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## Modelling the Individual and Collective Aspects of Migrants’ Decisions in Pakistan

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### Abstract

Migratory movements are complex processes, which are difficult to understand and to describe in models as they usually do not follow a central planning or organisation. The structure of migratory movements and the group behaviours of migrants rather emerge from the local interaction of decisions, characteristics and rules of behaviour of a large number of autonomous individuals. Usually, highly aggregated mathematical models are used to describe the process of migration. These classic models assume that migrants are a homogeneous group of individuals who are behaving rationally. They do not describe complex group behaviour, such as the formation of networks, cultural transmission, trade, etc. arising from the interaction of the individuals in a heterogeneous group of migrants or in a heterogeneous society.

The paper describes the concept of an individual-based model to analyse spatial aspects of decision-making of migrants in Pakistan. This model will allow to assess migration dynamics based on the interactions of decisions and behaviour of the individuals and to delineate the decision-making process of labour migrants. We know that the behavior characteristics of human beings are rather qualitative, and the rules which an individual applies before taking a decision are complex and frequently even contradictory. Under this assumption, an expert system approach is applied to transparently describe the decision-making process of the migrants. The expert systems will be used to develop the rules of behaviour to be implemented in an individual-based model. The potential of this innovative approach will be shown taking the example of villagers in Pakistan who decide to migrate abroad, to some urban centre, or to refrain from migration.

**Keywords:** Agent-based, expert system, migration, modelling, Pakistan