

## PLANNING IN A RESEARCH INSTITUTE

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**Purpose:** As with any organisation, one of the most important prerequisites for the effective operation of a research institute is proper planning of its functioning – that is, accurately defining the future and establishing all the resources necessary for scientific, financial and economic activities. This paper is an attempt to illustrate the importance of planning the activities of a research institute over different time horizons for its proper functioning.

**Design/methodology/approach:** To solve the research problem posed in this way, the following was used: (1) a method of analysing and critiquing the literature through literature studies leading to a possibly multifaceted presentation of the issue of planning the functioning of a research institute and (2) a document examination method involving the collection of source materials, which were: financial plans, prospective directions of scientific, development and implementation activities, thematic directional plans for scientific research and development work, the institute's strategy and the procedures and practices used to prepare the plans.

**Findings:** The research shows that the planning process at the research institute is subject to the requirements of the applicable regulations. This implies the necessity to draw up four types of plans in terms of: prospective directions of scientific, development and implementation activities, directional thematic plans of scientific research and development works and annual activity and financial plans.

**Originality/value:** In the article, the authors attempt to adapt universal planning principles to the specific activities of research institutes. This is a new issue and a response to practical needs.

**Keywords:** research institute; planning in research organization; science organization in Poland.

**Category of the paper:** theoretical paper.

### 1. Introduction

As with any organisation, one of the most important prerequisites for the effective operation of a research institute is proper planning of its functioning – that is, accurately defining the future and establishing all the resources necessary for scientific, financial and economic activities. Properly constructed plans, prioritised in terms of time (when?), subject (what?) and

execution (how?), preceded by a detailed analysis of the environment, identification of both the positive and negative sides of the institute and all realistically available opportunities for action under specific financial conditions, significantly increase the likelihood of proper operation and development.

This paper is an attempt to illustrate the importance of planning the activities of a research institute over different time horizons for its proper functioning. To solve the research problem posed in this way, the following was used:

- a method of analysing and critiquing the literature through literature studies leading to a possibly multifaceted presentation of the issue of planning the functioning of a research institute,
- document examination method involving the collection of source materials, which were: financial plans, prospective directions of scientific, development and implementation activities, thematic directional plans for scientific research and development work, the institute's strategy and the procedures and practices used to prepare the plans.

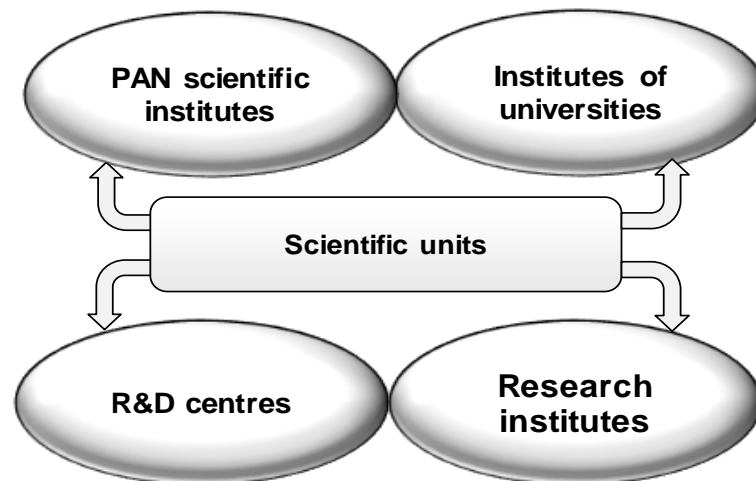
In this way, descriptive as well as quantitative information about the subject of the research was collected. In the course of it, the following activities were carried out:

- documents were collected and a preliminary selection was carried out,
- the authenticity of the documents collected was established and their reliability checked,
- document analysis was carried out.

The method used was complementary to the analysis of literature sources. Due to the necessity of ensuring an accurate, unambiguous and reliable analysis, it was necessary due to doubts arising in the course of interpreting the examined documents. The key condition, fulfilled at each stage of the research, was to demonstrate the reliability of the documents analysed. Another important aspect of the conducted research was that it concerned not only the material obtained in the process of anonymised research, but also as a result of activities unrelated to the research process undertaken.

