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ALGORYTHM OF MARKETING DECISION MAKING

АЛГОРИТМ ПРИЙНЯТТЯ МАРКЕТИНГОВИХ РІШЕНЬ

The contemporary stage of the marketing evolution assumes the process of the marketing decision making under the conditions of great uncertainty. It requires the very rapid marketing decision making and its automation. The algorithmisation of the marketing decision making has to proceed its automation. Statement of the aim was to improve the technique of marketing decision making for startup project development by formalizing it as an algorithm. The methods of the system analysis, the analyses of the marketing environment, SWOT analysis, analysis and synthesis, the methods of the analogies are used in the article. The algorithm was developed on the basis of the processes how the human brain works, particularly a logical process and an emotional process of the big data processing. It made it possible to explain and improve the process of conducting the situation analysis, the SWOT analysis that was represented as the set of the mechanical actions. The algorithm can be used for the program coding in the future that will make it possible to release some intelligent resources of the marketing activity.

Keywords: *marketing decision making technique, startup project, situation analysis, SWOT, algorithm of decision making, marketing evolution.*

Маркетинг як концепція управління підприємством пройшов чотири стадії свого розвитку. З одного боку, сучасний етап його еволюції, Маркетинг 4.0, передбачає процес прийняття маркетингових рішень в умовах високої невизначеності. З іншого боку, цей етап вимагає від маркетологів спроможності розробляти, запускати та управляти стартап-проектами у промислових масштабах, що означає їх велику кількість. Такі умови потребують швидкого прийняття маркетингових рішень, їх автоматизації, що узгоджується з принципами концепції Індустрії 4.0. Однак процесам автоматизації процесів прийняття маркетингових рішень мають передувати процеси їх алгоритмізації. Однак основні методики управління маркетинговою діяльністю пов'язані з високоінтелектуальною діяльністю маркетолога, для якої характерна нечітка логіка, гнучкість. Це визначає головну причину відсутності докладного алгоритму дій маркетолога при прийнятті маркетингових рішень, зокрема в частині проведення SWOT-аналізу. У статті запропоновано алгоритм процесу прийняття маркетингових рішень, в основу якого покладено принципи роботу мозку людини, зокрема логічний і емоційний процеси оброблення великої кількості інформації. Це дало змогу пояснити та удосконалити процес проведення ситуаційного аналізу факторів маркетингового середовища, зокрема в частині проведення конкурентного аналізу, а також SWOT-аналізу, який був представлений у вигляді переліку механічних дій. Такий алгоритм у подальшому може бути переведений у програмний код, що дасть змогу вивільнити інтелектуальний ресурс маркетингової діяльності для вирішення більш стратегічних завдань. З іншого боку, запропоновані удосконалення процесу прийняття маркетингових рішень також управляють роботою мозку маркетолога, дають змогу сконцентруватися на розробці відповідних маркетингових рішень, що особливо важливо в умовах великих обсягів хаотичної інформації, що має бути проаналізовано маркетологом. Це дає змогу розробляти більш ефективні маркетингові рішення в умовах невизначеності.

Ключові слова: *техніка прийняття маркетингових рішень, стартап-проект, ситуаційний аналіз, SWOT-аналіз, алгоритм прийняття рішень, еволюція маркетингу.*

Formulation of the problem in general. Marketing, been the concept of the enterprise governance, has already evolved through four stages of its development. There are many different classification and approaches to the criteria of this [1]. One of them is the classification on the basis of changes of economic relations. According to this approach to the marketing development, every its development stage can be determined in accordance with the stage of the global economic development that also corresponds with the global technological changes [2; 3]. So the first stage of the marketing development (Marketing 1.0) appeared under the economic conditions of the Industry 2.0 when technologies started to scale themselves en masse and marketing turned into an effective tool of governance of different emerging markets. On this stage marketing tools were concentrated on development of every parts of the marketing mix in accordance with just the company economic interests predominantly [4]. Later when supply started to exceed demand and competition rose, marketing researches began to develop. But conducting marketing researches always assumed involving a human (a marketer) in this process.

