CONCEPTUAL FRAMEWORK FOR FUNCTIONAL ROLE ALLOCATION IN SMALL INTELLIGENCE ANALYTICAL TEAMS

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Abstract

The article examines the specific features of organizing the activities of small analytical groups within intelligence and information-analytical processes. The increasing volume of information, the high dynamics of the operational environment, and the need for the rapid production of analytical outputs necessitate the effective allocation of functional responsibilities among members of analytical groups. The purpose of the study is to substantiate an integrated approach to the distribution of functional roles in small analytical groups based on the combination of behavioral models of team interaction, responsibility allocation mechanisms, and agile coordination approaches. The methodological framework of the study is based on the methods of systems analysis, structural-functional analysis, comparative analysis, content analysis, modeling, matrix analysis, decomposition, and analytical generalization of practical experience. The study analyzes approaches to organizing team interaction, role allocation models, and Agile coordination mechanisms. The results of the study identify the key criteria for assigning functional responsibilities within small analytical groups, including professional competence, behavioral characteristics, workload level, motivational orientation, and team role type. An integrated model for the distribution of functional roles has been developed, combining Belbin's team roles, the RACI (Responsible, Accountable, Consulted, Informed) responsibility assignment matrix, and elements of Agile coordination. The sequence of functional responsibility allocation is substantiated, and a functional model of a small analytical group is proposed, consisting of a group leader, an analyst, and an analyst-engineer. The scientific novelty of the study lies in the development of an integrated conceptual approach to organizing the activities of small analytical groups through the combination of behavioral models of team interaction, formalized responsibility allocation mechanisms, and adaptive coordination tools operating within a dynamic information environment. The practical significance of the obtained results consists in the possibility of applying the proposed approach to the organization of analytical groups engaged in intelligence activities, information and analytical support, and decision-making support processes.

Key words: Analytical Process, Intelligence Analysis, Small Analytical Group, Belbin Team Roles, RACI Matrix, Agile, Functional Role Allocation.

Introduction

The analytical process constitutes a key component of the intelligence cycle, as it ensures the transformation of fragmented data into actionable intelligence capable of supporting managerial and operational decision-making (Clark, R. M., 2003) The effectiveness of an intelligence system largely depends on the ability of analytical units to process large volumes of information in a timely

manner, assess its reliability, generate forecasts, and satisfy the information requirements of intelligence consumers (Cummings & Verhappen, 2003).

The intelligence process is expected to fulfill three fundamental functions: creating conditions for the formulation of intelligence requirements by consumers, ensuring the prompt utilization of available intelligence data to address those requirements, and organizing the rapid acquisition of new information to eliminate identified information gaps (Clark, R. M., 2003). Consequently, analysts are required not only to process and interpret data but also to coordinate interaction among all participants in the intelligence process and develop predictive assessments of the operational environment.

An important component of analytical activity is data management, which includes data selection, validation, storage, accessibility assurance, and documentation for subsequent interpretation and analysis (Cox, 2012). The continuous growth of information volumes, the multiplicity of information channels, and the necessity for rapid responses to changes in the operational environment significantly complicate the analytical processing of data. Under such conditions, the organization of small analytical groups becomes particularly important, as these groups are directly responsible for the development of intelligence and analytical products.

Previous studies indicate that the effectiveness of analytical groups depends not only on the professional competence of individual members but also on the quality of functional role allocation, the organization of team interaction, and the team's ability to minimize cognitive and organizational losses (Hastie, 2011; Straus et al., 2011; Labib et al., 2022). Members of analytical groups are expected to participate in problem identification, hypothesis generation and validation, data integration from multiple sources, and the application of contemporary analytical and collaborative tools.

A separate challenge concerns the allocation of tasks and responsibilities among members of analytical groups. In practice, ineffective distribution of functions often results in duplication of effort, excessive workload concentration on individual members, diminished accountability for final outcomes, and reduced quality of analytical products. This issue is particularly significant in small analytical groups, where individual participants frequently perform multiple functional roles simultaneously.

Despite the existence of studies addressing team dynamics, behavioral models, and agile management methodologies, the adaptation of role and responsibility allocation approaches specifically to small analytical groups operating within intelligence environments remains insufficiently explored. In particular, further clarification is needed regarding the criteria for task allocation, mechanisms for incorporating participants' behavioral roles, and practical approaches to combining functional specialization with the principles of agile management.

Accordingly, the purpose of this article is to substantiate the procedure and criteria for allocating responsibilities among members of small analytical groups through the application of behavioral models of team interaction and elements of agile management methodologies.

Literature review

The issue of organizing the work of analytical groups has been examined within several research domains, including team interaction theory, organizational psychology, intelligence analysis, knowledge management, and agile management methodologies (Hastie, 2011; Hammerström, 2021).

One of the primary research directions focuses on the impact of group dynamics on the effectiveness of analytical activities. In their work, Straus, Parker, and Bruce emphasize that the performance of analytical teams largely depends on the quality of interaction among team members, as well as on the team's ability to minimize cognitive biases, group polarization, and confirmation bias (Straus et al., 2011). The authors argue that group interaction can both enhance the quality of analytical judgments and create risks of collective errors in the decision-making process.

A substantial body of research has been devoted to behavioral models of role allocation within teams. The most widely recognized framework is Meredith Belbin's team role model, according to which team effectiveness is determined not so much by the individual professional qualifications of team members as by the balance of their behavioral roles (Aritzeta et al., 2007). Belbin identified nine team roles, which are commonly classified into thinking-oriented, people-oriented, and action-oriented categories. This model has been extensively applied in team management, organizational consulting, and team-building practices.

At the same time, contemporary literature contains ongoing debates regarding the validity of the Belbin model. Some researchers report a positive relationship between role balance and team effectiveness. For example, Adamis identified a statistically significant association between the diversity of team roles and team performance. However, other scholars have highlighted the limited psychometric reliability of certain versions of the Belbin questionnaire and the substantial overlap between Belbin's team roles and traditional personality frameworks, particularly the Big Five model.

