

Strategy and Tactics of International Digitalization and Intellectualization of Economic Relations

Nestor Shpak^a, Kateryna Doroshkevych^a, Yuriy Shpak^a, Ihor Salata^b and Marharyta Sharko^c

^a Lviv Politechnik National University, St. Bandery str, 12, Lviv, Ukraine, 79013

^b Hetman Petro Sahaidachnyi National Army Academy, 32 Heroes of Maidan street, Lviv, Ukraine, 79026

^c Kherson National Technical University, Beryslavske sh., 24, Kherson, 73008

Abstract

The article studies the strategy and tactics and examines the relationship between concepts based on such properties as priority, time period of action, essential affiliation, etc. Given the nature of the established relationships, a number of tactical approaches can be formed and implemented within the chosen strategy. In order to select them, the elements of the suffix tree method are used in the following order: definition of attributes (features) of the selected strategy and formation on their basis of the array T; detection of suffixes (T[i..n]) of an array of data of length n, the essence of which determines the strategy, namely the array T; construction of a suffix tree; selection of tactical approaches, moving from the root of the suffix tree to any of its letters ending in \$. The practical implementation of the formed method made it possible to identify tactical approaches to digitalization of the economy.

Keywords 1

strategy, tactics, tactical approaches, digitalization, intellectualization, suffix tree

1. Introduction

In modern economic conditions, characterized by dynamic changes in the external environment of the impact on enterprises and its complexity due to the processes of globalization and internationalization of the world economy, the development of science, technology, information technology, there is an intensification of information flows and processes as well as the growing importance of information support of the company and the economic system in general. At the same time, strategic activity planning, which involves the formation of business strategy and a number of tactical approaches, has a significant impact on the performance of the enterprise (types of economic activity, national economy) and its efficiency, as it provides goal-oriented and coordinating activities, focusing on solving major problems in current and future activities.

In these conditions, significant importance is attached to the strategic aspects of digitalization and informatization, technical support of communication processes, generating decisions on volume, location and forms of existence of information etc. At the same time, tactical approaches to the implementation of the strategy and the process of their formation remain insufficiently studied. This reduces the effectiveness of strategic planning and the effectiveness of the economic system and its development in the long run.

2. Related Works

The concept of strategy and tactics of enterprises have been studied in the works of such economists as Minzberg H., Quinn J. B., Ghoshal S., Kuzmin O. Ye., Folomkina I. S., Usachova I. D.

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EMAIL: nestor.o.shpak@lpnu.ua (N. Shpak); kateryna.o.doroshkevych@lpnu.ua (K. Doroshkevych); yurii.n.shpak@lpnu.ua (Y. Shpak); igor.zen@ukr.net (I. Salata); mvsharko@gmail.com (M. Sharko).

ORCID: 0000-0003-0620-2458 (N. Shpak); 0000-0003-3966-224X (K. Doroshkevych); 0000-0002-3895-4139 (Y. Shpak); 0000-0002-0214-2710 (I. Salata); 0000-0003-2321-459x (M. Sharko).



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& Dunska A. R., Tymofeyev V. M., Mardus N. Yu., Ruban V. M., Saviczka N. V., Kolomiyecz O. L., Goloven O. V., Klopov I. O., Goryelov D. O., Bolshenko S. F., Levchenko M. O., Kalnyczka M. A., Gangur O. Yu., etc. [1-11]. Thus, Usachova I. D. and Dunska A. R., studying the processes of foreign economic activity planning, they rely on the fact that "tactics are the setting of tactical short-term goals and the development of short-term plans, which determine the set of practical methods needed to achieve the goals" [2]. At the same time, the essence of the strategy is not specified by the authors, but the process of its formation is considered as a multidimensional concept.

