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## **ІНФОРМАЦІЯ ТА МАПУВАННЯ ІНФОРМАЦІЙНИХ ПОТОКІВ ЯК ЧИННИКИ УСПІШНОЇ ДІЯЛЬНОСТІ ПІДПРИЄМСТВА**

**Анотація.** У статті досліджено сутність та відмінності категорій «дані», «інформація» та «знання». Також розглянута система «дані-інформація-знання» та стадії трансформації цих понять. Подано узагальнену та деталізовану схеми інформаційних потоків на сучасному підприємстві. Визначені типи інформаційних потоків, що надходять із зовнішнього середовища та функціонують всередині підприємства. Розглянуто сутність та роль мапування як методу опису інформаційних потоків на підприємстві. Авторами запропоновано власне визначення та рівні поняття «мапування інформаційних потоків». Досліджено різні види мапування та проаналізовано їхні спільні та відмінні риси. Запропоновані у статті положення можуть бути використані під час аналізу існуючої інформаційної системи на підприємстві та її реорганізації.

**Ключові слова:** дані, інформація, знання, інформаційний потік, мапування інформаційних потоків, зовнішнє середовище.

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## **ИНФОРМАЦИЯ И МАПИРОВАНИЕ ИНФОРМАЦИОННЫХ ПОТОКОВ КАК ФАКТОРЫ УСПЕШНОЙ ДЕЯТЕЛЬНОСТИ ПРЕДПРИЯТИЯ**

**Аннотация.** В статье исследована сущность и различия категорий «данные», «информация» и «знания». Также рассмотрена система «данные-информация-знания» и стадии трансформации этих понятий. Поданы обобщенная и детализированная схемы информационных потоков на современном предприятии. Определены типы информационных потоков, поступающие из внешней среды и функционирующие внутри предприятия. Рассмотрены сущность и роль мапирования как метода описания информационных потоков на предприятии. Авторами предложено собственное определение и уровни понятия «мапирование информационных потоков». Исследованы различные виды мапирования и проанализированы их общие и отличительные черты. Предложенные в статье положения могут быть использованы при анализе существующей информационной системы предприятия и ее реорганизации.

**Ключевые слова:** данные, информация, знания, информационный поток, картирование информационных потоков, внешняя среда.

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## **INFORMATION AND INFORMATION FLOWS MAPPING AS FACTORS OF THE MODERN ENTERPRISE SUCCESSFUL ACTIVITY**

**Abstract. Introduction.** A modern enterprise has to own information factor for the stable and productive work in the market. Thus, information helps to simplify the process of production and sales, to set up networking with economic players.  
**Purpose.** To investigate place and role of information and information flows

mapping in the modern enterprise successful activity. **Methods.** Analysis, generalization, system and complex analysis, method of pair comparisons. **Results.** The essence and distinctions of categories “data”, “information” and “knowledge” are analyzed. The system “data-information-knowledge” and stages of these concepts transformation are considered. The generalized and detailed schemes of information flows at the modern enterprise are submitted. The types of information flows, those are coming from environment and functioning in the enterprise, are considered. It is also reviewed the essence and role of mapping as a method of information flows description at the enterprise. The concept “information flows mapping” is defined and leveled. Different types of mapping are investigated and their common and distinctive features are analyzed. **Conclusion.** The specified distinctions of the categories “data”, “information” and “knowledge” help to operate information massifs effectively at the enterprise. These concepts’ transformation stages and conditions allow constructing the effective system “data-information-knowledge”. The generalization and specification of information flows allows tracking and controlling the information from the external and internal environments for its effective management. The stated aspects of information flows mapping can be used in the analysis of enterprise information system and its reorganization.

**Keywords:** data, information, knowledge, information flow, information flows mapping, external environment.

**JEL Classification:** D 80, D 89

**Introduction.** Today with the development of society and the economy for the effective functioning of an enterprise it is not enough to own only basic factors of production: resources, capital, labor. A modern enterprise has to own information factor for the stable and productive work. Information helps to simplify the process of production and sales, to set up networking with economic players, such as suppliers, customers, financial institutions, government, partners, etc.

