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SYNTHESIS CONCEPT OF INFORMATION AND ANALYTICAL SUPPORT FOR BANK SECURITY SYSTEM

In this paper a synthesis concept of information and analytical support for bank security system is proposed. In addition, its structure under the ITIL and IDEF0 standards is defined, basic principles, classification attributes, and synthesis specific features are grounded. A classification of decision makers in accordance with international standards is suggested.

Keywords: *synthesis; information and analytical support; bank security system; bank.*

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КОНЦЕПЦІЯ СИНТЕЗУ ІНФОРМАЦІЙНО-АНАЛІТИЧНОГО ЗАБЕЗПЕЧЕННЯ СИСТЕМИ БАНКІВСЬКОЇ БЕЗПЕКИ

У статті запропоновано концепцію синтезу інформаційно-аналітичного забезпечення системи банківської безпеки. Визначено її структуру у стандартах ITIL та IDEF0, обґрунтовано базові принципи, класифікаційні ознаки, особливості синтезу. Наведено класифікацію осіб, що приймають рішення у відповідності до міжнародних стандартів.

Ключові слова: *синтез; інформаційно-аналітичне забезпечення; система банківської безпеки; банк.*

Табл. 1. Рис. 9. Літ. 19.

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КОНЦЕПЦИЯ СИНТЕЗА ИНФОРМАЦИОННО-АНАЛИТИЧЕСКОГО ОБЕСПЕЧЕНИЯ СИСТЕМЫ БАНКОВСКОЙ БЕЗОПАСНОСТИ

В статье предложена концепция синтеза информационно-аналитического обеспечения системы банковской безопасности. Определена ее структура в стандартах ITIL и IDEF0, обоснованы базовые принципы, классификационные признаки, особенности синтеза. Приведена классификация лиц, принимающих решения в соответствии с международными стандартами.

Ключевые слова: *синтез; информационно-аналитическое обеспечение; система банковской безопасности; банк.*

Introduction. Recently in Ukraine, there has been an increase of interest in research of banking security. A number of studies (Heiets et al., 2006; Kavun et al., 2012; Kirichenko et al., 2008; Kozachenko et al., 2003) have been focused on the theory of bank security (TBS). However, the results of the survey prove that TBS is generally treated as a notion concerning protection from possible economic offenses (Kurkin, 2004) rather than a security theory having its own structure, basic categories and indicators. Undoubtedly, threats are important and should be always taken into consideration but treating TBS as a very notion is unpromising for banks, as it may necessitate the development of conceptual synthesis provisions, i.e. the creation of

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information and analytical support (IAS) for TBS as a foundation of bank security system (BSS).

Literature review. The most promising aspects pertaining to economic security, economic threats, BSS functioning, the principles of IAS BSS formation and functioning of its structural components, development and management have been investigated by many national and foreign researches: I. Ansoff (1989), O. Bandurka et al. (2003), V. Heiets et al. (2006), O. Kirichenko et al. (2008), T. Klebanova and N.L. Chymak (2000), H. Kozachenko et al. (2003), M. Kurkin (2004), V. Ponomarenko and S.V. Kavun (2008), N. Reverchuk (2004), the well-known national experts, dealt with IAS development and its implementation for entities.

Unresolved issues. The current situation within bank operation system cannot ensure a significant competitive advantage at the market through material and financial resources (Trydid and Oriehova, 2010). Market advantages and bank leadership are increasingly the result of effective use of modern mechanisms and technologies, combined with IAS BSS. Existing technologies and mechanisms of BSS are sometimes contradictory, are not efficient enough and sometimes have a lot of discrepancy that causes slowdown or altogether the impossibility of creating a single theoretical basis for information and analytical support (IAS) of bank security system (BSS). Being greatly respectful to Ukrainian and foreign researchers for their scientific achievements, one should admit that the issue of information and analytical support of bank security system synthesis is not properly investigated neither from the practical point of view nor the theoretical one, as well as there is no systematic generalization of it. Therefore, IAS of BSS development and its further implementation could be a basic factor in determining the market value of banks and in forming their competitive strength at a high level.

Objective. The objective of this research is to provide basic principles of IAS of BSS synthesis concept.

Key research findings. As a result of one of the authors' research (Trydid and Kavun, 2014), the structure of BSS subsystems interaction is determined by ITIL standards (Figure 1) within existing management outlines as well as its model and first level decomposition determined by IDEF0 standard (Figures 2–3) was created, where the following terms were used:

- financial subsystem (FSS) – provides the most efficient use of all types of bank resources with the aim of profit increasing and also losses and taxes shrinkage;
- intellectual and personnel subsystem (IPSS) – provides the development of intellectual potential, efficient personnel management aimed at maintaining corporate intelligence and personnel potential;
- technical and technological subsystem (TTSS) – intended for extensive use of state-of-the-art technologies as to the resource expenditures optimization;
- political and legal subsystem (PLSS) – guarantees contractual protection of functioning and observation of current legislation with the requirement of dynamic changes synchronization;
- information subsystem (ISS) provides information and analytical documentation of the entire bank functioning in the relevant field;
- ecological subsystem (ESS) – used for minimization of pollutant emission in the environment as well as corresponding tax reduction; it could be omitted in the case of BSS;

