The co-evolution of enterprise systems and employment structures

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ABSTRACT

The simulation model is based on jES (java Enterprise Simulator) and jESOF, or "java Enterprise Simulator Open Foundation". Both the packages are based on Swarm.

jES is a large Swarm-based package aimed at building simulation models both of actual enterprises and of virtual ones. jESevol simulates systems of enterprises or production units in an evolutionary context, where new ones arise continuously and some of the old are dropped out.

The environment is a social space with metaphorical distances representing trustiness and cooperation among production units (the social capital). The production is represented by a sequence of orders; each order contains a recipe, i.e. the description of the sequence of activities to be done by several units to complete a specific production.

Two units can cooperate in the production process only if they are mutually visible in our social network. Units that do not receive a sufficient quantity of orders, as well as the ones that cannot send the accomplished orders to successive units, disappear. New enterprises continuously arise, in the attempt of filling the holes of our social network. A complex structure emerges from our environment, with a difficult and instable equilibrium whenever the social capital is not sufficient.

In a parallel way, other layers of the economic structure can evolve, always in an agent base perspective: banking system, employment structures, …

In this model the focus is related to employment: when an enterprise produces a good, the sequence of the activities must match the presence of working units with the required skills. In this context a fine grain description of the steps in the recipes is needed.

Adequate labor units can be lacking, or might simply be already hired, thus fostering the emergence of competition among production units in the hiring process

Products change over time; as a consequence, productions units and labor skills have to adapt continuously, with co-evolutionary effects.