

# **GAIM (Gestione Accoglienza IMmigrati):**

## **A System Dynamics Model for Immigration “housing” Management**

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### Abstract

An immigration reception “house” which has the aim to deal with both first aid problems (food and bed) and health and social needs (medical and social services) involves many variables with a high level of interaction, hence a complex system. In order to manage such an infrastructure which can host a limited number of immigrants with different type of characteristics (Status – single(male/female), part of a family,...; Geographic provenience- Europe, Africa, Asia, ...; Religion- Christian, Moslem, ...; ...) offering a selected number of services is not an easy job.

Supplying possible services, often with time constraints due to urgent situations, creates a complex environment for who has the responsibility to manage the reception house. Just in time decisions become often an essential necessity.

On the base of a enlarged project sponsored by the department of social activities of Lazio Region (the region which includes Rome city) aiming to train and supply tools to a number of *intercultural mediators* a system dynamics model has been developed both to analyse and better understand the overall immigration reception process and to create a sort of “flight simulator” in order to evaluate, in advance, some decision effects over possible scenarios.

*The paper will describe both the structure of the model which has been developed to embed, as much as possible, the whole process and a set of results produced in reply of a set of what-if analysis.*

**Keywords:** Immigration reception, Flight Simulator, What-if analysis, Human resource management

## **1 Introduction**

Managing any organisation which deals with limited resources and unlimited needs is a hard job! An immigration reception house in the present unforeseeable situation to manage the immigration process in different European countries is surely very similar to above situation.

What has NOT been done with GAIM model is the usual (and correct !) approach of analysing in deep the process, creating different subsystem causal diagrams and hence developing the overall integrated system. In this case, as our knowledge on the overall process was full of lacks and time to construct the model was very limited we decided to approach the

problem step by step with so called *good sense* and simplified process analysis without claiming to have the *magic wand* which offers any solution.

The *ideal* reception house we took in to account has been characterised in order to manage services to three types of immigration needs:

1. **long term residential request**; i.e. immigrants who, for different reasons (problematic disease, no sustenance, ...) need to stay in the house for more than a week,
2. **short time residential request**; i.e. immigrants who use the house for a short period of time (more than a night and less than a week) needing essential services,
3. **specialised requests without staying in the house**; i.e. immigrants who need specific services offered by the “house” which do not need using the first aid infrastructures (food and bed).

System Dynamics analysis helped us to better understand the whole process through the *good sense* approach and the simulation model built, seems to be a good initial tool, helpful to put in evidence the main levers which the manager of an immigration reception “house” should take under control in order to *govern* in a rational way his work.

## 2 Model description

The model has been divided in three subsystems :

1. Immigration acceptance management
2. Immigration “house” services management
3. Immigration “house” personnel management

### 2.1 Immigration acceptance management

The model distinguishes between three different immigration type of needs:

- i. long term residential
- ii. short time residential
- iii. specialised services

