

PROBABILITY MODEL FOR EVALUATING EFFICIENCY OF AN AIRLINE'S ACTIVITY

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Present-day active airline operates in market relations, i.e. under conditions of strong competition which, for its turn, requires taking measures on increasing efficiency of an airline's operation on the part of a decision-maker (DM, head of airline).

Therefore, when describing an airline's activity it should be noted that efficiency of operation depends on level of staff qualification. The very notion of "staff" is defined as a group of employees united with organization structure, aim of activity and interests. Consequently, emphasis must be placed on improving the system of staff training and additional training, and ensuring a high level of staff qualification (for example, service staff of "Aeroflot" must work on probation at enterprises of American airline "Delta"). An airline should be provided with duly qualified flying and maintenance personnel attested according to the requirements set in standards of International Civil Aviation Organization (ICAO).

First of all, a criterion for determining qualification must be established. There can be proposed quite many various variants of evaluating the level of qualification. Nevertheless, evaluation can be performed based on results of an airline's activity.

Let us use the following line of reasoning with the view to construct a mathematical model where influence on activity efficiency of a standard airline would be taken into account.

It would be logical to suppose that the more money is spent on raising of staff qualification, the better quality of work can be achieved. It is also obvious that the level of qualification will reach some practically limiting value after the lapse of some time, where after even very heavy spending on raising the qualification will result in a little (slight) increase in respect of qualification. This implies that the constructed mathematical model must represent the function which monotonely increases from its zero value to specific limiting value.

If to take the probability of obtaining specific qualification as a criterion, then the function will monotonely verge towards one without exceeding it. This description nicely matches the function

$$P = 1 - e^{-\lambda k}, \text{ where } \lambda k \text{ is a level.} \quad (1)$$

It has to be also noted that more qualified staff will give a higher value of f compared to less qualified one, other factors being equal. For further analysis, let us take the functional relationship

$$f(k) = 1 - e^{-\lambda k}, \quad (2)$$

where λk is a level of qualification.

At analysis we shall consider λk conditionally substituting values of λk starting from zero.

First of all, a criterion for determining qualification must be established. There can be proposed quite many various variants of evaluating the level of qualification. Nevertheless, evaluation can be performed based on results of an airline's activity.

With reference of the above said, it would be reasonable to note that there exists a point of considerable retardation of efficiency growth at a certain stage of raising qualification of an airline's staff.

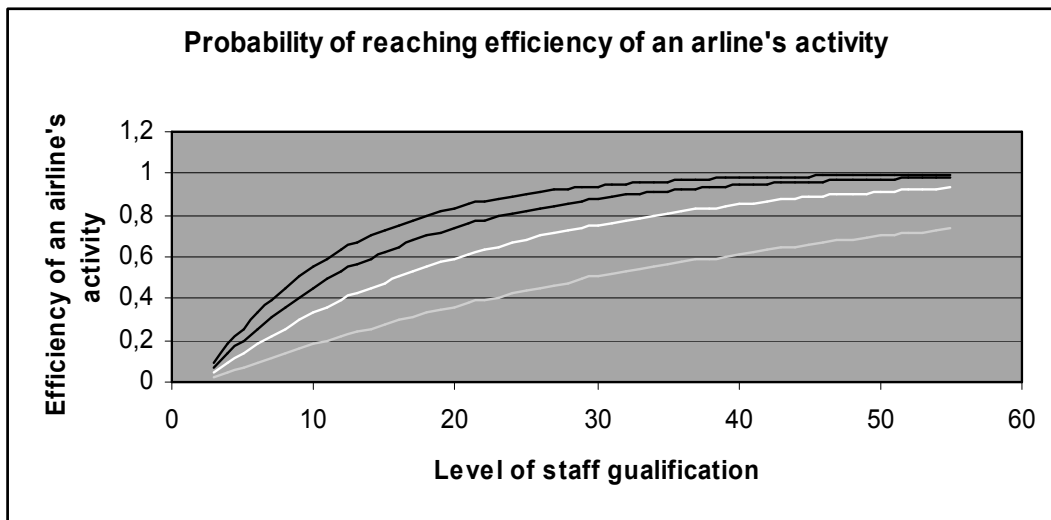


Figure 1.

