

## Practical Application the Theory of Constraints: Experience and Challenges of Russian companies

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### Abstract

The article describes the results of the research the Theory of Constraints (TOC), Throughput Accounting, 3Q Accounting, the experience of International Companies which successfully implemented the Theory of Constraints and the Practical Application of this Theory and Methods in Russian companies. The research was conducted on the basis of the public corporate data, the disclosed project implementation results of the consulting companies, the comments and the clarifications of Business seminars' participants.

**Keywords:** Theory of Constraints, Throughput Accounting, 3Q Accounting, Management Accounting.

### 1. Introduction

The success of several international companies, which implement the Theory of Constraints, has not gone unnoticed during the global financial crisis. The distinctive characteristic of the companies that implemented TOC is the way they survived the economic crisis during 2008-2009 and have developed in 2010-2013 [1, 2]. While other companies in the same industries were experiencing serious decline in sales and profits, many companies that used the theory of constraints, could keep their performance on the pre-crisis level and, moreover, could ensure the significant growth. The particular interest for Russia is presented by the experience of its BRICS partner – India, including that of following companies, which were focused on TOC: «Fleetguard Filters Pvt Ltd» - manufacturer of automotive industry, «Tata Steel» - steel producer, «Dr. Reddy's» - manufacturer of pharmaceuticals [8]. In his reports, the international director of «Goldratt Schools» Oded Cohen mention the representative of Russian business, which implements and actively uses the theory of constraints in its management accounting - the LLC LPK Continental Management, vertically integrated holding company and one of the largest timber companies in Russia. However any other information about the application of TOC in theory and practice of Russian accounting is missing in these reports [3, 4]. That's the reason why we have conducted the research on implementation of the TOC methods in accounting by Russian businesses. This research studies the Russian firms in different industries which implemented or are currently implementing TOC, the terms of the implementation, the consulting partners for the implementation, the reasons for the introduction of TOC and its results as a set of performance benchmarks [5, 6].

### 2. The Objects of Research

The sample of Russian companies which have claimed in 2010-2013 their orientation on TOC and its practical application in accounting amounted to 25 units. Information was obtained from the open sources (from the official websites of the participants of research, the results of projects implementation on the websites of consulting firms serving the implementation of TOC at the company - participant, educational portals), that can testify about the reliability of the information, declared by companies. 32% of the 25 objects of research are located in Central Federal District, 28% - on the territory of Volga Federal District, 16% - on the territory of Ural Federal District and Siberian Federal District, 4% - on the territory of Northwestern Federal District and Southern Federal District (see Panel A Table 1). We would like to note the concordance of the concentration of such companies with the availability of the science centers and the resource base in respective areas.

By the form of ownership limited liability companies prevail - 48%. This fact is associated primarily with the wide adaptation of accounting on the TOC basis in the sphere of trade and services (64% of the limited liability companies operate in this sphere), the launch of E. Goldratt's book «Isn't It Obvious?» (Theory of Constraints for retailers), the

availability of resources for implementation at consulting firms and opportunities to teach managers in business schools. 36 % and 16% are consisted, respectively, by the closed joint stock companies and joint stock companies - the largest mining and processing enterprises with sophisticated production technology [9]. Their appeal to TOC caused as a rule by the problems of slowdown of production growth, deteriorating of financial performance, low turnover of inventories along with long production cycle, customer dissatisfaction with the shipment terms [10].

By industries the largest share of TOC - oriented companies belongs to machinery (from aerospace to manufacturing of electronic goods and medical equipment), trade industry, construction, services and timber processing (see Panel B Table 1).

