Post pandemic and transportation expenses: case study at the Federal University of Pernambuco

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Abstract

The objective of this study is to identify the least expensive options with transportation at the Federal University of Pernambuco, among: (i) own fleet, (ii) rental, (iii) taxi and (iv) transport apps. As a response to the SARS-CoV-2 Coronavirus pandemic, social detachment resulted in a reduction in the demand for vehicles, as activities started to be performed remotely. The methodology of the case study considered the opportunity cost, understood as what is left to gain or save by choosing one option instead of another. The research contributes by indicating that the alternative (iv) transportation apps is the least expensive, followed by (iii) taxi, (ii) rental and, finally, (i) maintenance of its own fleet, which proved to be the last option of investment.

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Key words: Public expense. Transport apps. Opportunity cost. University Management. Post-Pandemic.

Efficiencies of the public expense with transportation

The public manager has the power-duty of analysing whether the actions taken are economically optimum, since the efficiency principle pointed in the Constitution of the Federative Republic of Brazil's 37th article (1988) directs them towards this. Therefore, prudence is needed as a way to verify whether the expenses may be carried out alternatively, less onerously not only from the financial point of view (effectively incurred expenditures), but also economical (whether the decision taken is the best way of allocating the resources).

Despite all that, the decision-making process is much more complex than just the involved resources; there are other opportunity costs inherent to any choice. The mere reduction in an expense does not imply, necessarily, higher efficiency, for this concept is related to the use which, concomitantly, results in the usage of fewer resources and better results.

While studying the public expense subject, outsourcing stands out, being characterized as the transference of the production of goods or the services provision to third parties. On the one hand, outsourcing has been discussed as a tool for the public administration to lower its expenses (Alonso et al., 2017). On that line, by analysing a less onerous means of contracting drivers for a public university, Caldeira and Caldeira (2019) carried out a case study at the Federal University of the Triângulo Mineiro and identified that outsourced employees may lower the public expense in about 28% by driver.

On the other hand, according to the research done by Alonso et al. (2017), there was no reduction in the public expenses, in the federal level, of some European countries that adopted this type of contracting. These results stimulate the research in the pursue for a consensus about the contracting of outsourced employees in different contexts.

As the results found diverge from each other, there is still doubt on which choice should the public administration adopt in order to execute their expenses in an adequate way. The effi-

ciency, under the Economical Sciences optics, more specifically relating to the Pareto theory, is reached when an individual in a certain context cannot improve their condition if not to the detriment of another individual (Aragão, 1997).

That being said, the adequate use of resources is required for the public services to be available for more people and, to decide how to apply these resources, it is possible to rely on the opportunity cost concept (Costa et al., 2015). A means of comprehending the opportunity cost concept is that "by choosing, we take a course of action, abandoning other alternatives that provide us specific benefits" (Goulart, 2002, p.21). In other words, opportunity cost is the amount that was not earned/spared due to the option chosen.

Even though it is not a modern term, opportunity cost has been widely discussed by the economists for it is necessary to include the values disregarded when one of the available options is selected in the composition of costs (Denardin, 2004).

Previous Studies

In this section the main works about transportation expenses will be presented. To transport the employees from the State University of Mato Grosso (Tangará da Serra campus), vehicle location was found to be the less onerous alternative (Galvão et al., 2013). The researchers simulated the substitution of the five vehicles in the university's fleet.

For the decision of owning cars or outsourcing them, Diniz and Paixão (2017) observed that the latter is the best choice for companies that operate with road freight. The analysis was limited to the vehicles used by the sales and marketing teams. Similar result was found when Oliveira and Coimbra (2018) analysed a grocery store, in which the freight fleet was considered.

For safety companies, the alternative of renting vehicles presents lower costs comparing to owning a fleet (Sousa et al., 2019). This result was found in two analysed scenarios. In the first scenario the sparing is over 6% and in the second one it is of almost 25%.

While analysing the options of owning the vehicle, renting it or using a transportation app, Chagas et al. (2018) observed that it is necessary to assess the distance to be travelled. Up to the distance of 800 kilometres a month, using the app is the most econo-

mical option. Renting vehicles is indicating when the travelled distance is between 800 and 3.500 monthly kilometres. Above this distance, it is recommended to use the companies' own vehicle.

Except for the research by Sousa et al. (2019), which added the costs related to the fleet manager, and the one by Oliveira and Coimbra (2018), which added the drivers and their assistants' salaries, the studies used solely the expenses directly related to the vehicles, such as the Automotive Vehicles Property Tax (IPVA), the licencing fees and the maintenance expenses.

Ufpe's vehicles

The Federal University of Pernambuco owns 132 vehicles; two classified as for institutional transportation, 114 for common services, and 16 for institutional services (Universidade Federal de Pernambuco [UFPE], 2017). According to the information presented in the Management Report for 2017, these vehicles are, in average, 7 years old and they travelled, in the mentioned year, approximately 1,3 million of kilometres.