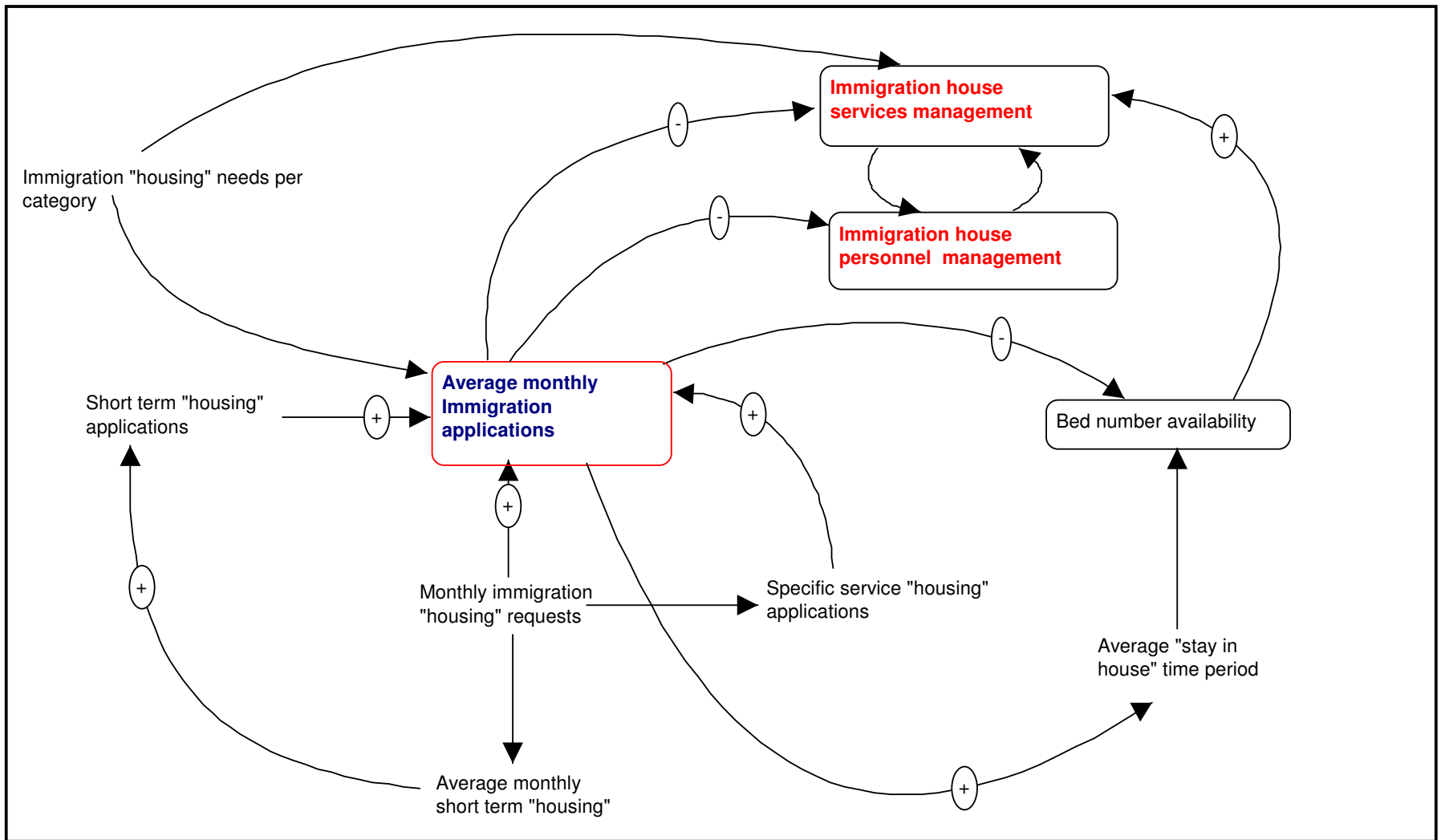
The first type of need is carried out by two principle variables;

- the availability of beds for a long time stay (more than a week) and related personnel support (doctors, assistants, etc.),
- the availability of necessary services in relation of immigrant category.

The second type of need is managed, verifying the limited bed availability and presence of personnel and related essential services.

Finally the specialised needs depends essentially on specific services and the personnel related to manage those services.

Figure 1 depicts the main relations determining the dynamics of the “long term residential” subsystem.



**Fig. 2 – Immigration « housing » application management influence diagram**

## 2.2 Immigration “house” services management

The management of “house” services is detailed in the model by two vectors:

- the different “type” of immigrants (presently we have simply defined 4 category – C1,C2,C3,C4),
- the typology of immigrants needs (long term residential, short time residential, specialised services).

Hence the matrix which deals with the immigrants request of “house” services is always detailed in the above two dimensions (immigrant category, application type).

