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The Economic Consequences of Insourcing Public Transportation, a Case Study from Region Örebro in Sweden

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Abstract: The purpose of this study is to deepen the understanding of the economic impact of transitioning from outsourced to insourced public bus transportation operations within a Swedish context. The research scrutinized an uncommon occurrence in Sweden where a regional PTA (public transport authority) transitioned their public bus services to an in-house operation after previously contracting them out to a private provider, a move that goes against the growing trend of competitive tendering in bus transportation services. Data were collected through document analysis and interviews with industry experts and managers from public and private bus operators. The study concludes that public transportation costs would have been lower if the services had been procured through a competitive tendering process, with estimated potential savings in the range of 3.5% to 6.4%. Additionally, the study finds that the purchaser's specifications and demands contributed to increased costs for public transportation by enforcing strict age requirements for buses and specifying bus sizes for each departure.

Key words: Public transport, bus transport, outsourcing, insourcing, sourcing, competitive tendering, procurement, contract.

1. Introduction

1.1 Background

In the past, public transportation was under the control of European governments, operating as state-run monopolies. However, a paradigm shift occurred in the late 1980s when numerous countries began to embrace competitive tendering.

Sweden's public transport sector also underwent deregulation, and since 1989 implemented competitive tendering in public procurement legislation. Since then, a surge in public procurement activities related to transportation occurred and currently, over 90% of the public transport services in Sweden are outsourced through competitive tendering processes [1].

The provision of public transport services in Sweden is managed by 21 PTAs (public transport authorities), each representing a Swedish region. They possess the discretion to outsource these services or manage them inhouse [1].

In the spring of 2017, the PTA of Örebro region decided not to renew contracts for public transportation in the region. The consequence being that responsibility for performing public bus transportation would shift from the incumbent private contractors Nobina and Keolis to the region organization itself.

Contrary to the trend of using competitive tendering, region Örebro insourced the traffic together with another nearby region who had already insourced the traffic into a company called Svealandstrafiken. The company is fully owned by the two regions.

The purpose of the move not to renew the private

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contracts and take over the operations of services was multifaceted. Economical aspects were drivers behind the move, but also other factors. The prestudy performed ahead of the decision listed four reasons for the move:

- dissatisfaction with the quality of services provided by private contractors,
- lengthy and costly public procurement procedures,
- job insecurity and stress among employees during contractor transitions, and
- a decrease in the number of bids received, indicating reduced competition.

The positive effects of a region insourcing were estimated to be:

- annual economic synergies of up to 6 million Swedish Kronor (MSEK),
- enhanced job security and long-term staff relationships through permanent employment,
- acquisition of new strategies and competencies via Svealandstrafiken, and
- increased female employment rates compared to the industry average.

1.2 The Purpose of the Study

This study aims to analyze the economic consequences associated with the policy transition from outsourced to insourced public transportation operations in region Örebro. The central research question to be explored is: What are the economic effects and comparative financial outcomes of shifting from outsourced to insourced public transportation services?

1.3 Limitations

The study will only consider the economic aspects in city bus traffic. This means that the focus of the comparison is the financial consequences of the public takeover.

The study compares January of 2019 to January of 2020. The month has been chosen for several reasons: Comparable calendar month with consistent items affecting comparability. New operations stabilized after running for several months with consistent costs.

Major impacts of the COVID-19 pandemic mitigated.

Only the city traffic contract was fully transferred to public operations and hence this is the geographical coverage of the study.

2. Previous Research

Competitive tendering is a process in which the government invites various entities to bid for the opportunity to perform a service or project that has historically been managed by the state itself or acquired through direct negotiation of contracts [2]. The practice of competitive tendering was initiated in London in the mid-1980s. Since that time, a variety of European nations have transitioned their public procurement strategies from exclusive single-provider models to those based on competitive bidding [3, 4].

Sweden was an early adopter of competitive tendering for its local bus services, laying the groundwork for what is commonly known as the Scandinavian model [5]. Under this model, government authorities are tasked with designing public transport services, which are subsequently procured from private or public legal entities via a competitive bidding process [1].

