

Developing a Methodology for Category Management in Manufacturing Companies

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Abstract

'Category management' term has been used in manufacturing companies for over 10 years, but its methodology has not been clearly defined yet. Traditional category management (CM) originated in retail and it is obvious that the whole set of its tools is impossible to apply to the purchases of industrial companies due to a number of specific restrictions: some of the goods purchased by a manufacturing enterprise are modified in the process of production, and the others are acquired not for external, but for the needs of company internal consumer. Therefore, it is necessary to make a number of clarifications in the methodology of CM for manufacturing companies concerning the process framework, toolkit and implementation guidelines. In this regard, we proposed a fundamentally new concept of 'category approach'. By analyzing the theory of traditional CM, the practice of manufacturing CM and summarizing the experience of Russian industrial companies we outline the methodology of 'category approach' and its toolkit and implement these findings in a big Russian metallurgical company. The questions that arouse in the course of implementation made us develop a new strategic decision-making tool, which was successfully tested during the project.

Keywords

Supply management, category management, purchasing category management, category approach.

1. Introduction

Procurement function of industrial enterprises has been underestimated and viewed as a service function for a long period. But over the last decade, raising efficiency of a supply management process becomes a priority for many companies worldwide, for investments here are relatively low and quick to return. According to KPMG study, 'The Purchasing Maturity Model. Analysis of the procurement function in Russian companies'¹, the share of goods purchased in the revenues of production plants makes from 25 to 65%. For example, in the steel industry their cost is 65%, in chemical 61%, in heavy industry - 42%. Purchases have a decisive impact on the financial result of a company, as a purchase cost reduction of 10% can lead to a double increase in profits. KPMG estimates that the potential to reduce the cost of purchasing in Russian companies is about 10-15%.

Data collected by KPMG-Russia confirm that it is economically expedient to search for a reserve to improve competitiveness in reducing procurement costs. According to KPMG experts, the most important issues in developing procurement function of Russian enterprises are strategy, improving the process of sourcing and implementation of category management. The major question that arises is what exactly category management means for manufacturing companies? The practice of category management was originally developed and used in retail enterprises in order to manage the assortment of goods sold. There is a gap in theoretical basis for category management and its implementation in manufacturing, lack of academic literature about its methodology, toolkit, guidelines. All these are the reasons why CM is a costly and unique knowledge offered by consulting agencies, hardly available for small and

¹ The Purchasing Maturity Model. Analysis of the procurement function in Russian companies. URL: <https://assets.kpmg/content/dam/kpmg/ru/pdf/2016/8/ru-ru-procurement-survey.pdf>

medium size companies. Thus, the purpose of this study is to develop category management process model, methodology and toolkit for manufacturing companies.

2. Literature review

2.1. Category management in retail

Category management, as an approach to the management of purchased products range, originated in Procter&Gamble in the 1990s (Holweg et al. 2009). Traditionally, categorical management has evolved as a method of managing purchase in retail and wholesale trade. According to ECR, CM can be defined as ‘a distributor/supplier process of managing categories as strategic business units producing enhanced business results by focusing on delivering consumer value’ (Holweg et al., 2009). The methodology of category management was developed by large consulting organizations as Nielsen and ECR. The first step of implementing category management is to divide the range of goods into categories and allocate subcategories in accordance with consumer perception. Then, based on the share in turnover and revenue of the company, the roles of categories (basic, convenient, etc.) are determined. For each category it is necessary to analyze its composition, internal structure, supplier market and strategies. Based on the category development strategy, a plan of activities related to marketing, layout, pricing, etc. is being developed. CM as a process includes the following stages:

- Managing the product range, managing suppliers;
- Marketing activities aimed at increasing sales and customer loyalty;
- Pricing. A pricing policy is developed for each category separately to maximize the profits of the company;
- Layout (merchandising) is a retail tool that allows increasing sales by effective location of goods on the shelves (Il’enkova 2018).

