EDITAL PPGT Nº 04/2023 - SELEÇÃO DE CANDIDATOS ÀS VAGAS DO PROGRAMA DE PÓS-GRADUAÇÃO EM TRANSPORTES PARA O CURSO DE MESTRADO ACADÊMICO COM INGRESSO NO PRIMEIRO PERÍODO LETIVO DE 2024

PROVA DE MÚLTIPLA ESCOLHA

Leia com atenção as instruções abaixo:

1. A prova terá duração de **2 (duas) horas**, já incluído o tempo de preenchimento da folha de resposta.

2. Será eliminado o candidato que, durante a realização das provas, for surpreendido portando: aparelhos eletrônicos, tais como *wearable tech*, máquinas calculadoras, agendas eletrônicas e(ou) similares, telefones celulares, *smartphones*, *tablets*, *ipods*®, gravadores, *pen drive*, *mp3 player* e(ou) similar, relógio de qualquer espécie, alarmes, chaves com alarme ou com qualquer outro componente eletrônico, fones de ouvido e(ou) qualquer transmissor, gravador e(ou) receptor de dados, imagens, vídeos e mensagens etc.; óculos escuros, protetor auricular, lápis, lapiseira/grafite, marca-texto e(ou) borracha; quaisquer acessórios de chapelaria, tais como chapéu, boné, gorro etc.; qualquer recipiente ou embalagem que não seja fabricado com material transparente, tais como garrafa de água, suco, refrigerante e embalagem de alimentos (biscoitos, barras de cereais, chocolate, balas etc.); livros, dicionário, notas ou impressos que não forem expressamente permitidos.

3. Não será permitida a interferência e/ou a participação de outras pessoas, salvo em caso de candidato que tenha solicitado condição especial, em função de deficiência que impossibilite a realização da prova pelo próprio candidato.

4. Durante a realização da prova, o candidato não deverá se comunicar com outros candidatos nem se levantar sem a autorização do responsável pela aplicação da prova.

5. A folha de resposta deve ser preenchida com caneta em tinta azul ou preta.

6. O candidato somente poderá deixar a sala de prova após **30 (trinta) minutos** do início da avaliação.

7. O candidato somente poderá levar o caderno de questões no decurso dos últimos **15 (quinze) minutos** anteriores ao horário determinado para o término da prova. Caso o candidato opte por deixar a sala de prova antes deste horário, o caderno de questões deverá ser entregue juntamente com a folha de resposta.

8. A desobediência de qualquer uma das determinações constantes nas instruções acima e no edital implicará na eliminação do candidato.

Identificação do Candidato
Inscrição:
Nome completo:
Assinatura:

QUESTION 1

Following Table 1 below, from the manuscript "Fatal crash involvement of unlicensed young drivers: County level differences according to material deprivation and urbanicity in the United States", the percentage of Young Unlicensed Drivers fatal crashes in divisions "Middle Atlantic", "South Atlantic" and "Pacific" is:

Table 1
Distribution of counties with a YUD fatal crash by division and urbanicity.

	Total YUD fatal crashes (%)	Counties with no YUD fatal crashes	Counties with at least one YUD fatal crash
Division			
New England	55(1.8)	30	37
Middle Atlantic	142(4.6)	53	97
East North Central	339(11.0)	242	195
West North Central	226(7.4)	466	161
South Atlantic	607(17.3)	277	310
East South Central	296(9.7)	159	205
West South Central	819(26.8)	215	255
Mountain	460(15.0)	59	110
Pacific	561(18.3)	149	132
Total	3059	1650	1491
Urban–rural			
Urban	1109(36.3)	556	533
Suburban	828(27.1)	453	479
Rural	1122(36.6)	580	540
Total	3059	1589	1552

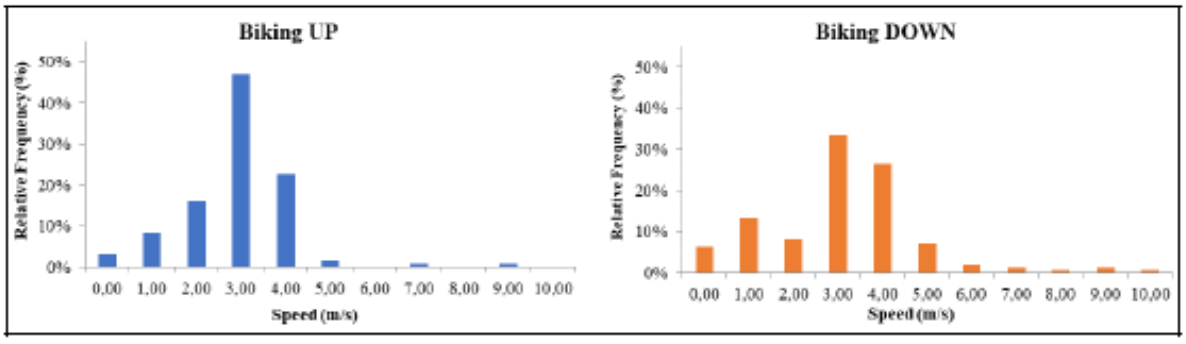
Source: FARS 2000–2006, Census 2000, and RUCC, 2003.

a) 4.6%
b) 17.3%
c) 40.2%
d) 18.3%
e) 21.9%

QUESTION 2

In the manuscript "Assessment of human physiology as indicators of stress when driving, biking, and walking" one of the results presented by the authors, showed in Figure 6, shows how bicycle speeds are different for uphill and downhill routes. It can be stated that:

Figure 6 Histograms of frequency distribution of bicycle speeds



The bike speed histograms shown indicate that the mode is twice the walking speeds, being 3 m/s for both ascents and descents with relative frequencies of 47% and 33%, respectively. On the uphill slopes, 26% of speeds were above 3 m/s, while on descents 39% were above this value.

a) Based on the mode value of 3m/s, the percentage of observed downhill speeds above the mode are 47%.
b) Based on the mode value of 3m/s, the percentage of observed downhill speeds above the mode are 33%.
c) Based on the mode value of 3m/s, the percentage of observed downhill speeds above the mode are 26%.
d) Based on the mode value of 3m/s, the percentage of observed downhill speeds above the mode are 20%.
e) Based on the mode value of 3m/s, the percentage of observed downhill speeds above the mode are 39%.

QUESTION 3

Following Table 2 below, from the manuscript "Fatal crash involvement of unlicensed young drivers: County level differences according to material deprivation and urbanicity in the United States", the non-significant parameters (for 95% confidence level) are, knowing that a parameter can be considered significant if 1 is outside the Confidence Interval (CI) of the Odds Ratio:

Table 2
Conditional logistic regression on division predicting an association of a YUD fatal crash occurrence by urbanicity, material deprivation, and the interaction of urbanicity.

