“The definition of a necessary and sufficient information accumulation level to substantiate a choice of enterprise's market opportunities directions development”

AUTHORS	Ilyashenko S. M

ARTICLE INFO	Ilyashenko S. M (2004). The definition of a necessary and sufficient information accumulation level to substantiate a choice of enterprise's market opportunities directions development. *Problems and Perspectives in Management*, *2*(1)
RELEASED ON	Wednesday, 17 March 2004
JOURNAL	"Problems and Perspectives in Management"
FOUNDER	LLC “Consulting Publishing Company “Business Perspectives”

NUMBER OF REFERENCES **0**

NUMBER OF FIGURES **0**

NUMBER OF TABLES **0**

The definition of necessary and sufficient information accumulation level to substantiate a choice of enterprise's market opportunities directions development

Il'ashenko S. M.[1]

Abstract: The article treats the basic rules of theoretical and methodological approaches to defining necessary and sufficient information accumulation level for taking marketing decisions' on the substantiation of the enterprise's market opportunities development projects.

Taking rational decisions on estimation and choice of the projects of enterprise's market opportunities development demands appropriate information base presence, which is necessary to reduce the degree of uncertainty and risk, caused by it, and to increase the taken decisions' validity. But increase of persons' knowledge level is connected with significant expenses on the additional information obtaining which can exceed possible benefits from more exact decisions' substantiation. Therefore, to determine the quantity of the information which is really necessary to take the substantiated decision, it is necessary to compare marginal benefits to expected expenses on its obtaining.

The question of market research information maintenance directed at finding and choosing market opportunities development directions, demands significant attention to be paid. There are many publications devoted to this problem, among them it is necessary to underline the importance of [1, 2]. The analysis shows that the problems of creating information base for formulatin variants of development choice are urgent. The existing publications consider different aspacts of these problems. But the questions of economic substantiation of a necessary and sufficient level of information accumulation (its volumes and kinds) have not been covered sufficiently. This does not allow to optimize the procedure of choosing variants of development of the concrete enterprises which operate in adequate market situations. In its turn, it results in taking wrong decisions with all the consequences following.

In respect to the ideas mentioned, the purpose of the given research is to development theoretical methodological approaches to defining necessary and sufficient level of information accumulation for taking justified marketing decisions on the choice of directions of enterprise's market opportunities development.

At first we shall determine, that the marginal quantity (Qm) and marginal price (Pm) of the necessary information is determined by a point in which the expected marginal benefit curve (Bm) crosses the expected expenses (Ex), connected with its reception (Fig. 1) [3]. If the expected benefit of the information purchase exceeds the expected marginal expenses ($B \geq Ex$), then such information will be necessary to obtain. If, on the contrary, ($B < Ex$), it is necessary to refuse from the information purchase, as the expected meaning of the result under the conditions of uncertainty will be higher, than that obtained under conditions of certainty.

[1] Doctor of economic sciences, the professor , the head of marketing department, SSU

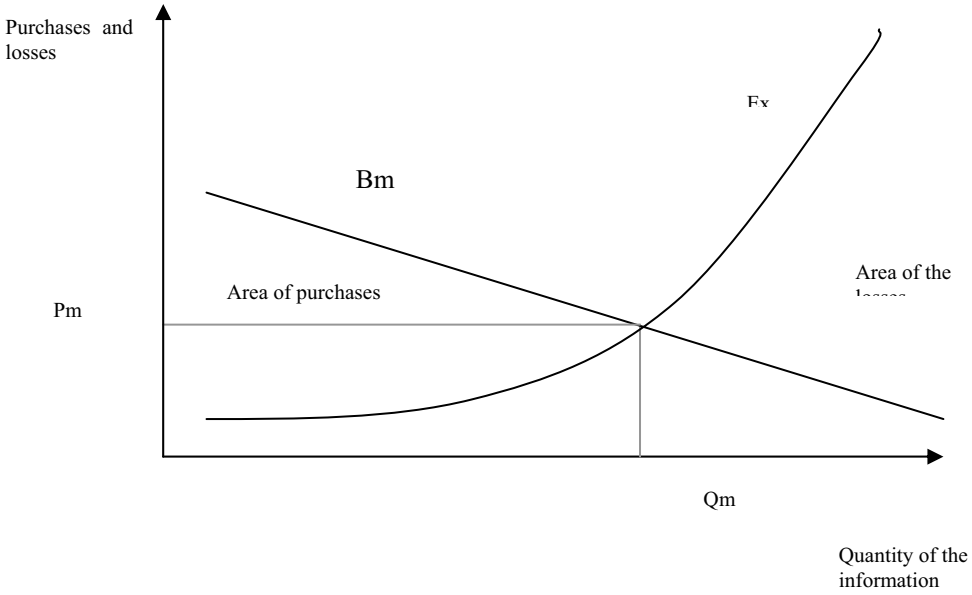

Fig. 1. Definition of the necessary information optimum volume

According to [4], the limiting cost of the complete information is determined as a difference between the expected results of the certain event or decision, expressed in the cost form, which is executed or accepted in conditions of complete knowledge (Rc), and expected results of the same event or decision taken under conditions of uncomplete knowledge (Ru).

$$C_{\lim} \le Rc - Ru \tag{1}$$

If the information costs are more than Bm, their purchase will reduce the size of the result, for example, profit, which is gained under the conditions of certainty, if compared with the profit made in conditions of uncertainty. In this case, the purchase of additional information is irrational.