The second marketing development stage (Marketing 2.0) emerged under the conditions of the Industry 3.0 when technologies began to "learn" how to communicate with a human. It was a period when the global econ-

omy faced with different features of the information society, the appearance of new economic subjects like makers of information content, content providers (for example, different social media), new communication channels and new communication tools. And enterprises needed a new approach to economic relationship management by new tools of marketing – Marketing 2.0. Data rising needed new automated technologies for marketers to simplify marketing research conducting. Information and communication technologies (ICT) helped this process as on the step of gathering Big Data of information as on the step of working with it, for example, when different mathematical and statistical methods were used. Although on the global level different AI-technologies already learnt to predict the future results accurately enough on the basis of Big Data analysis by super computers [5]. But on the micro level of the particular company the process of the marketing data analysis was still conducted just by a human (a marketer of the company).

When companies faced with the first nontypical global economy crisis in 2008, the next stage of the marketing evolution started – Marketing 3.0. The main features of Marketing 3.0 assumed the implementation of new tools of creating and managing startup-projects. It has to be highlighted that this period corresponded simultaneously with the beginning of the Industry 4.0. It means that technologies have started to learn how to communicate with each other and a human role in this process can disappear. This worldwide trend will have to reflect on the process of marketing decision making too. But in contrast to algorithms marketing of startup-projects has started to approximate to much more fuzzy way for making marketing decisions. For example, marketing activity of the startup project assumes non linear way when all steps may be conducted simultaneously [6; 7] that can be explained by the blow-up regimes when all the processes start to accelerate according to the exponential law [8].

The contemporary stage of marketing development Marketing 4.0 has started when the global economy fell into the pandemic. Marketing 4.0 is a new concept that assumes marketing decisions making under the conditions of great uncertainty. This uncertainty brings many innovative global risks additionally and including technological features of Industry 4.0 marketers will have to face with. One of them assumes developing and launching startup projects in industrial scales by companies [9]. This means that a number of necessary management decisions will be increasing and it needs a method to make it possible to be automated.

Analysis of recent studies and publications. There are many scientists who develop the theory of the marketing decision making. Among them there are R. Stewart, O. Benepe, A. Mitchell, P. Kotler, K. Keller, D. Jobber, E. Learned, C. Christensen, K. Andrews, H. Mintzberg, K. Andrews, P. Selznick, A. Chandler, W. Guth, E. Gurl, A. Starostina, S. Solntsev, O. Zozul'ov and many others. All of them proposed authors' technique to make marketing decisions. But in contrast to the worldwide trend of all processes automation the contemporary common methodology of marketing decision making has not been automated enough yet. This methodology was developed under the conditions of the industrial society and the Industry 2.0. It based on the structured methods which assumed the complex of tables for analysis of the marketing environment

and SWOT [10]. All these tables were associated with deep human intelligence just and very flexible and fuzzy logical thinking that assumed all marketing decisions had to be made by humans [11]. These meant that this process associated with much time although it was structured enough and the table way of making management decisions tries to minimize the human factor. But the conditions of the Industry 4.0 require this methodology of marketing decision making to be improved.

The way for decision making by tables corresponds with an initial attempt to turn marketing researches on some stringent algorithm which would be used in the program coding that associates with principles of the Industry 4.0. Such kind of the program code can help marketing decision making to save time, be more effective and qualitative if such decisions are prepared by a robot. But we have to define and improve the parts of the marketing decision making process and formalize it as an algorithm which can be transferred to the program codes in the recent future.

Formulating the purposes of the article. Statement of the aim is to improve the technique of making marketing decisions for startup project development by formalizing it as an algorithm.

Methodology. The methods of the system analysis, the analyses of the marketing environment, SWOT, analysis and synthesis, the methods of the analogies are used in the article.

Presentation of the main research material. The process of the marketing decisions making for the startup project development is shown on Figure 1.

On the Step 1 (see Figure 1) the marketer has to compare the marketing goals with the results which the company has received by its marketing activity. This step helps to identify symptoms of a marketing management problem or a marketing management opportunity. If the goal figures are bigger than the result figures, this fact shows symptoms of some marketing management problem. The opposite fact shows symptoms of some marketing management opportunity.