Tymofeyev V. M. and Mardus N. Yu. cite a number of differences between the concept of strategy and tactics, which can be summarized in the statement that strategy has a systemic nature, which is manifested in action at intersystem levels, and tactics – situational nature of the action in the middle of each individual element of the system [3]. The authors also point out the different time periods for which the strategy and tactics of the enterprise are developed. The strategy is aimed at periods of more than a year, and tactics are formed in order to achieve a specific goal and benefit in the short term [3].

Ruban V. M. points out that tactics are specific short-term strategies [4]. Thus, the author identifies the essential meaning of the concept of strategy and tactics and distinguishes them only depending on the time factor. The authors Saviczka N. V. and Kolomiyecz O. L. similarly explain the difference between the strategy and tactics of the enterprise, noting that the tactics cover short-term goals of the enterprise and ways to achieve them. However, the authors also point out that in the process of tactical management is the implementation of tactical goals of the enterprise, which should be formed in such a way that in the process of achieving them to ensure the implementation of the chosen strategy of the enterprise [5].

The time factor is also decisive in the work of Sorvina O. V. Taking into account the time period of management decisions for which they are developed, and the speed of achieving the target values of the established benchmarks in the activity, the author identifies strategic and tactical management of production costs of the enterprise.

Tactical solutions allow: to implement short-term plans; to achieve short-term goals in the field of production cost management of the enterprise [12].

The concept of tactical management is also developed in the work of Goloven O. V. and Klopov I. O., who see the relationship between strategy and tactics of the enterprise in the following. Within the strategy of enterprise development, management tactics are formed, which provides for the solution of certain medium-term problems, which is necessary to achieve the strategic goals of the enterprise [6]. According to Rassadnykova S. I. tactics are "short-term and adaptive actions to achieve long-term strategic goals". According to the author's definition, the tactics of greening investment activities are a set of short-term and adaptive means of influencing the progress of greening processes in order to implement the strategy at the appropriate stages [13]. Korotaeva E. considers tactics as the closest interactions between subjects of pedagogical process, and strategy, as a perspective for the development of a position by subjects of the pedagogical process [14]. According to Solov'ev V. I., the strategy includes decisions on the choice of business model by the firm, and decisions on activities within the chosen business model are considered tactical [15]. Therefore, it is obvious that tactical approaches are aimed at achieving short-term goals of the enterprise.

Competition tactics (competitive actions of the enterprise) means a set of competitive actions used by market participants for a limited period of time when interacting with specific rivals to solve a certain range of internally related tasks for the use of competitive potential and achieve the desired competitive results. Rubin Yu. B. consider the tactics of competitive action as one of the components of the tactics of enterprise management. At the same time, other components are: investment tactics, tactics of accounting and use of profit, production tactics, innovation tactics, personnel development tactics, production and sales tactics [16].

According to Goryelov D. O. and Bolshenko S. F., the main components of planning and implementation of enterprise strategy are tactics, policies, procedures and rules [7]. The authors see the essence of tactics in the process of developing short-term plans that are consistent with the company's strategy. In our opinion, tactics should not be considered a process as a set of actions that lead to the desired result, because in the process of planning the activities of the enterprise should also ensure the formation and selection of administrative levers. Regarding the components of the management process, Zhirkina N. I. emphasizes the importance of defining the strategy and tactics of

the bank's development in order to determine its ability to lend to customers and develop the bank's business activity in the market [17].

Gradov A. P. carried out strategic, tactical and sub-tactical classification of tasks for the formation of competitive advantages of enterprises, which did not provide for the existence of policies, rules and procedures in the system of administrative levers of the enterprise. According to the author, such an in-depth classification of the nature of the components and sources of competitive advantage allows you to develop many necessary actions that can be combined into a targeted comprehensive program of competitive advantage [18].

At the tactical level, the knowledge management process includes the following stages: gathering information based on methods of effective information retrieval; use of information that contributes to the creation of an environment in which a creative approach to work is supported, generation of new ideas, etc.; staff training, which includes the organization and implementation of training in the management process; dissemination of knowledge, which is to involve employees in the dissemination of their knowledge and transfer them to the general knowledge fund of the enterprise [19].

