

## A MODEL APPROACH TO MEDIUM- AND SHORT-TERM PLANNING IN A RESEARCH INSTITUTE

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**Purpose:** This paper is aimed at presenting the proper significance of the research institute operations' planning, including, but not limited to, the ones relating to the development of tactical and operating plans. It refers to the development of the tactical and operating activity plans in research institutes. Their importance for the effective institute work organization is stressed.

**Design/methodology/approach:** Its provisions are based primarily on the analysis of reference works and various planning documents developed in different institutes.

**Findings:** To guarantee that the projects will ensure existence and development of the institute, the plan scope (in particular for the operational ones) should cover the largest scope of the institute operations possible. The applicable legal requirements refer to four different plans, including two operational ones, i.e. the activity and financial plan. Besides them, it is advisable to develop plans "complementing" the implementation scope of the assumptions made in the operational strategy or medium-term plans, e.g. the marketing activity plan or plan to employ the required scientific or technical personnel.

**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; tactical plan, operating plan, Integrated Management System.

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

### 1. Introduction

According to the PWN Encyclopedia, "an institute is a name of various institution types, having legal personality, created to perform tasks stipulated in their statutes. At present, this name refers primarily to research and development or research and educational institutions or the ones within university or scientific corporation structures" (Encyklopedia.pwn.pl).

Based on this definition, the institute can be described as an organization created and operating for a specific purpose. To survive, develop and operate efficiently, every organization needs proper management. Referring to the definition of “management” studied by a separate management science, the reference works contain numerous definitions offered by various researchers. Here are some examples:

- It is an inherent component of every organization, regardless of its size or activity type. It is defined as a process of planning, organizing, coordinating and control of resources and activities to achieve the set objectives (Encyklopedia Zarządzania.pl).
- It is a managerial activity consisting in setting goals and getting them achieved (Pasiczny, 1981).
- It is designing the future that we want and the effective ways to achieve it (Ansoff, 1988).
- It is a set of four functions, including planning, organizing, leading and control, oriented towards the organization’s (human, financial, in-kind and informational) resources, used to achieve the specific objectives of the organization (Griffin, 1998).
- It is a process of planning, organizing, motivating and controlling the work of the organization’s members and using any organization’s resources available to achieve their objectives (Stoner et al., 2001).
- It consists in ensuring (creating on purpose) the conditions for the organization to operate consistently with its assumptions, meaning for it to pursue its mission, achieve objectives stemming from it and retain the consistency level required for continued operations, i.e. the differentiation from other organizations and development or, in other words, the pursuit of its mission and achievement of its goals in the future (Kozmiński, Jemielniak, 2011).

The most important of the four functions of the management process listed in reference works (Griffin, 1998; Stoner et al., 2001) is planning, as it is impossible to organize and control activities or to motivate employees (select the personnel, determine the task performance measures and the salaries and/or extra rewards), unless they have been planned. If there is no plan, the managerial activities will always be ad hoc, chaotic and casual, which makes them relatively ineffective and inefficient.

This paper is aimed at presenting the proper significance of the research institute operations’ planning, including, but not limited to, the ones relating to the development of tactical and operating plans. Its provisions are based primarily on the analysis of reference works and various planning documents developed in different institutes.

## 2. The basic information on the research institute and its operations

Pursuant to the Research Institutes' Act (the Act, 2010), it is: “an organizational unit, separate in terms of the legal structure, organization, economy and finance, which conducts scientific research and development works aimed at their implementation and application in practice”.

The basic scopes of the research institute activities include:

- conducting scientific R&D works,
- adapting the R&D results to the practical requirements,
- implementing the R&D results.

In Poland, there are various institutes, including the ones belonging to the Polish Academy of Sciences, universities, R&D centers and autonomous, specialist research institutes. Their major operations include research activities with the proviso that the institutes of the Polish Academy of Sciences and universities are oriented primarily towards the development of science, whereas the activities of the R&D centers and autonomous research institutes are targeted mostly at the provision of specific solutions to different entities (Cilak, 2015).