But there are also other aspects of search of the necessary information. It is possible to collect the information, which will not contain the really necessary data. In this case there will be a large error of search of the information and, according, by low efficiency of search. In other words, the expenses for search of the information will be not efficient.

The efficiency of search of the information can be evaluated with the help of parameters of an error of search and completeness of search, which are calculated according to the following formula.

$$П_{пг} = 1 - \frac{K_p}{K_o}, \tag{2}$$

$$П_{пл} = \frac{K_p}{K_{рм}}, \tag{3}$$

where Ппг is the error of search; Ппл – the completeness of search; Кр – the volume given of the relevant information; То – the general volume of the given information; Крм – the volume of the relevant information in its general set.

The values of Кр, Ко, Крм can be measured by quantity of the documents or in standard units, which are taken for measurement of quantity of the information Byte, Kilobyte, Mbyte, Gbyte and so on.

In Fig. 2 [5] Ппг, Ппл are submitted as attitude of crossing area to each of the two allocated areas.

According to formula (2-3), the efficiency of search of the information in more, than completeness of search and is less than an error of search. In other words, the areas, allocated with circles in Fig. 2, theoretically should be imposed on one another, but practically it is not achievable.

It is necessary to establish boundary meaning of completeness of search and error of search (these parameters, as it follows from the formulas 2-3, are in back proportional dependence – the increase of one causes reduction of another), as the increase of completeness of search results in increase of cost of the information. Such meaning of completeness of search is necessary to find which will be acceptable with the point of view of person, which makes a decision, but at the same time expenses but its achievement should not exceed the certain size. As follows from Fig. 1, the information should be accumulated so long as the expenses on its purchase are less or equal to expected boundary benefits from possession by it. And, such estimations should be carried out before realization of search of the information, because the estimation should carry the character of the forecast. But on the moment of a beginning of the tax of the information it is very difficult to make such forecast, because of too high level of uncertainty.

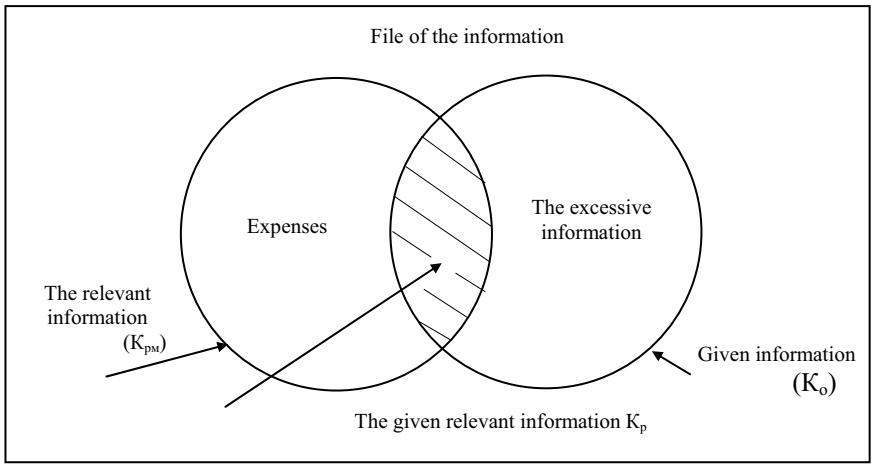

Fig. 2. The circuit of the information search error occurrence

As first approximation dependence between size of expenses for purchase of the additional information and completeness of its accumulation, which is determined in factor Ппл, (3), can be expressed by the following differential equation:

$$\frac{dBm}{d\Pi_{пл}} = Bm + Bm \cdot a \cdot \Pi_{пл}, \tag{4}$$

where *a* is the factor of proportionality.

For the decision of this equation we shall transform it to the following kind

$$\frac{dBm}{Bm} = (1 + a \cdot П_{пл}) \cdot dП_{пл} \cdot \quad (5)$$

The solving of the equation (5).

$\ln|Bm| = П_{пл} + a \cdot \frac{П_{пл}^2}{2} + \ln|C_1|$, or after transformations

$$Bm = C_1 \cdot e^{\frac{a \cdot П_{пл}^2}{2} + П_{пл}}. \quad (6)$$

The marks of the module are lowered, as the sizes accept only positive meanings.

The dependence between boundary benefits from use of the information and its accuracy, which is determined in factor Ппг (2), can be expressed by the following differential equation:

$$\frac{dB}{dП_{пг}} = B - в \cdot \frac{Bг}{П_{пг}}. \quad (7)$$

where *в* is the factor of proportionality.

Having executed transformations of this equation is similar to transformation (4) in (5) and having solved it rather Вг we have.

$$Bг = \frac{C_2 \cdot e^{П_{пг}}}{П_{пг}^{в}}. \quad (8)$$

The meanings of constants C_1 and C_2 can be received if we substitute (accordingly, in (6) and (8)) the meanings of known sizes (for С1 it Вт and Ппл i, for С2 - Вгi and Ппг i) and solve these equations rather Вт and Вг.

$$C_1 = \frac{Bm_i}{e^{\frac{a \cdot П_{пл\,i}^2}{2} + Ппл_i}}, \quad (9)$$

$$C_2 = \frac{Bг_i \cdot Ппг_i^{в}}{e^{Ппг_i}}. \quad (10)$$

The meanings of factors *a* and *в* can be received by replacement of sizes *dBm*, $dП_{пл}$, *dBг*, $dП_{пг}$ on *ΔBm*, $ΔП_{пл}$, *ΔBг*, $ΔП_{пг}$ and substitution them in the equation (5) and (7). Further accepting $ΔП_{пл}$= 0,01 and $ΔП_{пг}$=0,01 and using the method of the least squares, we differentiate (5) on *a* and (7) on *в*. Solving the received equations rather *a* and *в* shall find there meanings.