Over the past decade, research into the theory and practice of CM has focused on managing the range products retailers purchase: product category management, risk, introduction of new products (Dass and Kumar 2012; Goic et al. 2015), assessing the role of brands, (Casteran et al. 2019; Hall et al. 2010), the impact of the breadth and depth of the product range on consumer loyalty (Bauer et al. 2012; Beneke 2015; Beneke et al. 2013). Since the product range of retailers is usually more than a thousand items, the data analysis methods used also deserve special attention (Yang and Li 2017; Casteran et al. 2019; Sinha et al. 2013). Besides, one of the main issues of modern CM is the efficient pricing and profitability management of the categories (Gonzalez-Benito et al. 2010, Voleti et al. 2017) and inventory management by categories (Che et al. 2012; Ma et al. 2010). The researchers are interested in the practical application of the category management toolkit in various market segments, such as FMCG (Hyvönen et al. 2010; Sandell 2019), and at various types of retailers (Hamister and Fortsch 2016; Han et al. 2010; Zhang et al.2010; Shen 2011; Cadeaux and Yee 2013).

2.2. Category management in manufacturing

The term category management was first applied referring to manufacturing companies in 2009 by Jonathan O'Brien, CEO of the international purchasing consultant agency, in his practical book named ‘Category Management in Procurement’. This was the first book about the application of category management to non-retailers. O'Brien uses the terms ‘marketing category management’ and ‘purchasing category management’ The first refers to the traditional approach to managing product groups, depending on how the buyer sees and uses them. The author introduces the concept of category management in purchasing: it is the practice of dividing the main areas of expenditure for purchased goods and services into separate groups according to their functions and characteristics of the respective markets (O'Brian 2019).

There are very few academic papers on category management applied to manufacturing companies. The same year with O'Brien's practical book, Heikkilä & Kaipia published their research paper mentioning the same term ‘purchasing category management’ (Heikkilä and Kaipia 2009). They explained that the practice of grouping purchased goods in categories and managing them separately had been long time used in manufacturing companies and used to be called ‘commodity management’. The more recent systematic approach to managing categories was commonly called ‘purchasing category management’ by practitioners. As the academic literature on this topic scarcely could be found, they analysed the practical application of CM in seven industrial companies in order to find out how the process was organised. This paper was mainly focused on the principles of forming categories.

Their further research was devoted to organizing category management function within PSM, integration between the purchasing department and other business functions in the process of purchasing category management. Four cases of application in manufacturing companies were studied (Heikkilä et al. 2018).

Øystein Nygård, business consultant and practitioner in purchasing, uses the term ‘category management’ applied to procurement in manufacturing without any attempts to step aside from retail CM. In his definition CM is a strategic approach which organizes procurement resources to focus on specific areas of spend (Nygård 2017). Although CM may seem similar to strategic sourcing, Nygård (2017) formulates the main difference: CM is a broader concept aligning sourcing supply markets and ongoing process of managing category value for the organization, i.e. it is not limited by short-term cost reduction goals.

In 2019 we published a paper explaining that the term ‘purchasing category management’, that had probably originated in practical use of manufacturing companies’ management and was then introduced to academic literature by Heikkilä, was somewhat irrelevant. The use of terms ‘marketing category management’ and ‘purchasing category management’ seems incorrect because, according to most authors, the classic ‘category management’ in retail includes marketing management activities, and is most often implemented by managers of retail procurement departments. Thus, category management can use marketing tools, and at the same time be carried out by the employees responsible for purchasing. So both retail and manufacturing category management can be called ‘purchasing category management’.

But as the term ‘category management’ has long been attributed to retail and assumes a certain number of marketing tools inappropriate for goods, purchased by manufacturing companies (such as promotion, pricing, merchandising), it is better to use a different term concerning manufacturing practice. So we proposed to name this practice ‘category approach’. The major difference in ‘category management’ in retail and ‘category approach’ in manufacturing is that the first focuses on managing the assortment of goods, and the second one is focused on managing suppliers and supplier markets (Burlakova and Ruzhanskaya 2019). They also assume different toolkits, which has been the focus of this paper.