The Act specifies a special institute category, i.e. the “state research institute”. By the decision of the Council of Ministers, this status can be awarded to the institute, which is requested to do tasks of particular importance for planning and implementing the state policy.

The Act (2010) imposes the following obligations on the below-mentioned people and bodies:

- The institute head is obliged to develop the annual activity plan including the most important tasks to be implemented in a calendar year and the directional thematic plan of scientific R&D works.
- The institute scientific board is obliged to determine the prospective directions of the scientific, development and implementation activities.

Another document mentioned in the Act, meaning the mandatory one, is the annual financial plan, which should be considered in the activity plan of the research institute.

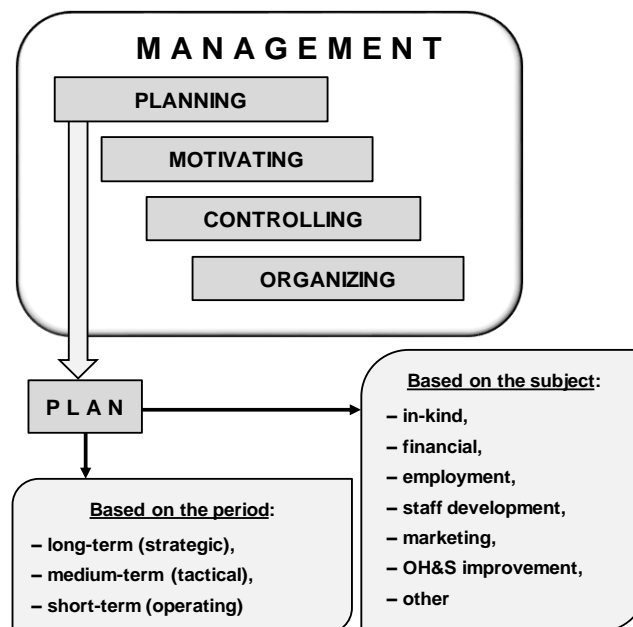
## 3. Significance of planning in management

Similarly to management, reference works provide various definitions of “planning” offered by different scientists. They are highly similar to one another and use analogous statements. Based on them, it is possible to capture the basic essence of planning in the simplest terms as designing future effects, specifying in detail who is to implement what, at what cost and in what time. Such a statement, being the end result of the planning process, is the organization's activity plan, or “a record of future activity simulation” (Trocki, Wyrozębski, 2015).

Planning, referring to various objectives, can (and should) refer to all the areas of the organization's operations, in particular the ones crucial for obtaining the assumed objectives. Proper formulation of goals to be achieved is of key importance for planning. It was most probably best captured by the American scientist G.T. Doran, who formulated the SMART rule of the organization's objective determination, based on which each objective should be: Specific, Measurable, Achievable, Rational and Time bound (Doran, 1981).

For planning to be rational and accurate, it must consider various boundaries, primarily the financial, resource- and time-related. Another important aspect is that the data being the basis for plan development is verified, preferably by its future performers, who should take active part in the planning process.

Depending on the needs, various plan types can be developed. Two basic criteria of this division include the time horizon (period), covered by the plan, and the subject of planning (Figure 1).



**Figure 1.** Plan type examples.

Source: own source.

The criterion analyzed in this paper will be the period, for which the objectives are planned. As shown in Figure 1, there are three different plan types, i.e.

- long-term (strategic), for 5 to 10 years of operation, specifying the organization's mission and vision, major operating objectives, the place, where the organization would like to be in the future, together with the resources it would like to use to get there,
- medium-term (tactical), for up to five years, describing more detailed ways to implement the primary, strategic objectives of the organization,
- short-term (operating), specifying the detailed tasks to be performed to implement the adopted assumptions.

The determined operating strategy specifies the major targets and objectives to achieve in general terms. To specify the current activity of the organization, the next step needs to develop more detailed plans, including tactical and operating ones (Table 1).