That means that raising qualification is not expedient at the given stage.

It can be also pointed to that there is observed certain tendency relative to spending required to raise the level of staff qualification. The bigger the spending on staff training, the higher level of staff qualification will be achieved.

It is also obvious that the level of qualification will reach some limiting value after the lapse of some time. Therefore further increase of spending will not lead to improvement of the qualification.

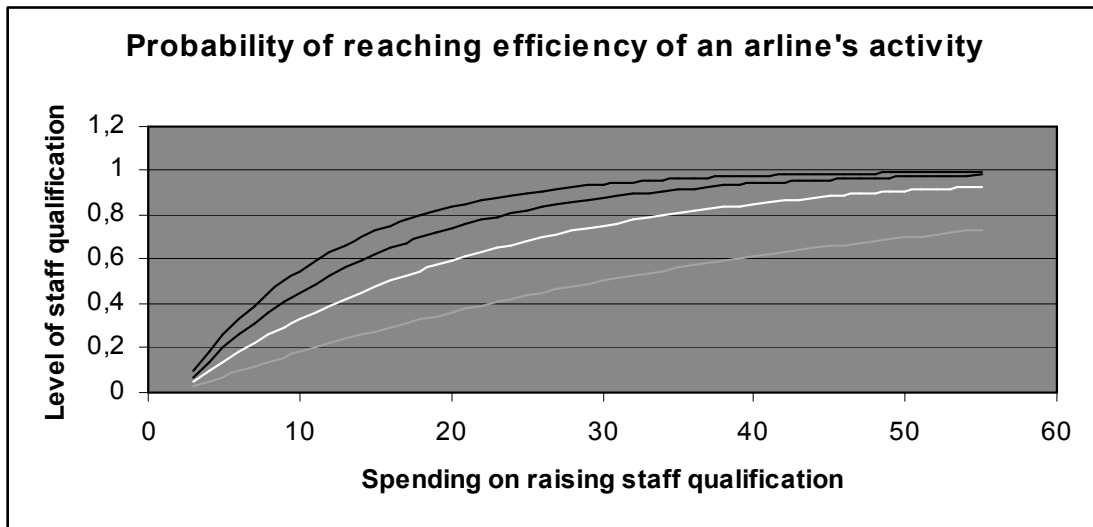


Figure 2.

All the above said allows to conclude that the growth of spending on raising efficiency of an airline's activity will produce the growth of the very efficiency. However, the further increase of spending will affect to a decreasing degree efficiency of service provision.

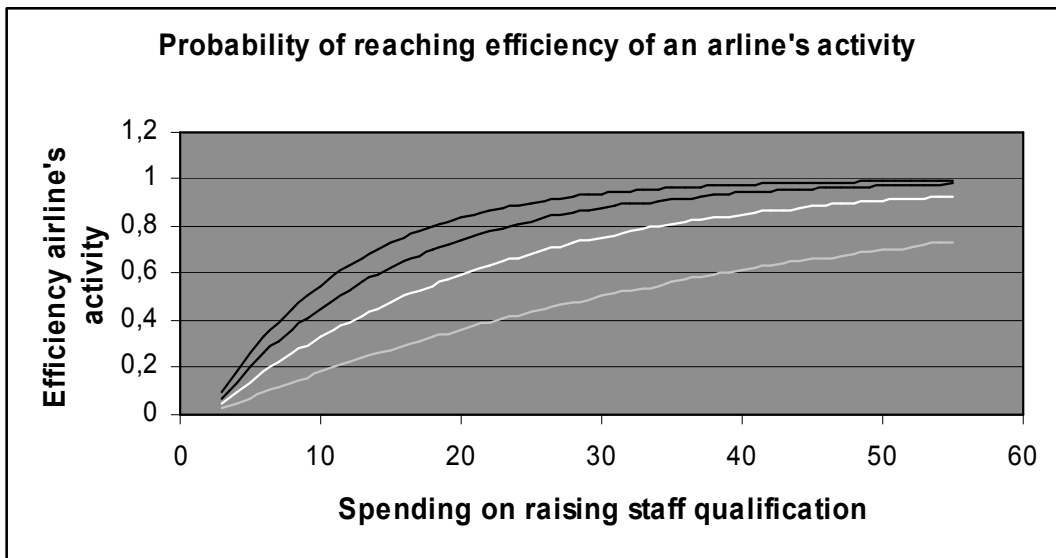


Figure 3.

