



FIG Commission 3 Workshop

The Empowerment of Local Authorities:
Spatial Information and Spatial Planning Tools

Paris, France, October 25-28 2011

Modelling Framework for Integration of Geographical Information System and Multi- Agent Models as Planning Support Tools in Enhancing Local Authority Functions

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design &
decision
support
systems

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Where innovation starts

Outline

- 1. Introduction**
- 2. GIS and MAS Integration**
- 3. Study Area and Data Sets**
- 4. Economic Growth and Firm Demography**
- 5. Modelling Framework and Methodology**
- 6. Conclusion**

Introduction

- **Interest in modelling urban system increasing**
- **Contribution of advance modelling approach – new models to improve the understanding of urban development process**
- **Current development in Malaysia- economic region**
- **Integration of Multi-Agent System (MAS) and Geographical Information System (GIS) - Progress in modern GIS tools and technique**

GIS and MAS Integration

- **Geographical Information System (GIS)**

“GIS is widely used to facilitate in analyzing, modeling, manipulating, representation and displaying geo-referenced data in order to solve complex problems which relate to planning and management of resources”

NCGIA (1990). "NCGIA Core Curriculum in GIS." University of California, Santa Barbara.

- **Multi-agent system (MAS)**

“collection of interacting autonomous agent each with their own capabilities and goal”

Cheng, J. (2003). "Modeling Spatial & Temporal Urban Growth.", International Institute for Geo-information Science and Earth Observation, Enschede Netherlands.

MULTI – AGENTS SYSTEM MODELS

Agent represent
desicion maker

Allow investigating urban
land use as complex system

GIS and MAS Integration

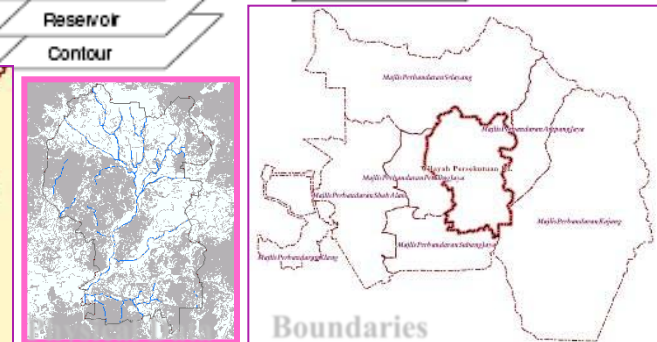
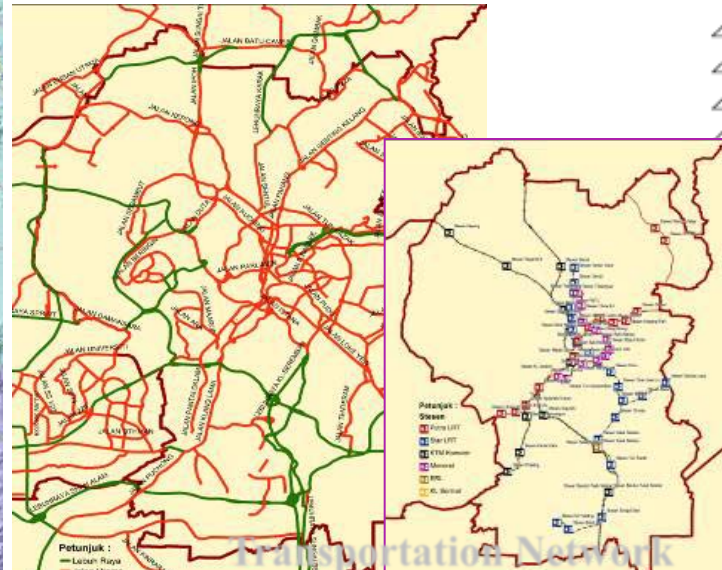
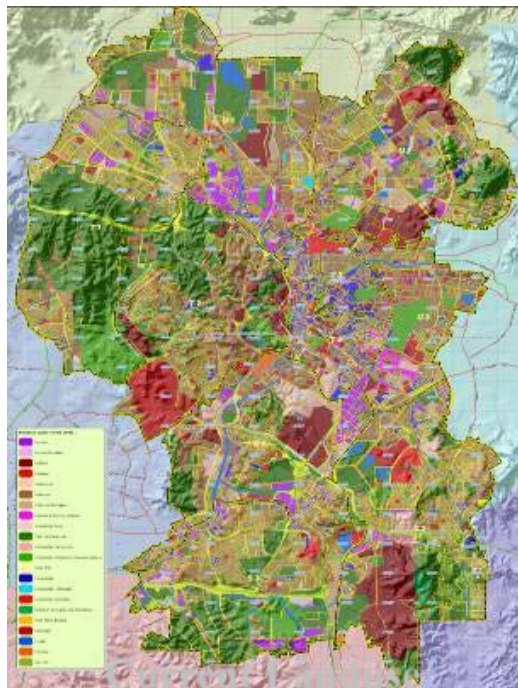
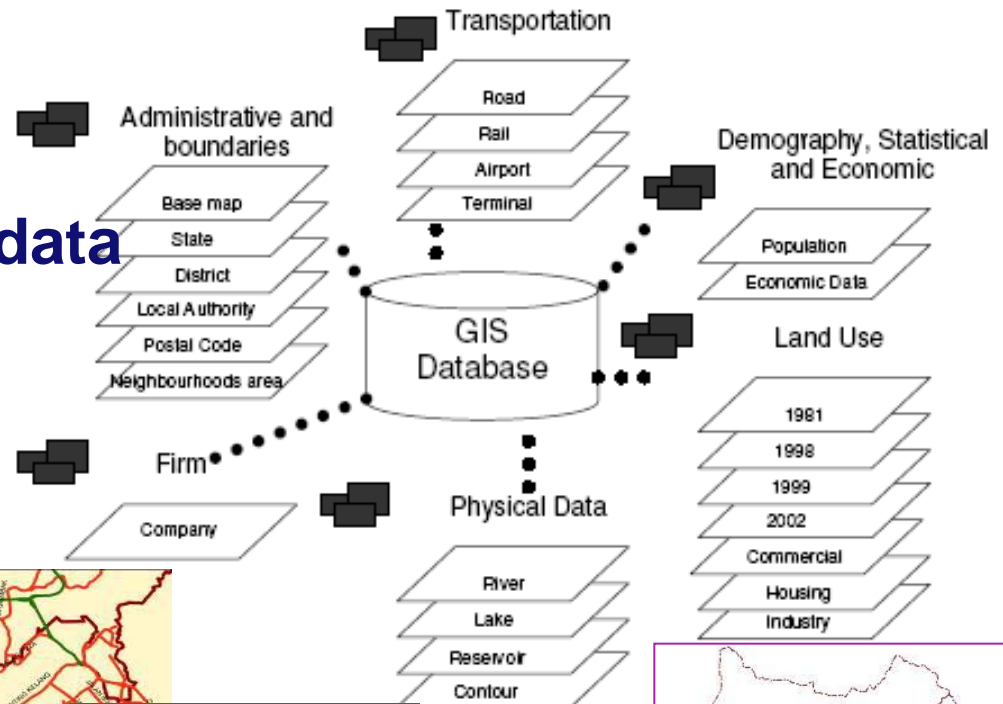
- GIS + MAS = enhance capability of urban simulation technique
- Makes available a considerable amount of data and information produced and used by users who commonly employ GIS.
- Model builder to validate the dynamic models.
- improves the results of decision process – cooperate between stakeholders and decision maker.