**Table 1.**

*Planning in an organization – periods and scope*

Period	Planning	Problems defined
Long – 5-15 years	Strategic	Why do we exist? What are our mission and vision? What should we deal with? In what direction should we go? What methods should we choose to achieve the goals?
Medium – 2-5 years	Tactical	What goals should we achieve? What activities should we take and what measures should we use? What will the required technical equipment be? Does the employed R&D staff have the required qualifications and is their number sufficient?
Short – 1 year	Operational	What should we do specifically next year? Who should be held accountable for it? At what expense? What results should be obtained?

Source: own study based on (Horvath, 1987).

#### 4. Medium-term planning – tactical one

The effects of scientific works and the implementation works carried out by the research institutes, in particular in the engineering and technical sciences, play highly important role in the contemporary world. Crucial in the aspect of the dynamic changes taking place now in virtually all global economy sectors, they refer primarily to projects aimed at reducing the growing climate changes, which threaten further existence of humans on Earth. Each year, there is a significant growth of the role of activities relating to the effective resource use thanks to the shift to the clean circular economy, reduced energy generation from fossil fuels, including coal, crude oil and gas, with a simultaneous increase in its production from renewable sources.

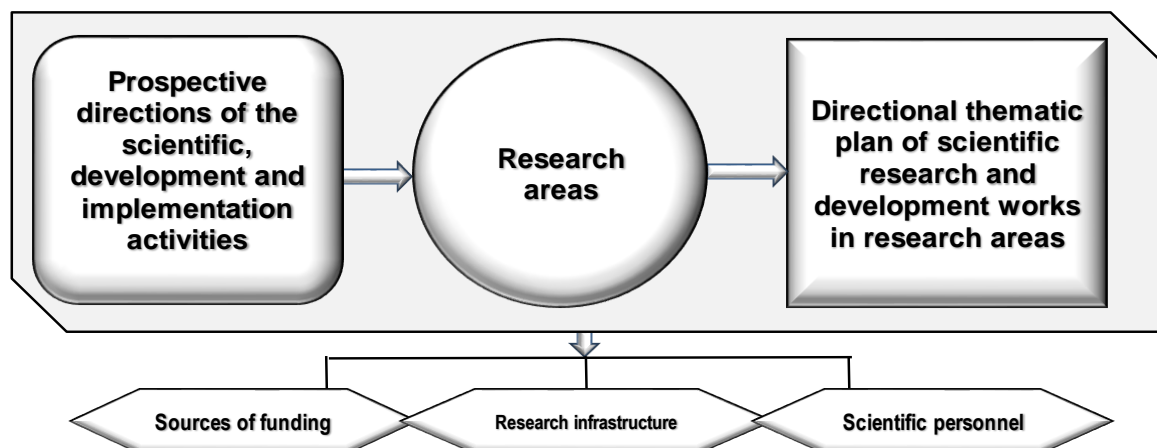
To meet the challenges faced by the research institute, it is necessary to develop medium-term plans of structured tactical activities first. Tactical plans determine activities required to achieve strategic goals. For the research institute, they include the ones listed in (the Act, 2010), i.e.:

- the list of perspective directions of the scientific, developmental and implementation activity developed by the institute scientific board, sometimes termed a “short-term strategy”. It sometimes contains the provisions on the research institute operations in 3-5 years, referring to the strategic documents shaping the scientific and economic policy of the state and to the needs of the industrial and local government milieus reported by them. The prospective directions are determined by the institute scientific board relating to the fields of science and scientific disciplines, and then grouped into research areas, which the institute is committed to;

- the directional thematic plan of scientific research and development works, developed by the institute head, with more detailed themes of the planned works specified in specific research areas. The plan is developed by the institute head and then subject to the scientific board's evaluation.

As the determined prospective activity directions and thematic research plans translate into the institute operations, both documents should also list the objectives to be achieved, with the measures of their implementation extent.

To stress the interdependencies between the two plans, they are usually included in a single document. The diagram of the way they are developed is presented in Figure 2.



**Figure 2.** Diagram of tactical operating plans development in a research institute.

Source: own source.

The same document should also contain the provisions specifying the feasibility of the adopted assumptions. They include:

- indication of the available sources of funding,
- characteristics of the institute research potential relating to:
  - the possessed research infrastructure and technical equipment,
  - the scientific and research personnel employed.

