



## Optimization of Non-Profit Projects' Portfolio: Chosen Aspects and Assumptions

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**Abstract.** The chosen aspects and assumptions of the author's proposal of the optimization model of the non-profit projects' portfolio are presented. The functional model of the non-profit sector (third sector), which is the base for the further analyses, is also characterized. The article also contains the quantification of fundamental conditions of portfolio optimization. There is developed the utility model for the management system in the non-profit portfolio, in the framework of which there are specified the scope of the model and relationships between four categories of the non-profit portfolio's participants/stakeholders: non-profit organizations, donors, co-participants and customers (recipients of the basic benefits/values associated with the realization of the non-profit projects). The main optimality conditions and optimization algorithm of the non-profit portfolio are also given. The paper is concluded with exemplary analytical matrixes used for optimization of the non-profit portfolios and based on the evaluation of both the optimization utility conditions and added parameters. Only basic and chosen aspects of the optimization of the non-profit projects' portfolio have been described here.

**Keywords:** Management, Organization, Non-Profit, Project, Portfolio, Optimization, Utility

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*The next thing to do is to think through priorities. That's easy to say. But to act on it is hard because it always involves abandoning things that look very attractive, that people both inside and outside the organization are pushing for. But if you don't concentrate your institution's resources, you are not going to get results. This may be the ultimate test of leadership: the ability to think through the priority decision and to make it stick.*

P.F. Drucker, *Managing the Nonprofit Organization: Principles and Practices*,  
Harper Collins Publishers, Inc., Collins Business, New York, 2005, p. 48

## 1. Introduction

An organization of the non-profit projects is a contemporary challenge to both the theory and practice of the project management. The autonomous management system, which undoubtedly is the non-profit<sup>1</sup> sector — in a contrast to the business activity aimed at generating and maximizing the value of the net profit — is not characterized in the full extent in the current scientific achievements.

There are presented meritorical fundaments for the author's model for the non-profit projects' portfolio optimization model in the article. The main goal of this paper is to contribute to the enrichment of the current state of knowledge in the area of projects (portfolios) management in the non-profit sector, mainly in terms of defining differences between determinants of the utility function. The optimization processes are presented from the main participant of the portfolio's point of view — the non-profit organization.

## 2. How to understand and interpret non-profit sector and projects?

### 2.1. Functional model of non-profit sector — initial assumptions

Any activity undertaken in the widely understood economy may take one of two forms: (1) *activity focused on a profit creation*, and (2) *non-profit activity*. Each of these forms differs from each other substantially. The basic discriminatory criteria are<sup>2</sup>:

- the objectives (strategic, tactical and operational);
- the strategies of financing the activities;
- the organizational structures;
- the classes of stakeholders/participants in a project's realization<sup>3</sup>;
- concentration on the values and the nature of organizational culture;
- the key success factors and indicators;
- the nature of the board (executives).

The organization can be treated as an unit of the third sector if it meets the following criteria: (1) *is organized institutionally* — has a statute, internal rules, structure of the operations, etc., (2) *leads a non-profit and non-market activities*,

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<sup>1</sup> There are used and treated as the synonyms the following terms: third sector, social sector, non-profit sector, non-commercial sector and non-governmental sector in the article (model).

<sup>2</sup> [3, pp. 100-102], [6, pp. 47-50, by: 9, pp. 29-30].

<sup>3</sup> There are used and treated as the synonyms the following terms: *realizer*, *conductor*, *executor* and *stakeholder* in the article. Thus, the *stakeholder* is treated as the *realizer* of a given project.

(3) is oriented at obtaining support from other units from the environment, (4) is founded generally by a private person and is institutionally independent from a government<sup>4</sup>. The non-profit sector can be seen through the prism of various functional features — however, main criteria of units' (that are forming this sector) classification are [29, pp. 17-27]<sup>5</sup>:

- the sources of funding statutory (basic) activities;
- the ability to generate additional profits for financing statutory activities;
- the categories of units that participate in projects realized in the sector;
- the categories of generated goods and classes of their customers/recipients<sup>6</sup>.

Having regard to four above criteria, it can be made a classification of units in a non-profit sector on two basic and internally consistent groups [29, pp. 17-27]:

1. **the public sector** — organizations focused on the implementation of tasks of a public nature, of which recipient is the public; so that the recipient of the results of activities is not identified. The statutory activity should be financed from the public funds. These units are not oriented to generate additional profits;
2. **the social sector** — non-governmental organizations oriented to meet needs of individual customers, generate the intermediate goods (between the commercial and public ones<sup>7</sup>). These units are not geared to generate additional profits that are spent on other statutory tasks, however, such an approach is not excluded.

The article is focused on the *social sector*<sup>8</sup>, for which there is developed the optimization model in a paper. It should be noted that the meritorical area of this model is narrowed to the analysis of the activities of **the associations and foundations**<sup>9</sup>.

Projects realized in the social sector can be divided (with the use of four mentioned above criteria) on seven groups reflecting the specificity of the projects' portfolio. The portfolio groups are shown in Figure 1.

<sup>4</sup> [38, p. 27, by: 9, pp. 28-29].

<sup>5</sup> Compare e.g. with: [22, pp. 63-66], [3, pp. 32-37], [6, pp. 38-43].

<sup>6</sup> There are used and treated as the synonyms the following terms: *recipient* (of benefits, project's results) and *customer* in the article.

<sup>7</sup> Depending on the situation, some social goods may be commercial goods through their physical form, but as a result of specific changes/actions in the area of social policy and a doctrine, become goods of a public access. See more [in:]: [29, pp. 25-26].

<sup>8</sup> The Polish social sector is regulated e.g. by: [44], [45], [46]. See also [15, p. 43 et seq.].

<sup>9</sup> The associations and foundations are an object of the considerations in this paper and a base of an optimization model, because (next to the *church legal person* and *volunteer fire departments*) have a possibility to get the status of the *public benefit organization* [11, p. 28].

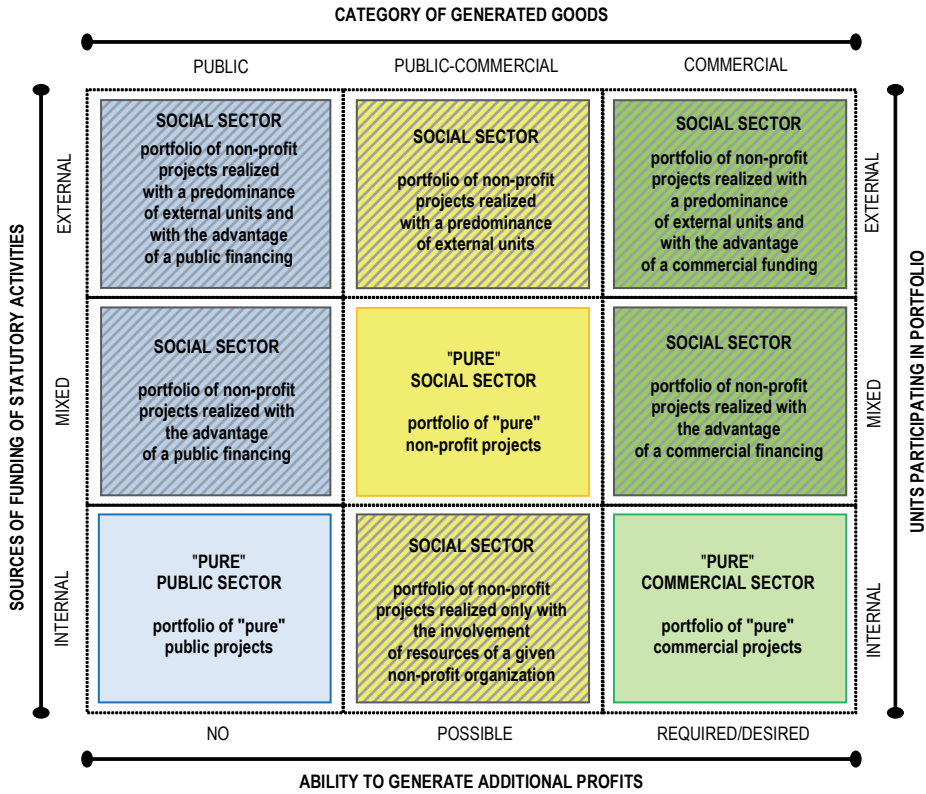


Fig. 1. The specification of the types of the non-profit projects in the social sector. Source: own study

The optimization model of the non-profit portfolio is focused on the portfolio group of the “pure social sector”, that has the possibility to generate the additional profits, public-commercial nature of generated goods (elements of the output of a system), heterogeneous sources of funding, and the possibility to participate in the portfolio by both the public and commercial (business) units. The choice of a “pure” portfolio is largely determined by the fact that this is the standard configuration of “forces” used in realization of the non-profit projects.

The way of tasks’ realization by the non-profit units in a “pure” social sector deviates from the standard perception of the non-profit activities, mainly by the significance of the multidimensional relationships with the commercial sector. Thus, the model of functioning of the non-profit units in a social sector (so-called the third sector) can be represented as a function of the value parameters:

$$MSS_{N-p} \stackrel{df.}{=} f(P_v), \tag{1}$$

where:  $MSS_{N-P}$  — the model of the social sector for the non-profit units;  
 $P_v$  — the value parameters, which are a set:

$$P_v = \{C_{rel}, T, F, Ef_{ec}, C, G\}, \quad (2)$$

while:  $C_{rel}$  — the categories of relationships with external units in the sector;  
 $T$  — the transfers between the model's elements;  
 $F$  — the category of financing sources for units in the model;  
 $Ef_{ec}$  — the economic efficiency of the non-profit organizations (the ability and potential to generate the additional financial gains, profits);  
 $C$  — the category of customers of the transfers' results;  
 $G$  — the category of goods generated by units in the model.

The value parameters (2) are described more precisely — in a context of the attributes of the non-profit projects — in a further part of the article.