## **2. The place of the research institute in the economy and science**

A research institute is a legally and economically distinct organisation (system), with legal personality, comprising structured elements (subsystems), between which there are specific links for the realisation of set objectives. There are various institutes – scientific institutes belonging to the Polish Academy of Sciences (Polska Akademia Nauk – PAN), institutes of higher education, institutes that are science and development centres and independent, specialised research institutes (Figure 1).



**Figure 1.** Research institutes among scientific units.

Source: own work based on (Gryzik, 2017).

Their main domain is to carry out research and scientific activities, but the institutes of the Polish Academy of Sciences and universities are primarily oriented towards the development of science per se, while the activities of research and development centres and independent research institutes are mainly directed towards the commercial provision of specific solutions for the needs of various entities (Cilak, 2015).

According to the provisions of the Research Institutes Act (Law, 2010a):

- a) a research institute is a state organisational unit with legal personality, legally, organisationally, economically and financially separate, which conducts research and development work aimed at their implementation and application in practice,
- b) the core activities of the institute include:
  - carrying out research and development work,
  - adapting the results of scientific research and development work to the needs of practice, – implementation of research and development results.

The Act also distinguishes a special category of institute, which is a state research institute. By a decision of the Council of Ministers, such status may be granted to an institute which is commissioned to perform tasks of particular importance for the planning and implementation of state policy.

The main documents underpinning the operation of the institute are its statutes and organisational rules, which define the subject matter and scope of the institute's activities and the working procedures of its bodies.

In addition to this, the institute operates on the basis of an activity plan established for the period of a calendar year, specifying the most important tasks to be carried out during the period covered by the plan. The Act stipulates that the tasks included in the developed activity plan should be correlated with the provisions of the directional thematic plans of scientific research and development works, annual financial plans and established perspective directions of scientific, development and implementation activities.

Research institutes are responsible for their own liabilities and trade in their own name and on their own account. What is important here is the fact that institutes not belonging to the Polish Academy of Sciences or universities operate outside the public finance sector. This exclusion results in the fact that they have to cover the costs of their activities from the revenues they receive – they should therefore conduct activities aimed at self-financing (Wyszomirska, 2022). This is an intermediate form between non-economic activities (as in the case of budgetary units) and commercial activities – they operate at the interface between the scientific and economic sectors (Cilak, 2015; Gryzik, 2017).

According to the provisions of (Law, 2010a), a research institute derives its revenue from subsidies and grants and in connection with its basic and other activities, including the sale of the results of scientific research and development work, patents, protective rights and licences, implementation work, production of equipment and apparatus, certification, issuance of qualification certificates and other production or services. Subsidies and grants may only be granted for "financing activities for the implementation of the state's scientific, scientific-technical and innovation policy, in particular scientific research, development work and the implementation of other tasks of particular importance for civilisational progress, economic and cultural development of the state" (Law, 2010b).

It is clear from this that they can be commercially active – the institutes provide a specific 'good' 'to the market', finding buyers to purchase it. From this point of view, they should be regarded as organisations operating in the market. Consequently, an institute that conducts research and commercially disseminates knowledge is an enterprise to the extent that it carries out economic activities. However, unlike 'typical' businesses, the main purpose of institutes is not to carry out commercial activities, but scientific and research activities serving the needs of the state or the economy, because that is what they were established for (Cilak, 2015). It follows that, the product offered is primarily newly developed technologies and innovative solutions. The optimal solution for a research institute is to license them, which allows it to retain control over the result of the development work and share in future profits. It is possible to contribute the results of the work to a special-purpose commercial company – the establishment of capital companies and the taking up of shares in them is allowed by the provisions of the (Laws, 2010a). However, it is important to bear in mind that, as a result of the restructuring processes that industry is undergoing, including in particular in industries defined as 'heavy industry', due to the liquidation, merger or sale of many enterprises, the number of potential recipients of the results of scientific research and development work has significantly decreased (Gryzik, 2017). This puts the onus on research institutes to carefully plan their work so that the results meet the actual needs of future buyers.

In order to better coordinate and plan research and development, networks of research institutes are being established in Western European countries (Barcikowska, 2018). They mainly deal with applied research conducted in cooperation with industry. They are financed by the beneficiaries of the solutions developed, which are state-owned and private companies. In the case of planning and achieving results that are also of significant social importance, it is also possible to obtain, often substantial, public funding.