Another important research stream concerns the application of agile methodologies, including Agile, Scrum, Kanban, and Scrumban, to the organization of small teams. Recent studies indicate that the effectiveness of Agile teams largely depends on the level of self-organization, the maturity of group interactions, and the ability of team members to adapt rapidly to changing environments. Researchers argue that Agile approaches can reduce coordination costs, increase process transparency, and facilitate a more effective distribution of responsibilities among team members (Gren et al., 2019; Licorish & MacDonell, 2021).

Studies focusing on autonomous Agile teams emphasize the socio-psychological dimensions of collaboration, particularly the importance of group identity, trust, and behavioral compatibility among participants. Gren argues that psychological aspects of team interaction remain insufficiently explored within the context of Agile methodologies, despite their substantial influence on team productivity and performance.

An additional area of contemporary research addresses the formation of heterogeneous teams through the application of artificial intelligence methods and behavioral role models. Alberola and colleagues proposed a team formation tool based on Belbin's team role framework and machine-learning algorithms, demonstrating its potential to improve team interaction and enhance the effectiveness of collaborative task performance.

Despite the considerable volume of research on team interaction and team effectiveness, the majority of existing studies focus on business environments, information technology projects, or educational teams. The adaptation of behavioral role models, responsibility allocation frameworks, and Agile approaches to the operation of small analytical groups within intelligence environments remains insufficiently investigated. Limited attention has been paid to the specific characteristics of analytical work performed under conditions of high uncertainty, time pressure, information overload, and the need to integrate heterogeneous data sources.

Therefore, the literature review reveals a clear theoretical and practical need for the development of an adapted approach to the allocation of functional roles and responsibilities within small analytical groups, taking into account the specific requirements of intelligence and analytical activities, behavioral models of team interaction, and the principles of agile management.

The conducted analysis of existing scientific approaches indicates the absence of a comprehensive model specifically adapted to the operational characteristics of small analytical groups. This research gap has determined the direction and objectives of the present study.

Materials and methods

To achieve the research objective, a combination of general scientific and specialized research methods was employed to substantiate the procedure and criteria for allocating responsibilities

among members of small analytical groups.

The theoretical foundation of the study was based on scholarly works in the fields of intelligence analysis, organizational psychology, team interaction management, data management, and agile management methodologies (Agile, Scrum, and Kanban) (Clark, 2003; Straus et al., 2011; Aritzeta et al., 2007; Gren et al., 2019; Licorish & MacDonell, 2021). The analysis of scientific literature was conducted using content analysis and the systematization of existing approaches to the organization of analytical teams.

The following research methods were applied:

- **Systems analysis** was used to examine a small analytical group as an integrated functional system whose elements interact within the intelligence process.
- **Structural-functional analysis** was employed to identify the functional roles of analytical group members, determine their interrelationships, and define the allocation of responsibilities among participants.
- **Comparative analysis** was applied to compare different models of team interaction (Belbin Team Roles, RACI, and Agile/Scrum/Kanban) and assess their applicability to the activities of small analytical groups.
- **Content analysis** was used to examine scientific publications, methodological materials, and studies related to analytical activities and team interaction.
- **Modeling** was employed to develop a responsibility allocation model for a small analytical group based on the RACI responsibility matrix and Belbin's behavioral role framework.
- **Decomposition** was applied to divide complex analytical tasks into distinct functional stages and identify the competencies required for their execution.
- **Matrix analysis** was used to construct a responsibility assignment matrix among analytical group members in accordance with RACI principles.
- **Analytical generalization of practical experience** was employed to systematize approaches to organizing the activities of small analytical groups, identify common challenges in the allocation of functional responsibilities, and adapt contemporary team interaction models to the specific requirements of intelligence and analytical activities.

To determine the behavioral roles of analytical group members, Meredith Belbin's Team Role Model was applied. Role analysis was conducted based on the functional responsibilities of group members, the nature of their interactions, and the typical tasks performed during analytical activities.

The practical application of the proposed approach was carried out through the simulation of a small analytical group consisting of a group leader, an analyst, and an analyst-engineer. Within the simulation environment, participants performed tasks related to information processing, analytical assessment, situation forecasting, and the preparation of intelligence and analytical products.

Several Agile elements were incorporated into task organization, including:

- task decomposition through the use of a backlog;
- workflow visualization using a Kanban board;
- short task-monitoring cycles;
- interim reporting by analytical group members;
- retrospective evaluation of work results.

The research findings were analyzed using qualitative assessment techniques aimed at identifying the potential impact of functional role allocation on the organization and effectiveness of a small analytical group.

The application of the selected methodological approaches made it possible to develop an integrated model for functional role allocation and to define the key principles governing interaction within small analytical groups.

Results

As a result of the analysis of scientific approaches to the organization of analytical teams, models of team interaction, and practices of functional responsibility allocation, it was established that the effectiveness of a small analytical group largely depends on the alignment of functional roles, the level of specialization of its members, and the group's ability to adapt to changes in the information environment.

The conducted study made it possible to identify the key criteria for allocating responsibilities among members of a small analytical group, develop a sequence for assigning functional roles, and formulate an integrated interaction model based on the combination of the RACI responsibility matrix, Belbin's team roles, and elements of the Agile approach.

1. Criteria for Allocating Functional Responsibilities Among Members of a Small Analytical Group

The study demonstrated that the allocation of functional responsibilities within a small analytical group should be carried out on the basis of a set of interrelated criteria that directly influence the effectiveness of analytical task performance, activity coordination, and the sustainability of group interaction.

One of the fundamental criteria identified is professional competence (hard skills), which reflects the level of specialized knowledge, analytical capabilities, proficiency in working with information resources, analytical tools, and data-processing techniques. Assigning tasks without considering professional specialization may result in reduced quality of analytical products, increased information-processing time, and a higher likelihood of errors.