**Table 1.** Geography and industries of the research of companies, focusing on TOC and its practical application to accounting

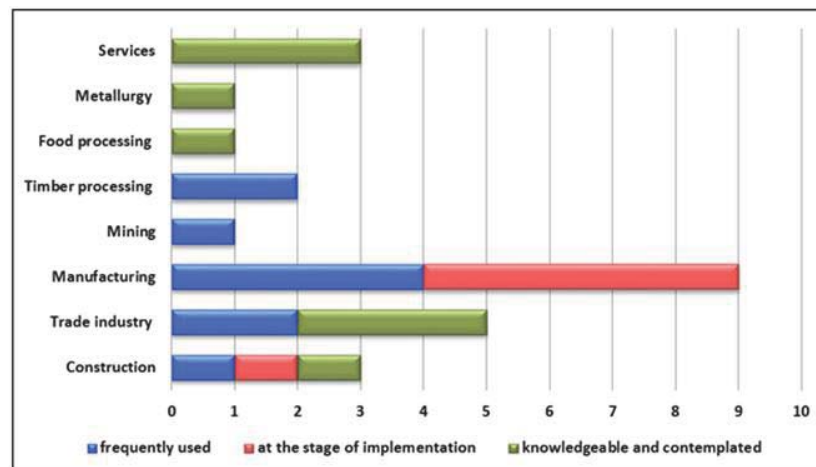
Panel A. Region		Panel B. Industry	
Central Federal District	32% (8 units)	Machinery	36% (9 units)
Volga Federal District	28% (7 units)	Trade	20% (5 units)
Ural Federal District	16% (4 units)	Construction	12% (3 units)
Siberian Federal District	16% (4 units)	Services	12% (3 units)
Northwestern Federal District	4% (1 unit)	Timber processing	8% (2 units)
Southern Federal District	4% (1 unit)	Mining and metallurgy	8% (2 units)
Far Eastern Federal District	0% (0 units)	Food processing	4% (1 unit)
Total	100% (25 units)	Total	100% (25 units)

### 3. Methods: Data Analysis of the Research

By to the degree of usage of the TOC tools we obtained the following data:

- 40% (10 units) of objects of research actively use the tools of TOC, while 4 units of them are presented by machinery manufactures (LLC Uniscan, CJSC Sovitalprod mash, CJSC Nikolsk Lighting Glass Factory, JSC Eletech Factory), 2 units - by timber processing (LLC LPK Continental Management, STKK JSC), 2 units by trade industry (ERGIS Group LLC, Tehnobum LLC), 1 unit - by the construction (Pokroff JSC) and 1 unit - by mining (Souzmetallresource CJSC);
- 24% (6 units) of the companies are at the stage of implementation of TOC projects, among them: 4 units are the companies in manufacturing, 1 unit in trade industry and construction.;
- 36% (9 units) of the remaining held seminars and trainings related to this instruments. Managers of these companies are considering the usage of the TOC instruments in the future.

In general, the state of the TOC introduction by the objects of research by branches of the economy is represented by Figure 1.



**Figure 1.** The extent of usage of the TOC instruments by branches of the economy

#### 4. IT-Service Providers and Consulting Firms

The structure of the IT-service providers and consulting firms, contributing to the process of implementing or having implemented TOC in research objects is as follows:

- 40% (10 units) of the market is taken by the Russian Office of the Goldratt Schools, which consults businesses, that have not yet embarked on a course of the TOC, through seminars and business training;
- 24% (6 units) of the market is taken by the Lithuanian company UAB Inherent Simplicity Baltic, which had implemented the TOC in the following companies: STKK JSC, LPK Continental Management LLC, Nikolsk Lighting Glass Factory CJSC, Eletech Factory JSC, Souzmetallresource CJSC;
- 16% (4 units) of the market is taken by ARB Consulting LCC, that incorporated TOC in trade companies Tehnobum LCC и ERGIS Group LCC;
- 12% (3 units) of the market is taken by SAI ARIS, which incorporated TOC for medical device manufacturer Uniscan LCC, and which started the implementation projects at NEVZ-Soyuz JSC и Novosibirsk Plant Electrosignal JSC;
- Continuous improvement of TOC, which had been initiated by the Director of Sovitalprodmash CJSC in 2005, was supported by the consulting firm Rightstep LCC, that also run a project of TOC implementation at the Kazan Helicopters JSC - 8% (2 units) of the market.

#### 5. The Practical Results of the Implementation

Sovitalprodmash CJSC (implementation of TOC in 2005/2007).