Several academic studies have argued that competitive tendering lowers the cost for public transportation services including bus services. For example, a study by Wallis and Hensher in 2005 [6], examined twenty cities in ten developed countries, found that short-term cost reductions by competitive tendering ranged from 5% to 50% with an average of 30% cost savings. Additionally, studies from Longva et al., 2005 [2], Vigren, 2016 [1] and Bekken et al., 2006 [7] further corroborate these findings of general cost savings from competitive tendering.

However, some data have indicated that these cost savings have not been sustainable over time. According to national data from Sweden between 2008-2015, the total real-term costs for all public transport services rose by 50 percent, which contrasts with a 20 percent growth in both ridership and service provision [1, 8].

For instance, data from two Swedish cities indicated short-term unit cost reductions ranging from 20% to 30% [9]. In the long term, however, efficiency gains have plateaued, with little further reduction in unit costs since the mid-1990s. Additionally, data from some areas suggest rising cost levels in the third and fourth rounds of tendering [9].

Camén and Lidestam (2016) [10] examined the factors contributing to the high(er) costs for public bus transports in Sweden and identified nine categories. The identified categories of cost drivers were of traffic appearance (peak times), greening of buses, age requirements, the contract period, the accessibility customization, specific requirements on buses, collective agreements (working time regulation), tendering and contracting process, and counterproductive political governance. The authors further argued that numerous cost drivers stem from the specific requirements included in the public procurement process by buyers and not from the process itself. These include varying regional demands across Sweden and the balance between bus operators' desire for greater contract flexibility and traffic authorities' concerns about increased risks, which lead to higher bids [10].

3. Method

3.1 Overall Method

To better understand the consequences of transferring bus operations from a private contractor to a public entity, a combination of quantitative and qualitative information gathering has been used. The reason being that trying to draw conclusions from the situation in Örebro presented two main challenges.

Challenge 1: The variations in costs are naturally small. Public bus transport is a low-margin industry, indicating that the disparity between an efficient and an inefficient operator will be small.

Challenge 2: The study's subject changed due to the switch from a private to a public operator, altering the transportation network and contract. Consequently, the transportation volume, routes, and reimbursement model are different.

To tackle these issues, three benchmarks were established for comparison: the previous contract, the current contract, and simulated operations.

3.2 Benchmark: Former Contract

Comparison 1: Compare the old contract with the current operations.

Explanation: "What would the cost be if the new routes of today was run with the terms and price levels from the former contract?"

Advantages: Former contract, terms, costs, and routes are well known.

Disadvantages: The former contract cannot be directly compared to the current operations since the routes and terms have changed. It should also be noted that the former contract was signed ten years previously under different terms, requirements and market conditions that are probably not present today.

Table 1 Summary of benchmarks.

Benchmark	Entity	Approach	Method
Former contract	Nobina (private contractor)	Adjust the invoice to Svealandstrafiken's conditions	Quantitative together with interviews with Nobina stakeholder to determine adjustments
Simulated operations	Theoretical private contractor bid by authors	Calculation based on input from industry experts	Quantitative together with interviews with industry experts to obtain cost input
Current contract	Svealandstrafiken (public operator)	Adjust the invoice to be comparable to Nobina	Quantitative together with interviews with Svealandstrafiken stakeholder to determine adjustments

Approach:

To simulate the cost for new routes and operations using the terms and prices from the previous contract an economic model of the old contract was developed.

The economic model contained several of the most important price drivers stated in the contract such as:

Travel distance and travel time, gas-price, calendar-adjustments (amount of weekdays vs. holidays), index adjustments, construction of the reimbursement model etc.

The model was, as far as possible, tested on time periods where the resulting cost was known, and it could be shown that the model could predict the actual cost with an accuracy of approx. 1%. With this model as a tool, a waterfall cost diagram could be built explaining the cost impact of each major contractual change between January 2019 and January 2020.

3.3 Benchmark: Simulated Operations

Comparison 2: Compare a simulated bid with the current operations.

Explanation: "What would a private operator demand to run the current operations if competitively tendered?"

Advantages: Based on the same terms and routes as the current operations. Private bus operator cost structures and other properties are based on current market conditions.

Disadvantages: The costs are estimates and no operator is legally committed to the simulated bid.

Approach:

The purpose with this approach was to build a simulated bid with the same considerations and level of accuracy as a leading contender would to win the public transportation contract.

