Assessment of the level of intra-industry competition in the regional suburban passenger transport market

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Abstract. The suburban passenger rail transport sector plays a significant role in the country’s economy, ensuring the freedom of movement of citizens, contributing to the increase of transport accessibility of certain areas and the functioning of advanced development zones. Improving suburban services in the largest agglomerations is identified as the most important task in the development Strategy of the “Russian Railways” holding for the period up to 2030. Increasing speeds on the main routes will attract significant passenger traffic and improve the economic and social condition of the regions. All these reasons, in addition to the significant sustainability challenges that this priority sector is currently facing in all aspects, justify the interest in research through strategic analysis based on the traditional Porter’s Five Force model. The application of this model will allow getting a general strategic vision that will provide a deeper knowledge of the object under study, which will serve as the basis for the subsequent development of a strategy for the development of suburban passenger transport by rail. The purpose of the paper is to assess the level of intra-industry competition in the regional market of suburban passenger transport in order to develop a strategy for the development of suburban passenger transport by rail.

1. Introduction

The five forces of competition model, created by Michael E. Porter of the Harvard business school in 1979, is the basis for industry analysis of the market and the development of a business strategy for any company [1]. Porter called these forces “forces in the microenvironment as they consist of forces close to the company that affect its ability to serve its customers and generate profit” [2]. As a rule, changes in any of these forces require the company to assess the level of intra-industry competition due to changes in the situation in the industry. It should be noted that the overall attractiveness of the industry does not mean that every firm in this industry will receive the same income. By applying their core competencies, business model, or network, firms can achieve profits above the industry average. Thus, the works of M. Porter show examples when companies operating in low-profit industries, using unique business models, were able to make a profit that exceeds the average for the industry [3]. Significant differences in the efficiency of suburban companies are observed on Russian railways. The same trend is observed for suburban carriers within the borders of the West Siberian railway [4]. Figure 1 shows the five main causes and circumstances (forces) suggested by Porter, and the criteria for each of them.

At the same time, the inability to analyze and explain dynamic industry changes is one of the most criticized aspects of the “Five Competitive Forces” tool for analyzing company performance [6,7,8].
In relation to the Russian conditions, the so-called extra-transport effect is extremely important. It can be called either a “force” or a “factor”, but economic practice still cannot quantify it.

Some researchers believe that the well-known analytical tool “Five Competitive Forces” by M. Porter should be modified to assess the modern dynamic structure of the industry [9]. For example, Marshall & Marx (2012) modified Porter’s Five Forces model to show competition between cartel and non-cartel companies and relationships with customers, suppliers, potential competitors, and substitutes [10].

![Porter's Five Forces and Corresponding Criteria](image_url)

At the same time, the research results confirm the validity and reliability of the “Five Forces of Competition” structure and demonstrate the relative stability of the industry structure over time, as well as a significant level of positive influence of the determining factors of the structure on the firm’s efficiency [9].

The purpose of the paper is to assess the level of intra-industry competition in the regional market of suburban passenger transport in order to develop a strategy for the development of suburban passenger transport by rail.

2. Research methods
The assessment of the level of intra-industry competition in the regional suburban passenger transport market was performed using a strategic analysis based on the traditional Porter’s Five Forces model [11].
The application of the five forces model for industry analysis gives an idea of the competitive environment in the regional suburban passenger transport market, showing the forces of the supplier, the buyer, the threat of substitution, barriers to entry and the degree of competition. By illustrating the key factors that affect the competitive environment, it gives an idea of the situation in the industry of suburban passenger transport.

3. Research results

The suburban passenger transport market in the Novosibirsk region is quite developed and includes suburban routes – railway transport (suburban trains) and bus transport (suburban routes). The share of suburban railway transport in the suburban transport segment is 49.79% [12].