At the same time, the findings indicate that the effectiveness of small analytical groups is determined not only by the professional qualifications of their members but also by their behavioral characteristics (soft skills). The most significant characteristics include communication skills, resilience to stress, coordination capabilities, adaptability, and the ability to operate under conditions of uncertainty. Within analytical activities, these behavioral attributes largely determine the quality of information exchange among team members and influence the team's capacity to respond promptly to changes in the operational environment.

The analysis of small analytical group operations further revealed that the current workload of team members represents an important criterion for responsibility allocation. Uneven task distribution creates risks of overloading individual participants, generating bottlenecks in information-processing workflows, and reducing overall team productivity. Therefore, the allocation of functions should consider not only the specialization of individual members but also their available time resources.

In addition, the study found that the motivational orientation of team members affects their level of engagement in analytical tasks, the speed of decision-making, and the quality of intelligence and analytical products. Individuals tend to demonstrate higher effectiveness when assigned tasks that correspond to their professional interests and areas of specialization.

The analysis of team interaction models also identified the type of team role as a distinct criterion for allocating functional responsibilities. The application of Belbin's Team Role Model enables consideration of participants' behavioral characteristics and their predisposition toward coordination, idea generation, critical evaluation, quality control, or the facilitation of interaction among participants in the analytical process (Aritzeta et al., 2007).

Therefore, the study identified five core criteria for the allocation of functional responsibilities within small analytical groups (Table 1): professional competence, behavioral characteristics, current workload, motivational orientation, and team role type.

Table 1. Criteria for the Allocation of Functional Responsibilities in Small Analytical Groups

Criterion	Functional Significance	Risks if Not Considered
Professional competence	Quality of analytical processing	Analytical errors
Behavioral characteristics	Coordination of interaction	Interpersonal conflicts
Workload level	Stability of task execution	Formation of bottlenecks
Motivational orientation	Participant engagement	Reduced productivity
Team role type	Complementarity of functions	Role duplication

Source: Developed by the author.

The study established that the isolated application of a single criterion does not ensure the effective allocation of functional responsibilities. The most effective approach is a comprehensive one, in which decisions regarding role assignment are made through the simultaneous consideration of the professional, behavioral, and organizational characteristics of members of a small analytical group.

2. Integrated Model for Functional Role Allocation in a Small Analytical Group

The results of the study indicate that the use of individual team interaction models alone does not adequately address the specific requirements of small analytical groups operating within intelligence and analytical environments. In particular, Belbin's Team Role Model primarily focuses on the behavioral characteristics of team members, the RACI matrix emphasizes the formalization of responsibility, and Agile approaches are designed to enhance the flexibility and adaptability of work processes. However, none of these models independently provides a comprehensive framework capable of simultaneously addressing functional specialization, behavioral interaction, and the dynamic nature of the information environment.

To overcome these limitations, an integrated model for functional role allocation within a small analytical group is proposed. The model combines:

- Belbin's behavioral team role model;
- the RACI responsibility assignment matrix;
- elements of Agile coordination.

The proposed model is based on the principle of functional complementarity among members of the analytical group. Its core concept is the integration of professional specialization, behavioral characteristics, and levels of responsibility associated with the execution of specific analytical tasks.

The findings demonstrate that Belbin's Team Role Model facilitates the identification of behavioral tendencies among analytical group members and supports the optimization of task allocation according to individual strengths. The RACI matrix provides a formal mechanism for responsibility assignment and reduces the likelihood of functional overlap among participants. The Agile approach, in turn, creates conditions for flexible task management, rapid reassignment of roles, and adaptation to changes in the operational environment.

The analysis further revealed that the integration of these approaches enables:

- improved coordination and coherence of interaction among analytical group members;
- reduced risks of functional duplication;
- enhanced transparency in responsibility allocation;
- minimization of information-processing delays;
- increased adaptability of the group to changes in the information environment;
- reduced likelihood of cognitive and organizational losses.

The proposed model involves a sequence of interconnected stages, including analytical task decomposition, identification of required competencies, assessment of participants' behavioral roles, allocation of functional responsibilities, development of a responsibility assignment matrix, coordination of task execution, and continuous monitoring and adjustment of team interaction.

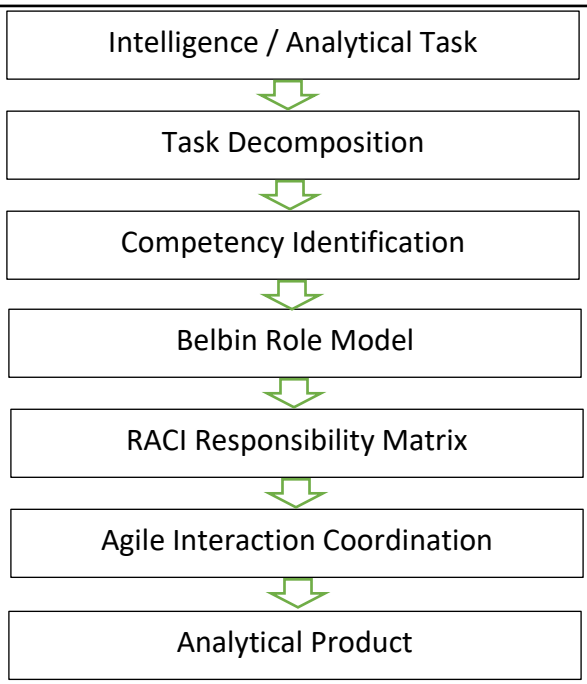

Figure 1. Integrated Functional Role Allocation Model for a Small Analytical Group
Source: Developed by the author.

The study revealed that a key characteristic of small analytical groups is the high intensity of functional interaction among team members and the necessity for partial role integration. Unlike large organizational structures, where functions can be rigidly specialized, members of small analytical groups frequently perform multiple functional roles simultaneously. This requires a high level of coordination, interchangeability, and rapid information exchange.

The findings indicate that the most effective organizational model is one in which:

- the group leader is responsible for coordinating team interaction, monitoring task execution, and making final decisions;
- the analyst performs the primary analytical functions, including information processing, hypothesis development, forecasting, and the preparation of analytical conclusions;
- the analyst-engineer provides technical support for data collection, processing, visualization, and workflow automation.