## 2.2. Notion of non-profit organizations — perspective of mission

The goal of the non-profit organizations operations' is a *success*, like in the case of the commercial organizations. However, there is a different way of understanding of this *success* in a non-profit organization, which grows out of **the vision and mission**; and this goal is not made for the financial gains — and it might be the reason why this *non-profit success* is harder to be defined and seen in practice and constructively evaluated. The mission of the social enterprise is the answer to the following question: *why an organization is useful for an ambient and what it provides for precisely defined social groups?* [51, p. 48]. It should also be noted that the *mission* grows out of the vision of the organization and should bond the basic values promoted by the *founders* of the non-profit organization, its *employees* and *co-participants* (volunteers, business companies, public administration, donors, etc.). So, it can be assumed that the process of a vision constructing for the organization in the third sector is multiaspected and states a kind of a vector of the values, ideas, aspirations, etc. of the different classes of stakeholders of the non-profit projects [51, pp. 48-49]. This success is so important, because it determines the continuity of activities within the organization, as well it has a reflection in the social *usefulness* of this non-profit unit and, thus, the projects carried out by it. There is no necessity of functioning of the non-profit organization, when it is not **socially useful**<sup>10</sup>. It is also worth to mention that this *usefulness* grows out of the mission, which shapes the structure of the objectives

<sup>10</sup> Of course, besides the pathologically understood functioning of the non-profit organizations aimed at creation of the benefits (including the financial ones) for their founders and employees, and not for the society.

and, thus, the non-profit projects' portfolio. The mission, therefore, plays a special role in the development of the activities of non-governmental organisations, and in the intensification and improvement in the support for the society. The mission is responsible e.g. for: (1) *defining the essence of the organization*, (2) *showing it the direction of its development*, (3) *creating an image of the organization*, e.g. it assists processes of new donors' obtaining, or (4) *integrating the projects' conductors with the organisation*, e.g. the volunteers [51, pp. 48-49].

Considering the role and significance of the mission in non-profit projects' realization, it must be made a reference to the basic challenges of modern management (also in the third sector), to which should be included e.g. [18, pp. 12-13]:

- the need to use the Information and Communication Technologies in an extent scope;
- development of the new structural configurations of the organizations;
- building new relationships with the clients/beneficiaries/recipients of the value;
- the new approach to the Human Resources Management (e.g. the employees, volunteers, teams, etc.) and to the leadership;
- ensuring the innovations (mainly the organizational ones), and the stability of an organization (e.g. in terms the processes' continuity) in a variable environment.

It can be assumed that **the mission of the non-profit organization** is also (1) an *overriding element* in a relation to the indicated above challenges of a modern management, (2) a *solution* of some of them, and also (3) an *element that penetrates* these challenges.

Taking an issue of the role and importance of the mission of the modern non-profit organizations into an account, with a particular regard to a project management, it is worth to display the processes of both the construction and transformation of the mission, because the mission has a significant impact on the portfolio's optimization, starting from the stage of shaping the purposes (see: annex). The mission of an organization that bases on the three pillars: (1) *chances/opportunities*, (2) *competences*, and (3) *involvement* [10, p. 8], strongly refers to the *Non-Profit Three-Point Model* (fig. 2). This relationship, in fact, refers to the area of the relationships between the *mission* of the organization of the third sector and: (1) *vision*, (2) *strategic constrains*, and (3) *financial constraints* [21, p. 54]. The mission reflects the scope (in the framework of the materialization of the vision) of the organization's activity and the requirements in relation to its results. The mission should also take the elements of the strategy into an account, especially in the areas of identifying new markets/areas of activity, as well of adapting to currently explored markets, and demarcating the issues of ownership and responsibility of the organisation (what is particularly important in the case of the third sector) in the long time horizon. In the non-profit projects' realization, there is important

an impact of the mission on the area of the financial constraints, i.e. the support of processes of obtaining new donors and initiating and sustaining an involvement of the workers and volunteers [21, pp. 55-59]. An integration of the *vision*, *strategy* and *finance* in the *Non-Profit Three Point Model* — through the *mission* — determines a widely understood quality of the decision-making process, which in turn have an impact on the creation of new and the use of current opportunities, permanent development (improvement) of workers' competences, and strengthening their involvement (fig. 2).

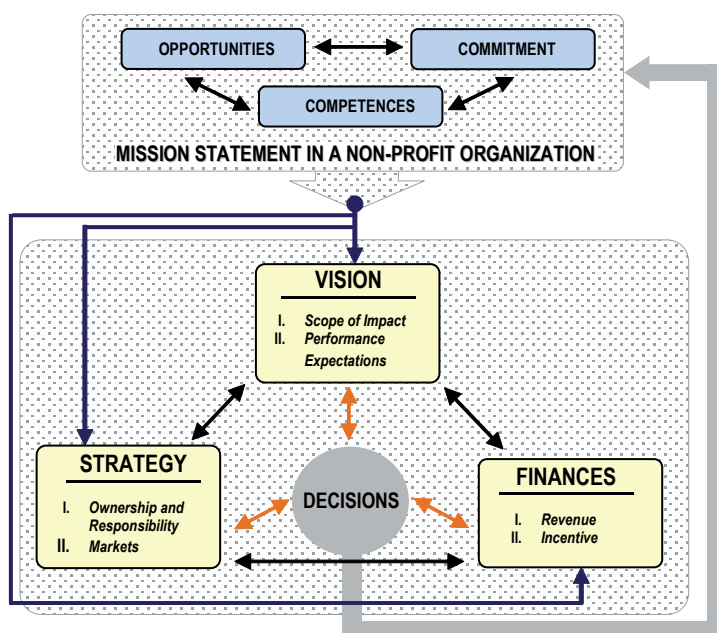


Fig. 2. The mission statement and the *Non-Profit Three Point Model*. Source: own study on a base of: [31, p. 2], [21, p. 54], [10, p. 8]

**The mission of the non-profit organization** should be consistent, and even the same as **the social mission** of this unit, and more specifically — the social missions (i.e. the provision of the results to the environment/society) of the individual projects in the portfolio. Of course, the social missions<sup>11</sup> of the individual projects may be (slightly) diversified — what should be regarded in the specification of the objectives of these projects and taken into an account in the portfolio's optimization — but always should reflect the essence of the mission of the whole organization.

<sup>11</sup> More information about the *social mission* [in:] [35, pp. 41-43].



The need to take the relationships between the *mission* and the *success* in the non-profit organizations into an account pointed out P.F. Drucker, who argued that the mission should reflect the actual reason for the existence of the organization and focus on what the organization is doing well, and what the promoters (stakeholders) of the non-profit projects believe in [10, p. 7]. The success should be underpinned by the innovation, however, it is worth to note that the implementation of the new projects and their joining to the portfolio requires an extra work from the stakeholders — with the caveat that temporary staff are not the *true believers* in the majority of cases [10, p. 15] — they are not strongly connected with the mission. But the managers and employees of the third sector organizations, that are oriented on a mission, are willing to cooperate in a long time period, because it generates better results (the outputs of the processes/projects) — there can also be seen a positive synergy effect<sup>12</sup> in a project. In addition, an element that bonds the areas of the mission and the success is a *leader* (especially a *transformational leader* [12, p. 2140]) who, on the one hand, sets the goals for the organization and projects and, on the other hand, is an exemplar for the project team (including volunteers) [10, p. 16]. Thus, it can be assumed that the leader integrates the project with the rest elements of the portfolio, and the leaders of the projects integrate the whole non-profit organization (fig. 3). The mission affects the way of functioning of both the individual leaders and the project teams. However, the success's achieving is burdened with the various types of threats. The examples include: (1) the *need for making a choice between the variety of resources and the focus on a specific activity by a leader*, or (2) the *decisions whether an action is an opportunity or a threat for the project* [10, pp. 24-25]. What more, if the mission is a source of the success (by an integration of the leader with the stakeholders) it should be well communicated. The mission is not, in fact, obvious to all stakeholders [10, p. 25, 45].

The mission of the non-profit organization is shaping its way of functioning — having regard to the scope of the responsibilities of the organization in relation to the stakeholders. In this case, there is an important role of the leader who is responsible for the results of the project team, and not only for the creation of ideas, planning and motivating. As P.F. Drucker indicates: “Leadership is *doing*” [10, p. 47], e.g. in the field of identification of the priority tasks [10, p. 48]. The leader is responsible for converting the mission from the intentions and knowledge into the effective operation [10, p. 49], also in the strategic dimension [52, p. 97]. A.K. Koźmiński notes that the leadership and management of the organization is a peculiar *spectacle* for the *general public*, from which much depends. The dramatic character of the leadership is to create the maximum emotional tension and maximum mobilization [28, p. 9], both within the organisation and in its surroundings. Therefore, this dramatic character should be read properly by the different classes

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<sup>12</sup> [2, by: 16, p. 96].



of the stakeholders of the non-profit projects. Therefore, the leadership oriented on the organization's mission should take the long planning horizon into an account — i.e. should have a form of the *strategic leadership* [7, p. 277] and translate it skillfully into the current planning (fig. 3). The results should be seen not only in the further future, but *tomorrow morning* [10, pp. 46-47, 49].

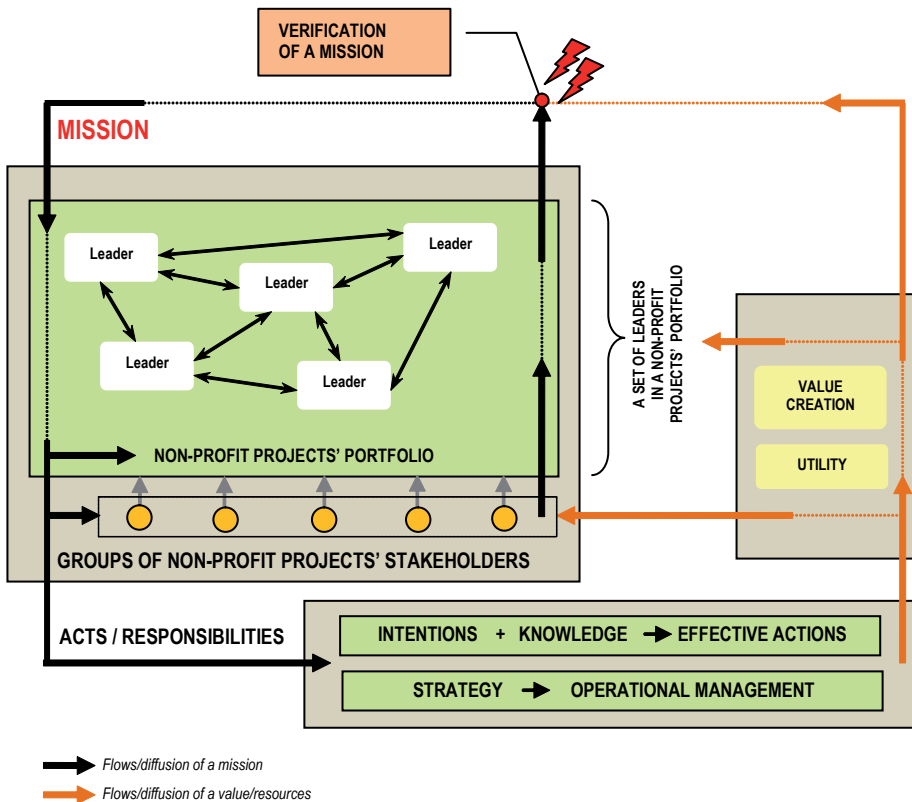


Fig. 3. The mission as an inherent element of the non-profit projects' implementation. Source: own study on a base of: [10, p. 16, 49]

The mission of the non-profit organization (and more precisely — the mission reflecting the specificity of a given project) is transformed into **the value created** for **the stakeholders** (*directly* — e.g. in the form of **the utility** of the results generated in the project; this is the social value, which may be seen e.g. through the prism of limiting the social exclusion of a specific social group [12, p. 2140]), and for **the organizations** (*indirectly* — e.g. by **increasing the involvement** of the environment in the projects). However, the variable conditions of an ambient (e.g. demographic changes) may cause the necessity of the mission's verification

[10, pp. 45-46] (fig. 3). The change of the mission occurs in the form of feedback from the stakeholders — they are also a source of the mission of the non-profit organizations. If the results of the projects are not satisfying for the environment (i.e. create too low value), then follows the need to modify the mission and change the optimality conditions of the non-profit projects' portfolio. The leaders are not allowed to permit the stratification of the mission and activities/processes in the projects [51, p. 49]. That is why the permanent verification of the mission is so important in the third sector. However, it should be kept in mind that the mission along with an each successive modification should not be broadened with the new and “better” tasks/goals. The mission still should be concrete and concise, because it generates the brightness of its communication and understanding in the surroundings, and also in the organization [10, pp. 5-6].

