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## **Analysis of flat public transport fare: Helsinki region case**

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## Abstract

Thesis studies flat tariff as potential pricing model for Helsinki Region Transport. Flat tariff is compared to current zone model through financial analysis, user experiences, benchmarking other cities and evaluating effects on least well-off passengers. Thesis utilizes qualitative methods of expert, individual and group interviews and quantitative methods of price elasticity and trip/income analyses. Behavioural effects are recognized through theoretical framework. Results show that flat tariff is realizable but would demand increased subsidies. Experience of fairness relates with losses; if flat tariff is implemented with the current lowest price level, feeling of injustice should not occur. If price increases would be needed, negative emotions of “losers” are stronger than the joy of “winners”. Flat tariff with current AB-zone price level would improve transport justice for all users. Flat tariff is not the optimal model to maximize both revenue and usage, unless the behavioural value for simplicity is expected to be high. However, defining the exact value of simplicity would demand further empirical preference studies. Behavioural economics is relevant framework for tariff planning, and planners need quantitative methods to combine psychological analysis and economical effects of pricing. In conclusion, thesis recommends remaining to zone model, but to lower prices of C- and D-zones in relation to AB-region.

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**Keywords** Public transport, flat fare, pricing, transport justice, behavioural economics

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## Tiivistelmä

Diplomityö tutkii tasatariffia hinnoitteluvaihtoehtona Helsingin seudun liikenteessä. Tariffia verrataan vyöhykkeisiin rahoituksen, käyttäjäkokemusten ja muiden kaupunkien kokemusten kautta sekä arvioidaan vaikutuksia pienituloisille matkustajille. Tutkimus perustuu asiantuntija-, henkilö- ja ryhmähaastatteluiden laadulliseen analyysiin sekä hintajoustojen ja matkojen kvantitatiiviseen analyysiin. Käyttäytymistaloustieteellisiä vaikutuksia analysoidaan teorian avulla. Tulosten perusteella tasatariffi on toteutettavissa, mutta edellyttää lisäsubventioita. Kokemus oikeudenmukaisuudesta liittyy hinnankorotuksiin; jos tasataksa toteutetaan ilman hinnankorotuksia, epäoikeudenmukaisuuden kokemus ei ole ongelma. Jos osalle käyttäjistä aiheutuu hinnankorotuksia, ”häviäjien” negatiiviset tunteet ovat voimakkaampia kuin ”voittajien” tyytyväisyys. Tasatariffi nykyisellä AB-hintatasolla parantaisi liikkumisen oikeudenmukaisuutta kaikille käyttäjille. Tasataksa ei ole optimaalinen malli tulojen ja käytön maksimoimiseksi, ellei yksinkertaisuuden arvo asiakkaalle ole korkea. Yksinkertaisuuden arvon määrittäminen vaatisi kuitenkin empiirisiä preferenssitutkimuksia. Työ osoittaa käyttäytymistaloustieteen keskeisen roolin hinnoittelussa, ja suunnittelijoiden täytyy hallita kvantitatiiviset menetelmät hinnoittelun psykologisten ja taloudellisten vaikutusten analysoimiseksi. Johtopäätöksenä suositellaan pysyttämistä vyöhykemallissa ja CD-vyöhykkeiden hintojen laskua.

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*Basis for this research stem from my work and passion for developing better public transport tariff solutions for sustainable and just mobility. My interest to analyse flat tariff is related to zone model Helsinki Region Transport, HSL, has currently introduced. Yet, long waited zone model has intensified demands for expansion of inner AB-zones, which would practically mean flat tariff for whole metropolitan region.*

*The aim of this thesis is to analyse the motives for flat tariff in different cities, analyse potential effects of flat tariff for HSL, study customer value creation and transport justice of flat tariff. Recommendations are also presented for future tariff studies and developments in Helsinki region.*

*I want to thank all the interviewees from other cities who were willing to share their experience and knowledge with me. Tariff questions are politically loaded themes everywhere, and I was happy to understand the emotional aspects of PT pricing as well. I also want to thank my superior Suvi Rihtniemi who has enabled my studies, which were overlapping work time to time. Great thanks to my colleagues at HSL. Without their professional support I would not have been able to finish my work.*

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*Mari Flink*

Mari Flink

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# 1. Introduction

Zone based tariff for public transport (PT) have been used in many European cities for decades. Recently, zone systems have been simplified or totally removed in few cities, for example in Paris, Stockholm and Barcelona. (Massot 2015, UAB 2018, Jarnlo 2013). Removal of zones has resulted either as an aim to simplify tariff system or improve social justice development or both. Complicated zone models have been felt as barrier for usage, since people might experience difficulties to understand zonal system or the business logics are difficult to implement for new, customer friendly tariff technologies such as contactless payments. Simplicity attracts even though flat tariff often means price increases to many users.

Tariff model is one of the key elements of PT pricing. Small & Verhoef have listed three relevant components of tariff: fare level, fare structure and incentive effects of transit subsidies. (Small & Verhoef 2007, l. 8408). Also, Mulley and Batarce divide the components of a fare system to three parts: fare structure, fare collection system and fare level (Mulley & Batarce 2017, pp. 125, 225). Decisions about zones, flat tariff or distance based pricing are decisions about fare structure, and one of the most elementary design elements of transport planning.

Although, tariff design has crucial role in transport planning, the research on public transport tariff is scarce. Transport research has focused much more on general optimizing of public transport or strategic planning. (Otto & Boysen 2017, p. 350.) In general, it has been proved that theoretically public transport fare should equal social marginal cost to produce maximum social welfare (Mohring 1972, Mulley & Batarce 2018) but in practice such pricing model would be incomprehensible for passengers (Metsäranta & Hillo 2008, p. 17). The effects of theoretical marginal pricing for congestion tolls have been computer simulated (Kaddoura et al. 2015) but the simulation is based on computer agents, not real people or their psychological perceptions about pricing. Some studies have been made about ticket productization, i.e., it has been shown, that cheap season tickets can have a major impact on the demand for public transport due to zero marginal cost of extra trips. (FitzRoy & Smith 1999, p. 236). The relationship between fare and travel distance have been studied for profit maximisation (Jørgensen & Preston 2007) but not many studies comparing different pricing models exist. Because comparison between different zone-based tariffs and their ability to maximize revenue has been missing, Otto & Boysen showed that introducing two and three zones dramatically increases the revenue compared to flat tariff, but the benefit of additional zones quickly decreases if more zones are added (Otto & Boysen 2017, pp. 351, 364-365). Jansson and Angell were studying the optimal zone model for Oslo region and concluded that based on marginal cost principle, zone prices should be higher closer to the city centre where the capacity is in high use, and inner zones should be narrower. Flat tariff was found as the ultimate solution for easy understanding, but the disadvantage is loss of revenue unless prices are significantly raised for inner city, approximately by 30–35 %. (Jansson & Angell 2012, pp. 150-151.) Mathematicians Hamacher and Schöbel have in turn shown that design of zones is NP-hard problem, non-deterministic polynomial-time hard (Hamacher & Schöbel 2004, p. 907), which means that design of optimal zone modal is not easy and efficient calculation task.

However, public transport tariff studies are mainly mathematically or computationally oriented and lack the empirical data of human experience related to *value* of simplicity for



passenger. As Otto and Boysen remark: “We presuppose perfect knowledge on the customers’ willingness to pay. In the real world, however, surveying the willingness to pay is bound to forecast errors. Forecast errors, problems of the test persons to properly quantify their actual willingness to pay, and an aggregation of multiple customers lead to uncertainty” (Otto & Boysen 2017, p. 364). Otto & Boysen left these human errors and reasons out of their study and just refer to “long lasting discussions” of these themes in the marketing literature. Yet, marketing research and behavioural economics have shown that mental accounting matters and psychological observations and emotions, often unconscious and irrational, can profoundly change the way people consume, buy and behave (Kahneman & Tversky 1984, Thaler 1999, Thaler 2001, Skouras et al. 2005). Marketing and behaviourally oriented research has focused a lot to pricing and buying in consumer businesses (Skouras et al. 2005) but these methods have not been used in public transport to same extent. This is likely due to public service character of PT, and significant role of subsidies in financing public transport. Business oriented development has not had similar role in public transport planning as in commercial consumer services. Yet, defining how much people are willing to pay for easy usage of PT is challenging design problem since usually the goal of tariff changes is to increase passenger numbers, avoid revenue losses and to improve passenger experience. Hence, it is desirable to carry out surveys that combine user experience and behavioural approach to more traditional economic analysis.

This paper analyses flat tariff as potential tariff solution for Helsinki Region. The effects of flat tariff are studied from neoclassical economics perspective estimating sales and demand effects, but enriched with qualitative methods of human experience and behavioural economics and transport justice analysis of flat tariff. Such comprehensive analysis of flat tariff combining three frameworks (economical, behavioural, justice) has not been done before, at least not for Helsinki Region. Research is conducted using abductive case methodology. Thesis is also the first paper to analyse justice aspect of PT tariff in Helsinki region. Furthermore, empirical cases of real implementation of flat tariff in few European cities are reviewed.

The research about tariff fairness is an important aspect when designing tariffs (Otto & Boysen 2017). Walzer has developed the concept of ‘distributive spheres’ for goods that have a special social meaning, and differentiates them from regular goods that can be distributed on free market. Goods with special social meaning, such as health and education, should be taken out of the sphere of free exchange. (Waltzer 1983.) Martens has applied Walzer’s theory to transport, and identifies accessibility as the good that should be set apart from other goods (Martens 2017, pp. 215-217). The current justice dialogue and research of flat tariff versus zones or distance based tariff relates to transport possibilities of low income people, who are most likely using public transport regularly, since they have no other option. If it is true that such ‘captive riders’ live far from the city centre in outer regions, they suffer poor service level of public transport, worse time budget of mobility and are paying significantly more for their accessibility. Therefore, distance based zone pricing can create double or even triple punishment to least well-off people. On the contrary, there is evidence that flat tariff could mean higher prices for low income people (Rubensson et al. 2018, Brown 2018). Many concerns are also related to flat tariff such as questions of urban sprawl, increased subsidies and experience of fairness. Low travel costs of long-distance trips could attract households to access cheaper or more spacious accommodation far from the city centre and potentially encourage urban sprawl and growth in car use (Massot 2015).

This paper shows that flat tariff is an option for HSL region, and the financial effects and justice effects are tolerable, if simplicity is chosen to be the main design driver for the region. Furthermore, flat tariff can improve transport justice for passengers living in the outer regions. However, reservations are presented related to optimality of flat tariff, fairness experience of people living in A-zone, ticket revenue maximisation and potential expansion of HSL region in the future.

## **1.1 Background**

Finnish public transport authority Helsinki Region Transport changed tariff system of the metropolitan region in April 2019. The change has been prepared for over decade: work started already in 2006, and the first guidelines for the new zone based tariff was approved by Helsinki Metropolitan Area Council already in the beginning of 2008 (YTV 2009, p. 11). The new model was planned to be launched in 2014, but due the technical renewal of the travel card system, the introduction of the zones was postponed for five years.

Since 1986, the municipality border defined public transport tickets and pricing (Figure 1). Regional tariff has remained basically unchanged over 30 years. Although, municipal borders are currently abandoned as determinants of the travelling area, the problem of fare system border still exists. Within zone system borders are defined by some criteria and there can be always discussion about their legitimacy. Especially those people whose home or workplace locates on the more expensive side of the border, may ask justification for chosen solution.

Helsinki region comprises of 14 municipalities, and currently nine of them are members of HSL, Helsinki Region Transport. The region has had a common tariff for public transport starting from 1986. HSL was established in 2009, when City of Helsinki and regional transport authority merged their planning operations. Emerge of common authority for whole region has accelerated the regional planning and development of regional transport services and zonal pricing, which was launched in April 2019 (Figure 2).

Helsinki region is transferring to zones much later than many other European metropolitan areas. The urbanization of the region has occurred later than elsewhere in Europe, and region has still only a moderate number of inhabitants. The planning of the zones started already in 2006, but the final implementation actualized in the spring 2019. The long implementation phase was caused partly due to heavy political decision-making process between municipalities and partly due to delay in renewal of ticketing system.

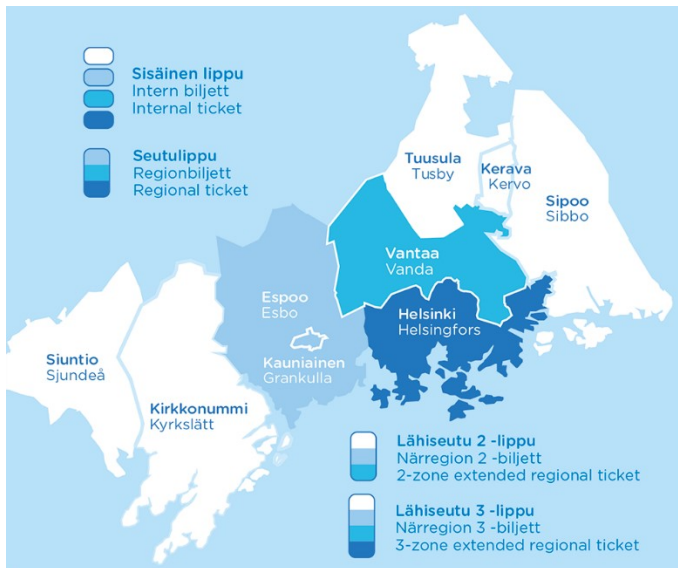


Figure 1. Tariff setting in HSL region before the launch of zones in 2019. Source: HSL

The area of HSL accounts for 2031 km<sup>2</sup>, which is divided to four zones: A-zone 48 km<sup>2</sup>, B-zone 264 km<sup>2</sup>, C-zone 491 km<sup>2</sup> and D-zone 1228 km<sup>2</sup>. Currently, 1,2 million people live in the area, but the population continues to grow at an annual rate of about 1,4 %. In 2030 the region is expected to inhabit 1,6 million people and by 2050 2 million people (HSL 2018). B-zone is the most habited one, and roughly 50 % of all HSL residents live in this zone. Yet, A-zone is the most densely populated; 5400 people live on square kilometre by average. A is twice as dense as B-zone and over 20 times denser than D-zone.

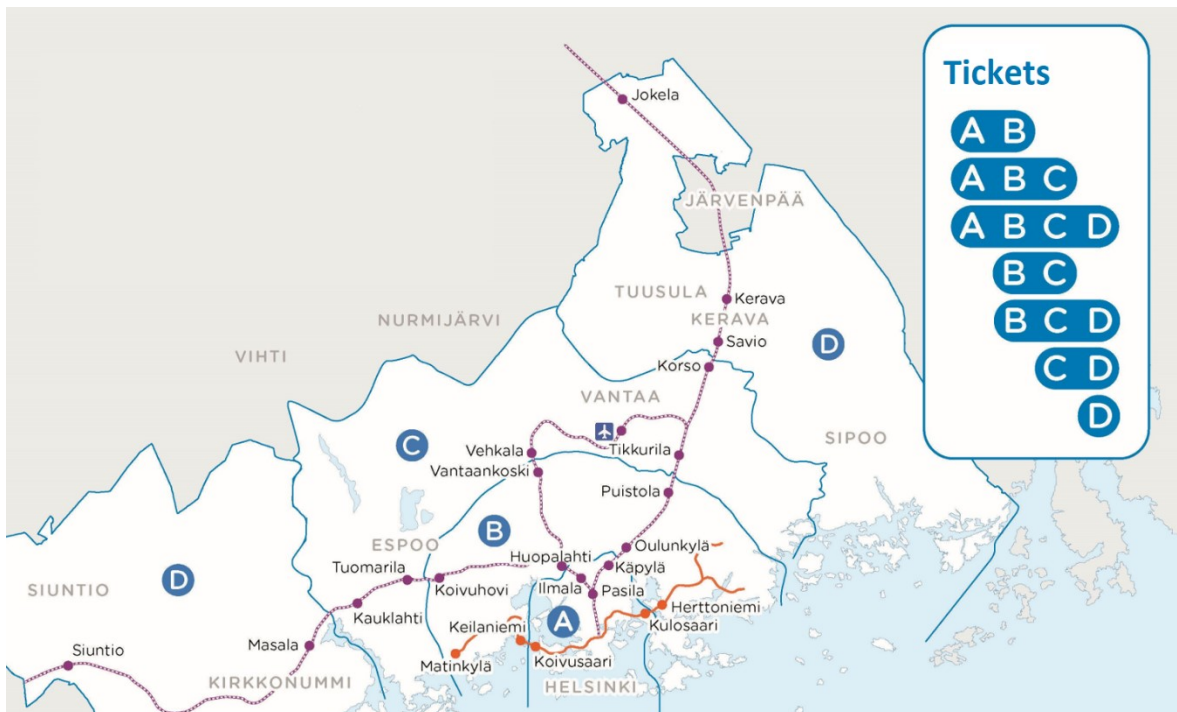


Figure 2. Zone-based tariff system of HSL. Source: HSL.

Table 1. Inhabitants of municipalities and zones in HSL region 1.1.2017. Source: HSL.

<b>INHABITANTS OF HSL REGION</b>					
<b>Municipality</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>Together</b>
Espoo		158 266	111 543		269 809
Helsinki	260 178	356 109	2 284		618 571
Kauniainen		9 004	250		9 254
Kerava				34 932	34 932
Kirkkonummi				38 498	38 498
Sipoo			450	19 231	19 681
Siuntio				6 042	6 042
Tuusula			582	37 298	37 880
Vantaa		84 778	130 704	249	215 731
<b>Together:</b>	<b>260 178</b>	<b>608 157</b>	<b>245 813</b>	<b>136 250</b>	<b>1 250 398</b>

## 1.2 Research questions

The motivation for this study is rising from existing discourse about zones especially from city of Espoo but also from Vantaa, surrounding municipalities and Helsinki, people living in A-zone. Complaints are contradictory: inhabitants of C-zone are expressing feel of injustice, since their neighbours living in same city but in a different zone are paying less for PT. People living in A-zone are complaining about the loss of cheap tram ticket and high price for short trips, since the regional zone system has no special tickets for different transport modes. City authorities from Espoo have already said B-zone need to cover all Espoo areas inside Ring Road III, when the extension of west metro line is finished. Espoo aims placing all five areal centres, Tapiola, Leppävaara, Matinkylä, Espoonlahti and Espoon keskus, to B-zone (Espoo 2018, p. 3). West metro extension is expected to be ready in 2024. If this change will take place, it has effect on Vantaa and Helsinki as well, since neighbouring cities would likely demand expansion of B-zone in north and east as well. As a result, all three cities and the city of Kauniainen would locate in AB-zones and there would be de facto a flat tariff for metropolitan region. This would practically mean disappearance of current C-zone, since there are only few people living in Espoo outside Ring Rail III. The objective of this study is to analyse flat tariff (Figure 3) as potential tariff solution for the whole region. Thesis defines strengths and weaknesses of flat tariff and analyses criteria to consider when planning tariff systems.

The research questions are addressed as follows:

1. *What are motives and experiences for flat tariff in different cities?*
2. *How HSL-customers see flat tariff? What elements make it attractive/non-attractive?*
3. *What effects flat tariff could have for ticket revenues, subsidies and usage of public transport in HSL region?*
4. *What effects flat tariff have for least well-off people in HSL region?*
5. *What frameworks public transport organisations should utilize when they are planning tariff and pricing strategies?*



Figure 3. Potential flat tariff for whole HSL region.

### 1.3 The structure of the research

Chapter two reviews the current theoretical literature about public transport pricing and pricing psychology as well research about transport justice. Main reviewed disciplines include transport economics, behavioural economics, marketing and justice philosophy and transport justice. Chapter three describes the methods applied in this study. The methodological framework is based on abductive logic and systematic combining to create rich and multidimensional picture of the surveyed case. The qualitative and quantitative results are presented in chapter four. Finally, the results of the different approaches and theoretical literature are combined in chapter five, which constructs a case analysis of flat tariff in HSL region. Chapter six concludes how the findings can be applied for current tariff planning and for future research.

## 2. Theory and literature review

This thesis operates in the middle ground of transport economics, behavioural economics and marketing. Transport economics is a discipline focusing on transport resource allocations and the interactions among independent agents in the markets (Small & Verhoef 2007, l. 161). Behavioural economics is the combination of psychology and economics that investigates what happens in markets, when some of the agents display human limitations and complications (Mullainathan & Thaler 2000, p. 2). Definition of marketing has evolved during the decades but currently American Marketing Association defines marketing and marketing research as “the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large. Marketing research is the function that links the consumer, customer, and public to the marketer through information” (AMA 2013). These three disciplines give an overall framework for this paper, but there are also questions related to service design and transport justice, when thinking about the question of flat tariff in public transport. This thesis tries to build bridges among different research fields, which all have something to say to the question whether flat price would be appropriate solution for public transport services.

### 2.1 Fare structure

Mulley and Batarce categorize fare structures broadly into three categories: flat fares, zonal fares and distance-based fares. The most suitable fare structure depends on evaluation criteria for the public transport system. They list six different criteria for fare structure:

1. Ease of understanding for passengers
2. Simplicity of collection
3. Ability to generate the required revenue
4. Ease to control fares (particularly from evasion by passengers)
5. Equitability
6. Attractiveness to passengers

(Mulley & Batarce 2017, pp. 125, 225)

#### *Flat tariff*

Flat tariff is against principle of price differentiation. Yet there many positive aspects in flat tariff: it is easy to understand, simple to collect and can be attractive, especially to long trip passengers. If payment is not related to length of trip, it can be economically inefficient. Yet there can also be situations, where flat tariff is more expensive in long distances than pure marginal social cost would be (Kaddoura et al. 2015, p.215.) It can also be experienced unfair. Flat fare might set price level so high that very short PT rides are substituted by walking or cycling. Therefore, it can significantly reduce revenue. Although, flat fare can be a good fare structure in cities where there is small deviation in the average distance travelled. (Mulley and Batarce 2018, p. 126.)

### *Distance-based tariff*

Distance-based fares are normally related to the line of travel rather than geography, so that the further the distance travelled the greater is the fare. This tariff is often used in long-distance transport services. Many of the disadvantages of distance-based fares can be overcome with more technologically advanced fare-collection systems. Need to raise revenues for the public transport system requires cities to have distance-based fares because of their enhanced revenue-raising ability. (Mulley and Batarce 2018, p. 126.) However, it has been shown that cumulative zone pricing with just few zones outperforms flat tariff and distance based pricing (Otto & Boyse 2017, p. 365). Yet, this tariff can also be inequitable: usually passengers living further from the city centre have also greater waiting and travel times and higher prices can be felt as extra punishment. Mulley and Batarce evaluate also that distance-based fares can lead to complicated fare structures while passengers seek simplicity.

### *Zones*

Zonal-based fare is crude form of distance-based fare. There is typically a single fare applying to intrazonal journeys and higher fares when travelling over multiple zones. Since it can be challenging if short trip travellers end up crossing zone boundaries, many cities with zonal systems have overlapping zones. In contrast to distance-based fares, zonal fares are based on the geographical relationship between origin and destination. The best zonal fare structures are those which have natural boundaries between zones, which makes zonal fares more attractive to passengers. (Mulley & Batarce 2018, p. 126.) The fewer zones, the more understandable the tariff is.

Usually zonal model collects more revenue than flat tariff. However, a comprehensive research of different zone-based tariffs and their ability to maximize the transport operator's revenue have been missing. In their study, Otto & Boysen showed, that the positive effects of additional zones to ticket revenues quickly diminishes. Introducing two and three zones dramatically increases the revenue, but the benefit of extra zones decreases the more zones are added. In turn, fewer zones ease the communication and customer's acceptance of tariffs. (Otto & Boysen 2017.)

## **2.2 Pricing**

The classic economic assumption is that suppliers set prices to maximize their profits, which on perfect markets and in the private companies equals private marginal cost and private marginal benefit. Yet, revenues of urban public transport hardly ever cover the costs of service production in modern motorized cities. After 1950's automobile industry increased rapidly in America as in Europe which had dramatic effects on public transit markets. After World War II public transit was largely privately owned in USA, but soon companies went out of business and many cities were left without service. Transit operations were falling into public hands as cities tried to rescue them from bankruptcy and maintain service for their citizens. For nearly 30 years transit finance has been dependent on public subsidies. (Wachs 1989, p. 1545.)

Free priced, unregulated public transport leads to high prices, limited supply and deviation from optimal use of resources. When the aim of pricing is to allocate resource that maximizes the social welfare rather than just the welfare of the supplier, some controls and incentives may be applied in the form of subsidies or taxes. (Elgar & Kennedy 2005, p. 72.) Therefore, both operational losses and investments are funded by subsidies, and transport service is sold below unit costs with social marginal cost. There are also other arguments for PT subsidies. Public transport has positive external effects, such as distribution of accessibility, environmental impacts of the transport system and health. Also, equal treatment of car and public transport favours public transport subsidizing because motoring is supported many ways as well. (Metsäranta & Hillo 2008, pp. 17-18.)

Public transport operates in falling marginal costs and economics of scale. Short run marginal cost is the cost of producing additional units of a good or service with additional variable inputs and their costs usually related to labour, material and energy. In the short run, all the fixed costs remain stable. In the long run, all costs are considered variable (Sexton R. et al. 1993, p. 34). In figure 4, the average cost of producing public transport is AC as the number of passengers increases. Costs include the demand for profit of the operator. Passengers' willingness to pay for public transport is demand curve D. Without a subsidy, the public transport service is priced according to the average cost ( $p'$ ), to cover all costs. The number of trips is  $q'$ . The social marginal cost SMC is lower than average cost, which is due to the positive effects of demand growth described above. The optimal number of trips is  $q$ . This requires that the cost of the trip is  $p$ , and the coloured area is covered by a subsidy. Subsidy increases the surplus of passengers (skewed area).

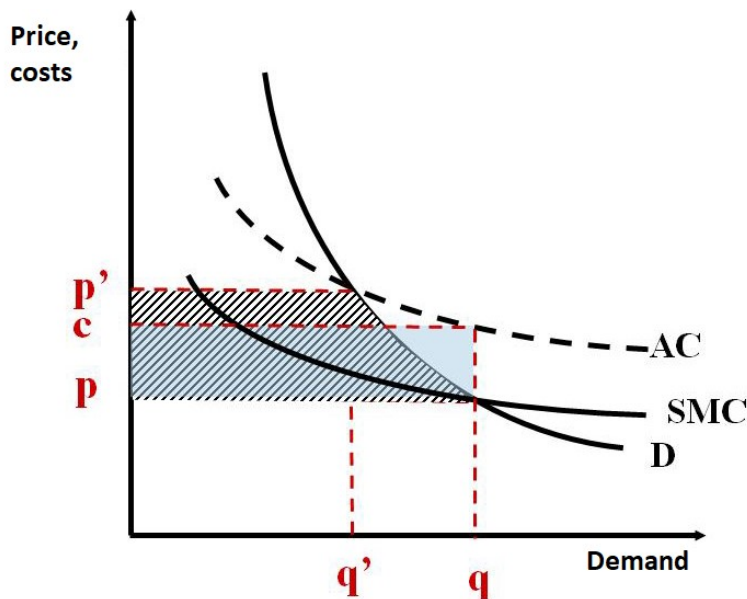


Figure 4. Falling social marginal cost of public transport and need for subsidies (Metsäranta & Hillo 2008, p. 19).

The major difference between regulated public pricing and prices chosen by privately owned firms is that a regulator attempts to choose prices intended to maximize consumer welfare, whereas unregulated firms choose prices to maximize profit (Shy 1995, p. 341). Figure 5 illustrates how social welfare maximum is not received and deadweight loss oc-



curs if the price is too high. When price is at  $P_0$ , the consumer surplus equals  $A$  and revenues minus cost equals  $B$ , so total welfare (supplier+consumer) is  $W = A + B$ . The area associated with  $Y$  is a deadweight loss associated with higher than social marginal cost pricing. When the price is reduced from  $P_0$  to  $P_1$ , which equals social marginal cost, then total welfare increases and  $W = A + B + Y$ . (Mattson & Ripplinger 2011, p.4.)