In 2017 about R$ 721 thousand (approximately £ 96,10 thousand in December of 2021) were spent with fuel and R$ 1 million (approximately £ 133 thousand in December of 2021) with preventive and corrective measures (Universidade Federal de Pernambuco [UFPE], 2017). It is also stated in the 2017 report that 29 vehicles (approximately 22% of the fleet) are not in usage conditions, and six are considered wasted. The oldest of the useless vehicles is from 1988 and the newest is from 2003.

The justification for owning an official fleet is that "activities carried out in the institution's units require the continuous use of vehicles to meet the demand for transport" (UFPE, 2017, p.164). The institution also clarifies that owning the fleet makes the supervision related to the "conduction, use, preservation and maintenance of the vehicles" easier (UFPE, 2017, p.165).

Another argument is that the university has three campuses: Recife, Vitória de Santo Antão and Caruaru. In Recife, there are unities external to the campus. Therefore, having its own fleet allows the academic community to move through its different campuses in a practical way to participate in meetings, training activities and other situations.

Methodology

The execution of this qualitative research consisted in a case study, focusing on the UFPE's transportation expenses. The following alternatives were taken into account: (i) own fleet, (ii) location, (iii) taxi and (iv) transportation apps (Table 1). It is expected that by analysing the transportation expenses, more resources could be allocated in other activities carried out by the university.

Table 1 - UFPE's transportation expenses comparison

Expense	Own Fleet	Location	Taxi	Apps
Fuel	√	√	x	x
Maintenance	√	x	x	x
Licensing	√	x	x	x
Mandatory insurance	√	x	x	x
Drivers	√	√	x	x
Depreciation	√	x	x	x
Replacement Cost	√	x	x	x
Cost per trip*	x	x	√	√
Source	Management Report 2017	Specialized websites	Recife cost table **	Recife cost table ***

(*) Related to values paid for taxi or transportation apps.
(**) Available at http://www2.recife.pe.gov.br/sites/default/files/tarifas_de_taxis.doc_29_de_dezembro_de_2015_1.pdf.
(***) Values obtained in price simulator for the apps.
√ - Included in the respective calculation.
x - Excluded from the respective calculation

To delimitate the study, the analysis considers solely the passenger vehicles subgroup, eliminating the other vehicles such as: bus, microbus, trucks, vans, pickup trucks and motorcycles.

To analyse the first alternative, (i) own fleet, data collected from the UFPE's management report from 2017 were used. Information about the number of vehicles by type, mileage, average age, as well as fuel, maintenance, mandatory insurance and licensing are provided in this report. The total expenditure with drivers was obtained in the "Portal da Transparência" (transparency portal) of the Federal Government.

As the fuel, maintenance, mandatory insurance and licensing expenses are not discriminated by group of vehicles, apportionment criteria were used to appropriate each of these

expenses to the passenger vehicles. For the fuel expenses the criterium was the annual mileage, whereas for maintenance, mandatory insurance and licensing the criterium was the number of vehicles.

To the total expense of UFPE's own fleet were added the values related to depreciation and replacement cost. Depreciation is the conversion of the asset purchase price into expense, representing the appropriation of these expenses to the financial performance reporting of the entity (Graciliano & Fialho, 2013). The replacement cost refers to the present value of what will be spent to renew the fleet. Thereafter, the purchase price of the vehicles was updated according to the Broad Consumer Price Index – IPCA, accumulated from 2009 to 2016. The choice of this period was given due to the fact that the average age of the fleet informed in the management report is of 8 years, approximately.

The insertion of the depreciation and replacement cost in the calculation is justified because, even though these are not present financial expenditures, they are values spent or to be expended to keep the fleet anew, for in the options ii, iii and iv the vehicles provided are always in new condition.

For the second alternative (ii – location), the values regarding the location of vehicles use as a base were gathered through research in specialized electronic websites, such as Rentcars, Movida and Decolar. Through the average charged price the calculation of the total expenditure with location was made. The gathering of these data occurred along 2019. In order to compare the representative total of this option with the first one (i – own fleet), the maintenance, mandatory insurance and licensing expenditures were excluded from the sum. Furthermore, the depreciation and replacement cost had to be excluded as well.

The third alternative (iii – taxi) considers the "taxi flag price", which is the fixed value charge per trip, which is added to the variable value, this one being the price charge per distance travelled. The prices of the fourth alternative (iv – transportation app) follow similar mechanics to the third one, since there is a fixed portion and a variable one according to the travelled distance. To calculate the average of the travelled distances, the total annual mileage was divided by the number of days in the year, which gives an approximation of the average distance travelled a day. Therefore, an average of 30 kilometres was used as a bases to calculate the expenditures with (iii) taxi and (iv) transportation apps.

Both for (iii) taxi as for (iv) transportation apps fuel, maintenance, mandatory insurance and licensing expenditures, besides depreciation and replacement costs, were excluded. Moreover, the expenditures with drivers were excluded from the scenarios were their services are not provided. The calculation of the total expenditure with drivers included the salaries, Christmas bonus (13th salary) and the vacation bonus.