Parameter	Odds ratio	95% CI	
		Lower	Upper
Urbanicity			
Rural by urban	0.55	0.52	0.58
Suburban by urban	1.03	0.97	1.09
Material deprivation	1.19	1.17	1.21
Material deprivation by urbanicity			
Rural by urban	1.00	0.98	1.03
Suburban by urban	0.92	0.90	0.95

a) "Material deprivation", "Urbanicity (Rural by urban)" and "Material deprivation by urbanicity (Suburban by urban)".
b) "Urbanicity (Suburban by urban)" and "Material deprivation by urbanicity (Rural by urban).
c) "Material deprivation" and "Urbanicity".
d) "Material deprivation" and "Urbanicity (Suburban by urban)".
e) None of the above.

QUESTION 4

According to the text below, extract from the manuscript "Fatal crash involvement of unlicensed young drivers: County level differences according to material deprivation and urbanicity in the United States", the selected drivers for the study were:

> "*The study focused on crashes involving a four-wheeled motorized passenger vehicle, a primary mode of transportation responsible for the majority of road fatalities among young people. Crashes occurred between January 01, 2000 and December 31, 2006. To qualify, at least one of the crash-involved drivers was under 19 years and never had been licensed, referred to as young unlicensed driver (YUD) for this study. The age limit of 18 is culturally accepted in the US when most young people obtain a license and no longer eligible for graduated licensing (Williams, 2009). Drivers who have entered the licensing process with learner's permits, or those with suspended, declined, or revoked licenses were excluded as the focus of the study was on the ecological area for never licensed youth*"

a) The driver was licensed and under 19 years old.
b) The driver was licensed and under 18 years old.
c) The driver has entered the licensing process with learner's permits.
d) The driver had suspended, declined, or revoked licenses.
e) None of the above.

QUESTION 5

In the manuscript "Assessment of human physiology as indicators of stress when driving, biking, and walking", the results presented in Figure 10 show the measured speeds of walking trips correlated with the calculated values of Energy Expenditure. It can be stated that:

a) For the two functions shown in the figure, there is an optimal speed for minimum Energy Expenditure (between 2 m/s and 3 m/s), and the speeds measured on routes were above this optimal speed (between 3.0 m/s and 3.5 m/s).
b) For the two functions shown in the figure, there is no optimal speed of Energy Expenditure, and the higher the speed, the lower the Energy Expenditure.
c) For the two functions shown in the figure, there is an optimal speed for the minimum Energy Expenditure (between 1 m/s and 1.24 m/s), and the speeds measured on routes were slightly above the optimal speed (between 1.32 m/s and 1.33 m/s).
d) For the two functions shown in the figure, there is a minimum Energy Expenditure for very low speeds, less than 0.5 m/s.
e) For the two functions shown in the figure, there is an optimal speed for maximum Energy Expenditure (between 1 m/s and 1.24 m/s), and the speed measured on the routes coincide with the speeds for maximum Energy Expenditure.

QUESTION 6

In the manuscript "Simulating a transition to autonomous mobility", it can be stated that:

a) The study examined the transition from Traditional Vehicles (TVs) to Autonomous Vehicles (AVs) using microsimulation modelling approaches.
b) The software package for the simulations Vissim was adopted for the simulation of TVs and AVs.
c) In this study, the simulation scenarios are tested over various simulation runs to make sure the results are internally consistent.
d) The constancy test named Cronbach's Alpha (α) was adopted to evaluate the consistency of the (initial) simulation runs.
e) All alternatives are correct.

QUESTION 7

The text reproduced below, from the manuscript "Combining analytics and simulation methods to assess the impact of shared, autonomous electric vehicles on sustainable urban mobility", allows us to identify three main fundamental factors driving the transformation of urban mobility. Based on it, choose the correct answer.

> *"While recent studies have begun to investigate the challenges associated with the operations of shared vehicle systems (e.g., [15–17]), the sharing economy is only one of the major transformations that are projected to fundamentally change urban mobility over the coming decades, with the others being electrification and autonomous vehicles. Electric vehicles (EVs) promise (at least locally) emission-free urban transportation, representing a powerful tool to combat air pollution that plagues urban*

centers around the globe [18–20]. Driverless, autonomous vehicles, on the other hand, bring the prospect of increased efficiency and safety, reduced congestion, and a further boost to urban sustainability [21–23].”

a) The Internet of Things (IoT); the sharing economy; autonomous vehicles.
b) Artificial Intelligence; 5G technology; electric vehicles.
c) Blockchain; 5G technology; electric vehicles.
d) The Internet of Things (IoT); electrification; the sharing economy.
e) The sharing economy; autonomous vehicles; electrification.

QUESTION 8

The text below from the manuscript “Combining analytics and simulation methods to assess the impact of shared, autonomous electric vehicles on sustainable urban mobility” indicates that the model is:

“There are multiple general-purpose, ready-to-use agent-based simulation platforms publicly available. The upside of broad applicability, however, comes with the caveat of a substantial amount of adaption that is required to fit them to our particular use case. Furthermore, we can only consider open-source software as commercial software is typically sold as an enclosed solution with no access to the original source code. This would prevent us from understanding all details of the model implementation. Relevant traffic-specific open-source platforms include, for instance, Multi-Agent Transport Simulation (https://www. matsim.org), Simulation of Urban Mobility (SUMO, http://sumo.dlr.de) and Microscopic Traffic Simulation Laboratory (https://its.mit.edu/ software/mitsimlab). While all of these platforms are, in principle, capable of conducting our simulation, they were originally designed for microscopic perspectives, such as modeling lane shifts and intersection crossings. Even though they have been extended by mesoscopic and macroscopic features and have grown into powerful all-purpose solutions, the implementation of charging and relocation behavior of vehicles in particular would entail substantial additional effort. Therefore, to ensure expandability, reproducibility, and transferability to other cities and data sets, we decided to develop a Python-based agent-based simulation model specifically customized for the analysis of SAEV systems. The model is structured in a modular fashion to easily assess the impact of different algorithms or decision rules in future research.”

a) An agent-based model based on the Python programming language.
b) A model using an OpenAI API and trained in actual data.
c) An agent-based model based on the VISIM platform.
d) A model based on Blockchain.
e) None of the above.