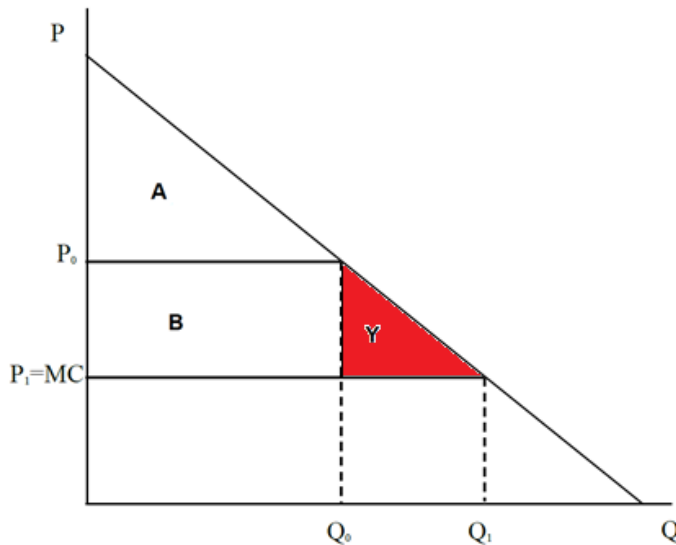


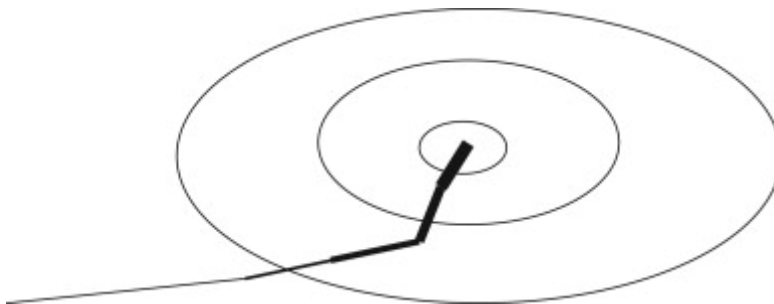
Figure 5. Marginal cost pricing and social welfare (Modified from Mattson & Ripplinger 2011, p.4).

Unlike in many other businesses, passengers play also a producing, not just consuming role in transportation business. People must supply their own time to the production process. In transport economics, price of a trip equals charged fare, the value the traveller attaches to the travel, waiting and access time. (Mohring, 1972, p. 591). The cost of trip decreases if more individuals use public transport. since growing demand increases frequencies and shortens waiting times. The phenomenon is called Mohring effect. When the number of users increase, others benefit with positive externalities creating better service level with lower prices. Because users do not consider these contributions to others when making travelling decisions, the appropriate fare must be lower than the production marginal cost. (Mulley & Batarce 2018, p. 133.)

It can be argued that the use of private vehicles in congested areas in peak hours is priced below marginal cost, since drivers are not paying for their negative externalities. One more argument for transport subsidies is the absence of road pricing. The argument is weakened because of the very low cross-elasticities that has been found between private vehicles and transit modes, as low as 0.02. These low cross-elasticities suggest that even very low transit fares will not ensure optimal resource allocation. Paying full price for their car externalities would likely be more efficient than subsidizing transit. Until marginal pricing is applied on all the transportation sectors, the second-best solution for transit seems to be subsidies than a transportation system without subsidies. (Elgar & Kennedy 2005, pp 73-74.)

Pure marginal cost pricing principle would lead to fare structure where all fares should be related to the distance travelled, demand, peak-time and more complicated things. For example, high-season passengers should pay the marginal operational plus the marginal capacity costs, whereas low-season consumers pay only the marginal operational cost (Shy, 1995, p. 351). In real world, public transport is not priced at social marginal cost, which would be the best option in utilitarian economics. Usually only time of day and trip distance are considered as principle for price differentiation and even they are often ignored for simplicity (Small & Verhoef 2007, l. 8506).

If price would vary extremely elastically depending on time, place, demand and many other factors, tariff would be difficult to define and hard for passengers to understand. Simplicity of the system and simple information is one valid design element for tariff system (Metsäranta & Hillo, 2008, p. 17). Therefore, transport service providers look for second-best options such as zonal pricing, distance-based tariff or flat tariff. Yet, some marginal cost pricing principles should be remembered, when planning tariff system. Jansson and Angell were studying the optimal the zone model for Oslo region and find that: 1) marginal cost price is dependent on riding time; 2) the boarding cost grows with the load at the boarding stop; 3) the crowding cost grows with the load when riding and is proportional to riding time; 4) the producer's marginal cost is higher in peak than off-peak periods. They concluded that based on marginal cost principle, zone prices should be higher closer to the city centre where the capacity use is higher and inner zones should be narrower. (Jansson & Angell 2012.) Figure 6 illustrates this principle for a route from the outskirts to the city centre. The thickness of the black line illustrates the in-vehicle congestion and thus also the price for various sections of the route. The inner zone represents the city centre and the zones grow larger with the distance from the centre. Travelling close to the city centre where capacity use is higher than in the outskirts will then mean higher optimal fares (Figure 6). (Jansson & Angell, 2012, pp. 150-151).



*Figure 6. Principal of fare differentiation and zones (Jansson & Angell 2012, p. 151).*

Jansson and Angell studied six different zone models one of which (A5) was a flat tariff model. Flat tariff was described as impossible due to revenue losses and fairness problems. “A5 is of course the ultimate solution due to easy understanding. But the disadvantages are likely easy to explain. Primarily it gives a much larger loss of revenue unless one significantly raises the prices for those who only travel within Oslo city... it could be possible introduce a unit-zone-fare by increasing the price for the shortest trips by approximately 30–35%. All other trips would be cheaper than originally. Of course, it would be very hard to get acceptance for higher prices within Oslo city... Our conclusion is, not surprisingly, that

large areas with a unit-zone fare is not possible from a practical point of view. And then we have not taken into account that this would stress fairness views even more than for the other alternatives.” (Jansson & Angell 2012, pp. 150-151.)

The researches end up recommending option of six zones compared to 88 zones of that time. To achieve the same or more revenues with fewer zones but minimum number of passenger losses they recommend raising the fares according to Ramsey principle: raise the fares of trips with low price elasticity and reduce the fares of trips with relatively high price elasticity. Proposed system meant substantial price reductions for longer journeys, while increasing the prices within the city of Oslo only marginally. (Jansson & Angell 2012, pp. 150-151). Recommended pricing change would shift the tariff system closer towards flat tariff as the price differences between centre and outskirts narrow. However, the political opinion emphasized that travellers within Oslo *must not lose too much*.

Economist William Vickrey, famous for his work with congestion pricing has also concluded that ideally public transit as well as other transport services should be priced based on marginal costs and charge fares on the basis of origin, destination, routing and time-of-day in close conformity to marginal cost (Small & Verhoef 2007, l. 8506). “Ideally, if redistributive considerations were unimportant, if fares could be made as variable as desired without increasing the costs of fare collection, if reactions of passengers to variable fares were unconfused and rational, if competing modes of transportation were being made to pay charges according to their appropriate marginal cost, and if there existed a method of taxation both acceptable to the public and free of undesirable side-effects, then it would be proper to charge prices as close as possible to marginal cost“ (Vickrey 1980, p. 393). There are many if’s in one sentence and as Vickrey recognizes, pure marginal cost pricing would not be simple, would need sophisticated methods of fare collection and would seem customers as somewhat bizarre. Vickrey recognizes the mental side of tariff; passengers might not react to marginal cost pricing as rationally as economists would want them. The conclusions of marginal cost pricing principles for public transport could be summarized that it is not feasible as such. However, good tariff should follow some SMC principles: PT prices should follow both the demand curve and the cost curve and prices should be highest, where and when the demand and costs are highest, including external costs.

Mathematicians Hamacher and Schöbel studied design problem of zone tariff using computational complexity theory, and found that the design of zones, is NP hard (Hamacher & Schöbel 2004, p. 907). NP hardness means that solving problem by computing becomes very soon enormous calculating task. Most famous NP hard problem is travel salesman problem, where there is set of cities and the problem is to find a shortest route that goes through each city. The number of such routes grows very quickly with the number of cities. As IBM’s chief architecture writes: “the number of circuits is  $= (n-1)(n-2)...$  For 16 cities there are more than a trillion circuits. For 10,000 cities this number is about  $10^{35657}$ . There is no way one can compute the shortest circuit for 10,000 cities this way, even using the fastest available computing grid for a century.” (Puget, 2013.) Similarly, calculating the optimal zone structure based on PT network nodes becomes impossible task, and therefore Hamacher and Schöbel ended up using different heuristic methods in their study.

The price elasticity of public transport fares refers to the responsiveness of demand for tickets to changes in their prices. Rider sensitivity to fare changes have been studied a lot, and in general, if fares are increased, patronage will decrease (Balcomb et al. 2004, pp.15,

49). The price elasticity is based on empirical data, and the concept has been used widely also in marketing (Tellis 1988, p. 332), which has always been more psychologically oriented than economics and borrowed many theoretical foundations from psychology and particularly the field of perception (Skouras et al. 2005, p. 364). Ticket sales have also impact from cross elasticity with other modes of transport such as car driving

The value of the price elasticity is the ratio of the proportional change in patronage to the proportional change in fares. It has a negative value when fares and patronage are inversely related: an increase in fares leads to a decrease in patronage and vice versa. If the value of the elasticity is in the range zero to -1, then a fare increase will lead to increased revenue. If the value exceeds -1, then a fare increase will lead to decreased revenue. Fare elasticities are dynamic and varying over time. Therefore, it is common to distinguish between short-run and long-run elasticity values, usually short-run to be 1 or 2 years, and long-run to be around 12 to 15. (Balcomb et al. 2004, p. 15.) In literature reviews, short-run price elasticities of tickets vary between -0.2 and -0.5. In the long run, price elasticities are significantly higher. The realisation that long-term elasticities can exceed -1 has serious implications for the public transport industry. While the immediate effect of a fare rise might increase revenue, the long-term effect is likely to be a decrease. Attempts to prevent falling revenue with fare increases will eventually fail. (Paulley et al. 2006, p. 297.)

Service quality (speed, frequency, coverage, and comfort) and parking pricing tend to have the greatest impact on transit ridership. Elasticity appears to decrease with increasing city size and in the city centre due to increased traffic congestion, parking costs and improved transit service due to economies of scale. Elasticity decreases, when transit has a competitive service and good price position in contrast to car. Elasticities appear to increase somewhat as fare levels increase. (Litman 2004, p. 40.) Off-peak transit ridership exhibits roughly twice the sensitivity to fare changes of peak period ridership. (McCullom & Pratt, 2004, p. 6). Elasticity for same journey purpose can vary as potential new users may have different perceptions of using public transport. Those who have access to a car have more alternatives than those without. Males tend to have higher elasticity values than females. This may be partly because they are more likely to have a car available. Transit dependent riders 'captive riders' are generally less price sensitive than discretionary riders. People with low incomes tend to be more transit dependent. People travelling to work or to school generally have little choice of trip ends or timing of journeys. Hence elasticities tend to be lower than for other trip purposes. Evidence has been found to support the idea that elasticities are higher for very short and very long trips, and lower for medium-length ones. (Paulley, N. et al. 2006, p.299.) One interesting finding in price elasticity studies relates to direction of price changes. Transportation demand models often apply the same elasticity value to both price increases and reductions, but there is evidence that change is not symmetric and fare increases tend to cause a greater reduction in ridership than the same size fare reduction will increase ridership (Litman 2004. p. 40). This refers to occurrence of loss aversion phenomenon in PT price elasticities.

In the Helsinki metropolitan area price elasticity studies have been conducted in 1999 and 2014. The study in 2014 by HSL examined changes in ticket sales in 2005-2013 as well as other factors related to the use of public transport. The time series models assume that demand for tickets depends on ticket prices, various background variables and demand at an earlier stage. Time series models were also used in this study to estimate effect of flat tariff. (HSL 2014, p. 7.)

Traditional economists assume that buyers behave rationally, their preferences are stable and they act to maximize the utility from their purchases. Based on rational markets, it is possible to derive the law of demand, i.e. the quantity demanded of any good if its price changes. Economist theories remind that these laws apply when market information is perfect, competition is perfect and all other things are kept equal and only variables keep changing. This is hardly ever the case and already the change in price already changes the budget of consumer and often the prices of substitutes sold by competitors. (Skouras et al. 2005, p. 363.)

The weakest part of the traditional economic theory is the concept of utility-maximization by rational consumers. Utility-maximization is result of neoclassical economics where perfectly competitive markets and rational consumers and companies leads to a social optimum of prices. Most people have everyday experience that seem to contradict such principles, but also the work of psychologists and behavioural economics experiments have shown that rationality and utility-maximization can hardly be considered as universal traits of consumer behaviour. (Skouras et al. 2005, Kahneman 1994, Thaler 1999, 2001.)

Behavioural economists have rejected the strict rationality in human decision-making. They found their approach on the pioneering work of psychologists Kahneman and Tversky (Skouras et al. 2005, p.364.) One important finding of Kahneman and Tversky was that people value gains and losses differently, feeling the pain of losses of as double time heavier than similar amount gain (Figure 7 and 8). Thus, prospect theory has become one of the key components in behavioural economics. Kahneman and Tversky showed that the actions of human beings deviate from the rationality of traditional economics. People make systematic errors of judgment and these insights led to the rise of a new field, behavioural economics. Behavioural economics does not imply that neoclassical approach of utility maximisation, equilibrium and efficiency should be rejected but those theoretical frameworks should be tested in empirical world and based on the results new theories could be suggested (Camerer et al. 2004, p.3).

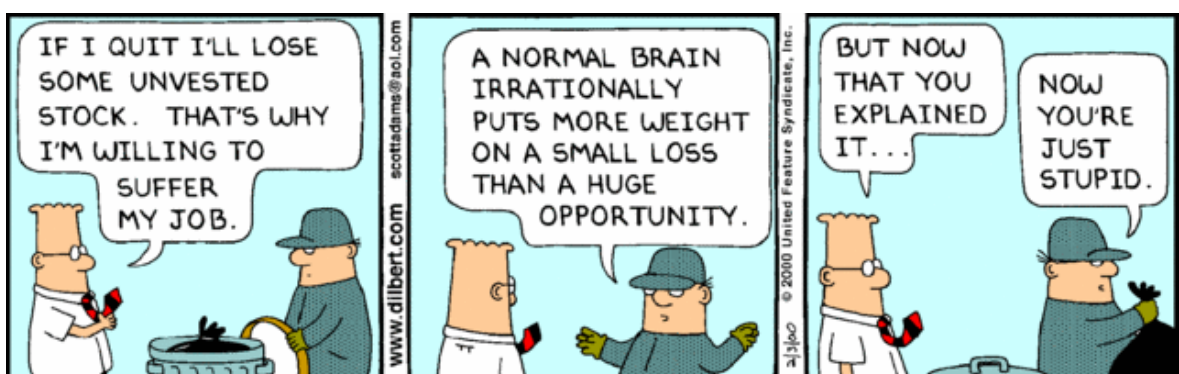


Figure 7. Dilbert understands loss aversion (Behavioural Strategy Group, 2016).

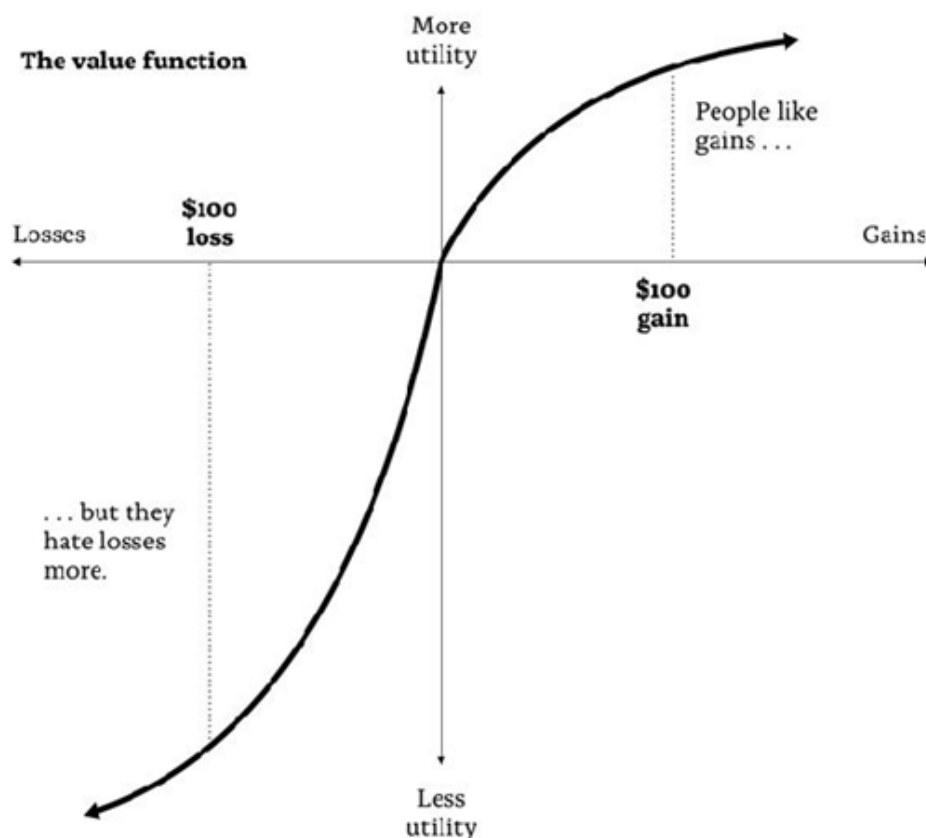


Figure 8. The value function of losses and gains show that a loss is more aversive than a gain of same amount is attractive (Kahneman & Tversky, 1984, p. 342).

These findings can have profound effects on the question of PT tariff. It is likely that people, who are experiencing price increases due to flat tariff, are actually suffering more than the ones enjoying the price decreases. Loss aversion can have strong impact on political decision makers but also to final results of tariff changes. If operators or authorities underestimate reaction to loss aversion, they can experience unexpected losses.

Behavioural economist Richard Thaler contend that people are not just irrational but predictably irrational. Thaler's work has studied irrational effects of ownership, confidence, and a sense of fairness. Together with Daniel Kahneman, Thaler showed "endowment effect": people place a higher value on what they already possess. Also, traditional economics assume more information lead to better decision-making, but instead Thaler found that the more information people acquire, the more overconfident they feel about their ability to make decision, which can lead to poorer decisions. Thaler's research showed also that people have firm standards of fairness. Because most consumers do not know what goods are actually worth of, they determine value based on what seems fair. If they got feeling they are being gouged, it might discourage sales in ways that have nothing to do with the utility of the goods. (Thompson 2017.)

Another interesting behavioural economics concept is mental accounting. Mental accounting is the set of cognitive operations used by people to organize, evaluate, and keep track of financial activities. Both the sources and uses of funds are labelled and grouped into categories (housing, food, etc.) in this mental accounting system and spending is sometimes

constrained by implicit or explicit budgets. Accounts can be balanced daily, weekly, yearly and can be defined narrowly or broadly. (Thaler, 1999, p.183.) Mental accounting can have profound effects for tickets products. For example, if money is freed from mental transport account due to price decreases, the money would most likely be spent to some other transport services but still inside the same account.

Behavioural economics have shown, that people choose flat-rate prices even if it be would more rational for them to not pay fixed sum. This flat-rate bias is relevant phenomenon when comparing flat tariff for example to pure distance based tariff, which has no prepaid tickets. Flat prepayment decouples the purchase from the consumption and doing so seems to reduce the perceived cost of the activity. The cost of including extra services to the pre-paid price will look relatively small when combined with other costs compared to a negative transaction utility if paid separately. Another disadvantage of the pay-per-use pricing policy is that it links the payment and the consumption very noticeably. Consumers don't like the experience of "having the meter running". Most telephone customers elect a flat-rate service because they seem to value flat-rate over measured service even when the bill would be the same. Similarly, health clubs typically charge members by the month or year rather than of a per-use basis. This strategy decouples usage from fees, making the marginal cost of a visit zero. (Thaler 1999, p. 192.)

Lambrecht and Skiera list four possible factors behind the flat-rate bias. First one is called "insurance effect": consumers may choose a flat-rate to avoid variation in their monthly billing rate to avoid the risk of high costs in periods of greater-than-average usage. Second one is "taxi meter effect": consumers may enjoy their usage more on a flat-rate than on a pay-per-use tariff. This is the case where taxi meter reduces the pleasure of a taxi ride. Mental accounting (Thaler 1999) assumes that paying per use lessens the joy from consumption because of the pain of paying to consume at the time of usage. In contrast, paying a flat fee decouples payment and usage, which can be enjoyed as if it were free. "Convenience effect" appears if consumers believe that choosing optional tariffs is inconvenient and try to avoid the effort of identifying alternative tariffs. To minimize information cost, they might choose the tariff that seems to be the "default tariff". Consumers may also overestimate their demand for a good, "overestimation effect". (Lambrecht & Skiera 2006, pp. 213-222.)

Lambrecht and Skiera also found that underestimation of usage leads to the pay-per-use bias. Consumers with pay-per-use bias have a much higher likelihood to churn and they are unhappy with their tariff choice. (Lambrecht and Skiera 2006, pp. 213-222.) A classical utility maximisation theory would say that consumers having flat-rate would consume until their marginal utility of consumption is zero and the flat fee should not have any impact on consumption. Thaler made the notion that individuals derive utility from feeling as if they have gotten a good deal. His work decomposes the total utility from purchasing a good into acquisition utility and transaction utility. Acquisition utility is determined by the consumer's valuation of consuming the good minus the money used in acquiring the good. Transaction utility is the value to the individual of obtaining a good deal on the purchase of the item. Thaler suggests consumers feel better off when they have paid a low average price for the goods consumed. (Thaler 1999.) Results are particularly important in a flat rate context where increasing consumption decreases the price per unit. Thus, if consumers are strongly motivated by transaction utility, they may increase their consumption in flat tariff to get a better deal. Research on causes of the pay-per-use bias is limited because the

pay-per-use bias has hardly been observed. There are suggests that a risk-averse consumer who does not know his or her future income might prefer a pay-per-use tariff, even if it costs more on average than a flat rate. (Lambrecht and Skiera 2006, p. 214.)

Just and Wansink have shown that individuals in a flat-rate context indeed may consume the amount that enables them to get their money's worth. If flat price is increased, people consume more and the other way around. (Just & Wansink 2011.) In flat-rate context of monthly tickets, price reduction may not always be the best solution to promote the usage among existing customers even though it attracts new customers. Zero valued transaction utility and mental budgeting for transport costs are probably one explanations to very poor impacts of a free-fare public transport policy in Tallinn. An analysis has shown that totally free public transport increased the demand in Tallinn only 1,2 % (Cats et al. 2014). When transport service is free, there is no value to use it and saved money can be spent on other transport services such as taxis or car. People should be aware of costs because it makes them consume more. This sunk-cost effect, tendency to continue consuming if people have invested time or money or some resource in it, makes consumers use products, what they have paid for to avoid feeling of waisted money (Figure 9). Such pricing tactics that mask prices reduce pressure on buyers to use the product or service and can decrease the likelihood of usage. Members who paid monthly used the gym most consistently making this pricing model the most likely to generate membership renewals. (Gourville & Soman 2002, p. 94.)

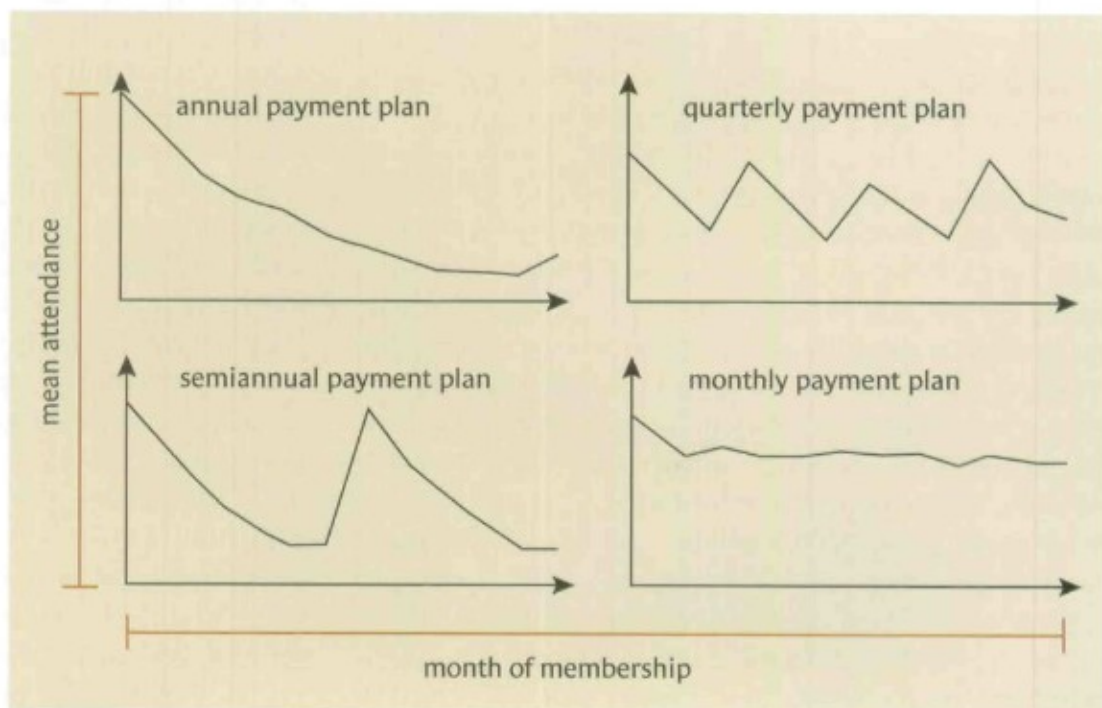


Figure 9. Analysis of health club's records showed that consumption closely follows the timing of payments (Gourville & Soman 2002, p. 94).

One example of flat rate bias in PT can be found in the German city of Freiburg, which has experienced an enormous and unprecedented rise in the demand for local public transport. A study investigated the causes of this dramatic increase over the decade since 1984, and the main explanation was cheap travel pass with unlimited use at zero marginal financial cost, interpersonal transferability and wide regional validity. The expansion in public



transport trip demand was achieved without any long-term deterioration in the operating deficit of the municipal transport company. (Fizroy & Smith 1998.)

Contrary to traditional economics, lack of belief in perfect rationality or full information has been a characteristic of consumer behaviour studies in marketing. Consumers have been analysed for decades in marketing field through theoretical frameworks which have been borrowed from psychology and the field of perception. Since marketing has no strong theoretical core, it has been open towards other disciplines while mathematically highly developed economics has focused to the development of theories (Skouras et al. 2005, pp. 366, 371.) The difference in the treatment of pricing between marketing and economics can be explained by the differences in the origin, mission and evolution (Figure 10).

	<b>Economics</b>	<b>Marketing</b>
<b>Buyers' response to prices</b>	<p>Rationality assumed on the part of the buyer, which is essential to the utility maximization theory. Price is used as a determinant (i.e. independent variable in the function) of this utility</p> <p>Price is the most important criterion in buyers' decisions</p> <p>The focus is on rational buyers' behavior rather than on how actual buyers behave in reality</p>	<p>Rationality is not always evident as shown by research in psychology (price-quality relationship, Weber-Fechner Law, buyers' process prices from left to right, presentation of prices to buyers may alter their reference prices, assimilation and contrast theory, adaptation theory, difficulty in recalling prices)</p> <p>Price is not always the most important criterion in buyers' decision making especially in the business-to-business sector</p> <p>The emphasis is on how buyers are actually processing prices through empirical observation studies</p> <p>Some concepts such as reservation prices, price elasticity or consumer's surplus have been borrowed from economics</p>
<b>Firms' determination of prices</b>	<p>Emphasis on optimality issues through the use of formal models that attempt to maximise an objective function under certain constraints</p> <p>Profit maximisation has been the most common objective but a wide variety of other joint objectives have also been investigated</p> <p>Price is usually considered as the main business decision for gaining competitive advantage</p> <p>Theoretical concepts and econometric tools have been developed in the context of optimising models</p> <p>A large number of empirical studies have been conducted to test econometrically the range of applicability of various optimizing models</p> <p>Recent interest in behaviorist approaches seems likely to grow</p>	<p>Emphasis on how firms are actually behaving through the behavioral examination of issues such as pricing behavioral objectives, pricing methods, departments responsible for pricing decisions, pricing of new products and examination of the firm and business conditions that favour a price increase or decrease</p> <p>Firms are considered to pursue a variety of pricing objectives apart from profit with the emphasis being placed on achieving satisfactory rather than maximum results</p> <p>Price is regarded as a less important business activity compared with the other elements of the marketing mix</p> <p>Some issues such as pricing over the product life cycle stage, service pricing, retail pricing, online pricing have been examined mainly, if not exclusively, within the marketing literature</p> <p>Relatively few empirical studies have been conducted from a marketing perspective, while optimality models used tend to be less formal and incorporate managerial judgement</p> <p>Concepts such as price discrimination, price skimming, price leadership and cost-based pricing have been borrowed from economics</p>
<b>Industry- and economy-wide role of prices</b>	<p>Industrial economics examines how the nature of competition in a market affects pricing behavior</p> <p>General equilibrium theory shows how mutually consistent relative prices can be determined under conditions of perfect competition. It is the theoretical hard core of economics and provides an ideal standard for social organisation and a platform for political action</p> <p>Macro-economics focuses on the overall price level and its rate of change and studies their interrelationship with other central macroeconomic aggregates, such as income, employment, rate of interest, investment, savings and consumption</p>	<p>These issues have been examined almost exclusively within the economics literature</p>

*Figure 10. A comparison between the economics and the marketing literature on pricing. (Skouras et al. 2005, p.370.)*

Wilkie and Moore distinguish four eras of marketing (Wilkie & Moore 2003, p. 117).