Results

The comparative analysis amongst the options of keeping the university's own fleet, renting from specialized companies, using the taxi service of transportation apps is displayed on Table 2. The column entitled "own vehicle" regards the values informed in the management report available in the UFPE's electronic website, whereas the columns entitled "location, taxi and app" regard the market alternatives for each category with the same number of vehicles or annual mileage.

Table 2 - Costs comparison (R$)

Expense	(i) Own fleet	(ii) Location	Revenue (cost) of opportunity of renting	(iii) Taxi	Revenue (cost) of opportunity of using taxi	(iv) Apps	Revenue (cost) of opportunity of using apps
Location		1.035.000	1.035.000				
Taxi				1.933.110	1.933.110		
App						1.044.24	1.044.424
Fuel	401.264	401.264			(401.264)		(401.264)
Drivers' costs (actual employees)	546.399	546.399			(546.399)		(546.399)
Maintenance	488.579		(488.579)		(488.579)		(488.579)
Mandatory insurance	8.299		(8.299)		(8.299)		(8.299)
Licensing	5.296		(5.296)		(5.296)		(5.296)
Depreciation	424.484		(424.484)		(424.484)		(424.484)
Replacement cost	471.649		(471.649)		(471.649)		(471.649)
Total	2.345.970	1.982.663	(363.307)	1.933.110	(412.860)	1.044.24	(1.301.547)

The column "opportunity revenue (cost)" represents the difference between the respective alternative option and the actual value, where the values between parentheses are negative, meaning that the option is more competitive than the currently applied model, that is, that UFPE is at economical loss due to the current policy.

The three options are less onerous than keeping the university's own fleet, for owned vehicles generate non-financial costs that will be recognized solely in the future, representing opportunity costs for the UFPE. This result diverges from what is informed in the university's management report from 2017. In this report, it is stated that renting the vehicles would be more onerous than keeping the fleet. One possible explanation for this disagreement is that the university may not take into account the opportunity costs.

Amongst the three alternatives, the one more economically viable for the public management would be transportation apps, which represents an economy of over R$ 1,3 million for the public coffers (approximately £ 170 thousand) per year. The location and taxi services presented themselves equally viable, given that they represent an economy of approximately R$ 500 thousand a year (approximately £ 66 thousand).

The total cost of the employees responsible for the conduction of the vehicles may be highlighted, for it represents an annual expenditure of R$ 546 thousand (approximately £ 72 thousand), taken into account the salaries, Christimas and vacation bonuses. This expenditure, which is an actual cash outflow for the entity, does not exist when one of the other three available services are adopted, and may be available for other expenditures of the university.

The found results coincide with the ones from other authors (Diniz & Paixão, 2017; Galvão et al., 2013; Oliveira & Coimbra, 2018; Sousa et al., 2019), according to which owning the fleet is the most expensive option in comparison to renting or to outsourcing the fleet. It is highlighted that, from these research, only Oliveira and Coimbra (2018) added the values related to the drivers' salaries.

Observing the findings of Caldeira and Caldeira (2019), who analysed the options of contracting or outsourcing the drivers, being the latter the one that generates fewer costs to the studied institution, one may realize that opting for not keeping the fleet is the decision that lowers the costs of the universities.

Thereby, one may realize that the people responsible for taking the decision of keeping or not owned vehicles must evaluate their choices based in all costs, including the ones that do not represent a cash outflow, such as the depreciation and replacement costs, besides comprising in the discussion the changes imposed by the pandemic currently occurring, for instance the remote activities in which the employee can participate in meetings without the need of commuting.

In this analysis, the budgeting difficulties that the universities have been through in past years must be considered. By reducing the expenditures with vehicles, the spared resources might be applied in other activities of the university, providing benefits for the whole academic community and the society.

Conclusion

Based on the results found and in the society's change of behaviour, imposed by the social distancing, but useful in any context, it is noteworthy that the organizations must evaluate the need to maintain the fleet, as well as to adopt alternatives for the transportation of their employees. Even though the activities have been occurring remotely in 2020, the university continues to have expenditures with its own fleet. In case it utilized the other alternatives listed in this research, the spared resources could be applied in other areas of the university.

Therefore, this research contributes to the reflection about whether is pertinent for the institution to keep its own fleet in face of the recent changes in the execution of the employees' activities provided by the technological advances driven by the new coronavirus, SARS-CoV-2.

To delimitate the study, the analysis considered solely the passenger vehicles group, not comprehending buses, microbuses, trucks, vans, pickup trucks or motorcycles. As a limitation, it was necessary to estimate the average distance travelled by UFPE's vehicles, for the specific expenses were not discriminated in the management report, as well as the salaries paid to the drivers because there is no available information about the number of drivers responsible for the common services vehicles. Nevertheless, this work's contribution is not impaired for the average is a good metric of what the university expends annually.

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