However, only possession of information isn't a guarantee of success. Another important aspect is the ability to process, to interpret and to use information for decision-making management. Information management in the enterprise increases

efficiency and competitiveness in the market, reduces risks and helps to resist to negative influence of environment.

**Brief Literature Review.** Problems of information and information systems influence on enterprises activity efficiency were considered in many authors' researches, for instance Illiashenko S.M. (2005) [1], Zagorna T.O. and Kolomyceva A.O. (2011) [2]. The essence, types and distinctions of categories "data", "information" and "knowledge" are defined by such authors as Lundqvist M. (2007) [3], Whitney H. (2007) [4]. To analyze the "information flows mapping" concept we recommend the following authors' works: Al-Hakim L. (2006) [5], Brightman J. (2003) [6], Hibberd B.J. and Evatt A. (2004) [7], Soliman F. (1998) [8]. Rafael Accorsi and Claus Wonnemann (2009) [9] devoted their work to the description of information flows essence and to the research of information flows management techniques at the enterprise. Braytman's (2003) [6] description approach to mapping methods is interesting from the practical point of view.

**The purpose** of the article is to investigate place and role of information and information flows mapping in the modern enterprise successful activity.

**Results.** Modern literature distinguishes three levels of information: data, information and knowledge. On the basis of Lundqvist M. (2007) [3], Whitney H. (2007) [4] we can define the essences and classify the types of data, information and knowledge.

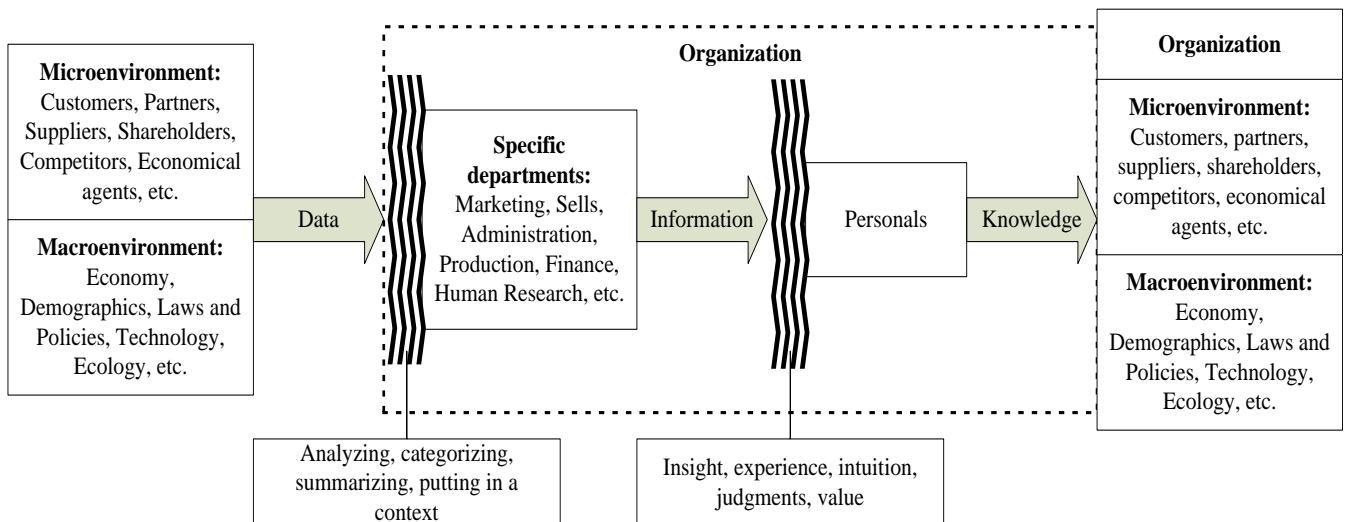
Data is the set of discrete, objective facts presented out of context and without judgment or external interpretation; or unprocessed facts and figures without any added interpretation or analysis. The main types are: quantitative and qualitative data; primary and secondary data; discrete and continuous data; ungrouped and grouped data; public or limited access data; hard or soft data; formal or informal data; internal or external data.