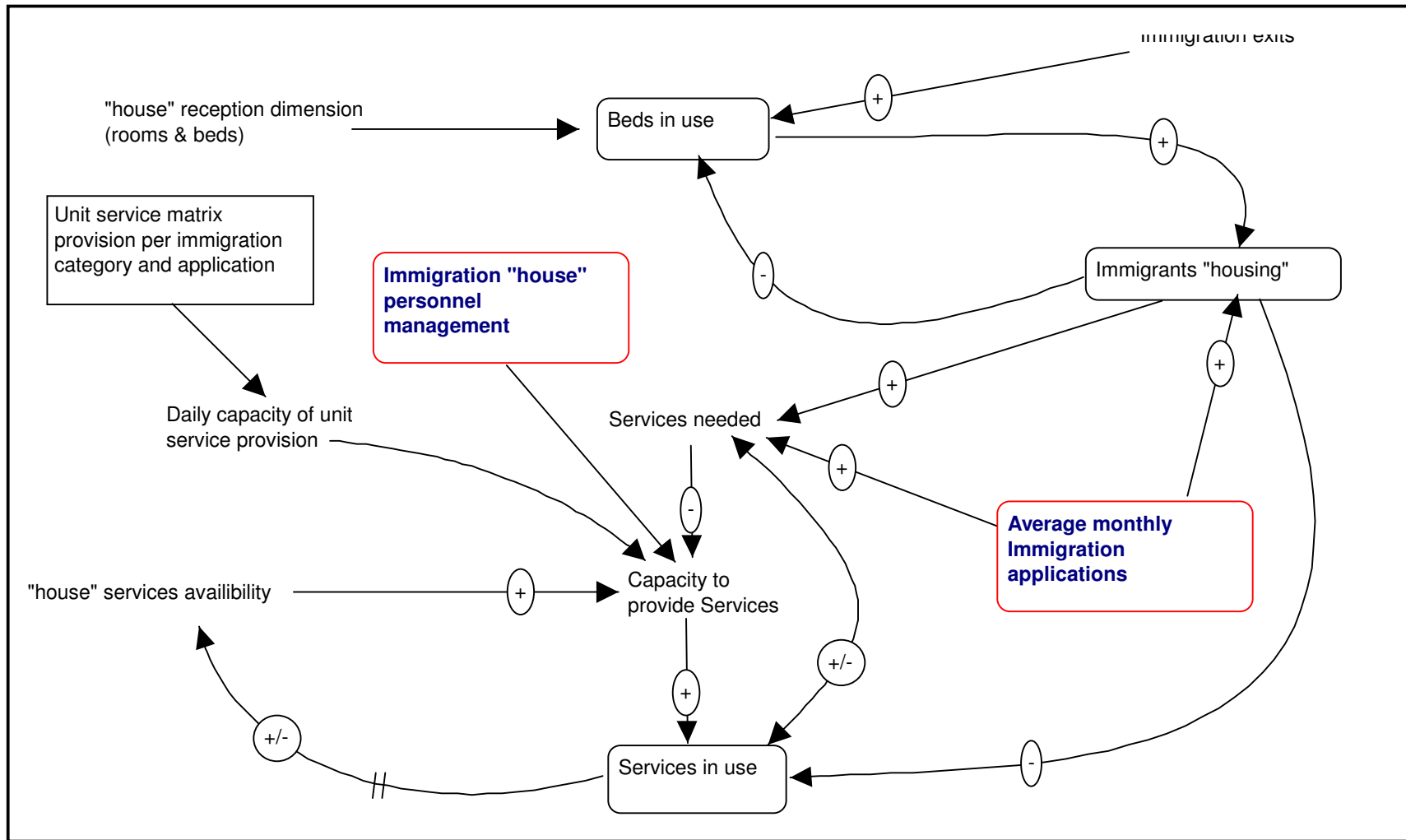
As it can be seen in figure 2, the relations, even very simple, sufficiently represent the variables which influence the “house” overall services (beds and specific services) availability and need.