The study further demonstrates that the proposed integrated model enables an appropriate balance between functional specialization and interaction flexibility. Such a balance is critical for the effective operation of small analytical groups in conditions characterized by a highly dynamic information environment and limited organizational resources.

3. Procedure for Allocating Functional Responsibilities in a Small Analytical Group

The study demonstrated that the effectiveness of functional responsibility allocation within a small analytical group depends not only on the identification of participants' roles but also on the sequence and organization of the task allocation process itself. The absence of a clearly defined procedure may lead to functional duplication, ambiguity of responsibility, coordination failures, and a decline in the overall effectiveness of analytical activities.

The analysis of team interaction approaches made it possible to identify a sequence of stages for allocating functional responsibilities among members of a small analytical group.

The first stage involves the decomposition of the analytical task. At this stage, the overall intelligence or analytical task is divided into separate functional components, thereby establishing the structure of the group's future activities. The findings indicate that task decomposition enhances

process transparency, reduces uncertainty, and creates the foundation for the subsequent allocation of responsibilities among team members.

The study determined that the decomposition of analytical tasks should take into account:

- task complexity;
- the required level of specialization;
- time constraints;
- the need for cross-functional interaction;
- the volume of information to be processed.

The second stage consists of identifying the competencies required for the execution of each functional component of the task. The results indicate that the effectiveness of a small analytical group largely depends on the degree of correspondence between task requirements and the professional characteristics of individual participants. At this stage, competency requirements are defined in relation to:

- analytical skills;
- information systems proficiency;
- digital literacy;
- critical thinking capabilities;
- communication and coordination skills.

The third stage involves matching functional tasks with the behavioral roles of group members. The analysis demonstrated that consideration of behavioral roles improves interaction among participants and reduces the likelihood of interpersonal conflicts. In particular:

- tasks associated with the generation of new ideas and alternative solutions are most effectively performed by participants exhibiting the characteristics of the Plant role;
- coordination and organization of work processes are more effectively carried out by participants assuming the Coordinator role;
- tasks requiring careful monitoring and verification of results are best assigned to participants performing the Completer Finisher role;
- critical evaluation and hypothesis-testing functions are most effectively performed by participants exhibiting analytical and evaluative behavioral characteristics, corresponding to the Monitor Evaluator role.

The fourth stage involves the development of a RACI responsibility assignment matrix. The findings indicate that the application of the RACI framework enables the formalization of responsibilities among members of a small analytical group and reduces uncertainty during task execution (Manning, 2006).

The RACI matrix provides:

- clear identification of task performers;
- assignment of accountability for final outcomes;
- identification of participants involved in consultations;
- identification of individuals who must be informed about task results.

The study also revealed that, due to the limited number of participants, members of small analytical groups frequently perform multiple RACI roles simultaneously. Under such conditions, maintaining an appropriate balance between responsibility concentration and the prevention of individual overload becomes critically important.

The fifth stage concerns the coordination of interaction among group members. The analysis demonstrated that coordination should be conducted continuously and should include:

- intermediate monitoring of task execution;
- information exchange among participants;
- clarification of priorities;

- adjustment of workload distribution;
- adaptation to changes in the information environment.

The study further established that the use of Agile practices enhances the flexibility of interaction within small analytical groups. In particular, the implementation of short reporting cycles, visualization of task execution processes, and rapid adjustment of priorities contributes to more effective management of analytical activities in a dynamic information environment.

Therefore, the findings indicate that effective functional responsibility allocation within a small analytical group should be based on the sequential integration of task decomposition, competency analysis, consideration of behavioral roles, formalized responsibility assignment, and flexible coordination of interaction among participants (Figure 2).

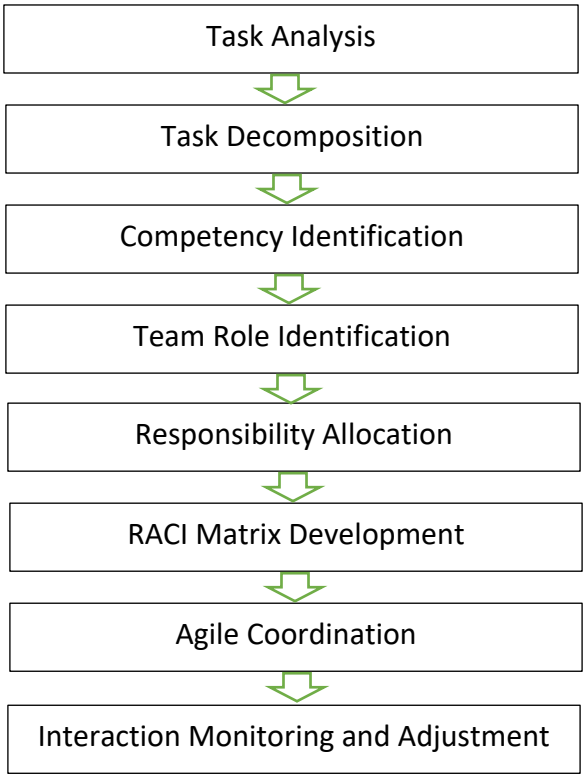

Figure 2. Procedure for Allocating Functional Responsibilities within a Small Analytical Group
Source: Developed by the author.

4. Functional Model of a Small Analytical Group

The results of the study indicate that the effectiveness of a small analytical group depends on the clear definition of participants' functional roles, the quality of their interaction, and the organization of information flows throughout the execution of analytical tasks. Unlike large analytical organizations, where responsibilities are typically highly specialized, members of small analytical groups frequently perform multiple functional roles simultaneously. This increases the requirements for coordination, interoperability, and the interchangeability of participants.

Based on the findings of the study, a functional model of a small analytical group was developed. The proposed model consists of three core positions:

- Group Leader**;**
- Analyst**;**
- Analyst-Engineer (Figure 3).