3. Methods

Since January 2021 we were involved in a pilot project of implementing category management in a big Russian metallurgical company, so it was necessary to develop process framework and methodology for CM process. Based on the practitioners books (O’Brian 2009, Nygård 2017) and academic papers (Heikkilä and Kaipia 2009, Heikkilä et al. 2018), we developed a process framework for applying category approach in a manufacturing company, which consists of 10 stages (Figure 1):

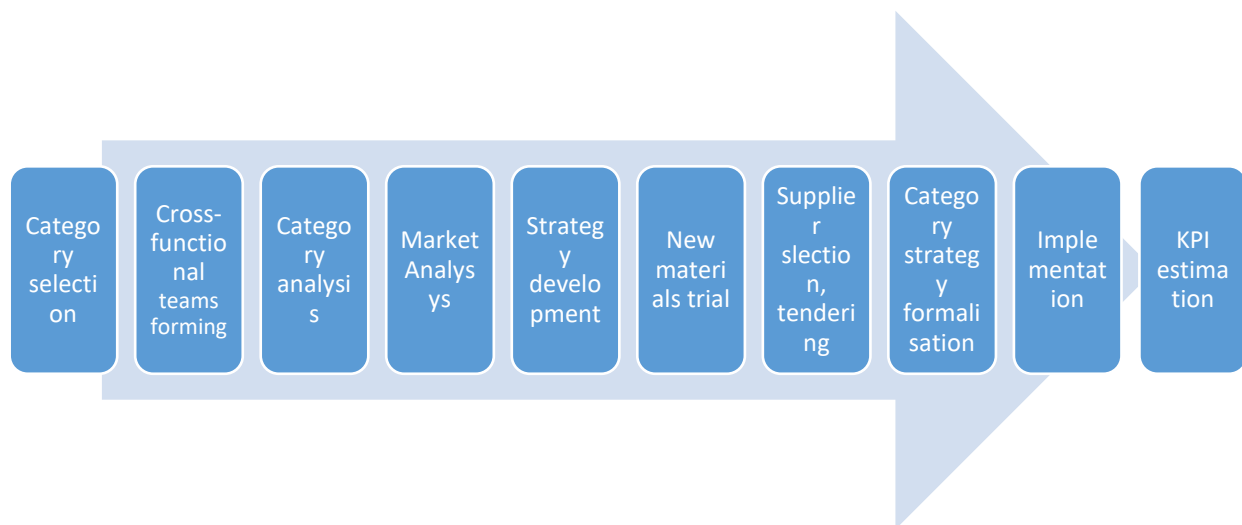


Figure 1. Authors’ CM process framework

Analysing the mentioned works, PSM academic literature and consultant agencies websites we defined specific managerial tools for each process stage.

At Stage 1 (Table 1) a company must first define categories and subcategories, and there is no single universal classifier or template. Goods could be classified using different codification and classification systems, such as CPV (Common Procurement Vocabulary), ECLASS, GPC (Global Product Classification) etc.

In USSR there was Unified Nomenclature Directory, which is out of use in Russia now, so we proposed to use supplier registries of biggest national B2B marketplaces, as goods there have been classified according to supplier markets.

