

# How Promoting the Research Ability for Publication in High Level SSCI/SCI Journals? (Summer Camp)

- 2 -

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July 15 (TUE) – 17 (THU), 2014  
National Taipei University**

# Promoting Research/Working Ability

“Story (Objects)” of Real Case (Case Study in Experience) for Solving Real World Problems

+

Research Methods for Problems-Solving  
(Which methods will be new hybrid MCDM model?)

↓

Expressions in Results

(How to Promote the Writing Skills and Speech Skills in Logic)

# OUTLINE

- ❖ **Part I: How to write the high-quality/good papers?**
- ❖ **Part II: How to publish papers in good journals?**
- ❖ **Part III: How to find a good research topic?**
- ❖ **Part IV: What should be included when submitted a paper?**

# Goals

## Global Excellence

**How to Become Number One – Improvement?  
(Researches and Publications)**

## Global or Local Impacts

**Do I need to publish as a researcher? Yes.  
Do I have other choice? No.**

# Google Scholar

Gwo-Hshiung Tzeng

Distinguished Chair Professor

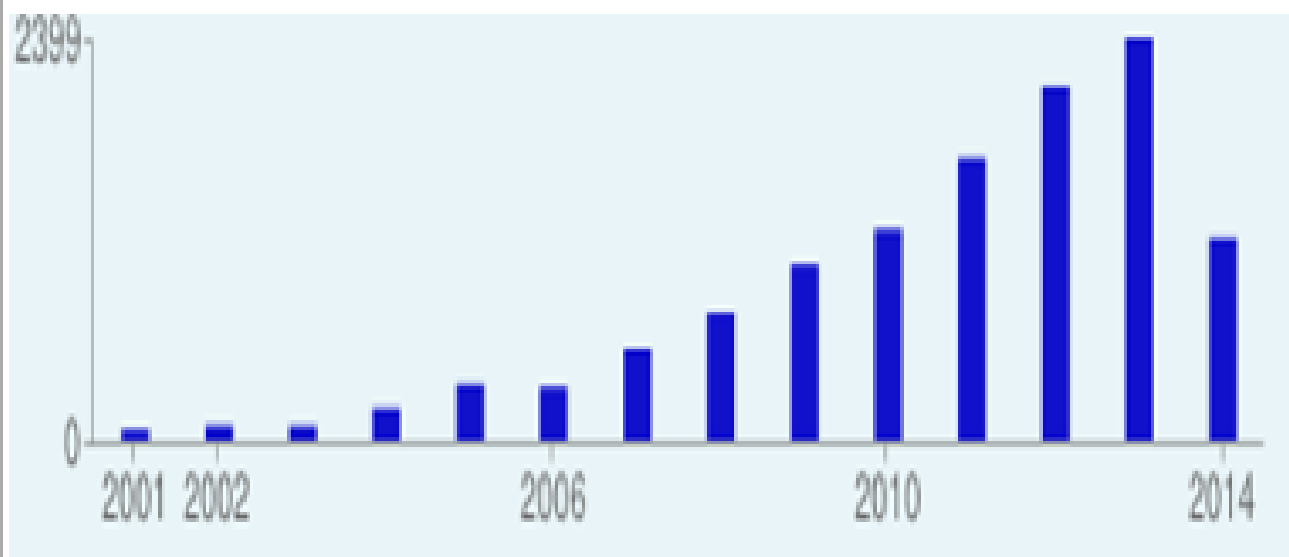
Research methods for problems-solving: Data Analysis (crisp sets, fuzzy set theory, rough set theory -> statistics and multivariate analysis, evolutionary computation, soft computing, etc.), multiple criteria decision making (MADM and MODM), and so on for applications in the real world problems

## Citation indices

	All	Since 2009
<a href="#">Citations</a>	12441	9714
<a href="#">h-index</a>	59	51
<a href="#">i10-index</a>	172	153

July 10, 2014: 2011 (1531 times), 2012 (2254 times), 2013 (2399 times)

## Citations to my articles



<http://scholar.google.com/citations?user=ZRXOrvQAAAAJ&hl=en>

# OUTLINE

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# Part I: How to write the high-quality/good papers?

- ❖ How can enhance the research/work ability and expanding competence?
- ❖ Need which skills to write the high quality papers?
- ❖ How can write the high-quality/good papers for publication in high level **SSCI/SCI** Journals?

Learning: 「求拜名師(Find Excellent Mentor/Teacher)」  
可以「事半功百倍(Get Hundred the Result with Half Effort)」, “No free lunch”

# Enhancing the research/work ability and expanding competence (I/II)

- Based on “Research Methods for Problems-Solving” -

- ❖ Promoting the **logic thinking** and **logic reasoning**.
- ❖ Enhancing the **basic tools for problems-solving**, such mathematics, science, society, economics, practice experience and so on for creating the aspired-to **interdisciplinary education system** in the e-era (“T”, wide and deep).
- ❖ Reinforcing in education: (1) **Logic Reasoning** -- “Research Methods for problems-solving” in idea, logic reasoning, thinking, and problems-solving by systems” for analyzing, and solving all possible problems in real world; (2) **Man-machine Language**; (3) **International (Foreign) Language**.



# Enhancing the research/work ability and expanding competence (II/II)

- Based on “Experience for Case in Real World” -

- ❖ Case story (objects): Which problems in real world should be understood? How understand the real problems in practices?
- ❖ Experience in real world should be enhanced
  - How enhancing the experience for case study in real problems? Such as projects for real case, working in industries, etc. to find problems, then thinking how to solve these problems (in Apprentice (學徒, 跟名師學習, 如朱銘, Cantor (1845-1943), Hilbert (1862-1943) → von Neumann (1903-1957) → Shapley)

# Need which skills to write the high quality papers

Good story (hot-topic and which problems)

+

Which problems-solving methods are good/suitable to solve our hot-topic problems in the real world (interdisciplinary systems)

+

Good writing skills

# Need which skills to write the high quality papers (Good writing skills)

## ❖ What should be included (pay attention to logic)

1. Title
2. Abstract
3. Key Words
4. Main Contents
5. Conclusions
6. References
7. Appendices
8. Cover letter
9. List of potential referees

# Need which skills to write the high quality papers (Good writing skills)

## ❖ **Title**

- Short, meaningful, precise and attractive
- Include few words (terminology) for a clue (purpose)

## ❖ **Abstract**

- Very important
- Problem statement and results obtained contribution

Including: (1) how this topic is hot, which problems? (2) which purpose? (3) adopting which methods for solving this/these problem(s), (4) an empirical case of ... is illustrated to show (demonstrate or prove (proof)) the proposed method, (5) which results and contributions.

- No mathematical equations.
- Need to streamline expression, the best is one paragraph or at most two paragraphs only.

# Need which skills to write the high quality papers (Good writing skills)

## ❖ **Key Words**

- Will help editor to find referees
- Check the journal list
- Internet and citation search

## ❖ **Main Contents**

- Introduction
- Literature review (Organization of the paper)
- Research Method (Building ... model for ...)
- An empirical case of ...  
(May contain several subsection: problem descriptions, main results, discussions and implications)
- Conclusions and remarks (or Concluding remarks; including suggestions, future researches, etc.)

# Need which skills to write the high quality papers (Good writing skills)

## ❖ Literature review

- Be **complete**, be **precise**. **Don't miss** those papers that are closely related to your works (in recent papers, potential referee, etc.)
- **Don't miss** articles in flagship journals (whether or not fit within the Aims and Scopes). Don't just cite many Chinese authors
- Be considerate, especially if you are extending other people's works
- Be **positive** (reviewers in here)
- **Relationship to Literature:** Does the paper demonstrate an adequate understanding of the relevant literature in the field and cite an appropriate range of literature sources? Is any significant work ignored?:

# Need which skills to write the high quality papers (Good writing skills)

## ❖ Research Method (Building ... model for ...)

If this Section divides into some Sub-sections, we should use the 3-8 streamlines to describe why adopting the proposed method(s) for solving this problem, which purpose of the proposed method(s), contents, and so on.

- If the method(s)/approach(es)/model(s) is(are) newly proposed by author(s), the new propose method(s)/approach(es)/model(s) should describe in this this sub-section in details;
- If application papers using: new research method(s), the method(s) can put in **Appendix**; traditional method(s), method(s) can be omitted;
- For example: 3.1 The DEMATEL technique, 3.2 Finding the influential weights using DANP, 3.3 Modified VIKOR.
- **Methodology:** (1) Is the paper's argument built on an appropriate base of theory, concepts, or other ideas? (2) Has the research or equivalent intellectual work on which the paper is based been well designed? (3) Are the methods employed appropriate?

# Need which skills to write the high quality papers (Good writing skills)

## ❖ An empirical case of ...

Using 3-8 lines by streamline to describe purposes of this section, such as proof (show) this method can meet the actual effectiveness of human behavior can be explained and applied, and XX as example to explain contents and **contributions**.

