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# Working with Constraints in Project Management

**Abstract.** The purpose of the article is to identify the influence of the theory of restrictions on the general management of project management in the company and the ability to use it by the Office of Project Management to reduce the impact of critical restrictions of project portfolio. The article shows the relationship between various theories of constraints in project management and theories of constraints in general management (TOC). Constraints are the restraining factors of the project, with which all project managers and project offices must work on the way to achieving project goals. Each project is unique and has limitations that consist of the specifics of the industry, a specific enterprise, and the project. The project manager and the project office need to identify the most influential constraint, or several constraints, that reduce the performance of the entire system. That is, it is necessary to identify and eliminate restrictions that primarily affect the entire portfolio of projects. The theory of constraints makes it possible to determine exactly where in the process of project implementation there is a bottleneck that reduces the productivity of project implementation. The elimination of bottlenecks and the optimization of processes lead to an increase in the efficiency of project execution and the project portfolio as a whole. This makes it possible to obtain better project results at lower costs of limited resources by improving the quality of project management by the project management office.

**Keywords:** project constraints, project management triangle, Critical Chain Project Management, theory of constraints, project management office

<https://doi.org/10.58683/dnswsb.633>

## 1. Formulation of the Problem

Successful project management involves understanding the restrictions. Balancing of these restrictions with the maintenance of stakeholder satisfaction is a permanent project activity performed by the project manager or project office.

Restriction is a deterrent factor that influences project management, program, or project portfolio. Traditionally, such restrictions are the “content and limits of work” that determine the amount of work, “time” and “cost”. Such restrictions

were called “Project Management Triangle”, where each party is a certain restriction. Each project has its own amount of work, which must be done within a given budget, a given time of work (work schedule) and at the same time the product must correspond to the agreed level of quality. They are restrictions and always the project manager should choose how to balance the impact of one restriction at the expense of others (The standard of management, 2021). One side of a triangle cannot be changed so as not to affect the other sides. For example, if you increase the amount of work, then the budget and/or the time of work should be increased.

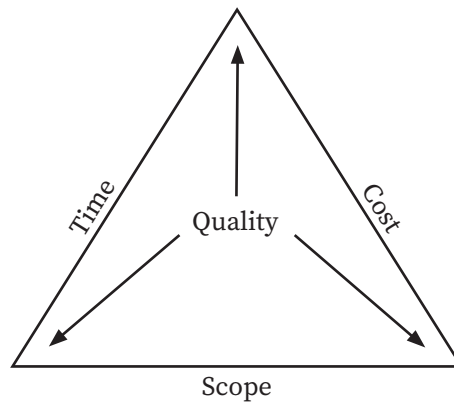


Fig. 1. Project Management Triangle  
Source: Project Management Triangle (2023)

My experience with projects in different industries shows that different sectors of the economy have their own industry specificity of the availability or shortage of resources and the possibilities of their involvement. For example, construction enterprises tend to have a greater impact of time limit. They cannot stop or extend the construction time, as they will have significant, multiple costs and risks in the quality of the building from the impact of technology and environmental impact. Mass products, such as bread, grocery, meat, dairy products, and other mass products, usually work at high speeds, sales, but with a small margin. Therefore, their projects are most influenced by budget restrictions. For enterprises that produce high technological products that compete at the expense of unique consumer characteristics, the main limiting factor is the quality of the product.

## 2. Literature Review

From the beginning of the creation of a comprehensive project management theory, in the standards of project management (PMI), the concept of project restrictions and methods of working with the project and the project management triangle and the critical project management triangle. But if in the 3 edition of project management standards, these restrictions and methods are considered in the context of projects, then in the development of project management theory in the latter today 7 editions of project management standards, these restrictions are already considered to a set of projects, programs, portfolios of projects, i.e. more complex management systems (The standard of management, 2021). Little B. Studies the impact of human capital, leadership and communication on the success of the project and proves that such methods of working with restrictions as a critical way of managing the project have shortcomings because it does not take into account them (Little, 2011). E. Goldrat, by combining the theory of physics and economics, created the theory of restrictions for business. Its theory is based on the search and management of a key restriction of the system, which determines the success and efficiency of the whole system as a whole. Kumar P. analyzes the influence of E. Goldrat's constraint theory on project management theory (Hendricks & Singhal, 2001). Kannan V., Tan K. Just is studied as the impact of process optimization and elimination of restrictions in projects can improve the quality of the product. Which, in turn, improves customer satisfaction and sales volume (Kannan & Tan, 2005).