Table 1. Category selection

Stage1. Category selection	
Objective	Tool
Dividing goods into direct and indirect classes	Direct materials are constituent part of manufactured product Indirect materials are bought to support production process
Defining categories	Goods codification and classification systems, such as CPV (Common Procurement Vocabulary), ECLASS, GPC (Global Product Classification) etc. Supplier registries of biggest national B2B marketplaces
Perform cost analysis in order to select priority categories to work with	Cost analysis of organizational annual spend (by categories, suppliers, stakeholders) using ABC- analysis
Draw time-schedule for running category projects	Project management tools the company uses

In our 2019 study of category management implementation in Russian companies we studied four cases and concluded that integral parts of CM in manufacturing are cross-functional category teams and ‘category strategy’ - formalized document. Heikkilä et al. (2018) also have a four-cases study of category teams cross functional interaction. So in Stage 2 we assume forming a cross functional team consisting of procurement stuff, internal customers and other stakeholders (Table 2).

Table 2. Cross-functional teams forming

Stage 2. Cross-functional teams forming	
Objective	Tool
Cross-functional team leader and members selection	Professional and managerial competencies testing Psychological tests Filling ‘Category team card’
Selecting participants from other functional divisions	RACI model (O’Brian 2009)
The team work monitoring	Gantt chart

For Stage 3, which implies detailed analysis of each category, we developed ‘category card’ template including goods description, price parameters, logistic parameters, volume of supplies, alternatives / replacements, problems voiced by the customer, information about existing suppliers (Table 3).

Table 3. Category analysis

Stage 3. Category analysis	
Objective	Tool
Purchased goods description	Category card, goods description:

	code, nomenclature, units, manufacturer, goods description, use, technical characteristics, quality standards, packaging and storage information etc.
Defining demand, value	Internal customers interview
Pricing parameters	Category card, pricing parameters: unit price, price dynamics, price change sources like currency and market rates, payment terms.
Logistics parameters	Category card, logistics parameters: delivery terms, delivery time, packaging, transportation lot size, supplier shipping costs, other costs (including customs).
Supply volume	Category card, supply volume: method of demand calculation, frequency of purchase orders, volume of daily/monthly/yearly supply, inventory analysis, methods of stock replenishment.
Alternatives	Category card, alternatives: alternative materials that have ever been used, potential substitute goods, recyclable/returnable packaging.
Problems	Category card, problems: internal customers interview
Current suppliers information	Category card, suppliers: main suppliers, potential suppliers, alternative suppliers (share of purchases, characteristics of the supplier)

In order for the market analysis to be as comprehensive as possible, it is necessary to designate a wider range of analysis tools for managers (Table 4), since in everyday practice many of them limit their search to the use of preselected internet browser. The suppliers found are to be estimated not only in terms of lowest price, but complex cost and strategic perspective.

Table 4. Market analysis, strategy development, new Materials Trial, supplier selection and tendering

Stage 4. Market analysis	
Objective	Tool
Gathering supplier market information in order to understand the structure of local, federal and international markets.	RFI (Request for information) Internet search using different search algorithms (as, for example, Google and Russian Yandex provide different search results) Aggregator web-sites Commercial and governmental B2B marketplace supplier registries (like Russian Fabrikant and B2B Center) Supplier visits Market reviews Professional industrial exhibitions, journals, trade-support governmental organisations
Stage 5. Strategy development	
Objective	Tool
Cost analysis	TCO (total cost of ownership calculation) TCE (transaction costs calculation)
Strategic analysis	Supply chain analysis, Kraljic portfolio analysis, SWOT
Stage 6. New Materials Trial	
Objective	Tool
The choice of materials appropriate	The company's testing methodology
Stage 7. Supplier selection and tendering	
Objective	Tool
Selecting suppliers	Company's supplier selection methodology

Among the most important stages are strategy formalization and KPI estimation, because these steps help to keep category team reach the destination point on time and declare results (Table 5).

Table 5. Category strategy formalization, implementation, KPI estimation

Stage 8. Category strategy formalization	
Objective	Tool
Fixing all the information obtained, decisions made and action plans in a form of a document	Category Strategy document template
Strategic analysis	Supply chain analysis, Kraljic portfolio analysis, SWOT
Stage 9. Implementation	
Objective	Tool
Implement the developed strategy	Company procedures
Stage 10. KPI estimation	
Objective	Tool
Estimate process effectiveness	Metrics: Meeting deadlines, actual savings, potential yearly savings

A template for every stage report was formalized, so that completion could be tracked.

