Second part :
Besac Game, first steps for application…

- **Besac Game**
  - Space = 9 peripheric zones of Besançon
  - Agents' behavior = strategy of localization of different types of firms
  - Database = results of a survey. Limited rate of responses allows not deduction of general rules ⟶ preliminary study
- **Informations obtained by the survey**
  - Perception (good, mean or bad) of eahc type of firms for each zone with respect to different criteria
  - Importance of the criteria
- **Interpreting the results**
  - Only three criteria are considered :
    - * good acessibility
    - * presence of dynamic enterprises
    - * good image of the zone
  - Six types of firms (metallurgy, other industries, wholesale trade and transport, retail trade, construction, services and other)

- **Construction of the perception and importance vectors**
  - Perception : for each zone and each agent evaluation (good, mean or bad) is transcrived into fuzzy values (1 or 0.5 or 0).
    e.g. 1 corresponds to a perfect membership to the set "good accessibility".
    To obtain for each zone and each type of firms mean fuzzy value, choice of the maximum frequency in the sample.
  - Importance : evaluated for each type of firms by using exploratory analysis

Area dynamism

perception ⟷ *importance*

	zone 1	zone 2	zone 3	zone 4	zone 5	zone 6	zone 7	zone 8	zone 9	
metallurgy	1	0.5	-	0.5	1	0	0	0.5	0	0.6
other industries	1	0	1	1	1	1	0.5	0	0	0.5
wholesale trade and transport	1	1	-	0.5	1	1	1	1	1	0.5
retail trade	1	0.5	-	0.5	0.5	0	1	0	0	0.7
construction	0.5	1	-	0.5	0.5	0.5	0	0	0	0.3
services and other	1	0.5	1	0.5	1	0.5	0.5	0.5	0.5	0.5

• **Composition of the attribute vector:** three variables

– Accessibility: its definition differs with respect to the type of firms (retail = facility for traffic and quality of arrowing the firms _ Othertype of firms = distance to the highway exit)

– Dynamism: number of dynamic firms of each type

– Image

Third part: conceptual perspectives for modelling the dynamics of the system

◊ Reaction of agents to actual situation *(including planners proposition)*

- Migration process: *sequence of stochastic events* according to the probabilities $p^K(j)$
  ⇒ *Markov chain of events*
- Settlement process: it governs the spatial dynamics
  ⇒ spatial impact: for each zone modification of the *ratio of occupation*

◊ Retroaction on urban dynamics

- Settlement process affects the attribute vector:
  – modification of the vacancy rate
  – potential modification of quality of life in unit *j*: *(*e.g. the decline of the landscape quality may affect the land price)
  ⇒ *affects the perception of the unit (may be evaluated by the knowledge about agent's behavior)*
  ⇒ ***space retroacts on agent's behavior***
  may affect the future urbanization (*e.g.* because of drop in prices, unit may become less attractive for some social groups and more attractive for other ones)

The emergence of a social demand

- Critical thresholds of attractiveness a_c for each of the attributes (noise, etc.)

  $\Rightarrow$*three possibilities of reaction:*

  1) emigration
  2) defending the proper interests in own unit *i*
  3) acceptation

- Behavior may depend on individual experiences

  $\Rightarrow$ *probability to react (or to accept)* $p^K(b_l|a_i>a_c)$ $l = 1), 2), 3)$

  Choices *l* depend on social group *K*

  $\Rightarrow$ option 1) *emigration* (modelized according to emigration)

  $\Rightarrow$ option 2) *defending the proper interests*

$\Rightarrow$ ***Emergence of a social demand***

- Social demand d_S: depends on individual attractivity a_i and number of agents who share the opinion

  $d_S = f(a_i, n(a_i))$

- Individual probability to react $p^K(b_2|a_i>a_c) = f(d_S)$

if d_S beyond critical threshold $d_S > d_c$

- Global probability to react

  $p^K(b_2 \cap a_i>a_c) = p^K(b_2|a_i>a_c)p^K(a_i>a_c)$

- Affect the attribute vector of unit *i*

  $\Rightarrow$*retroaction on urban dynamics*