QUESTION 9

According to the text reproduced below from the manuscript “Combining analytics and simulation methods to assess the impact of shared, autonomous electric vehicles on sustainable urban mobility”, it can be stated that:

“Urban transportation is one of the wicked problems society is currently facing and our findings support policy makers and managers alike in giving quantitative arguments for their decisions regarding investment in technology, fleet size, and charging infrastructure. Our results show that a system of shared, autonomous EVs can enable sustainable, zero-emission urban mobility with a substantially reduced fleet size – resulting in a higher resource utilization – while satisfying current service level requirements. What is particularly noteworthy is the low number of charge points required to make such a system work. Recalling that a single charge point can supply 264 kWh of energy per day, which

translates into 1760 km driven, the 28 charge points identified as the infrastructure threshold would run at a utilization rate of 61% to satisfy daily travel demand of 30,000 km. This illustrates not just a very efficient use of vehicle capacity, but also of infrastructure capital enabled by SAEV systems. While our showcase analyzed data from the city of Berlin, Germany, the approach is easily transferable and extendable to other cities through the openly accessible simulation platform."

a) The number of charging points needed for a fleet of autonomous EVs is very large.
b) A system of shared, autonomous EVs can enable sustainable, zero-emission urban mobility with a substantially reduced fleet size.
c) Running a system of shared, autonomous EVs is too expensive.
d) The model is suitable for Berlin but cannot be easily adjusted to other cities.
e) None of the above.

QUESTION 10

The manuscript "*The effect of neighbourhood and urban center structures on active travel in small cities*" addresses the theme of transportation in small cities in the Norwegian context. Based on the information provided by the article's author (Wolday, 2023), read the following sentences and choose the correct answer.

I. Scale (size) limitations constrain small cities from promoting a transit-oriented urban planning that can compete with private car use.
II. Small cities are usually characterized by relatively compact and predominantly monocentric city configurations, which together create an urban environment that is reachable by non-motorized transport.
III. Commercial facilities, personal services and institutional facilities are often concentrated at small-cities' centers. This in turn increases the average distance from residential settlements to various facilities.

a) Only statement I is correct.
b) Only statement II is correct.
c) Only statements I and II are correct.
d) Only statements II and III are correct.
a) All statements are correct.

QUESTION 11

The following text is from de manuscript "Impactos da metropolização no sistema de transporte coletivo: estudo de caso na Região Metropolitana de Goiânia".

Starting in 2012, urban mobility in Brazil came to be defined by the law that regulates the National Urban Mobility Policy, which defines urban mobility as the "condition in which the movements of people and goods are carried out in the urban space" (Brasil, 2012, art. 4º, II). To understand these movements, it is important to consider that mobility is strongly related to urbanization processes, characterizing itself as a sociospatial process that is particularized depending on the formation of each place (Ipea, 2016).

In this sense, the expansion of urban agglomerations, whose logic is based on the location of workplaces in the core of the agglomerations and the location of housing in peripheral areas, facilitates pendular displacement, considered one of the most striking features of the new world order. More and more workers are settling in peripheral areas and contributing to their expansion (IBGE, 2016).

According to the text, what is the main cause of pendular displacement in large Brazilian cities?

a) The low quality of public transportation, which makes it difficult for people to commute daily between work and home.
b) The lack of affordable housing in the city centers, which forces people to seek cheaper housing in the peripheries.
c) The increase in the supply of jobs in the peripheries, which attracts workers from other parts of the city.
d) The growth of the population in rural areas, which puts pressure on the labor market in large cities.
e) The reduction of the purchasing power of the population, which makes it more difficult to access housing in the city centers.

QUESTION 12

Based on Figure 3 of the manuscript "*The effect of neighbourhood and urban center structures on active travel in small cities*", that shows the distribution of grocery stores in each of the three small Norwegian cities, read the affirmative sentences and choose the correct answer.

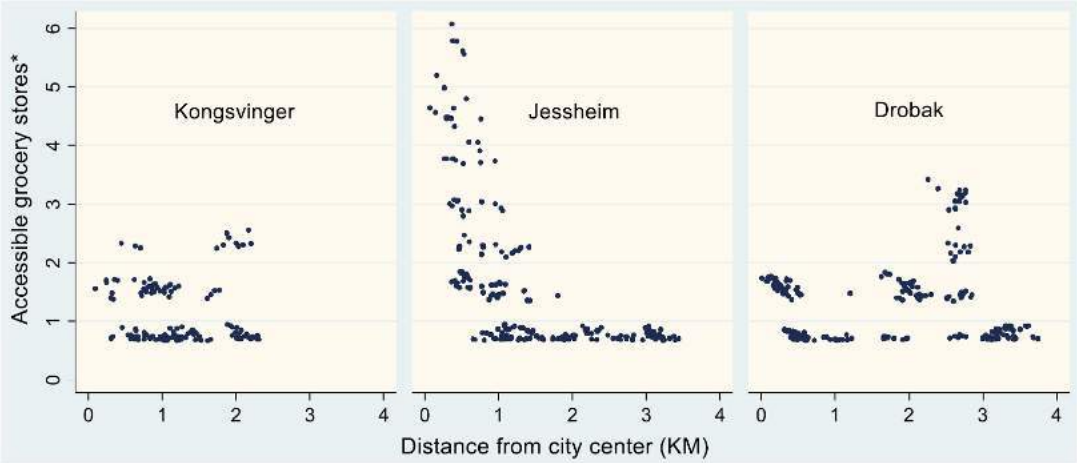


Fig. 3. Accessibility distribution to grocery stores from city centres of the respective cities
*Number of grocery stores that can be accessed within 850-meter range from a residence

I. Kongsvinger has a fairly homogeneous distribution of grocery stores within a two-kilometer radius of the city.
II. Jessheim has a substantial proportion of grocery stores are concentrated at the city fringe.
III. Drøbak has a higher concentration of grocery stores further away from the city center.

a) Only statement II is correct.
b) Only statement III is correct.
c) Only statements I and II are correct.
d) Only statements I and III are correct.
e) All statements are correct.

QUESTION 13

In the manuscript "Simulating a transition to autonomous mobility", the Chronbakh's Alpha test was conducted on the simulation results of a random traffic condition (on 4th of May 2017). Results of the evaluation (Table 8), demonstrate that (choose de correct answer):

Table 8
Reliability Assessment of the simulation model in the test condition (May, 4th).

Evaluated parameter	Cronbach's Alpha (α)			Reliability
	TVs	AVs	Average	
Travel time	0.913	0.906	0.910	Very good
Number of vehicles (origin-destination)	0.456	0.851	0.654	Acceptable
Number of vehicles (total)	0.839	0.986	0.913	Very good
Queue delay	0.867	0.889	0.878	Good
Queue length	0.834	0.883	0.859	Good
Vehicle delay	0.855	0.887	0.871	Good
Stop delay	0.773	0.719	0.746	Acceptable
Number of stops	0.779	0.886	0.833	Good
CO emission	0.825	0.924	0.875	Good
Fuel consumption	0.825	0.924	0.875	Good
LOS	0.929	0.912	0.921	Very good
Average reliability	**0.809**	**0.888**	**0.848**	**Good**

a) Nine out eleven evaluated parameters of the simulation model represented good (and very good) reliability;
b) Two parameters, the number of vehicles from origin to destination, and stop delay represented acceptable consistency for TVs;
c) In general, the simulation model of this study represented an overall α value of 0.848, which is a good reliability;
d) The simulation model showed to be reliable to represent consistent results.
e) All previous options are correct.