Information is the data that has been interpreted so that it has meaning for the user. The main types are: operative data, analytical data, procedural data, metadata, paradata.

Knowledge represents (individual) truth and does as such offer a reliable basis for action and can be recognized as a combination of information, experience and insight that may benefit the individual or the organization. The main forms are: formal, explicit or generally available knowledge and instinctive, subconscious, tacit or hidden knowledge.

Data is the general concept that means the information array. When data arrive to enterprise, it is analyzed, categorized and processed in special departments. So data becomes information. When information is processed by individual employees through the filters of their insight and experience, it becomes their knowledge.

The whole transformation process of the system “data – information – knowledge” is shown in Figure 1.



**Fig. 1. The system “data – information – knowledge”**

*Source: [It is developed by the authors]*

Data have to meet the following requirements to be transferred into useful information (Whitney H. (2007) [4]): to be relevant to the specific purpose; to be complete; to be accurate; to be in time; to be in the right format; to be available at a suitable price.

That’s why we can make a conclusion: useful information must be got in right way, at the right time, by right person, at a suitable price.

Transfer of information from one subject to another has caused the appearing of the “information flow” concept.

According to Rafael Accorsi and Claus Wonnemann (2009) [9] we can define the information flow as the transfer of information from a subject A to a subject B. In the organization activity a subject can be represented by a primary or secondary external source, a special department or special person at the organization.

Figure 2 shows examples of different information flows that come to the enterprise from the macro and microenvironment, as well as form in the enterprise according to the department.