Optimum meanings of sizes Ппл and Ппг are determined from a condition.

Вг-Вт $\rightarrow$ max or

$$\frac{C_2 \cdot e^{\Pi_{пг}}}{\Pi_{пг}^{в}} - C_1 \cdot e^{\frac{a \cdot \Pi_{пл}^2}{2} + \Pi_{пл}} \rightarrow \max \quad . \tag{11}$$

Thus the restrictions should be observed

$$0 \le \Pi_{пг} \le 1,$$

$$0 \le \Pi_{пл} \le 1, \tag{12}$$

$$Bm \le Bm_{гр},$$

where $Вт_{гр}$ is the limiting size of expenses, which can be allowed by the enterprise on accumulation of the information for filling information base of information system.

The size Вт is determined under the formula (6). The meanings Ппл and Ппг in the equations (11) and (12) concretize by substitution in them of known sizes Кр, Ко, Крм (2-3).

Optimum meanings of sizes Ко, Кр can be found at known meaning Крм, which are determined as «area of the data and knowledge» about the process, a subject or phenomenon with which is called to work information system.

Thus, we have developed the basic rules of the theory-methodical approach to definition of a necessary level of accumulation of the information for taking of the proved decisions on the choice of directions and variants of development of market opportunities and so it's hard to estimate the future results.

But in practice it happens difficult to estimate possible benefits from reception of the additional information, because at a stage which precedes market researches, it is not yet clear for an estimation of prospects of the enterprise development, what variants of market opportunities of development will be chosen and so it's hardly to estimate the future results.

It is also hard to estimate expense for reception of the information. The different stages and investigation phases, with the purpose of substantiation of optimum variants of development, require information of a different kind and in different volumes. Different ways of its reception and analysis are used, which differ in terms of realization, completeness of search, cost of the information etc.

Further features of information maintenance on stages of process of an estimation and choice of variants of development of the concrete enterprise in existing conditions, are considered with the purpose of reduction of uncertainty at an estimation of expenses on the tax and analysis of the information, in view of prospects of their further development.

The process of estimation of variants of market opportunities development follows [6] to consider stages as a system, which consists of the following elements: the phase of a concrete stage of acceptance of the decisions – the purpose of each stage, the information, which is used in deciding the tasks of stages – criteria of achievement of the purposes at each stage.

The given system can be submitted as set X, which, in turn, is determined as the Cartesian product of its making sets Xi:

$$X \equiv X_1 \cdot X_2 \cdot X_3 \cdot X_4. \tag{13}$$

where X1 is the set of stages of a process; X2 – the set of the purposes of stages; X3 – the set of the information's kinds; X4 – the set of estimated criteria.

Each set characterizes homogeneous elements of the system. Accordingly, for each of evaluation stages of variants of market opportunities development there will be a fair following parity.

$$X^i \equiv X^i_1 \cdot X^i_2 \cdot X^i_3 \cdot X^i_4. \tag{14}$$

The set $X^i \subset X$ is determined by interrelations between the purposes $X^i_2 \subset X_2$, kinds of the information $X^i_3 \subset X_3$ and estimated criteria $X^i_4 \subset X_4$ for i stage to process. The set X^i_1 contains one element – i stage of a process of an estimation of variants of market opportunities development.

Filling concrete sense X^i_1, X^i_2, X^i_3, X^i_4, for each of the stages we shall receive dependences, which will unequivocally establish the purposes of stages, kinds of the information, which is used for the realization of works of the appropriate stages, criteria of an estimation of efficiency of these works.

It will allow to reduce a degree of uncertainty of volumes of the information necessary for acceptance of the proved decisions during a substantiation of the projects of development of the enterprise for stages, will raise accuracy of forecasting of expenses on reception of the information.

In Fig. 3 the model of the process of segmentation is submitted, which includes the following structural elements: stages of the process of segmentation, kinds of the information, criteria, purpose of stages.

In Fig. 3 the coordinates of the purposes of stages of segmentation are shown, and they are not submitted because of a large size of records.

The kinds of the information, which are used at different stages of a process, are determined and also the sets of criteria are offered, on which an estimation of tha process efficiency is conducted. Accordingly, the following stades are determined: the evaluation stages of the enterprise's opportunities – the level of profit, the sufficiency of resources, chances in a competition; stages of the definition of principles and factors of segmentation, construction of economic-mathematical models, tax and analysis of the information – capacity, the level of profit, the tendency of a segment's growth; for last stage – all sets of estimated criteria (Fig. 3).

As the general purposes of stages (they are subject to detailed elaboration) the following are allocated: estimation of opportunities of the enterprise – to estimate sufficiency of potential of the enterprise for realization of existing market opportunities, to determine what kinds of production it can make; definition of principles and reasons of segmentation – to reveal principles, reasons and to change the reasons.

We follow the same scheme to build information models of other stages of the process of the target markets formations and stages of the process of market opportunities development as a whole.

The stated above approach is convenient for formalization of the description of information base for management of the enterprises' market opportunities development. Each stage of an estimation and choice of variants is considered as a system: stages of a process – a purpose of stages – information necessary for acceptance of the decisions, an estimated criteria. It allows to somewhat lower uncertainty of formation of information base, at the expense of an establishment of unequivocal conformity between elements.