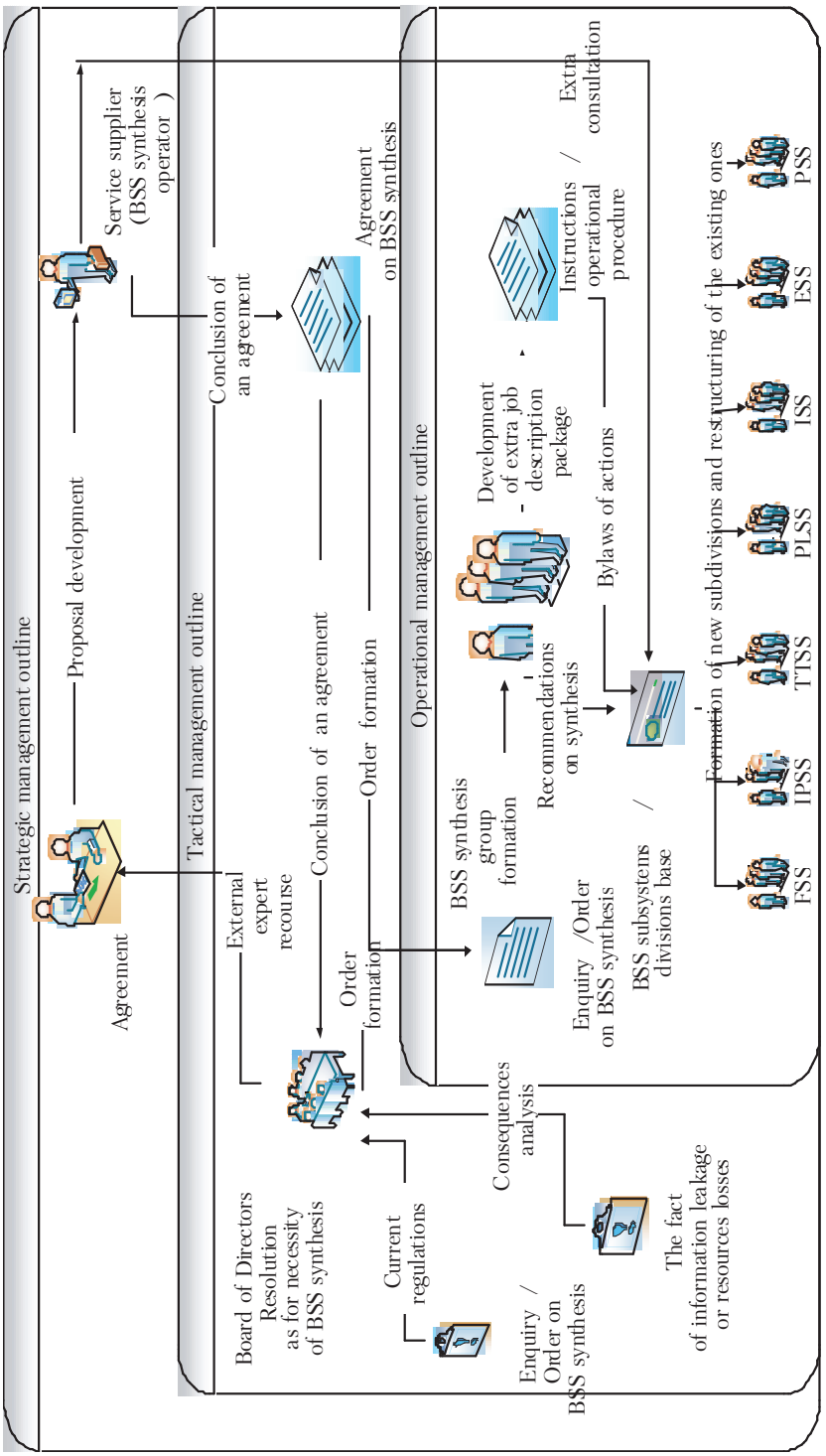

Figure 1. **Structure of BSS subsystems interaction determined by ITIL standards,** *designed according to the data* (Trydid and Kavun, 2014)

- power subsystem (PSS) – guarantees physical security of bank employees (executives) and their property protection.

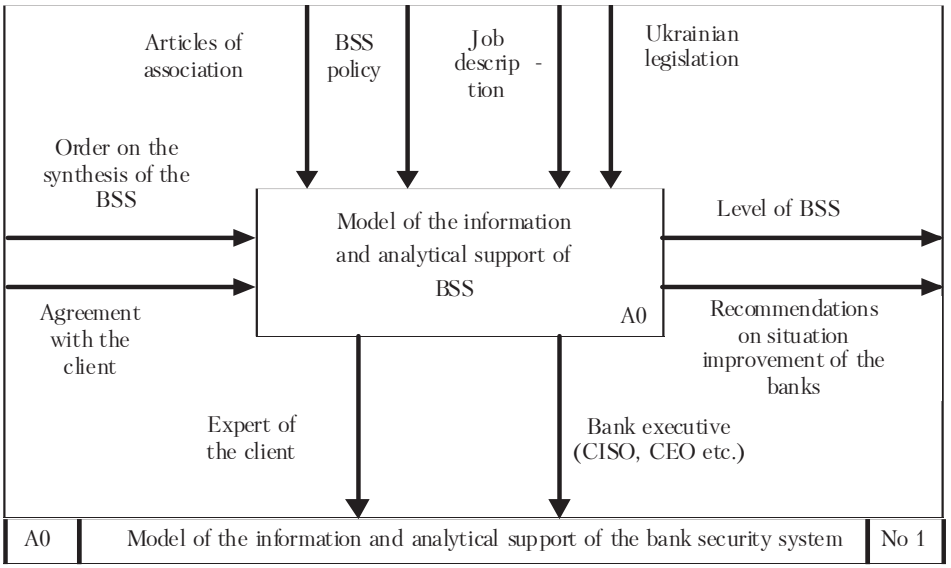

Figure 2. **Synthesis model of the information and analytical support of the bank security system,** *authors' development*