- May contain several subsections, example: 4.1 Problem descriptions, 4.2 Main results and analyses, 4.3 discussions and implications;
- **Implications for research, practice and/or society:** **(1)** Does the paper identify clearly any implications for research, practice and/or society? **(2)** Does the paper bridge the gap between theory and practice? **(3)** How can the research be used in practice (economic and commercial impact), in teaching, to influence public policy, in research (contributing to the body of knowledge)? **(4)** What is the impact upon society (influencing public attitudes, affecting quality of life)? **(5)** Are these implications consistent with the findings and conclusions of the paper?



# Need which skills to write the high quality papers (Good writing skills)

## ❖ **Conclusion and Remark (or Concluding remark)**

### • **Conclusion and remark**

Based on discussion and implication of empirical case, then give results in conclusion and remark

- **Results:** Are results presented clearly and analysed appropriately? Do the conclusions adequately tie together the other elements of the paper?:

# Which skills to write the high quality papers (Good writing skills)

## ❖ References

- Alphabetical order (look for journal instructions on format);
- Based on paper citations, not too few, not too many (unless it is a reviewed paper);
- Editor may choose referees from that list;
- It is helpful to include few references from that particular journal;
- The list must include most recent (3~5 years) publications;
- The related papers of submitted journal should be cited some papers.

# Which skills to write the high quality papers (Good writing skills)

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# Which skills to write the high quality papers (Good writing skills)

## ❖ Appendices

- Complicated and long proofs/math should be here.
- If the **Appendix** is too long, it is easy to eliminate the appendices or move it to the web (Some journal enforce this)
- General guideline: Without Appendix, reader should still be able to understand the paper.

# Which skills to write the high quality papers (Good writing skills)

## ❖ Cover letter

- Can be very helpful, especially if the topic or abstract are not clear enough;
- You may suggest names that might be the referees (This is requirement for some journals; you also have right to suggest that you do not want xxx to be the referee) ;
- This paper has not been copyrighted, published or submitted elsewhere for the publication;
- DO NOT submit one paper to more than one journal simultaneously.

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# How to publish papers in good journals?

What journals?

What contents should be included when submitted a paper?

How to revise a paper?

How to respond to editor and referees' comments

# Experience

**Advisor ← → Student**

**Editor (Referee) ← → Author**



# Experience

**No Free Lunch!!**

**Author of five papers per year**  
→ **obligated to review 15**  
**papers per year**

**Good referee or good authors**  
→ **Associate Editor**  
→ **Department Editor**  
→ **Editor**

# Good Paper?

## Hot vs. Good Problem

Hot problem, Good Motivation/Application,  
Theory Break Through Solid Model  
/Analysis Great Results and Contributions  
Managerial/Social Insight

## Hot Topic vs. Good Topic?

International Visibility: Published in good  
journal, and frequent citation

# What journal?

- ❖ **Understand the journal (fit within the Aims and Scopes) before submit your paper.**
- ❖ **Matching: Paper and Journal (fit within the Aims and Scopes)**
- ❖ **Quality**
  - **Focus: Theory or Application**
  - **Editorial Board**
  - **Visit the journal website to look for detailed instructions**

# Publishers do want quality

## ❖ **WANTED**

- **Originality** (Does the paper contain new and significant information adequate to justify publication?)
- **Significant advances in field**
- **Appropriate methods and conclusions**
- **Readability**
- **Studies that meet ethical standards**

## ❖ **NOT WANTED**

- **Duplications**
- **Reports of no scientific interest**
- **Work out of date**
- **Inappropriate methods or conclusions**
- **Studies with insufficient data**

# Criteria for Paper Review

- ❖ Seeking articles that will be attractive to a broad readership and that have broad significance and importance.
- ❖ Papers are evaluated according to the criteria in journal published "Editorial Policy, "where we state that, "Manuscripts will be reviewed for the significance of the problem, the originality of the contribution, the cogency (説服力) of the method and argument, and the crispness and clarity of prose."

# Who is the audience/reader? (How do consider?)

- ❖ Do you want to reach specialists, multidisciplinary researchers, or a general audience? You will need to adjust information and writing style accordingly
- ❖ Journals, even in similar subjects, reach readers with different backgrounds
- ❖ Each journal has its own style; read other articles to get an idea of what is accepted
- ❖ Is the readership worldwide or local?

# Which good journal?

## ❖ Consider

- Aims and scope (check journal websites and recent articles)
- Types of articles
- Readership
- Current hot topics (go through recent abstracts)
- Asking colleagues for advice

**Sometimes it is necessary to lower one's sights or return to the lab/clinic to obtain more data**

# Which good journal?

- ❖ Sort by citations to find most cited article in this research area
- ❖ Select top journal rankings
- ❖ Get an overview:
  - See Top Journals for specific topics
  - Top Authors' to follow in the research of one topic
  - Use this information to find Experts in a subject field for peer-review. Email addresses provided where available
  - In which year was this research most popular



**Consulting the Guide for Authors will  
save your time and the editor's**

**All editors hate wasting time on poorly  
prepared manuscripts**

**Keep your paper quality**

# Good paper (high quality paper) submit to good journal

- ❖ Keep high quality in long time
- ❖ High cited journal (high impact factor or IPP)
- ❖ Many famous authors published in this journal
- ❖ Famous editor and referees' comments?
- ❖ High contributions in the world

# Accepted Criteria for Publication (1/4)

- ❖ Basic Criterion for Publication: Knowledge Development
  - ∞ Refutation of a Common Belief
  - ∞ Better Explanation of a Phenomenon *via*
    - ❖ Better Theory
    - ❖ Better Method
    - ❖ Better Data

# Accepted Criteria for Publication (2/4)

## ❖ Detailed Criterion for Publication: A Scholarly Manuscript

- ❧ Demonstrates Critical Thought
- ❧ Demonstrates Rigorous Analysis
- ❧ Logically Argued
- ❧ Well-Written

## ❖ Detailed Criterion for Publication: Addresses

- ❧ Important Real Phenomenon of Your Research Area in an
  - ❖ Original
  - ❖ Sophisticated &
  - ❖ Provocative Manner

# Accepted Criteria for Publication (3/4)

## ❖ Detailed Criterion for Publication: Presentation Is Critical

- ❧ Write Well
- ❧ Be Neat
- ❧ Make It Sexy, NOT Silly
- ❧ Do Not Oversell

## ❖ Detailed Criterion for Publication: Segmentation Is Critical

- ❧ Pick Your Journal Carefully
  - Check Your *ESSENTIAL* References
- ❧ Attend Conferences
  - Make Presentations
  - Listen to Comments for *Affect & Substance*
  - Meet the Key People in YOUR Area
  - Talk About *Research* with Them

# Accepted Criteria for Publication (4/4)

## ❖ Detailed Criterion for Publication: Cubic Hours Are Critical

- ☞ Do Research in an Area That YOU Enjoy/Love/Dream About
- ☞ YOU Need a Burning Desire to Learn & to Educate

# Minor Revisions (I/II)

## ❖ Your *Minor* Tasks

- Do *Everything* Requested by Editor
- Do *Everything* Requested by Reviewers
- Do It Quickly

## ❖ *Minor* Tasks

- Cover Letter to Editor
  - ⌘ Overview on What has been Done
  - ⌘ Attend to All Points in Editor's Letter
- Notes for Reviewers
  - ⌘ Details on What has been Done
  - ⌘ Attend to All Points in the Reviews
- Mail the Package

# Major Revisions

## ❖ Your *Major* Tasks

- ❖ *Think* about Requested Revisions
- ❖ Decide What Can Be Done
- ❖ Decide What Cannot Be Done
- ❖ Resolve Conflicts Between Reviewers
- ❖ Let Editor Know When Revisions Will Be Completed

## ❖ *Major* Tasks

- ❖ Do the Doable
- ❖ Write It Up
- ❖ ...
- ❖ Think *Very Deeply* About What Cannot Be Done



# Risky Revisions

## ❖ Your *Risky* Tasks

- ❖ *Think* Deeply About Requested Revisions
- ❖ Decide What Can Be Done
- ❖ Decide What Cannot Be Done (& Why)
- ❖ Decide If It Is Worth Doing
- ❖ If It Is Worth Doing Proceed As Above

## ❖ *Risky* Tasks

- ❖ If Not Worth Doing: Let Editor Know
- ❖ Go to a Rival Journal?
  - ❧ Learn the Lesson & File the Results  
(Unless Risky Request is First Journal's Ridiculously High Standards)
  - ❧ Reviewer **Overlap**

# Risky & Rival Journals

- ❖ At Least One Reviewer the Same
- ❖ Suppose **NOT** the Same Paper
- ❖ Editor *May* Hear About It
- ❖ Everyone **Will** Conclude  
YOU **DO** Heed Reviewers' Advice
- ❖ Risky  $\Rightarrow$  Major
- ❖ Major  $\Rightarrow$  Major
- ❖ Do Requested Revisions for the Next Journal

# How to Revise a Paper (Very Important)

- ❖ Almost all published papers did go through revision
- ❖ Always take **positive** way
- ❖ Thank the referees –do not argue with them!
- ❖ On a separate document show how you addressed all comments

# How to respond to editor and referees' comments?

- ❖ **RESPONSES TO Referee (Associate Editor)**
- ❖ **Paper Title : xxxx**
- ❖ **Manuscript number: xx-xx-x**
- ❖ **Thank you very much for your ...; in the following, we describe the revisions we have incorporated based on your comments.**
- ❖ ***Comments: xxxx (copy in Italic)***
- ❖ **Response: page, line...; point by point, item by item**

# **Be sure to approve your submission !!**

- ❖ **The PDF for submission number xxx--06-00278 is ready for viewing.**
- ❖ **Please return to the main menu to approve your submission.**
- ❖ **With kind regards, or Best regards,**
- ❖ **Editorial Office**

# What can I do for a Rejected paper?

- ❖ Should I fight back?
- ❖ Don't deeply hurt (不要傷心), how to do next step?
- ❖ How can understand to be rejected?
- ❖ How can do to be improved or re-written?
- ❖ Should I resubmit it to some other journal?  
What kind of journal?