### 2.3. Non-profit project — what is it indeed?

The term **project** should be understood primarily as a complex, multi-objected activity, carried out in an accordance with the plan, which (due to the complexity of the case) should be made with the use of special methods<sup>13</sup> [42, p. 17], contained in a finite time interval, with highlighted both the beginning and ending of all processes<sup>14</sup> [42, p. 18]. The project is unique both in terms of the concept and execution<sup>15</sup> [42, p. 17], and is a response to the individual needs<sup>16</sup> [42, p. 17]. It should also be noted that the project is a temporary activity undertaken in order to create an unique result [36, p. 5] expected by the unit/structure/organization that is a main customer/recipient<sup>17</sup> of the values [42, p. 17], and the implementation of a project is under risk factors that may generate given loses/threats or profits/benefits [49, p. 13]. The project is also carried out in order to meet the requirements of the complexity and variability (the dynamics) of an ambient, i.e. the modern socio-economic system [24, p. 14]. The selected approaches (shown above) to defining the project display its basic attributes: (1) *complexity*, (2) *orientation on objectives*, (3) *precisely defined timeframes*, and (4) *innovative/novel character* [50, pp. 15-17]. This way to understanding the project category, taken from an area of the commercial activities, can be incorporated into the non-profit organizations and projects' management — however, with the provisions that:

- there may be changed the structure, scope, and specification of objectives in a non-profit project;

<sup>13</sup> By T. Kotarbiński.

<sup>14</sup> By K. Kukuła.

<sup>15</sup> By *Strategor*.

<sup>16</sup> By *Strategor*.

<sup>17</sup> By G.D. Oberlander.

- there can be shortened a planning horizon in a social project, because not in all types of the non-governmental projects it is necessary to prefer a long-term planning when it comes to the implementation of the individual projects — however, a non-profit project's portfolio management in an organization should have a strategic nature [41, pp. 81-83] (e.g. because it is useful in maintaining the continuity in a given organization, and in the defined classes of stakeholders);
- the complexity of the projects may be less than in the commercial ones, what is conditioned by a nature of a non-profit organizations' activities — in many cases the project is treated only as a fundraising process, conducted to *help an individual person/unit* (e.g. by funding medical care, specialist treatment methods, etc.), or to *support the society* (e.g. by organizing conferences, trainings, courses, educational programs, and giving professional advices in areas of ecology, entrepreneurship, culture, art, health care, consumers' rights, etc. [15, pp. 21-22], [35, pp. 41-43], [1, pp. 265-266], [51, pp. 15-16]);
- the innovativeness/novelty of created and developed solutions should be described (in many cases) in other categories than in commercial projects. For example, this criterion seems to be difficult to meet, especially in a case of organisations with a precisely defined activity profile, e.g. foundations that support a treatment of a particular type of disease. Although each case of customer/recipient of a value can be seen through the prism of a new (different from the previous actions) case/project.

In turn, **the projects' portfolio** should be understood as a set of projects in an organization [26, p. 27]. It should also be noted that a portfolio of projects is a collection/combination of projects managed and coordinated in such a way that the level of the total provided benefits would not be possible to achieve in the case of an individual management of each project<sup>18</sup> [26, p. 28], carried out under the direction of a single sponsor or one organization<sup>19</sup> [26, p. 28]. This depiction of a notion of the projects' portfolio points to the fact that the portfolio of projects is focused on *maximizing the benefits for an organization* — and taking the specificity of the statutory objectives of the third sector organisations into an account — and also (if not mostly!) the benefits of the general public, or its selected areas/subsystems, e.g. homeless, unemployed, handicapped, addicts, minorities and refugees, etc. [15, pp. 22-35]) — so, in other words, wherever the public sector's activities are impossible/hard to be carried out [52, p. 96], and the commercial sector's activities are unprofitable [9, p. 26]. On the other hand, there is underlined the network and system nature of the relationships shaped in the implementation of the non-profit projects in portfolios managed (in most cases) by a leading non-governmental organisation

<sup>18</sup> By A. Platje, H. Seidel and S. Wadman.

<sup>19</sup> By N.P. Archer and F. Ghasemzadeh.

(e.g. a foundation) in this approach. In the project portfolio management, there should be drawn an attention to [26, p. 27]:

- the identification of the sources of funding the activities<sup>20</sup>;
- the integration of the objectives of the organizations and individual projects<sup>21</sup>;
- the maximization of the values for the stakeholders in the project<sup>22</sup>

what has a particular importance in the social sector.

What is more, the third sector organisations can be usually called “*pure*” *project organizations*<sup>23</sup> — they are, in fact, set up for the implementation of specific projects and this is the essence of their statutory activity (in most cases, e.g. the foundations and associations). The possible — and often used in practice — variant of the non-profit projects’ realization is a *network project organization*<sup>24</sup>, especially with a strong participation of the particular classes of stakeholders in the implementation of the specific projects, e.g. business companies, local communities, volunteers, public administration, etc. However, there are possible to use other organizational structures of the project management in the third sector<sup>25</sup>.

As it was underlined previously, the projects conducted in the social sector can be defined in the different ways. In order to specify the essence of the non-profit projects’ management (and their portfolios), there should be identified the fundamental features of this class’ projects. The basic features of the non-profit projects are presented in Table 1.

TABLE 1

The basic features of the non-profit projects

Criteria	Description
Complexity	Project is a multi-aspect and multi-stage process. It is not a single and autonomous activity that generates the specified results. There must be a cause and effect relationship between the links responsible for implementation of an each task in a project.
Precisely defined objectives	Projects have to have the specific purposes and to be carried out with a view of reaching preliminary assumptions (in a form of the mission) — e.g. the maximization of the utility function of all implementers of the project/portfolio. The project has to have an objective — have to serve to somebody or something, and assist a development by promoting the action-oriented objectives (the strategic and operational ones).
Specified time of execution	The project must have a precisely defined the starting and ending moments. It is directly related both to the schedule of the project, as well to the realization of the goals. The project must be carried out according to a specific, defined plan.

<sup>20</sup> By H. Kerzner.

<sup>21</sup> By K.A. Artto, P.H. Dietrich and T. Ikonen.

<sup>22</sup> By M. Thiry.

<sup>23</sup> More [in:] [43, pp. 105-108].

<sup>24</sup> More [in:] [43, pp. 118-119].

<sup>25</sup> Other structures of a project’s organization are described [in:] [43, p. 72 et seq.], [51, pp. 29-34].

Continuation of Table 1

Criteria	Description
Novelty	The project should be innovative, as well should introduce a broadly understood element of novelty to the organization/portfolio/alliance/network. The project should be an activity that was not carried out in a similar form previously. Therefore, the routine activities/processes (also appearing in the non-profit projects' portfolio) cannot be defined as a project (however, a given non-profit project may be conducted in an organization for a long period of time, becoming an element of this organization/portfolio) <sup>26</sup> .

Source: own study on a base of: [42, pp. 13-15; 17-19], [50, pp. 15-16], [51, p. 58], [49, pp. 12-14], [24, pp. 14-18].

TABLE 2

The attributes of the non-profit projects

No.	Criterion	Attributes	Non-profit project		
			+	0	-
1.	<i>Categories of relationships in the project</i>	There are emotional-, psychological-, and social-natured relationships in a project	●		
2.		The responsibility of a project's executor only to the customer or the funding unit (donor)			●
3.		There is a social control in a project	●		
4.		There is a rivalry for customers in a project			●
5.		The recipient imposes on a project team a vision of the results	●		
6.		The multi-aspect and disinterested collaboration between the various executors of projects/portfolios for a given customer/recipient	●		
7.	<i>The nature of transfers</i>	The transfers are one-sided primarily (from a project's executor to a customer/recipient of a value)			●
8.		There are the financial and non-financial transfers in the non-profit project	●		
9.	<i>Sources of funding</i>	The commercial funding – by a customer			●
10.		The social funding of the projects (e.g. by the individual donors)	●		
11.		The public funding, e.g. in the form of donations and subsidies	●		
12.		The funding from own sources, e.g. activities of a project team (an organization)		●	
13.	<i>Economic efficiency</i>	The economic efficiency of projects is the main criterion in implementing the tasks in a project			●
14.		There is a need to generate profits by projects		●	
15.	<i>Category of benefits' recipients</i>	The main recipient (customer) is a commercial (business) unit			●
16.		The only recipient of the project is a customer			●
17.		The recipient is the individual that is in a need, is weaker, and is not able to achieve the set of its objectives on her/his own (mainly in a financial dimension)	●		
18.	<i>Category of generated goods</i>	Generated goods are commercial		●	
19.		Generated goods are public		●	
20.		Generated goods meet social goals and are consistent with the values recognized by the general public	●		

The following symbols mean: + (attribute meets a project), — (attribute does not meet a project), 0 (attribute is neutral). Source: own study on a base of: [51, pp. 14-15, 58], [15, pp. 166-169], [9, p. 32], [29, pp. 14-17], [20, pp. 27-28].

<sup>26</sup> More about *innovations* in the social organizations [in:] [35, pp. 43-44].