The complexity of IAS BSS is caused not only by the features and by characteristics of an object, but specific external factors. Therefore, two groups of subjects – internal and external ones – can be specified.

External subjects include legislative, executive and judicial authorities aimed at security of all participants of business relations. Entrepreneurs cannot control these bodies and so they form the legal basis for the functioning and security of banking and ensure its implementation. Internal subjects are individuals who are directly in charge of the IAS BSS security. They include internal and external security service personnel providing servicing for IAS BSS. The methods of influence and recommendations for SBB improvement under negative changes of development indicators can be considered as the objects to control IAS BSS. The subjects to manage SBB are the individuals with delegated rights who make decisions (i.e. deputies, managers, professionals in TBS (CISO, CEO)). The authors have determined the compliance of positions in State Classification of Occupations (Klassifikator professij, 2006) with existing international positions taking into account the hierarchical interrelation in national and international legislation based on de facto and de jure characteristics.

The analysis proved (Georg et al., 2009; Trydid and Kavun, 2014; Kavun and Sorbat, 2012; Ponomarenko and Kavun, 2008) that formally described full-function methodical and methodological IAS BSS synthesis providing information aspect of implementation, does not exist in banking. It results from the organizational framework of IAS BSS synthesis (Figure 4).

Moreover, organizational framework can ensure the full cycle of IAS BSS synthesis forming the classification criteria of structural elements such as BSS objects;