The managers of a research institute cannot assume that its primary income will be the subsidies received from the state. In order to function on the market, institutes should operate efficiently, and this requires good management. Hence the importance of the two most important management functions, in particular planning. The proper determination of the activities carried out in all areas of planning is a prerequisite for generating revenues sufficient to allow the institute to function. This is because it must be borne in mind that, according to the provisions of the (Law, 2010a), if it continues to make financial losses, the institute may be liquidated or declared bankrupt by the decision of the supervising minister (with the exception of an institute participating in the health care system).

With regard to the need for proper planning, in addition to the financial aspects, there is another thing that must be borne in mind and concerns scientific staff and their publication activities. It is extremely important for every research institute to obtain an appropriate scientific status. If it employs at least 12 independent researchers active in a particular scientific discipline, it is subject to mandatory evaluation (assessment) in that discipline. The result of this is, among other things, the award of an appropriate scientific category. In addition to being largely decisive for the prestige of the institute, the rights to conduct studies, doctoral schools, award degrees and titles and the amount of financial subsidy it may receive from the state budget depend on it. The size, type and scientific profile of the institute are taken into account in the evaluation process, and the parameters of the evaluations vary depending on the specifics of the fields of science being evaluated. The grade obtained depends, *inter alia*, on (the Ministry of National Education information):

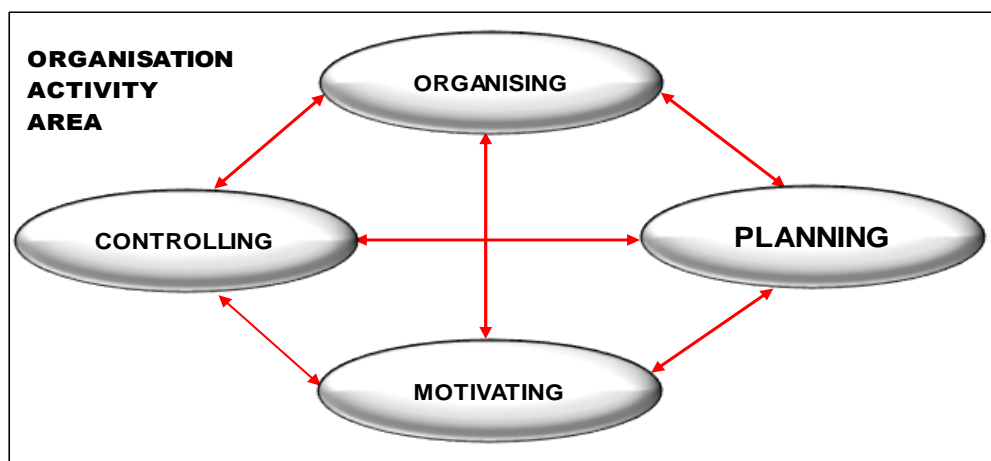
- evaluation of scientific level, measured by the number of scientific papers published in scientific journals and peer-reviewed proceedings of scientific conferences, monographs published, patents granted for inventions,
- financial impact of the research and development work carried out,
- impact of scientific activity on the functioning of the economy and society.

The prerequisite for obtaining a high rating is first and foremost the proper planning of the directions and topics of the research carried out, the number of scored scientific publications, employing an appropriate number of highly qualified scientific staff, undertaking cooperation with renowned national and foreign research centres.

### 3. The essence of planning in organisational management

In today's economic and business realities, the main conditions for the existence of any organisation, including a research institute, should be its development and the efficiency of its functioning. And these mainly depend on the quality of management (Bąk, 2018; Jonek-Kowalska, Turek, 2016).

There are a number of different definitions of the term 'management' developed by management scientists. In this paper, the best one to use will be the definition developed by the American scholar R.W. Griffin. He defined management as a set of four functions – organising, planning, motivating, controlling – directed at an organisation's resources (human, financial, physical, information), used with the intention of achieving specific organisational goals (Griffin, 1998). Within each of these functions, organisational managers use specific methods and approaches to achieve them. The different management functions, which cover the whole area of the organisation's activities, are interrelated and interdependent (Figure 2).



**Figure 2.** Planning considerations at a research institute.

Source: (Bąk, 2018).