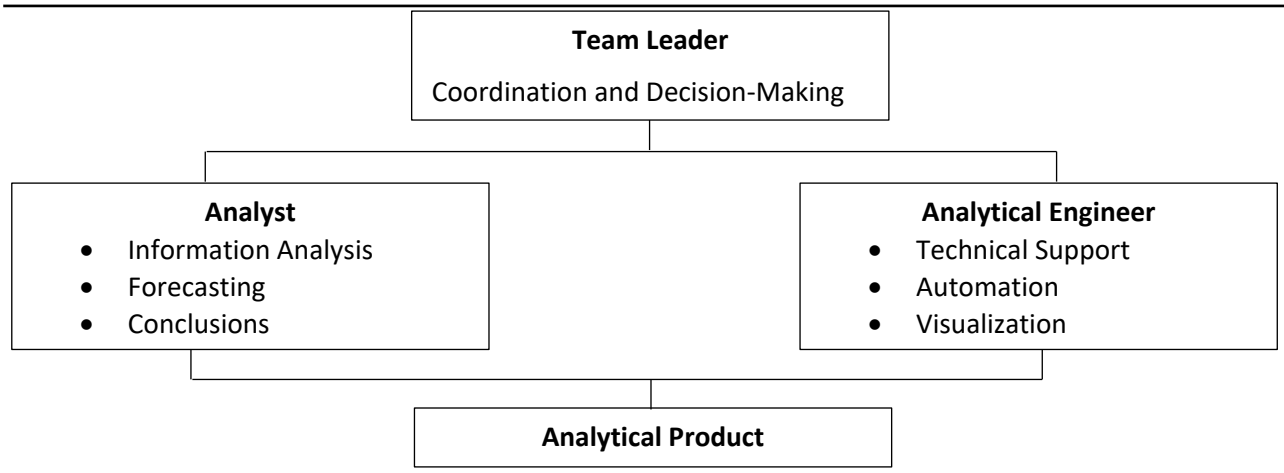

Figure 3. Functional Model of a Small Analytical Group
Source: Developed by the author.

The study established that the group leader performs the functions of strategic coordination and ensures the integration of individual contributions into a unified analytical product. The primary responsibilities of the group leader include:

- setting priorities for analytical activities;
- developing task execution plans;
- coordinating interaction among group members;
- making decisions regarding activity adjustments;
- controlling the quality of analytical outputs;
- presenting analytical results to intelligence consumers.

The analysis revealed that the group leader simultaneously performs the functions of coordinator, integrator, and final decision-maker. Within the RACI framework, the group leader predominantly assumes the roles of Accountable and Consulted, ensuring task oversight and alignment of participants' activities.

The study further identified the analyst as the primary performer within the analytical process, responsible for the direct processing and interpretation of information. The analyst's main functions include:

- analyzing information sources;
- developing hypotheses;
- identifying relationships and patterns;
- preparing forecasts and predictive assessments;
- formulating analytical conclusions;
- developing intelligence and analytical products.

The findings indicate that the analyst occupies a central position in the transformation of fragmented data into actionable analytical outputs. Within Belbin's Team Role Model, the analyst may combine the roles of Monitor Evaluator, Plant, and Completer Finisher, depending on the specific requirements of the assigned tasks.

The study also determined that the analyst-engineer provides technical support for information collection, processing, structuring, and visualization activities. The principal functions of the analyst-engineer include:

- automation of information collection processes;
- maintenance of databases;
- integration of information systems;
- application of data visualization tools;

- processing of large data sets;
- facilitation of information exchange among group members.

The findings demonstrate that the role of the analyst-engineer becomes increasingly important in the context of growing data volumes and the expanding use of digital analytical tools. Within the integrated model, the analyst-engineer ensures the technical adaptability of the analytical group and creates conditions for improving information-processing speed and efficiency.

The analysis of functional interaction among members of a small analytical group revealed that the organization of information flows constitutes a key factor in effective performance. The study found that the effectiveness of analytical activities decreases in cases of:

- delays in information transmission;
- duplication of information flows;
- ambiguity of responsibility;
- fragmented exchange of analytical results;
- excessive centralization of decision-making.

The research further established that an effective functional model of a small analytical group should ensure:

- continuous information exchange;
- transparency of responsibility allocation;
- the ability to rapidly reassign functions when required;
- minimization of information delays;
- adaptation to changes in the operational environment;
- a balance between specialization and participant interchangeability.

An important characteristic of a small analytical group is the necessity to maintain a high level of horizontal interaction among participants. Unlike hierarchical organizational structures, the effectiveness of a small group depends not only on vertical management mechanisms but also on the intensity of coordination among members, the speed of information exchange, and the capacity for collaborative decision-making.

Therefore, the developed functional model of a small analytical group provides a framework that combines functional specialization, interaction flexibility, and adaptability to changes in the information environment, all of which are essential prerequisites for the effective organization of contemporary analytical activities.

5. Adaptation of Agile Approaches to the Activities of Small Analytical Groups

The study revealed that traditional approaches to organizing analytical activities are often characterized by excessive managerial centralization, rigid task execution sequences, and a limited capacity to adapt to changes in the information environment. Under conditions of a highly dynamic operational environment, large volumes of information, and the necessity for rapid development of analytical conclusions, such approaches reduce the effectiveness of small analytical groups.

Accordingly, the study substantiates the feasibility of adapting selected elements of Agile approaches to the organization of analytical activities. The findings indicate that the application of Agile methodologies can provide:

- increased flexibility in task management;
- reduced response time to changes in the information environment;
- improved coordination among group members;
- enhanced transparency of task execution;
- reduced risks of information delays;
- optimized workload distribution among participants.

The analysis demonstrated that the approaches most suitable for the specific requirements of small analytical groups are Scrum, Kanban, and Scrumban.

Table 2. Comparative Characteristics of Agile Approaches in the Activities of Small Analytical Groups

Approach	Primary Focus	Advantages	Limitations
Scrum	Iterative task execution	Control of intermediate results	Lower flexibility
Kanban	Process visualization	Workload control	Lack of a rigid structure
Scrumban	Hybrid approach	Balance between flexibility and control	Requires a high level of coordination

Source: Developed by the author.