The core of the marketing management problem (or the opportunity) has to be defined by the situation analysis of a marketing environment (Step 2 on Figure 1) and the SWOT-analysis (Step 3 on Figure 1). The situation analysis of a marketing environment consists of the deep analysis of possible impacts of all factors of the internal environment (the analysis of all strategies of the company and its resources) and the external environment (its macro-marketing environment and micro-marketing environment).

On the Step 3 (see Figure 1) the marketer builds the SWOT-table. It helps to define the hypothesis of the marketing management problem or the marketing management opportunity. In accordance with principles of the Industry 4.0 that assumes replacing a human intelligence activity by artificial intelligence (AI), the methodology of marketing decision making on the basis of the situation analysis and the SWOT-analysis has to correspond with the way how a human brain works. There are a logical way and an emotional way how a human brain operates with information. But the boarder between them is not clear enough [12; 13]. The main difference between the logical way and the emotional way assumes that under the conditions of the logical way of data processing, the left hemisphere of the human brain follows the induction principle (at first there is an analysis of information, than a synthesis of the
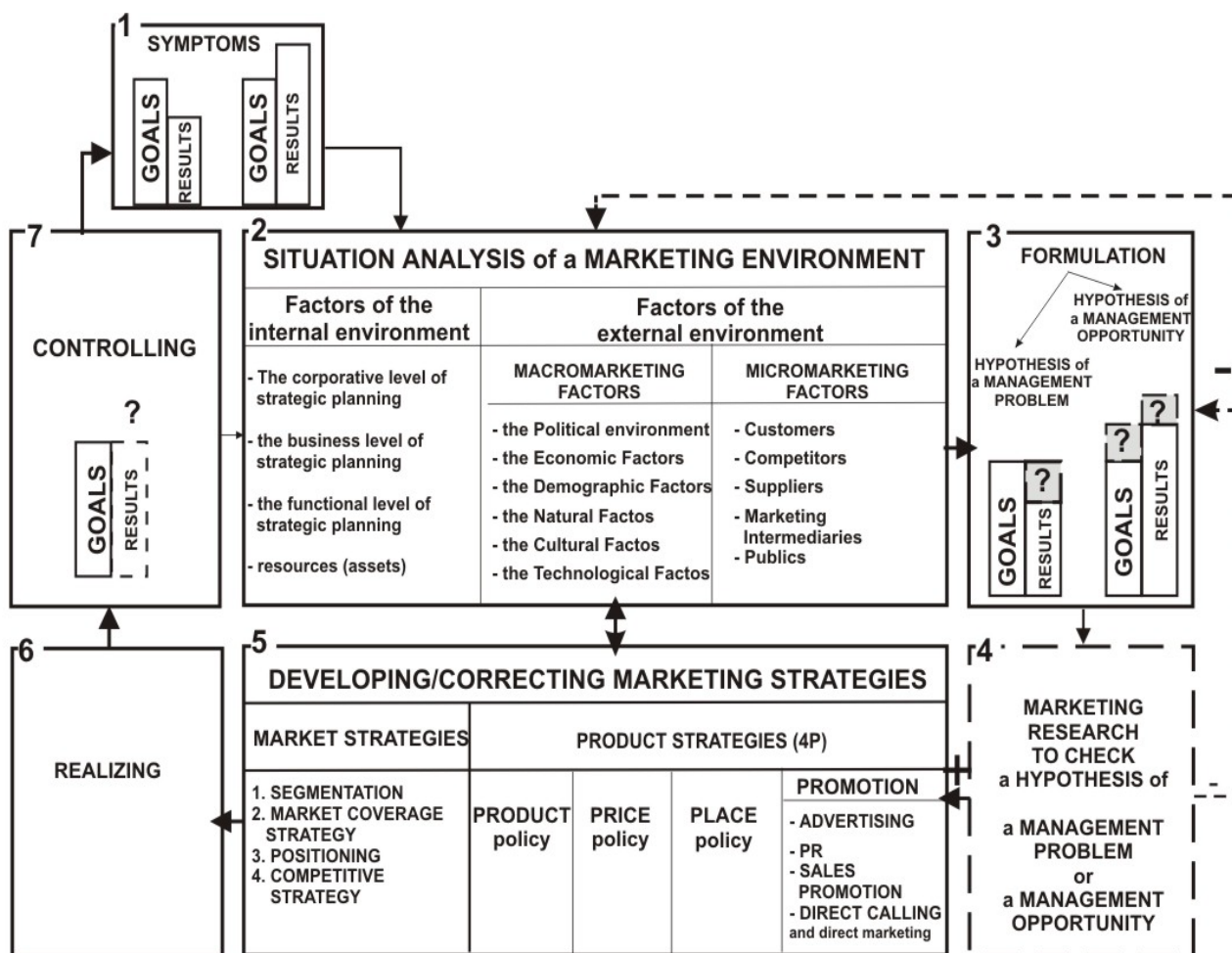
Figure 1. The process of the marketing decisions making