In addition, as mentioned in previous paragraph, the algorithm is elaborated using *health department human resources*

*factor* which influences the patients check-in (day hospital, doctor specialist examination, normal hospitalise application) rate which itself is calculated on the base of two main elements:

- health department personnel needs and availability, expressed in day-person,
- an external weight parameter which is defined by each personnel category

Figure 2 depicts the main relations determining the dynamics of the " Hospital human resource management" area.



**Fig. 3 -Immigration "house" Services Management**

### 2.3 Immigration “house” personnel management

This third area subsystem takes care of relations between the immigration “house” infrastructure needs and different personnel management.

The personnel is gathered in two different category:

- a) Doctors, divided in two specialised groups
- b) Social support personnel, divided in three different groups

The gap of personnel is managed by an algorithm, through new personnel engagement taking into account the time to be spend, by each personnel type, in taking care of present and future immigration needs (see figure 3).

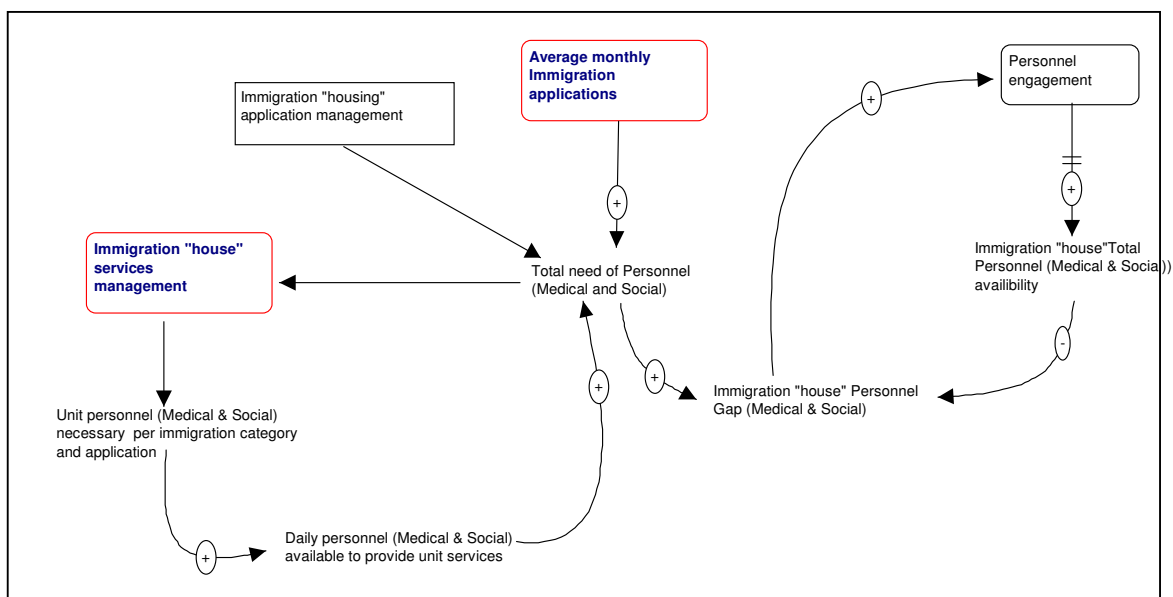
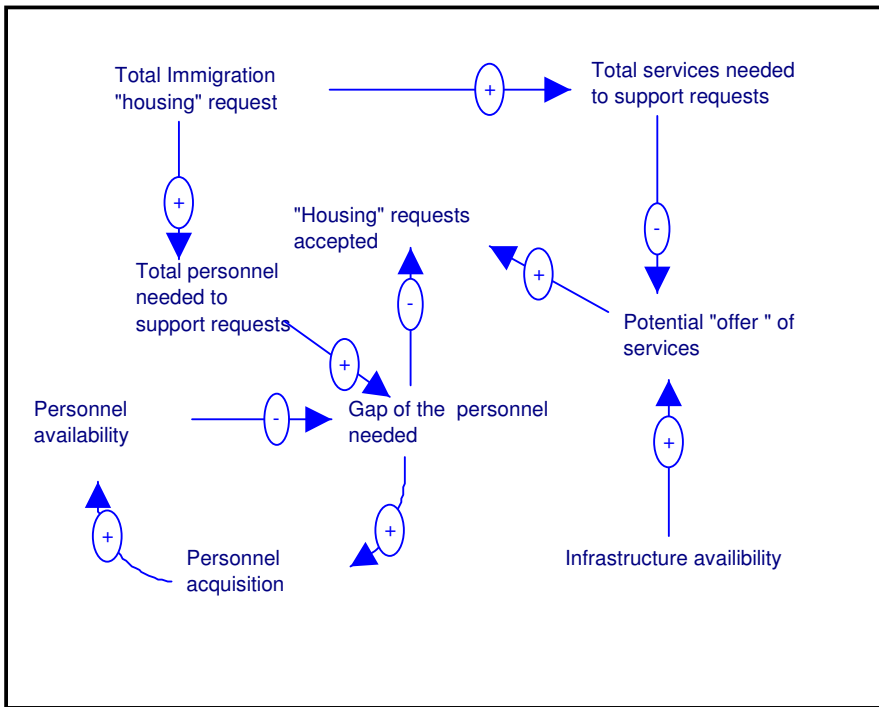