For practical realization of the stated approach the problem-oriented packages of the applied programs can be used, for example, relational SDBM such as Open Access or tabulated processors such as Microsoft Excel, which have the built - in tools of processing of the above mentioned mathematical dependences.

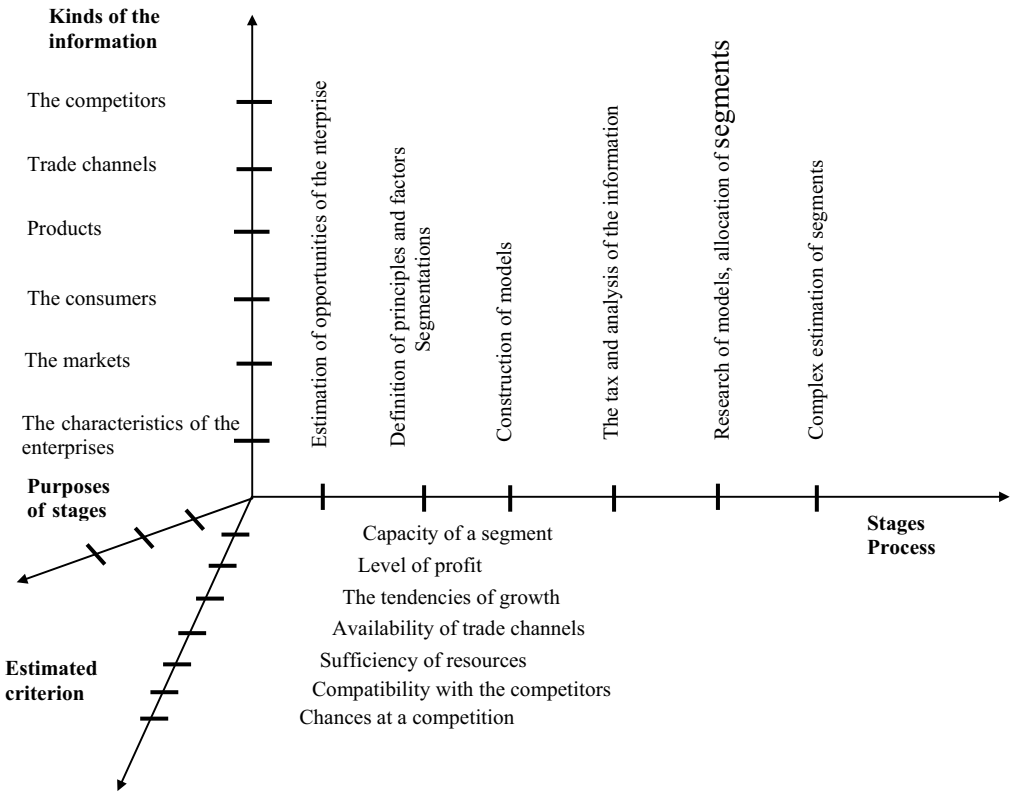

Fig. 3. The generalized model of segmentation as one of the stages of target market formation

The usage of the received results allows to make practical toolkit, which enables operatively and with a high degree of the validity to carry out work on creation of information base for an estimation and choice of directions of market opportunities development, to predict expenses on its updating more precisely.

Referring to the stated above approaches to the deciding problems of definition of a necessary and sufficient level of accumulation of the information with the purpose of information support of the process of an estimation of the alternative projects, it is necessary to determine, that the offered mathematical and information models allow in the greater degree to solve the problem of definition of the information cost. But the problem of definition of probable benefits from its use is more difficult and requires the further researches.

The author's approach to the decision of this problem is considered to be an example of definition of an optimum parity between a level of accuracy of a choice of market positions of the enterprise by a method of segmentation and expenses for formation of the target market on the basis of its allocated sites. It should be noted, that the accuracy of a choice of market positions determines opportunities of the existence of the managing subject, success of realization of its potential in existing external conditions (in view of the tendencies of their change) with the purpose of maintenance of a long-term survival and development within the framework of the chosen mission.

The high importance of the process of market positioning (allocation of target sites of the market for realization of the revealed market opportunities) puts forward also high requirements to accuracy and quality of performance of the appropriate market researches, estimation and interpretation of their results.

In the given context it is necessary to understand the accuracy of market positioning as a degree of conformity of the enterprise's opportunities to existing conditions of managing in the target market, chosen for their realization, its segments or niches.

The increase of accuracy and quality of market positioning reduces degree of uncertainty, allows to accept the proved decisions, but it causes sharp increase of expenses at the tax and analysis of the information, and as a whole – increase of expenses at all process of search and allocation of target sites of the market, and also formation of the target market on their base for realization of existing opportunities of development.

For definition of probable benefits from possession of the information it is necessary to execute the forecasts of the future development of events and to estimate probable results (their cost estimation) at a different degree of awareness. It permits to establish dependence of probable results on a degree of awareness about a subject of the decision and its probable consequences (dependence of results on quantity and quality of the initial information). It is also necessary to establish what kinds of information, what qualities and in what quantity are necessary for taking the decisions at different stages of substantiation of the projects of development, which will permit to estimate a degree of awareness in cost expression. The considered above approaches (see formula 1-14 and fig. 2) can be applied for this purpose.