The additional criteria that determine the specificity of the non-profit projects are:

- the categories of relationships with other units carrying out the project (portfolio);
- the non-commercial nature of the activities (not aimed at generation of the tangible/financial benefits by the executives of the project/portfolio, mainly the non-profit entities);
- the sources of funding, which are a derivative of the relationship categories in a project/portfolio, and the nature and specificity of generated goods (as well of the recipients of these goods);
- the perception of the efficiency of the actions undertaken in the framework of the project portfolios' realization not only through the prism of the profits' creation;
- the category of customers/recipients, with a particular regard to the role of the individual customers who e.g. receive specific, free of charge benefits (transfers) for the realization of a particular purpose. The customer is precisely identified and is seen through the prism of support, empathy, assistance — and not a business transaction;
- the category of generated goods — the output elements of the non-profit system are the social goods<sup>27</sup> — and not the typical private/consumer goods).

The basic criteria of identification of the non-commercial projects are presented in Table 2. It should also be noted that these criteria are also the parameters of values for the social sector.

The differentiating criteria, presented in Table 2, may constitute a base for developing and specifying the assumptions of the model of the non-profit projects portfolio's optimization, especially at the stages of identification of conditions for the optimization, development of a utility model for a non-commercial management system, or construction of the optimization matrixes. These criteria demonstrate the significance of occurrence of the non-profit projects' participants.

#### **2.4. Stakeholders in non-profit projects**

The role and importance of the stakeholders in the non-profit project management and, thus, the optimization of the portfolios of this class' projects, is particularly important. As it was indicated in the previous subchapter, the projects implemented in the third sector have their specific features. It should also be pointed out that they differ from the commercial projects, e.g. in an area of the role, significance and scope of the interference of the certain classes of stakeholders in the project.

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<sup>27</sup> See more [in:] [29, pp. 22-27].

Thinking about the optimization of the non-profit projects' portfolio, specificities of stakeholders should be taken into a consideration firstly (see: annex).

The research conducted by *The Stanford Research Institute* in 1963 showed that an additional group of recipients (despite *shareholders*<sup>28</sup>) in a relation to which the organizations are responsible, and without the support of the experience of their elements the existence of the organization would be hampered, are *stakeholders*<sup>29</sup>. In addition, M. Clarkson noted that the stakeholders' group consists of people who voluntarily or without specific needs/motives assume a part of the risk associated with the operation of the organization, e.g. the human capital risk, etc.<sup>30</sup> — what is particularly important and it is possible to observe in the third sector. What more, also important — from the point of view of the optimization of the non-profit projects' portfolio — is a definition of T. Kochan and S. Rubenstein, who noted that the stakeholders supply (under the risk) the resources and critical (for the organization's functioning) values<sup>31</sup>. The stakeholders are located both within the organization (the project), as well outside of it (in the surroundings) [47, p. 317].

Making an identification of the non-profit projects' stakeholders, it is worth to refer to the model of A. Sargeant, in which there are specified the relationships between the social sector and the commercial and public ones (fig. 4). The main stakeholders' groups in the social sector can be: (*other*) *non-profit organizations*, as well *employees* of a current organization who are involved in the implementation of the project (or the several projects in the portfolio). In the commercial sector, there can be identified the following groups of stakeholders: *donors* (e.g. companies/firms), and *business suppliers/co-participants*, who are not the donors (e.g. the PR and marketing agencies, sales networks that promote the activities of the non-profit organizations, etc.). There are the main stakeholders groups in the public sector: the units of the *self-government administration* and the *central administration* (in this case, there are also the donors). The additional group of the stakeholders is a *civil society*, in which there can be enhanced the *individual donors, volunteers*, and *customers/recipients of the values* (fig. 4).

In general, there are four main groups of the stakeholders in the non-profit projects: (1) **non-profit organizations** (the main units of the projects' implementation), (2) **donors**, (3) **customers/recipients of benefits/values**, and (4) **co-participants** (see: fig. 5). A particular importance in ensuring the continuity of the non-profit projects' implementation (and therefore of the whole portfolio) has a long-term

<sup>28</sup> It is also worth to note that there is no the shareholders group (in a basic/traditional form) in the third sector. However, the result of the indicated research is also interesting.

<sup>29</sup> [14, p. 89, by: 47, p. 315].

<sup>30</sup> [5, p. 4, by: 47, p. 316].

<sup>31</sup> [25, p. 367-386, by: 47, p. 316].



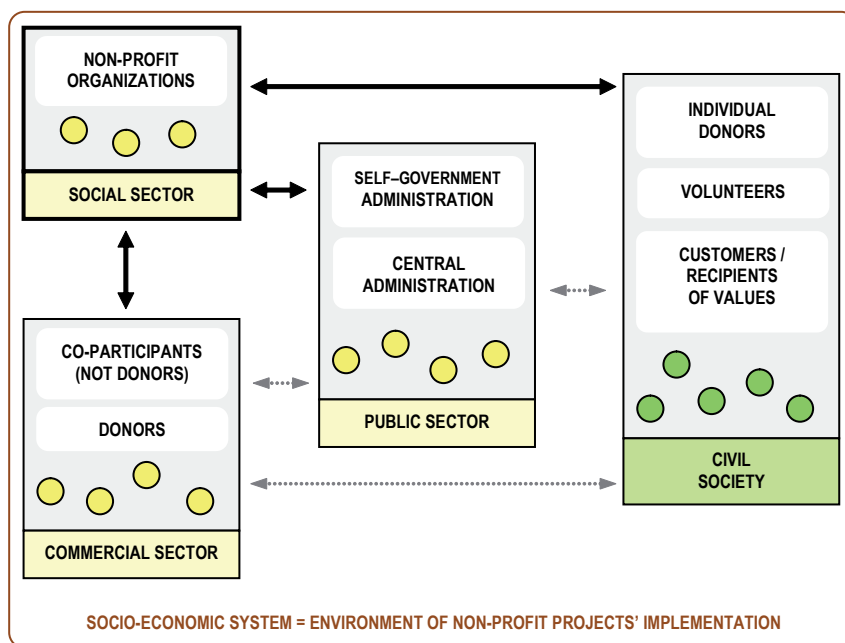


Fig. 4. The relationships between the non-profit organization and stakeholders. Source: own study on a base of: [39, p. 22, by: 33, p. 31], [9, pp. 135-140]

maintenance of the relationships between the organization and their stakeholders, e.g. in terms of listening to their needs, requirements, suggestions, etc. [47, p. 317]. The stakeholders are, in fact, a reflection the mission of the non-profit organization/project.

It should be noted that the non-profit projects implemented as a **multilateral cooperation network** are a major challenge for the realization of a whole portfolio in the third sector, but also a necessity, that arises due to the specificity of the non-profit projects, mainly in the framework of providing the resources and creating the common values. The networking character of the activities gives an ability to implement and apply the approach to manage in accordance with the concept of **sustainability**. An integration of the stakeholders in the project may be, in fact, the base of: (1) *learning of the non-profit organization*<sup>32</sup>, (2) its *adaptation and development*, as well its (3) *revitalization*, (4) *reconstruction*, and (5) *reorientation* — and in a consequence the creation of **the above-average values** for the specified recipients [19, p. 102]. Thus, it can be said that the individual stakeholders in the non-profit projects form a *system of activities*, focusing on such phenomena as: the creation of the value on the principles of the positive synergy effect, shaping

<sup>32</sup> See also: [4, pp. 190-194].

the conditions of the functional equilibrium, or exposing the informational admissions of the projects' realization [27, p. 41]. There is worth to use optics of the cybernetics and identify (among the stakeholders) the controlling and controlled subsystems/units<sup>33</sup> in the project management (as well in the optimization of the portfolios of the projects).

There has a particular importance a shaping of **an intellectual capital** — as one of the basic determinants of the value creation — in forming the *network relationships* between the non-profit organization (as the main executor of the project) and the different classes of stakeholders. Among the *stakeholders of information about an intellectual capital in a project*, there can be specified: (1) **the internal stakeholders**, i.e. the *managerial staff* and *employees*, e.g. the *leaders*, of the organization (see: fig. 3), and (2) **the external stakeholders**, e.g. the *potential co-participants, partners, customers, self-government administration*, etc. [37, p. 73].

The integration of the stakeholders in the non-profit projects gives an ability to release an additional potential that can be transposed into the value of the projects' portfolio in a long-term horizon. A. Jabłoński and M. Jabłoński distinguish e.g. the following **success factors** for the organisations of the third sector (as the pillars of the strategic management): (1) *orientation to objectives*, (2) *orientation to effectiveness and efficiency*, (3) *orientation to the future*, (4) *marketing orientation*, (5) *innovations*, as well (6) *standardization* [23, pp. 66-68]. This approach is consistent with the proposition of P.F. Drucker, who identified **the four-key success factors** for the non-profit organizations: (1) *plan*, (2) *marketing*, (3) *people*, and (4) *money* [10, p. 53].

There are presented the key success factors in relationships between the non-profit organization and the stakeholders' classes in Table 3. As it can be seen, each of the stakeholders' classes treats the key success factors that the non-profit organization has at its disposal in a different way (at diversified level of importance). For example, the marketing factor: *specification of each intangible value that will be/is a subject of the transfers in a project* in relationships between the non-profit organization and the donors has a *low importance*, but with the volunteers has a *high importance*, and with the customers — a *very high importance*.

What more, the importance of the chosen relationships identified in Table 3 (and also the other relationships that may occur in the non-profit project/portfolio) should be seen through the criteria of: **utility**, **risk**<sup>34</sup>, **efficiency**, and **added value** (both in the operational and strategic approaches) — because it may *improve the optimization processes* (see: annex).

<sup>33</sup> More about the *cybernetics* in the *management processes* [in:] [17, p. 9 et seq.].

<sup>34</sup> See also [8, p. 29 et seq.].