QUESTION 14

As it is stated in the Table 1, from the manuscript "Operations Research in Passenger Railway Transportation", there are different planning problems.

level	time	central	local
strategic	10-20 years	rolling stock management	
	2-5 years	crew planning	
	every few years	line planning	
tactical	1/year	timetabling (basic)	platform assignment (basic)
	1/year	8 o'clock rolling stock assignment	
operational	6/year	timetabling (details)	platform assignment (details)
	6/year	rolling stock circulation	shunting
	6/year	crew scheduling	crew rostering
short-term	daily	timetabling	platform assignment
	daily	rolling stock circulation	shunting
	daily	crew scheduling	

Table 1: Planning problems at NSR

Therefore, based in the Table 1 just mentioned, it can be stated that:

a) the strategic level of planning has to be done daily.
b) the tactical level of planning has to be done every week.
c) the short-term level of planning has to be done every year.
d) the strategic level for the crew planning has to be done in 2-5 years.
e) the operational level for the crew planning has to be done for 12/year period.

QUESTION 15

The manuscript "Operations Research in Passenger Railway Transportation" describes a mathematical representation of the routing problem (PAGE 21). Therefore, it is introduced a set T as the set of trains. The set F_t consists of routing possibilities for train t ∈ T, and is split in the Inbound routing possibilities F_t^i, the Platform options F_t^p , and the Outbound possibilities F_t^o , i.e. $F_t = F_t^i \cup F_t^p \cup F_t^o$. Moreover, the set $F_{t,t'}$ contains all pairs of routing possibilities (f, f') for trains (t, t') which do not result in a conflict. Note that this set contains possibilities (f, f') for train t if f, f' ∈ F_t^i with j ∈ {i, o, p} and f ≠ f ' . The parameters $\rho_{t,f}$ represent amongst others the wish to route as many trains as possible and the earlier mentioned service considerations. They define the decision variables as:

$$x_{t,f} = \begin{cases} 1 & \text{if train } t \in T \text{ uses routing possibility } f \in F_t, \\ 0 & \text{otherwise.} \end{cases}$$

Now, the problem is stated as follows:

$$\text{maximize} \quad \sum_{t \in T} \sum_{f \in F_t} \rho_{t,f} x_{t,f} \tag{1}$$

$$\text{subject to} \quad \sum_{f \in F_t^i} x_{t,f} \leq 1 \quad \forall t \in T \tag{2}$$

$$\sum_{f \in F_t^p} x_{t,f} \leq 1 \quad \forall t \in T \tag{3}$$

$$\sum_{f \in F_t^o} x_{t,f} \leq 1 \quad \forall t \in T \tag{4}$$

$$x_{t,f} + x_{t',f'} \leq 1 \quad \forall t, t' \in T, f \in F_t, f' \in F_{t'}, (f, f') \notin F_{t,t'} \tag{5}$$

$$x_{t,f} \in \{0, 1\} \quad \forall t \in T, f \in F_t \tag{6}$$

Therefore, according to how they define the variables, mark the correct answer for the following Objective Function (1), already given:

$$\text{maximize} \quad \sum_{t \in T} \sum_{f \in F_t} \rho_{t,f} x_{t,f}$$

a) the Objective Function tries to minimize the number of trains allocated for each route.
b) the Objective Function tries to minimize the number of crew members allocated for each route.
c) the Objective Function tries to minimize the number of pairs cities served by the tarins.
d) the Objective Function focus on maximizing the number of disruptions by the trains.
e) the Objective Function focus on maximizing the routing of as many tarins as possible.

QUESTION 16

The manuscript "Operations Research in Passenger Railway Transportation" states that in the crew rostering problem, the duties resulting from the crew scheduling step are combined into a number of rosters for a certain period. In particular, for the Cyclic Crew Rostering Problem (CCRP), rosters are created for a group of crew members, where drivers are in the same group if they have the same characteristics (e.g. all full-time employees, same route knowledge). Therefore, based in the given definition of the CCRP problem, it can be stated that:

a) a roster has crew members which are all full-time, at the same time.

b) a roster has crew members which are in different routes, at the same time.
c) a roster has crew members which are the same route but are full and partial time, at the same time.
d) a roster has crew members which are full time but are in different routes, at the same time.
e) a roster has crew members which are full and partial time and, they are also in different routes, at the same time.

QUESTION 17

Read the text bellow, extract from de manuscript "*Investigating Drivers' Behavior During Diverging Maneuvers Using an Instrumented Vehicle*" and answer the question.

> "*To study the driver behaviour along the existing maneuvers …., the driving speeds and trajectories were collected whilst approaching the deceleration lanes, during the existing maneuvers and along the deceleration lanes. For studying the existing maneuvers through the deceleration lanes, the driver's speed was recorded at seven measurement points*", as shown in the Figure 2 below.

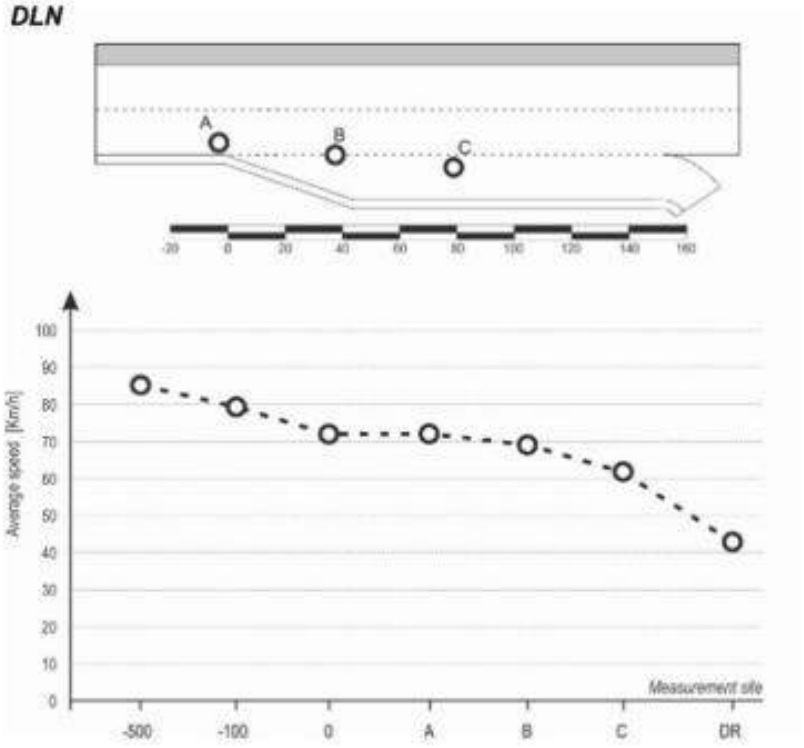


Figure 2 – Average values of speed and positions measurements sites

Choose the best reading for the points in the graph:

a) The seven points in the graph were chosen randomly.
b) Points "-500" and "-100" have a negligeable speed in the study.
c) DR point was defined based on the driver position.
d) Points "A", "B" and "C" are respectively: where the vehicle began to change lane, the vehicle speed is approximately 70 km/h; the driver's trajectory crossed the line between the right through lane and the deceleration lane, vehicle speed begins to decrease; the vehicle was completely within the deceleration lane and, its speed is about of 60 km/h.
e) It is not possible to identify such points.

QUESTION 18

The following text is from de manuscript "Impactos da metropolização no sistema de transporte coletivo: estudo de caso na Região Metropolitana de Goiânia".

> *"Quality in public transportation systems focuses on the aspects that directly influence the user's perception of a trip (Transportation Research Board – TRB, 2013, p. 149). Quality measures availability, comfort, and the facilities offered, and often depends on the operational decisions made in the public transportation system regarding the characteristics of the service to be offered, as clarified by the National Association of Urban Transport Companies (NTU, 2008).*
>
> *Ferraz and Torres (2004) and NTU (2008) present the main quality factors for bus public transportation: accessibility, frequency of service, travel time, crowding, reliability, safety, bus features, stop features, information system, connectivity, operator behavior, and road condition.*
>
> *Efficiency, on the other hand, is directly related to the performance of the service offered. According to Ferraz and Torres (2004), efficiency, related to the economic area, refers to productivity and expresses the relationship between the product obtained and the inputs spent in production. The product obtained is the trip offered, while the inputs are the vehicles, employees, fuel, tires, parts, accessories, lubricants, etc. Greater economic efficiency means achieving a lower final cost, for a given quality or service standard. Economic efficiency is evaluated from the cost per passenger transported.*
>
> *In general, for efficiency to be maximized, it is important that: the distance to be traveled be reduced to the minimum possible, so that the mileage traveled and the number of vehicles used are smaller and, thus, there are fewer costs with fuel, lubricants, tires, parts and accessories, salaries and social charges of operators, etc.; the speed used is the maximum possible, for the reduction of travel time and the consequent decrease in the number of vehicles and corresponding costs; the capacity of the vehicles is the maximum possible, according to the demand of passengers and the geometry of the road, for the reduction of the mileage traveled and the number of vehicles employed, with the consequent reduction of the costs related to the vehicles."*

According to the text, what is the main difference between quality and efficiency in a public transportation system?

a) Quality is related to the user's perception, while efficiency is related to the performance of the service offered.
b) Quality is related to the factors of accessibility, frequency of service, travel time, crowding, reliability, safety, bus features, stop features, information system, connectivity, operator behavior, and road condition, while efficiency is related to the factors of distance, speed, and vehicle capacity.
c) Quality is related to the reduction of the final cost, while efficiency is related to the reduction of mileage traveled, travel time, and vehicle capacity.
d) Quality is related to the increase in user comfort, while efficiency is related to the reduction of the number of vehicles used.
e) Quality is related to the satisfaction of users, while efficiency is related to the profitability of the service.

QUESTION 19

The effects of a set of variables are showed in Figure 4 from the manuscript "Children's life satisfaction and travel satisfaction: Evidence from Canada, Japan, and Sweden".

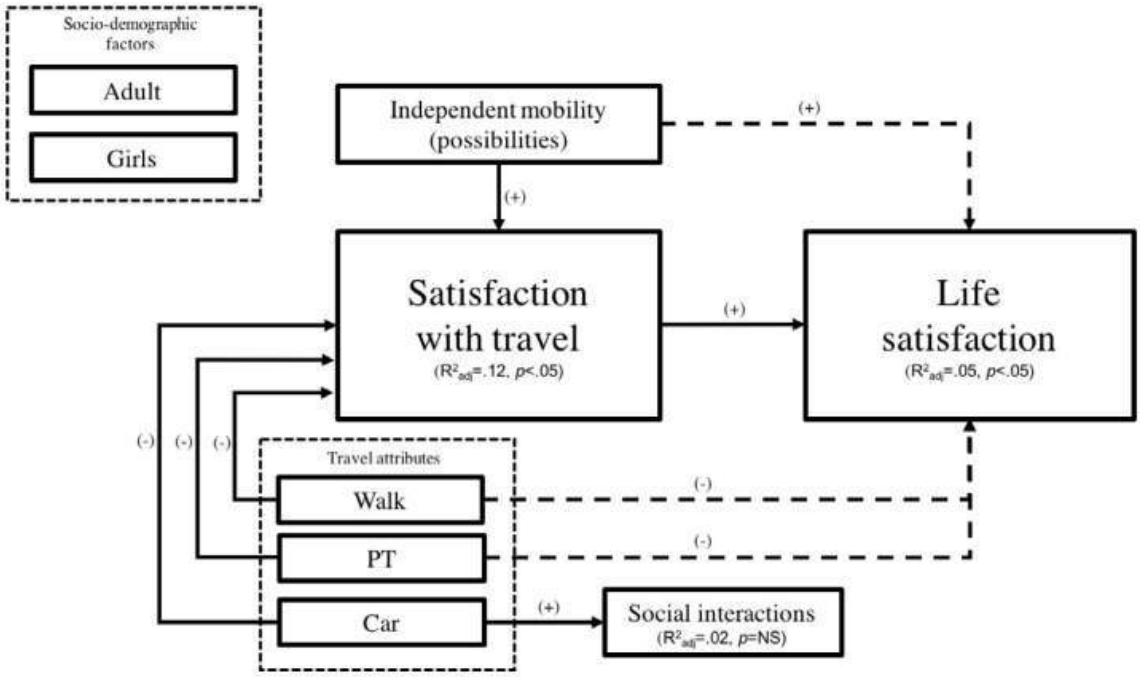


Fig. 4. Significant direct effects (solid line) and indirect effects (broken line).

According to Figure 4, it can be stated that:

a) All modes, apart from cycling, were negatively associated with travel satisfaction and indirectly with life satisfaction.
b) Socio-demographic factors are positively associated with life satisfaction.
c) Significance level of Satisfaction with travel and Life satisfaction are not significant.
d) Independent mobility has direct effect on Life satisfaction.
e) All statements are correct.

