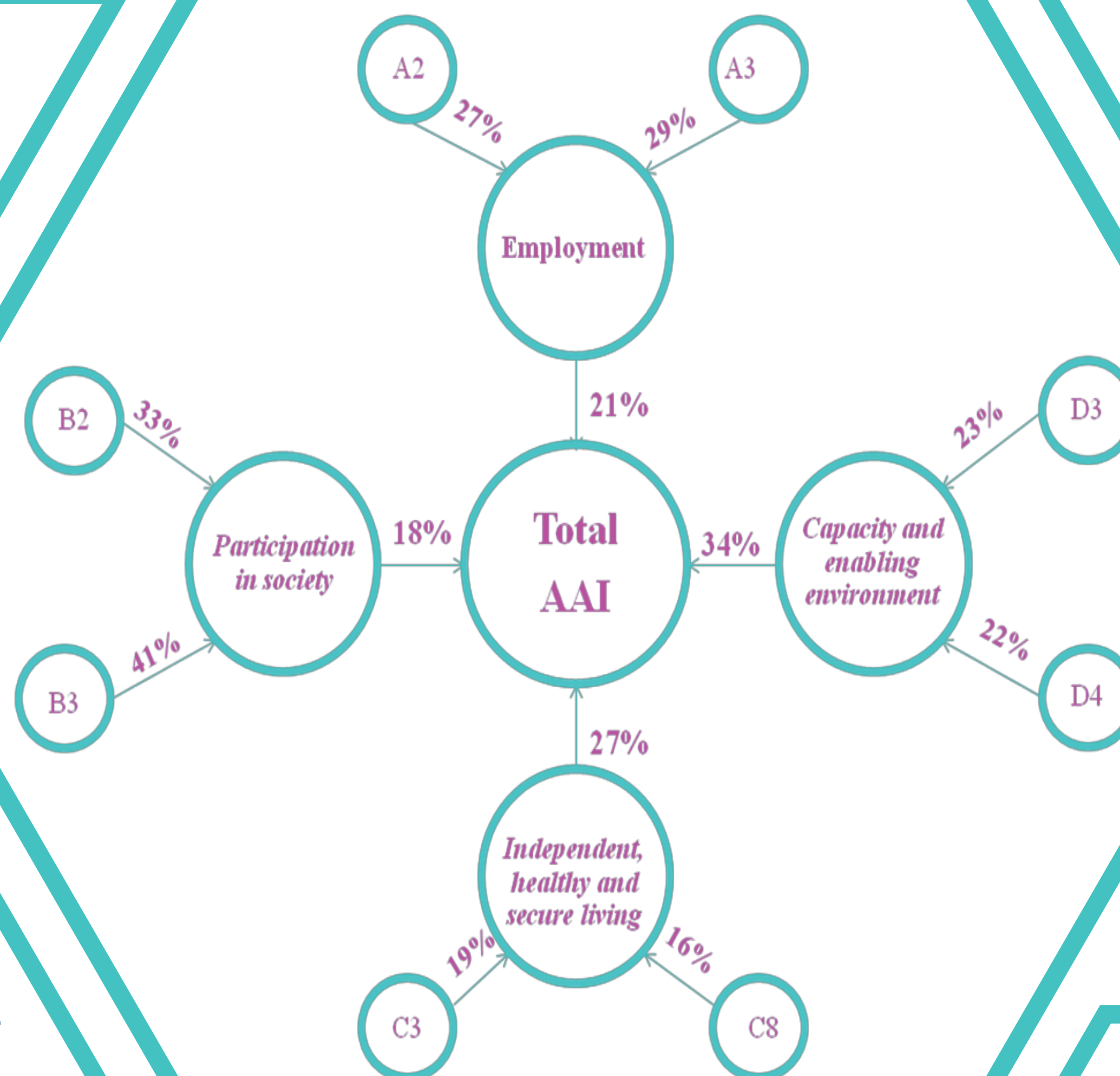
New methodology takes into account current situation among people aged above 55

- **Employment:** more emphasis is given to countries with higher level of employment among two oldest age groups;

- **Participation in society:** results indicate that separate gender analysis should be done;

- **Independent, healthy and secure living:** It is necessary to define whether some indicators should be excluded from the 3rd Domain;

- **Capacity and enabling environment for Active Ageing:** Increase in the significance of the indicator *Use of ICT*, and problem with the structure of the data within the indicator *Educational attainment*.



I-distance method

Composite indices allow presentation and analysis of an individual phenomenon with only one global measurement, by taking into account different variables from the designated dataset.

I-distance method takes into account many different variables, stressing the importance of their right combination in order to create one synthesised indicator which represents the rank. The method is based on the creation of a fictive entity, the one with the minimum values of each variable, and measuring the distance of other entities in the observed data set from the fictive entity.