# Suggestions

Suggestions stick your goal in good quality, although you don't want to put all your eggs in one basket

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# What topic?

- ❖ **Macro (Focus on the big problem, interdisciplinary systems)**
- vs.**
- ❖ **Micro (no one can write a big idea paper every time out)**
- ❖ **Theory vs. Application**

# How to find the hot topics

- ❖ Hot topics are very important problems to be existed our surround environment, also to be global problems
- ❖ Which is called a hot topic? (Depending on areas, fields, different time and space, it is happen in first priority need to solve problem)
- ❖ Now these hot topics are not good method in traditional research methods

# Where do ideas for new researches come from?

- ❖ Reading the literature
- ❖ Contact with the real world
- ❖ Curiosity about things
- ❖ Publication Networking
- ❖ Teaching
- ❖ Logic reasoning and thinking

# How to find a good research topic?

- ❖ Understand problems from experience, understand the reality (Working in real world, doing projects in real cases, work with Senior Colleagues or famous researchers first, 「求拜名師」)
- ❖ Read and familiar with literature (No free lunch) (Equip yourself with enough skills, 閱讀名師之名期刊論文或論著)
- ❖ Think globally, be innovative (Curiosity), but please act locally
- ❖ Globalize yourself
- ❖ Following famous professor in taking course, discussions

# **The journal is interested in papers that focus on one or more of the following dimensions**

- ❖ **Define new problem domains for the field;**
- ❖ **Introduce/create innovative concepts or methods for using to problems-solving;**
- ❖ **Provide new insights into problems-solving;**
- ❖ **Develop new methodologies to approach known and new problems;**
- ❖ **Apply new powerful research methods in creative way to interesting application areas.**

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# What Work in Finished Manuscript for Preparing to Submit Journal

- ❖ Detailed Reading and Checking Whole Paper
- ❖ Consider who judges your article?
  - Someone like you!
  - Chief editor has the final say
  - Reviewers check the manuscript in detail
  - All are based in a university and are fulltime researchers
  - Checking articles is an activity outside of their normal job
  - They're very very busy
- ❖ Publishers do not want zero-cited articles
  - **Editors now regularly analyze citations per article**

“The statistic that 27% of our papers were not cited in 5 years was disconcerting. It certainly indicates that **it is important to maintain high standards when accepting papers**... nothing would have been lost except the CV's of those authors would have been shorter...”

– Marv Bauer, Editor, *Remote Sensing of Environment*

# What Work in Finished Manuscript for Preparing to Submit Journal

- ❖ Check what type of manuscript?
- ❖ Consider who is the audiences?
- ❖ Submit to which journal?
- ❖ Check format
- ❖ Check article structure
  - Title, Authors and affiliations, Abstract, Keywords, Introduction, Literature review, Methods, Empirical case, Discussions, Acknowledgements, References, Supplementary materials
- ❖ Check English
  - Word-space, spelling, logic in sentence, word-use, grammar, etc.



# Writing a quality manuscript (Language)

## ❖ The three “C”s

- Good writing possesses the following three “C”s: (1) clarity, (2) conciseness, (3) correctness (accuracy)

The key is to be as brief and specific as possible without omitting essential details

## ❖ Know the enemy

- Good writing avoids the following traps: (1) **Repetition**, (2) **Redundancy**, (3) **Ambiguity**, (4) **Exaggeration**
- These are common annoyances for editors

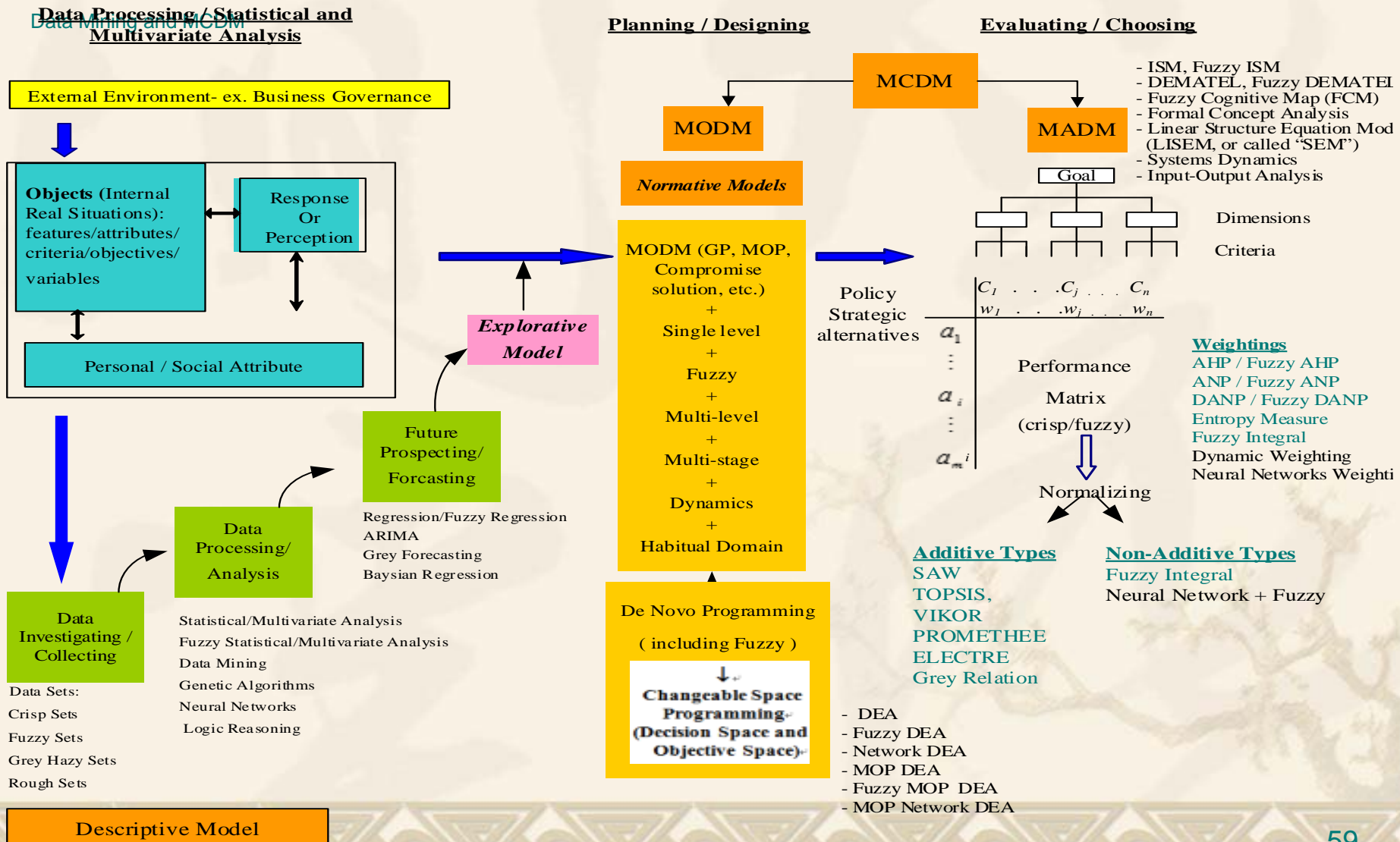
## ❖ Language Editing Services

- **Your manuscript is precious, invest in it**
  - Specialist scientific and medical editing services are commercially available to polish the language in your manuscript prior to journal submission; Rates start from \$8 per page
  - More information can be found on the Elsevier website at:  
<http://www.elsevier.com/wps/find/authorsview.authors/languagepolishingwriting> possesses t

