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## Practical aspects of solving the problem of selecting corporate real estate development projects

In the modern world, corporate real estate development projects play an important role in business development. The success of the company largely depends on the efficiency of the implementation of these projects. In this paper, the author considers the practical aspects of solving the problem of selecting corporate real estate development projects, with an emphasis on the need for a comprehensive approach to making a decision on project implementation. Various strategies that are used in the process of corporate real estate portfolio management are considered. The diversity of strategies necessitates the formation of a multicomponent list of criteria for solving the problem of selecting development projects implemented in the framework of corporate real estate portfolio management. The author developed a list of criteria that includes three groups of project parameters: financial and economic, environmental and managerial. It is proposed to use social return on investment as a criterion of overall efficiency, which is included in the group of financial and economic criteria, together with capital intensity, scale and total cost of ownership. Environmental criteria take into account such parameters of the real estate object as availability of various certificates, energy efficiency class, as well as implementation of automated building management systems. Management criteria allow assessing the compliance of the project with the general strategy of the corporation, so this group includes such parameters as: commissioning date, project implementation format, as well as provision of space for employees. To make the final decision, the author proposes to use the method of hierarchy analysis, which is widely used in various industries in solving similar problems. The paper presents the methodological basis, as well as a practical example of the application of this method.

**Keywords:** *project management, corporate real estate development, project selection, portfolio management*

Uninterrupted functioning of enterprises of any type and orientation is impossible without providing the business with resources of various types, one of which is real estate [1].

One of the most important indicators that can be used to assess the effectiveness of a corporate real estate development project is the social return on investment (SROI) [2, 3]. Taking into account the peculiarities of corporate real estate development, strategic aspects of corporate real estate portfolio management, as well as the methodology of SROI assessment, we can distinguish the following groups of criteria that should be taken into account when making a decision on project implementation: financial and economic, environmental, managerial.

The first group of criteria includes primarily such indicators as SROI and TCO, however, in some cases it is possible to apply generally accepted metrics such as NPV, IRR, PI [4, 5]. Application of these metrics is possible in case of realization of a real estate development project aimed at realization of the main activity of the corporation: for a corporation of the banking sector — opening of a new bank branch, for logistics companies — construction of a new warehouse complex, for retailers — construction of new retail premises, etc. Financial and economic criteria can also include the scale of the project and the capital intensity of the project [6]. The scale of the project is determined based on the impact of the project on the regional real estate portfolio and is defined as a share of the total area of the regional project. Accordingly, capital intensity is determined based on the amount of investment required in the project.

The second group of criteria is environmental. In this case, the following parameters are taken into account [7]:

- energy efficiency class of the real estate object;
- availability of certifications and compliance with green building standards;
- availability of energy-saving engineering systems (heating, ventilation);
- availability of automated building management systems;
- use of renewable energy sources in the power supply scheme of the real estate object;
- implementation of systems for separate collection of solid waste in the project;
- availability of systems for water collection and reuse.

Consideration of environmental parameters of a real estate object is important from various aspects. In addition to the obvious positive effect on the environment, the introduction of green technologies allows to reduce operating and utility costs, and positively affects the image of the corporation.

The next group of criteria is managerial. This group first of all includes parameters that allow assessing the compliance of all project characteristics with the current strategy of corporate real estate portfolio management and development. The modern concept of real estate portfolio management is primarily aimed at increasing its value. However, the increase in value can be achieved through various tools and with a focus on certain aspects of the real estate portfolio. In foreign practice,

the following corporate real estate management strategies can be found [8–10]:

- productivity improvement (production process support);
- cost control (production process support);
- reducing environmental impact (sustainability);
- ensuring social and economic sustainability (sustainability support);
- development of the company's brand (support of the company's brand);
- interaction support (support of the production process, support of sustainable development, support of the company's brand);
- improving employee safety (supporting the production process, supporting sustainable development, supporting the company's brand);
- increasing employee satisfaction (supporting the production process, supporting sustainable development, supporting the company's brand);
- risk control (production process support, sustainable development, company brand support);
- increasing flexibility and liquidity (increasing the share of lease agreements, entering into short-term lease agreements);
- promoting innovation (adapting design to realize an innovative workflow).