4. Data Collection

During the project 15 categories were selected and analysed (Table 6). Category teams consisted of purchasing specialists and managers, and were working in close collaboration with internal customers and technical experts. Together we obtained deeper understanding of supplier markets (up to 40 new suppliers per one category were found).

Table 6. Project results: cost savings

No	Category	Project duration, month	Annual spend, USD	Expected savings per year, USD	Expected savings per year, %
1	Additive 1	5	425 292	107 847	25,4%
2	Raw material 1	3	152 157	0	0,0%
3	Raw material 2	2	238 378	0	0,0%
4	Additive 2	7	174 000	0	0,0%
5	Additive 3	4	101 878	4 701	4,6%
6	Pachaging 1	5	601 413	0	0,0%
7	Pachaging 2	5	82 763	0	0,0%
8	Raw material 3	4	111 858	0	0,0%
9	Supplies	3	336 998	0	0,0%
10	Equipment	5	200 370	0	0,0%
11	Packaging 3	6	9 857	0	0,0%
12	Packaging 4	6	68 915	0	0,0%
13	Packaging 5	6	118 736	17 546	14,8%
14	Packaging 6	6	93 000	0	0
15	Packaging 7	6	47 432	0	0
	Total		2 763 048	130 094	4,7%

5. Results and Discussion

After 7 month of project duration only 3 categories have proven potential annual savings, i.e. new suppliers were selected, trials successful, contracts signed and first lots received. These savings together make 4,7% of the total

annual spend of selected categories. We still have some other potential savings that hasn't been confirmed yet. The best result was achieved with Additive 1 category. Initially, the category was defined as a specific brand of additive that used to be purchased in Germany. Widening the scope of additives considered, the team found new local manufacturers, conducted trials, negotiations, the product and packaging was reworked by the supplier, and the contract with 25% annual savings was signed. With Additive 3 the effect was achieved by rearranging delivery and switching from vans to railway. With Packaging 5 a new supplier from another region was found and won the tender. We assume that the reasons why we couldn't obtain savings result in other categories is raw materials price dynamics. When market prices have tendency to grow rapidly the goals turn from savings to cost rise avoidance.

5.1 Proposed Improvements

During the project, we faced the difficulty of justifying the selected suppliers through corporate supplier selection methodology. Some companies tend to select suppliers by cost savings only, without taking into account strategic reasons, others pay more attention to weighted sum or risk and comfort criteria. Therefore, we have developed a new tool based on a digitized Kraljić matrix (Figure 2), (Kraljic 1983), that allowed us to combine cost analysis and assessment of strategic risks and benefits.