While considering the evolution of the TOC instruments in the Russian business, the first effective and practical experience is associated with the 2005 year at the factory Sovitalprodmash CJSC. Due to the TOC, previously unprofitable enterprise producing refrigeration equipment became a leader in the industry in just two years. The project of the TOC implementation and its practical application to the accounting began in September 2005. Back in 2005 the total capacity was loaded only by 5%, the company suffered millions of losses and debts, an excessive amount of inventories and finished goods (2 monthly turnover) was stocked in warehouses and production, along with the frequent lack of cash on the operating account. As a result of the two-years' implementation the production of refrigerated cabinets increased in 4 times (up to 60 thousand units per year), revenues grew from \$20 million in 2005 to \$70 million in 2007, with an average annual rate of growth of the Russian refrigeration market during this period, consisting 25%, while reducing inventories in five times and reduction of the delivery term from two months to one week, the plant productivity boosted by 70% at the expense of developing production range, taking into account the value generated to load the bottleneck, the company entered new markets while working on the market bottlenecks (see Panel A of the Table 2).

**Table 2.** The results of the implementation of TOC in some Russian companies

Key indicator	Before implementation of TOC	After implementation of TOC
Panel A. Sovitalprodmash CJSC (machinery)		
Sales	20 million dollars	70 million dollars
Inventory turnover	60 days	12 days
Term deliveries	60 days	7 days
Capacity utilization	5 %	70 %
Panel B. LPK Continental Management LLC (timber processing)		
Cycle times	long	reducing cycle times up to 75%
Level of availability of products in warehouse	lack of a number of need positions and excess of other positions	increasing in the availability of products in warehouse - up to 95%
Panel C. ERGIS Group LCC (wholesale)		
Shipping	was delayed for 14-21 days	trouble-free
Volume of filled orders	60 %	99 %
Sales vs. market level	lower than market level	increased by 10 % with an overall market falls by 35 %

LPK Continental Management LLC (implementation of TOC in 2008/2009).

LPK is operating in complex industry of timber processing had been implemented TOC at its companies for six months in 2008. The company identified a number of the following problems: the company holds stocks of finished goods and is forced to start production in conditions of lacking orders, only relying on the forecast, the lack of several items at the warehouse leads to missed sales, the excess of other items leads to the obsolescence and write-off of the production and low turnover of goods. The results of resource enabled to increase the availability of products at the warehouse - up to 95% in six months after implementation; to reduce production cycle up to 75%, to avoid the employees' redundancy during the crisis (see Panel B of the Table 2).

ERGIS Group LCC (implementation of TOC in 2010/2011).

In late 2010, operating in wholesale of door fittings, had faced a number of serious problems, hindering its further development: several old customers quit, the orders of existing customers were not fully fulfilled (50 - 75%), several clients stopped making new orders, order shipment was delayed for 2-3 weeks until complete procurement, company's customers preferred to buy most goods from one place on hand while the company was not able to support the sufficient level of products in stock. Top management decided to introduce TOC tools, the results of which were the following: sales increased by 10% with an overall market fall by 35%; the shipment started to take place on time, company began to work with the large retail chains, the clients' applications were performed by 99%. The implementation is currently continuing in the number of other companies, which are ERGIS Group LCC customers (see Panel C of the Table 2).

## 6. Conclusions

Conducted research has shown the following result: management accounting on the base of TOC in Russian enterprises in 61% cases is implemented by attracting foreign consulting firms and IT-service providers, and only 39% with the assistance of the Russian consulting firms and IT-service providers. However, with the wide penetration of the "world of constraints" in the mentality of the Russian businessman this ratio will have to change soon in favor of the local companies. So, 40% of the researched companies in Russia are actively using TOC and its practical application to the management accounting today, another 24% of the companies are on the stage of introduction of the TOC tools. As for the branches of the industry, TOC is widely used in machinery (36 % of the researched companies) and trade industry (20% of the companies). The evolution of TOC in Russia can be represented by three key periods and respective companies, Russia's leaders in business organization on the base of the TOC tools: CJSC Sovitalprod mash, which operates in the production of refrigeration equipment; LLC LPK Continental Management, which operates in the complex industry of timber; LLC ERGIS Group, which operates in wholesale.

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