This diversity of strategies necessitates a careful selection of criteria to determine whether the project under consideration is consistent with the strategy. The minimum required set of management criteria should include the following project parameters:

- class of the real estate object to be created — this parameter

will influence the degree of employee satisfaction and the brand image of the corporation [11];

- staff space availability also affects employee satisfaction [12];
- possible commissioning period — this criterion reflects the relationship with the overall strategy of the corporation;
- impact on the total area of the portfolio — the need for this criterion is due to the fact that the total area of the portfolio is an important indicator of its efficiency, projects should be aimed at achieving the target set by the strategy;
- project implementation format — with a strategy aimed at increasing flexibility, it is preferable to implement projects in build-to-suit format or on leased sites.

In the case of solving the problem of project selection, it is necessary to take into account all the above criteria. For convenience, Table 1 provides a complete list of all criteria and target values of indicators.

With the help of these criteria it is possible to solve one of the most important practical tasks of project portfolio management, namely project selection. The most common way of solving this problem is to use the method of forming a comprehensive assessment based on the construction of a hierarchical structure of the criteria tree or Analytic Hierarchy Process (AHP) [13].

To apply the AHP method, each group of criteria and subsequently each criterion must be given a certain weight. To determine the weight of each group of criteria and criteria within the groups, the method of pairwise comparison and ranking of criteria is applied [14]. The standard scale of criteria evaluation is presented in Table 2.

Table 1. Project selection criteria for the corporate real estate portfolio

| Criteria group         | Criterion                                                                               | Target value of the indicator                                                         |
|------------------------|-----------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Financial and economic | SROI                                                                                    | > 1, →max                                                                             |
|                        | TCO, mln rub.                                                                           | →min                                                                                  |
|                        | Capital intensity, mln rub.                                                             | →min                                                                                  |
|                        | Scale of the project, %                                                                 | →max                                                                                  |
| Environmental          | Energy efficiency class                                                                 | A+                                                                                    |
|                        | Availability of certifications and compliance with green building standards             | Certification of international standards BREEAM, LEED is possible                     |
|                        | Availability of energy-saving engineering systems (heating, ventilation)                | The project provides for energy-saving engineering systems                            |
|                        | Availability of automated building management systems                                   | The project includes the installation of a telemetry and remote control system (RTMS) |
|                        | Use of renewable energy sources in the power supply scheme of the real estate object, % | →max                                                                                  |
|                        | Implementation of systems for separate collection of solid waste in the project         | The project envisages and possible realization of                                     |
|                        | Availability of systems to reduce water consumption                                     | The project envisages and possible realization of                                     |
| Managerial             | Class of the object to be created                                                       | A+                                                                                    |
|                        | Provision of staff with space                                                           | For offices — 10 sq. m/person                                                         |
|                        | Possible commissioning date                                                             | →min                                                                                  |
|                        | Impact on total portfolio area, sq. m                                                   | →max                                                                                  |
|                        | Project implementation format                                                           | Consistent with the strategy                                                          |

Source: compiled by the author.

Table 2. Fundamental scale for pairwise comparisons of criteria

| Degree of significance | Determination                                                                                                           |
|------------------------|-------------------------------------------------------------------------------------------------------------------------|
| 1                      | Equal weighting of criteria                                                                                             |
| 3                      | One criterion is slightly more important than the other                                                                 |
| 5                      | One criterion is significantly more important than the other                                                            |
| 7                      | One criterion is indisputably more important than the other, confirmed not only by expert judgment but also in practice |
| 9                      | One criterion is absolutely more important than the other                                                               |

Source: compiled by the author on materials [15].

Table 3. Ranking of criteria groups

| Criteria group         | Financial and economic | Managerial | Environmental |
|------------------------|------------------------|------------|---------------|
| Financial and economic | 1                      | 1          | 7             |
| Managerial             | 1                      | 1          | 5             |
| Environmental          | 0.14                   | 0.2        | 1             |

Source: compiled by the author.

Accordingly, it is initially necessary to determine the weights of each of the groups of criteria to form a comprehensive assessment. The ranking of the groups of criteria is presented in Table 3. According to the AHP method, the total sum of values of all criteria corresponds to one, the weight of each group is determined based on the ranking.

Next, the quotient of each value in the table from the sum of numbers in the column is determined. After that, the arithmetic mean of each row is determined. The final results of determining the weights of each group of criteria are presented in Table 4.

Similarly, within each group of criteria, the weights of the criteria themselves are determined. The results of determining the weights for all criteria are presented in Table 5.

