RATING THE ECONOMIC EFFECTIVENESS

Ing. Peter Malega, PhD.
Technická univerzita v Košiciach
Strojícká fakulta
Katedra manažmentu a ekonomiky
Nám. Nemeckej 32, 042 00 Košice,
peter.malega@tuke.sk

Abstract
This scientific article treat with the economic effectiveness, because in today’s high competitive in every business sphere, it is crucial to produce more effective than others. The text is oriented only on the one main theme, which is rating the economic effectiveness. It is possible to find here some equations, which demonstrate the relations that are very important when someone want to decide, if this production is effective.

Key words
Effectiveness, economic effectiveness, roboting systems

INTRODUCTION
One of the three conditions necessary for an economy to be economically efficient is that it be on its production-possibilities frontier. If it is not on the production-possibilities frontier, more could be produced with the given resources and technology. Because greater production would increase value, any position below the production-possibilities frontier is inefficient. [7]

This requirement that resources must be used properly can be stated more technically. Effectiveness requires that an equimarginal principle has to be satisfied.

Where
\[ N_m (1 + a_2) \]
\[ J \cdot k_v (a_1 + k_t + N_{pr}) \leq 0.5 \]

When we want to calculate the one-shot costs we have to speak about these factors [2]:

1. Investment costs that are added in the investment building programme:
   - Mechanical investment, which includes financial supply of resources of operating and take down manipulation including traffic and assembly,
   - Underlying investment, including supply of special equipment,
   - "Evocation" investment including costs to ensure automated operations.

2. Investment costs related with replacement of labour force.

3. No investment costs on project preparation.

4. Costs for preparation and realization:
   - Preparation the technology of production,
   - Complex tests,
   - Test operation,
   - Engineering activity,
   - Modifications and changes of no-examining equipment,
   - Induction courses for people,
   - Construction works.
Complex evaluation executes through the indicators of production-economic effectiveness, social effects and economic effectiveness.

**PRODUCTION-ECONOMIC EFFECTIVENESS**

Production-economic effectiveness deal with business aspect, which expresses the effect of roboting system realization on exploitation of manufacturing sources and changes of economic requirements and effects in straight ring. Production-economic effectiveness characterizes next system of indicators [2]:

a) Gross profitability of manufacturing funds (%)

\[
\begin{align*}
    r_i &= \frac{Z}{I_s + I_l + ZAS} \times 100
\end{align*}
\]

Where

- \( r_i \) - gross profitability of manufacturing funds in target year, which results from the realization of roboting system,
- \( Z \) - Annual profit change, which results from:
  - The change of manufacturing opposite the conventional production,
  - The change of production costs,
  - The increase of the profit, which results from the production of absolute labour forces release,
- \( I_s \) - Distinction between sale price and remain value of release and liquidate capital assets following the realization of roboting system,
- \( ZAS \) - stock level change;

b) Labour productivity from self performance (mil. EUR)

\[
\begin{align*}
    P_p &= \frac{VV}{L}
\end{align*}
\]

Where

- \( P_p \) - labour productivity in rated roboting system,
- \( VV \) - self performance in rated system,
- \( L \) - man effort in rated system;

c) Economic return of costs \( t_{nh} \)

Where

- \( N \) - saving of costs, which is expressed in profit increase. Social effects are rated according to relation

\[
    U_s = U_p + U_a
\]

Where

- \( U_p \) - effect consequents from lower demands on quality of working environment (mil. EUR),
- \( U_p = J_p, k_f + N_{pp} \)

Where

- \( J_p \) - change (saving) of one-shot costs, which are invested on the quality of working environment,
- \( N_{pp} \) - change (saving) of operation costs on working environment.

Economic effectiveness characterizes indicators:

a) social-economic profitability \( V_{se} \)

\[
\begin{align*}
    V_{se} &= \frac{U_c + U_s + U_o}{J}
\end{align*}
\]

Where

- \( U_c \) - Economic effects (profit increase, decrease, or increase of manufacturing costs),
- \( U_s \) - Annual average social effect,
- \( U_o \) - other economic effects;

b) Economic return \( t_{nh} \)

\[
\begin{align*}
    t_{nh} &= \frac{J}{U_c + U_s + U_o}
\end{align*}
\]

Necessary request is, that economic return has to be shorter, than technical and moral lifetime of roboting system. Usually we can speak about effective robot putting, when economic return is shorter than 5 years.

By the realization of roboting system outside the countable requirements and effects, we have to consider with extra economic effects (especially in social-economic area). The most important are [2]:

a) Labour content changes of production preparation:

- Labour content changes of development the technological process,
- Decrease the labour content of output standardization.

b) Quality change of output standardization:

- Specification of performance norms,
- Optimization possibilities of manufacturing process,
- More precisely operative production planning,
- Upgrade of the organization production process.
c) Changes in planning and production management:
- Labour content changes of operative production planning,
- Labour content changes of managing works,
- Labour content changes of administration works,
- Precising of operative production planning,
- Reduction of continuous production time.

d) Reduction of the human factor effect on the production process:
- Reduction of loses from the worker fluctuation,
- Reduction of adaptative loses of workers when they begin with the production of new components,
- Reduction of effect, that workers have fatigue throughout workday and week.

e) Change in the working environment:
- Decrease of the work difficulty,
- Elimination of work monotony,
- Increase of the work culture and improvement of working environment,
- Improvement of work health,
- Increase the labour protection.

f) Changes in business organism:
- Refill enhancement of the intradepartmental information,
- Enhancement of the normative activities.

CONCLUSION

A production process is effective if a given quantity of outputs cannot be produced with any less input. It is said to be inefficient when there exists another feasible process that, for any given output, uses less inputs. The rate of effectiveness is simply the amount of (or value of) outputs divided by the amount of (or value of) inputs. [3]

To be on the production-possibilities frontier, all resources must be used. Unemployed resources indicate that more goods and services could be produced, which means that the economy was not on the frontier initially. [4] In addition, resources must be used properly. If society randomly assigns people to jobs or if it assigns jobs on the basis of political reliability, it will not produce as much as it could. It will require some people with little intellectual ability to perform jobs that require great intellectual ability, and it will likely some people with little strength and endurance to perform jobs that demand much strength and endurance. If switching people among jobs can increase output, the original situation was not on the production-possibilities frontier and thus not economically efficient. [8]

REFERENCES


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