0. “Pre-Marketing” (Before 1900): No distinguishing field of study.
1. “Founding the Field” (1900–1920): Development of first courses with “marketing” in title. Focus on marketing as distribution.
2. “Formalizing the Field” (1920–1950): Development of generally accepted foundations or “principles of marketing.” First professional association, conferences, journals.
3. “A Paradigm Shift—Marketing, Management, and the Sciences” (1950–1980). Two perspectives emerge to dominate the marketing mainstream: (1) the managerial viewpoint and (2) the behavioural and quantitative.
4. “The Shift Intensifies—A Fragmentation of the Mainstream” (1980–present). New challenges arise in business world: short-term financial focus, downsizing, globalization, and reengineering.

Management science and behavioural science emerged into the marketing during the 1950’s and 1960’s (Wilkie & Moore 2003, pp. 125-126). The Journal of Consumer Research was founded in 1974, The Journal of Psychology and Marketing ten years later in 1984 and Journal of Consumer Psychology in 1995. Organizers of Journal of Marketing have presented four fundamental issues to distinguish field of marketing from other disciplines, and direct further research: (1) How do customers and consumers really behave? (2) How do markets function and evolve? (3) How do firms relate to markets? (4) What are the contributions of marketing to organizational performance and societal welfare? (Day & Montgomery 1999, p.1.) Marketing and behavioural economics both accept human behaviour as it occurs, and are more interested in to study mental processes through empirical data instead of mathematical formula.

Classical marketing mix of 4 P’s was created by E. Jerome McCarthy in 1960’s. He divided marketing into four sets of activities: price, promotion, place and product. Price is perceived value of the product to the customer instead of true costs of product or service. If product has positive customer value, it may be priced higher than its monetary value. Pricing is important and should consider fixed and variable costs, competition, company objectives, proposed positioning and target group. An organisation can adopt several pricing strategies based on its objectives. (Ahuja 2016). However, marketers consider price as only one feature affecting buyers’ decisions and even not the most important one. There are empirical studies in marketing, which have shown that other criteria such as reliability, service quality, time delivery and fame are often regarded as more important than price when selecting a vendor. (Skouras et al. 2005.) Economists would call these things as utility or value of the product or service.

Buyers tend to associate a higher price with a higher quality and perceive price differences in proportional rather than in absolute term. Furthermore, presentation of prices may alter reference prices, so adding high-priced product to the product line increases the buyers’ reference prices, making the remaining products in the product line look less expensive. Consumers either contrast or assimilate the price levels with their reference prices. Very high price cut might not be judged positively because it might signify a decrease in the product’s quality. (Skouras et al. 2005.) Industry of public transport has not applied all po-

tential marketing strategies due to its public service character. However, many pricing observations from marketing and behavioural economics should be utilized, when planning PT prices, product category and tariff setting.

### 2.3 System and justice effects

Pricing literature has presented, how different pricing strategies can impact on demand and consumer behaviour of PT. Yet, pricing is not the only and perhaps not even the most critical factor, when passenger is making the decision of PT usage. It is suggested that most behaviours of consumer are only partly voluntary and depending on consumer motivation. Some behaviour demand abilities like knowledge, skills and resources that are not available to everyone, and some external conditions or opportunities may promote or prevent travelling by public transportation. John Thøgersen has constructed MOA (motivation, opportunity, ability) model for consumer action that considers both the direct behavioural effects of opportunity and ability constraints. (Thøgersen 2009.) Figure 11 shows that even if consumer has the motivation to take PT trip, some constraints in abilities or opportunities might prevent behaviour to take place. If some people are experiencing significant restrictions in transport resources or opportunities, they can suffer transport injustice or even transport poverty.

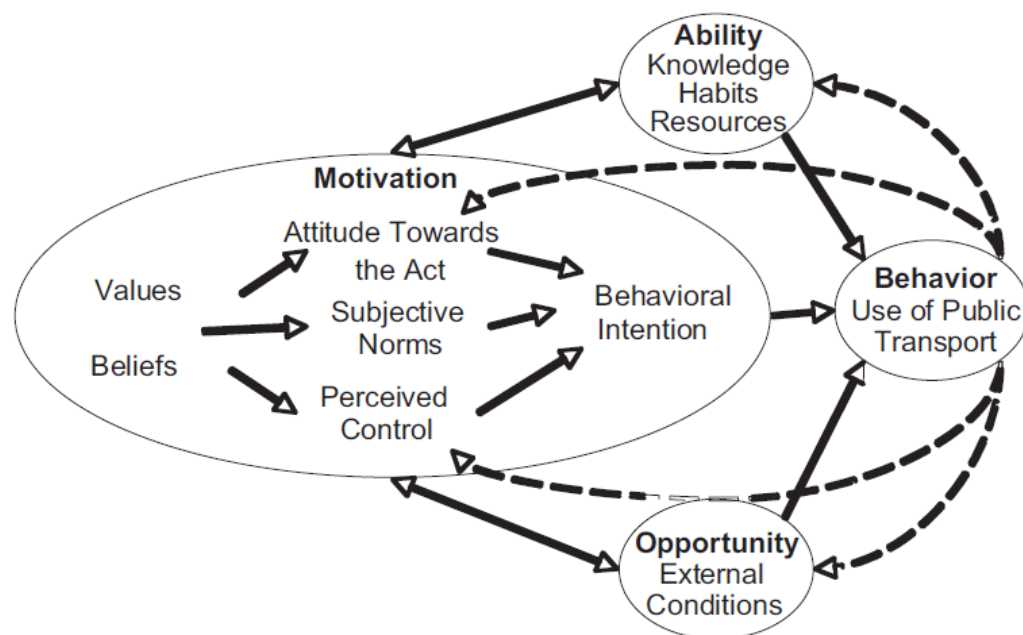


Figure 11. Motivation, opportunity, ability (MOA) model for the use of public transportation (Thøgersen 2009).

Justice of flat tariff can be reviewed from two different perspective: does flat tariff *feel fair* and *is it fair*? Three criteria have been found that people use in their fairness judgments. (1) They care about being treated fairly and treating others fairly. (2) They are willing to resist unfair firms. (3) They have systematic implicit rules that specify which actions of firms are considered unfair. Furthermore, the most important lesson was that the rules of

perceived fairness cannot be reasoning from economic principles or from intuition but demands a true behavioural data from the customers. (Kahneman et al. 1986.)

Many studies have been carried about perceived fairness also in the field of public transport (Xia et al. 2004). The survey administered among young people in Copenhagen and Lisbon showed that higher perceived fairness relates positively to higher perceived quality of transit service and higher perceived ease of paying for transit use. Higher perceived spatial equity is also associated with higher perceived service quality. (Kaplan et al. 2014.) The real fairness of flat tariff is very much moral and ethical question that can be reviewed from many different perspectives. British philosopher and economist John Stuart Mill described the concept of utility as search after happiness (Mill, 2009, p.13). The idea of utilitarianism is that actions and institutions should increase the overall amount of happiness in the world (Crisp, 1997, p.7). Jeremy Bentham, the founder of utilitarianism and mentor of Mill, defined “the greatest happiness principle” morally obligatory, which produces the greatest amount of happiness for the greatest number of people (Sweet, IEP). Utilitarianists would say that morality of action is based on its outcomes. Despite a criticism towards utilitarianism, it still exists very much in the field of transportation, where economists calculate negative and positive externalities for cost-benefit analyses (CBA). In cost-benefit analysis values are used to produce the highest state of social wellbeing in terms of utility. Yet CBA ignores how preferences are chosen, and the legitimacy of the values to welfare maximization can be questioned. (Choy 2018.)

The philosopher John Rawls published his famous book *A Theory of Justice* in 1971 and presented his two principles of justice. First one is The Greatest Equal Liberty Principle: “Each person is to have an equal right to the most extensive scheme of equal basic liberties compatible with a similar scheme of liberties for others.” The second one is Difference principle and Equality of Opportunity principle: “Social and economic inequalities are to be arranged so that they are both (a) reasonably expected to be to everyone’s advantage, and (b) attached to positions and offices open to all.” (Rawls 2003, p.53.) The second principle can be divided to two pairs. This principle only permits inequalities that work to the advantage of the worst-off. Rawls' view is that inequalities can be just, as long as they are to the benefit of the least well off. This is a question of the distribution of social and economic primary goods among which Rawls includes the competences and privileges connected with professional positions, income and possessions and the social bases of people’s sense of self-respect. These primary goods should usually be equally divided, unless unequal distribution is to everyone’s advantage. (Höffe 2013, p.40).

Political theorist Michael Walzer (1983) considers society as distributive community where goods can neither be reduced to a set of abstract goods nor precisely valued as utilitarianists do. Goods can have different meanings in different societies and therefore common criteria cannot determine the distribution of all goods available in society. The social meaning of a good is crucial importance in Walzer’s approach. It is the basis for determining what constitutes a fair distribution. Walzer develops the concept of “distributive spheres” and goods that have a special social meaning, which differentiates them from regular goods. Regular goods like mobile phones can be distributed through the market and principle of free exchange. Goods with distinct social meaning should be taken out of the sphere of free exchange. Typical examples are health and education. According to Walzer, injustice occurs if spheres are not autonomous. The distribution of one good can become dominant and determine the distributions of many other spheres of distribution. Typically,

money and power are such dominant goods. Autonomy guarantees “complex equality”, where inequalities within spheres may exist, but will not add up across different spheres. (Martens 2012, p. 1035.)

Karel Martens applies Walzer’s theory of justice to transport, and states that if transport good has a socially distinct meaning then a distributive approach to transport can be justified. He identifies accessibility as the good that best captures the social meaning of transport, and finds evidence that transport good should be set apart from other goods. Martens suggests transport planners should not focus to system functionality but person-centered approach, where focus is in passengers’ accessibility levels, income levels, residential locations, travel-related abilities and available means of transportation. (Martens 2017, pp. 215-217.) Martens’ conclusion is that injustice is done whenever a person experiences an insufficient accessibility and interventions to transportation system are only justified if they do not result increase in the number of persons experiencing insufficient accessibility. (Martens 2017, p. 126.)

HiReach is an EU-project that aims to mitigate transport poverty. Kuttler et al. (2018) have defined transport poverty as follows: “An individual is transport poor if, in order to satisfy their daily basic activity needs, at least one of the following conditions apply (Figure 12):

- There is no transport option available that is suited to the individual’s physical condition and capabilities (availability),
- The existing transport options do not reach destinations where the individual can fulfil his/her daily activity needs, in order to maintain a reasonable quality of life (accessibility),
- The necessary weekly amount spent on transport leaves the household with a residual income below the official poverty line (affordability),
- The individual needs to spend an excessive amount of time travelling, leading to time poverty or social isolation (time budget),
- The prevailing travel conditions are dangerous, unsafe or unhealthy for the individual (adequacy).

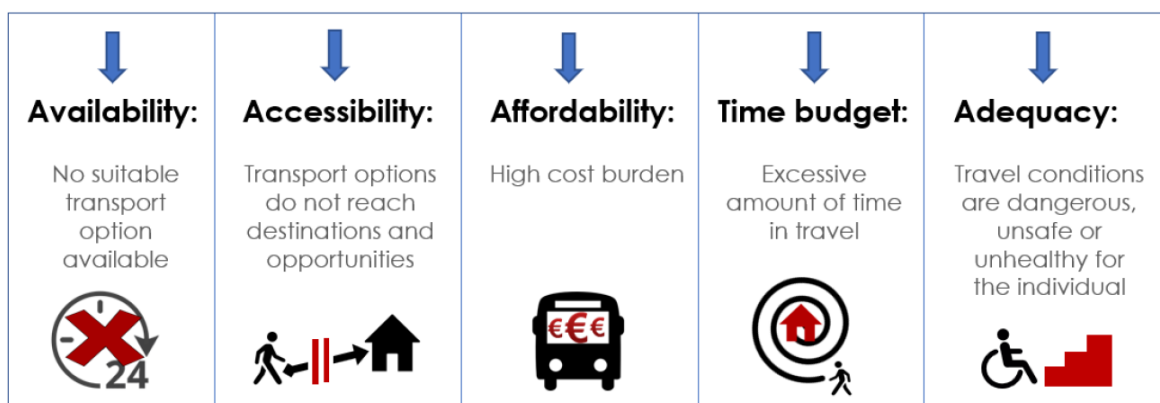


Figure 12. Five elements of transport poverty (Kuttler et al. 2018).

Fairness of flat tariff can be question of perceived fairness or true affordability. People views about perceived fairness can be studied through different questionnaires, but if the principle that tariff change should not increase transport poverty of the least well off is accepted, transport planners need to understand, who are the least well off, where do they

live, what is the quality of their transport services and what are their daily basic transport needs.

Distance based fares are usually considered to benefit those who travel short distances, whereas flat fare benefits those who travel long distance trips. In public debate, it is often said that flat fares are fairer for low income travellers and distance based fares benefits those who are more affluent. Rubensson, Cats and Susilo have researched whether the flat tariff of Stockholm is fair for residents, and their conclusion was contrary to arguments above: the more distance based the fare scheme is, the more it benefits low income travellers. (Rubensson et al. 2018.) Anne Brown found similar results when she studied trips among different income groups in Los Angeles which has flat tariff scheme in public transport. In her studies (Figure 13), the tariff combining both a distance-based fare and an off-peak discount seems most preferable for low income group. According to Brown, high and low-income riders take roughly the same number of trips, but low income riders travel more outside of the peak period. Low income riders have shorter distances per trip. Her analysis also revealed that low-income residents use less monthly passes. (Brown 2018.)

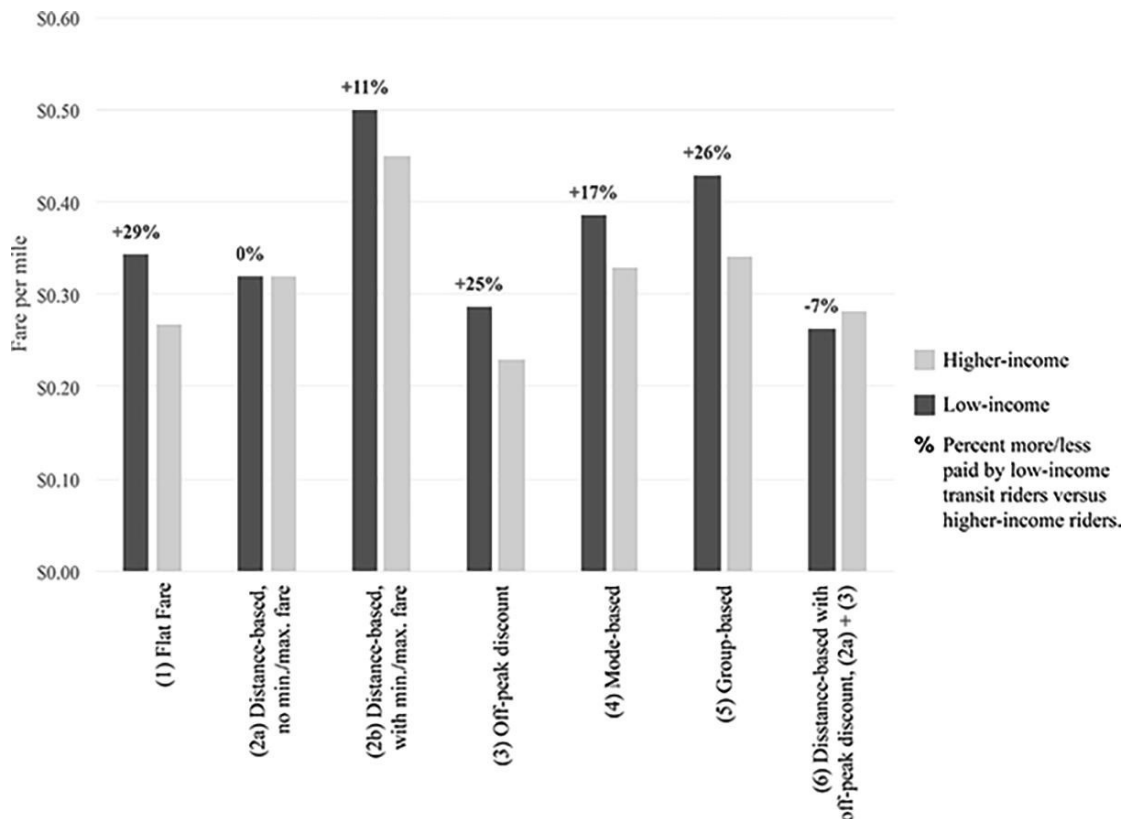


Figure 13. Judged by riders' ability to pay, non-capped distance-based fares combined with time-of-day pricing result in the most equitable fare structure in Los Angeles (Brown 2018).

In Helsinki region, the total number of daily trips seem to increase along with the income level (Figure 14). Only the lowest income group has more total trips than in the previous income group. Yet, the number of car trips increases according to income level, and the

number of public transport trips decreases. It is fair judgement to say that the lowest income group is most dependent of public transport, and potential tariff changes of PT have most significant effect on them.

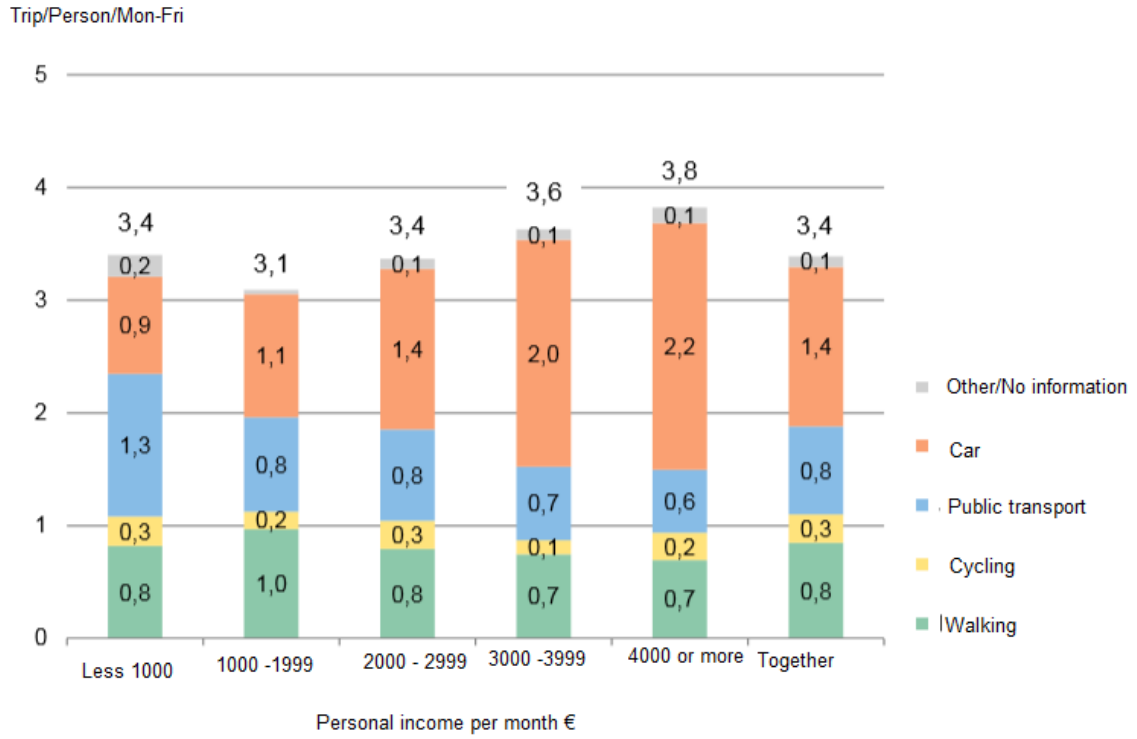


Figure 14. Trips in the Helsinki Region by personal income and mode of travel (HSL 2013, p. 43).

## 2.4 Aggregated framework

Theory section has presented relevant research related to tariff planning, pricing and transport justice, though vast amount of literature and research remains outside of this follow-up. Design principles from different perspectives and disciplines are sometimes conflicting with each other, and tariff planners' challenging task is to evaluate and prioritize different goals of PT tariff.

Figure 15 presents the theoretical framework of this study for public transport tariff, which consists of three sub-frameworks: user frameworks, transport system framework and political/social framework. Transport economics discipline would aim for maximising social welfare and find marginal social cost tariff as theoretical first best solution but hardly applicable. User framework would emphasize simplicity, attractiveness and perceived fairness while marketer would pursue maximisation of market share. Transport justice framework would review tariff through social justice analysis. All three perspectives should be considered in transport organisation's decision-making process.

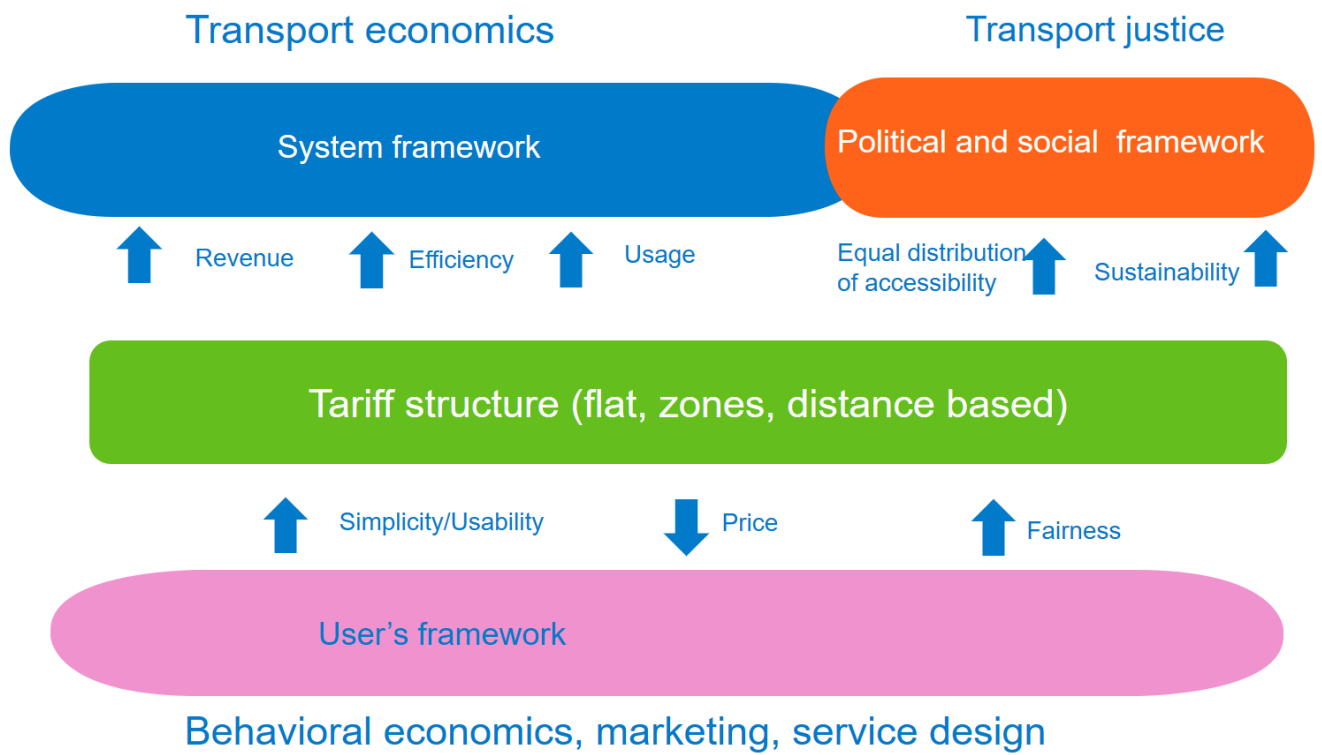


Figure 15. Theoretical framework for planning a tariff structure.



## 3. Methodology

### 3.1 The process of the research

In the beginning of this study was a vague clue that despite the general reluctance towards flat tariff among the public transport professionals, flat tariff has attractive aspects from the user perspective. Intuition was that attractiveness of flat tariff is related to simplicity, equity questions and potential difficulties of the zonal system. The first pre-research question was “What would be a customer oriented and fair pricing model for public transport authority of Helsinki region?” When the research plan was drafted, it soon became obvious that so wide question will not be solved in one master thesis. After data gathering, literature review and matching empirical data to theory, the final research questions and methods used to answer the questions were formulated as follows:

1. ***What are motives and experiences for flat tariff in different cities?***
  - a. *Experts interviews*
  - b. *Document analysis*
2. ***How HSL-customers see flat tariff? What elements make it attractive/non-attractive?***
  - a. *Focus groups*
  - b. *Individual interviews*
3. ***What effects flat tariff could have for ticket revenues, subsidies and usage of public transport in HSL region?***
  - a. *Price elasticity calculations*
  - b. *Theory and literature*
4. ***What effects flat tariff have for least well-off people in HSL region?***
  - a. *Income analysis, trip analysis*
5. ***What frameworks public transport organisations should utilize when planning tariff and pricing strategies?***
  - a. *Literature analysis and development of theoretical framework*

Experts from Turku, Stockholm, Wien and Paris with experience of flat tariff were interviewed for the thesis. The interviews focused on finding out the motives and decision-making process of the tariff system, the effects of flat tariff, customers’ reactions and the experiences about the fairness of the system. Similar results were found between different cases but also differences and reasons for them. Cities were analysed based on features of flat tariff system, geographical area, effect on revenues and passenger growth and usability and fairness experience.

Regular and random HSL users were interviewed in two separate focus group discussions to find out people’s attitudes and valuations about price, usability and perceived fairness of flat tariff. Discussions focused to compare the potential flat tariff with current zone based model, which was about to be launched few months after the interviews. Fourteen people were also interviewed individually concerning different tariff models for HSL and their comments about flat tariff were analysed for the thesis.

Price elasticities were used to calculate potential financial and demand effects of flat tariff. Trip and sales behaviour of whole region and low income postal code areas were analysed to understand current travel behaviour of the least well-off people and the potential effects flat tariff could have for their transport justice. The analysis was based on trip data from Telia mobile operator from the fall 2018 (Telia 2018), travel survey 2018 of HSL (HSL 2019 a), sales data of HSL from May 2019 (HSL 2019 b) and postal code income data from the year 2016 (Statistics Finland 2019).

The theoretical framework for the study has developed alongside the empirical studies using abductive methodology. This study can be categorized under behavioural economics, since emphasis is given to notions of people's real behaviour and emotions. The concept of loss aversion of prospect theory was found to be useful to explain critical challenges of flat tariff. However, theoretical framework was originally based on traditional transport economics and discipline of marketing. The question of transport justice was presented from the very beginning but not clearly defined. It was recognized that equity was one of the critical arguments used both to support and resist flat tariff. When the study evolved and first expert interviews and focus group discussion were held, the fields of transport economics and marketing just did not seem to fit together. The economist's idea of an optimal price for the ticket which can be calculated in theory from private and social internal and external costs just did not fit the marketer's idea of price being whatever the consumer is willing to pay. This puzzle was source of frustration and anxiety. Just after all the interviews were made, the article "Economics and marketing on pricing: how and why do they differ?" (Skouras et al. 2005) was found. This article shared innovation of the differences between two disciplines, and built a bridge between mathematic-logically oriented economics and behaviourally oriented marketing. The article referred severally to behavioural economics and brought this discipline into theoretical framework. The study evolved with following phases presented in Figure 16.

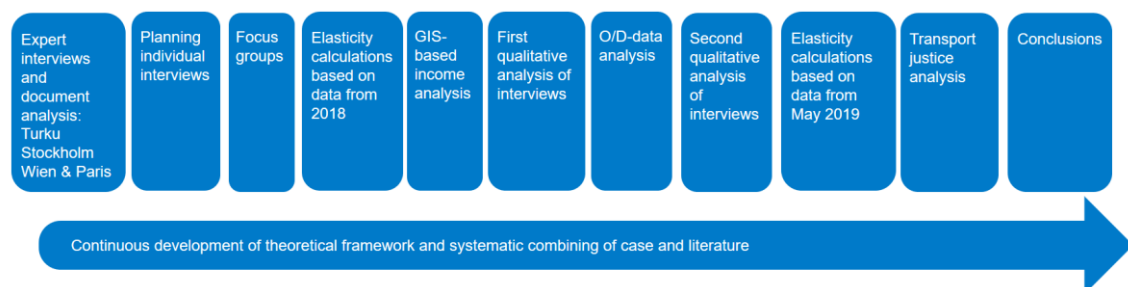


Figure 16. Timeline of the studying process.

In the end, this research is more interested in how actually people behave and not so much how they are assumed to behave according to utilitarian principle. Yet, dependence on behavioural economics was not known, when empirical data was collected. After critical reflection, the methodology, questionnaires for the focus groups and expert interviews could have been more focused to behavioural questions.

