Appendix
Basic Values of the Model Parameters

Wherever possible the values of the model parameters were estimated on the basis of data of real industrial processes development. Because of the unavailability of real data, some of the values, especially the parameters relating to the search process, were chosen so as to get plausible results. The values of all parameters are typical of 'standard industry'. The estimated values presented below form the so-called basic values of the model parameters.
It is assumed that at the initial moment ($t = 0$) there are 12 firms ($n = 12$) and the supply and demand are fully balanced. The parameters of the demand function are: the initial market size $N = 3{,}000$, no growth of the market size is assumed, so $\gamma = 0$, and the elasticity of the average price is $\beta = -0.30$.
The constant unit cost of production is equal to zero, $\eta = 0$.
No economies of scale are assumed, so $a = 0$, $b = 0$ in the function $v(Q)$.
The initial unit variable cost of production $V = 5.0$ and the initial product price is 6.80, so the initial margin of price is equal to 36%.
The elasticity of price in the competitiveness $\alpha = 2$.
The normal rate of return $\rho = 5\%$.
The credit rate is assumed to be lower than the interest rate, $\rho_1 = 3\%$.
The SV investment strategy for all firms with the average repay period $\mu_1 = 10$ years and the credit parameter $\mu_0 = 2.0$.
The fraction of firm's profit conveyed for saving, *ToSave* = 1.
The initial debt of all initial firms as well as all firms entering the market is equal to zero.

Firms select the O_1 objective with parameters $a_4 = 1$ and $a_5 = 5$.
The initial productivity of capital $A = 0.1$.
The physical capital depreciation rate $\delta = 0.1$.
Prediction of average price and average competitiveness in the next year is based on exponential extrapolations of the relevant values in the last five years.
Entrants to the industry have capital, *InitCapital*, equal to 0.5% of the total capital (or equal to 10 units if the value of 0.5% of total capital is lower than 10), that is, *InitCapital* = max {10, 0.005 K}.

SEARCH PROCESS

Research funds: $h_0 = 0.005$, $h_1 = 0$, $h_2 = 0$; the initial structure of research funds is: 50% for innovation, and 50% for imitation, so $g(0) = 0.5$. Parameter controlling the rate of change of the structure of research $G = 100$.
Number of explorations for innovation (no. of experiments): $e = 10$, $\psi = 0.25$, $E_0 = 0$.
The scope of exploration by mutation: $a^u = 5$, $b^u = 1$, $\upsilon = 0.5$.
Probability of mutation: $a^m = 0.01$, $b^m = 0.0$, $\zeta = 0.50$.
Probability of recombination: $a^r = 0.1$, $b^r = 0.0$, $\xi = 0.50$.
Probability of recrudescence: $u_1 = 0.0$ if no recrudescence and 1.0 if recrudescence present, $u_2 = 0.005$.
Probability of a routine deletion: 0.0005.
Probability of a routine transition (from one firm to another): 0.005.

Normal probability of transposition (without recrudescence) is equal to zero. In the case of recrudescence the probability of transposition is equal to 0.3, and the probability of mutation is 0.01.
The number of technical characteristics $m = 2$.
The number of routines is 10, partitioned into 4 segments (3+2+3+2).
The range of routines is: *MinRut* = 0, *MaxRut* = 255.
The initial values of the routines are: 100, 1, 150, 35, 60, 75, 10, 25, 40, 20.
The distance function in the modernization investment is

$$\left\| r - r^* \right\| = \left(\sum \left| r - r^* \right|^{\kappa} \right),$$

κ controls the value of modernization investment *IM*, and it is assumed that $\kappa = 1.0$, r and r^* are the currently applied and the alternative sets of routines, respectively.
The functions of routines transformation into the technical characteristics, productivity of capital $A(r)$, and variable cost of production $V(r)$ are assumed to be:

$$z_d(r) = c_{d0} + \sum_i c_{di} r_i \quad \text{for } d = 1, 2$$

$$V(r) = v_0 e^{-b\left|\sum_i v_i r_i\right|}$$

$$A(r) = a_0 \left| \sum_i a_i r_i \right|^c$$

The values of c_{d0}, a_0, v_0 and b, c are automatically selected in the simulation program to provide the assumed initial values of products characteristics z_d, productivity of capital A and unit cost of production V, taking into consideration the assumed values of c_{di}, a_i and v_i.
The technical competitiveness function $q(z)$, describes so called adaptive landscape and is a sum of hills described by exponential functions:

$$q(z_1, z_2) = \sum_{k=1}^{HN} A_k \exp(-s_k((z_1 - z_{k1})^2 + (z_2 - z_{k2})^2)$$

Different adaptive landscapes are shaped by assuming a number of hills *HN* in that landscape, and for each hill: its altitude A_k, the gradient s_k, and a peak's co-ordinates (z_{k1}, z_{k2}).