TABLE 3

The key success factors in the relationships between the non-profit organization and stakeholders' classes

The non-profit organization		The importance of the key success factors in relationships between the non-profit organization (main project executor) and stakeholders' classes						
Activities of the organization that carries out the non-profit project = What does the non-profit organization has at its disposal?	The potential areas of the impact on stakeholders' activities	Chosen classes of the stakeholders of the non-profit projects' portfolio						
		Co-participants <sup>35</sup>				Customers/ recipients of the value	Donors	
		Other non-profit organizations	Business units (not donors)	Volunteers	Institutions of the public sector			
The four key success factors <sup>36</sup>	Plan	<ul style="list-style-type: none"> <li>Operational and tactical planning of activities,</li> <li>Setting goals and milestones</li> </ul>	very high	very high	average	very high	very high	very high
		<ul style="list-style-type: none"> <li>Scheduling of activities</li> </ul>	very high	very high	average	very high	very high	very high
		<ul style="list-style-type: none"> <li>Allocation/relocation of resources</li> </ul>	very high	very high	low	very high	very high	very high
	Marketing	<ul style="list-style-type: none"> <li>Creation of a positive image of a non-profit organization in an environment</li> </ul>	very high	very high	very high	very high	very high	very high
		<ul style="list-style-type: none"> <li>Promotion of social activities of stakeholders</li> </ul>	average	very high	average	low	none	very high
		<ul style="list-style-type: none"> <li>Specification of each intangible value that will be/ is a subject of the transfers in a project</li> </ul>	average	average	high	average	very high	low
		<ul style="list-style-type: none"> <li>Specification of the ways of distribution of the created values in the project</li> </ul>	High	high	very high	high	very high	average
	People	<ul style="list-style-type: none"> <li>Engaging people to work in projects<sup>37</sup>,</li> <li>Specification of the motivation mechanisms for the stakeholders</li> </ul>	High	high	very high	high	low	very high
		<ul style="list-style-type: none"> <li>Specification of needs of staff/volunteers (specification of vacancies)</li> </ul>	Low	low	very high	none	average	none
		<ul style="list-style-type: none"> <li>Identification of employees/ work stations responsible for the administrative processes and maintaining the relationships with the co-participants, donors, etc.</li> </ul>	High	high	high	high	very high	very high
	Money	<ul style="list-style-type: none"> <li>Specification of the funds' values that are needed for the implementation of the projects and to maintain administrative continuity of non-profit organizations,</li> <li>Searching for the sources of funds</li> </ul>	Low	none	none	low	very high	very high
		<ul style="list-style-type: none"> <li>Specification of the ways/ directions for allocation of the accumulated funds</li> </ul>	very high	none	none	very high	very high	very high
<ul style="list-style-type: none"> <li>Defining, understanding and adoption of the ethical principles and using them by the non-profit organization</li> </ul>		very high	very high	very high	very high	very high	very high	

Source: own study on a base of: [11, pp. 66-68], [34, pp. 19-44], [51, pp. 11-14, 61-104], [29, p. 117 et seq.], [9, p. 64 et seq.], [15, p. 182 et seq.], [40, pp. 203].

<sup>35</sup> There are only four chosen groups (as the examples) of the co-participants in a presented comparison.

<sup>36</sup> By: [10, p. 53].

<sup>37</sup> This problem is also described [in:] [32, pp. 1-10].

### 3. Optimization criteria for non-profit projects' portfolio

The basic criterion of the optimization of the non-profit projects' portfolio is **the utility criterion** in a proposed model, and more precisely:

- the criterion of the *marginal utility* (internal and external);
- the criterion of the *rate of growth of an utility* (internal and external).

The analysis of the non-profit projects based on the utility criteria is developed by the additional parameters:

1. **the significance parameter** (fig. 9) — specifying an extent to which a given project contributes to objectives of the portfolio, mainly in terms of strategic management;
2. **the complementarity parameter** (fig. 8) — corresponding to the evaluation of the degree of completing ranges of the projects in a portfolio, thereby identifying:
  - the contribution of an each participant in a realization of tasks in the portfolio;
  - the share of an each portfolio's participant in generating the final value for each class of customers in a model;
  - the quantity of interactions of an each portfolio participant, pointing to the possibility of the resources allocation in the portfolio, as well the realization potential of the tasks by various categories of the project's contractors in the portfolio.

There can be seen an exclusively concentration on a criterion of the *internal utility* with a regard to the *complementarity and significance parameters* in the paper. This model will also be extended by the three additional optimization criteria in the future<sup>38</sup>:

1. **the internal efficiency** — understood in the model as:
  - the capacity to achieve the intended objectives by an each class of the participants of the activities in the portfolio;
  - the acquisition and allocation skill of the received resources from the environment, notably the financial resources. The internal efficiency criterion should not be equated with one of the value parameters ( $Ef_{ec}$  — economic efficiency) in the  $MSS_{N-P}$  model (see the relationship (2)). An internal efficiency criterion is a broader concept than the parameter  $Ef_{ec}$ ;
2. **the value added** — perceived as an organizational potential to maximize the value of the utility function of individual participants/stakeholders of

<sup>38</sup> These are the *future research areas* for an issue of the optimization of the non-profit projects' portfolio.

the projects in the portfolio, and also to generate an unique and no-imitable combination of benefits obtained by recipients of output items of the project system (based e.g. on the evaluation of quality, reliability, availability, completeness, functionality parameters) both before and after the execution of tasks in a given non-profit project;

3. **the risk** — seen in terms of a tendency of a given project to reduce or to increase a value of the utility function of the participants/stakeholders in the portfolio (in the operational and strategic management).

The optimization criterion is **the utility** in the model (treated as a system criterion) and defined as the possibility to apply and use the elements of an output of a given system (a project/portfolio in this case), and also the relevance of the elements of the system in the realization of the objective function [50, p. 63]. **The utility function**<sup>39</sup> is a base for the use and evaluation of the utility criterion.

#### 4. Algorithm of optimization of non-profit projects' portfolio

The algorithm of the non-profit portfolio's optimization (see: annex) identifies the basic tasks that have to be carried out at various stages of the model. The presented algorithm (a simplified version) is a base for the specification of the assumptions of the optimization model, with a particular reference e.g. to the optimality conditions, analysis of the portfolio in terms of the utility criterion, and — terminally — to determining the optimization strategy for the non-profit portfolio.

### 5. Utility model for non-profit management system

#### 5.1. Domain of model

The base for the construction of the domain of the optimization model is the social sector. The domain of the model can be represented in the form of the sum of four sets [48, p. 211]:

$$D = S_{N-P} \cup S_D \cup S_C \cup S_{CO}, \quad (3)$$

where:  $D$  — the domain of an optimization model;  
 $S_{N-P}$  — the set of non-profit organizations;  
 $S_D$  — the set of funding units (donors);

<sup>39</sup> The *utility function* is characterized more precisely [in:] subchapters 5.3 and 5.4 in this article.

$S_C$  — the set of customers/recipients of benefits (outcomes of projects' realization);

$S_{CO}$  — the set of co-participants (mainly business units, public administration, volunteers, and other non-profit organizations).

The sum of  $Z_D$  and  $Z_{CO}$  sets is a subset of the domain, and is responsible for financing non-profit portfolios ( $D_{fin}$ ), what is shown by dependencies (4) and (5):

$$D_{fin} \subset D, \tag{4}$$

$$D_{fin} = S_D \cup S_{CO}. \tag{5}$$

Of course, it is assumed, that the non-profit organizations may also be financed by the individual units, or by a self-contained collection of funds (profits).

## 5.2. Relationships in model

The relationships in the optimization model are described by the graph (fig. 5). However, it should be noted that not all of the identified relationships in the graph are an analytical and decision-making base for the non-profit portfolio's optimization. The directed graph is an ordered pair (6) in this model<sup>40</sup>:

$$\Gamma_{(4)} = \langle V, \{R\} \rangle \tag{6}$$

where:  $\Gamma_{(4)}$  — the graph of the model (domain);

$|V| = 4$  — the set of vertexes (7), while [48, p. 212]:

$$V = \{v_1, v_2, v_3, v_4\}; \tag{7}$$

$|R| = 12$  — the set of ordered pairs of different vertexes from the set  $V$  (8) (arcs), and called the relationships in the model (9), while [48, p. 212]:

$$R \subseteq V \times V. \tag{8}$$

$$R = \{r_{11}, r_{12}, r_{21}, r_{22}, r_{24}, r_{42}, r_{13}, r_{31}, r_{43}, r_{44}, r_{14}, r_{41}\}. \tag{9}$$

It should also be noted that this model is a closed system/circuit. It does not take the relationships of projects' (portfolio's) participants/stakeholders with other entities existing in an environment into an account, because they do not have a real, significant and direct impact on the functioning of the elements in the model.

<sup>40</sup> On a base of: [13, p. 39].

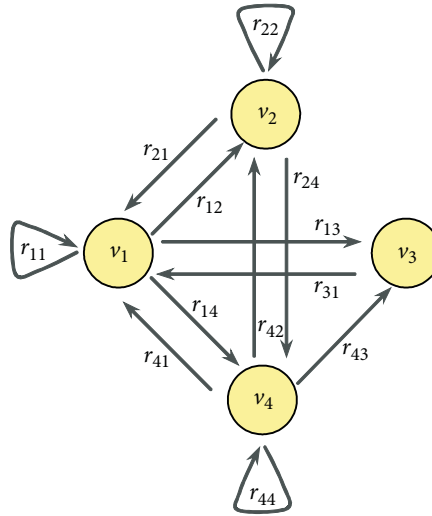


Fig. 5. The network of the relationships between the elements in the domain of the optimization model. Source: [48, p. 212]

However, in view of the fact that this model is intended to serve both qualitative and quantitative analysis of projects conducted within the framework of the non-profit portfolio, dependences presented in the form of the graph are treated as a network (fig. 5). Thus, an ordered three (10) is called a network in this model<sup>41</sup>:

$$\Gamma = \langle \Gamma_{(4)}, \{f_V\}, \{f_R\} \rangle, \quad (10)$$

where:  $\Gamma$  — the network of the model (domain);

$f_V$  — the set of functions on the set of vertexes;

$f_R$  — the set of functions on the set of arcs (relationships).

At this moment, it also should be noted that:  $v_1$  means  $S_{N.P}$ ,  $v_2$  means  $S_D$ ,  $v_3$  means  $S_C$ , and  $v_4$  means  $S_{CO}$ .

Other relationships, do not presented in the network (fig. 5), also may occur in the realization system of the non-profit projects. However, their role is limited, because they do not fully take the specificities of the non-profit projects into an account. The impact of these interactions on the functioning of the model is negligible. Therefore, these relationships are ignored in proposed model.

<sup>41</sup> On a base of: [13, pp. 51-52].