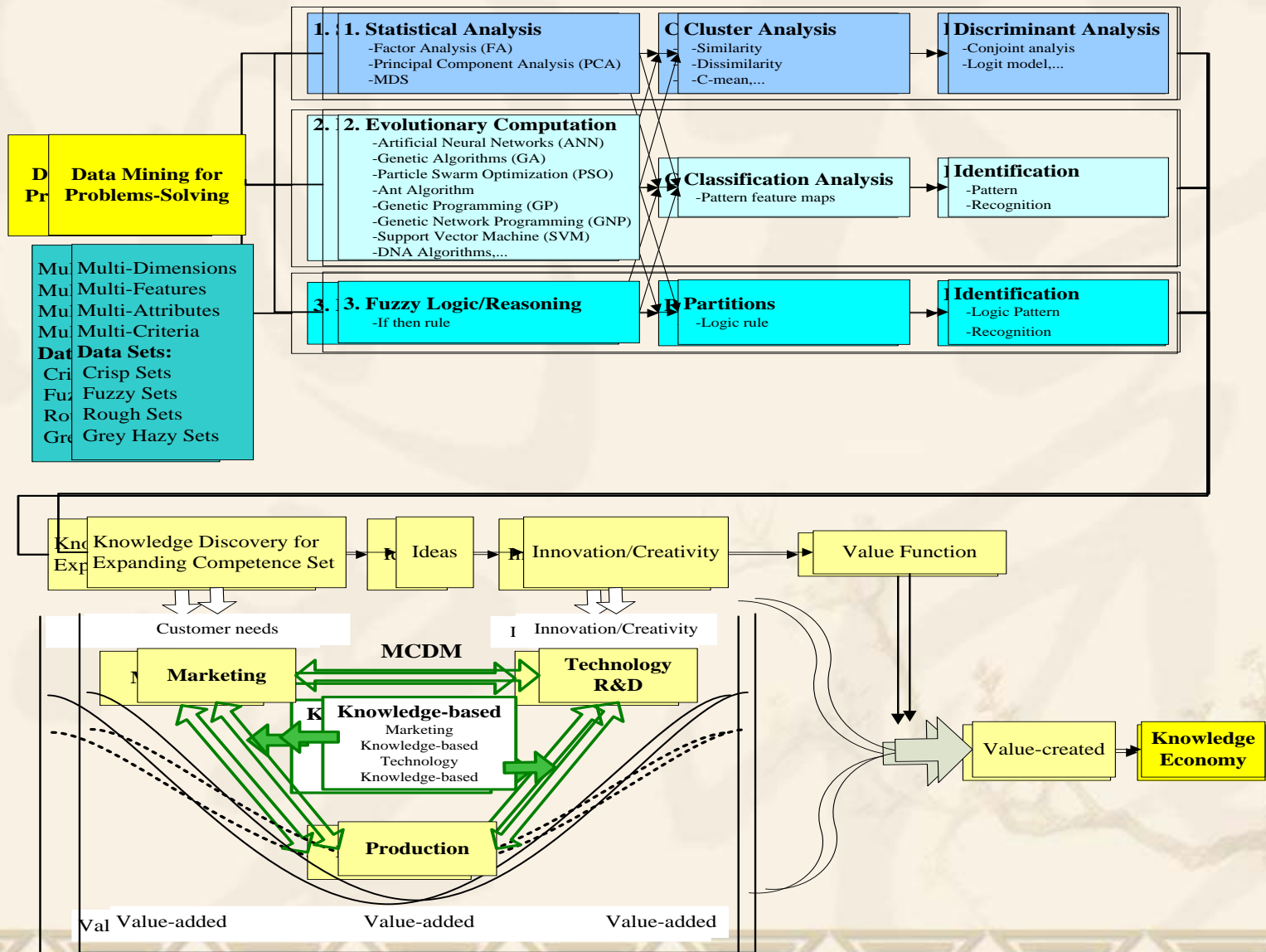
# Writing a quality manuscript (Technical details)