We think that the opinion of Levchenko M. O. is valid that for the implementation of the strategic course of management at the enterprise should develop tactics [8]. Kalnytska M. A. and Gangur O. Yu. consider the management strategy as areas of enterprise development to achieve the mission of its operation, and tactics - as ways and stages of movement within this area (strategy) [9].

Strategic links are defined in the development of a system of stochastic models of enterprise management based on artificial intelligence in work of Kwilinski A. and Kuzior A. [20]. At the same time, strategy and tactics are integral components of enterprise planning processes. As noted by Gorban S. I., the motive for the implementation of agreements on mergers / acquisitions of enterprises becomes the basis for the formation of market behavior of the organization. The entity may change this motive in accordance with the adopted strategy and tactics of the organization, but in this case it may not meet the scope of the agreement and lose his job [22].

Most authors also argue that strategic planning is the responsibility of senior managers of the enterprise, and the development of tactics is the prerogative of middle and lower managers [2, 9, 10]. The same opinion was expressed by H. Mitzberg, who pointed out that some actions from the standpoint of senior management of the company can be considered as a tactic, while for the head of marketing they will be considered a strategy, because their success depends on the success of his department [11].

The most careful description of the common features and differences of strategy and tactics was made by I. S. Folomkina, considering the essence of tactics, its features and relationship with strategy. According to the author, there are a number of significant differences between strategy and tactics: tactics contain actions of implementation the company's strategy, which indicates its organizational nature; components of tactics are practical methods and techniques of management, which indicate, that the tactics are aimed at using resources to achieve strategic goals; tactical decisions are detailed and the strategy is conceptual in its nature [10].

Thus, despite the need for effective implementation of the developed strategy, the tactics of enterprises remain insufficiently studied. In particular, the relationship between strategy and tactics of enterprises needs to be further studied, which will ensure the choice of tactics embodied in the methods of strategy implementation (practical actions, management methods, etc.).

The tactics of the enterprise are a logical continuation of its strategy. It is developed for short periods of up to a year in order to implement the strategy. Thus, tactics are a means of implementing a strategy that uses management methods, various ways of managerial influence, which ensure the implementation of strategic goals based on the use of enterprise resources, knowledge, skills, information etc. Within the chosen strategy it is possible to form and implement a number of tactical approaches, the choice of which is entrusted to managers of all levels of management. At the same time, in the process of implementing tactics through feedback channels, the strategy may be refined. The relationship between strategy and tactics is summarized in Table 1.

In order to choose tactics based on the formed strategy, we recommend using the elements of the suffix tree method. Suffix tree is a method of saving an array of data in the form of a tree, which allows you to search for the necessary messages (information) that are part of the array [23, 24].

Table 1

Correlation between the concept of "strategy" and "tactics"

Properties	Properties of the strategy	Properties of tactics
Priority	Is paramount	It is a logical continuation of the strategy
Time period of action	Developed for long-term periods of more than 1 year	Developed for periods of up to 1 year
Complexity (partialness)	It is a comprehensive plan for long-term development	It is a means of implementing the strategy

Using elements of the suffix tree method in order to select tactical approaches, it is necessary to identify significant components of the strategy (for example, attributes T_1, \dots, T_6).

3. Methods

Using elements of the suffix tree method in order to select tactical approaches, it is necessary to identify significant components of the strategy (for example, attributes T_1, \dots, T_6). We will conditionally consider them as suffixes, which will be the basis of the strategy suffix tree. The total number of attributes is taken as an array of data of length n ($n = 6$), the essence of which determines the strategy (T). Then, we will divide received array into suffixes, the total number of which is 6. Thus, the strategy (T = enterprise strategy) will have the following suffixes:

$$T[1..] = T_1, T_2, T_3, T_4, T_5, T_6;$$

$$T[2..] = T_2, T_3, T_4, T_5, T_6;$$

$$T[3..] = T_3, T_4, T_5, T_6;$$

$$T[4..] = T_4, T_5, T_6;$$

$$T[5..] = T_5, T_6;$$

$$T[6..] = T_6.$$

Based on the defined suffixes of the strategy, we will form a suffix tree that contains n ($n = 6$) leaves, each of the inner vertices of which contains at least the second degree (Fig. 1).