Study Area

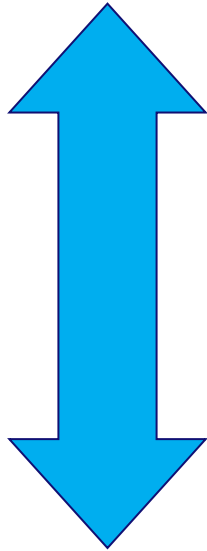
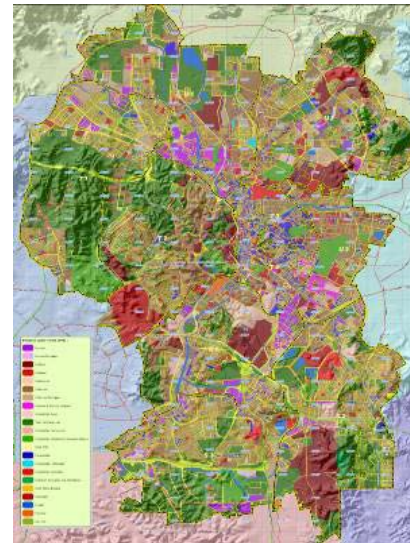


Data Sets

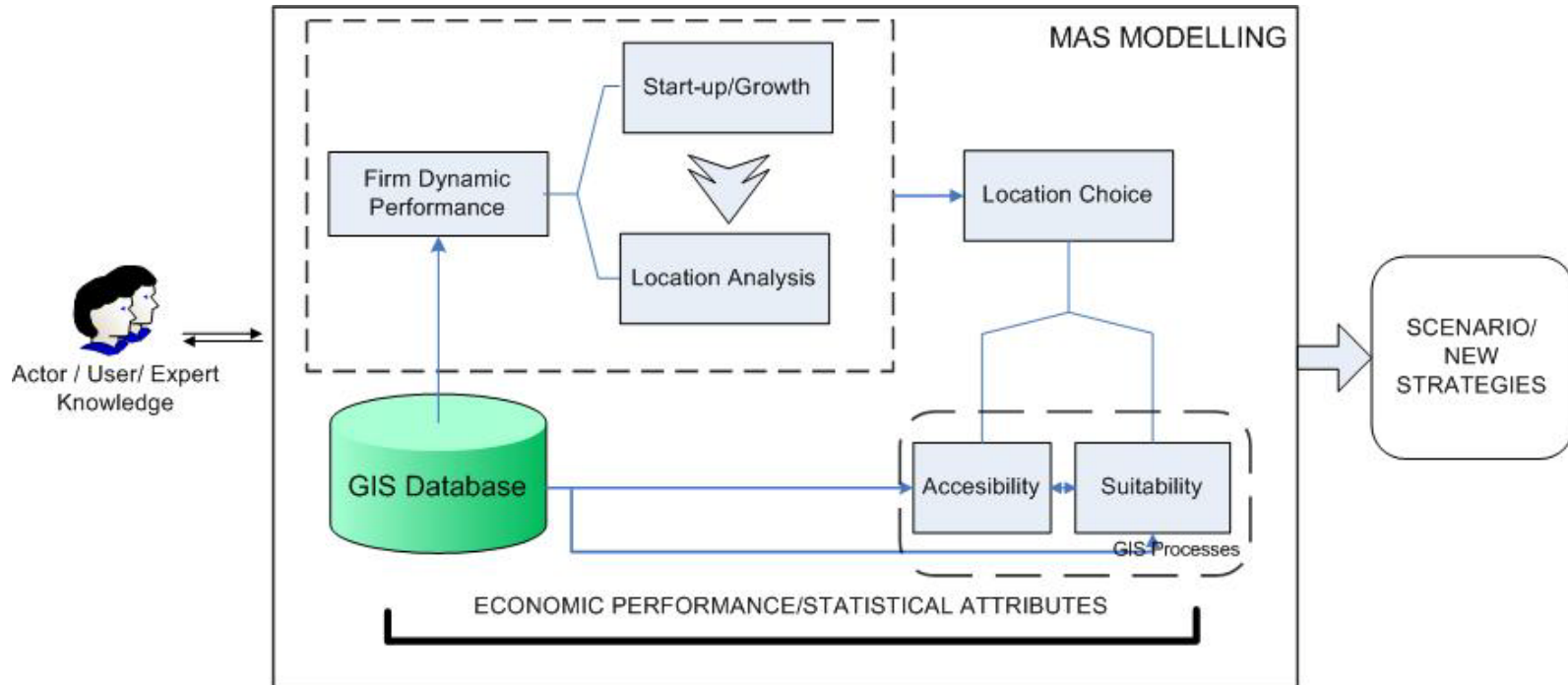
- Firm data