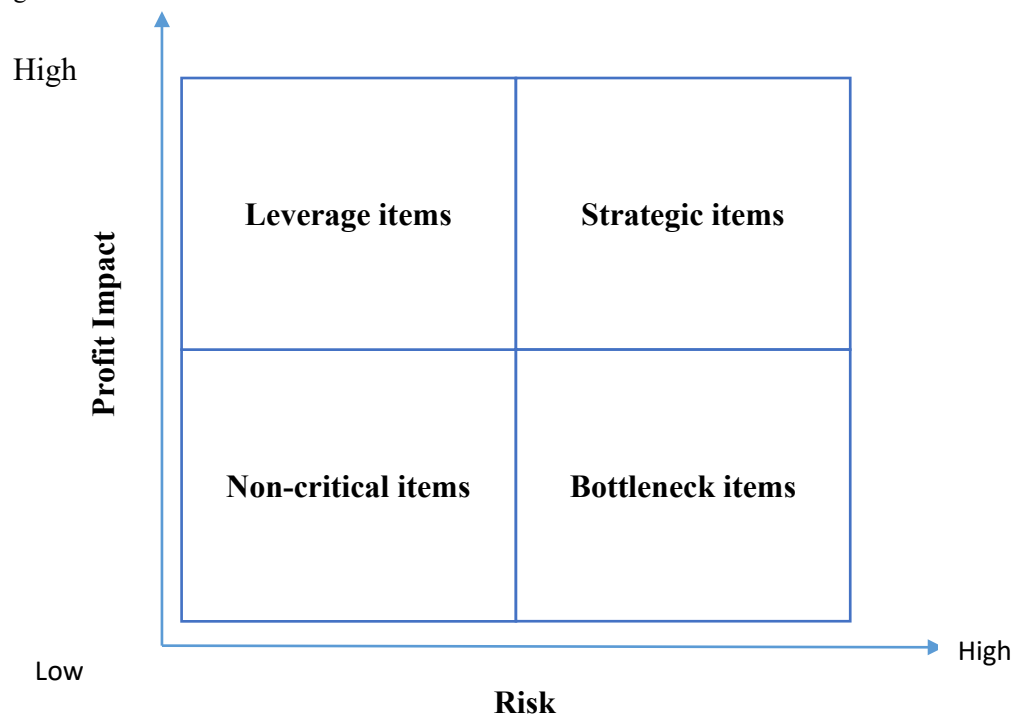


Figure 2. The Kraljic portfolio Matrix

The adapted Kraljic matrix, that was named 'Strategic Supplier Selection Matrix', has two scales: one with normalized price values and the other with normalised AHR risks and benefits. By placing the scales of risk and benefit assessment on the matrix axes, we got four quadrants with certain strategic characteristics. The ten suppliers (S1-S10) were evaluated on two scales by TCO and AHR methods, suboptimal solutions were cut off by the Pareto optimality algorithm, the rest of the solutions were evaluated according to the quadrants of the matrix.

5.2 Validation

The developed method was described in detail by Burlakova (2021). The paper shows this tool application to the case of Additive 1. Two Russian suppliers were chosen: these are new plants, which were evaluated as risky (the plants were new and the product had to be adjusted for the customer) and not the cheapest Chinese one, if there was only a cost analysis, and not the most expensive European one.

To select a supplier on two disparate scales, we will use the Kraljic Matrix (Figure 2). According to the adapted matrix received, the S3 supplier is not profitable, but safe. So the choice was made between suppliers S4 and S11, and it was decided to divide between them supply volumes to secure risks.