### **3.2 Abductive reasoning**

The methodology of this study is based on abductive approach of case studies. The main characteristic of this approach is a continuous movement between an empirical world and a theoretical model. During the process the research questions and the analytical framework are reoriented when they are confronted with the empirical world. Systematic combining is a process where theoretical framework, empirical fieldwork and case analysis evolve simultaneously. (Dubois & Gadde 2002, p.554.)

Abductive logic was developed after its predecessors deductive and inductive logic, which are the two most commonly known methods in qualitative research. Deductive logic means philosophical reasoning from a known, general level to specific facts, from theory to concrete details. The research is directed by previous research, earlier theories, and intuitive logical thinking of the researcher. A theoretical model achieved by this process directs the data collection and analysis on an empirical level. Deductive research favours surveys, where questionnaires are formulated according to researcher's theoretical framework. (Grönfors 2008, p.14.)

In contrast, inductive analysis is logical reasoning from details to generalizations, building a theory based on empirical data. Induction is usually related to purely qualitative, unstructured research methods. (Grönfors 2008, p. 15.) A critical phase for the inductive researcher is the classification of the data to create different categories and find correlations and relations between different sectors of empirical data. The concept of pure inductive research has been criticized since in most cases the researcher has some idea or clue upon which he goes to collect the empirical data. Such clue-driven research is known as abductive reasoning.

Abductive reasoning states that new scientific discoveries are possible only when findings are generated based on some principle, not only based on observations. The clue can be vague and intuitive, but it allows the researcher to focus his attention on something he believes might bring new knowledge of the phenomenon. The researcher can get his clue either from empirical interviews or from previous research or theories. The clue can be abandoned or modified through the whole research process. (Grönfors 2008, pp. 17-18.)

### **3.3 Systematic combining**

Research methodology tends to describe case studies as a linear process in the literature. Abductive systematic combining requires an integrated approach, and the main difficulty is handling the interrelation of the various elements during the research work. Researcher is constantly going back and forth from one type of research activity to another, between empirical observations and theory, which enables expansion of understanding of both theory and empirical phenomena. The researcher has preliminary framework consisting of preconceptions. Over time it is developed according to what is discovered through the empirical fieldwork as well as through analysis and interpretation. Empirical unanticipated observations might be further explored in interviews or by other means, and might end up redirecting the theoretical framework or change of the theoretical model. This process is named as systematic combining (Figure 17). (Dubois & Gadde 2002, p. 555)

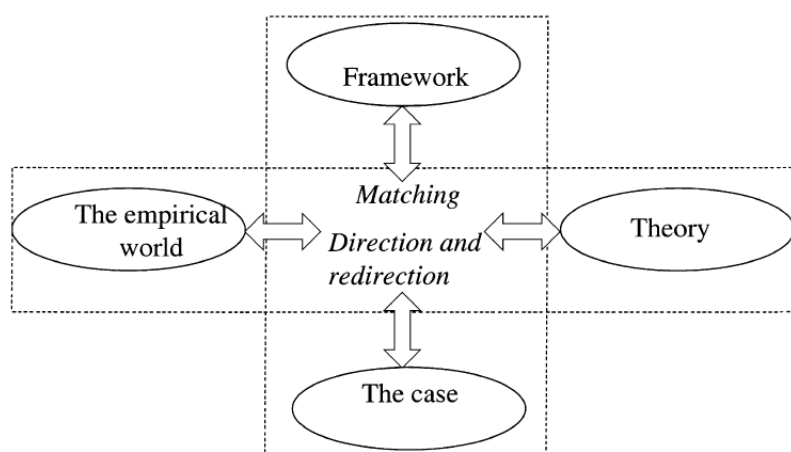


Figure 17. Systematic combining (Dubois & Gadde 2002, p. 555).

In systematic combining confrontation of theory to empirical data is continuous throughout the research process. This process is directed by another confrontation between the evolving framework and the evolving case. Matching is going back and forth between framework, data sources and analysis. Based on inductive methods, data should not be forced to fit pre-existing categories rather than the categories are to be developed from data. Yet, development of the theoretical framework is critical since systematic combining is studying theoretical concepts as well. (Dubois & Gadde 2002, p.556).

One way to increase the reliability of the research is to use different types of data, theories, perspectives or analytical methods. This is called triangulation, and it aims to show that the result is not obtained randomly but that different approaches can be used to achieve the same result. Qualitative research emphasizes subjective interpretation and therefore triangulation is not as relevant as in some other methods. In systematic combining the emphasis on verification is not the main issue. Rather, multiple sources contribute to revealing aspects unknown to the researcher and lead to discover new dimensions of the research problem and redirection of the study. (Dubois & Gadde 2002, p.556.)

Some researchers think, that multiple cases give some notion of statistical significance. This should not be the method in qualitative research. "Researching greater number of cases, with the same resources, means more breadth, but less depth" (Easton 1995, p. 382). Yet there has been criticism towards case study as scientific method. Easton (1995, p. 379) identifies three types of weaknesses in case study research: some case studies are simply rich descriptions of events and reader is expected to come to their own conclusions. "Many pseudo observers seem bent on describing everything and as a result describe nothing" (Weick, 1979, p. 38). Another problem is limited data that appear to provide only partial support of theories or frameworks and are used as quasi-deductive theory testing. A third weakness is usage of multiple case studies in a way that suggests they are offering some statistical generalisation. Dubois and Gadde suggest that stronger reliance on theory would help to reduce the negative effects of the second weakness identified by Easton. They suggest that investing in theory might improve the explanatory power of case studies.

If the research problem is focused on comparison of a few specific variables, good choice is to increase the number of observations. If the problem is analysis of interdependent variables in complex structures, the natural choice would be to go deeper into one case instead of increasing the number of cases. (Dubois and Gadde 2002, pp. 558-559.) This study is an example of the latter case. Dubois and Gadde question the idea that adding same type cases would automatically offer more analytical power. There actually seems to be consensus among researchers that case studies rely on analytical, not statistical generalization. (Dubois and Gadde 2014, p. 1279). Gummesson agrees that research based on few cases cannot answer questions related to “how often” and “how much” but “is it not better to understand a phenomenon in depth than to know how often the not understood phenomenon occurs?” (Gummesson 2007, p. 230).

For positivistic approach the aim of research is to test and verify findings based on criteria developed for quantitative research: validity and reliability. For them case research might be considered as a second-best method or a pre-study approach to generate theoretical setting before conducting proper studies. Positivist approach strives for simplicity and generality while non-positivists tend to favour complexity, originality and specificity. The objectives of researchers determine the choice. (van Maanen et al. 2007, p.1148.)

In systematic combining the problems should not occur if the evolving case and evolving framework follow the procedure of matching. Theory is the main tool for keeping control of data collection. The other rule is to have a parsimonious approach in the writing the case. (Dubois & Gadde 2002, p. 560). Common weakness of case-based research is lack of selectivity. Researcher can easily feel that everything is so interesting and should be shared with the reader, though readers tend to be more interested in the conceptual arguments than in the data. (Siggelkow 2007, p. 23.)

Research involving single case can get much closer to theoretical constructs and provide more persuasive argument about causal forces than broad empirical research can. However, researcher can't say the reader should believe that A leads to B, because there is an example. Theory should stand on its own feet and researcher needs to convince the reader that the conceptual argument is plausible and use the case as additional justification for the argument. (Siggelkow 2007, pp. 22-23.)

Abductive researcher should have some background theoretical information, but there is no need to review all literature beforehand. The researcher is not even able to identify all the literature since the empirical fieldwork challenges the theoretical conceptualization. Hence, the need for theory is created during the process. One major difference compared to both deductive and inductive studies, is the role of the framework. In abductive studies the original framework is modified based on unanticipated empirical findings (inductive method) but also based on theoretical insights gained during the process (deductive method). The analytical framework can be tight and pre-structured or loose and emergent. Dubois and Gadde suggest a tight and evolving framework in systematic combining. (Dubois and Gadde 2002, pp. 558-560.)

The process of abduction exists most likely in all promising research projects but is largely hidden from view because academic journals require a rather strict separation between the presentation of results and conclusions and between the presentation of theory and method. In reality, the research process is often messy and difficult to articulate. (van Maanen,

Sörensson & Mitchell 2007, p. 1149.) What is learned during the research process is generally considered the most important outcome of the research process. (Dubois and Gadde 2002, p. 560.) Here are listed main lessons of abductive systematic combining for qualitative case studies.

1. *Researcher needs clue or preliminary framework.*
2. *Evolving framework.*
3. *Tight but evolving theory.*
4. *Use inductive methods for empirical data. Be selective and parsimonious. Focus rather to conceptual arguments than in data.*
5. *Use different types of data, theories, perspectives or analytical methods. Multiple sources reveal aspects unknown to the researcher. Discover new dimensions of the research problem and be ready to redirect the study.*
6. *Matching is going back and forth between framework, data sources and analysis.*
7. *Case is a deep analysis of interdependent variables in complex structures. The evolving case is a tool which sharpens during the study.*
8. *Favour complexity, originality and specificity. Use analytical, not statistical generalizations.*
9. *Describe process of abduction and learning.*

### **3.4 Interviews**

Four other cases of flat tariff from European cities were studied to find out their motives and experiences of flat tariff. Chosen cities were Turku, Stockholm, Wien and Paris. They all have flat tariff in use, some for very long time and some have just recently moved from zones into flat tariff. Public transport culture, usage and subsidy levels of these cities are similar with HSL, so these cases can give some insights of potential effects of flat tariff. Cases were studied using qualitative method of content analysis of expert interviews and document analysis. Especially following themes were studied: features of flat tariff system, geographical area, populations, number of municipalities, changes in revenues and passenger numbers, usability and fairness experiences, equity issues, land use and actual process. Following people were interviewed using specific questionnaire (Appendix 1).

Top manager, Föli, Turku

Sales manager, Stockholm County Council, Transport Administration

Tariff manager, Wienerlinien

Tariff expert, Wienerlinien

Financial manager, Verkehrsverbund Ost-Region

Top manager, Ile-de-France Mobilités

All other interviews were made face-to-face, recorded and transcribed but interview with tariff manager from Wienerlinien was made by phone and interviews with tariff expert and financial manager from the Vienna region were made by email. The documents and reports of the travel data from the regions were analysed as well (Appendix 2).

The potential case of flat tariff for HSL region was studied through qualitative methods of focus groups and individual interviews. Two qualitative focus group discussions (regular + random users) were held, recorded, transcribed and analysed using content analysis and

evolving framework. Participants for focus groups were recruited from Norstat panel (Table 3 and 4). Participants were rewarded with 50 euros gift card. Both groups had two participants from the A-zone, three from B-zone, two from C-zone and one from D-zone. Their share reflected the real proportion of population between zones. One member of the second group cancelled very late, and the replacement came so late that no other data was collected just that he was from Kirkkonummi.

*Table 2. The participants of the regular users focus group.*

ID	City	Age	Profession	Status	Education	Family	Zone
1	Helsinki	44	Secretary	Working full time	University	Single	A
2	Vantaa	62	Practical nurse	Working full time	High school	Two adults	C VANTAA
3	Helsinki	22	Unemployed	Unemployed	High school	Single	A
4	Espoo	38	Food worker	Working full time	High school	Two adults	B ESPOO
5	Espoo	26	Student	Student	High school	Two adults	B ESPOO
6	Kirkkonummi	28	Student	Student	Applied sciences	Two adults	D
7	Helsinki	39	Controller	Parental leave	University	Two adults, children	B HELSINKI
8	Espoo	55	Real estate agent	Working full time	University	Single	C ESPOO

*Table 3. The participants of the random users focus group.*

ID	Age	City	Profession	Status	Education	Family	Zone
1	50	Helsinki	Wages clerk	Student	High school	Single	A
2	58	Vantaa	Maintenance manager	Working full time	Applies sciences	Two adults, children	C VANTAA
3	32	Espoo	Teacher	Parental leave	University	Two adults	C ESPOO
4	24	Helsinki	Student	Student	Applied sciences	Single	A
5	61	Espoo	Pensioner	Retired	University	Single	B ESPOO
6	62	Espoo	Engineer	Working part time	Applied sciences	Two adults	B ESPOO
7	62	Helsinki	Pensioner	Retired	University	Two adults	B HELSINKI
8	-	Kirkkonummi	-	-	-	-	D

Focus group discussions were based on semi-structured interview model (Appendix 3). The original clue for focus groups was that three dimensions of price, usability and fairness are important and interconnected, when people evaluate the attractiveness of any tariff setting. After the first content analysis, the framework expanded with several other categories such as budget, land use and modal share, which is often the problem with qualitative analysis (Krueger and Casey 2015, p. 290). Qualitative theoretical literature guided the study to return the original, parsimonious framework (Figure 18).

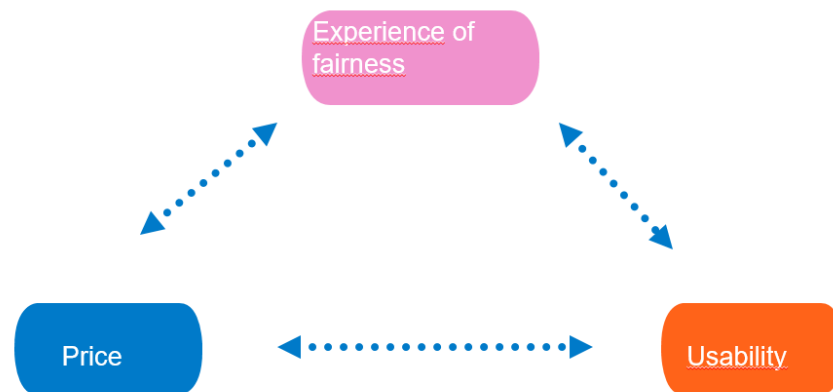


Figure 18. Framework for focus group discussions.

Fourteen individual customers were interviewed and recorded about tariff preferences (Table 5). These participants were also recruited from Norstat panel with similar tactics as with focus groups. The number 7 cancelled the interview, which explains why ID run to 15 even though only 14 interviews were made.

Table 4. Individual interviews about different tariff models in HSL region.

ID	Gender	Usage	Age	Profession	Status	Education	Family	City	Zone
1	F	Regular, uses wheel chair	19	Unemployed	Unemployed	Primary school	Single	Helsinki	B
2	F	Random	67	Pensioner	Retired	Applied sciences	Single	Helsinki	B
3	M	Don't use PT	36	Business manager	Working full time	University	Two adults, children	Espoo	C
4	M	Regular	41	Chef	Working full time	Vocational school	Two adults, children	Vantaa	Not known
5	M	Don't use PT	23	student	Part time working	High school	Single	Helsinki	A
6	F	Random	23	Waitress	Student	Vocational school	Single	Helsinki	A
7	-	-	-	-	-	-	-	-	-
8	M	Regular	36	Physiotherapist	Working full time	Applied sciences	Two adults, children	Helsinki	A
9	F	Regular	47	Assistant	Working full time	Vocational school	Two adults, children	Vantaa	B
10	F	Don't use PT	43	System engineer	Working full time	Vocational school	Single	Espoo	B
11	M	Don't use PT	55	Wine specialist	Working full time	Vocational school	Single	Porvoo	-



12	F	Don't use PT	31	Unemployed	Unemployed	Applied sciences	Two adults, children	Espoo	B
13	F	Regular	24	Waitress	Part time working	Vocational school	One adult, children	Espoo	B
14	M	Random	47	Areal manager	Working full time	Vocational school	Two adults	Vantaa	B
15	F	Regular	64	Pensioner	Retired	High school	Single	Kerava	D

Individual interviews were also targeted towards regular and random users, but also to no users because HSL wanted to understand how to promote these people a change in their transport behaviour. Selection criteria for these interviews followed the same principle as with focus groups. The duration of interviews was about 1,5 hours. Individual interviews were conducted by three people from service design agency Hellon: Ari, Maija and Sari. Interviews were recorded and first interpreted by interviewers. Second time analysis of flat tariff responses was made to this research by author. The interviews were based on a semi-structured thematic interview model (Appendix 4) and supported by scenario and theme cards. The interviews were analysed using inductive grounded theory, where first round of data analysis identifies emerging themes and then data was grouped around categories. The object of the interviews was to collect data about users' preferences and motives for choose or reject of tariff model. Three of the models focused on travel area: distance based, flat or personal zone tariff. Wider report of the results was used for HSL tariff development purposes, but this study was mainly interested in people's perceptions about flat tariff, which was the last model presented to the people. Flat tariff questions below were planned with the team of HSL and presented to people in interviews aiming to find motives and the rationalisation people used when they described their preferences towards flat tariff.

*What do you think if you could travel the whole HSL area with one price? Why?*

*What is good about this pricing? Why?*

*What is bad about this pricing? Why?*

*Is flat pricing easy to understand? Why/Why not?*

*Would flat tariff have effect on your travelling? How?*

*How fair/unfair the model is for you?*

*How fair/unfair the model is for all people living in metropolitan area?*

Framework for individual interviews in this study consisted of three different travel area tariff models and customer's own preference.



Figure 19. Framework for analysis of individual interviews.

Both focus groups and individual interviews were analysed by using content analysis method, where many words of the text are classified into fewer content categories and are presumed to have similar meanings. Similarity may be based on the precise meaning of the words or based on words sharing similar connotations to different concepts. A variable is valid to the extent that it measures or represents what the investigator intends it to measure. (Weber 1990, p.12.) In this study the qualitative analysis followed the principle described by Mayring: “Qualitative content analysis is not a rigidly delineated technique, but a process in which new decisions regarding basic procedure and individual stages of analysis constantly have to be made. In qualitatively oriented research theoretical arguments must be used and technical fuzziness is compensated for by theoretical stringency...In qualitative content analysis, content-related arguments should always be given preference over procedural arguments; validity is regarded more highly than reliability.” (Mayring, 2014, p.41.)

### 3.5 Elasticity calculations

Financial and transport system effects of flat tariff on HSL revenue and transport demand were evaluated using price elasticity values from the HSL survey (HSL 2014). Change of demand and sales were calculated using short-run values and long-run values (Table 5 and Table 6). Short-run effects refers to the change of demand in one year. Short-run calculations were made both with total sales data estimation for 2018 and restricted sales data from May 2019 after the zonal change. Long-run calculations were made only with May data. Sales data from May 2019 included HSL residents 18+ sales of monthly and single tickets from travel card and mobile ticketing system with postal code data. Following equation was used to calculate demand changes.

*Equation 1. (1-price elasticity coefficient PEC x price change%) x old sales pcs = new sales pcs*

*Table 5. Price elasticity values in HSL region. (HSL, 2014, p. 17).*

Price elasticity values	Short-run	Long-run
Single tickets	-0,5	-1,4
Value tickets (travel card, mobile)	-0,32	-0,6
Seasonal tickets	-0,36	-0,78

*Table 6. Example of formula of calculations for sales and demand changes.*

Old price	New price	Price change	Old sales pcs	Old sales €	Sales change	New sales pcs	New sales €	PEC*
x	y	100%(y-x)/x	z	z*x	100%PEC(y-x)	(1-PEC*100%(y-x)/x)z	(1-PEC*100%(y-x)/x)zy	0,32

*\*Price elasticity coefficient, always calculated with positive number*

The effects of flat tariff were calculated two times: first on estimated sales of 2018, and the second calculation was made based on the sales data of May 2019, when new zone tariff was already in use. 2018 sales including single tickets, value tickets and seasonal tickets

for adults, children and discount groups of the whole year accounted for 373 million euros. Numbers include no daily tickets. Both tram tickets and value tickets are included under the category “single tickets”. Sales data from May included customer data, which enabled clearing children tickets and sales from postal codes outside HSL region. Analysed sales included only over 18+ customers living inside HSL region, so that the data would be as comparable as possible with the income data as well with HSL trip data, which were also restricted to trips inside HSL region and by adult residents.

### 3.6 Income analysis

Income and trip analysis were used to study the social justice of flat tariff. Wellbeing distributes unevenly in HSL region and there are income differences between different postal codes areas. Income data of postal codes was retrieved from Statistics Finland (Statistics Finland 2019). Data consist of data of disposable monetary income by postal code. Table 7 lists 30 lowest income postal code areas in HSL region by average income per capita. Four postal codes from each zone were chosen for the analysis.

Table 7. Inhabitants' monetary income 2016. Source: Statistics Finland.

	Age 18 or over	Aver- age in- come	Median income	Inhabitants belonging to the lowest income dec- ile	Inhabitants belonging to the highest income dec- ile
<b>02150 Otaniemi (Espoo )</b>	3848	12124	10469	2407	193
<b>00940 Kontula - Vesala (Helsinki )</b>	20873	20403	19324	4904	2701
<b>01530 Veromiehenkylä (Vantaa )</b>	405	20417	20923	95	50
<b>00770 Jakomäki - Alppikylä (Helsinki )</b>	5372	20528	19672	1102	656
<b>02410 Gesterby (Kirkkonummi )</b>	1746	21027	19624	335	257
<b>00410 Malminkartano (Helsinki )</b>	7113	21033	20296	1772	1171
<b>01360 Koivukylä-Havukoski (Vantaa )</b>	10348	21398	20166	2162	1540
<b>00900 Puotinharju (Helsinki )</b>	3566	21462	19900	788	600
<b>00420 Kannelmäki (Helsinki )</b>	11888	21737	20232	2597	2011
<b>00820 Roihuvuori (Helsinki )</b>	6014	21884	20512	1194	1037
<b>00600 Koskela-Helsinki (Helsinki )</b>	3481	21901	18418	863	586
<b>00550 Vallila (Helsinki )</b>	8672	21904	20155	1962	1523
<b>00970 Mellunmäki (Helsinki )</b>	8769	21999	20954	1712	1407
<b>01200 Hakunila (Vantaa )</b>	9264	22112	21052	1742	1463
<b>00710 Pihlajmäki (Helsinki )</b>	10350	22323	21284	1923	1807
<b>00910 Puotila (Helsinki )</b>	5162	22420	20959	937	900
<b>00400 Pohjois-Haaga (Helsinki )</b>	8319	22421	21185	1693	1707
<b>01340 Leinelä (Vantaa )</b>	684	22482	21856	91	104
<b>01370 Jokiniemi (Vantaa )</b>	5276	22484	21778	1042	937
<b>00980 Etelä-Vuosaari (Helsinki )</b>	17654	22537	20968	3716	3316
<b>00700 Malmi (Helsinki )</b>	10925	22695	21092	2034	1893
<b>01720 Petikko (Vantaa )</b>	56	22728	23838	9	16

<b>00720 Pukinmäki-Savela (Helsinki )</b>	7110	22734	21474	1366	1307
<b>00500 Sörnäinen (Helsinki )</b>	12062	22874	21226	2327	2397
<b>01600 Myyrmäki (Vantaa )</b>	13865	22895	21809	2304	2561
<b>02470 Upinniemi (Kirkkonummi )</b>	283	22929	22928	34	39
<b>04250 Alikeraava (Kerava )</b>	3835	23133	22287	605	709
<b>00520 Itä-Pasila (Helsinki )</b>	6304	23484	21583	1349	1445
<b>00920 Myllypuro (Helsinki )</b>	10020	23493	21809	1876	2087
<b>01280 Länsimäki (Vantaa )</b>	7695	23498	22558	1324	1552

The university campus Otaniemi emerged as the poorest neighbourhood. However, the residents in Otaniemi are mainly students, and therefore it was excluded from the review. Some postal codes include both low and high-income subareas, which can distort the average. Income data of 250 m x 250 m squares from Statistics Finland was located to map using Qgis-software (Figure 20). The income distribution map shows low income neighbourhoods location along the rail and metro corridor to east and north from Helsinki city centre. Many red coloured high income squares concentrate to western direction of Espoo and Kauniainen and on the coast line. Low income postal codes can be found also from Espoon keskus and Kirkkonummi. A-zone has some low income postal code areas, but some doubts can be presented whether these areas represent truly underprivileged area or if they are inhabited by young people. Low income regions on B-zone situate usually with a very good PT service level and moderate price level. Based on geographical income analysis four postal codes from each zone were chosen for trip analysis (Figure 21).

00550 Vallila (Helsinki ), A-zone  
00940 Kontula - Vesala (Helsinki ), B-zone  
01360 Koivukylä-Havukoski (Vantaa ), C-zone  
02410 Gesterby (Kirkkonummi ), D-zone



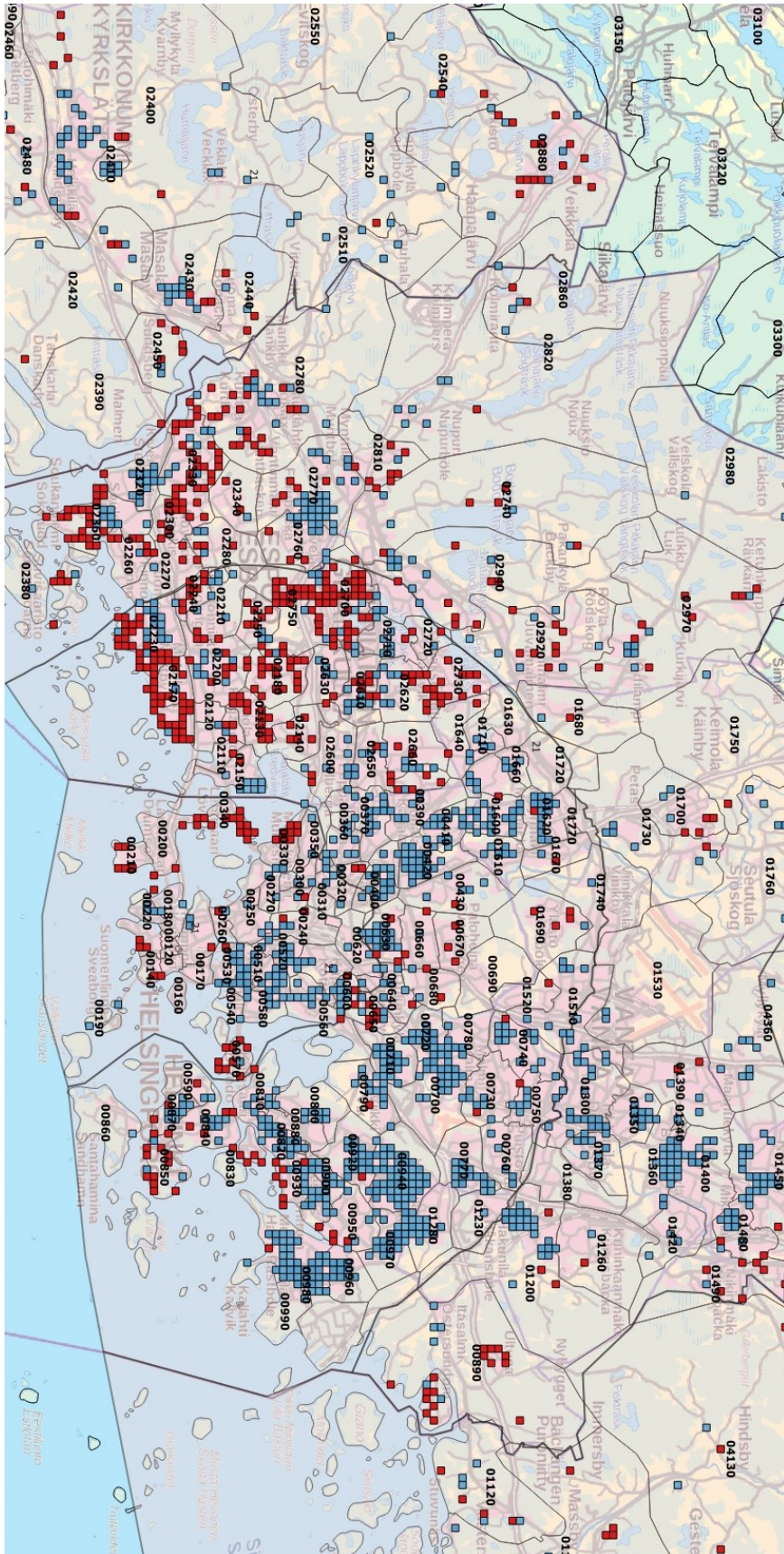


Figure 20. Two lowest (blue) and one highest (red) income decile squares of 250 m x 250 m in HSL region.