- Klang Valley's GIS Data
- Statistic and economic data for Klang Valley and Malaysia



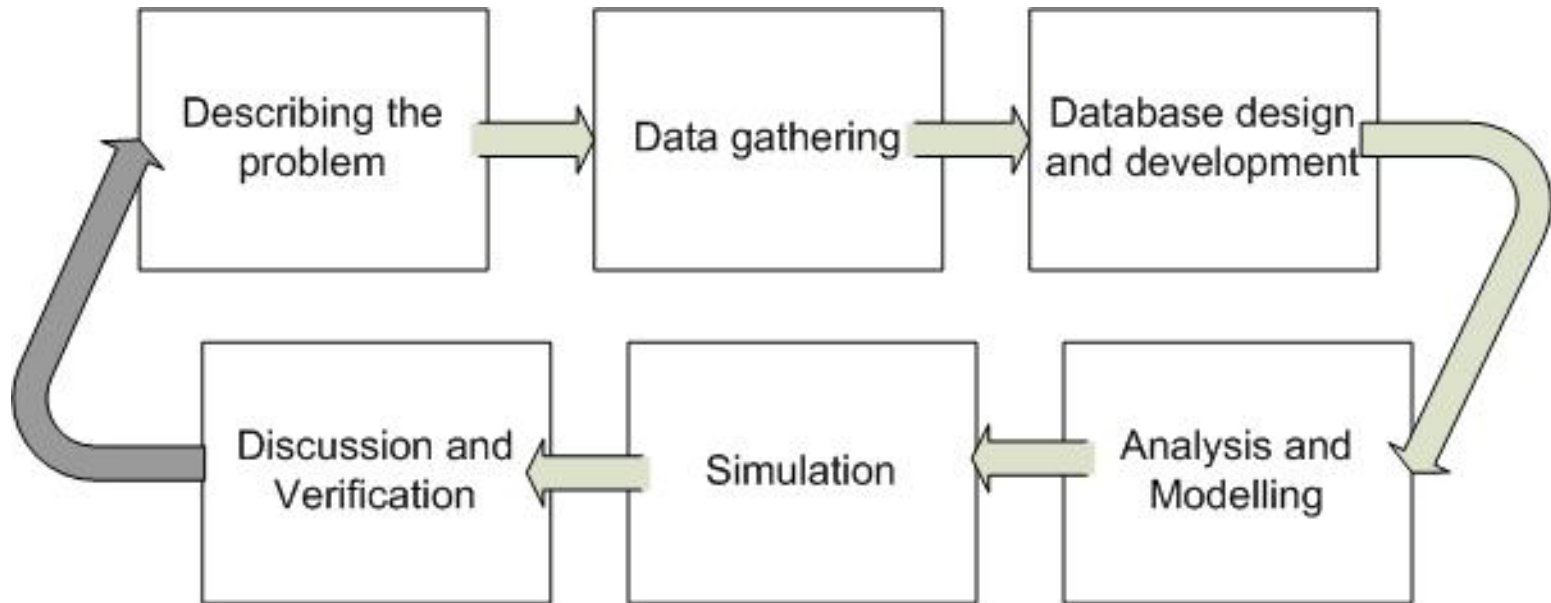
How to Incorporate Economic Growth?