- ❖ **Abbreviations**
- ❖ **Cover letter**

# Fig. 1 Basic Concepts of Course Systems in “Research Methods for Problems- Solving”

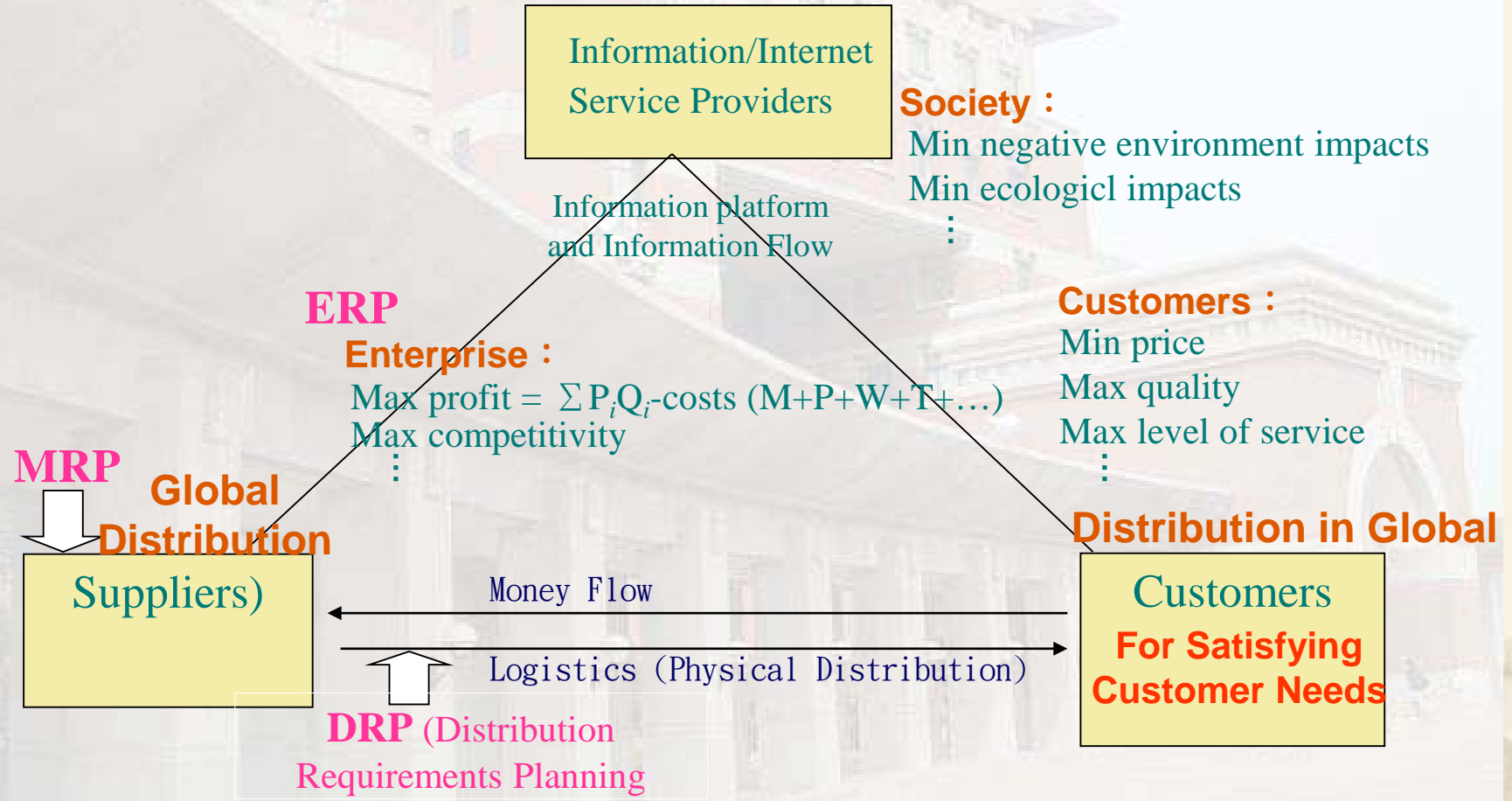


# Fig.2 Data Mining Concepts of Intelligent Computation in Knowledge Economy



# Fig.3 Business Competitiveness

## Model in E-Era E-Era



# Data Processing / Statistical and Multivariate Analysis (4)

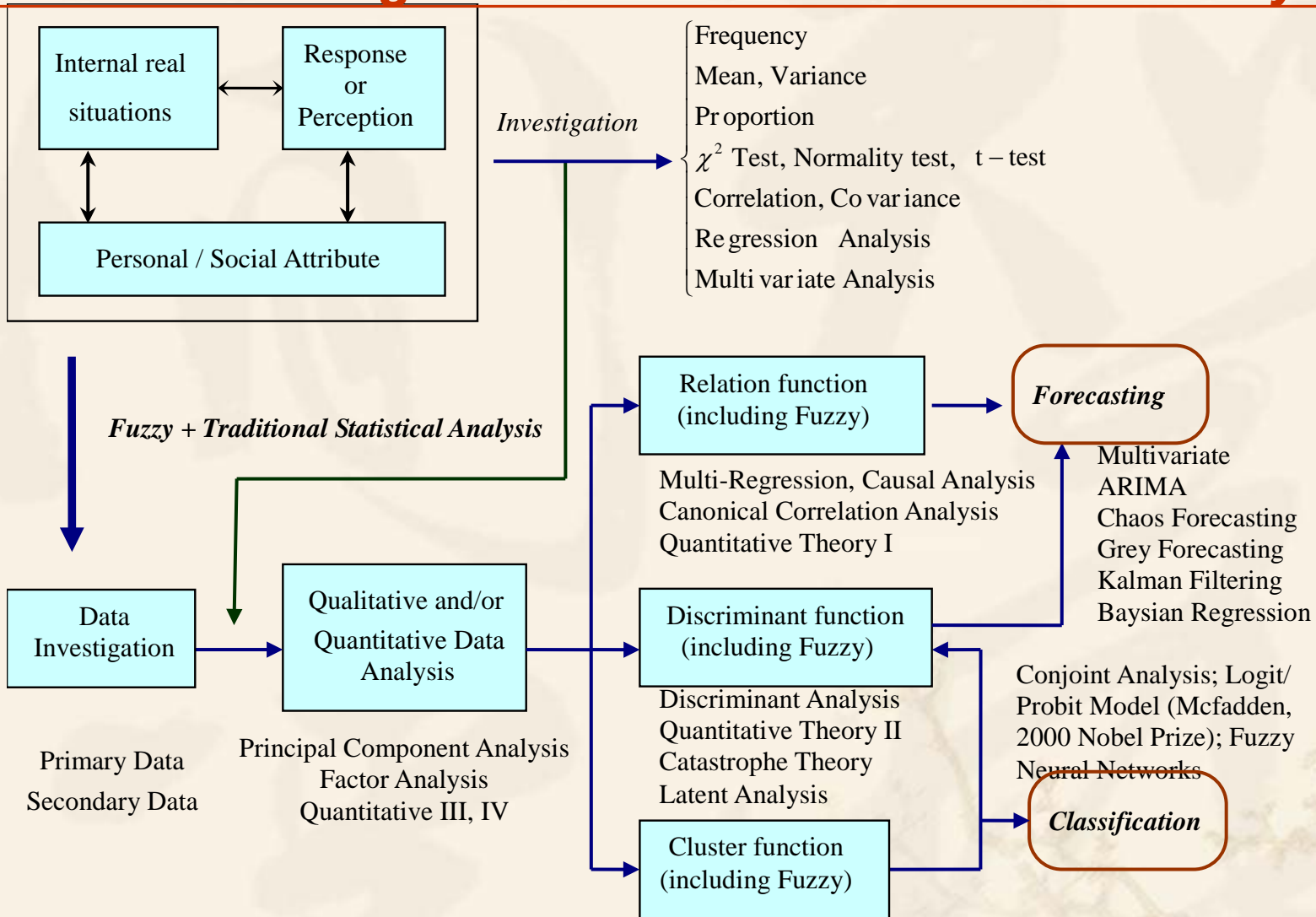
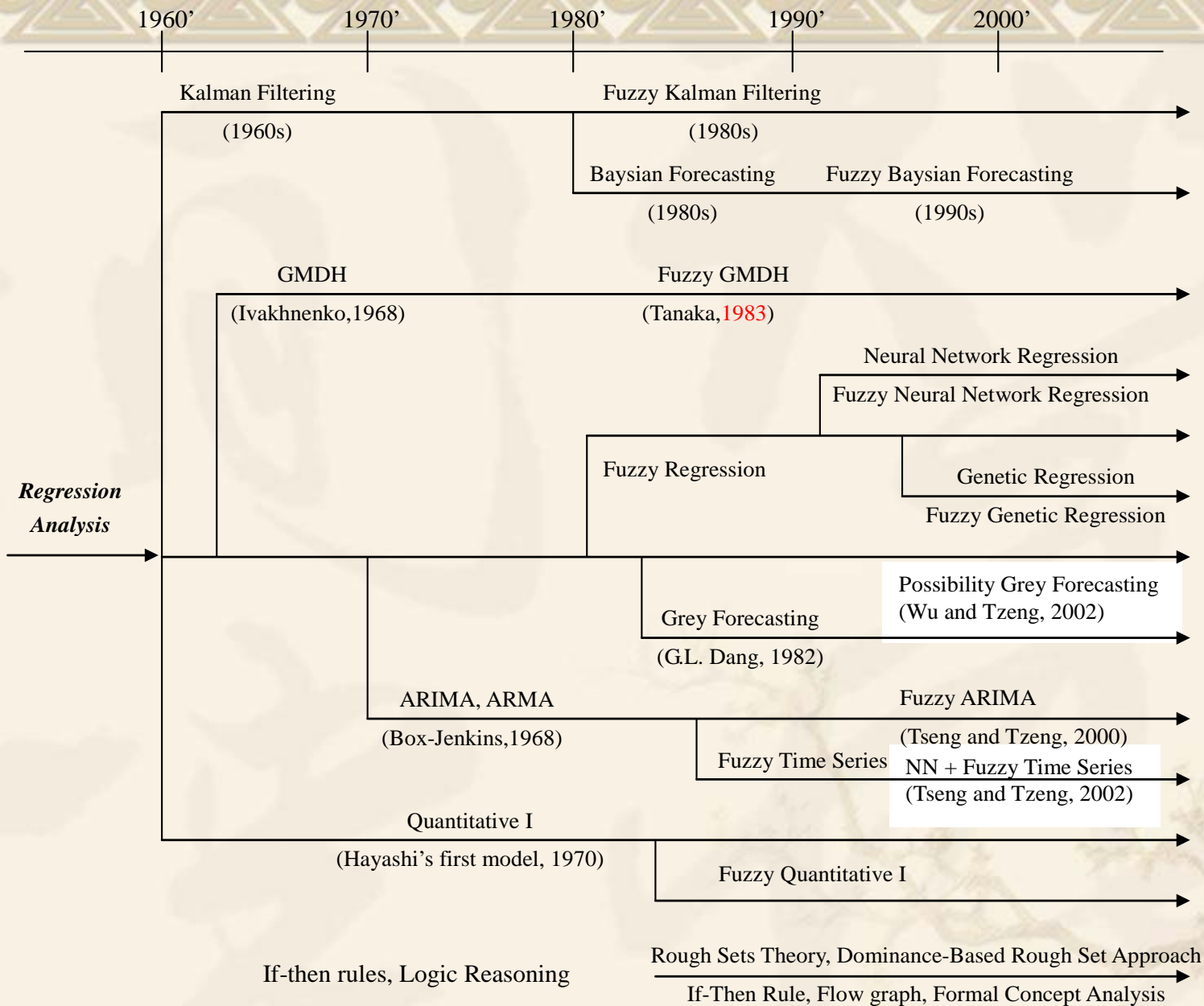
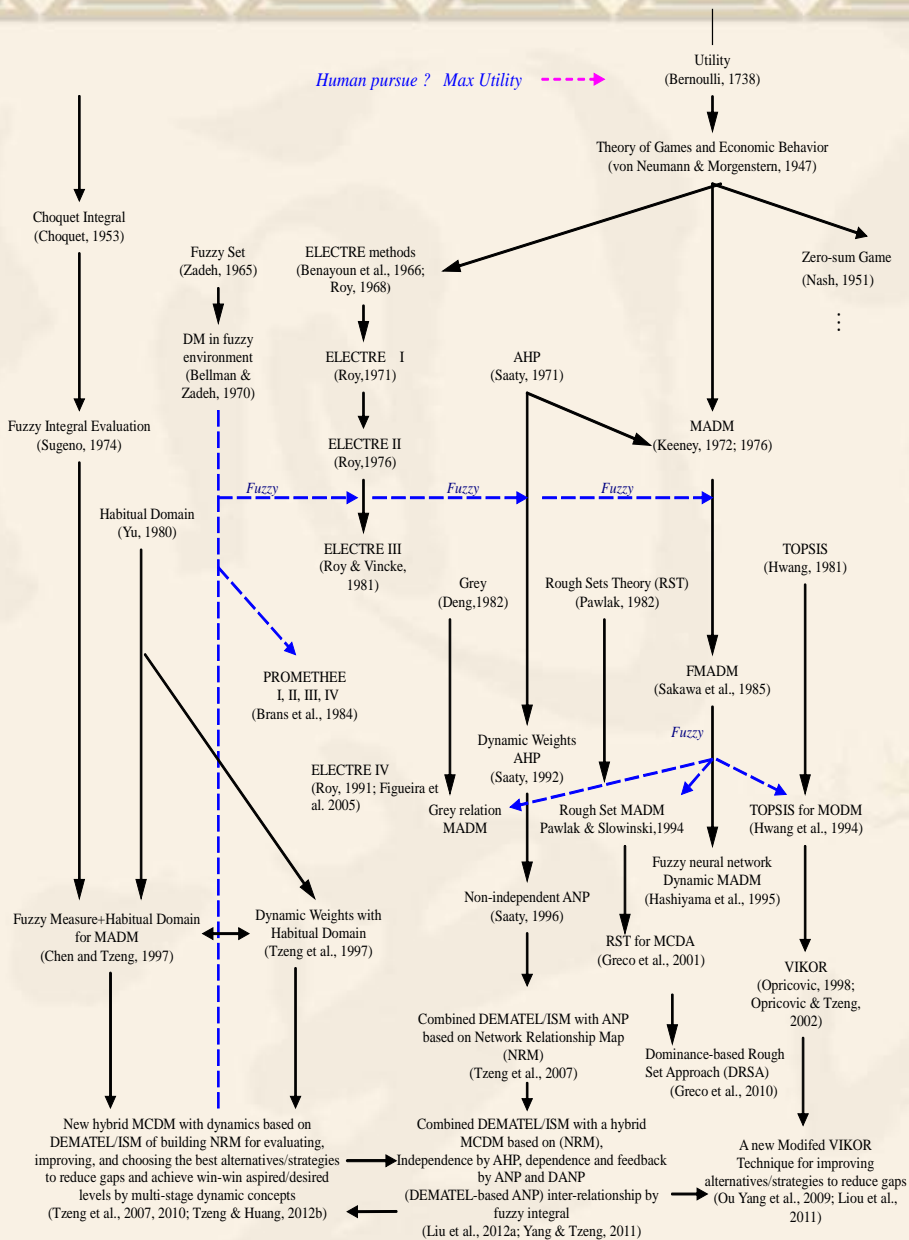