QUESTION 20

The following text is from de manuscript "Impactos da metropolização no sistema de transporte coletivo: estudo de caso na Região Metropolitana de Goiânia".

> *"In 2000, the number of destination flows (arrivals) was 7,030,250 people, a value that increased to 13,946,545 in 2010. Although the displacements are distributed throughout the country, this process is fundamentally associated with the expansion of urban agglomerations, especially those of a metropolitan character, and the possibility of using public or private transportation. In all metropolitan regions, the most important flow is that originating in the peripheral municipalities towards the central municipality. According to Delgado et al. (2016), larger flows indicate a greater process of peripheralization of occupation and greater concentration of activities in the central municipality. As can be observed in Table 2, with the exception of Salvador (29.3%) and Manaus (22.9%), all regions present more than 50% of commuting flows in the periphery-core direction. The Metropolitan Region of Goiânia stands out in this context, presenting the second highest percentage of peripheral-core commuting flow among Brazilian metropolitan regions."*

According to the text, what is the main factor that explains the increase in commuting flows in Brazil between 2000 and 2010?

a) The increase in the supply of jobs in the peripheral areas of metropolitan regions.
b) The reduction in the cost of living in the peripheral areas of metropolitan regions.
c) The expansion of urban agglomerations, especially those of a metropolitan character.
d) The improvement in the quality of public transportation in metropolitan regions.
e) The increase in the population in the peripheral areas of metropolitan regions.

QUESTION 21

Table 2 (manuscript "Children's life satisfaction and travel satisfaction: Evidence from Canada, Japan, and Sweden") shows the model results. According to the results it can be stated that:

Table 2
Detailed results from PLS-SEM: Direct effects (all countries included, with travel satisfaction and life satisfaction scales standardised).

	Social interaction			IM distance			IM possibility			Travel satisfaction			Life satisfaction		
	B	t	p	B	t	p	B	t	p	B	t	p	B	t	p
Girl				*−0.081*	*1.754*	*0.079*	−0.070	1.532	0.126	−0.013	0.276	0.782	0.072	1.528	0.127
Adults				0.007	0.152	0.879	−0.066	1.620	0.105	−0.002	0.070	0.944	*0.070*	*1.902*	*0.057*
Walk	0.024	0.542	0.588							**−0.151**	**3.517**	**< 0.001**			
Bicycle	*0.087*	*1.848*	*0.065*							0.031	0.634	0.526			
Public transport	0.062	1.240	0.215							**−0.159**	**3.612**	**< 0.001**			
Car	**0.113**	**2.030**	**0.042**							**−0.114**	**2.547**	**0.011**			
Social interaction										0.067	1.528	0.126	−0.013	0.347	0.728
IM distance										0.052	1.138	0.255	−0.010	0.246	0.806
IM possibility										**0.251**	**5.714**	**< 0.001**	0.082	1.495	0.135
Travel satisfaction													**0.196**	**4.037**	**< 0.001**
Adj. R^2	0.02			0.01			0.01			0.12			0.05		

Note: numbers in bold are significant at $p < .05$, and numbers in italics are significant at $p < .10$.

a) Independent Mobility (IM) related to distance is significative for travel satisfaction.
b) Independent Mobility (IM) related to distance is significative for life satisfaction.
c) Independent Mobility (IM) for possibility is positively associated with travel satisfaction.
d) Independent Mobility (IM) for possibility is significative for life satisfaction.
e) All statements are wrong.

QUESTION 22

Based on the results presented in Table 2 (manuscript "Children's life satisfaction and travel satisfaction: Evidence from Canada, Japan, and Sweden"), consider the statements below and choose the correct answer.

Table 2
Detailed results from PLS-SEM: Direct effects (all countries included, with travel satisfaction and life satisfaction scales standardised).

	Social interaction			IM distance			IM possibility			Travel satisfaction			Life satisfaction		
	B	t	p	B	t	p	B	t	p	B	t	p	B	t	p
Girl				*−0.081*	*1.754*	*0.079*	−0.070	1.532	0.126	−0.013	0.276	0.782	0.072	1.528	0.127
Adults				0.007	0.152	0.879	−0.066	1.620	0.105	−0.002	0.070	0.944	*0.070*	*1.902*	*0.057*
Walk	0.024	0.542	0.588							**−0.151**	**3.517**	**< 0.001**			
Bicycle	*0.087*	*1.848*	*0.065*							0.031	0.634	0.526			
Public transport	0.062	1.240	0.215							**−0.159**	**3.612**	**< 0.001**			
Car	**0.113**	**2.030**	**0.042**							**−0.114**	**2.547**	**0.011**			
Social interaction										0.067	1.528	0.126	−0.013	0.347	0.728
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Adj. R^2	0.02			0.01			0.01			0.12			0.05		

Note: numbers in bold are significant at $p < .05$, and numbers in italics are significant at $p < .10$.

I. For travel modes, the frequency of use of all modes (except for bicycle) was directly and negatively associated with travel satisfaction;

II. The possibility for the child to undertake independent trips on foot, by bicycle or by public transport was positive;
III. With respect to gender of the child, a marginally significant direct negative path from girls to the independent mobility distance was observed

a) All statements are correct.
b) Statements I and II are correct.
c) Statements I and III are correct.
d) Statements II and II are correct.
e) All statements are incorrect.

QUESTION 23

The sentence bellow is from the Conclusion Section of the manuscript "*Investigating Drivers' Behaviour During Diverging Maneuvers Using an Instrumented Vehicle*".

> *"The authors here present a procedure based on the post-processing of a large amount of data obtained from an instrumented vehicle. Furthermore, the authors identified new advanced indicators capable of illustrating driving performance along deceleration lanes, thus highlighting potentially unsafe driving conditions."*

According to the text, authors concluded that:

a) The study was not relevant considering drivers behaviour.
b) The decelaration lanes were safe enough to drivers, thus the results are negligeable.
c) The study confirms the potential of data from naturalistic for safety analysis and assessments of the driver's real behaviour.
d) An instrumented vehicle is not a good tool for studying safety in real world situations.
e) None of the above.