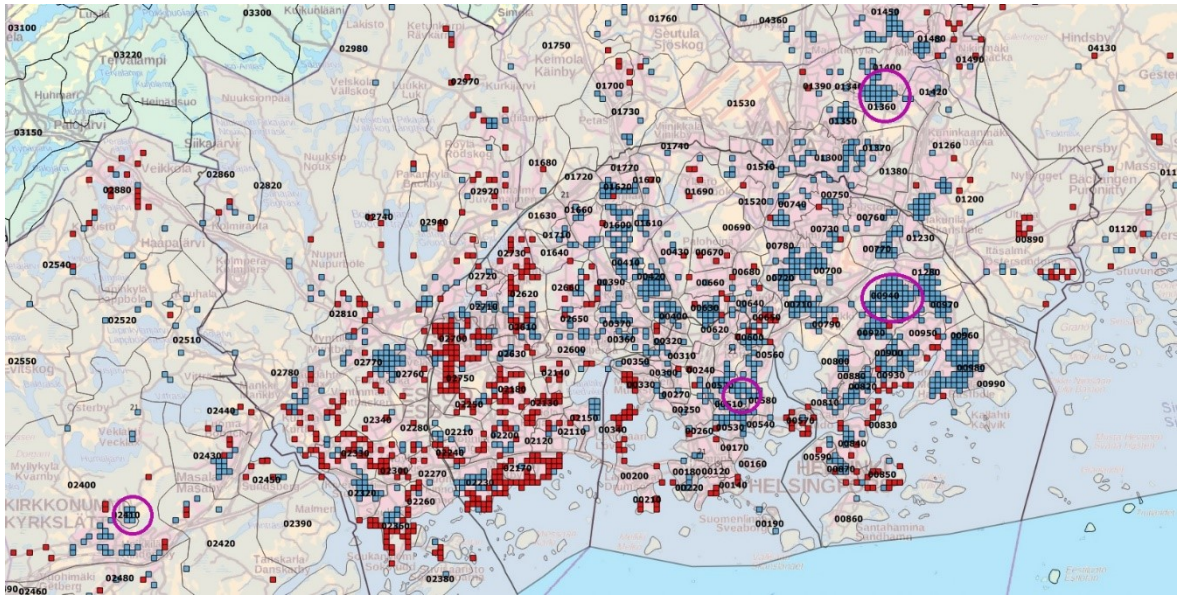


Figure 21. Postal code areas 00550, 00940, 01360 and 02410 circled on income distribution map.

Following indicators were calculated for the whole region and for chosen postal codes: PT spending per capita, PT spending-% of average income and share of AB, ABC and ABCD sales of total PT sales. Calculations were made using the population data and income data from Statistics Finland and PT sales data of May 2019 from HSL.

### 3.7 Trip analysis

Travelling behaviour of the whole HSL region and the chosen postal code areas were analysed to understand the transport justice differences of low income regions and potential effects of flat tariff. Also, the general distribution of trips and PT trips is interesting information, since flat tariff is worthy option if the deviation of trip lengths is small.

Trip data was retrieved from HSL travel survey 2018 (HSL 2019 a), mobile operator Telia's GPS database (Telia 2018), and sales data from HSL' travel card and mobile ticket system (HSL 2019 b). HSL trip data was based on travel journal study, which studies how and where people in the Helsinki region travel in everyday life. Data was collected by online survey and telephone interviews in autumn 2018 at weeks 36–40 and 44–48. Over 38 720 randomly selected 7-year-olds were invited to the survey, of which 10 924 participated. In this thesis data was cleared from children trips, trips to or from outside of HSL region and trips made by people living outside the region. Left were only trips made inside HSL region by adult living in HSL region. Trip data for this study consist of 5690 people and 21 168 trips.

Telia-data was collected during the same weeks as HSL travel survey. Data was averaged for each weekday and then multiplied accordingly to represent one week's trips. Almost 25 million trips were made in week, where both origin and destination were inside HSL-region. Data shows the number of trips between origin and destination postal codes, but does not include information about the transport mode. Data was cleared from trips to or from outside the HSL region. Most of the postal codes belong only to one zone but 23 postal codes cover two zones. Those trips were divided to zones using the zonal share of starting

trips from HSL survey. Based on GPS data, in whole HSL region 76 % of all trips are made inside one zone and 19 % inside two zones (Figure 22). So, 95 % of all trips are made inside a flat tariff, since two zones is the minimum price.

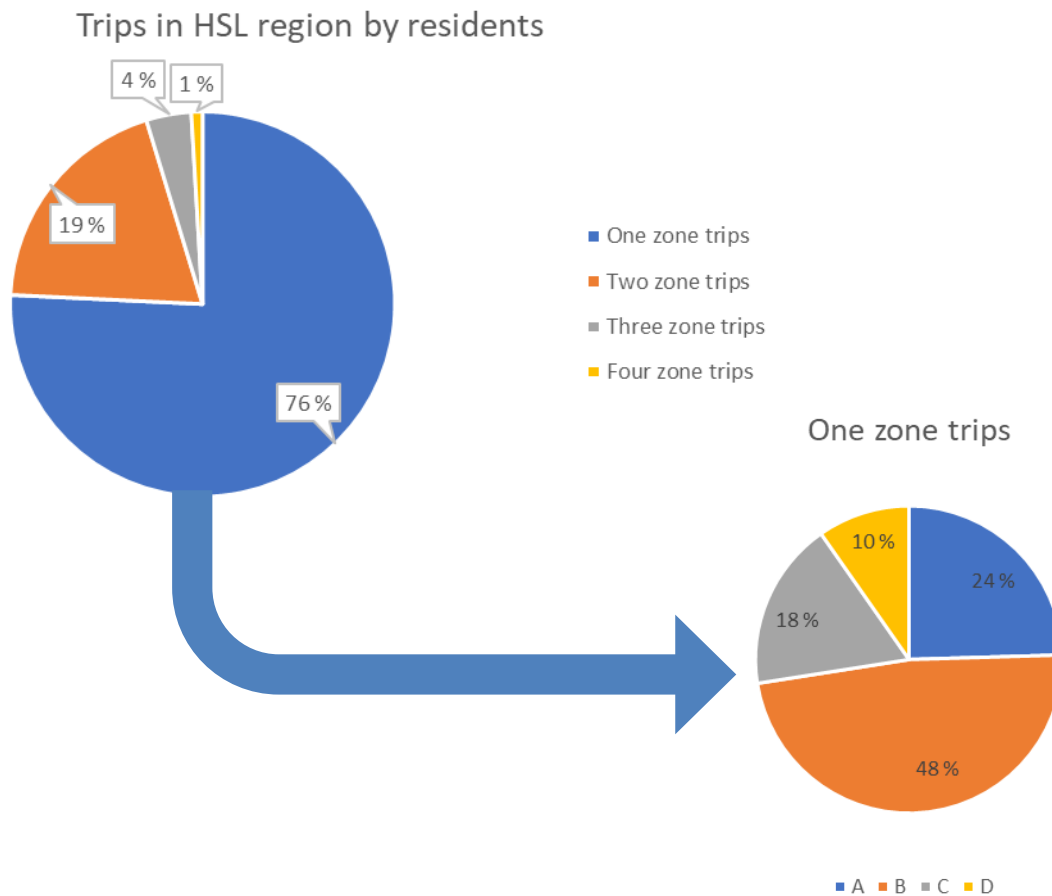


Figure 22. Trips between the zones in HSL region in the fall 2018 and the distribution of one zone trips (Telia 2018).

These findings are supported by HSL travel survey (Figure 23). Yet, HSL survey includes passenger information and was restricted only to 18 years or over residents' trips, which can explain slightly higher degree of three-zone and four-zone trips in this data. The average length of all trips in HSL survey from the crow flies accounts for 5,5 kilometres. Overall picture of these two data sources is similar: one zone trips constitute a major part of all trips.

Trips between zones in HSL survey

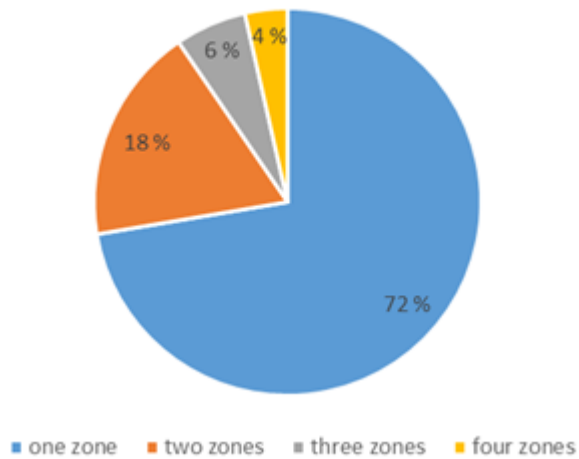
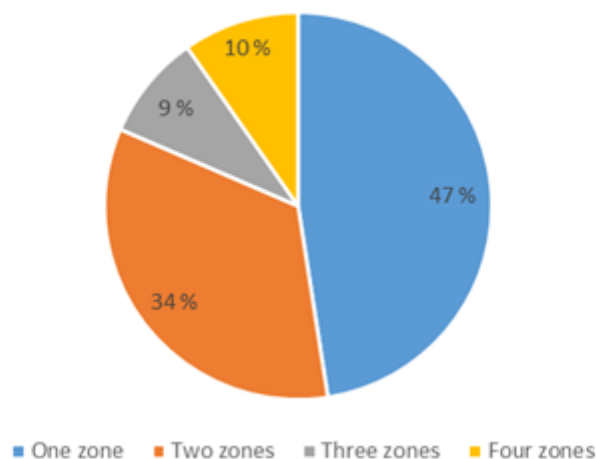


Figure 23. Trips of 18+ inhabitants in HSL region (HSL 2019 a).

However, general trip distribution relates no directly to public transport trips, since walking and cycling trips are usually shorter than public transport trips. Of all analysed respondents in HSL survey, 34 % had made PT trips. The share of PT trips of all trips was 20 %. The average length of PT trips was 9,1 kilometres, therefore significantly longer than the average general trip length. Of all PT trips, 81 % were made inside one or two zones, and the rest of the trips were divided evenly between three-zone and four-zone trips (Figure 24). Similar analyses were made to four chosen postal code, and the results are reported in the next chapter.

PT trips between zones in HSL survey





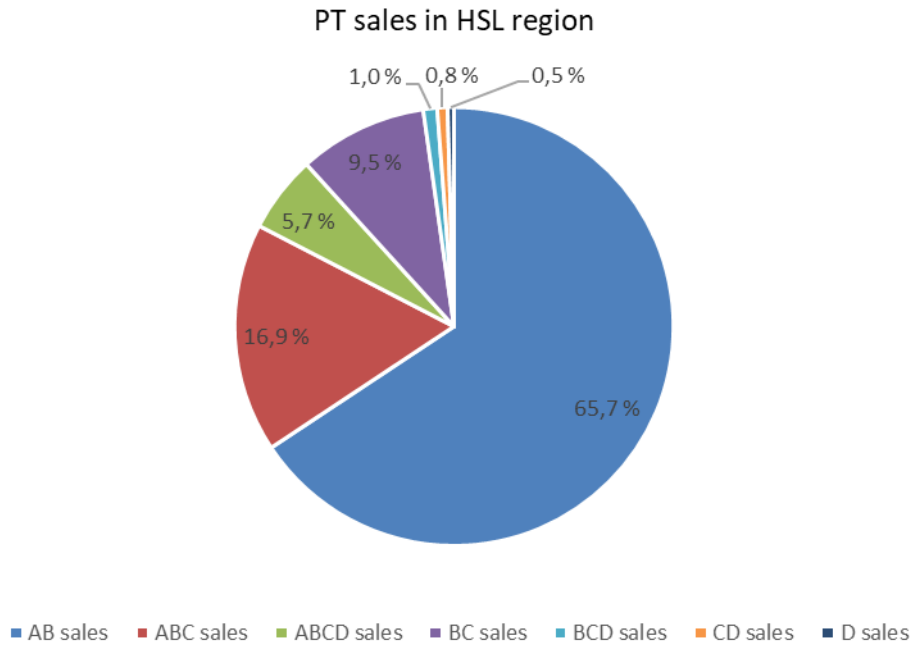


Figure 24. PT trips and sales of 18+ inhabitants in HSL region (HSL 2019 a, HSL 2019 b).

### 3.8 Systematic combining in HSL case

The process of systematic combining of this case study is described in Figure 25.

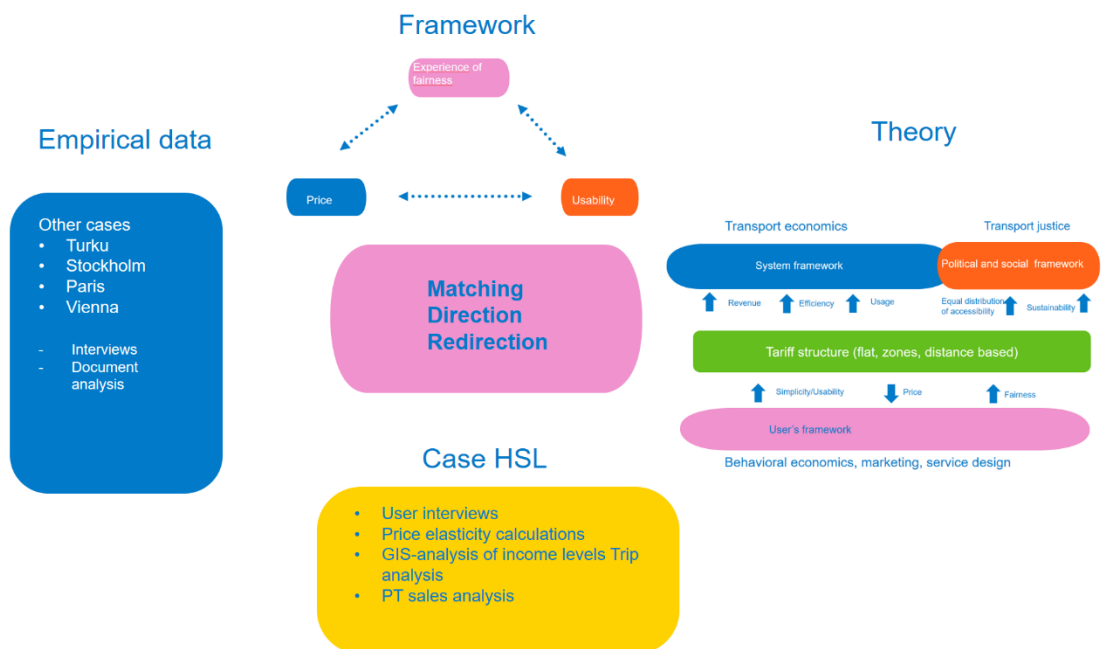


Figure 25. Systematic combining of the case study of flat tariff in HSL region.

## 4. Results

### 4.1 City cases

Following four European city regions have used flat tariff as a pricing model for public transport either for the whole region or some part of the network. Pricing solutions are based on different historical developments in each city.

#### *Turku*

As EU public transport procurement governed by the Public Service Obligation (PSO) entered into force in 2009, the new law mandated regional authorities over urban public transport services. The legal change was the biggest in decades. Starting from 2012, Turku has been the authority for public transport of the area covering six municipalities: Kaarina, Lieto, Naantali, Raisio, Rusko and Turku (Figure 26). All the regional transit contracts expired on 30.6.2014, when the regional authority Föli was established, and new regional tariff needed to decide. The current Föli area covers 1185 km<sup>2</sup> and habits 293 000 people.

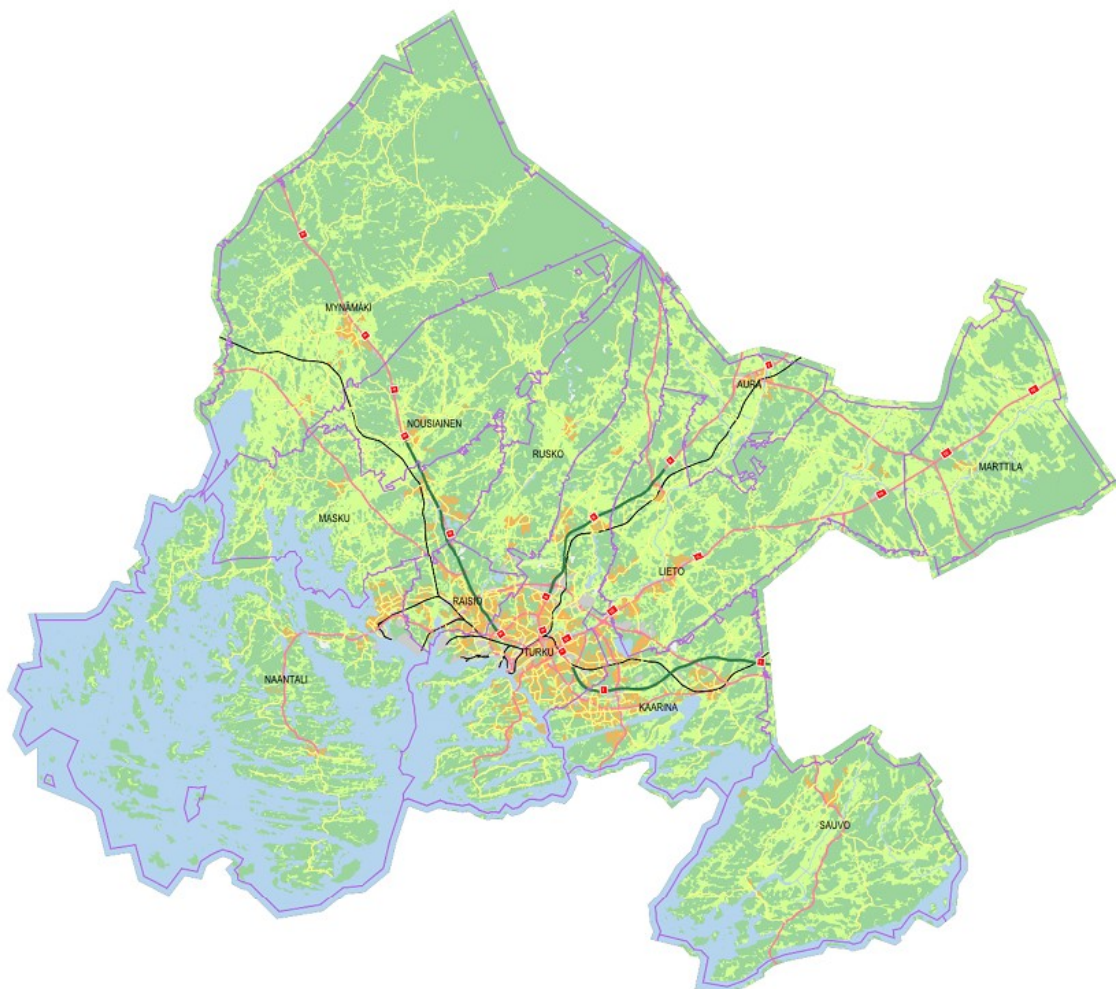


Figure 26. Flat tariff area of Föli in 2019. Source: <https://opaskartta.turku.fi>.

Turku region started to plan payment system for regional transport service already in 2012. City procured a study about the payment, ticketing and zone options for the region, which looked at four different tariff models: flat rate for the entire region, municipal model, 2-zone model and 4-zone model. The conclusion of the comparison showed that 4-zone model with minimum 2-zone ticket purchase would generate the biggest revenues and PT trips but at the same time would be the most complicated (Table 9).

Table 8. The estimated effects of different tariff models in Turku region (Kalenoja, Metsäpuro, Wallander 2012, p. 27).

Tariff model	Price level for internal trips	Price level for regional trips	System clarity	Effect on land use	Revenue	Justice	Attractiveness of PT
Flat tariff	++	+++	+++	---	++	---	++
Municipality tariffs	+	+	++	--	+	-	+
Two zone model	++	+++	+	++	+	++	++
Four zone model	+++	++	--	+++	+++	+++	+++

+++ significant positive effect  
 ++ moderate positive effect  
 + light positive effect  
 - light negative effect  
 -- moderate negative effect  
 --- significant negative effect

Föli decided flat tariff instead of zones. Member of top management in Turku public transport operations opened the process behind the decision. Pressure towards flat tariff came especially inside Turku, but also due to practical problems of new payment system. “Two zone model was presented to the municipalities, but they felt someone was left to the other side of the border and others pay more than others. Aggressive resistance came from all those who would have been left in the second zone *especially within Turku*. It raised war. No politicians were willing to make such decisions. Turku politicians began to think, if Turku should be on the first zone and the others second, but it was not in accordance with the agreement that municipal boundaries will be removed. Then won the idea that we could start with flat tariff and rethink later. The key coincidence was that we were in the Market Court for the payment system purchase, and it was easier for us to make the system work without zones, since there was very little time left. Flat tariff was result of both purposeful planning and coincidence”, manager opens the process.

Flat tariff simplicity helped to begin the regional operations. “It was a fascinating that when we decided to go on flat tariff, everyone was happy and things started to go like

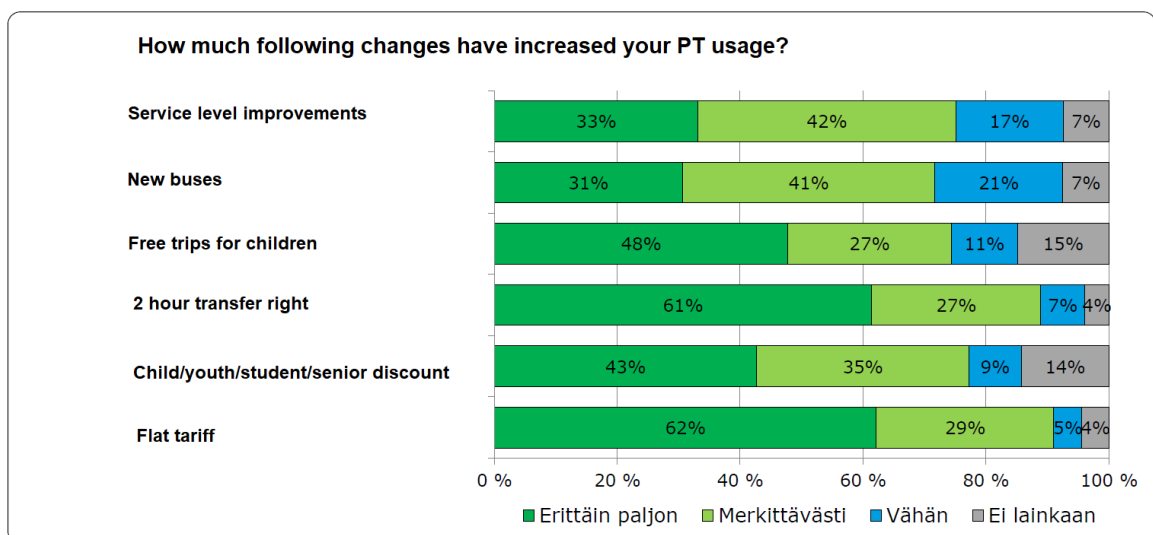
dancing. Many other things were twisted but this suddenly was terribly easy to decide”, manager explains. The price of the Turku season ticket did not change in the reform, but some felt the regional tariff was an increase because there were new people who could travel at the same price. “It’s peculiar that even if your own price stays unchanged, you feel it is out of your pocket if someone else gets the same benefit. It is the length of the journey that can produce a sense of injustice. If you have a three kilometres trip and the other one drives 20 kilometres, you start to think your price should have become cheaper. But it is a minority that has experienced that. Most people in Turku have seen this as positive thing.” Manager views that the fairness of flat tariff realizes on service levels instead of prices. “There are areas where the bus goes in every ten minutes, but if you are in Rymättylä and have a cheap ticket, you have to plan your trip, since bus goes once an hour or even less frequently.”

Manager considers simplicity as a best thing in flat tariff. “It’s easy for customers. The second thing is that it is easier to develop the system without the zones. Weaknesses are hard to come by, perhaps the only thing is that people living in the centre of Turku may have the feeling that the model favours those who live further.”

The regional trips increased over 15 % after the change. There has also been growth in Turku. Transport consultant Ramboll made passenger surveys both in 2014 (710 respondents) and 2015 (865 respondents). The later survey showed that flat tariff was considered as the most significant reason for increase of PT usage. The pre-estimated negative effects of injustice and scattered land use have not realized (Table 9).

*Table 9. Traveller’s estimations of the factors behind increased PT usage in Föli region 2014 – 2015 (Ramboll, 2015).*

#### The effects of regional tariff change in Turku

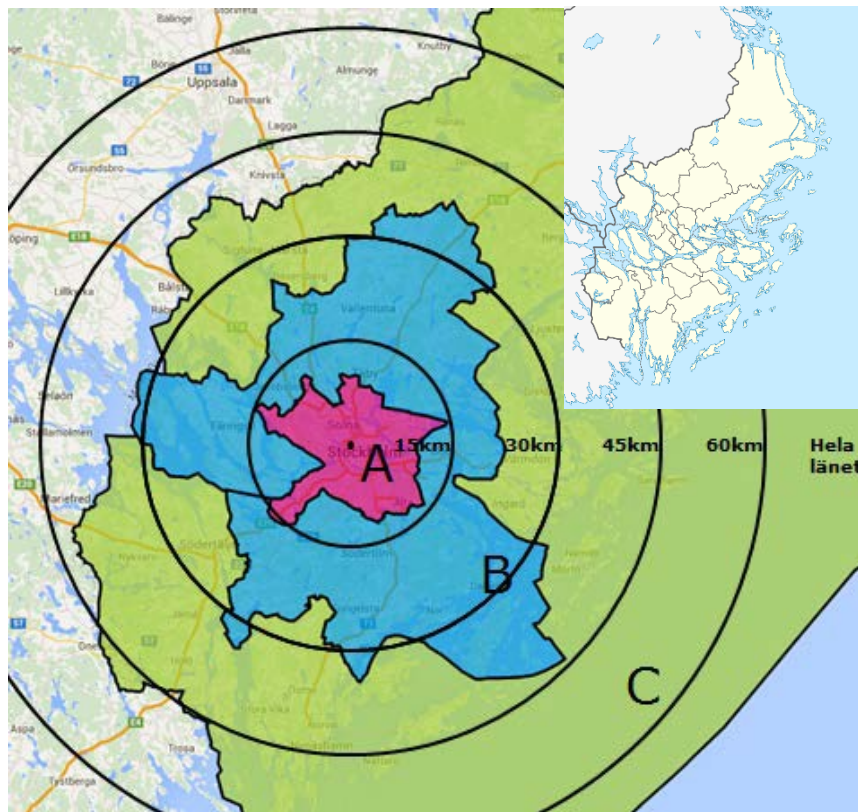


Manager sees flat tariff as one cornerstone of Föli’s success. People like flat tariff and it has received the most positive feedback over the years because of its easiness. “Simplicity is a great thing. If you want the ease of everyday life, flat rate is one piece in it.”

Turku PT region is expanding and the tariff questions are considered again. Municipalities Paimio, Parainen, Masku, Nousiainen Mynämäki would like to join Föli and the flat rate. Föli would like to stick to tariff model too but with newcomers the whole region expands much. Manager does not believe new potential municipalities could join flat tariff. Transport consultant Trafix made a study in 2017 about three potential tariff models for the wider area of Föli: flat tariff, 3-zone model and 4-zone model. Both zone models were estimated to generate more revenues than flat tariff but decrease the number of trips. The report ended up recommending Föli to stick with flat tariff for the current region since the benefits from the increased revenues are not that significant that they would cover the risks of introducing zone tariff with weaker clarity and comprehensibility.

### *Stockholm*

Stockholm region gave up zones in the beginning of 2017. The current one zone area covers the Stockholm county which includes 26 counties, over 2,3 million people and geographical area over 6300 square kilometres.



*Figure 27. Zone model of SL before the change. Source: Beslutsunderlag gällande SL:s zonsystem.*

The public transport administration at Region Stockholm plans the public transport in Stockholm County. The brand name for public transport is SL, Storstockholms Lokaltrafik. The service is very metropolitan like in the central Stockholm but rural in the outer regions. Transport system covers buses, subways, trams, commuter trains and some boats. SL has had flat zone for monthly passes all the way from The Million Program, which was launched in 1960's (Allmännyttan 2019), a social democrat housing construction program which aimed to solve an acute housing shortage. However, single journey tickets were

based on zones. The tariff manager of SL remembers Stockholm county had five-zone-system for single tickets for decades. There was a short, nine months period in 2006 without single ticket zones, when politicians decided quickly about one zone system. Trial ended in April 2017, and SL moved back to zones but this time to three zones. “The very cheap single ticket of that time made people buy single tickets instead of seasonal tickets. Price ratio between them was so good. Politicians noticed this was not good for financials, and tariff was running only for nine months”, SL manager describes.

The system worked nicely from the simplicity perspective when people used paper strips and they could ask the driver, which ticket is needed between two places as the driver stamped the ticket. When SL changed paper strip to electronic strip, people were forced to use higher level of self service and had to decide which zones to buy. “We don’t understand this, I feel unsecure, have I paid right amount, have I paid too little or too much”, manager describes customers’ challenges. Majority of the politicians wanted SL to make their Access card system simpler for the travellers. SL was looking at different things from changing signs to other options. SL established a political steering committee for the work, which had one politician from each party of the board. Process was laborious but fruitful. “Flat fare had opponents and supporters based on political colour. Politicians were involved and they had possibility to go back to their working groups in their parties and check what they think. I think everyone came along during these meetings and said flat fare could be a good idea”, manager analyses.