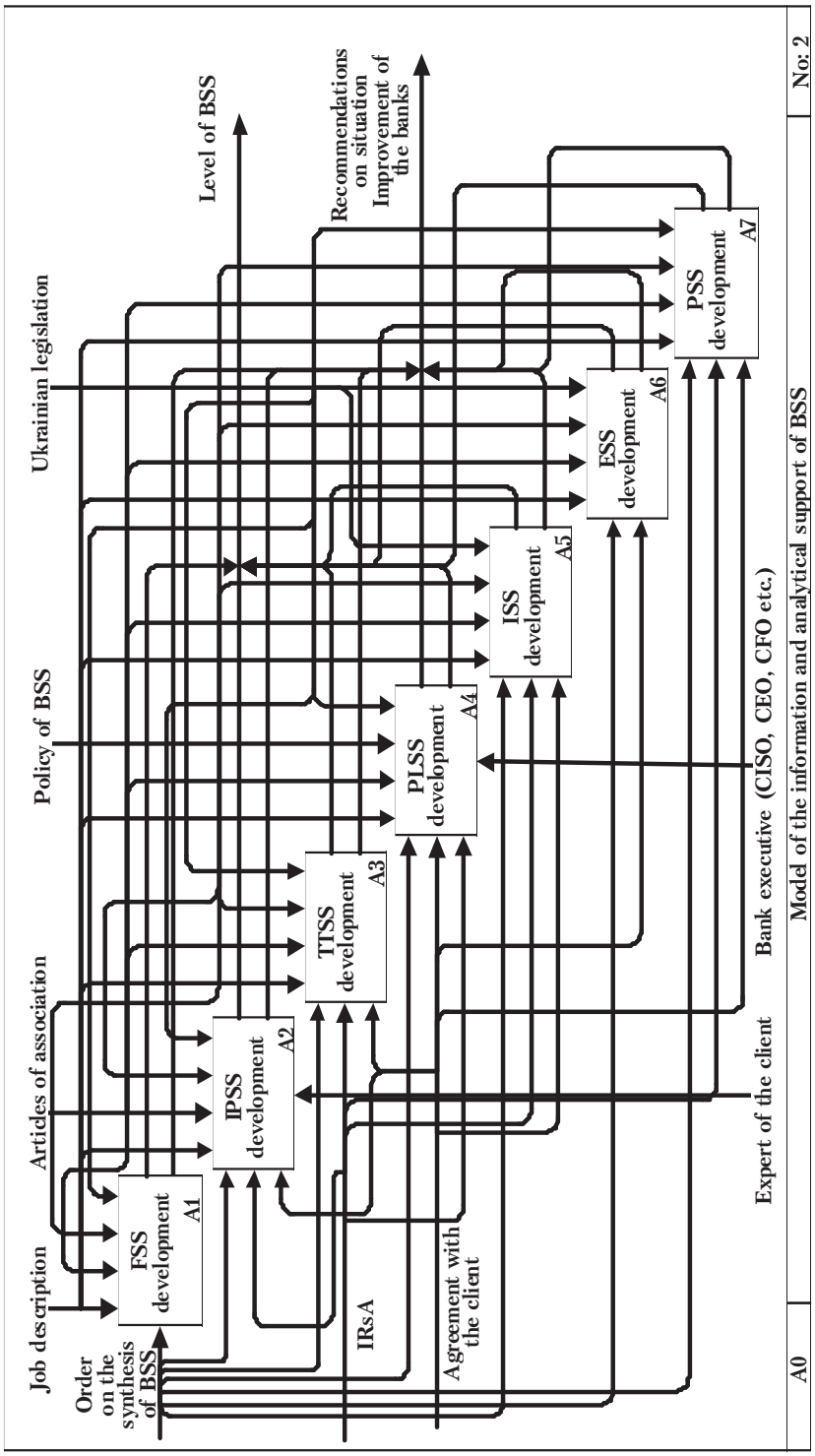

Figure 3. **Decomposition of the first level of the synthesis model of information and analytical support of bank security system,** *authors' development*

objectives and specific features of BSS synthesis and its functioning; documents on various activities in record-keeping including electronic; classified information with restricted access, which is the basic structural element of record-keeping and system functioning; other features (Figure 5).

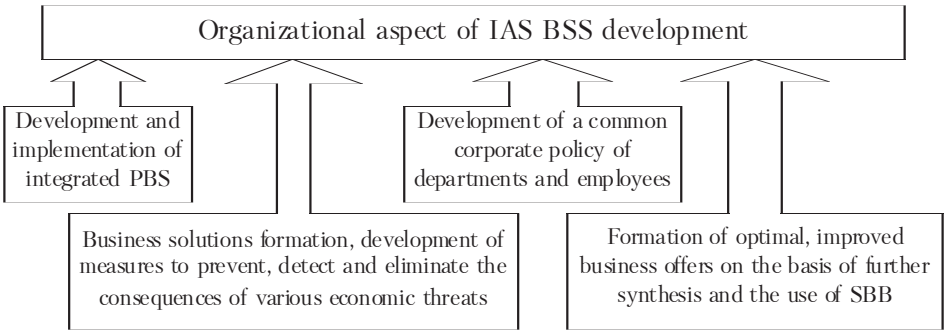

Figure 4. **Organizational fundamentals of synthesis,** *authors' development*

Territorial distribution	Association in Communication Network	Centralization of Data Storage	Classifier of Business Objective Types
Classifier of Resources	**Features of Synthesis and BSS Functioning**		Classifier of User Types
Differentiation of Information with Restricted Access (IRsA)			Interfaces Interacting with Administrative Structures
Classifier of Information Types			Interfaces Interacting with Environment
Organizational Distribution			Use of "24 x 7" mode
Increased Volume of Spread Information	Modularity Principle in BSS Structure	Regulated Access to Common Data	Direct Access to Relevant Data of Employees

Figure 5. **Organizational features of the IAS BSS synthesis,** *authors' development*

BSS has been divided geographically (into representative offices, offices, branches) and in compliance with organizational system. The structure of BSS is largely dependant on bank specific performance (Kavun et al., 2013), as well as organizational peculiarities of IAS BSS synthesis (Figure 5).

The main principles of developing complex systems should also be taken into consideration for the synthesis of IAS of BSS. It would allow providing multifactor characteristics of IAS BSS synthesis concept, including the facilities of the proposed organization and technical methods and modern soft and hardware-based tools as well as to provide perspective development of IT.

In many studies, the authors attempted to classify the provision means of the theory of banking security (Kavun and Sorbat, 2012; Trydid and Kavun, 2014), but some approaches do not fully characterize the nature of threats and opportunities of protection via the details of the classification to be used. For example, in terms of applied instruments, the means of BST are subdivided into legal, organizational, administrative, software-based, engineering and cryptographic ones. Based on the analysis, the following classification of IAS BSS (Figure 6) is proposed, that includes a number of suggested methods and tools (Figure 5).