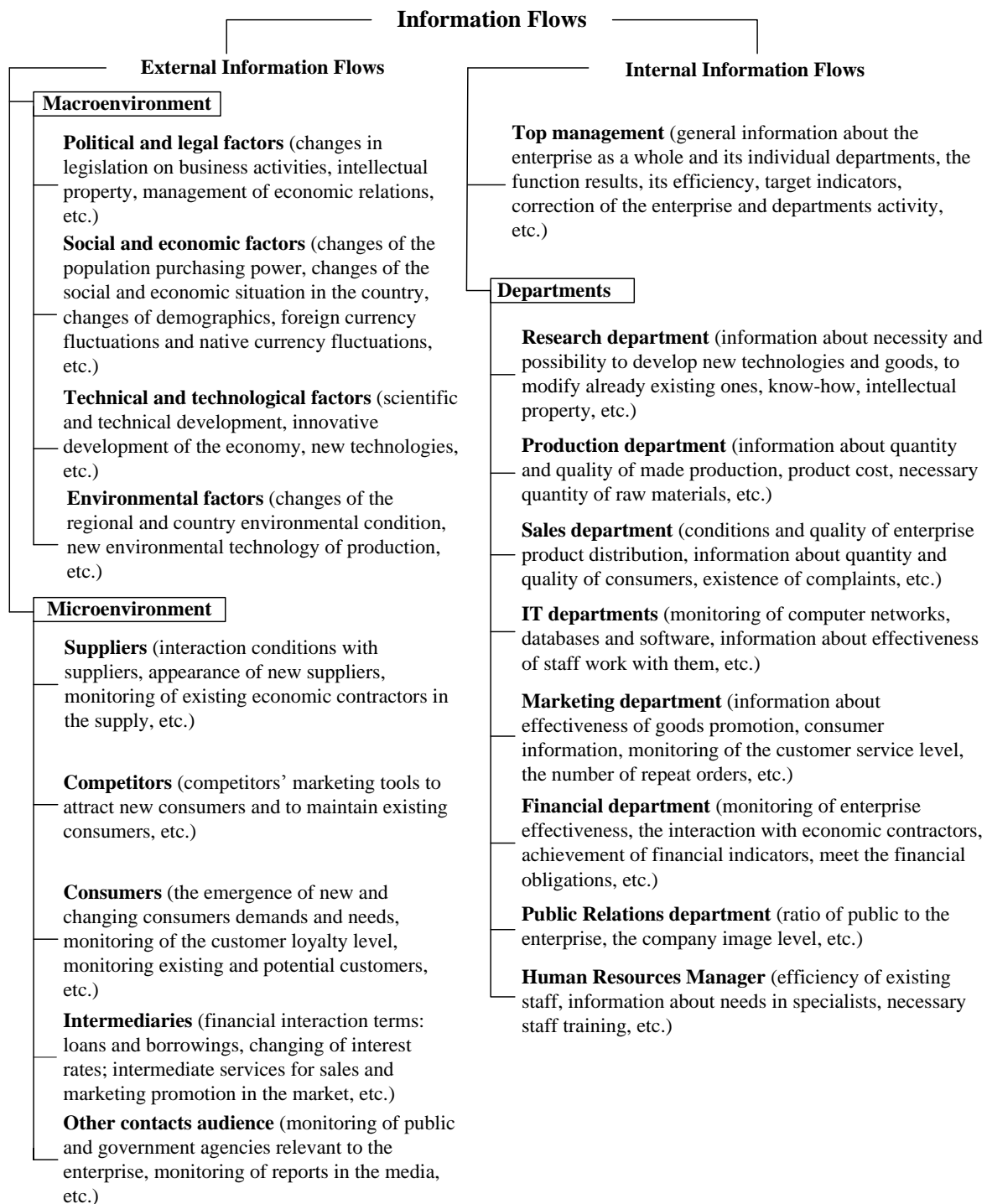
Based on the above, authors propose to divide information flows into external and internal, vertical and horizontal. The first classification feature depends on the source of information. The external information flow means the exchange of information between organizations and their environment. The internal information flow characterizes the exchange of information between the subsystems of the organization. In turn, the internal flow of information can be divided into vertical (business interacts with subordinates) and horizontal (interaction between employees within the department of the same rank).

Transformation of data into information and knowledge, levels and different sources of information flows cause the appearing of information management to avoid information curvature and unnecessary costs.

Summing up the above, we can confirm that modern enterprise activities are accompanied with many diverse information flows. It makes the necessity to develop management techniques. The method of information management should take into account the nature and specificity of different information flows. Today, one of the most effective information management tools is information flows mapping. It allows to describe the process of formation, moving and saving of information, taking into account spatial and temporal interactions and relationships.

Scientists understand the essence of the term «information flows mapping» in various ways. Hibbert B. J. & Evatt A. (2004) [7] considers that mapping information flows is a process to analyze how information is transferred from one point to another within organization. Meanwhile, ISD Scotland [10] defines information flows mapping a subset of mapping process which aims to provide a pictorial representation