Fig. 3 - Immigration "house" personnel Management Influence diagram

A simplified overall influence diagram representing the global interaction between the three above subsystems is shown in the following figure 4.



**Figure 4 – Overall model Influence diagram**

### 3 Description of the environment

GAIM is developed in the first version in Powersim environment with two layers:

- the front end,
- the simulation model.

The front end is simple and intuitive and an exhaustive help on line is available. It contains complete scenarios (including sets of parameter values) and specific input levers, output results and simulation commands.

In figures 5, 6 and 7 front end windows are shown. Figure 5 & 6 depict the two mainly representative scenario (input data), and figure 7 captures the simulation results, where the user, at any simulation step, can choose to observe, at different level, any model output variable both in graphic or table report form.

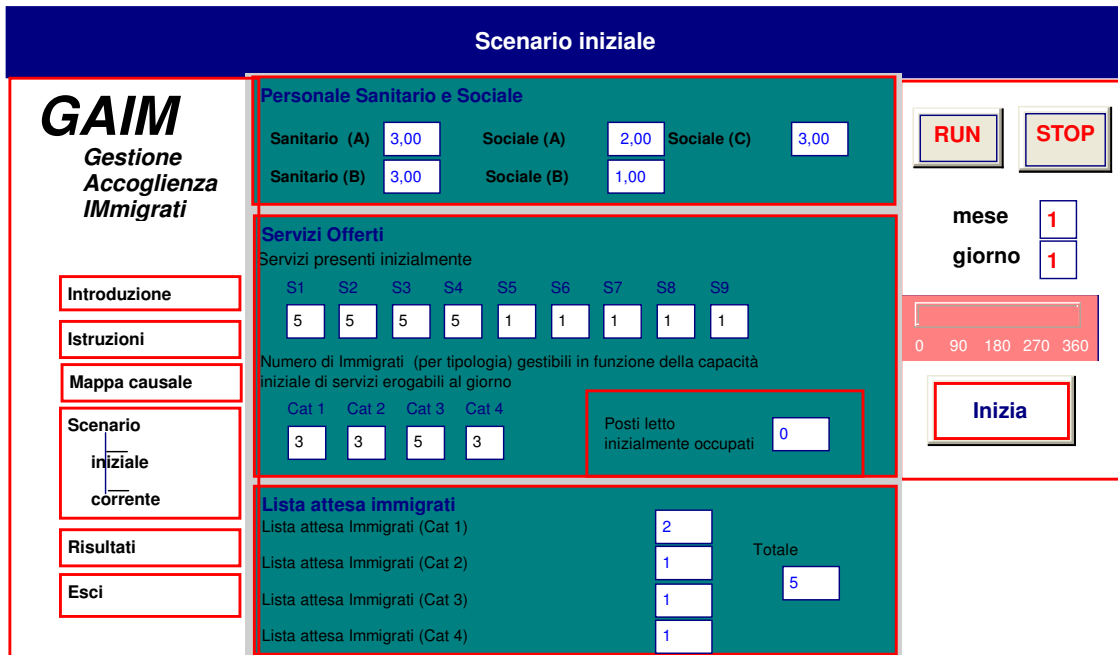


Figure 5 - GAIM front end Scenario window

The GAIM System Dynamics model, simulates over a period time of 360 days (about 1 year) with the simulation step of one day and decisions can be performed every 30 days (One month).

