p : average number of information packages of each R&D project
n : number of past cycles
I_i : number of remaining information packages of past cycles from i = 1 to i = n)
f : rate of fading effect (*)
E = fraction of added information packages by external knowledge

(*) It shall be noted that for remaining information packages of past cycles we intend that initial information packages of a cycle is reduced by fading effect *f* at each successive cycle before the last one. With $f = 0$ the fading effect is not present and with $f = 1$ there is a complete loss of past information packages.

The number of potential innovative ideas G, independently of their validity, is obtained by a combinatory calculation considering the number of available information packages I_T, and number of combining information packages *m* necessary to have a potential innovative idea, and expressed by the following formula:

$$G = I_T(\ I_T - 1\ )/m \quad (4)$$

in which we have:

G : number of potential ideas for innovations
I_T : total number of information packages available for potential innovative ideas after the last cycle
m : combinatory number of information packages necessary to generate a potential innovative idea

In fact, such number G of potential ideas is a simple combinatory result not considering any validity about specific combinations and contains necessarily in fact a large number of invalid or even absurd combinations. It is the task of the territorial innovative system to make a selection of valid innovative ideas. The number P of effective new valid ideas becoming R&D research proposals may be obtained by considering a rate factor *s* applied to the number G of potential new innovative ideas:

$$P = sG \quad (5)$$

Such rate *s*, expressed as percentage, represents a measure of the *innovative system efficiency* (ISE) of a territory. A last selection occurs in comparing R&D project proposals budgets with available R&D investments, and we may define a rate *t* determining the number N of R&D proposals that can effectively become R&D projects following the relation:

$$N = tP \quad (6)$$

Concluding we may express the total number N of R&D projects carried out in a cycle as a function of generated packages of information I_T by the previous cycles combining equations (4), (5) and (6):

$$N = tsI_T(\ I_T - 1\ )/m \quad (7)$$

However, in simplifying our application, we will consider later that all generated R&D proposals are valid and there is always enough R&D investment for the corresponding R&D projects. That means that we consider always $t = 1$ and consequently the number N of R&D projects will be equal to the number P of generated R&D proposals.

Considering the adopted functioning of the model with its simplifications we may expect the formation of three scenarios. The first one corresponds to the case of introduction of a limited number of initial R&D projects and a low ISE, by consequence the number of R&D projects