Fig.4 Multivariate Statistical Data Analysis (cont'd)

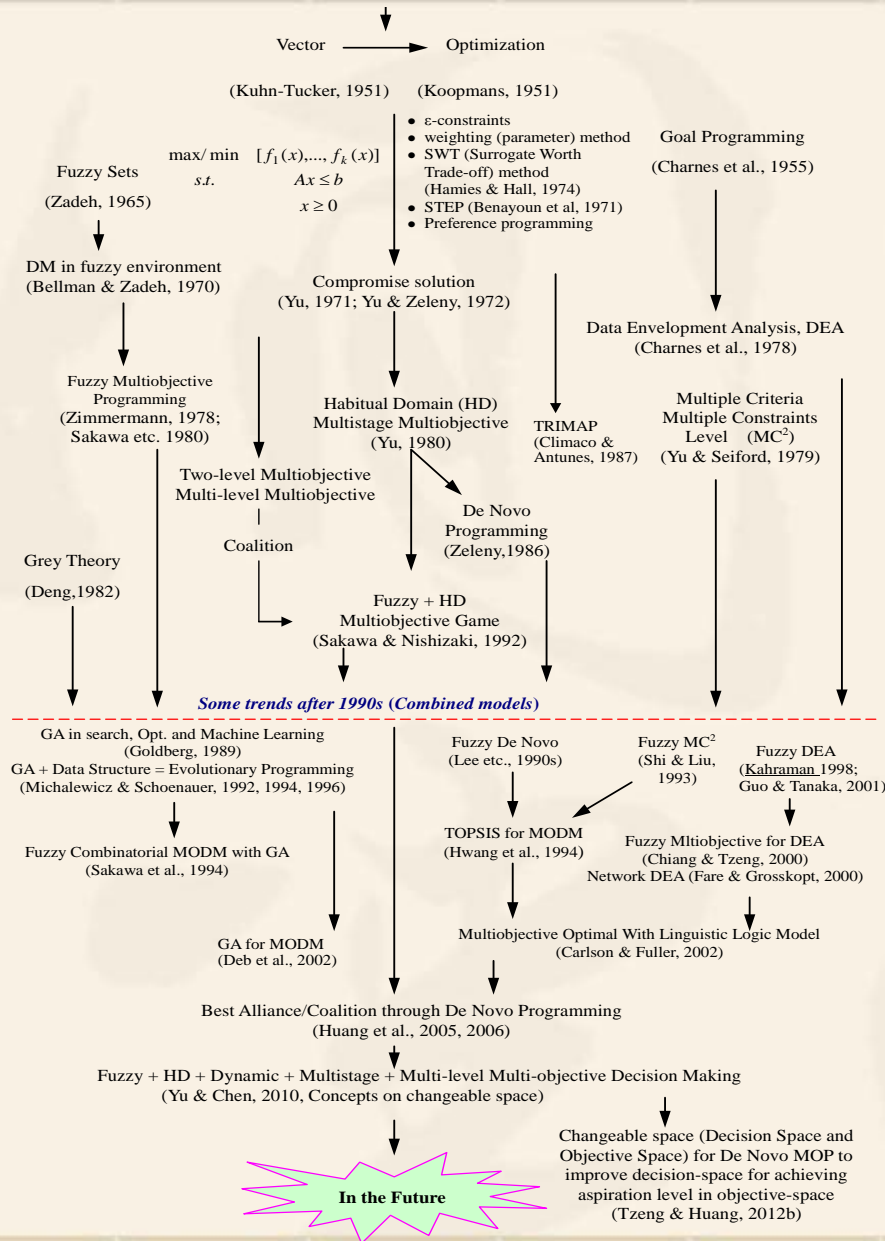


**Fig. 5 Forecasting Model**

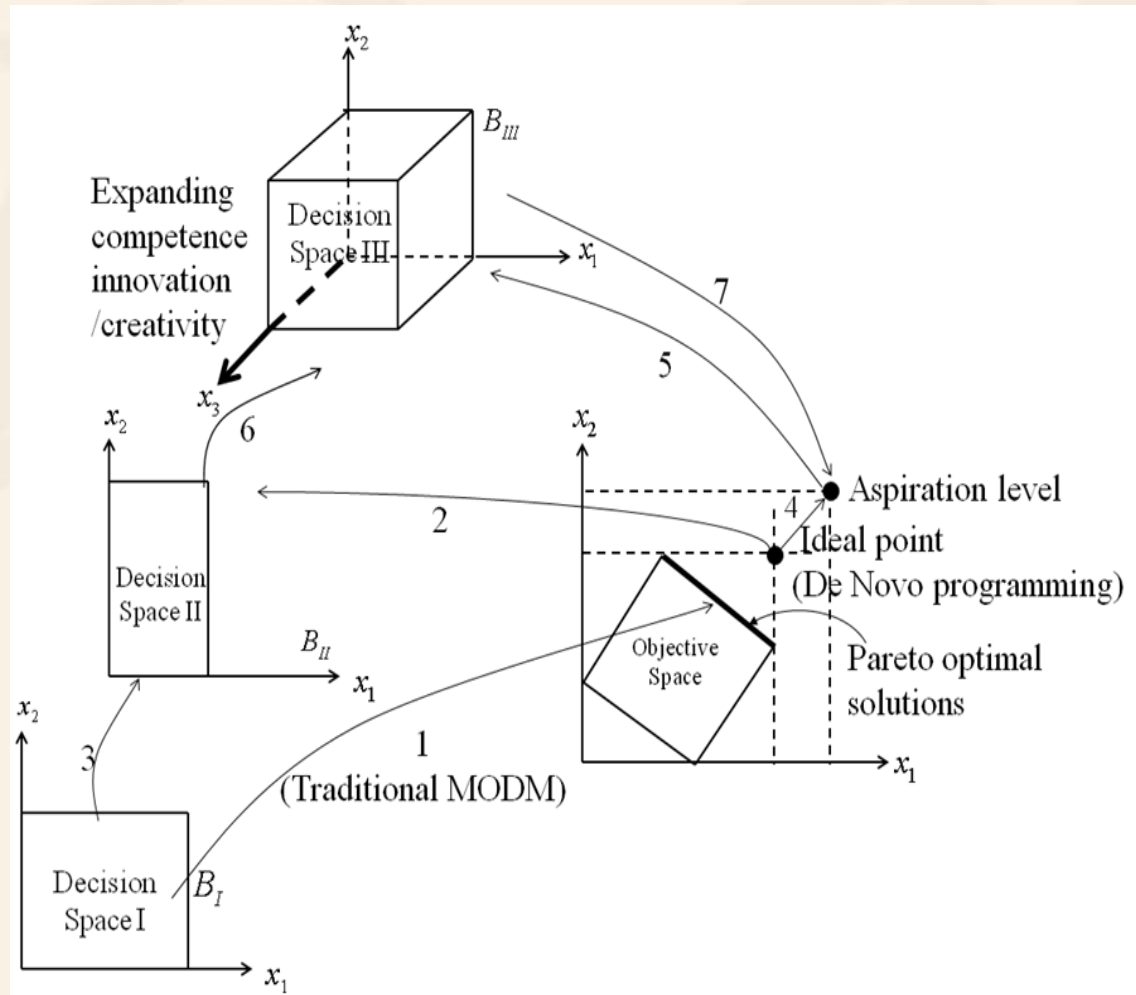


**Fig.6 Development of Multiple Attribute Decision Making**





**Fig.7 Development of multiple objective decision-making**



**Fig.8 The concept of changeable decision space and aspiration level**

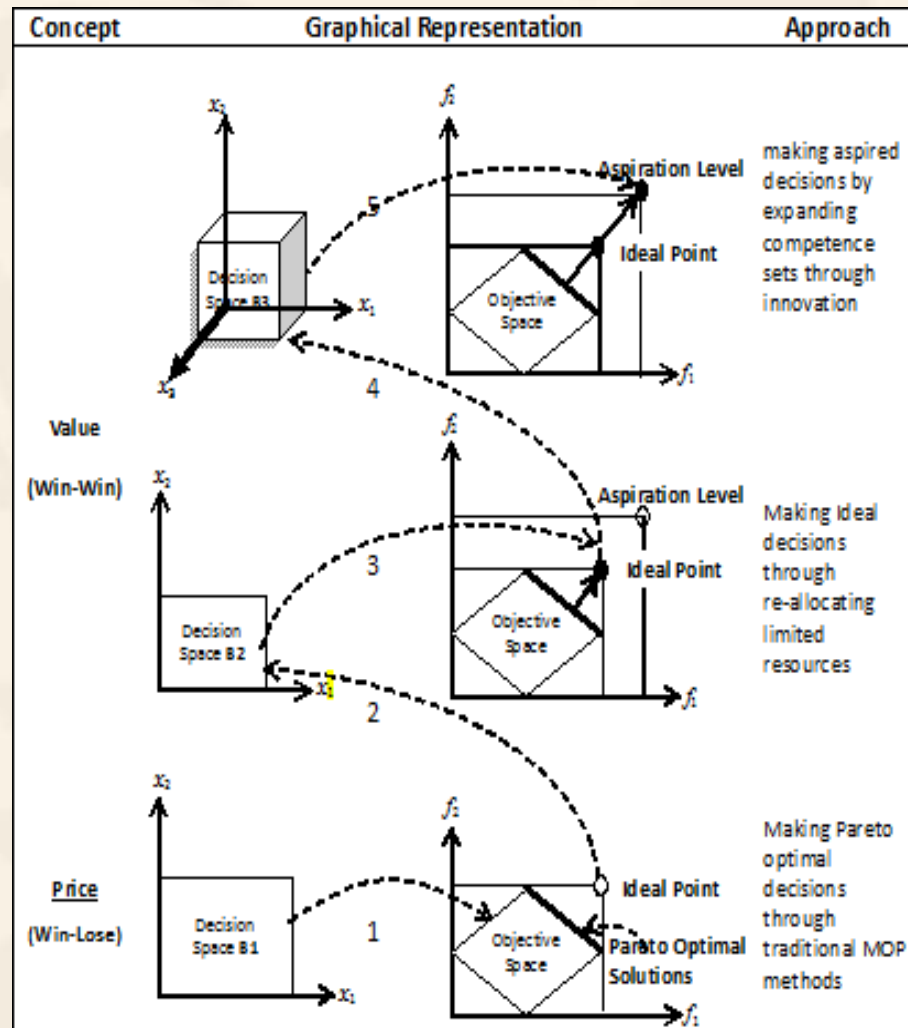


Fig.9 Basic concept of changeable decision space and aspiration level (Liou, Tzeng 2012; Tzeng, Huang 2013)

# 1. Data Process

- ❖ The main contents include “**statistical and multivariate analysis**” and “**data mining**” in **evolutionary computation** and **soft computing** for knowledge discovery
- ❖ The **purpose** of these techniques is to make **analyses** and **identifications** of **patterns/clusters/classifications** for **solving/understanding the problems** in **knowledge discovery** and for **prospecting the future in theory** and **applying to the real cases.**

## 2. Multiple Criteria Decision Making (MCDM) (1/3)

- ❖ Refers to making decisions in the presence of multiple, and often simultaneously faced/managed more one, i.e. multiple criteria/objectives with conflicting and non-commensurable criteria in real world.
- ❖ Problems for MCDM are common occurrences in everyday life. Many problems encountered along the way how can we measure, plan/design, evaluate, rank, improve, or select these problems for reducing the gaps to achieve or close the aspired/desired levels (or grades) forward to enriching number-one in practice.
- ❖ The problems of MCDM can be broadly classified into two categories: Multiple Objective Decision Making (MODM) for plan/design and **Multiple Attribute Decision Making (MADM)** for evaluation/ improvement/selection.

## 2. Multiple Criteria Decision Making (MCDM) (1/3) (1) Plan/Design (MODM)

- ❖ The purpose is to focus on analyzing the problems of “plan or design” for multiple objectives/criteria problems to minimize the distance from all objectives/criteria performances (values) to their goal-level/aspiration-level/ideal-point (called **compromise solution**), or maximize the achieved level to the goal/aspiration/desired/idea-level (called **fuzzy multi-objective programming**)