The approach had three main components:

1. A simulation and optimization of traffic routes.
2. Identification of all cost components in a public bus transportation system.
3. Estimate of the costs for the factors identified above.

Simulation:

Simulation and optimization of the bus routes with the precondition that the timetables are a given, and enough safety margin must be given to accommodate traffic problems and delays.

The simulation was made in industry leading traffic simulation and optimization software Hastus™.

Identification of cost components:

This was made by studying public transportation contracts, open data such as annual reports, dialogue with three different public transportation companies and experts within the business.

Cost estimates:

Cost estimates were drawn from open sources such as annual reports, bus manufacturers and companies specializing in bus maintenance. Additionally, estimates were also gathered with the help from experts within the business and cross checked with public transportation operators.

The biggest cost, salaries, are mainly fixed due to collective bargaining contracts that are widely adopted across the industry.

3.4 Benchmark: Current Contract

The key component to enable both comparisons was the terms, conditions and not least the price levels for the current contract with Svealandstrafiken.

With these components at hand an evaluation could be made of the economic impact of the insourcing move.

Approach:

To enable simulated operations the current terms, conditions and routes must be understood.

Any changes in terms, conditions and routes since the end of Nobinas operations must also be understood in order to enable a comparison with the former operator.

The current price level must be known in order to fulfill the purpose with this study, at the same time this data is sensitive.

Knowledge of the current price level could jeopardize the integrity and credibility of the report.

To address this issue, the price information was deliberately not shared with the project team until all other comparisons and simulated operations were finished. Also, no changes in calculations, assumptions, simulated bids or equal were allowed after the price data was shared.

4. Results

4.1 Benchmark: Former Contract (Nobina)

Nobina was the private contractor who conducted the traffic during the years 2008-2019. Based on public data, the cost in January 2019 for public transportation was 16.10 million Swedish kronor (MSEK). To enable a comparison, adjustments were made to simulate similar conditions as Svealandstrafiken had in January 2020. These adjustments amount to +1.54 MSEK net and include:

- Increased rent for depot (+0.660 MSEK),
- Increased gas price (+0.486 MSEK),
- Increased proportion of larger buses (+0.209 MSEK),
- Increase in index according to the contract's index calculations (+0.206 MSEK),
- Expansion of traffic (+0.151 MSEK),
- Cost reduction due to more holidays in Jan. 2020 compared to Jan. 2019 (-0.173 MSEK).

Thus, after adding the adjustments, Nobina's traffic with the conditions in January 2020 would have been 17.64 million kronor.

4.2 Benchmark: Simulated Operations (Authors)

To establish an additional reference point and better understand the estimated price if a new private operator had been procured using competitive tendering under the same conditions as Svealandstrafiken, a simulated operations was created. The simulated operations were created by combining a traffic plan with cost components and reflected the same conditions as Svealandstrafiken. The simulated operations amounted to 17.05 MSEK and can be divided into four main parts:

- Traffic: 14.41 MSEK (84.5%),
- Overhead: 1.00 MSEK (5.9%),
- Real Estate: 0.98 MSEK (5.7%),

Other: 0.66 MSEK (3.9%).

Table 2 Calculation of simulated operations.

Category	Cost components	Thousand SEK	%
Traffic (14.41 MSEK)	Drivers	7,396	43.4%
	Fuel	3,012	17.7%
	Depreciation/write-offs	1,704	10.0%
	Maintenance of busses	879	5.2%
	Finance cost (interests)	699	4.1%
	Traffic management	219	1.3%
	Washing and cleaning	207	1.2%
	Vandalism	189	1.1%
	Operational planning	58	0.3%
	Insurance	30	0.2%
	Cars	8	0.0%
	Vehicle tax	6	0.0%
Real estate (0.98 MSEK)	Rent depot	956	5.6%
	Rent break rooms	25	0.1%
Overhead (1.00 MSEK)	Lost and found handling IT systems Back office (admin) Management Other external costs	1,000	5.9%
Other (0.66 MSEK)	Profit margin	498	2.9%
	Margin of error	164	1.0%
Total		17,050	100.0%

Table 3 Summary of results.