The source of funding for the scientific research and development works included in the directional thematic plan may be the funds from the budget of the minister supervising the institute, the National Centre for Research and Development, different special purpose funds, national and EU programs, within which they will be performed, and also from national and foreign business entities, state and local government administration bodies and other entities ordering specific research. The detailed scopes of funding are included in the annual operating financial plans.

The relevant technical infrastructure is grounds for the effective performance of the planned research. For this reason, the subsequent section of the document contains provisions on the possessed, required or modernized testing grounds, laboratories, test stands, specialist instruments, including the computer hardware and the indispensable software.

To implement the planned research and implementation activities, it is also required to employ the suitable number of employees holding the title of the professor, post-doc or PhD. Consequently, it is also necessary to analyze the number of the R&D employees and the activities aimed at maintaining or increasing it.

For many research institutes, which plan to implement the results of the R&D works and innovative solutions in other economic entities in practice to a significant extent, the final section of the document contains general information concerning that activity, which is important from the perspective of earning significant revenues on those grounds.

The scope of tactical targets presented in the horizon of several years is then specified in greater detail in various operating plans, developed usually for one year of the research institute operations.

## **5. Short-term planning – operational one**

Depending on the decisions of the research institute managers, the document may include various short-term plans, including those consistent with the provisions of (the Act, 2010), where two of them, i.e. the financial and activity-based one, are mandatory. Both documents are operational short-term plans relating to the ongoing activity programs.

The annual financial plan evaluated by the institute scientific board is a summary of the anticipated revenues and costs, investment expenditure to develop the research potential and the anticipated employment. The planned revenues are presented in three or four groups as:

- the revenues within funds for science, stemming from the statute subsidy for the maintenance and development of the research potential and within the grants relating to the implementation of the national and international special-purpose projects,
- the revenues from selling own research and service works performed for third parties,
- other operating and financial revenues,
- the revenues from subsidies for the performance of tasks of the state research institute (provided that the institute holds such a status).

Another section of the plan is the summary of the anticipated costs of the institute operations by type, including amortization/depreciation, materials and energy, purchases, services, taxes and levies, payroll, insurance, as well as other benefits and financial costs.

The annual financial plan is summarized by the list of the anticipated revenues and costs depicting the gross financial result to be obtained.

Starting from July 2023, the amendment to (the Act, 2010) imposes the obligation to develop the annual activity plan, evaluated prior by the scientific board, on the research institute head. Because of the period covered by it, it is another operating activity plan. The document should consider the assumptions of the prospective directions of the scientific, developmental

and implementation activities, as well as the directional thematic plan of scientific research and development works. Referring to the assumptions concerning the scientific and organizational activities of the institute, it should contain primarily:

- the list of the most important national and international projects and research to be performed,
- the assumed number of applications for research funds obtained from third-party institutions,
- the assumed number of publications by renowned Polish and foreign publishers,
- the list of training and educational projects implemented for third-party entities,
- planned employment in general or with the number of scientific employees,
- the summary of promotional and informational activities.

The correct development of the assumptions in the above aspects is crucial for the research institute operations and scientific status. The projects for third-party recipients and the special purpose funds for specific research are the basic source of the institute revenues enabling to fund its operations. Besides that, they are an aspect of the institute evaluation in the scientific field, where at least 12 senior scientific employees of the institute operate. The evaluation result translates into the award of the relevant scientific category, which gives the institute prestige and the award of the rights to organize university courses and doctoral schools, to grant degrees and titles, as well as of the financial subsidy, which can be obtained from the state budget. The score is conditional e.g. on (Evaluation – Information from the Ministry of Education and Science):

- evaluation of the scientific level, measured by the number of scientific papers published in scientific journals and peer-reviewed papers from scientific conferences, published monographs and awarded patents for inventions,
- financial effects of scientific research and development works,
- scientific activity impact on the economy and the society.

This means that the correctly planned directions and subjects of the research, number of ranked scientific publications and employment of the appropriate number of highly-qualified scientific personnel are highly important for the research institute operations and development.