## 3. Main Results of the Study

Individual enterprises have their systemic restrictions that affect their projects and project portfolios. This can be the ability to get the necessary equipment, hire staff to implement projects, limit the setup or development of IT systems for projects, the ability to attract funding, and others. To reduce the impact of the restrictions that most affect the project, project executives and project offices balance their impact at the expense of other resources. This is how the critical resource and the critical way of managing the project emerged. Critical Chain Project Management (CCPM) — is a method of project planning and management that puts the first place to manage resources (physical and human) needed to accomplish the project tasks. It appeared as a direction of project management theory that is related to project restrictions. The CCPM method is focused on project planning aspects, but does not include anthropic aspects such as leadership

and communication (Little, 2011); In addition, this concept is limited by a lack of economic interpretation in the plane of choice of organizational structure of the project (Hodgson, 2002). In particular, this unified model is intended to provide a new understanding of resource management within the project (Hall, 2012). In addition, the theoretical model should include a comprehensive assessment of the components of a successful project, by analogy of the Project Management Triangle, which covers the volume, time and cost drivers. In the beginning, the main attention of project management theory was focused on the tasks and their duration. However, traditional project management methods, in particular EVM/ES, have not taken into account the impact of multitasking and uncertainty related to the assessment of the duration of the task (Little, 2011). The idea of introducing buffers to soften the effects of multitasking and uncertainty was presented within the framework of the CCPM concept (Little, 2011). CCPM focuses on planning actions within the project activity and proposes to estimate the length of work with 50% probability of timely completion. In addition, CCPM proposes to use buffers to take into account uncertainty (Little, 2011). In fact, the concept of CCPM is one direction of the development of theory of theory of constraints (TOC) for projects. The main task is to increase the productivity (or increase the percentage of tasks completed) in the organization. Applying the first three of the five major TOC steps, system restrictions for all projects are defined as resources. To use limitations, the task on a critical path is prioritized than other activities. In general, projects are planned and managed in such a way that resources are available when the critical path tasks should begin, subordinating all other resources to the critical path.

Theory of constraints, developed by E. Goldrat in the 1980s, proposes an approach to management based on the vision of the system as one or several restrictions that reduce its effectiveness (Hendricks & Singhal, 2001; Kannan & Tan, 2005; Kumar, 2017). Restriction is all that prevents the system from achieving its goals. After determining the restriction, the theory focuses on overcoming this restriction, which will expand the capacity of the system and accordingly enhance the efficiency of its functioning. The methodological approach within the framework of the theory of restrictions involves a number of steps. First, you need to determine the system restriction. It is a step that defines one or more factors that limit the performance of the system. It is important to note that not all restrictions are the same. Some restrictions are more important than others, and the task is to determine the most important restriction. Secondly, it is necessary to decide how the system can function more effectively within the existing restriction. As part of this step, you need to find out how to get the maximum return within the existing restriction. Third, it is necessary to subordinate all other management

decisions and measures to function more effectively with a previously defined restriction. Accordingly, all other actions in the system must be subordinated to a decision on a previously defined restriction. In other words, all other actions should be designed to support the organization of the organization under certain conditions. Fourth, it is necessary to overcome the previously defined restriction. This involves the search for ways to expand the capacity of the existing restriction, which will continue to enhance the efficiency of the organization. Finally, for detecting a new restriction, to reproduce the algorithm described above as part of increasing efficiency.