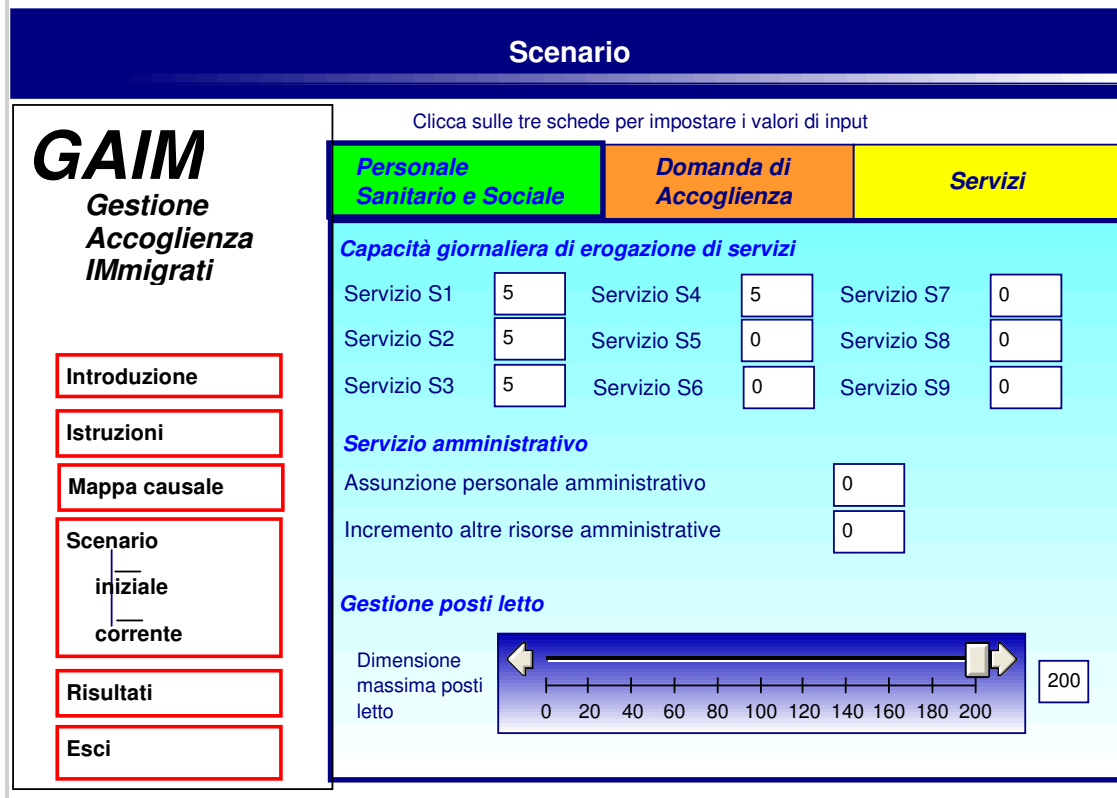
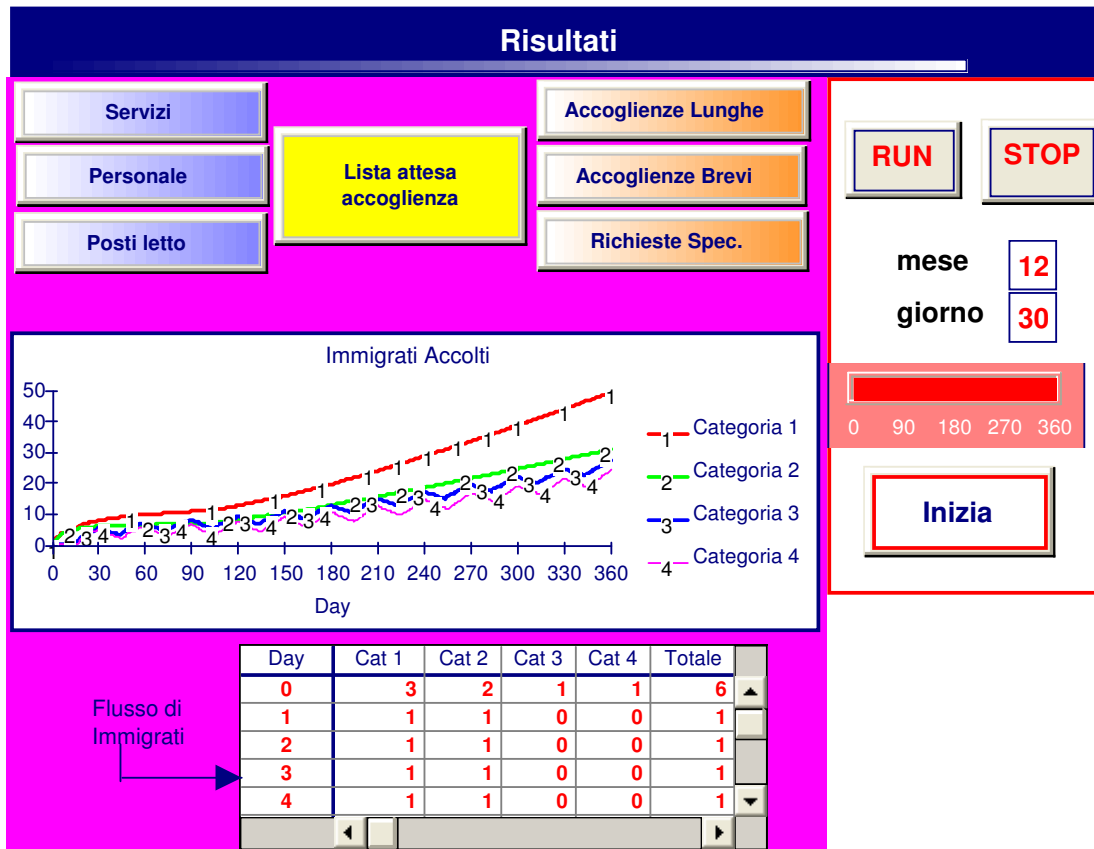


Figure 6- GAIM front end Input window



All simulation data (both user's decisions and relative simulation results) are recorded into the model in order to allow users to elaborate them after each run.



## 4 Conclusions

Up to date the model has been used in two different training courses (one for training *foreign intercultural mediators* course and a University Master course on Immigration Management). In both courses after a detail presentation of the model the model has been put at disposal of students in order to operate directly with the simulator. The interaction with the model and different run session of the simulator let students:

- to better understand the whole process of Immigration “housing” with the knowledge of principle system levers, through managing of which, different problems can be evaluated,
- to learn how much is important to act with a systemic approach rather than pure experience i.e. simply planning to increase the number of bed-rooms to resolve the periodic excessive waiting list time,
- to be aware of different scenarios and in addition to evaluate these alternatives in advance with different solutions,