Each edge of the formed suffix tree of strategy contains suffixes – the components of strategy which can be considered as tactical approaches in its activity. Depending on the selected leaf of the suffix tree ($n = 1, 2 \dots 6$), the company can implement one or a number of tactical approaches to realize the strategy. The sign "\$" which is next to the suffixes, indicates a finite list of tactical approaches to implementing the strategy on each of the leaves of the tree. Summarizing the material above, we can identify the order of development of tactical approaches based on the use of elements of the suffix tree method:

- definition of attributes (characteristic features) of the chosen strategy and formation on their basis of an array T ;
- detection of suffixes ($T[i..n]$) of a data array of length n , the essence of which determines the strategy, namely the array T ;
- construction of a suffix tree (Fig. 1);
- choosing tactical approaches, moving from the root of the suffix tree to any of its leaves ending in \$.

As you know, the government approved the Concept of development of the digital economy and society of Ukraine for 2018-2020 and approved an action plan for its implementation. Implementation of the digital strategy "Digital Agenda of Ukraine 2020" involves the elimination of barriers to digital transformation of Ukraine in the most promising areas.

This is achieved by stimulating the economy and attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere as well as building the country's innovation infrastructure and digital transformation [27, 28].

With the help of the suffix tree we will form a system of tactical approaches and perform a search for system elements using the appropriate algorithms.

The essence and scope of the suffix tree we have considered above. Recall that the i – th suffix of the array (text series) T is a suborder (element).