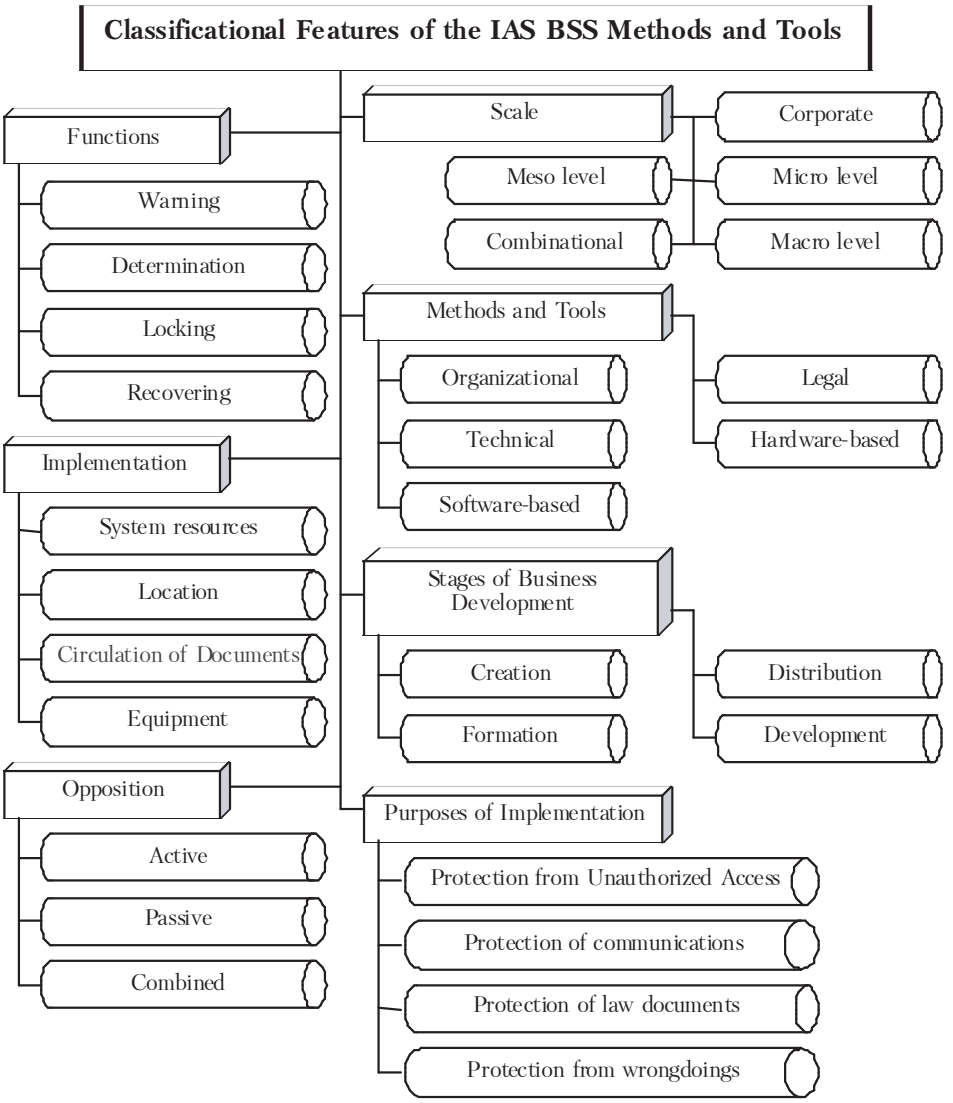

Figure 6. **Classification of the IAS BSS,** *according to* (Trydid and Kavun, 2014)

The authors in a system of principles summarize fundamental aspects of the IAS BSS synthesis concept. The principles are defined in Table 1, may be also used for the mesolevel, making changes in accordance with dimensions of the financial institution. The principles of TBS synthesis concept on a macro level were described in the paper (Trydid and Kavun, 2014).

High efficiency of FI management as well as optimality of its organizational and management structure require an adequate qualification level and intellectual capacity of staff. Taking into account all principles and foundations of BST concept based on methods and methodology provision for the synthesis of bank security system the BST concept taxonomy has been defined (Figure 7).

Table 1. **The Synthesis Concept Principles for Information and Analytical Support of BSS** (Trydid and Kavun, 2014)

#	Principle	Regulations to ensure the principle's implementation
1	Legality	The key points are considered in (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). Moreover, requirements of the existing legislation are sure to be performed. Requirements of keeping law concerns everyone. No employee should try to evade the law for a financial institution (FI) while FI in turn must not avoid providing and protecting the legal rights of the employees. The priority subject of legal regulation is an employee. FIs should create the most favorable treatment to meet diverse interests of their employees. In addition, internal guidelines and regulations should be developed, implemented by the FIs to be signed by employees.
2	Strategic goal	The key statements can be found in (Kavun and Sorbat, 2012; Trydid and Kavun, 2014). In addition, the use of the principle should be the strategy of FIs' performance and development in the context of BSS (bank security system). Unfortunately, in Ukraine in today's development, under the effects of the global economic and financial crisis, neither strategy formation, nor business development is practically implemented by home FIs: limited financial resources of the vast majority of Ukrainian FIs and the lack of experts determine the level of limitations of such a type of management performance in the FIs as well as their professional consulting on economic issues concerning the development of their strategies. There are several aspects, they are as follows: a cognitive one, which corresponds to the prediction of future, and a constructive one, which meets the way of transition either the transition to a desired future, or a plan of actions. In the cases, where a goal is relatively simple, the sense of the goal is to achieve it, and in the case of a complex goal, the plan is of an independent value as a part of setting goals. The plan defines the sequence of steps to achieve the goal and it determines the means and methods, timing of actions.
3	Hierarchy	The basic points are given in (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). Moreover, in most cases of IAS for banking security system, it is advisable to apply the hierarchy formation and/or formation of its constituents, i.e. ranking (managers, employees) is according to their significance. The hierarchy principle requires that the main components, goals, modules (departments, subdivisions, and subsidiaries) should be either searched or created within BSS. Hierarchy systems, as a rule, are created and researched from the top beginning with the analysis of higher-level hierarchy. If there is no hierarchy, the person making decisions should define the order of BSS constituents and the tendency of his/her individualizing the notions. This principle also will provide with individuals' identification and require that he/she should be fired because of wrongdoings, which threaten BSS. Decision making has always been multileveled, where a number of hierarchy levels is defined by the object of decision making, though the hierarchy itself can either change dynamically in timing accordance with objective and subjective circumstances, or cover both inner and outer factors. As a rule, decision-making system represents a triple ladder (first – top managers, second – managers, then – executives). Decision-making system (DMS) can be defined by employees' duties, timing that means the period of time at the financial institution to be spent by employees, and professionalism based on employees' qualifications.
4	Subjects & Objects' Decomposition	The major guidelines are defined in (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). The principle is grounded on BSS subdivision into separate parts (subjects and objects) and study of their features and peculiarities; it gives an opportunity for further effective analysis of BSS and its project. The principle is implemented to organize BSS management where by separate resources of financial institutions, for instance, financial, staff, material, intellectual etc. Thus, it is possible to get a hierarchy structure of a number of subjects and objects, their interrelations and interdependence, that allows forming a detailed hierarchy framework.