In this interdependence, the two most important functions are organising and planning. Primacy should be given in particular to planning, which establishes the objectives of the organisation's activities and the ways and undertakings to achieve the objectives set. This results in the creation of different types of plans, which may differ in the length of time they cover or the objectives they address. However, they will always form the basis for the other functions: unplanned activities cannot be organised, monitored or motivated. This is particularly true for the monitoring function, which mainly consists of identifying deviations from, the plan's findings (Bąk, 2012; Jonek-Kowalska, 2017).

The end result of planning is a plan, which is a record of a simulation of the course of future activities (Trocki, Wyrozębski, 2015). A properly developed plan is a document that defines the directions, ways and goals envisaged to be achieved, with the necessary tasks of work and activities given. The planning of the functioning of each organisation should take into account

the conditions of the environment in which it operates, including, first of all, those of a legal nature (applicable laws, regulations, provisions) and of an economic nature (the possibility of carrying out effective activities ensuring existence and development in a competitive market). It should also cover different time horizons. Depending on their length, plans can be distinguished:

- long-term – strategic, concerning the development programme,
- medium-term – tactical,
- short-term – operational, concerning programmes of ongoing activities.

The interrelationship of these factors, and their interactions, is illustrated in the diagram shown in Figure 3.



**Figure 3.** Planning considerations at a research institute.

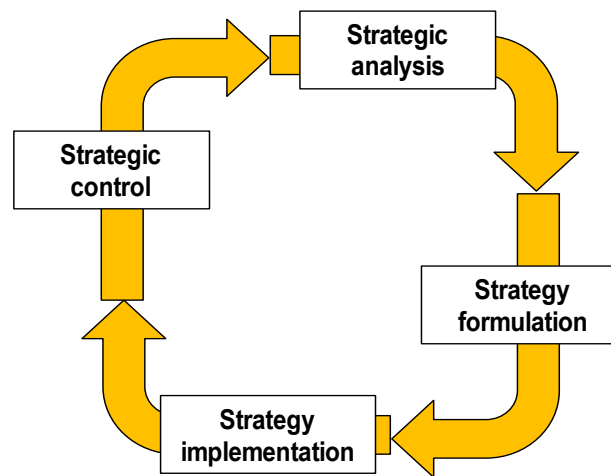
Source: own work based on (Griffin, 1998).

## 4. Planning in a research institute

### 4.1. Long-term planning – research institute strategy

In the most general terms, strategy can be defined as a combination of the objectives that an organisation is pursuing and the activities and means by which it intends to achieve them. In an organisation operating on the basis of the adopted strategy, strategic management is implemented, aiming to solve the key problems of the activity in a way that ensures its survival and development, with maximum use of its potential to reduce the threats coming from the environment in which it exists. Adopting the general model of strategic management, which

assumes the necessity of four stages – strategic analysis, strategy formulation, strategy implementation, strategic control – it can be concluded that a research institute should implement a sequence of activities (Figure 4).



**Figure 4.** Stages of the strategic management model.

Source: own work.

The starting point in the strategic management process is to carry out a strategic analysis including a diagnosis of the distant, proximate and internal environment. The strategic analysis of the situation of the research institute is about the fullest possible assessment of its condition and its current and future opportunities in the market, taking particular account of its resources and the likely directions of development of its environment. Obtaining information on the expectations of the environment and the capabilities of the research institute makes it possible to formulate:

- mission, defining the specific reason for its existence, giving an answer to the question of what distinguishes it from other institutes, what it is, what it does and where it is going,
- vision, indicating the situation in which the institute wishes to and may find itself in the future.