conclusions starts). In contrast, the emotional way of date processing assumes that the right hemisphere of the human brain follows the deduction principle (the synthesis is the first, the analysis follows then). So, the situation analysis uses the logical way of date processing (the induction), and the SWOT-analysis is based on the similar principle as the emotional way of data processing uses the deduction.

The situation analysis separates the marketing environment by factors and estimates the possible impact by each of these factors without any other estimation of the market situation in general and then develops the company possible feedback to every factor. The Table 1 shows the example of this structure exemplified on the basis of the Ukrainian startup-project of the launch of the water filters (This startup-project was launched by the innovative idea of its Ukrainian developers to purify water from its pollution differently on the basis of deep analysis of the structure of water pollution and making the most appropriate filter cartridge).

The same factor may cause some threat and some opportunity simultaneously. But we have to separate every such impact to make it possible to use them as the program algorithm.

The figures in the Table 1 are used to show how the particular information has to be implemented in the algorithm in the SWOT-analysis. This technique is very easy to formalize as a program algorithm for the analysis of the macro-marketing environment by a robot. The marketer needs to past just current marketing information into empty parts. This step needs the marketer to think over every part of such kind of information but the algorithm can simplify this process following this structure and this logicality. Such kind of stringent actions rules the marketer's brain to work more effective. It is very important under the conditions of the information society where Big Data can confuse thinking. It has to be also highlighted, if the same factor causes a threat and an opportunity simultaneously, the marketer has to put this factor twice in the table. It makes it possible for the proposed algorithm to use this information accurately in the SWOT-table on the Step 3 (Figure 1).

The similar principle can be used for the analysis of the micro-marketing environment (Table 2).

On the one hand the template of it has to be similar to the Table 1. But on the other hand the situation analysis of the micro-marketing environment has some steps which are not structured enough to be used as the program code. For example, the competitive analysis, been used as its part defines the strength and weaknesses of the company compared with its competitors (Table 3). According to the traditional SWOT-analysis [14], the marketer has to understand the internal environment analysis under the weaknesses and strengths of the SWOT analysis. But we also use such kind information on the basis of the exter-

Table 1

The template for the situation analysis of the macro-marketing environment
(with the example of its completing)

The factors	The factor impact to the company		Company feedback
	Threats	Opportunities	
Economic environment …			
Political environment …			
Natural environment 1. The water pollution structure in Kyiv depends on an urban district of Kyiv 1.		It is possible for the company to purify water in different ways on the basis of an urban district of Kyiv. There is an opportunity to launch a household water filter production made by the Ukrainian maker. 2.	1. To develop water filters that have cartridges with different compositions that are the most relevant to the water pollution. 2. To segment the Kyivers on the basis of the geographical criteria. 3. To conduct marketing research of the consumers demand and motivations to buy filters. 4. To investigate the water pollution structure in different regions of Ukraine to scale. 3.
2. The water pollution structure in Kyiv depends on an urban district of Kyiv 6.	Customers may not realize their needs of the different water purifying 4.		1. To conduct marketing research of consumers motivations to buy a water filter. 2. To launch an advertising educational and information campaign that explains the water pollution features in Ukraine. 5.
Demographic environment …			
Cultural environment …			
Technological environment …			

Table 2

The template for the situation analysis of the analysis of the micro-marketing environment.