Relating to the financial aspects, the annual activity plan should include:

- the assumed financial expenditure on investment activity, specifying the list of modernization and replacement tasks,
- the list of projects reducing the costs to be incurred,
- the initial draft of the financial plan for the budget year.

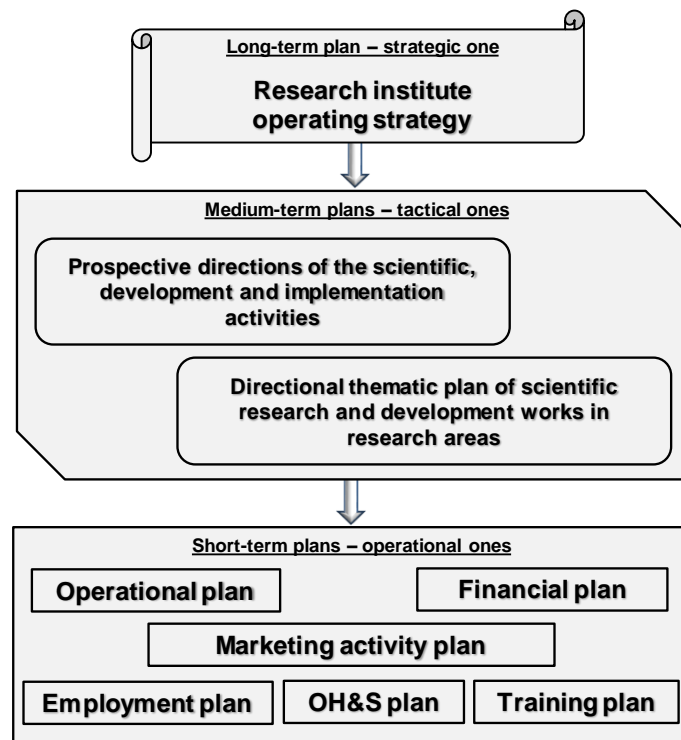


As already mentioned, the annual financial and activity plans are mandatory. If the institute managers believe that necessary, they may develop also other operational plans, including e.g.:

- a marketing activity plan, based on the strategic objectives included in the long-term strategic plan, which is to advertise the activities, which can be offered to external customers,
- a plan relating to the employment of professionals holding specific skills or licenses,
- a material and financial plan relating to the activities and purchases relating to OH&S,
- a plan relating to the training of employees aimed at improving their professional qualifications.

Because of the period covered by the above plans (starting from the research institute operating strategy), they create a certain cascade of more and more detailed provisions on the activities relating to the operations and development of the research institute (Figure 3).

It can be seen that, although the plans refer to different thematic areas relating to all the operations of the research institute, in many sections they contain provisions referring to the same problems. To avoid any discrepancies between the provisions, they should be developed (which is often done by different organizational units of the institute) in a coordinated way.



**Figure 3.** Summary of operational plans developed in the research institute.

Source: own source.

## 6. Integrated Management System – the planning location in the system

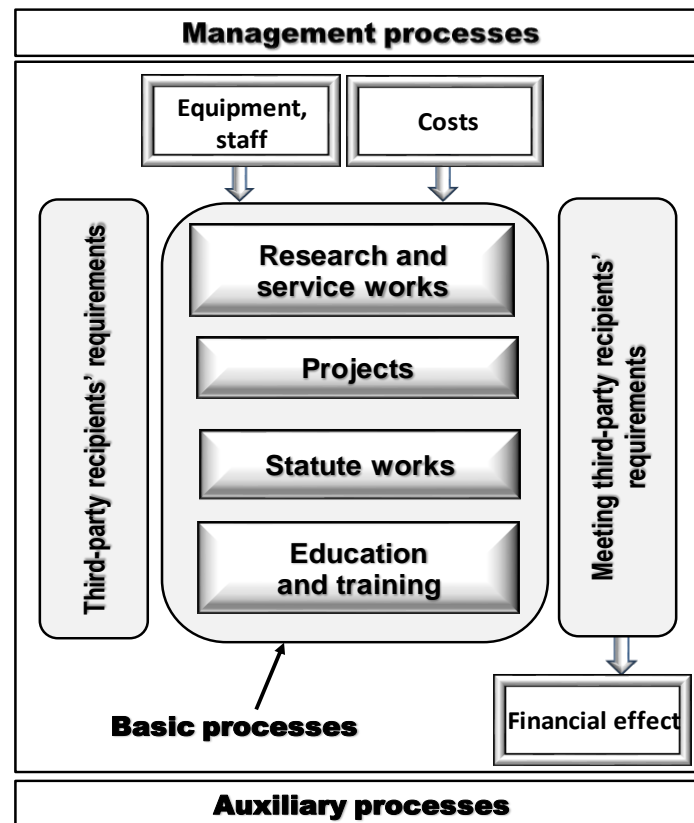
Provisions of various plans developed in the research institute can be coordinated by the implementation of the Integrated Management System (IMS) in it.