SL investigated several ways to make tariff simpler for the customers. They surveyed personal zone model of Skånetrafiken and what other authorities were doing outside Sweden. They calculated whether they should have zones for monthly passes. The decrease in price of having just one zone monthly ticket was minimal but the price doubled for those travelling three zones. Nobody wanted that. Quite soon parties realized that the easiest thing to simplify the system would be one zone tariff. They agreed it should be done without decreasing the revenues and it should bring more customers to public transport.

SL arranged customer interviews, customer meetings, customer surveys and service designs process. Question of price always came up. Customers were saying: “This is really good thing but if it is going to be really expensive, then I don’t think it is good thing.” Finally, SL was quite confident about the change. They calculated that 80 % of their total sales were season tickets. From single journey tickets 80 % were travelling only in one zone. Based on these findings SL calculated that if they had flat tariff, the need for extra charge would be only 1,5 crowns for journey. One zone price at that time was 25 crowns. The board of Trafiknämnden made the decision based on figures.

SL assumed that flat tariff would ease and promote the usage of public transport for those people living in the outer region or suburbs. But people making short trips seemed to like flat tariff too. “People travelling only one zone also liked it because they don’t have to think about zones anymore”, manager tells. He believes that people living in certain suburbs are more likely segregated and flat tariff offers them possibilities to travel through the region. “Our customers and politicians liked the thought about the fairness. It was equal to everyone and people liked about it, could connect to it and felt that this is fair.”

Some customers were irritated, why they need to pay the same if they are travelling only few stops. SL was replying, that in the central Stockholm SL is offering a great service with subway going in every 90 seconds and number of buses, trains, trams and places



where person can buy a ticket. Out in the region there might be two buses in a day. According to manager people accepted this. “There are still some saying that it is too expensive to travel only few stops and we don’t disagree on that. It is possibly too expensive to travel only a short trip in subway but the ticket is valid for 75 minutes and you can still change the mode and travel as long as possible.”

SL has no clear results of the change. They were changing the discount groups while increasing the prices, so they have difficulties to separate the effect of zone structure from other factors. Land use was not a relevant issue during the process. “The questions related to land use are more about house prices and new transport infrastructure investments but no tariff questions.” SL was neither looking whether people living further are financially doing well or bad. Stockholm has both suburbs consisting of low income flats and luxury villas on the beach.

“I have trouble to find any bad things about this structure. Customers are satisfied and we are doing well. Main benefit is simplicity. One thing is contactless payment and travelling in public transport. I really don’t think we could implement contactless with zones. Ticket system is very central tool for us internally but customers really don’t care about the tickets. They just don’t want it to be difficult. The best interface is no interface. If I had to choose between fairness and simplicity I would choose simplicity. Fairness is always very subjective but simplicity can be a shared experience. It is not something you can argue about“, manager describes.

### *Vienna*

Vienna’s public transport is part of the Verkehrsverbund Ost-Region VOR, transport association for Austria's eastern regions including parts of Lower Austria, the Burgenland and all of Vienna. The city of Vienna accounts for core zone, “Kernzone” or “Zone 100”, marked in the Figure 28 as blue area. The region around Vienna used to be divided to two different tariff systems: distance based and zone system, but in July 2016 the whole region started to use only distance based tariff.

Vienna has two million people and geographical area around 415 square kilometres, which is a little larger than current AB-zone in Helsinki region. VOR area covers three provinces and the geographical area is 23 600 km<sup>2</sup>. In total 745 municipalities belong to the area (Figure 28). There are 3,7 million people living in VOR area. Heavy rail services are financed with 80 % by state but also by the provinces. Regional buses are financed by provinces but some larger municipalities have their own internal bus services which are financed by these municipalities. All public transport within the City of Vienna is financed by the city.

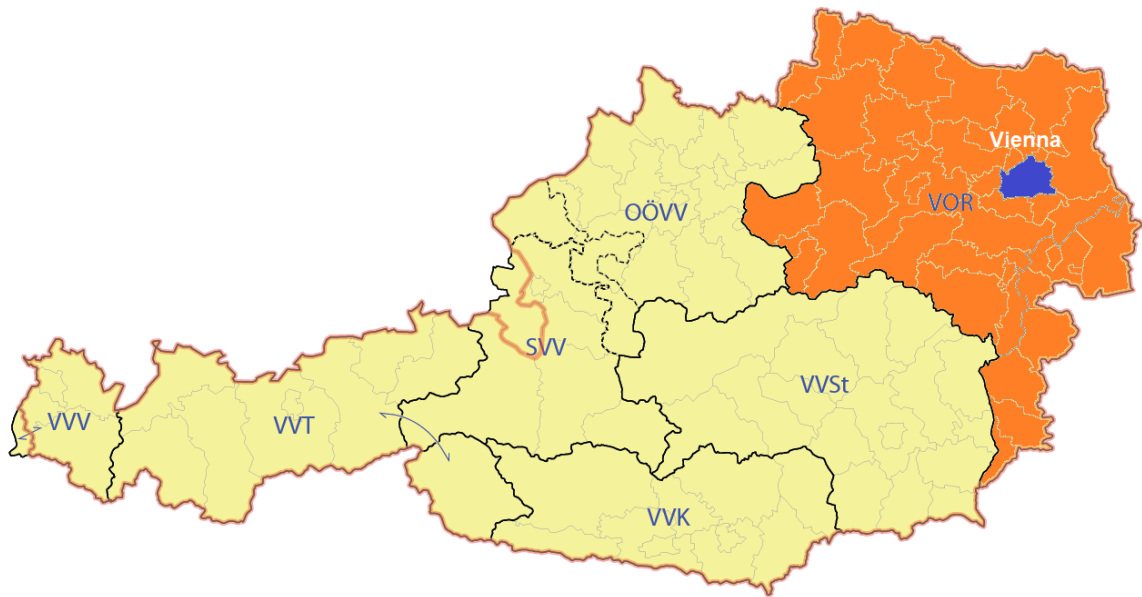


Figure 28. Flat tariff of Vienna and distance based tariff of VOR. Modified from wiki-voyage: [https://de.wikivoyage.org/wiki/Verkehrsverbund\\_Ost-Region\\_\(VOR\)](https://de.wikivoyage.org/wiki/Verkehrsverbund_Ost-Region_(VOR)).

City of Vienna have had flat tariff since 1982, when the current tariff system was established together with the regional authority VOR. Flat tariff covers single, weekly, monthly and annual tickets. Single ticket is 2,40, monthly ticket 51 euro and annual ticket 365 euro. Annual ticket price was set in 2012 by political pressure and has not changed since. Ticket revenue covers roughly two third of transportation costs, when investments are not included. Change from flat tariff to something else has never been discussed according to tariff manager of Wienerlinien: “This is working. This is a very clear system and everyone knows how to use the ticket. It is also easy to administrate and easy for invoicing. There is no need to change it.” Yet, Wienerlinien manager would like to change the pricing of an annual ticket. “The yearly ticket could be more expensive than 365 euros. Even if you look at the inflation, it should have changed. Market studies show that customers would pay more, because service level is that good. Very cheap yearly tickets have a decreasing impact on the sales of monthly tickets or weekly tickets.”

VOR was aiming to simplify their tariff in 2016. Trips are now cheaper for passengers travelling short trips between two former zones. Price calculation occurs automatically in distance based tariff, so people don’t have to remember zones. Flat tariff for the VOR region was not an option when the change was established in 2016. This was due to financial limitations. Financial manager of VOR emphasizes that distances of VOR area are large, wider than 200 km. “The distances you can travel are simply too big. The only flat tariff available for the whole area is a season ticket for school children, which costs 70 € per year”, financial manager of VOR describes.

### Paris

Paris region Île-de-France is the widest of analysed regions with flat tariff covering the whole area. The region has 12 million residents and 12 000 square kilometres including the City of Paris with 2 million inhabitants. Île-de-France is divided into 8 regions and 1 276



municipalities (Figure 29). The costs are covered 27 % by customer and rest by companies and subsidies.

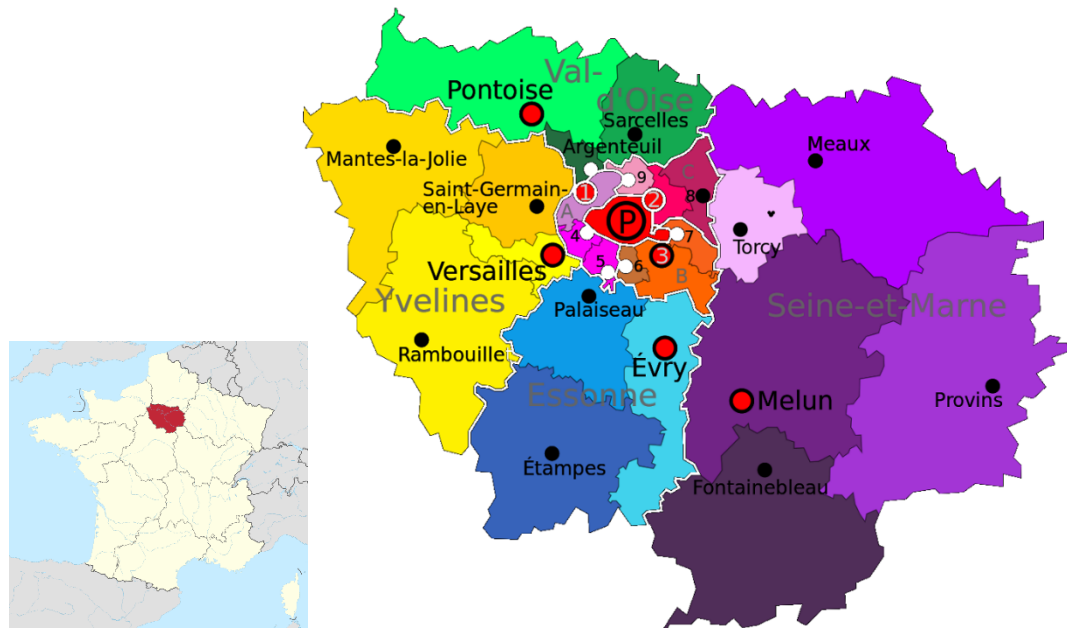


Figure 29. Flat tariff area of the Île-de-France-Mobilités. Source: Wikipedia, <https://en.wikipedia.org/wiki/Île-de-France>.

Paris is perhaps the most interesting of flat tariff regions since they had zone pricing both for monthly tickets and single tickets for decades. Flat tariff for monthly tickets was established in September 2015, three months before elections. The pressure for change came from politicians, especially from socialists and green party while right wing was opposing because of the financing. Single tickets have still zone pricing, so the setting is very similar to Stockholm tariff system before their change. Paris used to have 8 zones but less than in ten years the numbers shrank to one (Table 10). The introduction of all-zone passes enables subscribers to travel throughout the Île-de-France region at same 1-2 zone pass price prior to change. Before the change the monthly price was 70 euros for Paris and 116,50 euros for the whole region. After the change the flat tariff was 70 euros for all. Monthly price for all-zone pass is currently 75,20 euros.

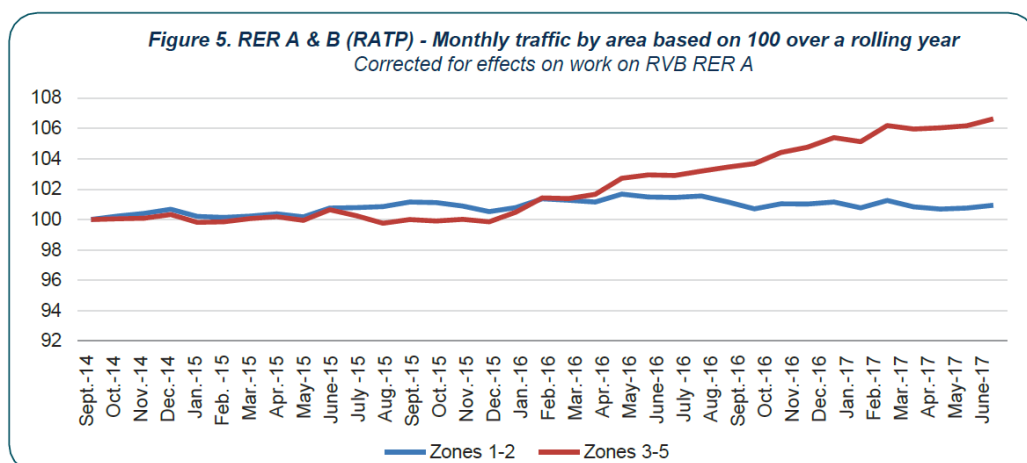
Table 10. History of pricing in Île-de-France-Mobilités. Source: Evaluation committee for the improvement of transit services in Île-de-France - Report for 2016.

July 2007	Elimination of zones 7 and 8
July 2011	Elimination of zone 6
September 2012	Eliminating zones on weekends and public holidays
Summer 2013	Eliminating zones for summer
September 2015	Creation of All-zones passes

Regional transport authority Île-de-France-Mobilités (IDFM), who sets the prices, was against the change and they saw the effort coming from the left party as an attempt to win the elections. IDFM hired a transport consultancy to calculate changes before and after the change. The main arguments pro flat tariff was that cheaper tickets would cause people to use more public transport. Manager from IDFM opposes this interpretation. “That was not true. Problem is that people living far from Paris use their car not because public transport is expensive but because there is no public transport. Public transport is always less expensive than car. Our calculations showed precisely that we have not reported move from car to public transport because of the price. It was just political thing to win votes.”

IDFM reports that people are happy about the flat tariff but manager reminds, that if people need to choose between quality of the transport or the price, they always choose the quality of the service. Equity question is not seen relevant in the context of zones or flat tariff, since there are well off people in Paris but also far away in Versailles. Similarly, very poor neighbourhoods situate both near and far from Paris. Instead of geographical comparison, manager would analyse the social fairness of tariff between different income levels. “Politicians should concentrate on money rather than flat fair. People who have less money should pay less, but not only in the region but also in Paris.”

In 2015 IDFM revenue was 3,4 billion euros. Organisation evaluated the direct revenue loss of change to be 450 million euros per year. The loss was collected from the companies of the region by increasing transport tax from 4 % to 6 %. In Paris region companies are forced to pay transport tax based on their pay roll. Now revenue is ten percent more, 3,8 billion euros. The measure has had a positive impact on mobility for trips with an origin or destination in the suburbs (Figure 30). After the change trips have increased 2 to 3 % per year and IDFM has nowadays over 8 million trips per day. IDFM speculates that people living outside Paris region that used to take train from there to Paris now drive to the border of the region and take the monthly rate because it is cheap. They see no modal shift from car to public transport. Manager names poor service level at outer regions as a main reason for this. He is also suspecting a modal shift from walking and biking to public transport because people have shifted from using single tickets to monthly passes.



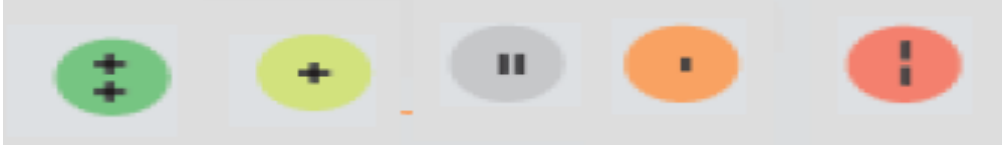
*Figure 30. Number of trips in RATP transportation services. Source: All-Zone Passes, what are the impacts two years after implementation? Brief summary 2018.*

IDFM is satisfied with territorial equity of flat tariff but not to loss of money and pricing dynamics (Table 11). The authority considers flat tariff as decision that should not have been made. Instead they would have stopped price increases in outer regions and shrank the price differences between city and the region. Currently IDFM is studying distance based tariff, which seems attractive based on economic studies. There is no political agreement on the subject and huge investments are needed for contactless payments. IDFM aims to have distance based pay as you go tariff in 2022 for single tickets. For monthly passes they believe flat rate will remain.

Table 11. Pros and cons of flat tariff in Paris region. Source: Evaluation committee for the improvement of transit services in Île-de-France - Report for 2016.

**Implementation of all-zone passes**

Cost management	Compliance with the timetable	Costs	Number of travellers affected	Improvements to time	Improvements to offer	Improvements in quality of service	Externalities
Good anticipation of annual cost overrun <i>Criterion not applicable since it is not a measure that includes expenditures</i>	=	€487 million/year estimated for 2016	+++	=	=	+	++ Economies for the majority of users, increased mobility



*Strong improvement*
*Existing improvement change*
*No*
*Partial weakening*
*Significant weakening*

Four flat tariff cities have their own characteristics based on the administrative structures, financing of regional public transport and the tariff history of the region. Turku and Stockholm represent cases where the flat tariff is in most intense use both in monthly and seasonal tickets. Paris on the other hand has the widest geographical area covered with flat tariff but only in monthly tickets. Vienna and VOR represent an example where flat tariff has so far remained only in the core city and is not expanding to the metropolitan region. Following table 12 presents the summary of the cases and evaluates also whether flat tariff had positive (+, ++, +++) or negative (-, --, ---) effects to key objectives of public transport authority or if there has been no effect at all (=) or the regional flat tariff is not in use (Ø).

Table 12. Comparison of flat tariff between cities.

City region	Turku/Föli	Stockholm/SLL	Vienna and VOR	Paris
<b>Features of flat tariff system</b>	Both single and monthly tickets in flat tariff since 2014.	Stockholm have had flat tariff for monthly passes from 1960's. Single ticket tariff was changed to flat in 2017.	City of Vienna have flat tariff from 1982. Region harmonized tariff to distance based in 2016.	Paris shifted from zones to flat tariff in 2015.
<b>Geographical area, people</b>	1185 km <sup>2</sup> 293 000 people	6300 km <sup>2</sup> 2,3 million people	Vienna, 415 km <sup>2</sup> , 2 million people VOR, 23 600 km <sup>2</sup> , 3,7 million people	12 000 km <sup>2</sup> , 12 million people
<b>Municipalities</b>	6 municipalities	26 municipalities	3 regions, 745 municipalities	8 regions, 1 276 municipalities
<b>Revenues</b>	+/-	+/-	∅	- - -
<b>Usability</b>	+++	+++	∅ (+++ in Vienna)	++
<b>Fairness/Equity</b>	+	+	∅	+
<b>Passenger growth</b>	+++	=	∅	++
<b>Land use</b>	=	=	∅	=
<b>Process</b>	Authority+ politically driven	Authority+ politically driven	∅	Politically driven
<b>Financing public transport</b>	Ticket revenues, subsidies from local municipalities.	Ticket revenues and regional tax.	Ticket revenues and subsidies from	Ticket revenues, employer tax, local, regional and national subsidies.
<b>Future plans</b>	New municipalities joining. Wants to keep flat tariff, but is not sure if it possible.	Implementing contactless payments. Want to keep flat tariff, which enables easy user experience for contactless	No significant tariff renewals coming.	Studies contactless payments and wants to renew the tariff. Distance based tariff is considered attractive for single tickets.

Easy usability is the most appreciated feature of flat tariff system in all cases. Parisian manager mention this only briefly but remembering how politicians pressed the authority to make the change, it is likely the authority has challenges to notice and report all the positive aspects of flat tariff. The discourse of flat tariff in Paris framework is critical and negative as Turku, Stockholm and Vienna are very much opposite.

Four cases differ geographically a lot. When these cities are compared to Helsinki region, HSL is between Turku and Stockholm but closer to Turku. HSL area covers together 2031 km<sup>2</sup>, 1,2 million people and nine municipalities. A-zone is 48 km<sup>2</sup>, B 264 km<sup>2</sup>, C 491 km<sup>2</sup>

and D 1228 km<sup>2</sup>. It seems that centralized regional governance and common financing covering both the central city and the region around it are some elements that makes it possible to favour comprehensive tariff solutions which flat tariff always is. When financing is not directly linked to municipality but coming from the regional or national level, it is easier to design the tariff system from the perspective of the majority and accept different subsidy levels in some marginal parts of the region. Could it be also that if public transport authority is regional organisation, it creates pressure to harmonise tariff, i.e. it is not seen justified to have different prices in different parts of the region?

In all cases of Turku, Stockholm and Paris it is striking that the level of flat tariff is either the same what the flat tariff was in the city centre or just slightly more. It seems that the phenomenon of loss aversion makes it difficult to shift to flat tariff unless the lowest prices remain quite steady and the public acceptance is guaranteed by this. Land use was not actively mentioned by any of the interviewees. When it was specifically asked, common response was that flat tariff has no direct connection to land use. It seems that regions develop their land use based on the service level of public transport rather than tariff levels. This goes hand in hand with the fact that supply elasticity is significantly higher in public transport than price elasticity, i.e., people react more to improvements on routes and accessibility that increases/decreases of prices.

Turku and Stockholm had similar processes: politicians had the will to change the system but they asked the authorities to prepare and analyse different potential models for the evaluation and gave them reasonable time to produce the deliveries. In Stockholm case politicians were exceptionally heavily involved in the process. Instead in Paris case the decision seemed quick, hasty and dictated from the politicians to the authority. Differences in procedures can be heard in expert interviews but might be seen also in the successfulness of the final design of tariff. One must also remember that authorities driving for flat tariff are likely to have bias towards positive interpretation of the results.

## **4.2 User preferences**

Two focus groups were held to discuss zonal model versus flat tariff and to compare their pros and cons. Some refers to distance based pricing were mentioned but it was not discussed deeply. First group consist of regular users and second group random users. The comments from focus groups were organized under framework "Price-Usability-Fairness". The answers favouring for flat tariff are marked with green and the answers opposing flat are marked with red. Neutral opinions were left as white. Such boxes are left empty where the participant did not comment the theme at all (Table 13 and 14).

Table 13. Regular users focus group opinions about flat tariff.

ID	Zone	Price	Usability	Fairness	Preferred model
1	A	Contradiction about flat tariff. Both best (usability) and worse option (potential price increase).	Flat has best usability		Flat tariff for ABC-area.
2	C Vantaa	Flat tariff with current AB-price would free from calculating whether to travel or not travel. Would use more monthly tickets and take trips to other zones if flat tariff. Suggests tram ticket for centre in flat model.	If flat tariff, would not have to think which ticket to use.	Outer regions would win if there were flat tariff. Thinks zone model is fairer for prices but unfair for those living just on the other side of the border. Students, retired and kids should have cheaper ticket.	Flat tariff because work place changes between Helsinki-Espoo-Vantaa-Kauniainen.
3	A	Assumes flat tariff price would be higher than zone prices. Suggest there could be cheaper single ticket for shorter trips inside Helsinki.	One zone model could make PT more workable since when people don't have to think borders.	Everyone wins in zone model except some Helsinki residents with very low income. Fears that in flat model poor people could not afford PT. Think zones can be a step towards flat tariff. The correlation of the trip length and price level is logical.	First chooses flat tariff with moderate price. Thinks it is the future oriented model. In the end switches to zones because fears price level and the result that people would stop using public transport.
4	B Espoo	Does not actively comment prices. Agrees others about the convenience of flat tariff is price is same as AB.		People living in B-zone are winners of zone model. Sees the correlation of the trip length and price level logical. Thinks zone model is fairer than flat tariff.	Flat tariff. Price could be 70 €/month. Then later is willing to recommend number 7's idea of flat tariff for ABC-area.
5	B Espoo	Is willing to pay max. 70 euro/month in flat model. Would enable trips to parents or airport. Would like to use annual ticket.	Praises the route feature in HSL application, which tells the ticket needed for the route and enables buying. Thinks flat tariff would promote PT usage.	Agrees with number three that flat price could be too high for poor people. Sees the correlation of the trip length and price level logical. Assumes that people living in the city centre would be upset about flat tariff. Points out the high apartment prices in the centre. Thinks people with lower income should have lower prices.	Zone model. Would like to have one zone ticket.
6	D	No cheaper single ticket for only centre but for the whole area.	Thinks flat tariff would promote PT usage.	Outer regions would win in flat price model.	Flat tariff.
7	B Helsinki	Is upset about price increase of single tickets in zones. In flat tariff 2,80 € would not bother as much. Thinks 59 euros/month is already high. Hesitates about flat tariff if the price is not known. Thinks the ideal model for her would be flat tariff only for ABC-zones and D could have separate tariff. Don't want cheaper centre area.	When living in Vienna found flat tariff easy. Wonders how people know where the zone border locates. Thinks two zone model would be clear, where ABC is one ja D the other. Four zone combinations too complicated.	Thinks zones are somewhat unfair though good for her. Considers flat tariff fairer than zones if the price would same as AB.	Flat tariff for ABC-area.
8	C Espoo	Agrees the convenience of flat tariff if the price is same as AB.			Flat tariff for ABC-area (no 7's idea).

Table 14. Random users focus group opinions about flat tariff.

ID	Zone	Price	Usability	Fairness	Preferred model
1	A	Would choose flat even if 20 % higher price.		Thinks it would be fair if monthly prices for Helsinki residents would increase a little if it would enable lower prices to Espoo and Vantaa.	Flat tariff
2	C Vantaa				Flat tariff.
3	C Espoo	Would 20 % higher price in flat model make people to take short trips with car?	In flat system there would be no need for such pre-planning as with zone tickets. Thinks flat tariff would promote PT usage.	Everybody should have some level accessibility.	
4	A			Reminds that many other facts like service level are more important than price. Considers zones fairer than the old municipal model.	
5	B Espoo	Would choose flat over zones, if price is same as AB or even 20 % more.	Flat price would save people's money and nerves and make PT more attractive. Random user has a problem with the zones, fear when one gets an inspection fee.	Thinks municipality pricing is fairer than zones.	In the beginning is favouring flat tariff but in the end chooses distance based pricing. Thinks it is the fairest.
6	B Espoo	Flat is ok, if single ticket is under 3 €. If the price is too high, car usage would increase. Nobody wants to pay too high price for short trip.	Flat model has best usability, travelling would be easier. Could increase the usage of PT.	Thinks zone model is fair because travelling is priced evenly to both directions.	Zone model. Thinks flat tariff has not been researched enough.
7	B Helsinki	Would use PT even if price is 10 % higher than now.	Has positive experience of distance based tariff from abroad: don't have to know anything about the destination or ticket prices.	Thinks municipality pricing is fairer than zones. Suggests also such flat tariff where one could travel with single ticket only 30 minutes.	Distance based pricing because it would be fair for old people's short trips.
8	D Kirkkonummi	Would choose flat if the price would be 10 % more than AB but not if 20 % more.	If flat tariff could be afforded, it would be much clearer. Also for tourists. Does not like the idea of distance based pricing because of the stress it would produce for traveller (taximeter effect).	It would feel unfair if the short trip is too expensive. Yet sarcastic comment that "is it the only problem in the world that everyone is able to travel with same price". Would like to see higher subsidies that would enable flat tariff. Thinks zones are fairer than flat tariff because there one pays only what he uses. "But if there is will to lead the region strongly and use bigger subsidies for PT, then let's choose flat tariff."	Zone model. Thinks flat tariff with maximum 10 % increase would be fair.

All participants from regular user group were willing to choose flat tariff if the price would be the same as AB-ticket is now. According to Rawl's veil of ignorance (Maxcy 2002, p.93) they were asked, what tariff model they would prefer if they did not know where they were living. The replies divided a little but still flat tariff was the most mentioned model. One of the group members invented the idea of flat tariff only for ABC-area, which received support from the group.

In the group of random users, most people were interested in flat tariff, if the flat price would be close to current AB price. Yet, when people were later asked to pick preferred model in the imaginary situation they don't know their living location, the responses divided between zone model, flat tariff, distance based tariff and no answers at all. Participants did not actively make remarks about land use or housing prices but when it was specifically asked, some saw that flat tariff could help the housing shortage of Helsinki. Student from D-zone commented that flat tariff could offer possibilities for growth in Kirkkonummi and municipalities like Vihti might want to join HSL. Opposite comment came from another student living in A-zone, who commented zone model enabling dense urban development.

Based on these conversations, regular public transport users who use prepaid seasonal products had more positive attitude towards flat tariff than random users. Flat tariff would offer them convenience of mobility without borders and stress. Random users were more worried about the pricing of the short trips which could explain their support for distance based tariff. However, people seem to perceive both positive and negative aspects of each tariff model gradually during the conversation and were ready to change their opinions after a new positive or negative perspective came up. Overall, none of the respondents in both groups had problems with flat tariff if the price would be the same as current AB-ticket or just slightly more. Nobody in both groups was favouring zones in such case. Furthermore, the fairness was not considered a problem in a situation where nobody has to pay more than current AB-price, even when some are using wider travel rights. However, if the flat tariff would cause significant price increases to some users, the experience of injustice rises quickly. When the random user group was asked what if the flat price would be 10 % or even 20 % more than AB-prices, there were still people both from A and C-zones choosing flat tariff. This implies that price level is critical factor for the acceptance of flat tariff.