Name	Baseline	Adjustments	Comparable price
Former contract	Invoice January 2019: 16.1 MSEK	• Increased rent for depot (+0.66 MSEK) • Increased gas price (+0.486 MSEK) • Increased proportion of larger buses (+0.209 MSEK) • Increase in index according to the contract's index calculations (+0.206 MSEK) • Expansion of traffic (+0.151 MSEK) • Cost reduction due to more holidays in Jan. 2020 compared to Jan. 2019 (-0.173 MSEK)	17.64 MSEK
Simulated operations	NA	• Traffic: 14.41 MSEK • Overhead: 1.00 MSEK • Real estate: 0.98 MSEK • Other: 0.66 MSEK	17.05 MSEK
Current contract	Invoice for January 2020 19.025 MSEK	• Variable compensation model (-0.545 MSEK) • Expanded commitment compared to Nobina e.g. traffic planning, property maintenance, maintenance of systems, etc. (-0.19 MSEK)	19.03 MSEK (18.14 MSEK when excluding improvement initiatives not strictly required by the Örebro PTA)

4.3 Benchmark: Current Contract (Svealandstrafiken)

Svealandstrafiken is the current contractor and conducted the traffic in January 2020. Based on public documents from region Örebro, the invoice for January 2020 was 19.025 MSEK. However, Svealandstrafiken had different conditions compared to the previous operator (Nobina) that impacted the price. Thus, these conditions also need to be adjusted to create a correct comparison. In total, Svealandstrafiken's price was negatively impacted by 0.73 million kronor due to the following:

- Variable compensation model (-0.545 MSEK),
- Expanded commitment compared to Nobina e.g. traffic planning, property maintenance, maintenance of systems, etc. (-0.190 MSEK),

Thus, 0.73 million kronor was deducted from Svealandstrafiken's price in January 2020 to enable comparability and amounts to 19.03 million kronor. Additionally, Svealandstrafiken has implemented several improvement initiatives not strictly required by the Örebro PTA, such as increased traffic operations and ensuring drivers start and end their shifts at the same location. These measures represent an estimated cost of approximately 0.89 MSEK for January 2020. Excluding this amount, the total cost would instead have been 18.14 MSEK.

4.4 Summary Results

Based on the three reference points, the current contract operated by Svealandstrafiken (19.03 MSEK) is higher compared to the former private contractor Nobina (17.64 MSEK) and the simulated operations (17.05 MSEK) developed by the authors. The simulated operations are 1.98 MSEK or 10.4% lower compared to Svealandstrafiken's cost. Additionally, the former contractor Nobina's price is 1.385 MSEK or 7.6% lower than Svealandstrafiken.

Svealandstrafiken's higher price compared to the other parties can partly be explained by priorities and initiatives that Svealandstrafiken has chosen to implement with the aim of increasing quality, and amount to 0.89 MSEK. If Svealandstrafiken had not conducted the initiatives of 0.89 MSEK, the price would instead been 18.14 MSEK which is still 6.4% higher than the simulated operations or 3.5% higher than the previous contractor (Nobina).

5. Conclusion

Both the previous traffic and the simulated operations are lower than the current traffic costs, adjusted for comparable conditions. Therefore, the study concludes that the cost for public transportation in January 2020 would have been lower if the traffic had been procured

though a competitive tendering process. The total potential savings, when also excluding Svealandstrafiken's priorities to increase quality, are estimated to be 3.5%-6.4%. The outcome aligns with the general belief in cost savings through public tendering, as noted by authors such as Longva et al. (2005) [2], Vigren (2016) [1], and Bekken et al. (2006) [7].

6. Discussion

6.1 How the Operator Can Create Efficiency in Region Örebro.

The study analyzed several ways that an operator can create efficiency in region Örebro such as a more efficient traffic plan, better purchase price for busses, have driver start and shift in other places and fuel consumption training.

The traffic plan is the design for operational traffic, including all aspects to execute the traffic from Point A to B such as routes, number of busses per type, places to switch drivers. It directly influences the efficiency of traffic production and thus the total cost. The traffic plan developed for the simulated operations showed a slight improvement potential of about 1% compared to the traffic plan used by Svealandstrafiken. The potential amounted to 0.110 MSEK for January or 1.2 MSEK for the entire year.