The factors	The factor impact to the company		Company feedback
	threats	opportunities	
Consumers 1. 1.		2.	3.
2. 6.	4.		
Competitors …			
Suppliers …			
Mediators …			
Publics …			

nal environment analysis too (micro-marketing factors) to define weaknesses and strengths of the company compared with its competitors.

The competitive analysis makes it possible for the marketer to define the weaknesses and the strengths of the company compared with competitors of the company. On this step we propose to develop also the company feedback to its weaknesses and strengths (Table 4). This way simplifies the synthesis process for the SWOT-analysis (Step 3 on Figure 1). hand the proposed improvements of the marketing decision making help to manage the marketer's brain processing, makes it possible for the

marketer to concentrate attention on the marketing decision making. This is very important, especially under the conditions of the Big Data of chaotic information for data processing that makes the marketing decisions to be more effective.

In accordance with this logical way, the similar template has to be used for the analysis of the internal environment of the company (Table 5).

According to the proposed algorithm, on the Step 3 (Figure 1) the synthesis of information has to be represented. This process has to be automated without any human intelligence activity.

Table 3

The template for the competitive analysis

№ п/п	The competitive criteria	A rate of the competitors compared with the company						
		−3	−2	−1	0	+1	+2	+3
1	A range of product		☺	❄			💣	
2	A level of the filter adaptation to water pollution geography		💣	☺				
3	A filter cartridge capacity		💣	☺				
4	Price	💣						❄
5	Open availability of cartridges		☺	❄				
6	Delivery system			☺			❄	💣
7	A market share of the company		☺			❄		💣
….	…							
….	…							
….	…							

☺ – …… (*the competitor #1*)
💣 – …… (*the competitor #2*)
❄ – …… (*the competitor #3*)

Table 4

The template of the analysis of weaknesses and strengths of the company

Company weaknesses (compared with its competitors):	Company feedback to its weaknesses	Company strengths (compared with its competitors):	Company feedback to its strengths
1. Delivery system 7.	To develop the delivery system of the company 8.	1. A range of product 9.	To launch different advertising messages in accordance with features of the range of the water filters of the company 10.
2. A market share 7.	Try to expand the market share by launching the advertising campaign 8.	2. A level of the filter adaptation to water pollution 9.	– To conduct advertising campaign that educates people of the difference of a new filter and features of water pollution – To collaborate with different chains and support them with different information materials, to conduct training that inform the features of the water pollution and a new filter. 10.
…. 7.	…. 8.	– A cartridge capacity 9.	To inform consumers about relation between the cartridge capacity and the price of the water filter 10.

Table 5

The template of the analysis of internal marketing environment of the company

Company weaknesses (compared with its competitors):	Company feedback to its weaknesses	Company strengths (compared with its competitors):	Company feedback to its strengths
7.	8.	9.	10.
…	…	…	…

The algorithm helps to match and transfer the special parts of information that has been generated by a marketer on the Step 3 (Tables 1, 2, 4, 5), into the relevant cells of the SWOT-table as it is shown by figures in Table 6. This process can be automated that can help to save time, intelligence and finance resources.

In the Table 6 we can see the set of chaotic information. But it has the plan of possible marketing actions. Also the marketer can notice that some actions are repeated and can be crossed it out. On the basis of these lists of possible marketing actions the marketer is able to define hypothesis of marketing management problem (or a marketing management opportunity).

This hypothesis may be checked on the Step 4 by the special marketing research conducting or may not. It depends on different rapid changes of the contemporary marketing environment that can change before the marketer receives results of marketing researches and the marketer will have to return to the Step 2 for the situation analysis conducting again. But it is expensive for time and