- ❖ Including: goals are fuzzy, parameters are fuzzy, or variables are fuzzy), or how to design to achieve the goal/aspiration/desired-level (called De Novo programming) in theory and apply to the real cases for decision-making in plan or design.

## 2. Multiple Criteria Decision Making (MCDM) (1/3)

### (2) Evaluation/Improvement/Selection (MADM)

- ❖ The purpose is to focus on evaluating each alternative to achieve the degree/grade of level and analyzing the gaps of distance based on network relation map (NRM) by using some techniques, such as DEMATEL, ISM, FCM, SEM, formal concept analysis (FCA) and so on for evaluating social network problems (SNPs), etc.
- ❖ And how we can improve and reduce the gaps from performance-values to achieve the aspiration/desired levels in each criterion, and then improve and select the best alternative for making decision in theory and applying to the real cases.

# New Frontiers of Multiple Attribute Decision Making (MADM) (1/2)

- ❖ Chapters of this Book (with *Jih-Jeng Huang, Taylor & Francis*)
  - ❧ Analytic hierarchy process (AHP) and fuzzy analytic hierarchy process (FAHP)
  - ❧ Analytic network process (ANP) and fuzzy analytic network process (FANP) .
  - ❧ Simple additive weighting (SAW) and fuzzy simple additive weighting (FSAW)
  - ❧ VIKOR and Fuzzy VIKOR
  - ❧ Grey Relation and Fuzzy Grey Relation
  - ❧ TOPSIS and Fuzzy TOPSIS
  - ❧ ELECTRE
  - ❧ PROMETHEE



# New Frontiers of Multiple Attribute Decision Making (MADM) (2/2)

- ❖ Building the Structural Relations-Map (ISM, DEMATEL, Fuzzy Cognitive Map, etc.)
- ❖ DEMATEL-based ANP (DANP) and Fuzzy DEMATEL-based ANP (Fuzzy DANP)
- ❖ Evaluation and Improvement Models Depend on Structural Relations-Map
- ❖ Preference Weights also Depend on Structural Relations-Map

Independence by AHP

Dependence and Feedback by ANP

Interdependence by Fuzzy Integral (Super-additive approach)

# New Frontiers of Multiple Attribute Decision Making (MADM) (3/3)

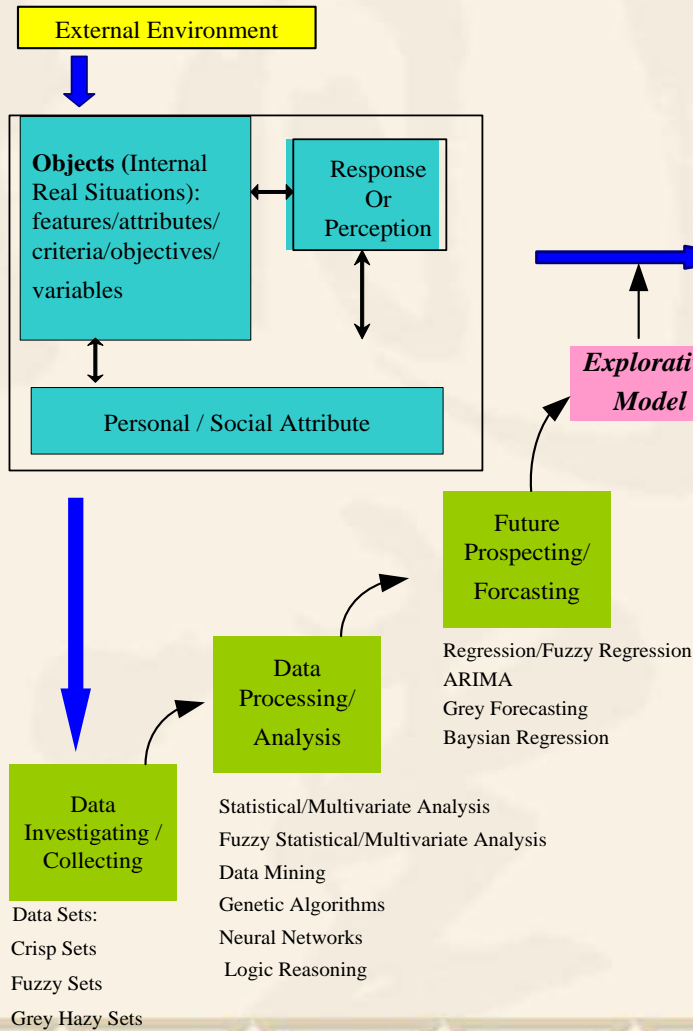
- ∞ Fuzzy integral
- ∞ Grey relation model
- ∞ Rough sets and its Applications
- ∞ Structural models
  - ❖ Interpretive structural modeling (ISM)
  - ❖ DEMATEL
  - ❖ Fuzzy cognition maps (FCM)