Furthermore, fourteen individual customer interviews were made about tariff preferences. For prepaid tickets presented three different option: personal zone, ABCD-zone model and flat tariff. People were also asked to choose their preference model. The results to flat tariff questions are presented in the table 15. The respondents having more positive attitude towards flat tariff are marked with green and more negative with red. Neutral respondents are left white.



Table 15. Comments of flat tariff from individual interviews.

ID	PT usage	Age	Status	Zone	City	Comments	Own preference	Interviewer
1	Regular	19	Unemployed	B	Helsinki	Uses wheel chair. Would visit more outer regions. Eco-friendly solution because promotes to take long trips with PT. Nothing bad comes to mind. Easy to understand. Clear. Fairer than zones because everyone pays as much.	Personal zone	Ari
2	Random	67	Retired	B	Helsinki	Don't like this, because is retired and makes short trips. Good for those who travel on large area. Would increase travel costs. Makes one think, is it worth to take a trip with PT. No benefits for me. Easy to understand. Unfair to people making short trips.	Personal zone	Maija
3	Don't use PT	36	Business manager	C	Espoo	Very clear and not Helsinki centre focused. Would suite me but would not increase my PT usage. Would benefit me if I would make lot long trips with PT. No need to know where and when one is travelling. Would increase usage to longer trips but does not courage to take short trips with PT. Perhaps not the optimal model. Trip length should correlate with price.	No choice	Maija
4	Regular	41	Chef	not known	Vantaa	It should be reasonably priced. Difficult pricing task. Major users would benefit. Small increase in prices would not harm but if it would be high, then would consider other modes. Evenly unfair to all.	Zone model	Maija
5	Don't use PT	23	Student	A	Helsinki	Would increase usage. Would attract plenty of travellers outside the region. Would not cost me a lot personally because usage of PT so little. Flat would be so much nicer. Easy to understand. Same price would unite people. Really fair. Would promote travelling further without a car. No need to worry about parking.	Flat tariff	Ari
6	Random	23	Student, waitress	A	Helsinki	Not reasonable if need is only for one kilometre and there is no other option than PT. This would be strange. Would diminish personal usage. Would feel unfair to pay same price as those travelling long. Unfair to people living in the city centre. Negative effects to them, positive effects to ones living further. Good that people living far away would move more and would move with PT. Easy to understand.	Zone model	Ari
8	Regular	36	Physiotherapist	A	Helsinki	Short trip travellers would pay also the trips of longer travellers. Would mean price decrease personally but still think flat tariff is unfair. As soon kids would start to use PT, this would mean bankruptcy. Kids move on a small area and still the price is same. Good thing is that you know what you pay. Profitable for long trip travellers. Would encourage to walk short trips. Feels unfair.	Personal zone	Maija
9	Regular	47	Assistant	B	Vantaa	Would encourage to expand the mobility area. Now one always thinks should to go centre or to Jumbo. Easy to understand. Not going to happen though. Unfair if the trip is really short. But everything is not fair always. Good for me.	Flat tariff	Sari
10	Don't use PT	43	System engineer	B	Espoo	Would be good for me but bad for short trips. Should pay according to your travelling. If flat tariff in use, how to define right price for long and short trip. It would be easy that the there are no different prices. One could always evaluate is this trip worth of this to me. Maximum charge like in London would be good. Then one can	Flat tariff	Maija

						budget the ticket consumption. This would be fairer to all but short trip travellers could feel this unfair. I don't think people coming further are privileged because they have worse connections and longer trips, poorer service.		
11	Don't use PT	55	Wine specialist	-	Porvoo	Best option clearly, this would be really good. Can't think of anything bad except too high pricing. Seem bad for Helsinki residents but good for Espoo and Vantaa residents. For outsiders this would be excellent.	Flat tariff	Sari
12	Don't use PT	31	Unemployed	B	Espoo	Good for people travelling further but not for short trips where walking is not an option. Clarity is good, same for all. Challenging for those who would be suffering. Can't please everyone. Neutral attitude personally. Would not effect on personal PT usage.	Personal zone	Sari
13	Regular	24	Waitress	B	Espoo	Not fair to all. Zone model makes sense because it is based on how much you move. Here others would travel more with the same price. Clear model, easy to budget. Clear but not fair. Personally price would probably be the same.	Zone model	Maija
14	Random	47	Areal manager	B	Vantaa	No problem if the price is reasonable. From the functionality this would be good, you always know what trip costs. Equity is not ok. 3 € minimum price would be too high. Unfair for short trips. Personally would be quite good. Would not have effect on PT usage, service level issues are more important than ticket price.	Zone model	Sari
15	Regular	64	Retired	D	Kerava	Better than zones. Fair to all. Easy to understand. Step towards free PT. Flat tariff could make people walk on short trips.	Flat tariff	Ari

People are making similar comments both on positive and negative aspects of flat tariff. All the respondents make remarks about flat tariff being clear and easy to understand. Many comments are also given that flat tariff could increase the price level for short trips. People making long trips and living far from the Helsinki centre are seen as “winners” and short trip travellers in the city centre as “losers”. Comments are also given that flat tariff is either fair or unfair. Those who think this model is fair, arguments that everyone pays as much regardless of where one lives. Those commenting about unfairness refer to the trip length and that it is not right that someone is travelling more but still paying as much.

Both people from A, B and D-zone (there is only respondent living in C-zone) are favouring flat tariff, but people living in the city centre seem to be more negative towards flat tariff than in the focus group. It also seems that people *not using* PT are giving only either positive or neutral comments about flat tariff. One reason could be, that zone model feels complicated for nonusers and the simplicity of flat tariff seems therefore attractive.

General impression between focus groups and individual interviews is that there was more negative attitude towards flat tariff in individual interviews than in focus group discussions. Few reasons can explain this. First is randomness, since there are only few people answering, and no statistical conclusion can be drawn from these. However, in focus group discussions people were mainly focusing to zone model vs. flat tariff and no other competing models were presented, so they had really time to evaluate all the negative and positive aspects of the model. In individual interviews flat tariff was the last model presented at the end of interview. People might have been already slightly tired, and some earlier presented competing concepts might have attracted participants so that the interpretation towards flat tariff is more negative. One relevant difference between focus groups and interviews was

that in the focus groups interviewer and participants elaborated the theme and speculated about the price level of flat tariff. This idea of having no losses for everyone made flat tariff acceptable for all. As remembered, the question of unfairness was not relevant if nobody loses anything even if someone benefits more than the other. This speculation of price levels was not present in the individual interviews which seemed to activate the negative emotions of losses. One notion is also that regular users of focus groups were clearly more interested in flat tariff than random users. One reason for this was the idea made by number 7. She suggested flat tariff just for ABC-area, which received support from other group members. The same idea did not pop up in the random group or in individual interviews.

### 4.3 Effects on demand and ticket revenue

The effects of flat tariff were calculated based on sales estimation for 2018 and sales for May 2019 using short-run elasticity values. Long-run effects were calculated only based on May sales. Two calculations produced quite different results for ticket prices. In the fall 2018 HSL estimated annual sales of single tickets, value tickets and seasonal tickets for adults, children and discount groups account for 373 million euros. Numbers include tram tickets but no daily tickets. Tram tickets and value tickets are included under the category “single tickets”.

Table 16 shows the results, if single ticket price for flat tariff would be close to AB ticket price and monthly ticket would cost 63,80 (coefficient 22 to single ticket). This price level follows roughly the principle of avoiding loss aversion, where current users would suffer no significant price increases. Elasticity calculations indicate that flat tariff could reduce total sales with 16 % and increase annual subsidies with 60 million euros. If financial object is to remain ticket revenues, single ticket price should be around 4 euro. This would increase monthly ticket price close to 90 euro, which would have striking effect on demand. Even with this significantly higher price level, the total sales would drop slightly but the demand for monthly ticket would decrease 14 % and monthly tickets as much as 24 %.

*Table 16. Short-run elasticity effects of flat tariff based on 2018 sales estimation.*

Tariff	PRICE	SALES EUR	TICKETS (piece)	SINGLE TICKETS	MONTH LY TICK- ETS	CHANGE IN DE- MAND	CHANGE IN SALES
Tariff 2018	Varies	372 996 805	62 024 761	59 100 505	2 924 256	0 %	0 %
Flat 1	2,90/ 63,80	311 542 800	59 032 833	52 511 964	2 903 387	-5 %	-16 %
Flat 2	4/88	366 591103	49 776 097	44 630 050	2 496 160	-21 %	- 2 %

Same calculation was made after the zonal change based on sales data May 2019 from travel card system and mobile ticket system. Comparison was restricted to only sales data of 18+ HSL residents' monthly (normal/discount) and single ticket purchases. Anonymous single tickets are missing from both calculations, but their share of the total sales is minor.

Children tickets and daily tickets are also missing but for the comparison they are not relevant. The results show that price level of 3,3/35/69 € could collect same revenue as now with significantly lower prices than in the first calculation (Table 17). By average, only 15-17 % price increases were needed. The zonal change is likely the main factor between different results, since zone prices have already “flattened” the tariff structure. Number of monthly tickets decreased 1,6 % and single tickets 3,5 %, mainly from AB-ticket users.

*Table 17. Short-run elasticity effects with price level 3,3/69 based on 18+ HSL residents' sales May 2019.*

		Old price €	New price €	Old sales pcs	Old sales €	New sales pcs	New sales €	Price elastic- ity
Single	AB	2,8	3,3	2437891	6826096	2298583	7585325	0,32
Single	ABC	4,6	3,3	317279	1459481	345972	1141706	0,32
Single	ABCD	6,4	3,3	91708	586928	105922	349543	0,32
Single	BC	2,8	3,3	401757	1124920	378799	1250038	0,32
Single	BCD	5,4	3,3	19698	106369	22149	73093	0,32
Single	CD	4,2	3,3	25459	106928	27205	89776	0,32
Single	D	2,8	3,3	26638	74585	25115	82881	0,32
Monthly	AB	59,7	69	109907	6561426	103743	7158269	0,36
Monthly	ABC	107,5	69	17828	1916487	20126	1388716	0,36
Monthly	ABCD	156,4	69	3808	595607	4574	315630	0,36
Monthly	BC	59,7	69	14120	842961	13328	919639	0,36
Monthly	BCD	115,8	69	865	100172	991	68372	0,36
Monthly	CD	98	69	533	52225	590	40688	0,36
Monthly	D	59,7	69	391	23325	369	25447	0,36
Discount	AB	32,8	35	47734	1565688	46582	1630362	0,36
Discount	ABC	59,1	35	8055	476056	9238	323316	0,36
Discount	ABCD	86	35	1253	107777	1521	53227	0,36
Discount	BC	32,8	35	5886	193048	5743	201022	0,36
Discount	BCD	63,7	35	410	26110	476	16673	0,36
Discount	CD	53,9	35	261	14065	294	10286	0,36
Discount	D	32,8	35	247	8109	241	8444	0,36
<b>TOTAL</b>				<b>3531726</b>	<b>22768362</b>	<b>3411562</b>	<b>22732452</b>	

When current lowest prices constructed the price level (Table 18), calculation showed 25 million extra annual (12 month) subsidy need for adult travel card and mobile sales. The total extra subsidy would be around 35 million euros at a rough estimate, when all children sales, daily tickets and sales outside HSL region are included. Interesting however, when using long-run elasticity values (Table 19), the need for extra subsidy is lower and demand grows more due to higher elasticity values of single tickets and monthly tickets.

Table 18. Short-run elasticity effects of flat tariff with AB-price level based on 18+ HSL residents' sales May 2019.

		Old price €	New price €	Old sales pcs	Old sales €	New sales pcs	New sales €	Price elasticity
Single	AB	2,8	2,8	2437891	6826096	2437891	6826096	0,32
Single	ABC	4,6	2,8	317279	1459481	357007	999620	0,32
Single	ABCD	6,4	2,8	91708	586928	108215	303002	0,32
Single	BC	2,8	2,8	401757	1124920	401757	1124920	0,32
Single	BCD	5,4	2,8	19698	106369	22733	63652	0,32
Single	CD	4,2	2,8	25459	106928	28175	78889	0,32
Single	D	2,8	2,8	26638	74585	26638	74585	0,32
Monthly	AB	59,7	60	109907	6561426	109708	6582469	0,36
Monthly	ABC	107,5	60	17828	1916487	20664	1239819	0,36
Monthly	ABCD	156,4	60	3808	595607	4653	279195	0,36
Monthly	BC	59,7	60	14120	842961	14094	845664	0,36
Monthly	BCD	115,8	60	865	100172	1015	60906	0,36
Monthly	CD	98	60	533	52225	607	36438	0,36
Monthly	D	59,7	60	391	23325	390	23400	0,36
Discount	AB	32,8	33	47734	1565688	47630	1571777	0,36
Discount	ABC	59,1	33	8055	476056	9336	308079	0,36
Discount	ABCD	86	33	1253	107777	1531	50532	0,36
Discount	BC	32,8	33	5886	193048	5873	193798	0,36
Discount	BCD	63,7	33	410	26110	481	15873	0,36
Discount	CD	53,9	33	261	14065	297	9813	0,36
Discount	D	32,8	33	247	8109	247	8140	0,36
<b>TOTAL</b>				<b>3531726</b>	<b>22768362</b>	<b>3598941</b>	<b>20696667</b>	

Table 19. Long-run elasticity effects of flat tariff with AB-price level based on 18+ HSL residents' sales May 2019.

		Old price €	New price €	Old sales pcs	Old sales €	New sales pcs	New sales €	Price elasticity
Single	AB	2,8	2,8	2437891	6826096	2437891	6826096	0,6
Single	ABC	4,6	2,8	317279	1459481	391770	1096956	0,6
Single	ABCD	6,4	2,8	91708	586928	122659	343445	0,6
Single	BC	2,8	2,8	401757	1124920	401757	1124920	0,6
Single	BCD	5,4	2,8	19698	106369	25389	71088	0,6
Single	CD	4,2	2,8	25459	106928	30551	85542	0,6
Single	D	2,8	2,8	26638	74585	26638	74585	0,6
Monthly	AB	59,7	60	109907	6561426	109476	6568551	0,78

Monthly	ABC	<b>107,5</b>	<b>60</b>	17828	1916487	23972	1438329	0,78
Monthly	ABCD	<b>156,4</b>	<b>60</b>	3808	595607	5639	338346	0,78
Monthly	BC	<b>59,7</b>	<b>60</b>	14120	842961	14065	843876	0,78
Monthly	BCD	<b>115,8</b>	<b>60</b>	865	100172	1190	71411	0,78
Monthly	CD	<b>98</b>	<b>60</b>	533	52225	694	41645	0,78
Monthly	D	<b>59,7</b>	<b>60</b>	391	23325	389	23351	0,78
Discount	AB	<b>32,8</b>	<b>33</b>	47734	1565688	47507	1567743	0,78
Discount	ABC	<b>59,1</b>	<b>33</b>	8055	476056	10830	357384	0,78
Discount	ABCD	<b>86</b>	<b>33</b>	1253	107777	1856	61236	0,78
Discount	BC	<b>32,8</b>	<b>33</b>	5886	193048	5858	193301	0,78
Discount	BCD	<b>63,7</b>	<b>33</b>	410	26110	564	18611	0,78
Discount	CD	<b>53,9</b>	<b>33</b>	261	14065	340	11216	0,78
Discount	D	<b>32,8</b>	<b>33</b>	247	8109	246	8119	0,78
TOTAL				<b>3531726</b>	<b>22768362</b>	<b>3659279</b>	<b>21165749</b>	

#### 4.4 Transport justice analysis

Travel survey from 2012 showed the higher the income level, the more trips people make, especially with car (HSL, 2013, p. 43). Survey from 2018 (HSL 2019 a) has no income data but contains status data of employment. Table 20 shows no significant difference in the number of trips between all, unemployed and retired. Also, the usage of PT is on same level among all respondents, but retired people use PT significantly less than others. The length of trips and PT trips among unemployed and retired are considerably shorter than among all respondents. If flat tariff would mean price increases to cheapest prices, the change could affect these groups in HSL region.

Table 20. 18+ inhabitants' trips inside HSL region from HSL survey 2018.

	Number of people	Number of people with PT trips	Share of people with PT trips	Number of trips/person	Number of PT trips/person	Average length of trips	Average length of PT trips
<b>All</b>	5690	1923	34 %	3,7	0,7	5,5 km	9,1 km
<b>Unemployed</b>	173	58	34 %	3,5	0,7	3,9 km	7,6 km
<b>Retired</b>	1683	330	20 %	3,4	0,4	3,7 km	6,9 km

When comparing low income postal codes travel behaviour to whole region, the higher usage of PT is seen in all four postal codes (Table 21). Vallila 00550, which has the densest city structure and best accessibility, scores highest in PT usage. The length of all trips and PT trips seem to be in direct relation to the distance from Helsinki city centre. However, data includes only few PT respondents from 01360 and 02410, but the sales data confirms that residents of these postal codes are making fewer but longer and more expensive PT

trips than their neighbours in Helsinki. As the modal share of PT correlates with the availability, accessibility, affordability and time budget of PT, it is no surprise that 005550 and 00940 scores higher than others with PT usage. Inhabitants of 02410 have less trips than others, while their PT trips are mainly long and expensive four zone trips (Figure 31). Probably, some trips in 02410 are unrealized due to service or budget restrictions.

*Table 21. Trip profile comparison between low income postal codes based on HSL survey 2018 and sales data from May 2019.*

	Average length of all trips	Average length of PT trips	Share of people with PT trips	Number of trips/person/day	Number of PT trips/person/day	PT spending/May 2019	%-share of AB/ABC/ABCD sales	%-share of PT spending/income	Change of PT spending if flat tariff
<b>All</b>	5,5 km	9,1 km	34 %	3,7	0,7	23 €	66/17/6	1 %	–
<b>00550</b>	2,7 km	4,4 km	72 %	4,6	1,8	29 €	84/13/2	1,6 %	↑
<b>00940</b>	4,7 km	7,8 km	57 %	3,9	1,3	23 €	89/6/1	1,4 %	↑
<b>01360</b>	5,5 km	11,4 km	40 %*	3,9	0,8	25 €	6/61/1	1,4 %	↓
<b>02410</b>	8,5 km	18 km	43 %**	3,3	0,8	16 €	5/2/46	0,9 %	↓

\*only 16 respondents with PT trips \*\* only 10 respondents with PT trips

Based on both trip data of postal codes (Figure 31) and sales data, it is likely that low-income areas on C or D-zone are suffering transport poverty in the form of ticket price, availability, accessibility and time budget. Instead, low income areas of A and B-zones seem to have better situation with their transport services and budget. The analysis shows, that flat tariff with higher prices than current AB-price would have opposite effect on these regions. Flat price would improve transport affordability of 01360 and 02410 but would weaken it in 00550 and 00940.

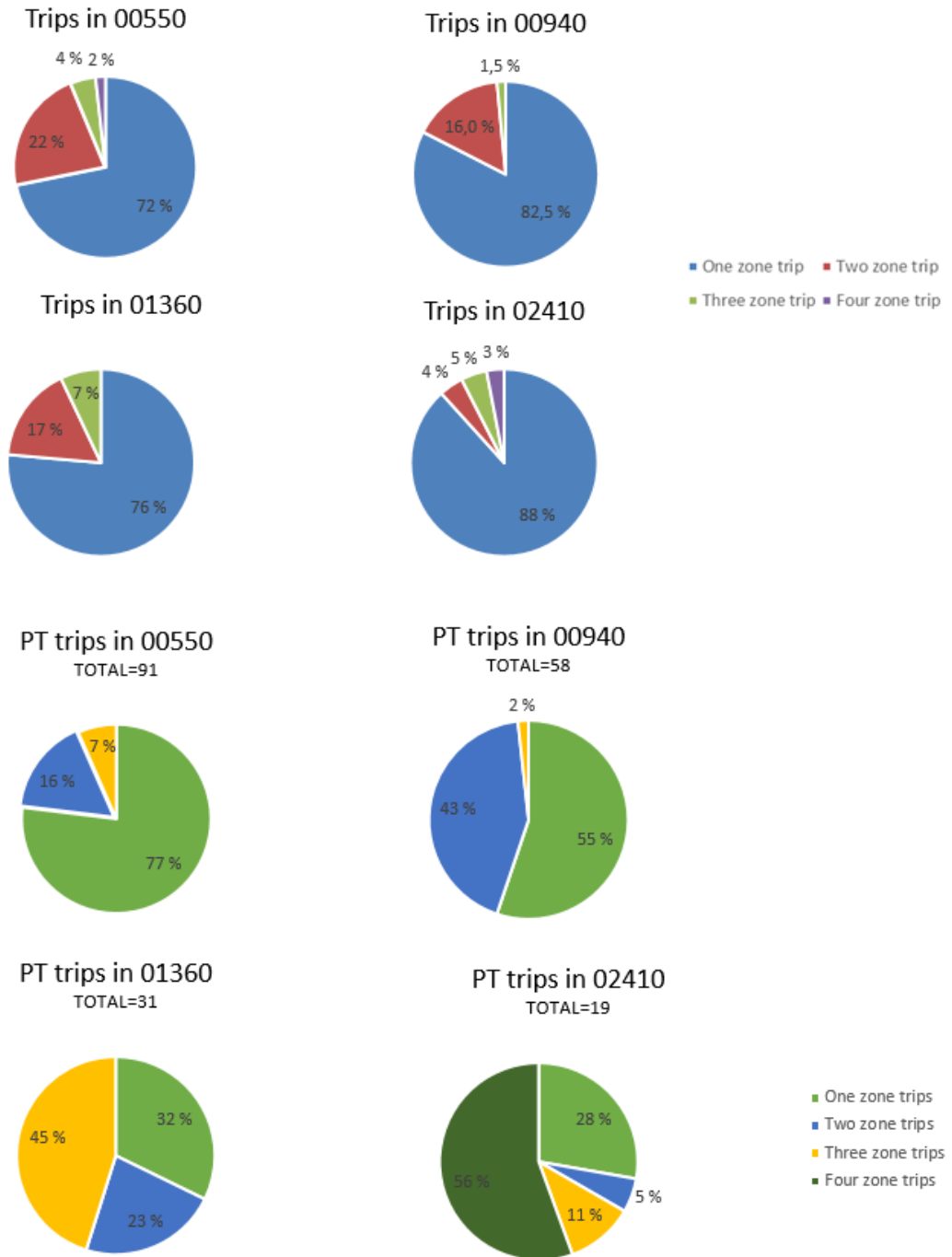


Figure 31. Trip distribution of 00550, 00940, 01360 and 02410 based on GPS data from Telia and PT trips of 18+ residents from HSL survey 2018.



## 5. Discussion

Next are presented the key findings as well critical comments both from literature review and empirical findings under each research questions.

### *What are motives and experiences for flat tariff in different cities?*

In theory, flat tariff is the best tariff solution for cities with small deviation in PT trip lengths and the demand for services is even. This can be the case in cities, which have round and dense structure like Vienna. Also, in larger regions the share of longer trips might be low so that it is easier and more useful to have flat tariff than to design complex zone structure. In Stockholm case, the share of already flat tariff monthly tickets of total sales was 80 % and from single ticket passages 80 % were made only in one zone, so there was no real financial need to keep up the zone structure for only limited share of revenue. However, normally flat tariff has not the same capacity to collect ticket revenue as optimal zone structure, which has beaten both flat tariff and distance-based tariff in revenue simulation study (Otto & Boysen 2017, p. 363).

Simplicity is the main benefit for flat tariff mentioned by all tariff experts and PT users in Stockholm, Turku and Vienna. Simplicity relates to easy usage but also to implementation of tariff collection system. Stockholm is implementing contactless ticketing and flat tariff simplifies the technical implementation of the tariff system. Turku case had similar experience. All cities praised easiness of the flat tariff except Paris, which was politically forced to switch zones to flat tariff. Paris had experienced the financial losses of flat tariff harder than others, since the area and population inside the flat tariff is much wider than in other cities. Yet, just three years after the change, Paris region was collecting 10 % more ticket revenues than before the change. It seems that lower prices in outer regions have promoted new sales. Goal to promote PT usage of the outer regions was the outspoken motive for change in Paris region. Political debate emphasized the fairness for outer regions and PT usage there, while authority was sceptical and considered this as adulation of voters before the coming elections.

There were two opposite fairness perspectives to flat tariff. One mainly coming from decision-makers and experts is that in outer regions people are having poorer service level, higher waiting times and longer travelling times. Therefore, it is not fair to make those users pay more. The opposite perspective of unfairness was coming people travelling short trips, usually living in the city centre. From theoretical perspective, marginal social costs are higher in the centre and therefore short trips should be more expensive there than in the suburbs, but for users this argument can be difficult to comprehend. Anyhow, marginal cost should *flatten* the tariff (Jansson & Angell 2012, pp. 150-151).

In all cases of Turku, Stockholm and Paris it was striking that the level of flat tariff was the same what the lowest price was earlier or just slightly more. In Turku the strongest resistance against zones came *inside* Turku citizens who would have located to more expensive zone. Same aversion towards losses was seen also in Oslo in another study (Jansson & Angell 2012, pp. 150-151). Stockholm calculated whether they should have zones for monthly passes. The decrease in price of having just one zone monthly ticket was minimal but the price would have doubled for those travelling three zones. Nobody wanted that.

These findings support the loss aversion theory; people experiencing losses are emotionally suffering more compared to joy of those having similar sized gains.

Centralized financing for whole region is likely one element that enables regional flat tariff. In Vienna region, discussion about flat tariff has never occurred as two independent organisations, City of Vienna and VOR, are separately financed. However, Turku region is financed by independent municipalities, who have at least so far manager agree on flat tariff subsidy model. Land use was not actively mentioned by any of the interviewees and seem to have no direct connection to tariff. More emphasis was given to service level improvements. Finally, good planning and design of tariff change must be notified as critical factor in successful tariff change. When planning was done poorly or in hurry, the results were weak and corrections were needed afterwards. Instead, careful planning, calculation and designing of flat tariff helped to avoid unexpected outcomes.

Yet, this paper has studied only four empirical cases and few literature ones, which is a small sample among city regions, and between the cases like Vienna and Paris there are significant differences. No statistical generalisations should be drawn based on this data. Also, the true value of simplicity is difficult to evaluate. Paris user figures and sales have developed well after the sales collapse, but how they would have developed with zones?

#### ***How HSL-customers see flat tariff? What elements make it attractive/non-attractive?***

**Simplicity.** That was constantly mentioned as the best element of flat tariff according to user respondents both in focus groups and individual interviews. Simplicity was the most appreciated feature, which would enable carefree travelling in the region, where one has no stress about the borders and travelling rights. This refers to existence of flat rate bias. When discussing distance based tariff, one respondent mentioned taximeter effect, the negative emotion of having “the monkey on the shoulder” while travelling (Lambrecht and Skiera 2006, pp 213-222). Some respondents suggested flat tariff could encourage them to take trips outside current usage area, but some thought they have no need for larger travelling. People not using PT, where favouring flat tariff, perhaps due to simplicity.

**Expensive price.** This was the most common fear related to flat tariff. People had very intuitive thought, that flat tariff would mean higher prices and they were especially worried about low income user groups such as students. The random users were more worried about the price, had more negative attitude towards flat tariff and seem to have pay-per-use bias. In focus groups discussions, the immediate response to flat tariff was “it would be really simple but probably expensive.” When elaborated more, people preferred flat tariff instead of zones, if the price would be the same or just 10 % more as AB-price. Some were willing to choose flat tariff even if the price would be 20 % more. Based on these interviews, the zone model lacks positive user experience other than possibility to lower prices for shorter trip travellers. The association of high prices of flat tariff was so intuitive, that it seem people have no real understanding of the very small portion of people making long trips or the fact that cost of trip is not in direct relationship to the length of trip.

Flat tariff was seen both fair or unfair. Those who think this model is fair, argument that it is fair that everyone pays as much regardless of where they live. Comments about unfairness refer that it is not right that someone is travelling more, but still paying as much. However, when elaborated more, the fairness of flat tariff related very much to potential

price increases. If tariff change would mean nobody have to pay more than currently, hardly anyone would complain about the unfairness. As one participant replied: “It is not taken away from me if someone is allowed to travel with same price”. It was somewhat surprising, that envy factor was related mainly to situation, where short trip prices would increase. People living in the Helsinki city centre were mentioned as “losers” and people living far away as “winners” in such situation. These comments were similar to user responses coming from Stockholm or Turku, though it must be remembered that the only few users were giving such feedback. Loss aversion can create very negative feelings and experience of injustice that are not easily compensated by the pleasure resulting from simplicity of flat tariff.

As a summary, people were struggling between simplicity and price, when evaluating the suitability of flat tariff. One of the participants in the first focus group invented the idea of flat tariff only for ABC-area as a compromise solution to this, which received strong support from the group and was chosen by many as their favourite choice. Though people were willing to pay extra for the simplicity, the real value of simplicity can't be known based on these interviews. Assessing how much more users would be willing to pay for simplicity would require extensive revealed preference surveys.