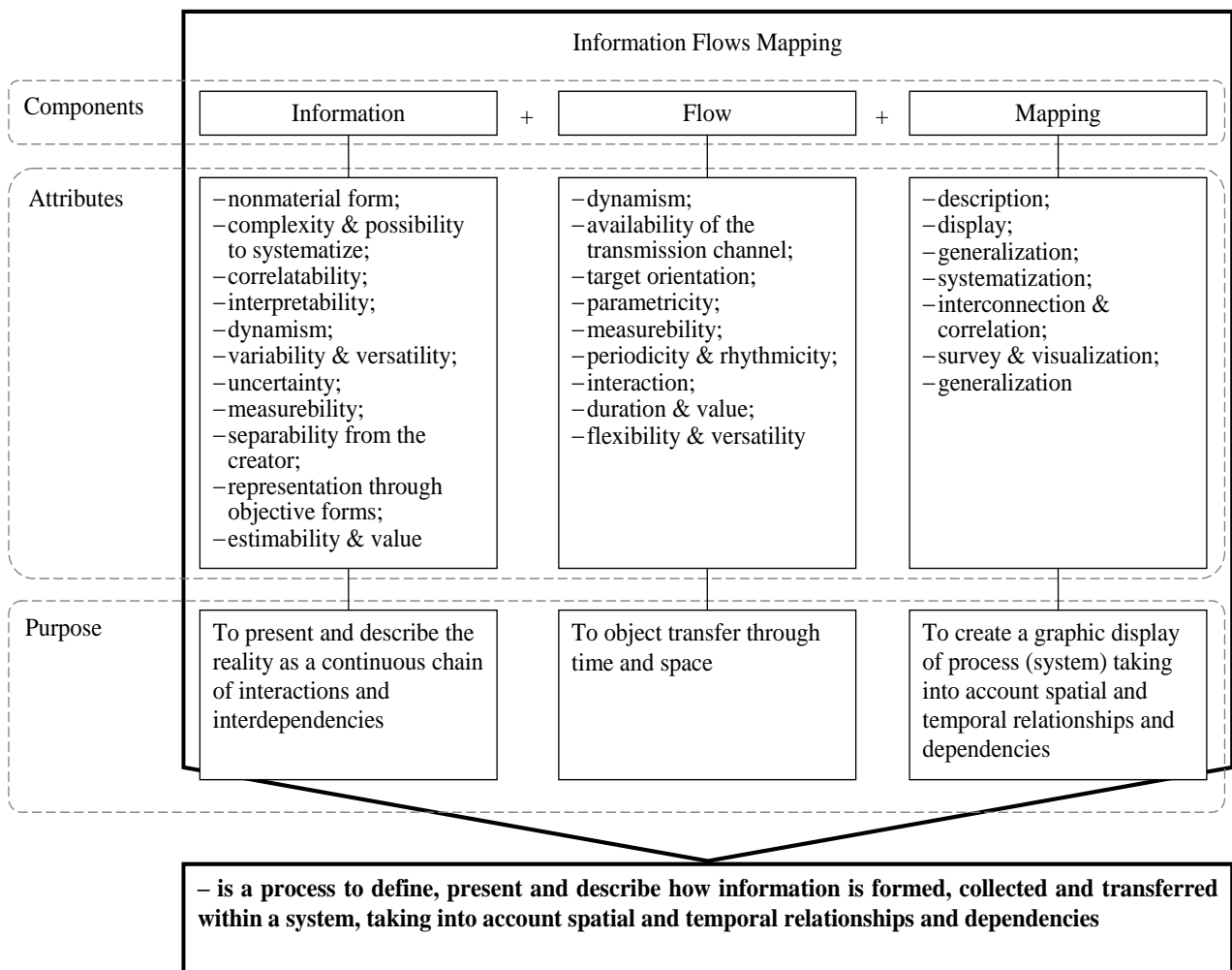
of what data is collected along a process, and how information flows through a system. In other hand, Al-Hakim L. (2006) [5] doesn't separate concept "information mapping" from more extensive concept "mapping process" and use Soliman's (1998) [8] definition: "Process mapping is a technique used to detail business process by focusing on the important elements that influence their behavior".



**Fig. 2. Information flows in the enterprise**

*Source: [It is developed by the authors]*

In order to reflect the authors' vision and to explore the concept of «information flows mapping» the deductive method and associative approach were used in the article. The results can be viewed in Figure 3.



**Fig. 3. Information flows mapping: the concept essence analysis**

*Source: [It is developed by the authors]*

The roles of information flows mapping in business processes can be represented as follows: 1. Depiction of information flows between various business process entities; 2. Enabling information system users to receive correct amount of information with relevant quality; 3. Improving of decision making process; 4. Improving of the business processes efficiency.