Continuation of *Table 1*

#	Principle	Regulations to ensure the principle's implementation
5	Interrelations & Interactions	The key points are given in (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). While using this principle within financial institutions it is necessary to create such a system of management where all objects obtain all possible ways to interact efficiently, which could cause the increase of competence within a financial institution, as well as financial result and profit due to their activities etc. However, this system of management should not create too large number of interrelations, because it can lead to deterring the quality of financial institution activities, and, as a result, it can go bankrupt. It is necessary to solve the task by V.S. Graichunas' formulae (Bandurka et al., 2003); according to the number of potential interrelations (NPI) with a lower stage of management it equals: NPI = 1/2 (n × 2n) + n − 1, where n − the number of employees, accountable to other coworkers responsible for decision making.
6	Closure	The key guidelines are given in (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). This principle provides identification of FI's life cycle, it defines the BSS stages (Trydid and Kavun, 2014) and when developing it gives an opportunity just in time organizing the BSS audit of the FI in the context of acknowledgement. For productive FI, the use of this principle ensures the formation of a closed loop, which improves FI's level of production and profit increase. The general scheme of using the principle of closure may be submitted in the following closed sequence of study (events on marketing): in today's market determination of the FI's level causes the definition of goals, objectives, current problems, the formation of FI image causes planning (strategic, tactical, operational, corporate and local) in order to perform its tasks; plans, implementation of activities to achieve business objectives etc.). The presence of the loop based on this principle will ensure the manageability of FI's performance at any level control.
7	Integrity	The main guidelines are formulated in (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). Between structural elements (objects and subjects), the principle requires corresponding relations (information, businesses, technological, physical, logical etc.), the combination of which will ensure FI operations and activities as a whole, its integrity. In addition, the use of this principle ensures the formation of a hierarchical structure in the form of FI management chains in the context of BS.
8	Basis (systemacy)	Based on the given principle all determined objects and subjects must have relevant BST level coordinated with other objects and subjects at all levels of FI activity. However, the sum of BST levels in all defined objects and subjects is not equal to $IF_{SES} \neq \sum_{i=1}^{n} {}^{i}IF_{SES}^{Об} + \sum_{j=1}^{m} {}^{j}IF_{SES}^{Об}$, where n is a number of FI objects; m is a number of FI subjects; ${}^{i}IF_{SES}^{Об}$ is BST levels for i-object of FI; ${}^{j}IF_{SES}^{Об}$ is BST levels for j-object of FI.
9	Dynamics	Main issues are formulated in works (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). The use of this principle gives an opportunity of structuring some issues concerning the provision of BST concept for FI. It leads to algorithm simplification of appearing problems while using BSS in FI. Moreover, the application of this principle helps to obtain BST objective indicators for FI temporally, i.e. to use known methods for making forecasts. It can also provide a timely response to emerging Peter's principle according to which at any FI in its hierarchical system (the system of interconnections and interactions between employees) an employee can be promoted to the position where his/her responsibilities do not correspond to his/her competence.
10	Reality	Main issues are formulated in (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). It is particularly useful for macrolevel, where its definition is given according to the concept of national policy of Ukraine. It comprises proper financing of supporting programs of the Ukrainians living abroad and strengthening Ukraine's international image (Trydid and Oriehova, 2010).

Continuation of *Table 1*

#	Principle	Regulations to ensure the principle's implementation
		Regarding FI, the principle is supposed to establish a set of standards for all subjects, according to which employees are to be directed to their responsibilities. Also, this principle requires the use of all calculations of BST levels for FI (real indicators, indices, values not requiring complicated difficulties) (Kavun and Brumnik, 2013; Trydid and Kavun, 2014).