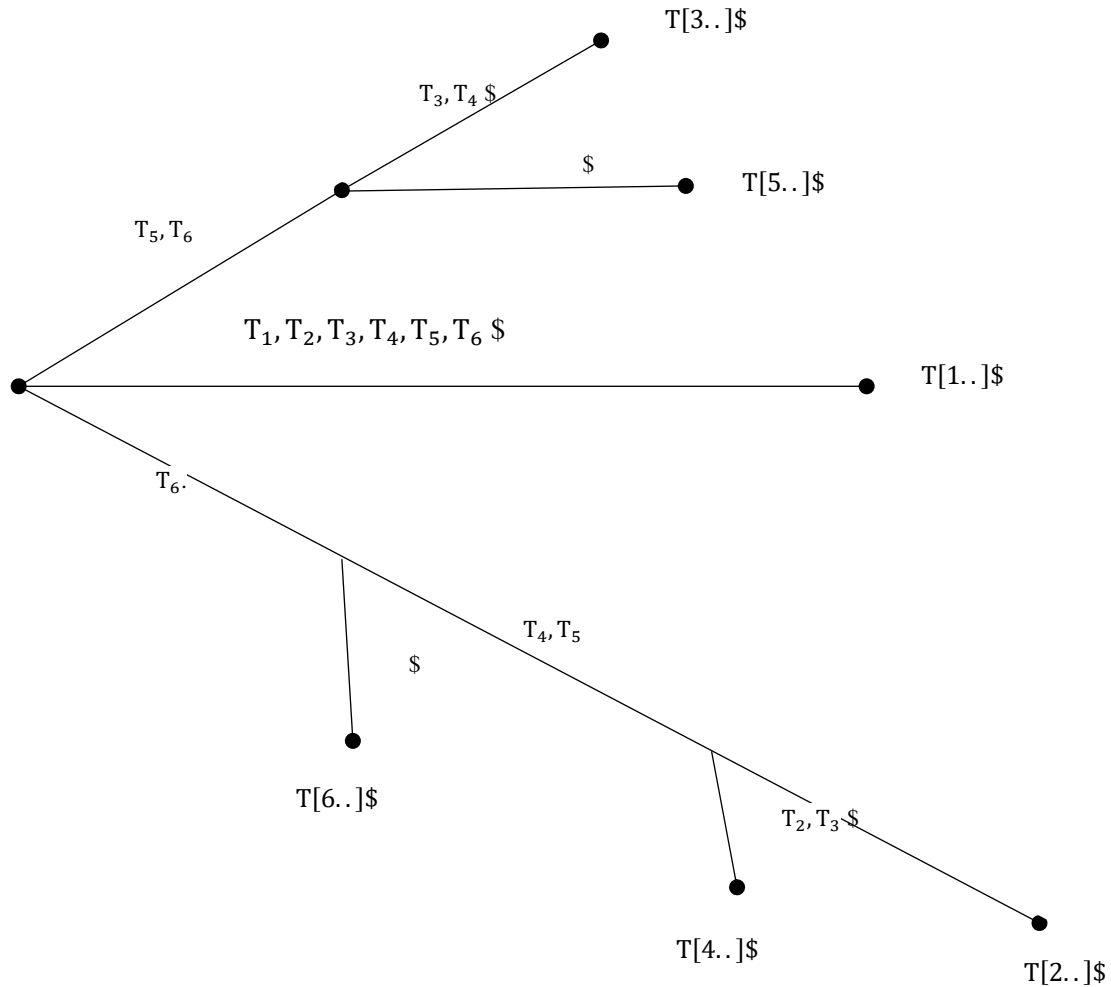


Figure 1: A suffix strategy tree designed to select tactical approaches

The entire text array T consists of a set of suffixes of length n . In order to form a system of tactical approaches of enterprises using elements of the suffix tree method, we adopted a text series of attributes of digital strategy as an array of T .

For example, if $T = \text{"digital strategy \$"}$, then we define its main attributes as "stimulating the economy, attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovation infrastructure, digital transformation" [27-29, 32].

Thus, the array $T = \text{"stimulating the economy, attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations \$"}$, its suffix 0 is "stimulating the economy, attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations \$", and the suffix 6 "digital transformations \$" (sixth level of indexation). Since the digital strategy has 6 attributes (stimulating the economy, attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations), the suffix tree will contain no more than $n = 7$ letters (suffixes). All inner vertices of the suffix tree (including the root vertex, if it is an inner vertex) are always branched, so

there can be no more than $5(n-1)$ such vertices. The \$ sign indicates the completion of the elements on the appropriate leaf of the suffix tree. This can be seen from the equation described above, where:

$$T(n) = \$, \quad (1)$$

where \$ - less than the attribute of the elements of the array.

Thus, the maximum number of vertices in the suffix tree = $7(n \text{ leaves}) + 5(n-1) \text{ inner vertices} = 11(2n-1) = O(n)$ vertices (equal to 11). Since the suffix tree is a tree, the maximum number of edges in the suffix tree is also $10((2n-1)-1) = O(n)-1$ edges.

Using the rules above, it is possible to perform a number of operations:

1. Construction of the suffix tree of the array T, which is a text set of attributes of the digital strategy.
2. Perform search operations: find the top of the suffix tree, the longest line of digital strategy attributes; find the longest repeating suborder (LRS) - the deepest inner vertex that separates the common prefix between two (or more) suffixes T; find the longest common suborder (LCS) - the deepest inner vertex that contains suffixes from two different original lines.
3. Search for elements of an array - a suborder (text series of attributes of a digital strategy), using the appropriate algorithms.

4. Results and Discussion

In order to construct a suffix tree, we use an online algorithm developed in 1992 by E. Ukkonen [30]. This is one of the possible algorithms for constructing a suffix tree, which was formed on the basis of the first proposed algorithm of the suffix tree developer P. Weiner and the left-right algorithm, which was developed by McCreight E. [31].