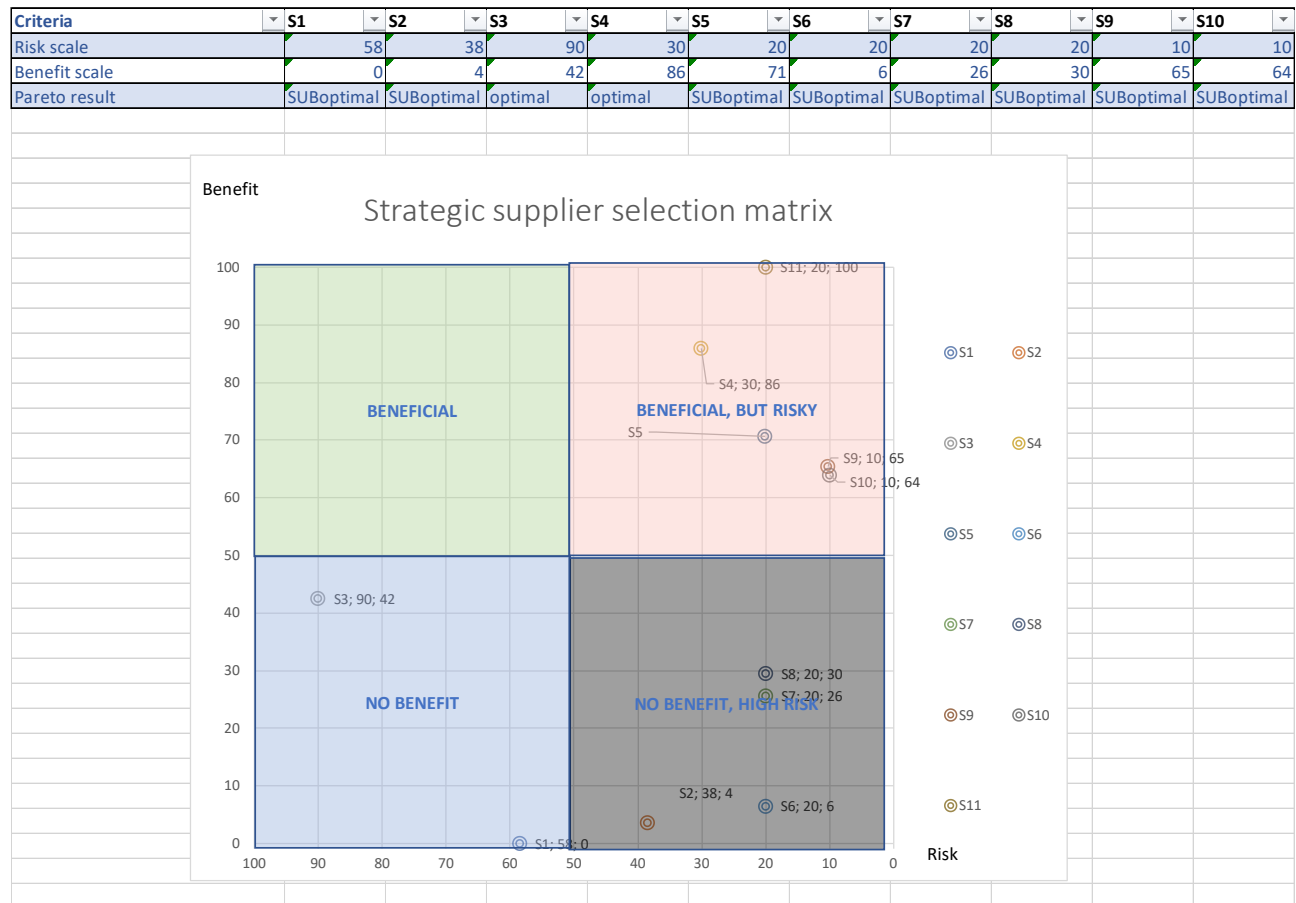


Figure 3. Strategic Supplier Selection Matrix

The developed methodology includes a multi-criteria assessment of suppliers and a strategic assessment of the Kraljic matrix. It will avoid biased assessment of financial factors, expand the range of parameters assessed to those enterprises that focus only on price comparison, and introduce an element of strategic evaluation of alternatives in the decision-making of the choice of supplier, and thus move from the operational function of choosing a supplier based on a multicriteria or TCO model to the level of strategic sourcing (Burlakova 2021).

6. Conclusion

Marketing tools used in retail CM are not appropriate for applying category approach in manufacturing companies effectively. It is necessary to have specially developed process framework, tools, guidelines and templates. We developed CM process framework and toolkit that helped us implement category approach in a big Russian metallurgical company, which led to considerable savings opportunity. Russian companies do have some specific PSM features, and its supply markets differ from those of other countries, but the methodology developed is based on general purchasing and CM theory, so it can be applied universally. During the project we found that some existing managerial tools, like Kraljic matrix, need to be adopted for industrial companies use: made more formalized, quantified. There is also necessity to formalize justification of strategic solutions. So we developed a new quantified supplier selection model based on Kraljic matrix, that combines risk assessment and cost reduction objectives. The model was tested on one category, which led to the most considerable savings. Probably some new tools should be developed specially for category approach in manufacturing companies.

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