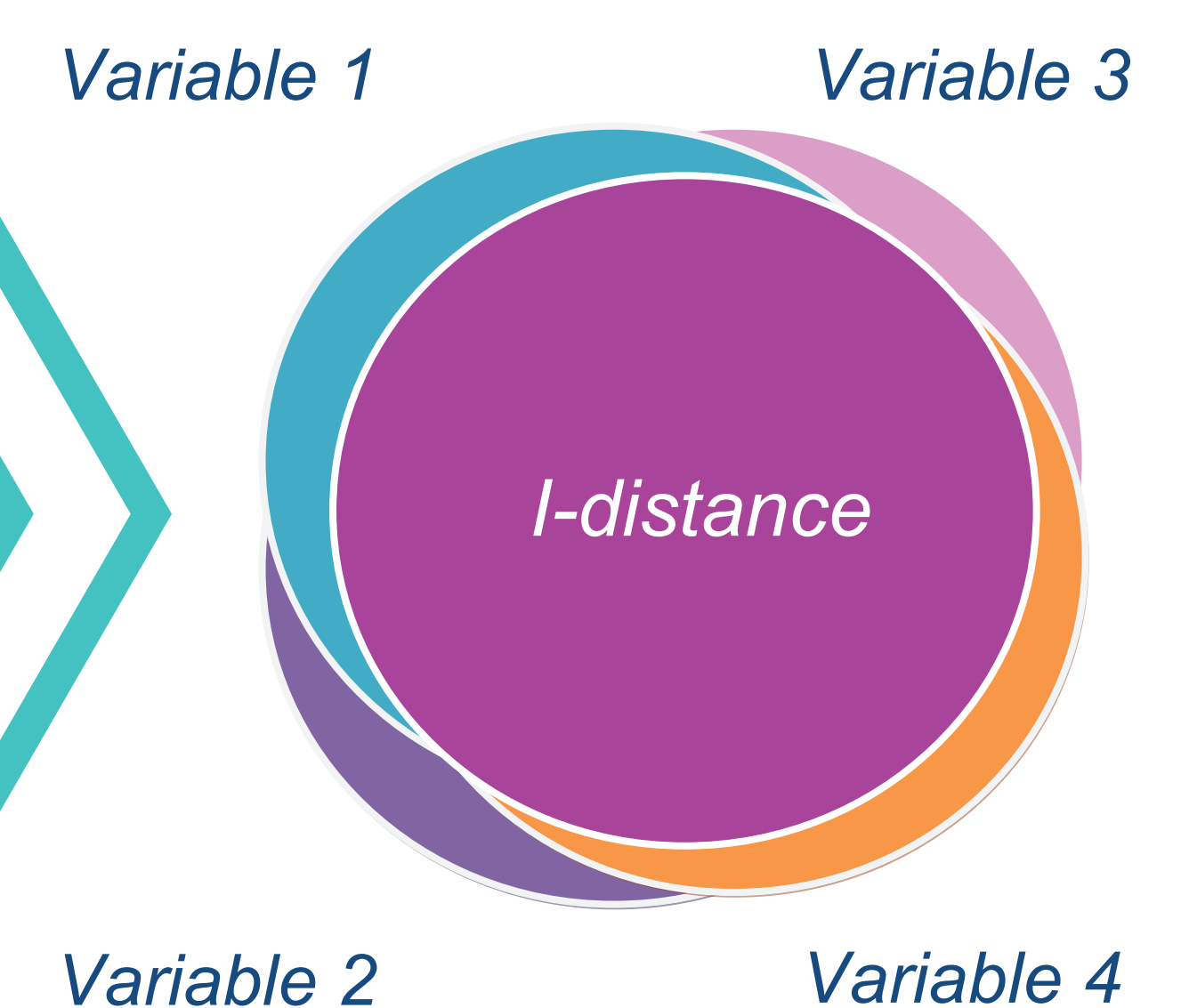
$$D(r, s) = \sum_{i=1}^k \frac{|d_i(r, s)|}{\sigma_i} \prod_{j=1}^{i-1} (1 - r_{j1,2,\dots,j-1})$$

The distance between the values of variable X_i for P_r and P_s is known as the discriminate effect:

$$d_i(r, s) = x_{ir} - x_{is} \quad i \in \{1, \dots, k\}$$

In addition, **square I-distance** is frequently used and given as:

$$D^2(r, s) = \sum_{i=1}^k \frac{d_i^2(r, s)}{\sigma_i^2} (1 - r_{i,2,\dots,i-1}^2)$$



Country	Rank				Total AAI
	Employment	Participation in society	Independent, healthy and secure living	Capacity and enabling environment for Active ageing	
Sweden	2	11	2	1	1
Finland	6	1	4	3	2
Denmark	5	14	1	2	3
United Kingdom	3	6	9	5	4
Netherlands	7	5	3	4	5
Belgium	18	2	12	6	6
Portugal	1	12	17	12	7
Czech Republic	10	4	6	11	8
France	16	7	5	9	9
Spain	14	3	16	10	10
Hungary	19	8	7	18	11
Austria	13	10	10	7	12
Estonia	4	16	13	15	13
Slovenia	11	9	11	13	14
Germany	8	19	8	8	15
Greece	12	13	19	14	16
Slovakia	17	15	15	16	17
Latvia	9	18	18	19	18
Poland	15	17	14	17	19

References:

Method was introduced in 1977 as a method for ranking countries by the level of their development. By now, it has been used successfully for the construction of various composite indices, e.g.:

- Ranking of universities
- Evaluation of socio-economic development and well-being of nations
- Measuring sustainable development

Future research:

- Increase the number of countries included
- Longer time series data
- Sensitivity analysis