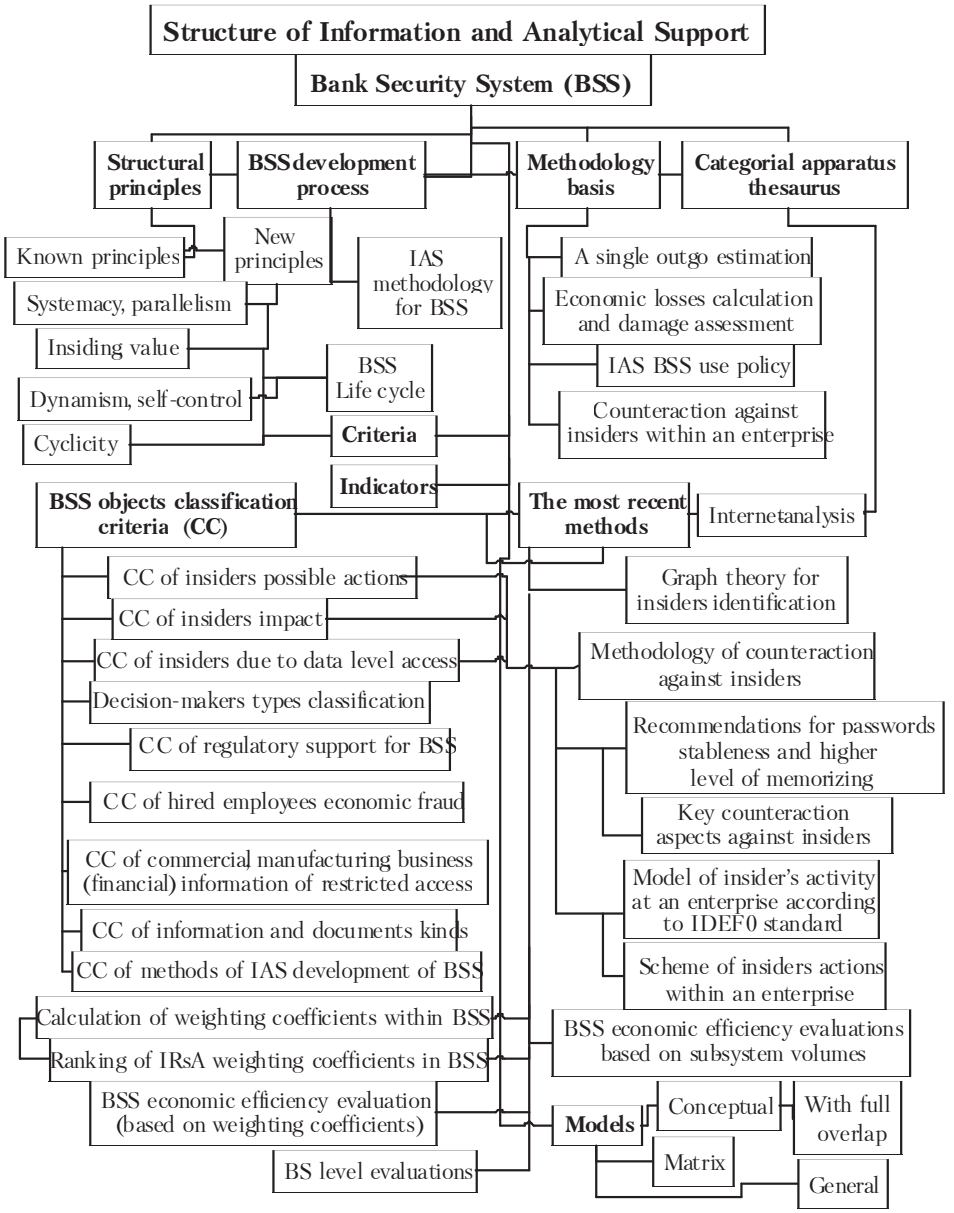

Figure 7. **Taxonomy for the Concept of Bank Security Theory (BST),** *according to* (Trydid and Kavun, 2014)

Based on the proposed specific basic principles the taxonomic model of all BST concept principles has been built. It is given in Figure 8, generalizing and representing graphically the hierarchy of interactions within FI.

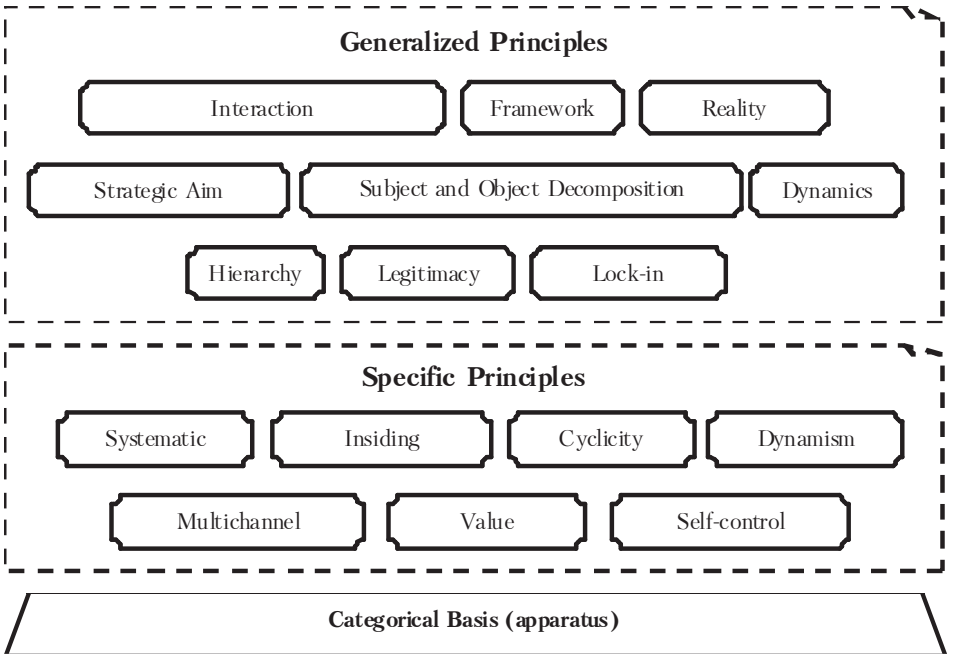

Figure 8. **Taxonomic Model of Principles for TBS,** *authors' development*

For the implementation of the suggested concept of synthesis of IAS for banking security system (IAS for BSS), the authors have developed a relevant stage-by-stage algorithm (for its realization).