Table 1 presents an analysis of competition from substitute products (the threat of substitutes (placeholder) for company services appearing on the market).

| Evaluation criterion | Comments | Assessment of criteria |
|----------------------|----------|------------------------|
| Substitute services for transportation according to the “price-quality” criteria”\(\text{assuming the same quality at a lower price}\) | available and occupy a significant market share | 3 |
| Final score | available but entered the market recently and have a low market share | 2 |
| Conclusion | not exist | 1 |

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The company “Express-prigorod” has no substitutes in the rail industry, however, the goods-substitutes become personal transport, which is purchased by residents of the region to make trips to the regional center.

In 2020, the Novosibirsk region entered the number of cities in the country with the largest number of cars, taking the 14th place in the top 20 rating. There are 832.4 thousand cars in the region, which is 1.9% of the all-Russian car fleet [13]. According to the territorial body of the Federal state statistics service for the Novosibirsk region, the permanent population of the Novosibirsk region (as of January 1, 2020) was 2798.2 thousand people [14].

Thus, the level of motorization in the Novosibirsk region is 297.5 cars per 1000 people (in 2008 this indicator was 204.5 cars per 1000 people, in 2012 - 246, in 2016 – 269) [15]. We can conclude that the level of motorization of the population of the Novosibirsk region is steadily increasing.

The increase in motorization of the population leads to an increase in the level of traffic congestion, which, in turn, can provide new opportunities for JSC “Express-prigorod” to attract passengers.

Table 2 provides an assessment of the level of intra-industry competition (the threat of increased competition between existing companies in the industry).

| Evaluation criterion | Comments | Assessment of criteria |
|----------------------|----------|------------------------|
| The only passenger carrier in suburban railway transport in the territory of the Novosibirsk region is JSC “Express-prigorod”. There are no competitors that carry out railway transport. However, JSC “Express-prigorod” is experiencing strong competitive pressure from road transport (buses) in the area of the suburban connection and with long-distance trains on the route Novosibirsk- Glavny – Barabinsk [12]. | a high level of threat from services substitution | 3 |

Table 3 provides an assessment of barriers to entry into the industry (the threat of new players entering the industry).

The emergence of new competitors is possible only from the side of road carriers on certain routes where the road duplicates the railway. So, in the Eastern direction of the Novosibirsk agglomeration, a significant part of the market is occupied by car carriers, winning both in price and in travel time, as well as in the frequency of cruising. In addition to the traditional competitors of rail transport-buses,
personal cars, and air transport — competitors with new business models are appearing on the market. These include ride-sharing and car-sharing services, but their market share in the region is still insignificant.

Table 4 gives an assessment of the market power of buyers of transport products (the ability of buyers to bargain).

| Evaluation criterion                  | Comments                                      | Assessment of criteria |
|---------------------------------------|-----------------------------------------------|------------------------|
| Number of competitors                 | high competition in the market carries the risk of losing market share if the market growth rate is low, there is a high probability of market redistribution | 3                      |
| Market growth rate                    | low differentiation of the offered services carries the risk of switching the consumer to the services of other companies | 2                      |
| Level of differentiation of services offered | lack of opportunities for price increases - severe price competition | 1                      |
| Restrictions on price increases       | restriction for price increases carries the risk of loss of profit when fixed costs increase | 3                      |
| Final score                           |                                               | 9                      |
| Conclusion                            |                                               | High level of intra-industry competition |

Features of the industry’s functioning may lead to:

- reducing the availability of commuter rail services. Currently, the relative level of suburban fares as a share of the price of an annual transport pass in the annual disposable income of households in the Russian Federation ranges from 5.5 percent to 7 percent, which is one of the highest levels in the World. Regional administrations subsidize this type of transport everywhere, but the amount of subsidies depends on the budget of the regions [16]. As a result, the price pressure on consumers of services also depends on the economic situation of the region;

- reducing the quality and level of service. Currently, in the perception of passengers, the quality of services in suburban rail traffic lags behind the dynamics of prices. The main problems noted by passengers in the region are: overcrowded railcars, significant intervals between the departure of suburban trains, lack of comfort and convenience, and poor condition of the rolling stock. Passengers are also dissatisfied with the current ticket distribution channels and the low level of interaction with other types of transport;
increasing the transport “discrimination” of the population, that is, reducing the availability of the regional center and other objects of the Novosibirsk agglomeration;