QUESTION 24

In the manuscript "Modal choice preferences in short-distance hinterland container transport" the following can be said about the actors involved in the route choice according to the respondents (see Figure 5):

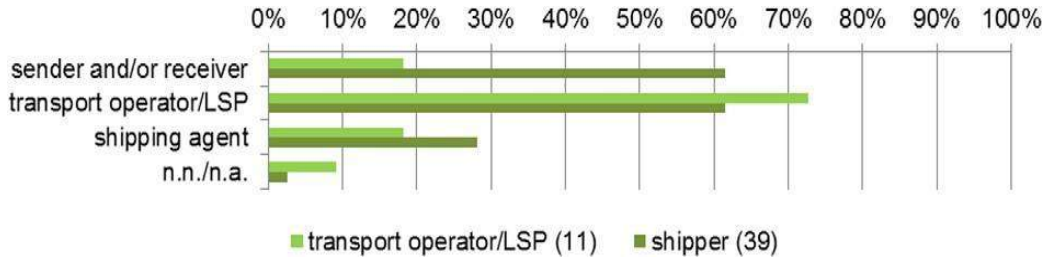


Figure 5: Actors responsible in the route choice according to the respondents.

a) 40% of responding shippers consider that the transport operator is responsible for making the decision to choose the route.
b) Less than 20% of transport operators consider that the shipping agent is responsible for making the decision to choose the route.
c) The route selection decision-making is the exclusive responsibility of the sender in the view of the shippers.

d) The majority of transport operators/LSPs consider (more than 70%) that the responsibility for making the decision to choose the route lies with them.
e) None of the alternatives is correct.

QUESTION 25

The Figure 1 below refers to the instrumented vehicle used in the manuscript "*Investigating Drivers' Behavior During Diverging Maneuvers Using an Instrumented Vehicle*".

Figure 1 – Instrumented vehicle configuration

Identify the sequence of instruments that better detects these equipment.

a) Four action cameras set on a resolution of 720 x 25 pixels.
b) Four GPS devices.
c) Action cameras set with high resolution; a common GPS and a digital stopwatch of sensitivity 0.01s.
d) Mini cameras that record the image in high resolution.
e) Driver side window: a camera is placed with the overall function of giving a reference of the longitudinal position by recording the hectometer signals along the road. Windshield midpoint: another camera that filmed the front view of the road to provide the vehicle lateral position. GPS device, and the stopwatch: The camera's function was to record the vehicle speed showed on the GPS and the time reference showed on the stopwatch, which was necessary to calculate the travelled distance and speed. Right-side window: a camera to get an overview of the driving conditions.

QUESTION 26

In the manuscript "Modal choice preferences in short-distance hinterland container transport", analysis of Figure 2 bellow, allows us to conclude that:

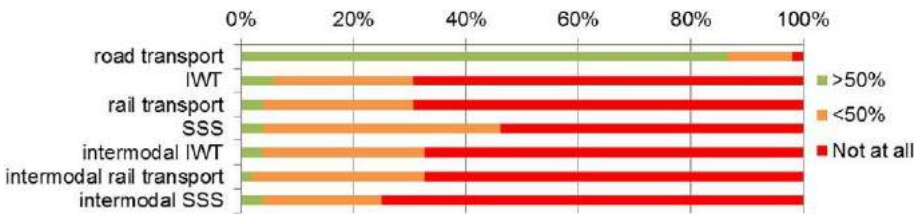


Figure 2: Transport options deployed by the respondents' companies.

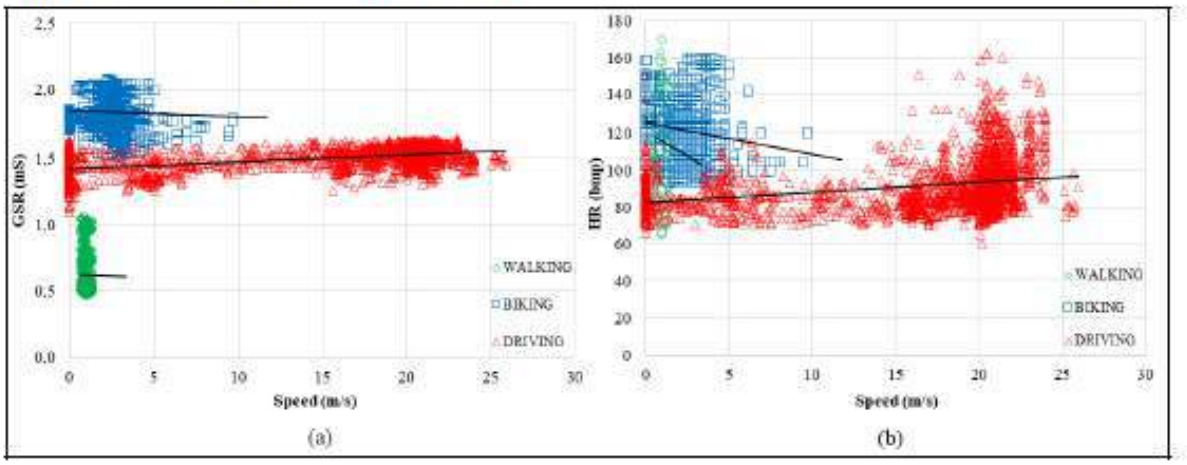
a) Around a third of respondents say they use an intermodal alternative.
b) No respondent uses an intermodal alternative.
c) 80% use the intermodal rail transport alternative.

d) Everyone uses the road transport alternative.
e) The IWT and SSS alternatives are the most used according to the respondents.

QUESTION 27

In the manuscript "Assessment of human physiology as indicators of stress when driving, biking, and walking", Figure 9 shows the velocities measured in the different modes (walking, cycling, and caring) correlated with the measured values of Galvanic Skin Response (GSR) and Heart Rate (HR). It can be stated that:

Figure 9 Correlation between GSR and HR



Therefore, it is noticeable in the Figure a positive linear trend line correlation of GSR and HR as a function of driving speed, while walking and cycling resulted in negative correlations. According to Figure 9, driving caused an increase in the driver's emotional arousal, while walking and cycling do not have the same effect on the traveller.

a) For driving trips there is a positive correlation between Speed, GSR and HR, which indicates an increase in HR and GSR with increasing speed.
b) For bicycle trips, there is a positive correlation between Speed, GSR and HR, which indicates an increase in HR and GSR with increasing speed.
c) For walking trips, there is a positive correlation between Speed, GSR and HR, which indicates an increase in HR and GSR with increasing speed.
d) For driving trips there is a positive correlation between Speed and GSR, and a negative correlation with HR, which indicates an increase in GSR only with increasing speed.
e) For bicycle trips, there is a positive correlation between Speed and GSR, and a negative correlation with HR, which indicates an increase in GSR only with increasing speed.