Analogous result is obtained at temporal, information and material expenses, which, for its turn, exerts influence on quality of the rendered services.

Conformity of employees with tasks to be fulfilled by them has to be maintained on a constant basis. Change of technology, perfection of quality control system – all this makes new demands for employees. Introduction of innovations and technological changes requires relative changes in working capacities of employees (in areas of profession, specialty, qualification). Methods of additional training according to strategic plans for an airline's activity must be worked out so as to retain economic activity. The realer changes in work become, the more active measures must be taken by heads to get staff prepared for such changes. Training and additional training of staff turns out to be a constant constituent of

management process. And it requires working out a reliable and constantly acting system of staff training. The following factors are required to ensure proper efficiency of training:

- Motivating employees. People must understand aims of the program, i.e. how acquired knowledge and skills will enhance their productive efficiency;
- Creating by organization management of training-favorable climate: trainees must be given an incentive and special premises for conducting training must be provided too;
- Dividing the training process into two stages (if obtained skills are complex ones);
- Establishing feedback. Approval and acknowledgement of the results on the part of a head can enhance employee's enthusiasm for studies.

Perfection of staff training in the field of information technology represents one of crucial issues for today. In terms of education system in Latvia, it means the necessity to stimulate need for using state-of-the-art developments in computer and information technologies as efficiently as possible. Demand for experts, capable of accomplishing tasks on making, accompanying and operating information and telecommunication systems in airlines, has grown recently in this branch. Training such experts must be flexible and more adaptable one. Complexes of teaching programs (computer simulators of air courts, electronic systems, distance-learning systems) are introduced by different air specialties and disciplines.

References

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V.Hodakovskis, J.Trofimenko. Aviokompānijas darbības efektivitātes novērtējuma varbūtības modelis
Aprakstoti aviokompānijas darbību, ir jāatzīmē, ka funkcionēšanas efektivitāti ietekmē personāla kvalifikācijas līmenis. Aviokompānijai ir jābūt nodrošinātai ar kvalificētu un atestētu darba spēku, atbilstoši Starptautiskās civilās aviācijas organizācijas prasībām. Bet aviokompānijas personāla kvalifikācijas līmeņa celšanas procesā kādā brīdī efektivitātes pieaugums ievērojami pazeminās. Tas nozīmē, ka izstrādātais matemātiskais modelis ir monotoni augošā funkcija no nulles lieluma, nepārtraukti tuvojoties kaut kādām robežlielumam.

V.Khodakovsky, J.Trofimenko Probability model for evaluating efficiency of an airline's activity
When describing an airline's activity it should be noted that efficiency of operation depends on level of staff qualification. An airline should be provided with duly qualified flying and maintenance personnel attested according to the requirements set in standards of International Civil Aviation Organization (ICAO). It would be reasonable to note that there exists a point of considerable retardation of efficiency growth at a certain stage of raising qualification of an airline's staff. This implies that the constructed mathematical model must represent the function which monotonely increases from its zero value to specific limiting value.

В.Ходаковский Вероятностная модель оценки эффективности деятельности авиакомпании
Для описания деятельности авиакомпании необходимо отметить, что на эффективность функционирования влияет уровень квалификации персонала. Авиакомпания должна быть обеспечена квалифицированным и аттестованным в соответствии с требованиями стандартов Международной организации гражданской авиации (ИКАО) летным и инженерным техническим составом. Но на определенном этапе повышения уровня квалификации персонала авиакомпании существует такой момент, когда приращение эффективности значительно снижается. Сказанное означает, что в разрабатываемая математическая модель должна представлять собой монотонно возрастающую функцию от своего нулевого значения, непрерывно приближаясь к какому-то предельному значению