In my opinion, the theory of restrictions applies to a wide range of systems, including production and service sectors, as well as public institutions and non-profit organizations. The advantages of this theory include improving the efficiency of organizations by concentrating on solving the specific problems that most affect the results of the activity. This is made in the form of the following results:

- ▶ Detection and elimination of narrow places: the theory of restrictions allows you to determine where in the process there is a narrow place that reduces productivity. After detection of this place, measures are taken to eliminate or optimize it, which accordingly leads to improving productivity;
- ▶ Improving efficiency: elimination of narrow places and optimization of processes lead to an increase in the efficiency of functioning of the organization, which means obtaining a better result at less cost of limited resources at the expense of reasonable management decisions in the plane of the organization; – cost reduction: optimization of processes and elimination of narrow places helps to reduce production and other costs. In particular, it is a reduction in the cost of raw materials, energy, staff, etc.;
- ▶ Increasing the level of customer satisfaction: optimization of processes and elimination of narrow places can improve the quality of the product. This can improve customer satisfaction, which in turn can lead to an increase in sales and growth of margin;
- ▶ Creation of a more sustainable organization: optimization of processes and productivity increase can lead to an increase in profit and competitiveness, which in turn will lead to the sustainability and long-term success of the organization. At the same time, there is an objective criticism of the theory of restrictions, which is expressed by some experts. In particular, complex systems can be difficult to identify a single key restriction. There may be several such restrictions, and it may be unclear which one is most important. In addition, the restriction can be dynamic. Restrictions can

change over time, so it is important to carry out permanent monitoring and determine the current key restriction (Hassan, 2013; Jarzabkowski et al., 2013; Lalonde, 2010).

## 4. Conclusion

In my opinion, theory of constraints can be difficult to implement in a practical plane. TOC requires fundamental changes in how organizations see and manage their activities, which is especially problematic for organizations that are used to traditional management methods. In addition, the practical implementation of the methodological approach of the TOC can be related to the significant cost of cash and other resources. TOC requires significant cash in personnel training, technological resources and time. This can be an obstacle to some organizations. But in my opinion, TOC as a methodological approach can produce good results for long-term use, within 1-2 annual cycles of project implementation. During this time, project managers and project office tend to understand what restrictions on projects in their company are systemic and how these restrictions can be influenced how to build systematic work with these restrictions.

Therefore, the following conclusion can be drawn: in the short term, the TOC does not give decisions to improve project management, but in the long run TOC can be used by the project management office to improve the management system of enterprise project management by reducing the impact of restrictions that affect the entire project portfolio.

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## Praca z ograniczeniami w zarządzaniu projektami

**Streszczenie.** Celem artykułu jest określenie wpływu teorii ograniczeń na ogólne zarządzanie projektami w firmie oraz możliwość wykorzystania jej przez biuro zarządzania projektami w celu zmniejszenia wpływu krytycznych ograniczeń portfela projektów. Artykuł pokazuje związek między różnymi teoriami ograniczeń zarządzania projektami a ogólnymi ograniczeniami zarządzania. Aby osiągnąć cele projektu wszyscy menedżerowie projektów i biura projektowe muszą wziąć pod uwagę czynniki ograniczające projekt. Każdy projekt jest wyjątkowy i ma ograniczenia, na które składają się specyficzne cechy branży, konkretnego przedsiębiorstwa i projektu. Kierownik projektu i biuro projektu powinni określić najważniejsze ograniczenie lub kilka ograniczeń, które zmniejszają wydajność całego systemu. Oznacza to, że konieczne jest zidentyfikowanie i wyeliminowanie ograniczeń wpływających przede wszystkim na całe portfolio projektu. Teoria ograniczeń pozwala ustalić, gdzie w procesie projektów istnieje wąskie gardło, które zmniejsza wydajność wdrażania projektu. Usunięcie wąskich gardeł i optymalizacja procesów prowadzą do zwiększonej wydajności projektu i całego portfela projektu. Pozwala to uzyskać lepsze wyniki projektu przy niższych zasobach poprzez poprawę jakości zarządzania projektami przez biuro zarządzania projektami.

**Słowa kluczowe:** ograniczenia projektu, trójkąt zarządzania projektami, zarządzanie projektami krytycznymi, teoria ograniczeń, biuro zarządzania projektami