Modelling Framework

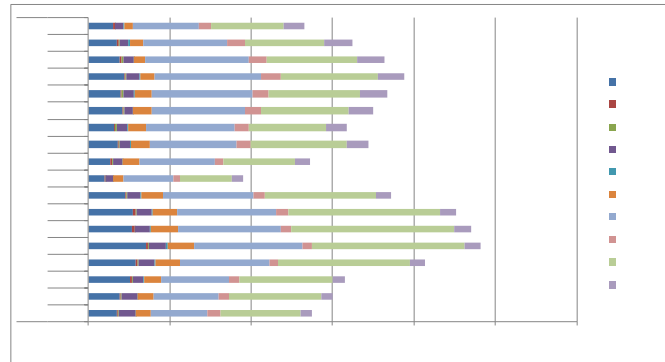
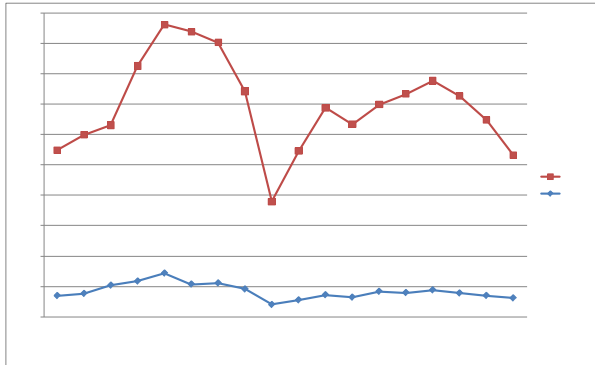


Methodology

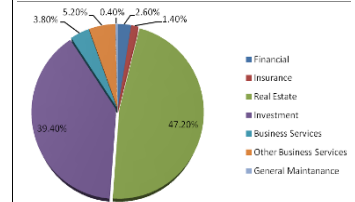
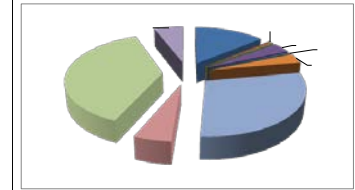
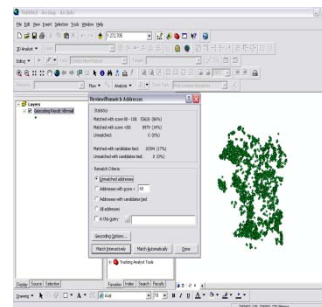
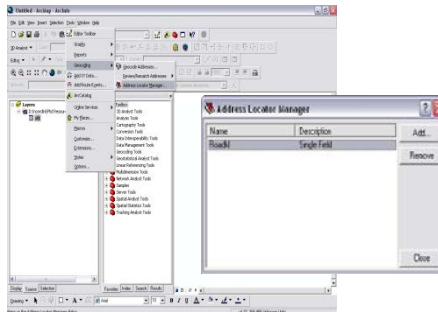
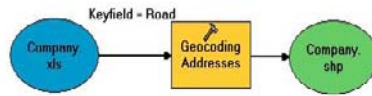


Analysis and modelling

- Firm Dynamic Performance**



- Location Choice – Geocoding, Proximity and Area analysis**



Conclusion

- **Firm demography concept as solution to modelling of economic development as bottom-up development process.**
- **partial data is available—opportunities are limited to data availability.**

THANK YOU FOR YOUR ATTENTION



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