The study determined that Scrum is particularly suitable when analytical activities involve clearly defined stages and require regular monitoring of intermediate outcomes. The use of short work cycles (sprints) makes it possible to:

- structure the execution of complex analytical tasks;
- ensure regular updates of analytical information;
- adjust priorities in a timely manner;
- improve the manageability of information-processing activities.

The findings indicate that short planning and control cycles are especially effective in forecasting activities, operational environment monitoring, and the preparation of intelligence and analytical products under dynamic conditions.

The study further established that the Kanban approach is highly effective in visualizing task execution processes and monitoring the current workload of participants. The use of a Kanban board enables:

- transparency in task execution;
- monitoring of work progress;
- identification of participant overload;
- minimization of functional duplication;
- improvement of information-sharing and coordination.

The analysis revealed that controlling Work in Progress (WIP) is of particular importance for small analytical groups. An excessive number of parallel analytical tasks reduces participants' concentration, increases information delays, and negatively affects the quality of analytical conclusions.

The study identified Scrumban as the most adaptive approach for small analytical groups because it combines the structured nature of Scrum with the flexibility of Kanban. The findings indicate that Scrumban enables:

- maintenance of continuity within the analytical process;
- flexible reassignment of tasks;
- rapid response to changing priorities;
- balance between planning and adaptability;
- optimization of information flows among group members.

The results further demonstrate that the adaptation of Agile approaches to analytical activities requires consideration of the specific characteristics of intelligence and analytical processes. Unlike conventional IT projects, analytical activities are characterized by:

- a high degree of uncertainty;
- incomplete information;
- the need to process multiple information sources simultaneously;
- rapidly changing information requirements;
- the necessity for timely generation of analytical conclusions.

Consequently, Agile approaches within small analytical groups should not be applied as rigid managerial procedures but rather as instruments for enhancing flexibility and improving

coordination among participants.

The study identified the following Agile elements as the most effective for organizing the activities of small analytical groups: development of an analytical task backlog; workflow visualization; short coordination cycles; regular refinement of priorities; retrospective analysis of performance outcomes; flexible reassignment of functional roles.

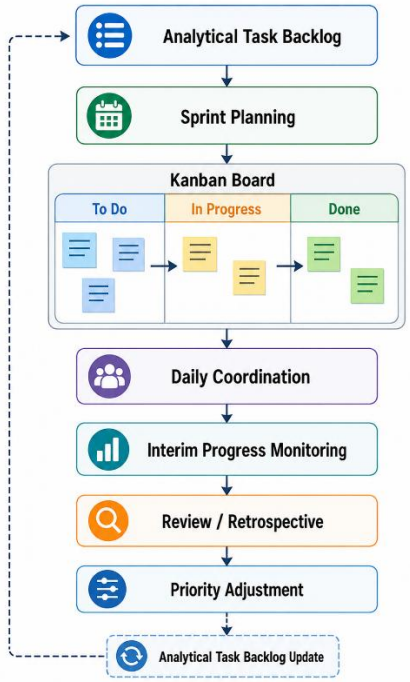

Figure 4. Agile Coordination of the Activities of a Small Analytical Group

Source: Developed by the author.

The findings indicate that the application of Agile approaches enhances the adaptability of small analytical groups to changes in the operational environment and facilitates more effective coordination among participants during analytical information-processing activities (Gren et al., 2019; Licorish & MacDonell, 2021).

6. Development of a RACI Responsibility Assignment Matrix for a Small Analytical Group

The study revealed that one of the key challenges in organizing the activities of small analytical groups is the ambiguity of functional responsibility among participants. In the absence of a clearly defined distribution of responsibilities, risks arise related to the duplication of functions, disruption of coordination, overloading of individual participants, and loss of control over the execution of analytical tasks.

The research determined that the RACI responsibility assignment matrix is an effective tool for formalizing functional interaction, as it enables the structured allocation of participants' involvement in the execution of analytical tasks.

The findings indicate that the application of the RACI framework provides:

- clear identification of task performers;
- formalization of accountability for final outcomes;
- identification of participants involved in consultation processes;
- transparency of information exchange and interaction;
- minimization of functional duplication among participants;
- improved coordination within the analytical group.

The analysis further identified the functional purpose of the principal RACI components within the structure of a small analytical group:

- Responsible (R) – the participant directly performing the analytical task;
- Accountable (A) – the participant responsible for the final outcome and decision-making;
- Consulted (C) – the participant or expert involved in providing advice and recommendations;
- Informed (I) – the individual who receives information regarding task progress or results.

Table 3. RACI Responsibility Assignment Matrix for a Small Analytical Group

Task	Group Leader	Analyst	Analyst-Engineer
Work planning	A	C	I
Information analysis	C	R	I
Development of conclusions	A	R	C
Data visualization	I	C	R
Automation of information collection	I	C	R/A
Quality control of results	A	R	C

Source: Developed by the author.

The study established that the activities of small analytical groups are characterized by the partial combination of multiple RACI roles by a single participant. This is primarily due to the limited number of group members, the necessity to maintain a high level of interaction speed, and the requirement for functional interchangeability among participants.

The findings indicate that the most critical aspect of applying the RACI framework within small analytical groups is maintaining an appropriate balance between the concentration of responsibility and the prevention of functional overload. Excessive concentration of the Responsible (R) and Accountable (A) roles on a single participant creates risks associated with:

- the emergence of bottlenecks in information-processing activities;
- delays in the execution of analytical tasks;
- reduced quality of analytical conclusions;
- an increased likelihood of cognitive errors;
- diminished adaptability of the group.

The study further demonstrated that the effective development of a RACI responsibility assignment matrix should be based on:

- the functional specialization of participants;
- the behavioral roles of team members;
- the level of professional competence;
- current workload conditions;
- the complexity of analytical tasks;
- the need for cross-functional interaction.