It is obvious, that it is necessary to find the conciliatory proposals between expenses for achievement of the certain level of knowledge and expected results in cost expression. Practically it can be executed by the method of consecutive approximation. To an initial degree of awareness (is estimated by quantity and quality of the information, and also expenses for its reception) it is necessary to consistently add certain gain and calculate expected meanings of a result. On one of iterations the total expenses for the information will be balanced with results. Thus, the economically expedient level of awareness will be determined.

We shall consider the basic rules of the approach [7], that permits to find an optimum parity between a level of accuracy of process of search of the target markets (target or segments of niches of the market) method of segmentation and expenses for its achievement. Thus the process of a choice of market positions is considered as multilevel iterative.

According to the given approach the work is carried out following the given stages:

- calculation of expenses on search of sites of the market for realization of the revealed market opportunities of development;
- estimation of accuracy of the process the market research;
- definition of an economically effective level of accuracy of a choice of a position in the market.

In its turn, any of the stages includes a line of stages. Accordingly, further consideration shall be conducted on stages, and inside stages – stage by stage.

I. The market target sites allocation works expenses' calculations.

It is necessary, that the calculations were carried out in the following sequence: defining the concrete purposes defining; it is necessary to work out the definition of tasks, necessery for achievement of these purposes; estimation of expenses on the decision of these tasks. Their sum will give focused size of expenses on realization of works.

The purpose of work of the given stage (as is marked above) is definition of the enterprise's place in the market, where the greatest measure can show its comparative advantages, that is revealing of target segments or niches of the market, and exact forecasting of volumes of selling on them.

It's necessary to carry out the work of the given stage in the following sequence:

- estimation of the enterprise's opportunities;
- definition of principles (orientation to a product, orientation to the consumer etc.) and factors (specificity of inquiries of the consumers, parameters of products, regions of selling etc.), search of target sites of the market by the method of segmentation;

- construction of a complex of matrix models (functional cards) [8] for allocation and estimation of segments or niches of the market on the consumers, products, basic competitors etc.;
- the tax and analysis of the information, which characterizes the markets of selling;
- allocation of target sites of the market and their complex estimation;
- choice of target segments of the market and manufacturing of the offers for acceptance of the administrative decisions.

We shall consider the purposes of concrete stages and tasks, which are solved during these stages.

Estimation of own opportunities of the enterprise. The purpose of the stage is to determine opportunities of realization of variants of development of available market opportunities of the enterprise in view of the available equipment, technology, sources of supply by raw material, site etc.

While achieving of the purpose the following tasks are solved:

1. The analysis of market conditions, that have developed, and prospects of their development.
2. Revealing and estimation of potential opportunities of the basic competitors.
3. The analysis of technical and economic opportunities of the analyzed enterprise in comparison with the basic competitors.

Definition of principles and factors of segmentation. The purpose of this stage is to define the principles of segmentation, allocation of the factors of segmentation and their meanings, and also the most probable combinations of the factors in view of their meanings.

The tasks, which are solved for achievement of an object in view, are as follows:

1. The analysis of opportunities of development, the data on selling for the past periods of managing, the items of information of bodies of state statistics, the branch structure of the consumers, the geographical distribution of the market etc.
2. A choice of principles, kind and factors of segmentation (on the basis of the executed analysis).
3. Definition of the most acceptable meanings (replaceable) factors of segmentation and degree of their differentiation.
4. Revealing of the best of combinations of the factors.

Construction of matrix models (functional cards) for allocation and estimation of sites of the market by a method of segmentation on the consumers, products, basic competitors etc. The purpose of this stage is the construction of matrix models (functional cards) and their representation as the computer aided information systems (databases and appropriate software).

The tasks, which are solved during achievement of an object in view, are as follows:

1. Development of breadboard models of the forms of functional cards (on the basis of results of a previous stage).
2. Transformation of functional cards to a kind of matrixes (tables), representation them as computer databases. The development of the software or (more probable) a choice of system management of databases (for example, Open Excess or anyone another), in which environment will be analyzed.

The tax and analysis of the information, which characterizes the markets of selling. The purpose of this stage is tax and information analysis, filling of tabulared (matrix) models by the fact sheet.

The tasks, which are solved during achievement of an object in view, are as follows:

1. Revealing of sources, methods and ways of the tax of the information.
2. Development of the questionnaire (if necessary).
3. The tax of the necessary data and their ordering.
4. The analysis of the data.
5. Filling of models by the fact sheet.

Allocation of segments of the market and their complex estimation. The purpose of this stage is the allocation of the market's segments and their estimation on all sets of the criteria, which are considered in a complex.

The tasks, which are solved during achievement of an object in view, are as follows:

1. The analysis of tabulated (matrix) models and allocation of the market's segments.
2. An estimation of segments by separate criteria from all of their set.
3. A complex estimation of segments by criteria.

Choice of target segments and development of the offers for acceptance of the administrative decisions. The purpose of the stage is the definition of necessity performance of the following iteration (recurrence of process segmentation, since one of previous stages), or acceptance of the decision about the completion of the process and choice of target segments.

The tasks, which are solved during achievement of an object in view, are as follows:

1. Choice of target segments.
2. Acceptance of the decision: to finish a process or to repeat, since one of previous stages.
3. Development of the offers for acceptance of the administrative decisions by a management of the enterprise.

It is necessary to note, that each following iteration increases cost of works. General expenses for performance of works in view of following *i+1* iteration (only for a part works, which are carried out once again) are determined in formula:

$$Zc_{i+1} = Zc_i \cdot A, \tag{15}$$

where Zc_i is the actually suffered expenses on previous i iteration; A is the correction factor determined on the basis of similar works, carried out in the past periods of managing in similar conditions.