Further, for each criterion it is necessary to provide a scale on which projects will be evaluated. The scale developed by the author is presented in Table 6.

According to the analytical hierarchical process method, the project that has the maximum score for all criteria will have the highest overall rating. Let us apply this scale to compare the previously considered project for the creation of a technology hub in Yekaterinburg, which will be labeled as project A, and

Table 4. Total weight of each group of criteria

| Criteria group         | Financial and economic       | Managerial                 | Environmental          | Weight |
|------------------------|------------------------------|----------------------------|------------------------|--------|
| Financial and economic | $1/(1 + 1 + 0.14) = 0.47$    | $1/(1 + 1 + 0.2) = 0.45$   | $7/(7 + 5 + 1) = 0.54$ | 0.487  |
| Managerial             | $1/(1 + 1 + 0.14) = 0.47$    | $1/(1 + 1 + 0.2) = 0.45$   | $5/(7 + 5 + 1) = 0.38$ | 0.435  |
| Environmental          | $0.14/(1 + 1 + 0.14) = 0.07$ | $0.2/(1 + 1 + 0.2) = 0.09$ | $1/(7 + 5 + 1) = 0.08$ | 0.078  |

Source: compiled by the author.

Table 5. Final weights of each of the criteria groups

| Criteria group         | Weight of the criteria group | Criteria                                                                         | Weight of criteria, within the group |
|------------------------|------------------------------|----------------------------------------------------------------------------------|--------------------------------------|
| Financial and economic | 0.487                        | SROI                                                                             | 0.56                                 |
|                        |                              | TCO, mln rub.                                                                    | 0.23                                 |
|                        |                              | Capital intensity, mln rub.                                                      | 0.15                                 |
|                        |                              | Scale of the project, %                                                          | 0.06                                 |
| Managerial             | 0.435                        | Class of the object to be created                                                | 0.07                                 |
|                        |                              | Provision of staff with space                                                    | 0.46                                 |
|                        |                              | Possible commissioning date                                                      | 0.24                                 |
|                        |                              | Impact on the total portfolio area                                               | 0.10                                 |
|                        |                              | Project implementation format                                                    | 0.13                                 |
| Environmental          | 0.078                        | Energy efficiency class                                                          | 0.21                                 |
|                        |                              | Availability of certifications and compliance with green building standards      | 0.05                                 |
|                        |                              | Availability of energy-saving engineering systems (heating, ventilation)         | 0.17                                 |
|                        |                              | Availability of automated building management systems                            | 0.24                                 |
|                        |                              | Use of renewable energy sources in the power supply scheme of the real estate, % | 0.22                                 |
|                        |                              | Implementation of systems for separate collection of solid waste in the project  | 0.06                                 |
|                        |                              | Availability of systems to reduce water consumption                              | 0.06                                 |

Source: compiled by the author.

the project for the creation of a technology hub in St. Petersburg, which will be labeled as project B. The evaluations of the projects under consideration are presented in Table 7.

The final rating of each project is obtained after summing up the product of each of the scores by the respective weights of the criteria and criterion groups. The results of the rating calculation are summarized in Table 8.

Thus, the results of the assessment indicate that, according to the totality of all criteria, Project A is the most attractive for implementation.