**Table 3. Barriers to entry into the industry.**

| Evaluation criterion | Comments | Assessment of criteria |
|----------------------|----------|------------------------|
|                      |          | 3 | 2 | 1 |
| Economies of scale in passengers transport | The larger the volume of transport, the less fixed costs affect the cost per unit of services provided | absent | only a few companies have it | significant |
|                      |          | 2 |
| The presence of strong brands | The stronger the brands of existing competitors, the harder it is for new companies to enter the industry | lack of strong brands | 2-3 major brands have a market share of about 50% | 2-3 major brands have a market share of about 80% |
|                      |          | 2 |
| Differentiation of services | it is more difficult for new players to enter an industry where there is a high differentiation of services offered | There is almost no differentiation of services | There are free market niches | all market niches are occupied |
|                      |          | 1 |
| Required level of investment to enter the industry | The higher the required level of investment to enter the industry, the more difficult it is for new players. | low | middle | high |
|                      |          | 2 |
| Access to distribution channels | the lower the attractiveness of entering the industry for new entrants, the more difficult it is to reach consumers | access to the target audience is free | access to the target audience requires a certain investment of capital | access to the target audience is severely restricted |
|                      |          | 2 |
| State policy | barriers to entry into the industry may include licensing policies and restrictions on access to strategic resources (infrastructure) | no restrictions | low level of government intervention | high level of government intervention |
|                      |          | 1 |
| Readiness of existing competitors to reduce prices | if existing competitors are willing to lower prices, this can become an insurmountable barrier to entry into the industry | existing competitors are ready to reduce prices when trying to enter a cheap offer | major players are not ready to reduce prices | current competitors are not ready to reduce prices |
|                      |          | 1 |
| The growth rate of the industry | the more attractive the industry is for new players, the higher the growth rate of the industry | high growth rate | slowing | stagnation or decline |
|                      |          | 2 |
| Final score | | | | |
| | | | 13 |
Evaluation criterion | Comments | Assessment of criteria
--- | --- | ---
Share of buyers with a large volume of sales | If the number of consumers is small, they can influence the company | 3 | 2 | 1 |
Consumers’ readiness to switch to substitute services | The lower the uniqueness of the company's services, the higher the willingness of consumers to switch to substitute services | 3 | 2 | 1 |
The sensitivity of the services at a price | if the sensitivity is high, it is likely that the service will be purchased from competitors at a lower price | high | middle | low |
customer satisfaction with the quality of services offered | if there is a hidden demand generated by dissatisfaction, it is likely that consumers will leave | dissatisfaction with the basic characteristics of the services offered | dissatisfaction with secondary characteristics of the services offered | complete customer satisfaction with the quality of services offered |

**Table 4. The ability of buyers to bargain.**

| Evaluation criterion | Comments | Assessment of criteria |
|----------------------|---------|-----------------------|
| The average level of the threat of entry of new players | The services provided are distributed among a significant number of clients | 1 |

**Conclusion**

The average level of the threat of entry of new players

**Final Score**

8

The main supplier of goods, works and services consumed by JSC “Express-prigorod” is JSC “Russian Railways”. JSC “Express-prigorod” consumes the following types of services of JSC “Russian Railways”: services for the use of railway transport infrastructure; services for the management, operation, maintenance and technical repair of rolling stock; rolling stock rental [16]. The volume of consumption of JSC “Russian Railways” services in 2018 amounted to 59% of the company’s total expenses.