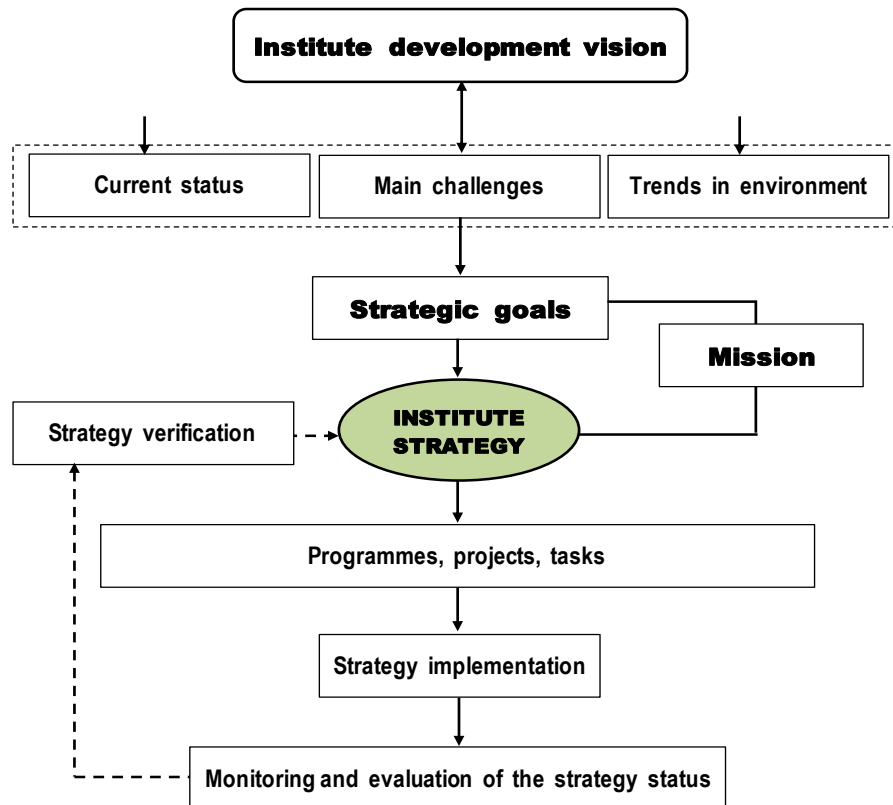
The organisation's system of objectives, defined at a relatively general level in the form of a mission and vision, and the analyses carried out of its interior and environment, form the starting point for defining key success factors. The constructed set of key success factors indicating the future desired states of the organisation is transformed into the form of a strategic objectives tree, assuming a simple mapping of lower-order objectives into higher-order objectives, or a strategic objectives map appreciating the cause-and-effect relationships occurring between the individual objectives.

The defined strategic objectives provide an ideal picture of the institute's intentions, a picture that does not in itself create any added value without specifying how the objectives are to be achieved and how they are to be measured. In order to ensure the applicability of the strategy, the goals must be translated into a system of strategic initiatives, each of which should



be broken down to the level of specific actions, to which responsible persons should be assigned, and timetables for their implementation.

Strategic initiatives can be implemented in the form of strategic processes (which are a set of cyclical activities related to the core business of the institute linked or interacting, transforming input resources into products or services), as well as strategic projects (defined as unique, one-off undertakings with a well-defined objective, set in a specific timeframe, for the implementation of which specific resources are allocated). The system of strategic objectives should be correlated with a system of metrics including key performance indicators.



**Figure 5.** A model for strategy work at a research institute.

Source: own work.

The next stage, the implementation of the strategy, is linked to the need for action on two levels:

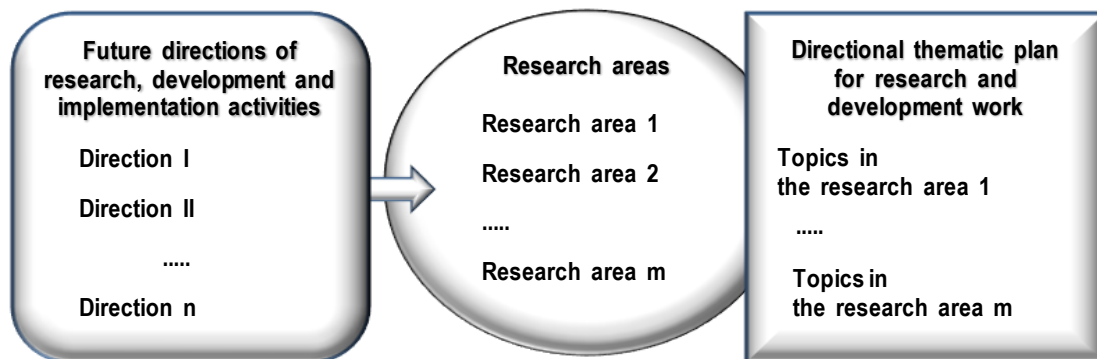
- the first – covering activities related to building mechanisms to implement and improve the strategy,
- the second, which includes projects aimed at aligning the organisation's components – systems, organisational structure, management styles, skills, competences, its organisational culture – with the adopted strategy.