Table 6. Scale for assessing corporate real estate development projects

| Criterion                                                                               | Score                                                              |                                                                                                                                                                                                        |                                                                                                                                                                                             |                                                                                                                                                                                               |                                                                                                                                                                                                           |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                         | 1                                                                  | 3                                                                                                                                                                                                      | 5                                                                                                                                                                                           | 7                                                                                                                                                                                             | 9                                                                                                                                                                                                         |
| SROI                                                                                    | Less than 0.8                                                      | 0.9                                                                                                                                                                                                    | 1                                                                                                                                                                                           | 1.2                                                                                                                                                                                           | More than 1.5                                                                                                                                                                                             |
| TCO, mln rub.                                                                           | The difference is more than 30 %                                   | The difference is less than 30 %                                                                                                                                                                       | The difference is less than 20 %                                                                                                                                                            | The difference is less than 10 %                                                                                                                                                              | The lowest among all projects                                                                                                                                                                             |
| Capital intensity, mln rub.                                                             | The difference is more than 30 %                                   | The difference is less than 30 %                                                                                                                                                                       | The difference is less than 20 %                                                                                                                                                            | The difference is less than 10 %                                                                                                                                                              | The lowest among all projects                                                                                                                                                                             |
| Scale of the project, %                                                                 | Less than 1 %                                                      | 3 %                                                                                                                                                                                                    | 5 %                                                                                                                                                                                         | 7 %                                                                                                                                                                                           | 10 % or more                                                                                                                                                                                              |
| Energy efficiency class                                                                 | E and below                                                        | D                                                                                                                                                                                                      | C                                                                                                                                                                                           | B                                                                                                                                                                                             | A and above                                                                                                                                                                                               |
| Availability of certifications and compliance with green building standards             | Certification is not possible                                      | Certification according to Russian standards is possible when changes are made to the object                                                                                                           | Certification according to Russian standards is possible without changes to the object                                                                                                      | Certification according to international standards is possible when modifications are made to the facility                                                                                    | It is possible to certify to international standards without modifying the facility                                                                                                                       |
| Availability of energy-saving engineering systems                                       | The project does not provide for energy-saving engineering systems | The project includes one of the energy efficient engineering systems: <ul style="list-style-type: none"><li>• heating;</li><li>• ventilation;</li><li>• power supply;</li><li>• conditioning</li></ul> | The project includes two energy-efficient utility systems: <ul style="list-style-type: none"><li>• heating;</li><li>• ventilation;</li><li>• power supply;</li><li>• conditioning</li></ul> | The project includes three energy-efficient utility systems: <ul style="list-style-type: none"><li>• heating;</li><li>• ventilation;</li><li>• power supply;</li><li>• conditioning</li></ul> | The project provides for all types of energy-saving engineering systems: <ul style="list-style-type: none"><li>• heating;</li><li>• ventilation;</li><li>• power supply;</li><li>• conditioning</li></ul> |
| Availability of automated building management systems                                   | Not foreseen by the project                                        | –                                                                                                                                                                                                      | A dispatching system is provided                                                                                                                                                            | –                                                                                                                                                                                             | Provision is made for the installation of a comprehensive STDU                                                                                                                                            |
| Use of renewable energy sources in the power supply scheme of the real estate object, % | 0 %                                                                | Less than 1 %                                                                                                                                                                                          | 1 to 3 %                                                                                                                                                                                    | 3 to 5 %                                                                                                                                                                                      | More than 5 %                                                                                                                                                                                             |
| Implementation of systems for separate collection of solid waste in the project         | Separate collection of TCO is not envisaged                        | Provision for a two-stream system for the collection of solid waste                                                                                                                                    | A three-stream system for the collection of solid waste is envisaged                                                                                                                        | A four-stream system for the collection of MSW is envisaged                                                                                                                                   | A five-stream system for the collection of solid waste is envisaged                                                                                                                                       |
| Availability of systems to reduce water consumption                                     | Not foreseen                                                       | –                                                                                                                                                                                                      | Use of metered water supply systems and water saving devices (aerators, batch faucets, infrared sensors, automatic faucets)                                                                 | –                                                                                                                                                                                             | Provision is made for water collection and reuse systems                                                                                                                                                  |
| Class of the object to be created                                                       | C                                                                  | B                                                                                                                                                                                                      | B+                                                                                                                                                                                          | A                                                                                                                                                                                             | A+                                                                                                                                                                                                        |
| Provision of staff with space                                                           | Less than 8 sq. m/person                                           | 9 sq. m/person                                                                                                                                                                                         | 10 sq. m/person                                                                                                                                                                             | 11 sq. m/person                                                                                                                                                                               | Over 11 sq. m/person                                                                                                                                                                                      |
| Possible commissioning date                                                             | More than 3 years                                                  | 3 years                                                                                                                                                                                                | 2 years                                                                                                                                                                                     | 1 year                                                                                                                                                                                        | Less than 1 year                                                                                                                                                                                          |
| Impact on total portfolio area, sq. m                                                   | Up to 1,000 m <sup>2</sup>                                         | 1,000 m <sup>2</sup>                                                                                                                                                                                   | 10,000 m <sup>2</sup>                                                                                                                                                                       | 50,000 m <sup>2</sup>                                                                                                                                                                         | More than 50,000 m <sup>2</sup>                                                                                                                                                                           |
| Project implementation format                                                           | Not in line with the strategy                                      | –                                                                                                                                                                                                      | Not taken into account by the strategy                                                                                                                                                      | –                                                                                                                                                                                             | Consistent with the strategy                                                                                                                                                                              |

Source: compiled by the author.