The ability of suppliers to dictate their terms is high due to the small number of suppliers, high costs in case of switching to other suppliers, and the low priority of JSC “Express-prigorod” for JSC “Russian Railways”. 
Table 5 provides an assessment of the market power of suppliers of transport products (assessment of threats to business from suppliers).

| Evaluation criterion                  | Comments                                                                 | Assessment of criteria |
|---------------------------------------|---------------------------------------------------------------------------|------------------------|
| Number of suppliers                   | a limited number of suppliers carry the risk of unjustified price increases | monopoly or oligopoly in the supplier market | unlimited number of suppliers |
| Limited resources required by suppliers | The more limited the resources of suppliers, the higher the probability of price increases | limited in volumes | unlimited in volumes |
| Switching costs                       | The higher the cost of replacing a supplier, the higher the risk of higher resource prices | high cost of replacement supplier | low cost of replacement supplier |
| Priority of the company or business direction for the supplier | The lower the importance of the business direction for the supplier, the less attention it pays to it and it is more difficult to negotiate | low importance of the business direction for the supplier | high importance of the business direction for the supplier |

**FINAL SCORE**

- 4 points  low level of supplier influence
- 5-6 points  average level of supplier influence
- 7-8 points  high level of supplier influence

**Conclusion: high level of influence of transport service providers**

4. Results discussion

Table 6 presents the results of the analysis in summary form and recommendations for JSC “Express-prigorod” to improve the strategy for the development of suburban passenger transport by rail in the territory of the Novosibirsk region.

Based on the results obtained using the Porter’s Five Competitive Forces model, we can make a general conclusion about the level of intra-industry competition in the regional suburban passenger transport market. The main determinant of the level of profit in the industry is competition between existing companies in the industry and competition from substitute goods-road transport. The greatest influence on the company among all forces is the threat of increased competition between existing companies in the industry-road transport (buses) and long-distance trains in the suburban area, threats
from substitute goods – personal motor transport and the market power of suppliers - JSC “Russian Railways”. The risk of new competitors and the market power of buyers are at an average level.

As a direction for further research, it is planned to combine the results obtained with the results of the assessment of the life cycle stage of the industry using the ADL matrix, carried out within the framework of the research laboratory “Transport economics” of the Siberian State University of Railway Transport. This will allow adjusting the company’s strategy in accordance with the stage of the industry’s life cycle and the level of its competitiveness in the market.

**Table 6.** Results of assessing the level of intra-industry competition in the regional suburban passenger transport market based on the traditional Porter’s Five Forces model.

| Parameter                                      | Value  | Description                                                                                                                                                                                                                       | Area of work |
|------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|
| The threat of substitutes appearing on the market | High   | JSC “Express-prigorod” does not have substitutes in the railway industry, but personal cars that are purchased by residents of the region to make trips to the regional center become substitutes. The level of motorization of the population of the Novosibirsk region is steadily increasing, although the growth rate is slowing down | 1. It is Recommended to adhere to the strategy of strengthening the uniqueness of the services provided and focus on a target market for which unique characteristics are important. |
| Increasing competition between existing companies in the industry | High   | JSC “Express-prigorod” is the only carrier of passengers in suburban railway transport on the territory of the Novosibirsk region. No competitor. However, JSC “Express-prigorod” is experiencing strong competitive pressure from automobile transport (buses) in the suburban area and with long-distance trains on the route Novosibirsk- Glavny – Barabinsk. The emergence of new competitors is possible only from the side of road carriers on certain routes where the road duplicates the railway. In addition to the traditional competitors of rail transport-buses, personal cars, and air transport – competitors with new business models are appearing on the market. These include ride-sharing and car-sharing services, but their market share is still insignificant. | 2. The main efforts of the company should focus on developing an effective tariff policy, updating rolling stock, developing the segment of intra-urban transportation, as well as logistics, multimodal transportation and increasing the mobility of citizens. |
| Risk of new competitors                         | Middle | The specifics of the industry may lead to a decrease in the availability of suburban passenger transport by rail, as well as a deterioration in the quality and level of service, which, in turn, may encourage the company’s current customers to use road transport instead of rail. The ability of suppliers to dictate their terms is high due to the small number of suppliers, high costs in case of switching to other suppliers, and the low priority of JSC “Express-prigorod” for JSC “Russian Railways”. | 3. Marketing activity should be focused on building a long-term relationship with the customer. |
| Market power of buyers                          | Middle |                                                                                                                                                                                                                                |              |
| Market power of suppliers                       | High   |                                                                                                                                                                                                                                |              |
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