### 5.3. Optimality conditions in the model

Having regard to the limited size of this paper, the specification of the optimality conditions is narrowed to the main project's (portfolio's) participant — the non-profit organization. The basic assumptions for construction of the optimality conditions for the relationship  $r_{21}$  (see: fig. 5) for the utility criterion in the model are as follows<sup>42</sup>:

1. the model is developed for 2-element portfolio (in order to simplify the analysis<sup>43</sup>):  $p_1$  (i.e. the value of project No. 1) and  $p_2$  (i.e. the value of project No. 2);
2. there is realized only one portfolio in the organization;
3. the both projects are normal goods. An increase in an income of the non-profit units results in an increase in demand for a given project and its development in portfolio;
4. the vector (11) is called the basket of non-profit projects:

$$\mathbf{p} = (p_1, p_2) \in R_+^2, \quad (11)$$

where  $i$  element  $p_i \geq 0$ ,  $i = 1, 2$  means (expressed in physical terms), a non-negative value of  $i$  project in the non-profit basket  $\mathbf{p}$ ;

5. there are only two baskets of the projects in the portfolio of projects<sup>44</sup>  $\mathbf{p}^1$ ,  $\mathbf{p}^2$ . While the space of projects is a set of all available non-profit projects in a portfolio  $P = R_+^2$ , with an Euclidean metric (12):

$$d_E(\mathbf{p}^1, \mathbf{p}^2) = \sum_{i=1}^2 (p_i^1 - p_i^2)^2)^{1/2} = ((p_1^1 - p_1^2)^2 + (p_2^1 - p_2^2)^2)^{1/2}, \quad (12)$$

which is a measure of the distance between two baskets;

6. the Cartesian product on the non-profit projects' space  $P = R_+^2$  is a set (13) of all ordered pairs of baskets, in which both baskets of projects  $\mathbf{p}^1$ ,  $\mathbf{p}^2$  belong to the space of the non-profit projects:

$$P \times P = \{(\mathbf{p}^1, \mathbf{p}^2) \in P \times P \mid \mathbf{p}^1 \in P, \mathbf{p}^2 \in P\}; \quad (13)$$

<sup>42</sup> On a base of: [30, pp. 18-34].

<sup>43</sup> The considerations presented in the article can be generalized and carried out for the portfolios that have a large and finished number of the non-profit projects.

<sup>44</sup> Also in this case, the analysis can be extended to a large and finished number of the baskets.

7. the budget set is an expression (14), denoting a set of all project baskets whose value in given prices is equal to an income from the project's participant<sup>45</sup>:

$$D(c_1, c_2, I) = \{(p_1, p_2) \in R_+^2 \mid c_1 p_1 + c_2 p_2 = I\} \subset P = R_+^2, \quad (14)$$

or

an expression (15), denoting a set of all project baskets whose value in given prices is lower than an income from the project's participant<sup>46</sup>:

$$D(c_1, c_2, I) = \{(p_1, p_2) \in R_+^2 \mid c_1 p_1 + c_2 p_2 < I\} \subset P = R_+^2, \quad (15)$$

here:  $\mathbf{c} = (c_1, c_2) \in \text{int } R_+^2$  — the prices of the projects expressed in a value of the non-profit projects' realization costs;  
 $I \in \text{int } R_+^1$  — an income of a non-profit organization;

The supply of the non-profit projects equals the demand of portfolio's customers;

8. the budget constraint is called as a set of all baskets of the projects whose value in given prices is equal to an income from project's participant (non-profit) (16):

$$L(c_1, c_2, I) = \{(p_1, p_2) \in R_+^2 \mid c_1 p_1 + c_2 p_2 = I\} \subset P = R_+^2. \quad (16)$$

Therefore, it can be noted that for a dependency (14) the budget set is simultaneously the budget constraint (16);

9. the goal of the project participant (non-profit organization) is the choice of a basket of projects (17), which (from the point of view of the preferences of the non-profit organization) would be the most useful in the project's space (assuming that its value will be less or equal to the income of the non-profit organization):

$$\bar{\mathbf{p}} = (\bar{p}_1, \bar{p}_2) \in D(c_1, c_2, I); \quad (17)$$

<sup>45</sup> It is assumed that the organization does not generate additional profits to finance the projects in its portfolio.

<sup>46</sup> It is assumed that the organization is geared to generate additional profits to finance further statutory activities.

10. the optimal basket of the non-profit projects in the set  $D(\mathbf{c}, I) \subset P = R_+^2$  is called as such a basket of projects  $\bar{\mathbf{p}} = (\bar{p}_1, \bar{p}_2) \in D(\mathbf{c}, I)$ , that:

$$\forall \mathbf{p} = (p_1, p_2) \in D(\mathbf{c}, I), \bar{\mathbf{p}} = (\bar{p}_1, \bar{p}_2) \succsim (p_1, p_2) = \mathbf{p}, \quad (18)$$

what means that the non-profit organization prefers the basket of the projects  $\bar{\mathbf{p}}$  at least like the basket  $\mathbf{p}$ . The basket  $\bar{\mathbf{p}}$  is not worse than the basket  $\mathbf{p}$ . Assuming that the weak preference relationship is a set (19):

$$P_s = \{(\mathbf{p}^1, \mathbf{p}^2) \in P \times P \mid \mathbf{p}^1 \succsim \mathbf{p}^2\} \subset P \times P; \quad (19)$$

11. the indifference relationship is the set (20) of all ordered pairs of project baskets  $\mathbf{p}^1, \mathbf{p}^2$  where the first basket of projects is as good as the second basket:

$$I = \{(\mathbf{p}^1, \mathbf{p}^2) \in P \times P \mid \mathbf{p}^1 \sim \mathbf{p}^2\} \subset P \times P. \quad (20)$$

In an optimization model, taking an external utility function into an account, by the side of the non-profit organization, there are only the indifference relationships. While taking the function of the internal utility into an account, there may occur (in addition to define above the weak preference relationship) a strong preference relationship in a model (21), pointing to the fact that the first basket is better than the second one:

$$P_s = \{(\mathbf{p}^1, \mathbf{p}^2) \in P \times P \mid \mathbf{p}^1 \succ \mathbf{p}^2\} \subset P \times P; \quad (21)$$

This situation is related to the fact that the non-profit organization maximizing internal benefits (the utility of its projects), must make a choice between different projects in the portfolio;

12. the supply set for the non-profit unit is specified as the set (22):

$$B = \{(p_1, p_2) \in R_+^2 \mid p_1 \leq s_1, p_2 \leq s_2\} \subset P = R_+^2, \quad (22)$$

of all projects in which the amount of  $i$  basket is not bigger than a non-negative supply of this project  $0 \leq s_i, i = 1, 2$ .

These conditions are a base of the evaluation of a value of the internal utility function of the non-profit organization.

#### 5.4. Definition of utility

The term of the utility function is understood as the compilation of benefits achieved by a given unit taking part in a realization of the non-profit project in

the social sector in this model. Taking the fact that the utility that is the value of the utility function at the given time  $t_0$  (25) into an account, it is perceived as the subjective economic category — what results in the difficulties in specifying the evaluation of the utility function, and thus its comparison between the different elements of the model (the portfolio's participants) — thus, there is as follows in the model:

1. bringing an analysis of the utility value to the value of a function of the marginal utility (23) and the rate of growth of the utility (24)<sup>47</sup>:

$$T_i(\mathbf{p}) = \lim_{\Delta p_i \rightarrow 0} \frac{u(p_i + \Delta p_i, p_j) - u(p_i, p_j)}{\Delta p_i} = \frac{\partial u(\mathbf{p})}{\partial p_i}, \quad i, j = 1, 2, \quad i \neq j, \quad (23)$$

where:  $T_i(\mathbf{p})$  — the function of the marginal utility;  
 $p_{i,j}$  —  $i$  and  $j$  project in the basket;  
 $\Delta p_i$  — the increment of the value (by broadening the scope)  
of  $i$  project in the basket;

$$S_i(\mathbf{p}) = \lim_{\Delta p_i \rightarrow 0} \frac{u(p_i + \Delta p_i, p_j) - u(p_i, p_j)}{\Delta p_i} \frac{1}{u(\mathbf{p})} = \frac{\partial u(\mathbf{p})}{\partial p_i} \frac{1}{u(\mathbf{p})} = \frac{T_i(\mathbf{p})}{u(\mathbf{p})}, \quad (24)$$

$i, j = 1, 2, \quad i \neq j,$

where:  $S_i(\mathbf{p})$  — the rate of growth of the utility.

2. the expression of the value of the marginal utility function in financial units;
3. the implementation of criteria of the internal and external utility into the relationships in the model (fig. 5) — due to the fact that the portfolio of the non-profit projects accounts the diversified categories of participants that percept the utility of project's results in different ways.

$$U = u(t_0), \quad (25)$$

where:  $U$  — the utility (value of the utility function at the time  $t_0$ );  
 $u(t)$  — the utility function.

The article widely describes only the optimization from the point of view of the main participant in the portfolio (non-profit organization). Therefore, the internal utility function  $u_{in-np}$  (defined on the space of the projects  $P = R_+^2$ ) is called the projection  $u_{in-np} : R_+^2 \rightarrow R^1$ , such that<sup>48</sup>:

<sup>47</sup> On a base of: [30, p. 32; 34].

<sup>48</sup> On a base of: [30, p. 24]. See: descriptions of the equations (19), (20) and (21).

$$\forall(\mathbf{p}^1, \mathbf{p}^2) \in P = R_+^2 \quad \mathbf{p}^1 \succsim \mathbf{p}^2 \Leftrightarrow u_{in-np}(\mathbf{p}^1) \geq u_{in-np}(\mathbf{p}^2), \quad (26)$$

$$\forall(\mathbf{p}^1, \mathbf{p}^2) \in P = R_+^2 \quad \mathbf{p}^1 \succ \mathbf{p}^2 \Leftrightarrow u_{in-np}(\mathbf{p}^1) > u_{in-np}(\mathbf{p}^2). \quad (27)$$

The indifference curve for the internal utility function of the non-profit organization is called the set (28) of all these non-profit projects' baskets, of which the internal utility is the same and equal  $U = \text{const}$ <sup>49</sup>:

$$G = \{(p_1, p_2) \in P = R_+^2 \mid u_{in-np}(p_1, p_2) = U_{in-np} = \text{const}\}. \quad (28)$$

Moreover, if the set  $G = \mathbf{p} \in R_+^2 \mid u_{in-np}(\mathbf{p}) = U_{in-np} = \text{const} > 0$  is given, then there exists the function  $t: R_+^1 \rightarrow R_+^1$  in the form:  $p_2 = t(p_1)$ , describing the relationship between the value of the first and the second project in any basket with the same value of the internal utility function  $U_{in-np} = \text{const}$ <sup>50</sup>.

An optimization model is based on a logarithmic function of the utility (29)<sup>51</sup>:

$$u_{in-np}(p_1, p_2) = \sum_{i=1}^2 a_i \ln p_i = a_1 \ln p_1 + a_2 \ln p_2 \Leftrightarrow p_2 = t(p_1) = \frac{e^{\frac{a_2}{a_1}}}{p_1^{\frac{a_2}{a_1}}}, \quad (29)$$

where:  $a_1 > 0$  — the parameter of the internal utility function for the non-profit unit;

$$p_i \in \text{int } R_+^1.$$

The value of the external utility function  $U_{ex}$ , i.e. the utility of other participants in the portfolio, maximized by a given project participant in the portfolio, is a Cartesian product of the values of the internal utility functions of other participants in the portfolio. The value of the external utility is as follows:

1. for non-profit organizations (30):

$$U_{ex-np} = U_{in-co} \times U_{in-d} \times U_{in-c}; \quad (30)$$

2. for donors (31):

$$U_{ex-d} = U_{in-np} \times U_{in-co}; \quad (31)$$

3. for customers (32):

$$U_{ex-o} = U_{in-np}; \quad (32)$$

<sup>49</sup> On a base of: [30, p. 29].