One large cost in the traffic execution is the cost for busses, including costs such as interest, amortization, maintenance, damage, and cleaning. These costs can be reduced by optimizing purchase price, maintenance costs, and residual value. A larger operator procuring more buses than a smaller operator could potentially optimize these costs by having a better negotiation position towards the manufacturers. The simulated operations have used the same purchase price for busses as Svealandstrafiken; however if a 5% discount were applied, a savings of 0.13 MSEK per month or 1.56 MSEK per year could potentially be obtained.

Another aspect of how to increase efficiency is to choose whether drivers should start and end their shifts at the same location. It can be considered a benefit to the drivers to end and start at the same location, but it can also lead to increased costs. Svealandstrafiken has chosen to offer this benefit; however, if this benefit were not offered, a potential savings of 0.183 MSEK for January 2020 or 1.98 MSEK per year could be achieved.

Fuel consumption is an additional cost that directly affects the cost of traffic. Many operators therefore systematically work with training, incentive programs, and several types of software to reduce consumption. In the simulated operations, a 5% lower fuel consumption than the current one within Svealandstrafiken has been assumed based on input from industry experts. This has created an estimated saving of about 0.176 MSEK for January 2020 or 1.9 MSEK per year.

6.2 How Region Örebro PTA Impacts the Operator

Region Örebro PTA has created several demands and conditions that the operator must follow, which impacts the price such as the timetable, all deployed busses need to be new, and the bus type per departure.

The region has specified the timetable to be used by the operator. The simulated operations are therefore based on the existing timetable, limiting an operator's ability to make changes for a more efficient traffic.

Another aspect of how Region Örebro PTA impacts the operator is that it has specified that the buses in operations need to be new. This can result in higher costs, as buses that are in adequate condition might be disqualified due to their age, leading to increased financing expenses [10]. Another consequence of a completely new bus fleet purchased at the same time can contribute to a lock-in effect around current technical solutions, which can complicate the introduction of innovative technology. Flexible age requirements and the possibility to apply a mixed bus fleet can facilitate the implementation of gradual changes in technical development. Region Örebro could instead set functional requirements for the interior and exterior condition instead of a detailed age requirement. This leads to a more sustainable use of vehicles and gives

operators the opportunity to use the vehicles in a more resource-efficient way.

Region Örebro also specified what type of buses can be used on what departure and that larger busses can only replace smaller buses and not the other way around. According to Camén and Lidestam 2016 [10], this "peak-times problem" is a major factor contributing to the increasing cost for buss traffic, since operators must plan for peak times by purchasing additional, larger buses, which drives up costs unnecessarily. The number of buses and bus size are tailored to accommodate peak traffic periods, meaning these large buses are also in operation during off-peak hours, leading to excessive costs. In region Örebro, the proportion of large buses increased from 58% to 76% compared to the previous contract with Nobina. If the bid had used the same proportion as in previous contracts, it could have resulted in an estimated cost saving of about 0.31 MSEK for January 2020 or about 3.3 MSEK per year. However, it should be noted that this study did not have access to passenger data, to determine if the use of larger buses is justified for capacity reasons.

6.3 Limitations and Uncertainty Factors of the Study

In this study, a simulated operations were created with no obligation for any party to undertake it. The bid may therefore be lower to appear more competitive, raising the risk of underestimation. To ensure a reasonable bid, the authors collected information from industry experts and compared estimates against statistics and open sources. Additionally, data from the previous traffic were used as a reference to determine if the estimates were reasonable. The authors therefore conclude that the created simulated operations are reasonably priced. On the other hand, in a real competitive bid process there could be bidders with strategic or tactical reasons to underbid to win the contract.

The study relies on received data, calculations and deductions performed by Svealandstrafiken to obtain the comparable cost of the current traffic. There may be incentives for Svealandstrafiken to make larger deductions than reasonable to appear to have a lower price. As the authors lacked access to Svealandstrafiken's internal accounting, the correctness of these deductions cannot be ensured.

Finally, the objective of the study was limited to focus solely on the economic perspective of different traffic performances, and thus ignoring any possible improvements to other aspects such as quality. Therefore, the study does not per se argue that one alternative is better than another from a holistic standpoint, but rather which is more advantageous from a strictly economic perspective. The lowest cost option is not always the best, but the economic perspective remains a crucial aspect in a competitive procurement process and a key component in a comprehensive analysis.

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