Starting from early 1990s, many Polish organizations initiated measures to implement various certified management systems, consistent with the requirements of ISO 9000 standards. Initially, they referred to the quality management systems, and then to the environmental, occupational health and safety management and information security management. As the number of the management systems used grew, the decision was made that, instead of dealing with individual systems separately, it is better to implement a single, comprehensive system to manage them simultaneously. This is how the Integrated Management System was created. Its implementation makes it possible for the organization to manage its operations more efficiently and effectively. It implements positive changes, contributing to the development of and increase in competitive advantage, e.g. by improved quality of the services offered and customer relations, and also to increased accountability of employees for the tasks performed (Olkiewicz, 2012).

All the activities under IMS must follow strict procedures. The basic IMS document is the Book of the Integrated Management System, being a source of information on the system, its requirements, maintenance and improvement. It contains, i.a., the description and map of processes carried out in the organization, with their relationships. Relating to the research institutes, it is usually possible to divide the processes into three groups, i.e. management, basic (business) and auxiliary one. The most important of them is basic processes relating directly to the institute operations, bringing about measurable financial results (revenues) stemming from the obtained subsidies or from revenues from research, designing, educational and training services. They include (Figure 4):

- “Research and service works”,
- “Projects”,
- “Statute works”,
- “Education and training”.

For the activities taken in every process shown in Figure 4, the institute must possess the suitable equipment (infrastructure) and the scientific and research personnel. Implementation of the related works entails expenditure, and their performance should bring about specific financial results.



**Figure 4.** Basic processes carried out in the research institute.

Source: own source.

Based on previous discussion, it can be noticed that all the components specified in the basic processes are covered by different plans developed in the research institutes. Consequently, in IMS, the plan development itself can be covered with relevant procedures, which provide detailed information on who is accountable for the development of specific planning documents and in what scope. This refers, in particular, to the operational plans, including, but not limited to, the two most important ones required by the provisions of (the Act, 2010), i.e. the activity and financial plans. The procedures developed for every plan type separately should specify at least:

- the subject of the procedure,
- the scope of responsibilities and authorizations,
- the detailed plan development method, determining the deadlines for specific work implementation,
- the way to monitor and supervise plan implementation.

It should be emphasized that, if the research institute has the implemented Integrated Management System, its procedures also comprise the detailed provisions on the mutual cooperation of its organizational units. Thanks to that, it is possible to determine the way to inform one another about the works on the development of individual plans, which will eliminate the danger of discrepancies between their provisions.

## 7. Conclusions

The thorough development of tactical and operational plans of actions in the research institute based on realistic assumptions is crucial for its effective operations. To guarantee that the projects will ensure existence and development of the institute, the plan scope (in particular for the operational ones) should cover the largest scope of the institute operations possible. The applicable legal requirements refer to four different plans, including two operational ones, i.e. the activity and financial plan. Besides them, it is advisable to develop plans “complementing” the implementation scope of the assumptions made in the operational strategy or medium-term plans, e.g. the marketing activity plan or plan to employ the required scientific or technical personnel. The precise allocation of the scopes of authorizations and obligations during plan development, resulting from the implementation of the Integrated Management System in the institute and covering the planning activities with the system procedures, should contribute to its improved quality.

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