<sup>50</sup> See: [30, p. 29].

<sup>51</sup> On a base of: [30, p. 28; 35].

4. for co-participants (33):

$$U_{ex-co} = U_{in-np} \times U_{in-d} \times U_{in-c}. \quad (33)$$

The functions of the internal and external utility are primarily used to identify such a basket of projects in which values of individual projects will be maximally beneficial for a given participant of the project (for the non-profit organization in this case). Thus, there is applied an analysis of the indifference curve (see: dependency (28)) in such a situation.

## 6. Analysis of portfolio in terms of utility criterion

The next step in the optimization model — after the identification and quantification of the optimality conditions — is an analysis of the portfolio (taking the additional parameters into an account). There is made a presentation of the analytical capabilities of the value of the projects in terms of the internal and external utility based on four basic optimization matrixes in this part of the paper. The matrixes (fig. 6-9) are developed for the main portfolio's participant (the non-profit organization).

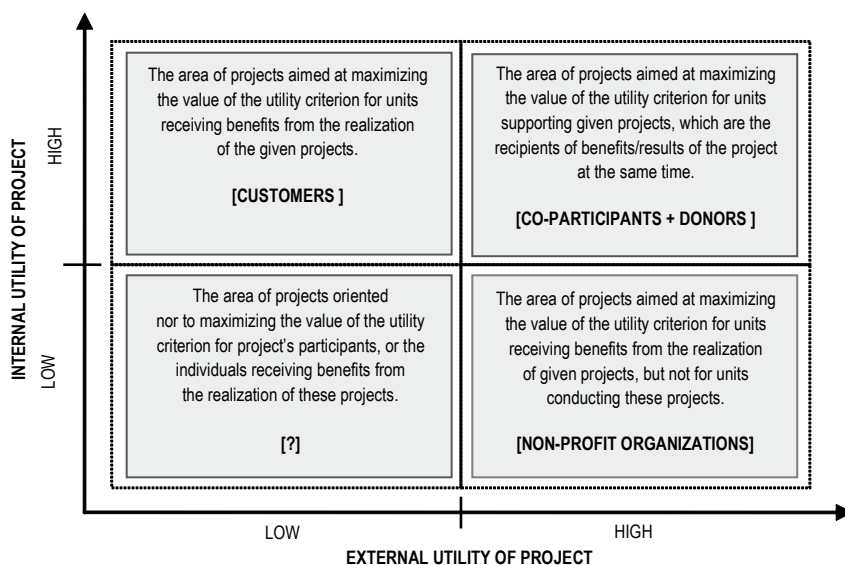


Fig. 6. Matrix No. 1 — the matrix for the optimization of the non-profit portfolio with the use of the utility criteria. Source: own study

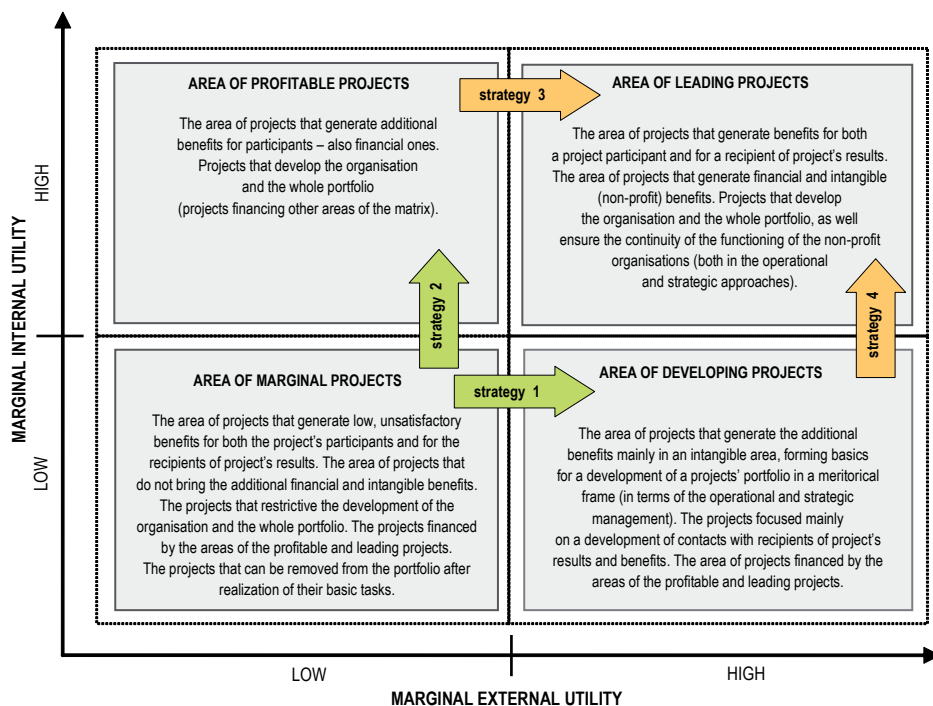


Fig. 7. Matrix No. 2 — the matrix for the optimization of the non-profit portfolio with the use of the marginal utility criteria for the non-profit organization. Source: own study



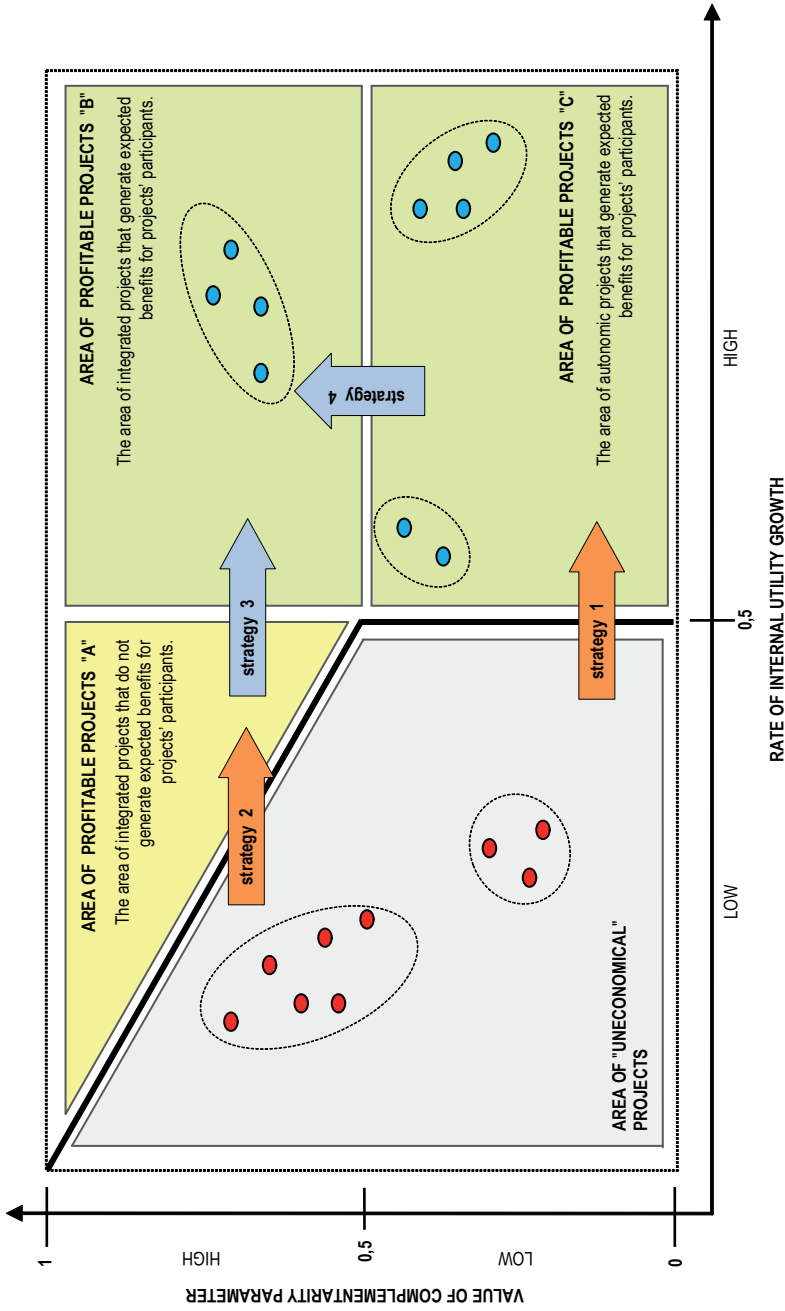


Fig. 8. Matrix No. 3 — the matrix for the optimization of the non-profit portfolio with the use of the rate of growth of the internal utility criterion and the complementarity parameter, and specifying the groups of the projects for the non-profit organization. Source: own study