The activities undertaken at the strategic control stage closing the strategic management cycle relate to monitoring the correctness of the implemented strategy and changes occurring in the environment. Dysfunctions identified in the strategy implementation process, or specific changes occurring in the environment, are the basis for returning to the beginning of the cycle and restarting the strategic analysis process (Figure 5).

#### 4.2. Medium-term planning – future orientations of research, development and implementation activities

In a period of dynamic change currently taking place in virtually all sectors of the global economy, resulting from intensive efforts to use resources efficiently through the transition to a clean, closed-loop economy and to counteract the loss of biodiversity and reduce the levels of pollution contributing to increasing climate change, the role of research and implementation work carried out by research institutes is increasing significantly. To meet such a challenge, it is necessary to develop a medium-term plan for the institute's structured tactical activities. This is a compilation of forward-looking directions for scientific, development and implementation activities, set by the institute's scientific council and sometimes referred to as a 'short-term strategy'. It usually contains provisions on the functioning of the research institute, most often in a 3-5 year perspective, referring in its content to the strategic documents shaping the state's scientific and economic policy and the signalled needs of the industrial and local government communities.

The prospective directions are defined with reference to the scientific fields and scientific disciplines which are the domain of the institute concerned. They are detailed in the next part of the document, called the directional thematic plan of scientific research and development works, established by the director of the institute. The individual lines of activity are most often grouped into specific research areas, and then, within a given area, the more detailed subject matter of the planned work is established. A diagram of how the plan is constructed is shown in Figure 6.



**Figure 6.** Diagram for constructing a tactical action plan at a research institute.

Source: own work.

In order to demonstrate the feasibility of the adopted assumptions, an important part of the plan is also to indicate the available sources of funding for the work and to present the institute's research potential in terms of its material resources (laboratories, research equipment) and intellectual resources (number and competence of scientific and research staff, possibility and ability to cooperate with the economic sector, technologies).

With regard to many research institutes, it is possible to assume that the implementation of scientific research and development works included in the directional thematic plan will be financed from the budgets of the Ministry, the National Centre for Research and Development, various special purpose funds and national and EU programmes under which they will be conducted. In many cases, it is assumed that funds will be obtained from domestic and foreign economic entities, state and local government offices and other entities commissioning specific scientific research and development works.

As an adequate research infrastructure is the basis for the successful implementation of the adopted assumptions, the next section of the document usually contains provisions concerning this issue. With regard to the existing research stations and the necessary apparatus and computer equipment and the necessary software, the plan presents the possible needs for their supplementation, together with an indication of the potential sources of funding for the necessary purchases and modernisation.

Bearing in mind that it is also necessary to employ an adequate number of staff with professorial titles and degrees at the institute in order to carry out the planned research and implementation activities, an analysis of the number of research staff and measures to maintain or increase it is necessary in the next section of the document.

#### **4.3. Short-term planning – annual activity and financial plans**

As required by the (Law, 2010a), the director of the research institute establishes an annual plan concerning:

- finances,
- activities of the institute.

Both documents are operational short-term plans for ongoing action programmes.

The annual financial plan, which is the basis for the management of the institute's resources, is a statement of anticipated costs and revenues, the amount of capital expenditure allocated to the development of research potential and anticipated employment. Planned revenues are presented in three groups, as:

- revenue under science funding from the statutory subvention for the maintenance and development of research potential and funding from national and international targeted projects,
- revenue from the sale of own research and service work carried out for external parties,
- other operating and financial income.