# Agenda

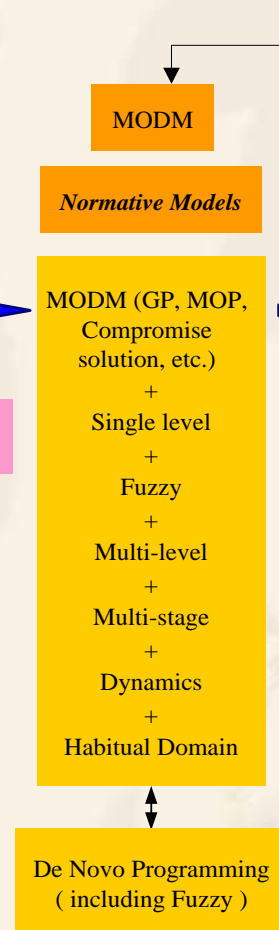
- ❖ Profile of Multiple Criterion Decision Making
- ❖ Historical Development of Multiple Objective Decision Making
- ❖ Historical Development of Multiple Attribute Decision Making
- ❖ Multiple Criterion Decision Making Methods
- ❖ Structural Model
- ❖ Conclusions

# Concepts of Systems for Research Methods in MCDM

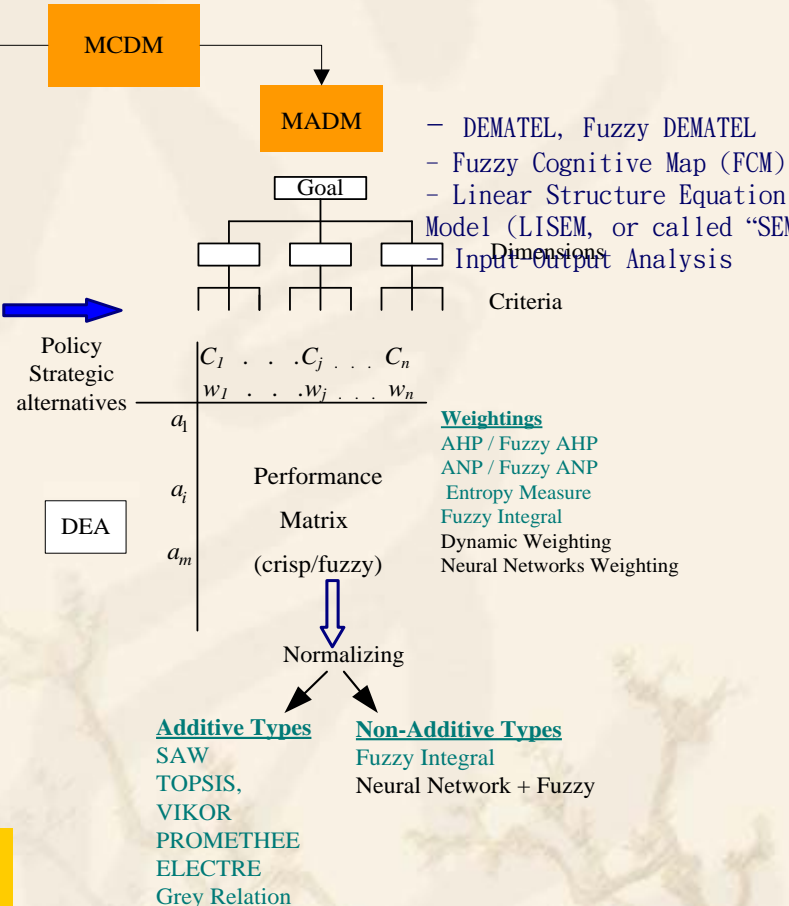
## Data Processing / Statistical and Multivariate Analysis



## Planning / Designing



## Evaluating / Choosing



## Weightings

AHP / ANP + Fuzzy  
Entropy Measure  
Fuzzy Integral

## MADM Methods

SAW, GREY RELATION  
TOPSIS, VIKOR  
PROMETHEE  
ELECTRE  
Grey Relation Analysis

## Additive Types MAUT

$$u(x_1, \dots, x_n) = \sum_{i=1}^n w_i u_i(x_i)$$

## Non-additive Types MAUT:

$$u(x_1, \dots, x_n) = \sum_{i=1}^n w_i u_i(x_i)$$

$$+ \lambda \sum_{i_1=1}^{n-1} \sum_{i_2=i_1+1}^n w_{i_1} w_{i_2} u_{i_1}(x_{i_1}) u_{i_2}(x_{i_2})$$

$$+ \dots + \lambda^{n-1} w_1 \cdots w_n u_1(x_1) \cdots u_n(x_n)$$

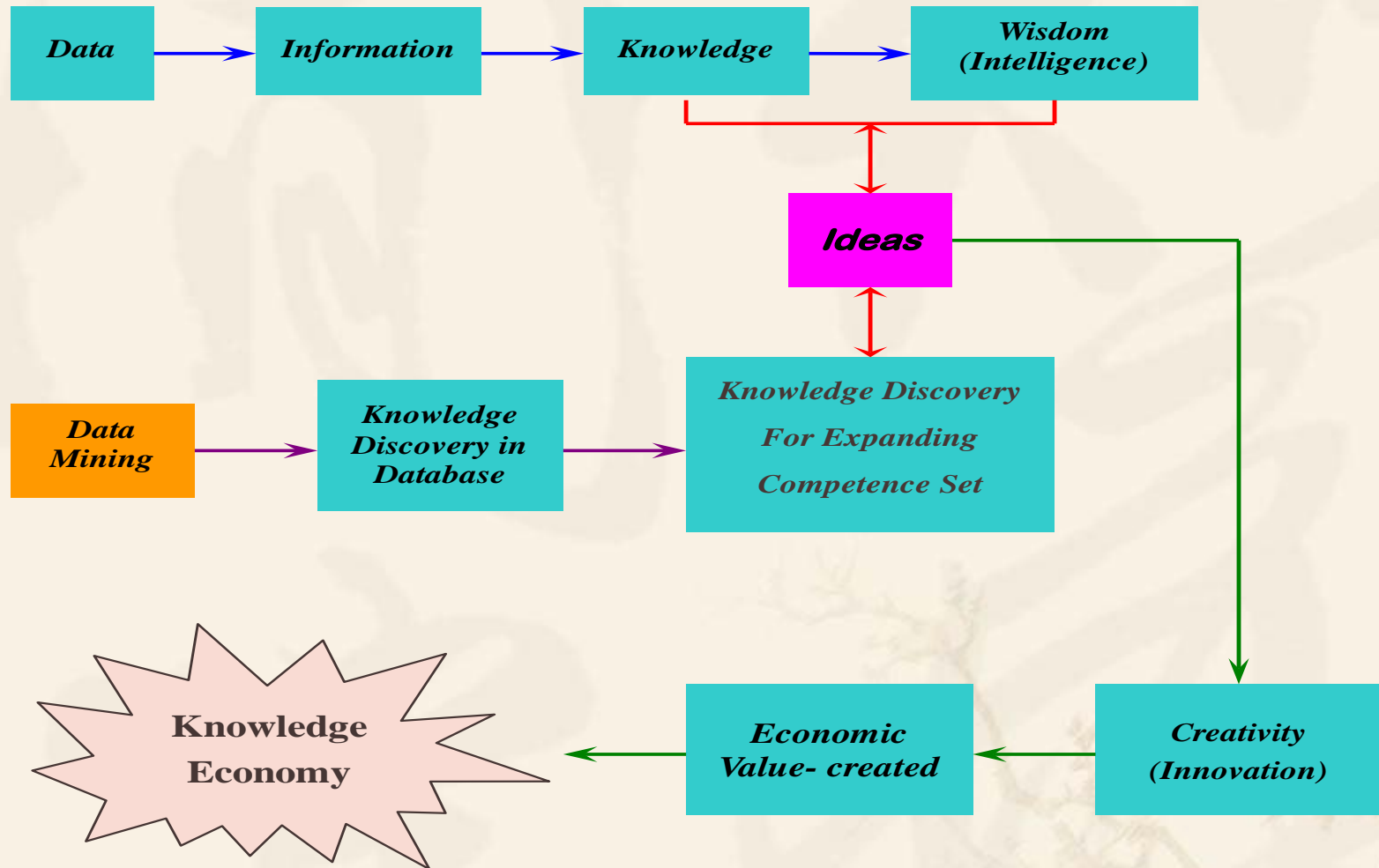
## Fuzzy Integral (Super-additive)

$$g_\lambda \{x_1, \dots, x_n\} = \sum_{i=1}^n g_\lambda(\{x_i\})$$

$$+ \lambda \sum_{i_1=1}^{n-1} \sum_{i_2=i_1+1}^n g_\lambda(\{x_{i_1}\}) g_\lambda(\{x_{i_2}\})$$

$$+ \dots + \lambda^{n-1} g_\lambda(\{x_1\}) \cdots g_\lambda(\{x_n\})$$

# Data Processing / Statistical and Multivariate Analysis (1)



**Fig.2 Data Process for Knowledge Discovery**

# Thanks.

## Questions & Answer!!

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