The sequence of stages is shown in a graph (Figure 9) according to ITIL standard. This sequence proved to be a generalized methodology that discovers the principal conceptual stages of synthesis of informational and analytical support of banking security system.

Furthermore, it is based on the conceptual and matrix banking security system models as suggested in (Ponomarenko and Kavun, 2008; Trydid and Kavun, 2014). Its implementation can be efficient under the methodological and methodical support of synthesis of banking security system, suggested by (Trydid and Kavun, 2014).

Conclusion. Cyclical use of methodological and methodical principles of synthesis of bank security system is a regular spiral process effecting the company performance. The efficient use of it under conditions of spiral development will gain profitability (Trydid and Kavun, 2014).

This paper offers the concept of information and analytical support that can be used in a bank as a fundamental bank security system (BSS), the description and structure of which are presented according to the relevant international standards. It has proved the possibility for creating the systematic and generalized concept of information and analytical support within bank security system. In addition, it con-

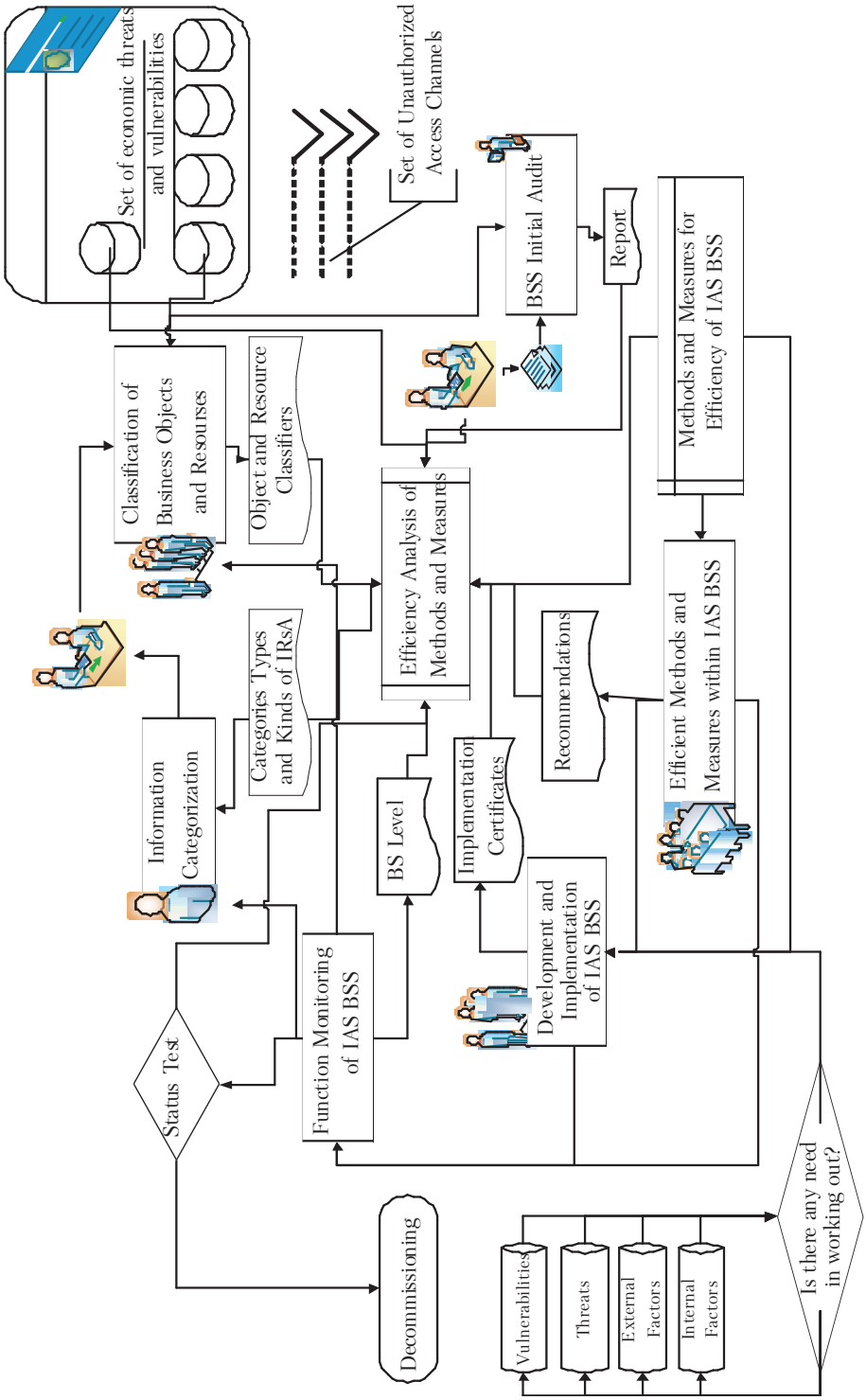

Figure 9. **Methodological Approach to Synthesis of IAS BSS,** *according to* (Trydid and Kavun, 2014)

firms a further improvement of one of the main factors in calculating the market value of any business entity and forming its high level competitiveness.

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