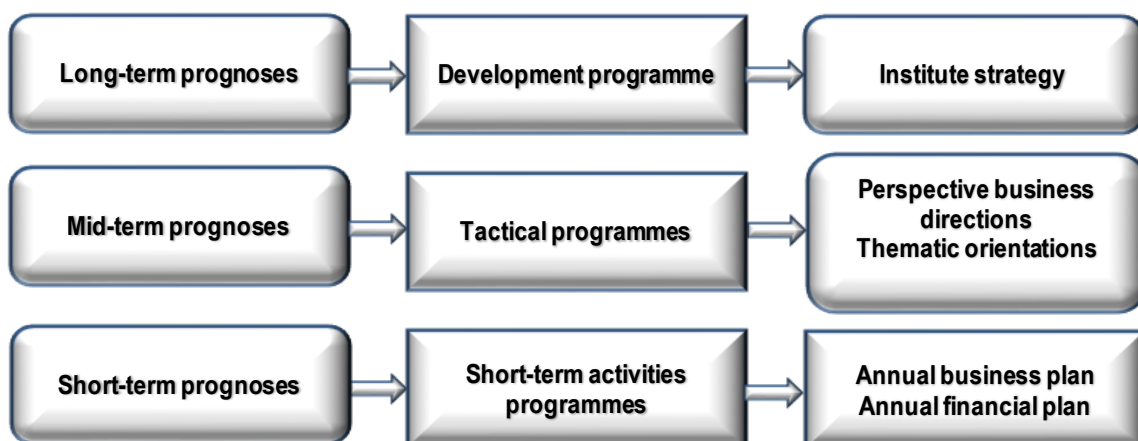
The next item in the plan is a breakdown of the Institute's anticipated operating costs by type, including: depreciation, materials and energy, purchases, services, taxes and charges, salaries, insurance and other benefits, and finance costs.

The final summary of the document is a combined statement of planned income and expenses, showing the gross financial result expected to be achieved.

The necessity to draw up an annual plan of the institute's activities was introduced by the amendment of the (Law, 2010a) effective from July 2023. It is assumed that this document will be prepared primarily on the basis of the provisions on the forward-looking directions of scientific, development and implementation activities and the directional thematic plan of scientific research and development works. The directions of scientific and development and implementation activities included therein, defined in a time horizon of several years, should be defined in more detail in the annual operational activities plan. In the case of a research institute, the document should primarily include:

- a compilation of major projects and national and international studies scheduled for implementation,
- an assumed number of publications in renowned national and international publishing houses,
- the assumed number of applications for research funding from external institutions,
- a summary of promotional and information activities,
- the amount of financial outlay for investment activities, with a list of modernisation and replacement tasks,
- the size of the planned workforce – in total and specifying the number of researchers,
- a list of cost-cutting measures,
- preliminary draft financial plan for the financial year.

The planning documents presented relate to the substantive and financial aspects of the research institute's activities and can be referred to as strategic, tactical and operational plans (Figure 7).



**Figure 7.** Summary of plans being developed at the research institute.

Source: own work.

To summarise the considerations of the different objectives and scopes of planning carried out at research institutes, a summary can be drawn up, directly indicating the differences that occur (Table 1).

**Table 1.***Features of strategic, tactical and operational planning in a research institute*

<b>Strategic planning</b>	<b>Tactical planning</b>	<b>Operational planning</b>
Institute strategy.	Prospective lines of business. Directional thematic plan.	Business plan. Financial plan.
Developed by the institute's management, reviewed by the scientific council.	The forward-looking lines of activity are set by the Scientific Council. The thematic directional plan is set by the director of the institute, the scientific council gives its opinion.	Determined by the director of the institute, opinion of the scientific council.
Defined over a horizon of at least five years, with an indication of prospects over a horizon of up to ten years.	Most often a three-year time horizon, no more than five years.	Annual time horizon.
Indicates actions to be taken to ensure the future sustainability of the institute's functioning and development. Defines the general lines of the plans and actions to be undertaken by the units and organisational units.	It sets out the specific objectives and directions of the activities included in the strategic plan. Often refers directly to 'single product' issues, e.g. a specific research area.	In conjunction with specific financial resources, it sets specific, detailed objectives to achieve strategic goals. It applies to both research and marketing activities to strengthen the institute's brand and position.

Source: own work.

## 5. Conclusions

The research shows that the planning process at the research institute is subject to the requirements of the applicable regulations. This implies the necessity to draw up four types of plans in terms of: prospective directions of scientific, development and implementation activities, directional thematic plans of scientific research and development works and annual activity and financial plans. In research institutes, there is no formal obligation to develop a functional strategy. The development of any type of plan is of vital, multi-faceted importance for the activities of a research institute. The proper selection of research directions that result in significant results, finding buyers interested in their implementation, and the employment of highly competent scientific staff, allow work to be carried out that provides significant support for the state economy and yields measurable financial results. It is also a prerequisite for the effective functioning of the institute and the building of its scientific prestige. There is a need for in-depth research on how to improve the planning process at the research institute.

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