The findings indicate that within the structure of a small analytical group, the group leader primarily assumes the Accountable role, ensuring coordination of interaction, supervision of task execution, and final decision-making. The analyst most frequently performs the Responsible role, conducting the direct analytical processing of information and preparing analytical conclusions. The analyst-engineer provides technical support for the analytical process and may perform either Responsible or Consulted roles depending on the nature of the assigned tasks.

The simulation of a small analytical group demonstrated that the application of the RACI matrix enables:

- increased transparency in the allocation of functional responsibilities;
- reduced coordination time;
- minimization of duplicated information flows;
- more effective workload management;
- improved responsiveness and adaptability to changes in the operational environment.

The analysis of analytical practice further revealed that the use of the RACI framework is particularly effective in situations involving:

- complex cross-functional analytical tasks;
- operations conducted under time constraints;
- the coordination of multiple information flows;
- the involvement of participants with diverse functional competencies;
- interaction between analytical and technical specialists.

At the same time, the study established that excessive formalization of the RACI framework may reduce the flexibility of interaction among members of a small analytical group. Therefore, integrating RACI with Agile approaches is considered appropriate, as it provides a balance between formalized responsibility allocation and the adaptability required for analytical activities.

Consequently, the application of the RACI responsibility assignment matrix enables the structured organization of a small analytical group, enhances the coherence of functional interaction, and creates favorable conditions for the more effective execution of analytical tasks.

7. Practical Model for Organizing the Activities of a Small Analytical Group

As a result of the conducted research, a practical model for organizing the activities of a small analytical group was developed. The proposed model is based on the integration of functional role allocation, the RACI responsibility assignment matrix, and elements of Agile coordination. It is designed to ensure the effective execution of analytical tasks in conditions characterized by a dynamic information environment, limited resources, and the need for the rapid generation of analytical conclusions.

The study established that the practical organization of a small analytical group should be based on the following principles: functional specialization; participant interchangeability; transparency of responsibility allocation; continuous information exchange; adaptability to changes in the operational environment; flexible coordination of interaction among participants.

The analysis revealed that the practical implementation of a small analytical group's activities consists of several interconnected stages (Figure 5).

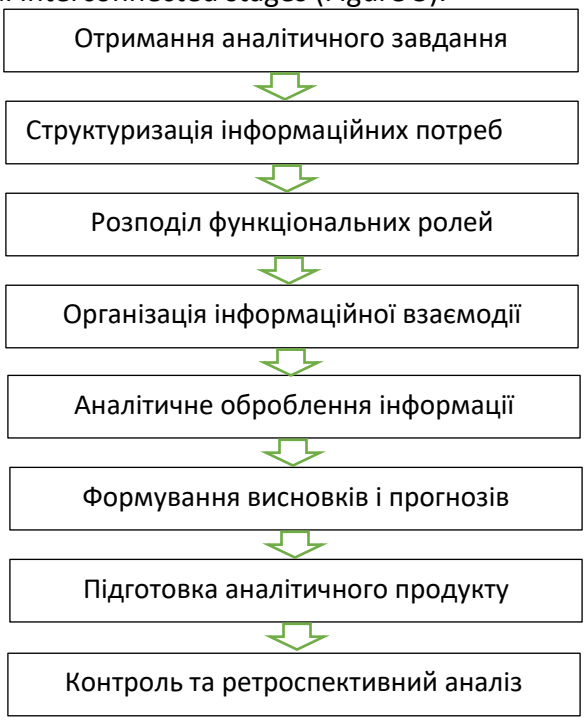

Figure 5. Practical Model for Organizing the Activities of a Small Analytical Group

Source: Developed by the author.

The first stage involves the receipt and structuring of an analytical or intelligence task. This stage includes:

- clarification of information requirements;
- determination of analytical priorities;
- assessment of time constraints;
- identification of information sources;
- preliminary assessment of task complexity.

The findings indicate that the quality of the initial task decomposition directly influences the effectiveness of the subsequent organization of the analytical group's activities.

The second stage involves the establishment of a functional interaction structure among group members. The study determined that this stage includes:

- identification of participant roles;
- allocation of functional responsibilities;
- assignment of responsibility levels;
- establishment of information exchange channels;
- definition of coordination procedures.

The analysis demonstrated that the most effective configuration is one in which the group leader coordinates interaction and supervises task execution, the analyst performs the primary analytical processing of information, and the analyst-engineer provides technical support for data collection, processing, and visualization activities.

The third stage involves the organization of the analytical information-processing cycle. Within this stage, the following activities are performed:

- collection of information from designated sources;
- verification of information reliability;
- integration of data from multiple sources;
- identification of relationships and patterns;
- formulation of hypotheses;
- forecasting the development of the operational situation;
- preparation of analytical conclusions.

The study established that the most critical elements of this stage are:

- the speed of information processing;
- the coherence of interaction among participants;
- the minimization of cognitive biases;
- the maintenance of continuous information exchange.

The fourth stage involves the coordination of task execution and the adaptation of group activities to changes in the information environment. The findings indicate that analytical activities frequently require:

- adjustment of priorities;
- reassignment of functional roles;
- redistribution of workloads;
- refinement of information requirements;
- modification of information sources;
- rapid response to emerging factors and developments.

The analysis demonstrated that the application of Agile practices enables more effective adaptation of small analytical groups to dynamic changes in the operational environment.

The fifth stage consists of performance monitoring and retrospective analysis. The study established that the effectiveness of a small analytical group largely depends on its ability to evaluate its own performance and continuously improve organizational processes.

The retrospective analysis includes:

- evaluation of the effectiveness of role allocation;
- analysis of information delays;
- identification of coordination problems;
- assessment of participant workloads;
- evaluation of the quality of analytical products;
- identification of opportunities for organizational improvement.

The findings indicate that the proposed practical model for organizing the activities of a small analytical group enables:

- improved coordination among participants;
- minimization of functional duplication;
- reduced preparation time for analytical products;
- increased transparency of responsibility allocation;
- enhanced adaptability to changes in the information environment;
- improved management of information flows.