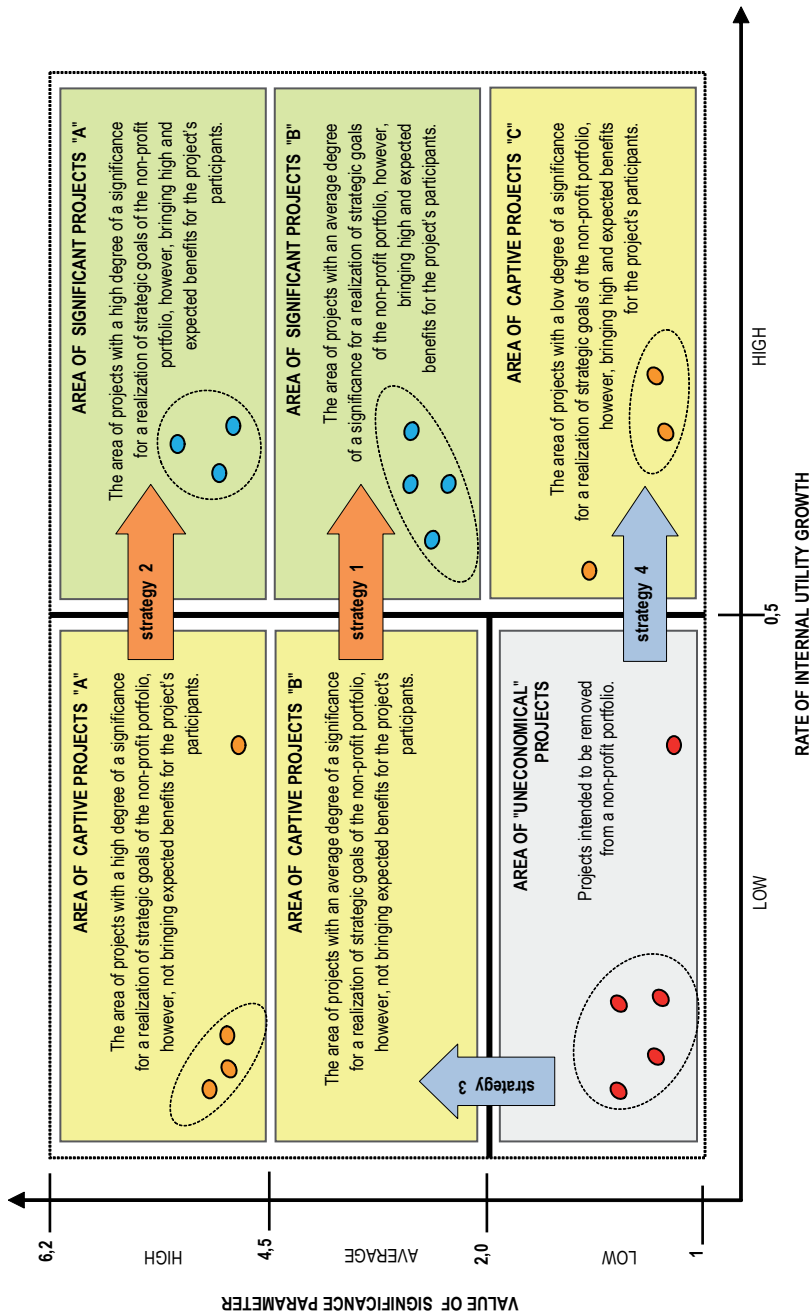


Fig. 9. Matrix No. 4 — the matrix for the optimization of the non-profit portfolio with the use of the rate of growth of the internal utility criterion and the significance parameter, and specifying the strategic groups of the projects for the non-profit organization. Source: own study

## 7. Conclusions

Summarizing the presented considerations, there can be made a specification of the following conclusions in the paper:

1. The optimization of the portfolio of the non-profit projects is a complex and multi-aspect process, which is largely determined by the characteristics of a given portfolio. It is not possible to develop a “rigid” model. Each portfolio is different — characterized by diversified goals, or the number and nature of the relationships and participants/stakeholders. Presented model provides only a framework for the optimization processes.
2. Management in the social sector is different from the activities in the business area. This has reflection e.g. in defining and perception of the utility function by all categories of portfolio’s participants, as well in the tendency to increase the range of the projects. The non-profit projects are implemented to maximize the value of benefits for the cooperating units, and not for the project’s contractors.
3. Non-profit portfolio management requires the use of the specific analytical and decision-making methods and tools. However, the optimization of the non-profit portfolio never generates sole and adequate results, even using precise methods and tools. In this connection, an important role is played by knowledge, experience and intuition of an analyst/manager.

In conclusion, it should be noted that the methods and tools of the optimization of the portfolio of the non-profit projects presented in this article may be even more detailed, e.g. there can be drawn up a list of the techniques and tasks in the framework of the strategic plans (for the specified matrixes) — depending on the analytical and decisional needs of the portfolio’s participants/stakeholders. Not without significance is the fact that the paper provides only basic aspects and assumptions of the optimization model, reflecting mainly the point of view of the non-profit organizations. However, there should not be forgotten other participants/stakeholders, i.e.: donors, customers and co-participants in the portfolio — whose role is equally important in the model.

What more — as P.F. Drucker wrote: “The next thing to do is to think through priorities. (...) This may be the ultimate test of leadership: the ability to think through the priority decision and to make it stick” [10, p. 48] — managers in the non-profit projects, especially the leaders, have to think through the prism of different, but precisely defined, criteria, such as: utility, risk, efficiency, added value, etc., and simultaneously they cannot forget about people that are the recipients of their projects’ results. Thus, this is the main reason, why the optimization of the non-profit projects’ portfolio is so difficult to conduct successfully. The preamble to this article (in a form of a citation from the book of P.F. Drucker [10]) displays also that managers/leaders in the third sector should be concentrated on the resources and

decision-making processes — in order to get estimated results. But there is no one and the best way to optimize the non-profit projects' portfolio in a practice. Different organizations have a diversified access to different kinds of resources, have different missions and visions, and also perceive the recipients and values in different ways. In conclusion, the optimization model of the non-profit projects' portfolio should also meet the *human factor*, and not only the “dry” facts and figures — that is why the model contains e.g. the analytical matrixes.

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J. WOŹNIAK

### **Optymalizacja portfela projektów non-profit: wybrane aspekty i założenia**

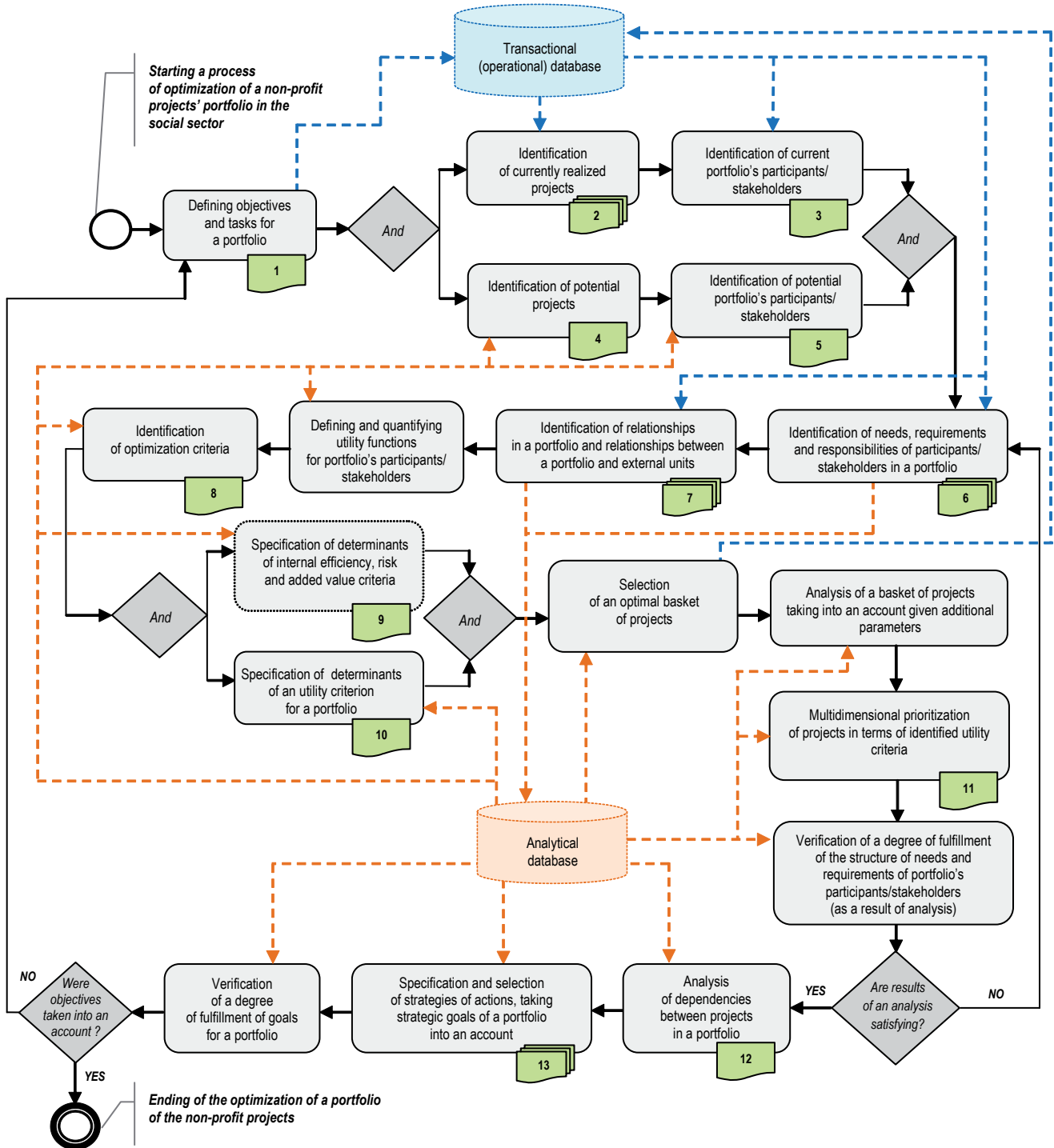
**Streszczenie.** W artykule przedstawione zostały wybrane aspekty i założenia autorskiej propozycji modelu optymalizacji portfela projektów non-profit. Scharakteryzowano model funkcjonalny sektora non-profit, będący jednocześnie podstawą przeprowadzania dalszych analiz. Dokonano również kwantyfikacji podstawowych kryteriów optymalizacji portfela projektów. Opracowano również model użyteczności dla systemu gospodarowania o charakterze non-profit, w ramach którego scharakteryzowano dziedzinę modelu oraz relacje pomiędzy czterema kategoriami partycypantów portfela projektów non-profit: organizacjami non-profit, donatorami, kooperantami i klientami (odbiorcami podstawowych korzyści związanych z realizacją projektów non-profit). W artykule przedstawiono także

główne warunki optymalności oraz algorytm optymalizacji portfela projektów non-profit. Artykuł zakończony jest prezentacją przykładowych macierzy analitycznych, służących optymalizacji portfela non-profit, bazujących na ewaluacji wartości zarówno kryteriów optymalizacji, jak i parametrów dodatkowych. Artykuł prezentuje jedynie podstawowe i wybrane aspekty optymalizacji portfela projektów non-profit.

**Słowa kluczowe:** zarządzanie, organizacja, non-profit, projekt, portfel, optymalizacja, użyteczność



**Annex: The optimization algorithm for the projects' portfolio in the social sector**



**LIST OF DOCUMENTS:**

1. A list of operational and strategic goals and tasks for a portfolio
2. Project charts of currently realized projects
3. A list of current projects' participants/stakeholders
4. A list of potential projects
5. A list of potential projects' participants/stakeholders

6. A list of needs, requirements and responsibilities of projects' participants/stakeholders
7. A list of relationships between participants/stakeholders in a portfolio
8. A list of optimization criteria for a portfolio
9. A list of determinants of internal efficiency, risk and added value criteria
10. A list of determinants of an utility criterion for a portfolio
11. A hierarchy of projects according to values of given optimization criteria
12. A list of relationships between projects in a portfolio (based on multidimensional analysis)
13. A list of strategies (strategies of optimization of a non-profit portfolio)

Source: own study on a base of: [48, pp. 216-218].