When applying the algorithm, the suffix array receives the appropriate order, which we will consider on the example of digital strategy. For its application we will present an array of attributes of digital strategy as one word consisting of the first letters of the attributes outlined by us:

$$T(n) = \text{«SAODDt»}\$, \quad (2)$$

where «SAODDt»\$ – coded elements of the array (text series), the content of which is disclosed in Table 2.

Table 2
Suffixes of an array of text series attributes of digital strategy

Suffixes	Content	Grouped suffixes
1. T[1..]: SAODDt\$	"Stimulating the economy, attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations \$"	1. T[2..]: AODDt\$
2. T[2..]: AODDt\$	"Attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations \$"	2. T[4..]: DDt\$
3. T[3..]: ODDt\$	"Overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations \$"	3. T[5..]: Dt\$
4. T[4..]: DDt\$	"Deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations \$"	4. T[3..]: ODDt\$
5. T[5..]: Dt\$	"Development of the country's innovative infrastructure, digital transformations \$"	5. T[1..]: SAODDt\$
6. T[6..]: t\$	"Digital transformations \$"	6. T[6..]: t\$

Next, we use the obtained suffixes of the digital strategy to build tactical approaches to digitalization of the economy through an online modulator, located at <http://www.allisons.org/ll/AlgDS/Tree/Suffix/>. The obtained results are displayed using Fig. 2.

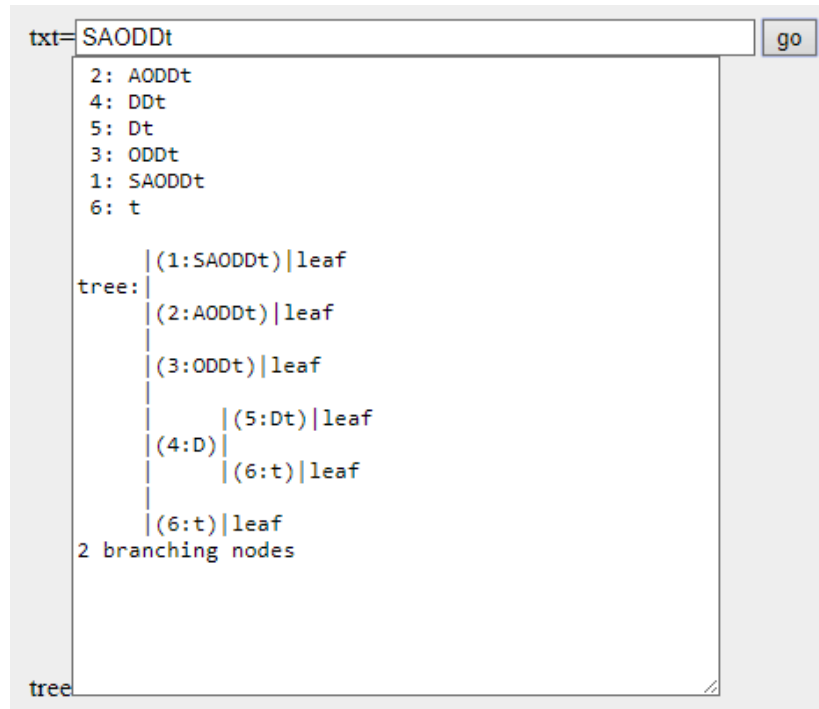


Figure 2: Suffix tree of digital strategy and identified tactical approaches to digitization

This result in the formation of the suffix tree for the digital strategy (Fig. 2) allowed to reach that the applied approach involves determining the level of the array of values inherent in a number of data.

According to the method of Kasai et al., the level (rank) can be determined by the formula [21]:

$$\text{rank}(k) = LCP(S_{\text{subtab}_{[k-1]}}, S_{\text{subtab}_{[k]}}), \quad (3)$$

where $LCP(i, j)$ - the longest common prefix of the suffixes specified in positions i and j of the subline.