Thus, in a general view the circle of tasks is determined by subject to the decision during allocation of sites of the market for realization of market opportunities of development.

The expenses for the decision of the allocated tasks in each concrete case different also depend on specificity of the enterprise, of a market situation etc. However in any case the general circuit of definition of expenses on works on search of variants of development remains such: definition of expenses on the decision of concrete tasks, and then account of their sum. It is necessary to note, that in performance of practical accounts for the concrete enterprise the insignificant changes of structure of tasks are possible.

II. An estimation of accuracy allocation of sites of the market for realization of the projects of development (estimation of accuracy segmentation for any of the allocated variants of development).

Optimum are the segments which have the best integrated (complex) estimation on all sets of known estimated criteria [8]: capacity of a segment (annual volume of selling in natural or cost expression); availability of trade channels (opportunity of the enterprise to receive trade channels of production); the tendencies of growth or reduction of a segment, whether they show it is necessary to focus work of the enterprise on the given segment; the level of profit of work in a segment; the sufficiency of resources for work in a segment; a degree of compatibility of a segment with the markets of the basic competitors (in what degree the basic competitors are ready to concede by the elected segment of the market?); chances of success in a competition.

For an estimation of accuracy of a choice of market positions on all sets, it is expedient to apply the following technique [7].

At first determine ranks of the allocated estimated criteria concerning a concrete market situation. For this purpose, expert method will carry out the analysis of criteria on a degree of their importance for an estimation of the market's segments of the concrete subject of economic activity in a concrete market situation, applying in pair's comparison (Tab. 1).

Table 1

Situational analysis of estimated criteria

Criterion	1	2	3	4	5	6	7	Together
1.Capacity of a segment		1	1	0	1	1	1	5
2.Availability of a segment	0		1	0	1	1	0	3
3. Tendency of growth	0	0		0	1	1	0	2
4.Level of profit	1	1	1		1	1	1	6
5.Degree of compatibility with the markets of the competitors	0	0	0	0		1	0	1
6.Chances in a competition	0	0	0	0	0		1	1
7.Presence of resources	0	1	1	0	1	0		3

The system of estimation is following: 0 – the criterion in column has overweight in comparison with criterion in a line; 1 – the criterion in a line has overweight in comparison with criterion in column [5]. The rank of criterion is determined by the sum of units in a line. The large sum answers higher rank.

Then ranks of criteria (sum of numbers) are transfered in weight parameters (in particles of unit) under the following circuit:

– to calculate the sum of numbers of all criterion ($S=\sum R_i$), for conditions of an example it is equaled 21 ($S=21$);

– to calculate the weight characteristics of any of criterion under the formula $(1/S)\cdot R_i$, for criteria in Tab. 1, accordingly, we receive: 0,23; 0,14; 0,10; 0,29; 0,05; 0,05; 0,14.

The designed weight characteristics of criterion are used in the further analysis.

At the second stage an estimation of the allocated target sites of the market (segments or "niches") is carried out [7]. In (Tab. 2) a degree of conformity of the allocated segments or niches of the market to estimated criteria is characterized. In the column with numbers of criteria (or their names) opposite the lines with the appropriate estimation there are marks, which show a degree of conformity of a segment to estimated criterion. The system of putting down of estimations: on crossing of a line with an estimation on a serial scale and a column with numbers of criteria there are numbers of sites of the market, which are analyzed (in the table the estimation by criteria only of two of them) is executed.

A relative estimation K_i of a site (segment or the niches) market on any of criteria is determined by the formula (16).

Table 2

The allocated site of the market degree's of conformity to estimated criteria analysis

Estimation	A serial scale	Criterion						
		1	2	3	4	5	6	7
4	Corresponds completely	2		1				
3	Probably corresponds	1				2		1,2
2	Vaguely		1, 2		1, 2		2	
1	Probably doesn't correspond			2			1	
0	Completely doesn't correspond					1		

$$K_i = \frac{P_i}{P_{\max}} \tag{16}$$

where P_i is the estimation of a site of the market on i criterion; P_{max} is the greatest possible estimation (in this case is 4).

At the third stage carry out an estimation of accuracy allocation of sites of the market on all complex of taken into account estimated criteria (Tab. 3) is carried out.

In a column of the appropriate sites of the market opposite to any of criteria there is an estimation, which is designed as a product of a relative estimation (see Tab. 2) on the weight characteristic of the appropriate criterion.

A final estimation of accuracy allocation of sites of the market carries out on the sum of estimations by all criterias. With the help of the given technique determines an integrated (complex) estimation of accuracy allocation of target sites of the market on all complex of estimated criteria ($0 \le K \le 1$), thus reduce together qualitative and quantitative estimations by separate criteria.

On size of an integrated estimation K it is possible to judge the accuracy (quality) of the process of segmentation (the closer K to 1, the above accuracy). That is about accuracy of allocation of sites of the market (segments or niches) for formation on their basis of the target market for realization of the revealed market opportunities.

Table 3

The complex estimation of sites of the market allocation's accuracy

Criterion	Sites of the market		
	1	2	3
Level of profit	0,145	0,290	0,218
Capacity	0,173	0,173	0,230
Availability	0,070	0,070	0,070
Presence of resources	0,105	0,105	0,035
The tendencies of growth	0,100	0,025	0,025
Chances of success in a competition	0,000	0,000	0,038
Degree of compatibility with the competitors' markets	0,013	0,013	0,025
Total estimation (*Kc*)	0,606	0,676	0,641

III. Definition of accuracy's economically effective level

In view of stated above, estimation of accuracy of work of alternative formation variants of the target market compares their integrated estimations. The advantage is the set of segments, which has higher integrated estimations.