Table 7. Estimates of projects A and B under consideration

| Criterion                                                                                                | Project A                                                    |       | Project B                                                    |       |
|----------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|-------|--------------------------------------------------------------|-------|
|                                                                                                          | Value                                                        | Score | Value                                                        | Score |
| SROI                                                                                                     | 1.221                                                        | 5     | 1.1                                                          | 5     |
| TCO, mln rub.                                                                                            | 5,303                                                        | 9     | 7,386                                                        | 1     |
| Capital intensity, mln rub.                                                                              | 1,100                                                        | 9     | 1,300                                                        | 5     |
| Scale of the project, %                                                                                  | 5 %                                                          | 3     | 6 %                                                          | 5     |
| Energy efficiency class                                                                                  | A                                                            | 9     | A                                                            | 9     |
| Availability of certifications and compliance with green building standards                              | GREEN ZOOM certificate                                       | 5     | No                                                           | 1     |
| Availability of energy-saving engineering systems (heating, ventilation, power supply, air conditioning) | All types of systems                                         | 9     | All types of systems                                         | 9     |
| Availability of automated building management systems                                                    | STDU installation                                            | 9     | STDU installation                                            | 9     |
| Use of renewable energy sources in the power supply scheme of the real estate object, %                  | Not foreseen                                                 | 1     | Not foreseen                                                 | 1     |
| Implementation of systems for separate collection of solid waste in the project                          | Three-stream collection system                               | 5     | Three-stream collection system                               | 5     |
| Availability of systems to reduce water consumption                                                      | Use of metered water supply systems and water saving devices | 5     | Use of metered water supply systems and water saving devices | 5     |
| Class of the object to be created                                                                        | A                                                            | 7     | B+                                                           | 5     |
| Provision of staff with space                                                                            | 10.3 sq. m/person                                            | 5     | 11.8 sq. m/person                                            | 9     |
| Possible commissioning date                                                                              | 1 year                                                       | 7     | 1.5 years                                                    | 5     |
| Impact on total portfolio area, sq. m                                                                    | 27,800                                                       | 5     | 26,000                                                       | 5     |
| Project implementation format                                                                            | Build-to-suit is in line with the strategy                   | 9     | Build-to-suit is in line with the strategy                   | 9     |

Source: compiled by the author.

Table 8. Results of calculating the final rating of projects

| Project     | Project A | Project B |
|-------------|-----------|-----------|
| Final score | 6.31      | 5.70      |

Source: compiled by the author.

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## Практические аспекты решения задачи селекции корпоративных девелоперских проектов

В современном мире корпоративные девелоперские проекты играют важную роль в развитии бизнеса. От эффективности реализации этих проектов во многом зависит успех компании. Автором рассмотрены практические аспекты решения задачи селекции корпоративных девелоперских проектов с акцентом на необходимость комплексного подхода к принятию решения о реализации проекта.

Рассмотрены различные стратегии, которые применяются в процессе управления портфелем корпоративной недвижимости. Многообразие стратегий обуславливает необходимость формирования многосоставного перечня критериев для решения задачи селекции проектов девелопмента, реализуемых в рамках управления портфелем корпоративной недвижимости. Разработан перечень критериев, включающий в себя три группы параметров проектов: финансово-экономические, экологические и управленческие. В качестве критерия общей эффективности предлагается использовать социальный возврат на инвестиции, который входит в группу финансово-экономических критериев, совместно с капиталоемкостью, масштабностью и совокупной стоимостью владения. Экологические критерии учитывают такие параметры объекта недвижимости, как наличие различных сертификатов, класс энергоэффективности, а также внедрение автоматизированных систем управления зданием. Управленческие критерии позволяют оценить соответствие проекта общей стратегии корпорации, поэтому в данную группу входят такие параметры, как: срок ввода в эксплуатацию, формат реализации проекта, а также обеспеченность сотрудников площадью.

Для принятия итогового решения автором предлагается использовать метод анализа иерархий, широко применяемый в различных отраслях при решении подобных задач. Представлены методические основы, а также практический пример применения данного метода.

**Ключевые слова:** управление проектами, девелопмент корпоративной недвижимости, селекция проектов, управление портфелем

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