Algorithm of Kasai et al. involves the use of the inverse suffix array sufinv , which can be described by the equation:

$$\text{sufinv}[\text{sufstab}[i]] = 1. \quad (4)$$

Therefore, $\text{sufinv}[i] = j$, which means the presence of rank j in the suffix S_i . At the same time, $\text{sufstab}[j] = i$. That is, j - is the suffix of the lowest rank S_i .

Assuming that, $P = \text{sufinv}[i]$, then rank S_i depends on its predecessor in the substring and can be calculated as: $\text{rank}(P) = LCP(S_{\text{subtab}_{[p-1]}}, S_{\text{subtab}_{[p]}}) = LCP(S_k, S_i)$, where $k = \text{substab}_{(p-1)}$. This summarized on the basis of the method of Kasai et al. [21] in Table 3.

Table 3

Example of calculating ranks for the inverse array P

Rank (i)	Substring (substab_i)	Calculation
p-1	k	$k = \text{sufstab}[\text{sufinv}[i]] - 1$
p	i	$p = \text{sufinv}[i]$
...
q'	$k+1$	$q' = \text{sufinv}[\text{sufstab}[\text{sufinv}[i] - 1] + 1]$
...
p'	$i+1$	$p' = \text{sufinv}[i + 1]$

The obtained results indicate possible tactical approaches to digitalization of the economy:

Tactical approach 1: attracting investments, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations;

Tactical approach 2: deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations;

Tactical approach 3: development of the country's innovative infrastructure and digital transformations;

Tactical approach 4: overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations;

Tactical approach 5: stimulating the economy, attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations;

Tactical approach 6: digital transformations.

By using the Internet service, the possibility of manually constructing a suffix tree (detailed and express method) is indicated, which provides for the application of the conditions provided in [30].

Consider them in detail:

1. If "X" is a substring of txt, then "X" must be located in the suffix tree. The location is found by tracking the "X" characters from the root of the tree.
2. The substring $x = \text{txt}[L..R]$ has a definite length, which can be represented as (L, R).
3. If "V" is the vertex of the suffix tree, then the pair "V, X" is equivalent to $V[L..R]$, which reflects the state (location) in the suffix tree found by tracking the characteristics of the symbols X with V.
4. It is possible to create special peaks "lowlands".
5. The vertex (node) of the suffix tree is called its explicit state.

5. Conclusions

In order to ensure the intellectualization and information of economic relations, it is important to intensify goal-oriented and coordinating activities, which are implemented in the process of strategic planning. Ukraine's digitalization strategy envisages the elimination of barriers to Ukraine's digital transformation in the most promising areas. It will be done by stimulating the economy and attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere as well as building the country's innovation infrastructure and digital transformation. According to the established dependencies, tactics are a logical continuation of the strategy, which is developed for short periods of up to a year. The implementation of tactical approaches uses management methods, various ways of managerial influence, which ensure the achievement of strategic goals on the basis of the use of resources, knowledge, skills, information etc. However, tactical approaches to digitalization and intellectualization of economic relations are not clearly defined.

In order to select them, the elements of the suffix tree method are used in the following order: definition of attributes (characteristic features) of the selected strategy and formation on their basis of the array T; detection of suffixes ($T[i..n]$) of an array of data of length n, the essence of which determines the strategy, namely the array T; construction of a suffix tree; selection of tactical approaches, moving from the root of the suffix tree to any of its letters ending in \$.

As a result of the use of elements of the suffix tree method, by online modulation have been formed 6 tactical approaches to digitalization of the economy: 1. Stimulating the economy, attracting investment, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovation infrastructure, digital transformations; 2. Attracting investments, overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovation infrastructure, digital transformations; 3. Overcoming digital inequality, deepening cooperation with the EU in the digital sphere, development of the country's innovative infrastructure, digital transformations; 4. Only the development of the country's innovation infrastructure and digital transformations or together with the deepening of cooperation with the EU

in the digital sphere; 5. Development of the country's innovation infrastructure and digital transformations. 6. Digital transformations.

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