To explore the information flows mapping phenomenon in terms of its frame of references we suggest to distinguish three dimensions that represent and measure properties of system at different moments of time: Past “What’s the matter?”; Present “What actually happens?”; Future “What will happen?”.



It should be noted that each information flows mapping dimension pays attention of the business process analyst to specific key points. Based on these key points, analyst can assess current situation, define problem zones and, as a result, form a system of actions to improve business. We think it expedient to consider each level in more detail (table 1).

**Table 1**

**The specification of key points for dimensions  
of the information flows mapping**

Feature	Dimension		
	Past	Present	Future
Task	To describe the history and dynamics of interactions and relationships in the system. Depth of level is defined by the purposes which are put by the analyst	To state the actual situation in the system, current interactions and interrelations in it	To simulate future interactions and interrelations in the system considering corrective actions and available forecasts on the development of environment
Data source	Data source can be both specially organized research (survey, interview, analysis of the process) and traditional databases (statistical and past performance data)		
Key points	Retrospective vision. Cause and effect connections	Up-to-date vision. Immediate response	Perspective vision. Scenario methods
Strengths	Based on data that actually took place. Identifies problem areas of management. Allows to analyze data in dynamics. Reveals regularities of development of the phenomena. Describes a process systemically	Based on data that take place in short period. Provide a workspace for exploring system's current status. Identifies problem areas of management. Allows to compare planned and achieved results	Identifies development trends. Forms the basis for decision making. Justifies the development strategy. Forms the development guidelines
Weaknesses	Data may be not represented to all system. Analysis is probalistic. Subjective interpretation of a situation by the researcher. Results may not be applicable to current situation. High labor input	Data may be not represented to all system. Analysis is probalistic. Subjective interpretation of a situation by the researcher. High labor input	Forecast is changeable and unsteady. Forecast may not display the development of the entire system. Subjective interpretation of a situation by the researcher. High labor input

*Source: [It is developed by the authors]*

Information flows mapping is implemented through different conceptual approaches and techniques. Jenny Brightman (2003) [6] considers four types of mapping methods based on their links, goal structure and action orientation. The following table 3 gives a review of the mapping methods characteristics:

**Table 2**

**The characteristics of the mapping methods**

Characteristic	Method			
	Mind mapping	Concept mapping	Cognitive mapping	Dialog mapping
Main idea	Consists of a central idea (expressed in the form of a picture or words and a picture) from which radiate ideas that are related to the central idea	Is made up of “concepts” and expressions of the relationships between concepts	Is made up of “concepts”(short phrases that express an idea: fact or assertion about an issue) and links (connections between the concepts which are read as “may lead to”)	Consists of questions, ideas, and arguments. Ideas link in to questions, arguments link in to ideas. Arguments may be either pros (plusses) or cons (minuses)
Links	Hierarchical; Associative	Hierarchical; Relational	Hierarchical; Causal	Not hierarchical; Relational
Goal structured	Yes, but not inherently	Yes, but not inherently	Yes	No
Action orientated	No	Yes, but not inherently	Yes, but not inherently	No
Question based	No	Yes, but not explicitly	Yes, but not explicitly	Yes, entirely

*Source: [It is developed by the authors on the basis of Jenny Brightman (2003) [6]]*

It should be noted that to improve the quality and reliability of the analysis information flows mapping it is necessary to carry out consistently in three dimensions. In our opinion information flows mapping can be strengthened by the accounting of the levels and components of information system of society and enterprise. Irrespective of it quality of information flows mapping depends on quality of information which moves in system, its attributes and factors.

**Conclusions.** The article shows the necessity to distinguish the concepts “data”, “information” and “knowledge” for effective information management. Transformational process of these categories is also described. In this research

authors specify that the complex system concerning information flows of the modern enterprise demands the application of information management modern techniques. The method of information flows mapping as one of the effective instruments of information management is considered to be more detailed. Therefore authors consider that the analysis of other information management methods, determination and assessment of information quality can be the areas for the further researches.

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