Therefore, the proposed practical model provides a comprehensive framework for organizing the activities of a small analytical group through the integration of functional specialization, behavioral models of team interaction, formalized responsibility allocation, and flexible mechanisms for activity coordination.

Discussion

The obtained results demonstrate the feasibility of integrating behavioral, functional, and adaptive approaches into a unified model for organizing the activities of analytical groups.

The study established that the organization of small analytical groups possesses several distinctive characteristics that differentiate them from conventional managerial or project teams. These characteristics include a limited number of participants, a high intensity of information exchange, the necessity for rapid responses to changes in the operational environment, and the combination of multiple functional roles by individual participants.

The analysis of scientific literature revealed that most existing models of team interaction were developed primarily for business environments, information technology projects, or large organizational structures. Consequently, their direct application to small analytical groups operating within intelligence and analytical domains is associated with certain limitations.

In particular, Belbin's Team Role Model primarily focuses on the behavioral characteristics of team members and does not fully account for the specific requirements of functional responsibility allocation during the execution of analytical tasks. Conversely, the RACI framework provides a formalized mechanism for responsibility assignment but does not consider participants' behavioral characteristics or the dynamics of their interaction. Agile approaches, in turn, offer a high degree of organizational flexibility but lack mechanisms for the detailed allocation of functional roles within small analytical groups.

The findings indicate that the most effective solution is an integrated approach that combines: Belbin's behavioral team roles; the formalized RACI responsibility assignment framework; Agile-based coordination mechanisms.

The study demonstrated that the proposed integrated model compensates for the limitations of individual approaches and provides a comprehensive framework for organizing the activities of a small analytical group.

Comparative analysis revealed that reliance solely on behavioral models of team interaction creates risks associated with insufficient formalization of responsibility and ambiguity in functional duties. Conversely, the exclusive use of formal responsibility allocation without considering

participants' behavioral characteristics may lead to reduced coordination efficiency, interpersonal conflicts, and diminished group adaptability.

The study further established that the activities of small analytical groups are characterized by a high level of cognitive workload. This is primarily due to the necessity of:

- simultaneously analyzing large volumes of information from multiple sources;
- operating under time constraints;
- dealing with incomplete and contradictory information;
- developing predictive assessments;
- making rapid decisions.

Under such conditions, minimizing cognitive biases and organizational losses within group interaction becomes critically important. The findings indicate that a clear allocation of functional roles contributes to:

- reducing duplication of analytical activities;
- improving the quality of hypothesis validation;
- enhancing coordination of information exchange;
- ensuring more effective quality control of analytical conclusions.

The study also determined that maintaining an appropriate balance between functional specialization and participant interchangeability is of particular importance for small analytical groups. Excessive specialization creates risks associated with critical dependence on individual participants, whereas excessive generalization may reduce the quality of analytical information processing.

The proposed approach was found to provide:

- a structured organization of analytical activities;
- transparency of functional interaction;
- enhanced group adaptability;
- optimization of information flows;
- more effective workload management among participants.

At the same time, the study has certain limitations. The proposed model is primarily designed for small analytical groups and does not account for the specific characteristics of large, multi-level analytical organizations. Furthermore, the research is predominantly conceptual and practice-oriented in nature and does not include a quantitative assessment of the effectiveness of the proposed model.

Accordingly, promising directions for future research include:

- quantitative evaluation of role-allocation models;
- application of mathematical modeling methods to team interaction processes;
- investigation of the impact of cognitive biases on analytical outcomes;
- application of artificial intelligence technologies to support functional role allocation;
- development of adaptive coordination models for analytical groups operating in dynamic information environments.

Therefore, the findings indicate that the integration of behavioral team-interaction models, the RACI responsibility assignment framework, and Agile coordination mechanisms can significantly improve the organization of small analytical groups and support a more adaptive analytical process within contemporary information environments.

Conclusions

The study substantiated an approach to organizing the activities of small analytical groups based on the integration of behavioral models of team interaction, the RACI responsibility assignment matrix, and elements of agile management methodologies. The findings demonstrate that the effectiveness

of small analytical groups largely depends on the alignment of participants' functional roles, the quality of interaction coordination, and the group's ability to adapt to changes in the information environment.

The research identified the principal criteria for the allocation of functional responsibilities within a small analytical group, including: professional competence; behavioral characteristics; current workload of participants; motivational orientation; team role type.

The study established that the isolated application of individual team interaction models does not provide a comprehensive consideration of the specific characteristics of small analytical groups. Accordingly, an integrated model for organizing the activities of a small analytical group was proposed, combining: Belbin's behavioral team roles; the RACI responsibility assignment matrix; elements of the Agile approach.

The research further developed a sequence for allocating functional responsibilities, which includes: decomposition of analytical tasks; identification of required competencies; matching functional tasks with behavioral roles; development of a responsibility assignment matrix; organization of coordination mechanisms among group members.

The findings indicate that the application of the RACI matrix enhances transparency in responsibility allocation, minimizes functional duplication, and improves coordination among participants in the analytical process. At the same time, the adaptation of Agile elements contributes to greater organizational flexibility, shorter response times to changes in the information environment, and more effective management of information flows.

The study also developed a functional model of a small analytical group consisting of a group leader, an analyst, and an analyst-engineer. The functional responsibilities of each participant, as well as the characteristics of their interaction during the execution of analytical tasks, were identified and substantiated.

The scientific novelty of the research lies in the development of an integrated approach to functional role allocation within small analytical groups that combines behavioral models of team interaction, formalized responsibility assignment mechanisms, and flexible coordination practices in a dynamic information environment.

The practical significance of the findings lies in the possibility of applying the proposed approach to the organization of small analytical groups engaged in intelligence and analytical activities, decision-support information services, information processing, and coordination of interaction among participants.

Promising directions for future research include the quantitative evaluation of functional role allocation models, the application of mathematical modeling methods to team interaction processes, and the use of artificial intelligence technologies to support coordination and decision-making within analytical groups.

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Competing interests

The authors declare that they have no competing interests.

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