Table 6

The algorithm of the SWOT-analysis

	STRENGTH 9. – A range of product – A level of adoption to pollution – A cartridge capacity – …..	WEAKNESSES 7. – Delivery system – A market share – …
OPPORTUNITIES 1. 1. The water pollution structure in Kyiv depends on an urban district …..	3, 10 1. To conduct marketing research of consumers motivations. 2. To launch an advertising educational and information campaign explaining the water pollution features in Ukraine 3. To launch different advertising messages in accordance with features of the range of the water filters of the company 4. To conduct advertising campaign that educates people of the difference of a new filter and features of water pollution 5. To collaborate with different chains and support them with different information materials, to conduct training that inform the features of the water pollution and a new filter. 6. To inform consumers about relation between the cartridge capacity and the price of the water filter	3, 8 1. To conduct marketing research of consumers motivations. 2. To launch an advertising educational and information campaign explaining the water pollution features in Ukraine 3. To develop the delivery system of the company 4. Try to expand the market share by launching the advertising campaign
THREATS 6. 1. The water pollution structure in Kyiv depends on an urban district …..	5, 10 1. To develop water filters that have cartridges with different compositions that are the most relevant to the water pollution. 2. To segment the Kyivers on the basis of the geography criteria. 3. To conduct marketing research of the consumers demand and motivations to buy filters. 4. To investigate the water pollution structure in different regions of Ukraine to scale 5. To develop water filters that have cartridges with different compositions which are the most relevant to the water pollution. 6. To segment the Kyivers on the basis of the geography criteria. 7. To conduct marketing research of the consumers demand and motivations to buy filters. 8. To investigate the water pollution structure in different regions of Ukraine 9. To launch different advertising messages in accordance with features of the range of the water filters of the company 10. To conduct advertising campaign that educates people of the difference of a new filter and features of water pollution 11. To collaborate with different chains and support them with different information materials, to conduct training that inform the features of the water pollution and a new filter. 12. To inform consumers about relation between the cartridge capacity and the price of the water filter	5, 8 1. To develop water filters that have cartridges with different compositions that are the most relevant to the water pollution. 2. To segment the Kyivers on the basis of the geography criteria. 3. To conduct marketing research of the consumers demand and motivations to buy filters. 4. To investigate the water pollution structure in different regions of Ukraine to scale 5. To develop the delivery system of the company 6. Try to expand the market share by launching the advertising campaign

resources of the company. And now in many cases on practice, particular for quick launches of startup-projects, this step disappears and marketing decisions are made on the basis of the situation analysis results just. That is why the situation analysis and the SWOT analysis are in charge for the effective marketing decision making, they have to be easy for understanding, rapid for conducting and perfect enough simultaneously.

On the Step 5 (see Figure 1) the marketer develops or corrects marketing strategies on the basis of the conclusions been made on the Step 3. On the Step 6 these strategies are implemented in the economic activity of the company and on the Step 7 the results have to defined and compare with the previous plans. The Step 7 is similar to the Step 1 which defines new symptoms of the marketing management problem (or opportunity).

This algorithm has to be closed and cycled. It makes it possible for marketing researches to be conducted perma-

nently So, marketing researches have not to define just the static 'slice' of the marketing environment but they have to become the dynamical marketing researches. The permanent conduction of the marketing researches helps to define the dynamics of marketing changes named the conjuncture. So it makes it possible for the results of the marketing researches to be implemented effectively in time and correspond with the traditional structure and the order and the classical logicality of the marketing activity (the Step 4 on Figure 1).

Conclusions. Under the conditions of great uncertainty marketers have to be able to develop, launch and manage a big number of different startup-projects. These processes need an understandable algorithm of the marketing decision making. The common techniques are used a fuzzy logics and a flexible intelligent brain activity of the marketer. It made it possible to use the principles of the human brain data processing for the development of the algorithm of the marketing decision making.

The algorithm of the marketing decision making improved and detailed the situation analysis and the SWOT analysis. In many cases, particular for quick launches of startup-projects, the step of marketing research conducting may disappear and marketing decisions are made on the basis of the situation analysis results only. That is why the situation analysis and the SWOT analysis are in charge for the effective marketing decision making, they have to be easy for understanding, rapid for conducting and perfect enough simultaneously.

The algorithm of the marketing decision making implementation into the marketing activity of the company can make it possible for the marketing activity of the startup-projects to approach to the effective traditional marketing activity, the effective marketing decision making and to the marketing research conducting permanently. The marketing researches have to turn into the dynamical marketing researches that can help to define the marketing conjuncture. Understanding the order of the marketing conjuncture makes it possible to forecast the future that is the highest destiny of science.

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