Theory of Knowledge Expression and Integration

## - Project in Strategic Center – SC2

Leader: Andrzej P. Wierzbicki

⚜ Research Outline

The project concentrates on the development of two general themes: 1) Knowledge creation and integration, and 2) Knowledge expression and integration.

In theme 1), the focus was on preparing a book Creative Space. The book presents a new method of integration of many known theories of knowledge creation, together with new conclusions concerning spirals of creating fundamental knowledge in time of scientific revolutions as well as in normal knowledge creation processes in academia as opposed to known spirals of knowledge creation in industrial firms and market organizations. The follow-up of this book, called Creative Environments, will be next focus of the project.

In theme 2), during the past year the focus has been the development of methods for knowledge representation and integration through the context-based modeling technique, including the representation of uncertain and/or imprecise knowledge. Another major part of theme 2) has recently been focusing on developing methods for multi-expert/multi-attribute decision making with linguistic and/or uncertain information. In addition, other aspects including rough-fuzzy hybridization, clustering for categorical and mixed data, and approximate reasoning, have been also investigated.
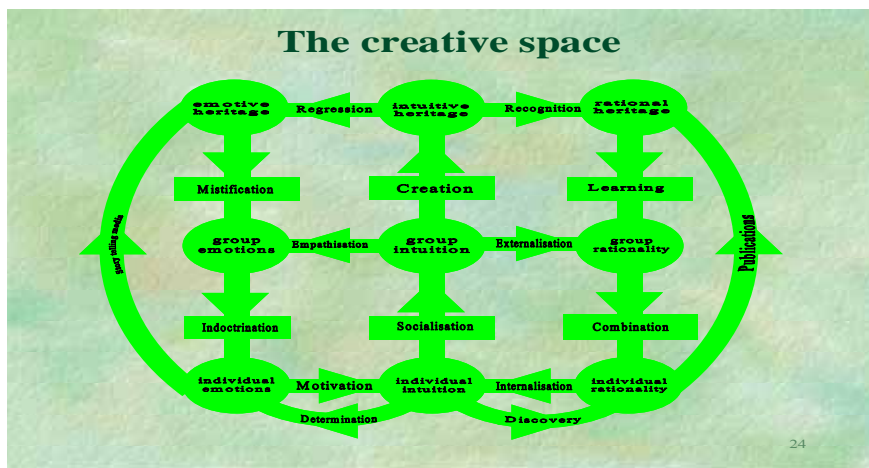
⚜ Members

A.P. Wierzbicki, Van Nam Huynh (Associate), M. Makowski (IIASA), M. Ryoke (Tsukuba University), Totok Hari Wibowo (PD); and Minh Hoang Lee, Wei Huang, Wita Purwasih (PhD candidate at the School of Knowledge Science)

⚜ Publications

Total over 12 papers (books, chapters in books, papers in scientific journals); more important:

- Wierzbicki A.P., Nakamori Y.: Creative Space. Springer Verlag 2005, in print
- Wierzbicki A.P.: Przestrzeń twórcza: próba syntezy teorii tworzenia wiedzy. Zagadnienia Naukoznawstwa 40 pp. 621-626 (in Polish: Creative Space: an approach to the integration of knowledge creation theories. Problems of knowledge science, December 2004
- Huynh V.N., Nakamori Y., Ho T.B.: Assessment aggregation in the evidential reasoning approach to MADM under uncertainty: Orthogonal vs. Weighted sum, in: M J. Maher (Ed.), Lecture Notes in Computer Science 3321, Springer-Verlag, Heidelberg 2004, pp. 109-127
- Huynh V.N., Nakamori Y., Ho T.B., Resconi G.: A context model for fuzzy concept analysis based upon modal logic, Information Sciences 160 (1-4) (2004) 111-129