QUESTION 28

In the article "Modal choice preferences in short-distance hinterland container transport", the two main reasons given by the group of transportation operators and LSPs for not using intermodal transportation are the following (see Figure 3):

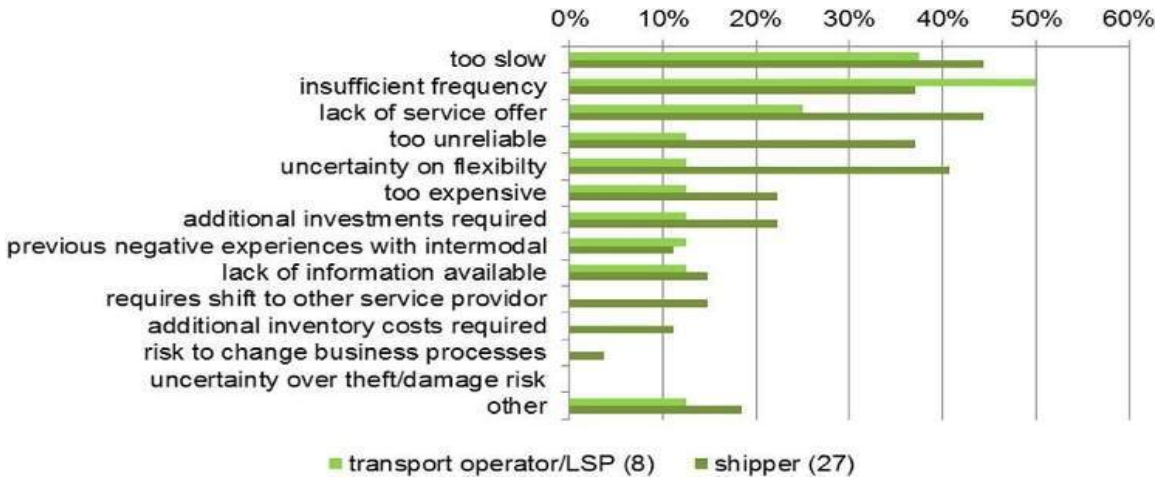


Figure 3: Share of respondents giving indicated reasons for not – or less – using intermodal transport solutions. (8) and (27) indicate the number of respondents that gave reasons for not – or less – using intermodal transport.

a) too slow and too expensive.
b) too unreliable and additional investments required.
c) lack of information available and too expensive.
d) too slow and insufficient frequency.
e) uncertainty on flexibility and too unreliable.

QUESTION 29

Consider Figure 2, extracted from the manuscript "*The effect of neighbourhood and urban center structures on active travel in small cities*". It can be stated that:

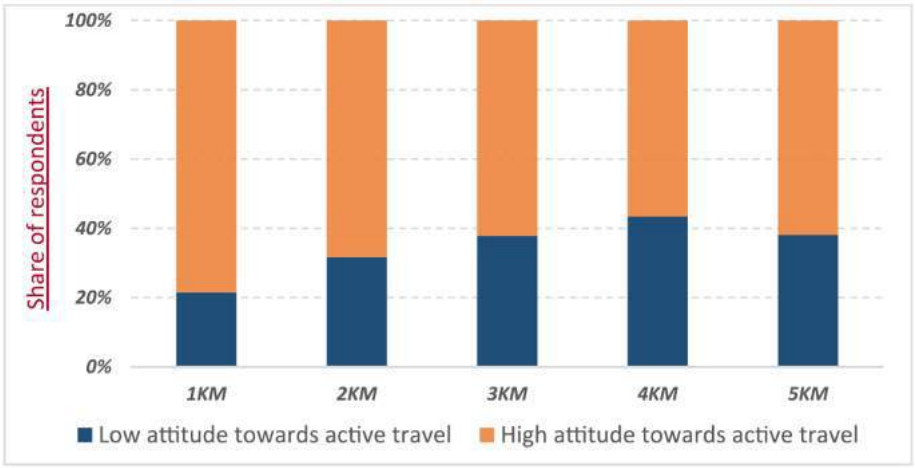


Fig. 2. Residents' attitudes towards walking/biking at different distance rings from the city centre.

a) Approximately 20% of people who reside 1 km from the city center have a high attitude towards active transportation.
b) The category corresponding to the longest distance has the highest proportion of residents with a low attitude towards active travel.
c) More than 70% of people who reside more than 2 km from the city center have a high attitude towards active travel.

d) Considering the first four distance categories (1, 2, 3, and 4 km), there is an increase in the proportion of residents with a higher attitude towards active travel as the distance increases.
e) For any distance, the majority of residents have a high attitude towards walking/cycling.

QUESTION 30

In the manuscript "Simulating a transition to autonomous mobility", the results in Figure 14, show that (choose the correct answer):

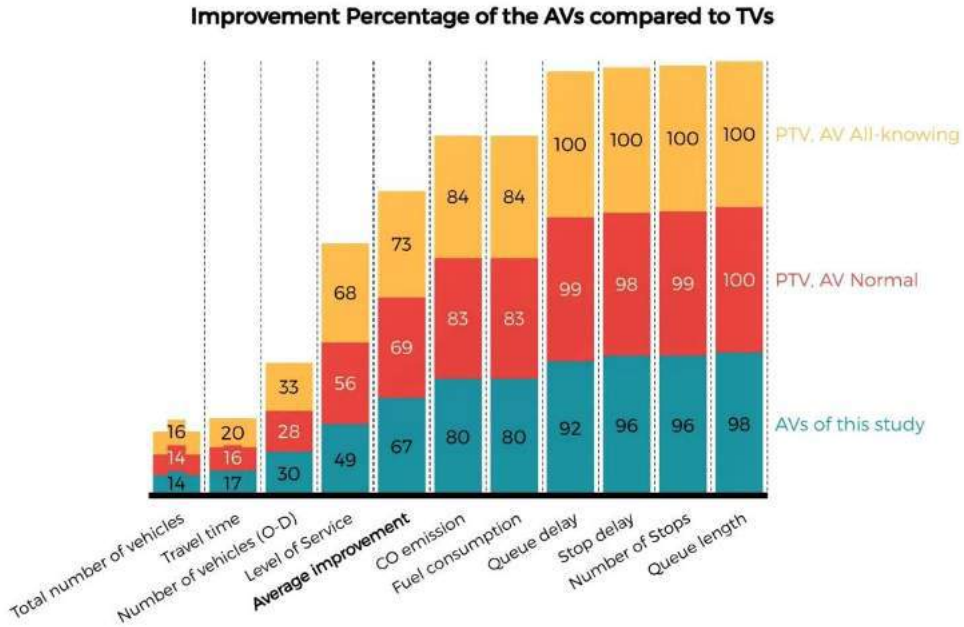


Fig. 14. Improvement percentage of the AVs of this study versus PTV-AVs.

a) AVs with All-Knowing driving behaviours improved the quality of traffic by 73%, which is slightly more [by 6%] than what the AVs of the current study obtained.
b) AVs with Normal driving behaviours defined by PTV (PTV, AVNormal) achieved a 69% overall improvement compared with TVs.
c) Alternatives (a) and (b) are correct.
d) Only alternative (a) are correct.
e) None of the alternatives is correct.