On the other hand, the process of a choice of market positions is considered by the enterprise as multilevel iterative. After each iteration it should be analyzed: whether to repeat work of the process at the following level or to finish it? Each following iteration increases the cost of repeated works, the increase of accuracy of segmentation sharply increases expenses, which can exceed expected benefits from exacter definition of target segments and formation on their base of the target market. Therefore it is necessary to determine that optimum level of accuracy, which excess conducts to increase of general expenses (Fig. 4).

But at the given stage it is difficult to determine expenses of work on generated on the basis of its allocated sites (segments or niches) target market of the enterprise. However, it is quite natural to make the assumptions, that the increase of accuracy of a market position reduces these expenses.

The dependence between the size of the target market formation expenses (formation of a marketing network, system of the goods flow, system of stimulation etc.) on the basis of its allocated target sites (segments or niches) in inverse proportion depends on accuracy of performance of process of a market position. This dependence can be described by the following equation:

$$\frac{dz}{dk} = Z - r \cdot \frac{Z}{K} = Z \cdot \left(1 - \frac{r}{K}\right) \tag{17}$$

where Z is the expense for work in the given target market or its site; K is the parameter of accuracy of a choice (integrated estimation); r is the factor of proportionality.

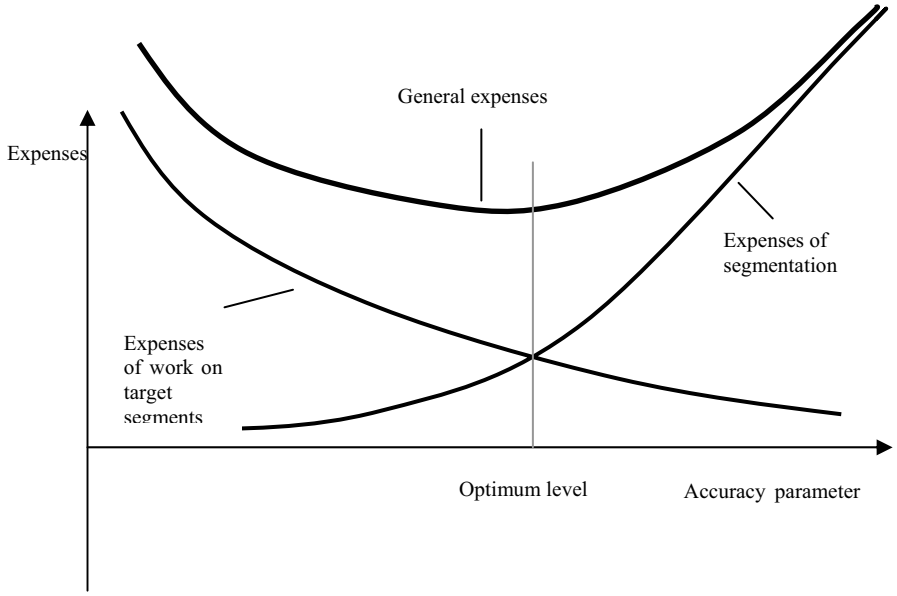

Fig. 4. The optimum level's of market position accuracy definition

The size K is determined according to a technique stated above. As it was marked above, integrated estimation K theoretically accepts meaning from 0 up to 1, however sites of the market (segments or niche of the market), which have an integrated estimation less than 0,5 to consider as target is inexpedient. Thus, K can change in limits (0,5-1).

Factor *r* can be determined in such a way. Let known meanings Zi at known Ki, for example, from the similar works, which have been carried out in the past periods of managing in similar conditions (*i*= 1, 2, 3..., n). Let's copy the equation (17), having transformed it to a kind convenient for the following analysis:

$$\frac{\Delta Z_i}{\Delta K_i} = Z_i - r \cdot \frac{Z_i}{K_i}, \tag{18}$$

Accepting ΔK_i=0,01, after transformations we have received

$$\Delta Z_i = 100 \cdot Z_i \cdot \left(1 - \frac{r}{K_i}\right). \tag{19}$$

For definition of factor r we use a method of the least squares:

$$\sum_{i=1}^{n} \left[\Delta Z_i - 100 \cdot Z_i \cdot \left(1 - \frac{r}{K_i}\right) \right]^2 \rightarrow \min \cdot \tag{20}$$

By differentiation (20) on r we shall receive

$$200 \cdot \sum_{i=1}^{n} \frac{Z_i}{K_i} \cdot \left[\Delta Z_i - 100 \cdot Z_i \cdot \left(1 - \frac{r}{K_i}\right) \right] \rightarrow 0 \cdot \tag{21}$$

Having solved (21) rather r, previously having substituted known Zi and Ki, determine meanings r.

For definition Z we solve the equation (17), previously having transformed it to a kind

$$\frac{dz}{Z} = \left(1 - \frac{r}{K}\right) \cdot dk \ . \tag{22}$$

Decision of this equation:

$\ln|Z| = K - r \cdot \ln|K| + \ln|C|$ or

$$Z = \frac{C \cdot e^K}{K^r}. \tag{23}$$

Marks of the module are lowered, as the sizes Z and K accept only positive meanings.

It is possible to find constant C if to substitute in the equation (23) known meanings Z and K, for example, whether Z_i and K_i or Z_n and K_n, received as a result of the analysis of the processes of segmentation executed in the past periods of managing in similar conditions, and to solve it rather C. For example:

$$C = \frac{Z_i \cdot K_i^r}{e^{K_i}}. \tag{24}$$

Thus received analytical dependences (21) - (24) are suitable for account of size of expenses, sufficient for formation of the target market on the basis of its allocated target sites depending on accuracy (quality) of their allocation (accuracy of a market position).

The size of common expenses on allocation of target sites of the market and formation of the target market on their basis can be calculated in such a way:

$$Zcy = Zc + Z. \tag{25}$$

The optimum level of accuracy is set by a condition

$$Zcy \rightarrow min. \tag{26}$$

For practical accounts for definition of an optimum level of accuracy of process of a choice of market positions formation of the target market on the basis of target segments or niches of the market for realization variants of the enterprise's market opportunities development, thus the process is considered as multilevel iterative, the following algorithm is offered.

1. Allocation of target sites (segments or niches) market on a known technique of the author [7].
2. Definition of an integrated estimation K of accuracy of the process of allocation anyone, from all of their sets, target sites of the market (degree of conformity of the allocated segments to estimated criteria).
3. Account of the actually suffered expenses on realization of works on a market position that is search of target sites of the market.
4. Account forecast of size of expenses on realization of works on the allocated sites of the market (23).
5. Account of common size of expenses on formation of the target market and work on it (25).
6. Definition of expediency performance of the following iteration for exacter allocation of a set of target sites of the market. In turn, includes the following stages.
   6.1. Forecast estimation of expenses on realization of works, which are necessary repeatedly for executing (after entering respective alterations), as products of the actually suffered expenses on performance of these works on size of correction factor A (15), which size is specified in process of accumulation of the data.
   6.2. Forecasting of meaning of an integrated parameter of accuracy of a market position expected after probable following iteration.

For reception of dependence of a probable gain of an integrated parameter K from quantity of iterations it is necessary to carry out special researches or to accept them at a level of similar works on the segmentation which has been carried out in the past periods of managing in similar conditions. In forecasting accounts, it is possible to expect the meaning of an integrated parameter K.

$$K_{i+1} = K_i \cdot \left(1+\frac{1}{10 \cdot i^2}\right), \tag{27}$$

where Ki is the meaning of an integrated parameter determined after previous i iteration.

If designed $K_{i+1} > 1$, accept $K_{i+1} = 1$.

   6.3. On the basis forecasting meaning of a parameter of accuracy (Ki+1) the size of expenses on work on the allocated sites of the market (Zi+1) is expected under the formula (23).
   6.4. The size of total expenses is expected under the formula (25) – $Ztotal_{i+1}$ and compared with actually designed $Ztotal_i$. If $Ztotal_{i+1} < Ztotal_i$, it is expected to carry out the following iteration, if $Ztotal_{i+1} \geq Ztotal_i$ (completion criterion), the process of allocation of target sites of the market is finished.

The given approach and appropriate methodical device permit to find an optimum parity between a level of accuracy of search of target sites of the market by a method of segmentation, which is considered as multilevel iterative process, and also expenses for process of formation of the target market on the basis of its allocated target sites (formation of a marketing network and systems of a flow of the goods, system engineering stimulation etc.). And it, in turn, enables to allocate the target markets or their sites for development of market opportunities of the concrete

enterprises in concrete conditions of managing, spending on it there are a lot of means, how many it is necessary, not supposing their over expenditures, that is to say to operate processes of search by the enterprises of their place in the market for realization of their potential in existing external conditions in view of prospects of their development.

Not aspiring on the settling depth of the analysis, it is necessary to note that the stated above approaches applied in a complex permit to solve a problem of definition of a necessary and sufficient level accumulation of the information for management of the enterprisess' market opportunities development at a stage of formation of the target market for their realization. They can be accepted as a basis at performance of similar development for other stages of this process.

The further developments should be directed to development of formal procedures of definition of a necessary and sufficient level accumulation of the information (on volumes and kinds) for a substantiation of a choice of directions of development of the enterprises' market opportunities.

References

1. Голубков Е.П. и др. Маркетинг: выбор лучшего решения. - М.: Экономика, 1993. - 222 с.
2. Базелл Р., Кокс Д., Браун Р. Информация и риск в маркетинге: Пер. с англ. - М.: Финстатинформ, 1993. - 240 с.
3. В помощь преподавателю. Основы экономической теории. Тема 11. Экономика информации неопределенности и риска / Учебно-методическое пособие под ред. Р.Нуреева // Вопросы экономики. - 1996. - № 4. - С.126-169.
4. Пиндайк Р., Рубинфельд Д. Микроэкономика: Пер.с англ. - М.: Экономика, Дело, 1992. - 510 с.
5. Джонс Дж.К. Методы проектирования: Пер.с англ. - М.: Мир, 1986. - 326 с.
6. Ильяшенко С.Н. Информационное обеспечение стадий процесса сегментации рынков сбыта промышленных предприятий // Информатика-Машиностроение. - 1996. - №4.- С.6-9.
7. Ілляшенко С.М. Управління інноваційним розвитком: проблеми, концепції, методи: Навчальний посібник. - Суми: ВТД "Університетська книга", 2003. - 278 с.
8. Современный маркетинг / В.Е.Хруцкий, И.В.Корнеева, Е.Э.Автухова / Под.ред.В.Е.Хруцкого. -М. Финансы и статистика., 1991.- 256 с.