***What effects flat tariff could have for ticket revenues, subsidies and usage of public transport in HSL region?***

In the fall 2018, 81 % of 18+ residents' PT trips in HSL region were made inside one or two zones, and the rest of the trips were divided evenly between three-zone and four-zone trips. The sales of one or two zone tickets among 18+ was 76 % (Figure 24). Even the high share of lowest priced tickets, there is still substantial share of longer and more expensive trips. If the zone model will change the travel behaviour to direction where maximum 2-zone trips would cover 90 % of all trips and sales, it could reasonable to think giving up zones.

Elasticity calculations show that flat tariff can be implemented either so that revenue stays the same, extra subsidies are not needed but the usage drops, or that usage increases but need for subsidies grows from 35 to maximum 60 million euros annually. Remaining revenues and increasing usage at the same time with flat tariff is not possible, unless the simplicity has higher than expected value to users. Interestingly, if long-run elasticity effects are realized accordingly, the decrease or increase related to price changes will be stronger, and flat tariff shows smaller need for subsidy and higher demand.

Calculations were made using the same coefficient to all data. However, due to loss aversion, the effect of increased prices (AB-zone) would be more intense than effect of falling prices. Also, elasticity values are known to be higher in the outer regions than in the city centre (Litman 2004. p.40.) This could mean that higher prices have no such strong negative effect on A-zone as expected. On the other hand, the positive effects on C and D-zone could be stronger than calculations report. Transaction utility and mental accounting (Thaler 1999) have also effects on monthly users, which elasticity values ignore. Consumers feel better off when they have paid a low average price for the goods consumed, and when flat rate for monthly price is decreased, the existing customers might decrease their PT usage and spent spared travel budget to other travel services. At worst, low-priced monthly

tickets could decrease PT usage. Instead, price increases of monthly ticket could result more trips taken.

The principle of marginal social pricing would suggest that zone prices should be higher closer to the city centre and inner zones should be narrower (Jansson & Angell 2012). Therefore, travelled kilometres should be more expensive in the centre than in outskirts. As learnt from trip data, people living in A-zone are making shorter PT trips than residents of D. Applying marginal social pricing here would direct flattening the price difference between AB and ABCD-tickets but not having a totally unified tariff.

As a summary, implementing flat tariff with current travel behaviour profile of HSL region is not recommended without prepare for extra subsidies. Only strong evidence of high value of simplicity of the system could cover price increases without extra subsidies. Qualitative data from HSL-customers, experiences from other cities or tariff literature do not support such strong interpretation. The usage of extra public money to flat tariff can also be questioned as the most efficient usage of subsidy. However, if flat rate would be implemented with price increases, it could increase usage among existing monthly ticket customers due to mental accounting. Flat tariff would also improve the PT usage on C and D-zone. Better option for extra subsidies would still be price cuts in C- and D-zone and investments to service level of these regions. However, based on behavioural and elasticity literature, average elasticity values have problems to describe accurately the behavioural change for the whole region. Presented results from elasticity calculations should be therefore treated with caution, as they tend to underestimate effects in outer regions and overestimate effects in inner zones.

### *What effects flat tariff have for least well-off people in HSL region?*

Low income neighbourhoods of HSL region appear heterogeneous, where outer regions are suffering from poorest service levels and highest prices. This double punishment increases transport poverty in C- and D-zone. If flat tariff price would be the same as current AB-ticket price, all four analysed neighbourhoods would benefit. Subsidies would be heavily increased mainly in outer municipalities, since Helsinki-residents travel only little to C- and D-zone. If the price level of flat tariff would be significantly higher than current AB-ticket, low income areas on A- or B-zone would suffer but neighbourhoods in C- or D-zone would likely benefit. However, low income postal codes of A- and B-zone seem to have significantly better transport services than on C- and D-zone (Figure 21). People living in Helsinki are travelling little outside AB-zone, so AB-priced flat tariff would not have effect on subsidies of City of Helsinki.

Rubensson et al. found that in Stockholm, contrary to arguments leading the tariff change, the more distance-based the fare scheme is, the more it benefits lower income travellers. They concluded that move from zonal fare to a flat fare scheme was a regressive policy change (Rubensson et al. 2018, p.8). Yet, conclusion to favour distance-based tariff as best solution to least well-off people in Stockholm would be oversimplification. Tariff design is NP-hard problem and even if distance-based tariff is fairer to low-income people in Stockholm than flat one, most likely it is not the fairest solution. Also, kilometre-based tariff of Stockholm case can be criticized having same kilometre prices through the region and violating marginal cost principle. In the first place, must be questioned, why fare structure should be designed based on residence of worst or best-off residents. Such design principle

will generate over-subsidies to people. Main design principle for PT tariff structure should rather be maximum attractiveness and usage, while fairness is solved through targeted discount pricing.

***What frameworks public transport organisations should utilize when they are planning tariff and pricing strategies?***

The study has reviewed theoretical literature related to PT pricing, experiences from other European cities, customer views, financial and demand impacts, travel behaviour in HSL region and transport justice analysis related to flat tariff. Based on the results, the ideal tariff maximizes social benefits, is easy and attractive to users, promotes PT usage, supports efficient use of network and improves transport justice for least well-off. During the study process following frameworks have shown to be critical: transport economics, behavioural economics, marketing, service design, transport analysis and justice analysis (Figure 15). Table 22 presents main design principles for PT tariff both from the theoretical literature and study process. It is important to notice that some goals are conflicting, such as aim for simplicity and social marginal cost principle. Yet designing optimal tariff structure is complex computational task, tariff planners should be able to define attractive fare structure through empirical data, knowledge and continuous learning.

*Table 22. Design principles for PT tariff planning.*

Use variety of qualitative and quantitative methods to analyse and design tariff.
Study empirically passengers' needs, behaviour and psychology.
Analyse travel behaviour and trip profile of the region.
Follow the social marginal cost principle to reasonable extent. Higher prices when and where the PT demand is highest.
Increase prices for trips with lowest elasticity. Decrease prices, where elasticity is highest (Ramsey principle).
Take into account both long-run and short-run elasticity effects as well as regional or situational elasticity effects.
Design simplicity for passengers.
Avoid loss aversion phenomenon on large scale.
Promote steady buying, paying and usage with pre-paid products.
Utilize sunk cost effect: remind people of what they have already paid.
Promote flat-rate bias instead of pay-as-you-go usage.
Include high priced products to product category to rise the reference price.
Learn from customers, what builds sense of fairness. Do not guess or deduce results but use qualitative, empirical data.
Analyse, which customers are suffering transport poverty, and improve their accessibility with targeted, efficient solutions. Don't over-subsidize masses.
Develop tariff through evolution, not revolution.
Develop computational models to compare different tariff settings.

## 6. Conclusion

This paper has showed that flat tariff in HSL region is realizable, but would demand extra subsidies if PT usage and customer satisfaction should be improved concurrently. Simplicity has reported to be the main benefit of flat tariff both for users and for the system in HSL region. Experience of fairness is related to potential losses. If the price level of flat tariff would be the current lowest AB-level, feeling of injustice is not a major problem. Instead, if flat tariff is implemented with price increase to inner zones, negative emotion of “losers” is stronger than the joy of “winners”. Flat tariff with AB-price level would improve transport justice for all users. Higher price level would improve transport affordability for low income regions of C- and D-zone, but least well-off people in A and B-zone would suffer. Elasticity calculations showed that flat tariff is not the optimal model to maximize both revenue and usage unless the financial value of simplicity is higher than expected. However, this paper does not define value of simplicity, which would need extensive empirical tariff studies. Flat rate with higher prices than currently could increase usage among existing monthly ticket customers due to mental accounting.

Study has showed that behavioural economics of buying and pricing is relevant framework when planning PT tariffs. Especially the phenomenon of loss aversion has shown to be critical in the process of tariff changes. Traditional economics and qualitative analysis of user experience include to tariff planner’s tool box, but they should be expanded with an understanding of passengers’ economical behaviour and quantitative methods of psychological pricing.

Current trip profile in HSL region does not support the usage of flat tariff, though the share of short trips is considerable, 95 % of all trips and 81 % of PT trips are made inside one or two zones. However, the number of two-zone PT trips should be close to 90 % to rationalize flat rate. The expansion of HSL-region would also be financially more problematic in flat tariff system. Instead of flat tariff, HSL is recommended to lower prices of 3- and 4-zone trips, which is justified based on social marginal cost principle and stronger elasticity effects to outer zones. Also, the revenues from the potential future road pricing should be targeted for extra subsidies and service level improvement in C- and D-zones, whose residents would be most affected by road pricing. Paper criticizes also the usage of geographical tariff structure as the most efficient tool to distribute transport justice. Instead are recommended targeted subsidies to least well-off passengers.

Most relevant lesson during the abductive research process was finding of behavioural economics for public transport pricing. Applying loss aversion theory to PT pricing was critical, since it explains the common phenomenon, where unsatisfied passengers are always louder than satisfied ones. One surprising observation was, at least to the author, that large share of short trips in HSL region. One unexpected finding was the lack of envy in situations, where extra discounts are distributed only to some, but no other suffers or is less advantaged.

Few limitations need to be mentioned. This paper includes no evaluation of all potential tariff solutions. Study focuses strictly to evaluate flat tariff for HSL region compared to zone model. Yet, some remarks are made about distance based tariff, since it is the full opposite to flat tariff. It is important to emphasize that no statistical conclusions can be drawn

based on qualitative focus groups, individual interviews and four other city cases. If new groups would be organized, some different arguments might likely come into sight.

Quantitative analyses have limitations as well. Elasticity values used in this study are general and they do not take into consideration the elasticity differences between different trips, zones or time of travel. Also, behavioural effects of transaction utility, mental accounting, flat-rate bias, sunk-cost effect, awareness of payments and utility value of simplicity have been recognized, but their true financial effects have not been evaluated, since it would require quantitative revealed preference studies.

Finally, the potential weaknesses of this case study are reviewed using Easton's three criteria (Easton 1995, p. 379): a. case studies are just descriptions of events b. limited data provides partial support of theories and is used as quasi-deductive theory testing c. multiple case studies are used as statistical generalisation. In this study, all main problems have hopefully been avoided. Paper has tried to analyse and argument the process and reasons behind the flat tariff development in city cases. Also, this paper has versatile and deep theory review to avoid the second problem as abductive methodology recommends. The rejection of statistical generalisation has emphasized several times during the process. However, main weakness of this study is the lack of quantitative method for behavioural effects of tariff, since behavioural theories were found just *after* the empirical data gathering process.

For future research suggestions HSL is recommended to make travel survey at earliest one year after the zonal change to analyse, how people's travel behaviour has changed and what is the current travel profile of zones. Large scale revealed preference study is needed to test behavioural pricing theories and examine new ones. Also, examining price elasticities more detailed for different type trips in different zones would be useful for future tariff development. Peak-pricing is also one pricing option worth to study. Finally, computational tools to analyse tariff models should be developed while knowing that optimal model can hardly be found, but a few very good options can be identified.

## Source list

- Ahuja N. 2016. The Eight 'P' of Marketing Mix. International Journal of Research in Humanities & Soc. Sciences, 4(8). ISSN:(P) 2347-5404 ISSN:(O)2320 771X. [http://www.raijmr.com/ijrhs/wp-content/uploads/2018/04/IJRHS\\_2016\\_vol04\\_issue\\_08\\_03.pdf](http://www.raijmr.com/ijrhs/wp-content/uploads/2018/04/IJRHS_2016_vol04_issue_08_03.pdf)
- Allmännyttan 2019. Miljonprogrammet. <https://www.allmannyttan.se/historia/tidslinje/miljonprogrammet/>. Retrieved 1.7.2019.
- American Marketing Association AMA 2004 & 2013. Definitions of Marketing. <https://www.ama.org/the-definition-of-marketing/> Retrieved 17.6.2019.
- Antara H. 2018. Economics: The Discipline That Refuses to Change. The Atlantic.com. Published 14.12.2018. Retrieved 26.2.2019. <https://www.theatlantic.com/education/archive/2018/12/why-do-econ-classes-barely-mention-behavioral-economics/578092/>.
- Balcomb, R. et al. 2004. The demand for public transport: a practical guide. TRL Report TRL593.
- Behavioural Strategy Group 2016. Dilbert does behavioural economics: Loss aversion, <https://behaviouralstrategygroup.com/2016/04/20/dilbert-does-behavioural-economics-loss-aversion>. Retrieved 10.3.2019.
- Brown A. 2018. Fair fares? How flat and variable fares affect transit equity in Los Angeles. Case Studies on Transport Policy, 6(4), pp 765-773.
- Camerer C.F. & Loewenstein G. 2004. Behavioral Economics: Past, Present, Future. In Camerer, C.F., G. Loewenstein, and M.Rabin (edit.) Advances in Behavioral Economics. Russell Sage Foundation. Princeton, NJ: Princeton University Press, pp. 1– 51. [http://www.contrib.andrew.cmu.edu/~gl20/GeorgeLoewenstein/Papers\\_files/pdf/BehEcon-PastPresentFuture.pdf](http://www.contrib.andrew.cmu.edu/~gl20/GeorgeLoewenstein/Papers_files/pdf/BehEcon-PastPresentFuture.pdf)
- Cats O., Reimal T. and Susilo Y. 2014. Evaluating the Impacts of Fare-Free Public Transport Policy: The Case of Tallinn, Estonia. Transportation Research Record, 2415, pp. 89-96. DOI: 10.3141/2415-10. <http://trb.metapress.com/content/vm0jx54u24846r7l/>
- Choy Y. 2018. Cost-benefit Analysis, Values, Wellbeing and Ethics: An Indigenous Worldview Analysis Faculty of Economics. Ecological Economics, 145(C), pp. 1–9.
- Crisp R. 2003. Mill on Utilitarianism. New York: Taylor & Francis e-Library. ISBN 0-203-71885-2.
- Day G. & Montgomery D. 1999. Charting New Directions for Marketing. Journal of Marketing, vol. 63, pp. 3-13.
- Dubois, A. & Gadde L-E. 2002. Systematic combining: an abductive approach to case research. Journal of Business Research, 55, pp. 553-560.



- Dubois, A. and Gadde L-E. 2014. "Systematic combining"—A decade later. *Journal of Business Research* 67, pp. 1277–1284.
- Easton G. 1995. Case research as a methodology for industrial networks: a realist apologia. *Proceedings from the 11th IMP Conference, Manchester*. Manchester: Manchester Federal School of Business and Management, pp. 368–91.
- Elgar, I. & Kennedy C. 2005. Review of Optimal Transit Subsidies: Comparison Between Models. *Journal of Urban Planning and Development*, 131(2), pp. 71-78.
- Espoo, 2018. Lausunto Helsingin seudun liikenne -kuntayhtymän alustavasta toiminta- ja taloussuunnitelmasta vuosille 2019-2021. Retrieved 19.1.2019. <http://hsl01.hosting.documenta.fi/kokous/2018555-2-1.PDF>
- FitzRoy F. & Smith I. 1998. Public transport demand in Freiburg: why did patronage double in a decade? *Transport Policy*, Volume 5 (3), pp. 163-173. [https://doi.org/10.1016/S0967-070X\(98\)00024-9](https://doi.org/10.1016/S0967-070X(98)00024-9).
- FitzRoy F. & Smith I. 1999. Season tickets and the demand for public transport. *Kyklos*, Volume 52 (2), pp. 219-238.
- Gourville J. & Soman D. 2002. Pricing and the Psychology of Consumption. *Harvard Business Review*, 80(9), pp. 90-96.
- Grönfors M. 2008. Laadullisen tutkimuksen kenttätömenetelmät (edit. Hanna Vilkka). [http://vilkka.fi/books/Laadullisen\\_tutkimuksen.pdf](http://vilkka.fi/books/Laadullisen_tutkimuksen.pdf)
- Gummesson E. 2007. Case study research and network theory: Birds of a feather. *Qualitative Research in Organization and Management: An International Journal*, 2(3), pp. 226–248.
- Hamacher H.W. & Schöbel A. 2004. Design of zone tariff systems in public transportation. *Operations Research* 52 (6), pp. 897–908.
- HSL 2013. HLJ 2015: Liikkumistottumukset Helsingin seudulla 2012. Helsinki. Edita Prima Oy. [https://www.hsl.fi/sites/default/files/uploads/liikkumistottumukset\\_helsingin\\_seudulla\\_2012\\_hlj2015\\_raportti\\_0.pdf](https://www.hsl.fi/sites/default/files/uploads/liikkumistottumukset_helsingin_seudulla_2012_hlj2015_raportti_0.pdf)
- HSL 2014. Joukkoliikenteen hintajoustotutkimus. [https://www.hsl.fi/sites/default/files/uploads/12\\_2015\\_hintajousto\\_tutkimus\\_2014.pdf](https://www.hsl.fi/sites/default/files/uploads/12_2015_hintajousto_tutkimus_2014.pdf)
- HSL 2018. MAL 2019. [https://www.hsl.fi/sites/default/files/uploads/mal2019\\_suunnitelmaluonnos\\_30102018\\_0.pdf](https://www.hsl.fi/sites/default/files/uploads/mal2019_suunnitelmaluonnos_30102018_0.pdf)
- HSL 2019 a. Travel Survey 2018. [https://www.hsl.fi/sites/default/files/uploads/liikkumistutkimus\\_2018\\_kulutusraportti\\_helsingin\\_seudulla.pdf](https://www.hsl.fi/sites/default/files/uploads/liikkumistutkimus_2018_kulutusraportti_helsingin_seudulla.pdf)
- HSL 2019 b. Sales data from travel card system and mobile ticketing system. May 2019.

Höffe O. (edit.) 2013. John Rawls, a Theory of Justice. BRILL, 2013. ProQuest Ebook Central, ISBN 978-90-47-43106-0

Jansson K. & Angell T. 2012. Is it possible to achieve both a simple and efficient public transport zone fare structure? Case study Oslo. *Transport Policy*, Volume 20, pp. 150-161.

Jarnlo H. 2013. "SL:s zoner är orättvisa". StockholmDirekt. <https://www.stockholmdirekt.se/sodra-sidan/sls-zoner-ar-orattvisa/cbbmay!yf16kOmmLGy7ErZH6ncHA/>

Jørgensen F. & Preston J. 2007. The relationship between fare and travel distance. *Journal of Transport Economics and Policy*, 41 (3) pp. 451–468.

Just, D. & Wansink B. 2011, The Flat-rate Pricing Paradox: Conflicting Effects of 'All-You-Can-Eat' Buffet Pricing. *The Review of Economics and Statistics*, 93(1), pp. 193-200.

Kaddoura I., Kickhöfer B., Neumann A. & Tirachini A. 2015. Optimal Public Transport Pricing: Towards an Agent-based Marginal Social Cost Approach. *Journal of Transport Economics and Policy*, 49, pp. 200-218.

Kahneman D. & Tversky A. 1984. Choices, Values, and Frames. *American Psychologist*, 39 (4), pp. 341-350.

Kahneman D., Knetsch J., Thaler R. 1986, Fairness and the Assumptions of Economics, *The Journal of Business*, 59(4, part 2).

Kahneman D. 1994. New challenges to the rationality assumption, *Journal of Institutional and Theoretical Economics*, 150 (1) pp. 18-36. [http://peintra.creatives-at-work.de/uploads/appointments/UMC4z0fuiif0aLrzbJyyT/Kahnemann\\_New%20Challenges%20to%20the%20Rationality%20Assumption.pdf](http://peintra.creatives-at-work.de/uploads/appointments/UMC4z0fuiif0aLrzbJyyT/Kahnemann_New%20Challenges%20to%20the%20Rationality%20Assumption.pdf)

Kaplan S., Silva J., Di Ciommo F. 2014. The relationship between young people's transit use and their perceptions of equity concepts in transit service provision. *Transport Policy*, 36, pp. 79-87.

Krueger R. & Casey M. 2015. *Focus Groups. A Practical Guide for Applied Research*, 5th Edition. Sage Publications, USA.

Kuttler T. et al. 2018. HiReach-project. Mobility in prioritised areas: mapping the field. [http://hireach-project.eu/HiReach\\_D2.1%20Mapping%20the%20field\\_v2\\_20190524\\_TRT\\_draft.pdf](http://hireach-project.eu/HiReach_D2.1%20Mapping%20the%20field_v2_20190524_TRT_draft.pdf)

Lambrecht A. & Skiera B. 2006. Paying Too Much and Being Happy About It: Existence, Causes, and Consequences of Tariff-Choice Biases. *Journal of Marketing Research*, vol. XLIII (May 2006), pp. 212–223.

Litman T. 2004. Transit Price Elasticities and Cross-Elasticities. *Journal of Public Transportation*, Vol. 7 (2), p .37-58.

- Martens, K. 2012. Justice in transport as justice in accessibility: applying Walzer's 'Spheres of Justice' to the transport sector. *Transportation* 39(6), pp. 1035-1053, <https://doi.org/10.1007/s11116-012-9388-7>.
- Martens K. 2017. *Transport Justice*. New York: Routledge. ISBN: 9780415638326.
- Massot Marie-Hélène, 2015. A flat-rate travel card for the Paris region: revolution or illusion? *Metropolitiques.org*. <https://www.metropolitiques.eu/A-flat-rate-travel-card-for-the.html>
- Mattson J. & Ripplinger D. 2011. Marginal Cost Pricing and Subsidy of Transit in Small Urban Areas. Retrieved 8.2.2019.
- Maxcy S. 2002. *Ethical School Leadership*, p. 93. Rowman & Littlefield Education, Maryland. ISBN: 0-8108-4387-0.
- Mayring, P. 2014. Qualitative content analysis: theoretical foundation, basic procedures and software solution. Klagenfurt. <https://nbn-resolving.org/urn:nbn:de:0168-ssoar-395173>
- McCullon B. & Pratt R. 2004. Traveler Response to Transportation System Changes. Chapter 12—Transit Pricing and Fares. TCRP Report 95. [http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp\\_rpt\\_95c12.pdf](http://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rpt_95c12.pdf)
- Metsäranta H. & Hillo K. 2008. Joukkoliikenteen lipputukijärjestelmä ja hinnoittelu. Liikenne- ja viestintäministeriön julkaisu 53/2008. ISBN 978-952-201-658-4.
- Mill J. 2009. Utilitarianism. Floating Press. ProQuest Ebook Central, <https://ebookcentral.proquest.com/lib/aalto-ebooks/detail.action?docID=435879>.
- Mohring H. 1972. Optimization and scale economies in bus transportation. *American Economic Review*, 67 (4), pp. 591-604.
- Mullainathan S. & Thaler R. 2000. Behavioral Economics. Working paper 7948. NBER Working paper series. <https://www.nber.org/papers/w7948.pdf>
- Mulley C. & Batarce M. 2018. The pricing of public transport services. In book: Jonathan Cowie & Stephen Ison (edit.) *The Routledge handbook of transport economics*. New York: Routledge. pp. 124-151. ISBN: 978-1-315-72678-6.
- Otto B. & Boysen N. 2017. Zone-based tariff design in public transportation networks. *Networks*. Volume 69 (4), pp, 349-366
- Paulley N. et al. 2006. The demand for public transport: The effects of fares, quality of service, income and car ownership. *Transport Policy* 13, pp. 295-306.
- Puget J. 2013. No, The TSP Isn't NP Complete. [https://www.ibm.com/developerworks/community/blogs/jfp/entry/no\\_the\\_tsp\\_isn\\_t\\_np\\_complete?lang=en](https://www.ibm.com/developerworks/community/blogs/jfp/entry/no_the_tsp_isn_t_np_complete?lang=en)

- Rawls J. 2003. Theory of Justice, revised edition. Cambridge; The Belknap Press of Harvard University Press. ISBN 0-674-00077-3.
- Rubensson I., Cats O. and Susilo Y. 2018. Is Flat Fare Fair? Equity Impact of Fare Scheme Change. [http://www.caspt.org/wp-content/uploads/2018/10/Papers/CASPT\\_2018\\_paper\\_50.pdf](http://www.caspt.org/wp-content/uploads/2018/10/Papers/CASPT_2018_paper_50.pdf)
- Ruututietokanta 2018, Tilastokeskus. [https://www.stat.fi/static/media/uploads/tup/ruututietokanta/rttk2018\\_kuvaus\\_fi.pdf](https://www.stat.fi/static/media/uploads/tup/ruututietokanta/rttk2018_kuvaus_fi.pdf)
- Sexton R., Graves P. & Lee D. 1993. The Short- and Long-Run Marginal Cost Curve: A Pedagogical Note. Journal of Economic Education, 24 (1), pp. 34-37
- Shy, O. 1995. Industrial Organization : Theory and Applications. Cambridge: MIT Press. ISBN: 9780585135113
- Siggelkow, N. 2007. Persuasion with case studies. Academy of Management Journal, 50(1), pp. 20–24.
- Skouras T., Avlonitis G. & Indounas K. 2005. Economics and marketing on pricing: how and why do they differ? Journal of Product & Brand Management, 14(6), pp.362-374. <https://doi.org/10.1108/10610420510624512>
- Small K. & Verhoef E.T. 2007. The economics of urban transportation. New York: Taylor and Francis e-Library. 11602 ll. ISBN 0-203-64230-9.
- Statistics Finland 2019. Households' disposable monetary income 2016. [http://pxnet2.stat.fi/PXWeb/pxweb/en/Postinumeroalueittainen\\_avoin\\_tieto/Postinumeroalueittainen\\_avoin\\_tieto\\_2019/paavo\\_5\\_tr\\_2019.px/](http://pxnet2.stat.fi/PXWeb/pxweb/en/Postinumeroalueittainen_avoin_tieto/Postinumeroalueittainen_avoin_tieto_2019/paavo_5_tr_2019.px/)
- Strafica 2019, Telia Crowd Insights -data analysis. Unpublished report.
- Sweet W. Internet Encyclopedia of Philosophy: Jeremy Bentham (1748—1832). <https://www.iep.utm.edu/bentham/>. Retrieved 10.3.2019.
- Telia 2018. Crowd Insights 2018. Trip data of HSL region from the weeks 36-40 and 45-48.
- Tellis G. 1988. The Price Elasticity of Selective Demand: A Meta-Analysis of Econometric Models of Sales. Journal of Marketing Research 25(4). ection pg. 331
- Thaler, R. 1999. Mental Accounting Matters. Journal of Behavioral Decision Making, 12, pp. 183~206.
- Thaler, R. 2001. Anomalies. Journal of Economic Perspectives, 15(1), p. 219.
- Thøgersen J. 2009. Promoting public transport as a subscription service: Effects of a free month travelcard. Transport Policy 16, pp. 335–343.

Thompson D. 2017. Richard Thaler Wins the Nobel in Economics for Killing Homo Economicus. The Atlantic.com. Published 9.10.2017. Retrieved 26.2.2019. <https://www.theatlantic.com/business/archive/2017/10/richard-thaler-nobel-economics/542400/>.

UAB 2018. The flat tariff for public transport of the metropolitan area is approved. <https://www.uab.cat/web/latest-news/news-detail-1096476786473.html?c=Page&noticiaid=1345778400916>

van Maanen, J., Sörensson, J., & Mitchell, T. 2007. The interplay between theory and method. *Academy of Management Review*, 32(4), pp. 1145–1154.

Vickrey W. 1980. Optimal transit subsidy policy. *Transportation*, 9(4), pp. 389-409. ISSN: 0049-4488 (Print) 1572-9435 (Online).

Xia L., Monroe K., Cox J., Kent B., Monroe K.B., Jones, J. 2004. The Price Is Unfair! A Conceptual Framework of Price Fairness Perceptions. *Journal of Marketing*, 68, pp. 1-15.

YTV, 2009. Pääkaupunkiseudun joukkoliikenteen taksa- ja lippujärjestelmän 2014 alustava kuvaus. Helsinki: Valopaino Oy. 49 pp. ISBN 978-951-798-747-9. [https://www.hsl.fi/sites/default/files/uploads/paakaupunkiseudun\\_taksa\\_ja\\_lippujarjestel-man\\_2014\\_alustava\\_kuvaus.pdf](https://www.hsl.fi/sites/default/files/uploads/paakaupunkiseudun_taksa_ja_lippujarjestel-man_2014_alustava_kuvaus.pdf)

Wachs, M. 1989. U.S. transit subsidy policy: In need of reform. *Science*, 244(4912), pp. 1545–1549.

Weber R. 1990. *Basic content analysis*. 2nd edition. Sage. Online ISBN: 9781412983488

Wilkie W. & Moore E. 2003. Scholarly research in marketing: Exploring the “4 eras” of thought development. *Journal of Public Policy & Marketing* 22(2), pp. 116 – 146.

## List of appendixes

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## **Appendix 1. Interview form for city interviews**

### **Part 1: Overall historical timeline**

1. What is the current tariff system setup?
2. What kind of setup was before the current tariff system setup?
3. When has the change been made?
4. Have you had some time of transition from one tariff system to another?
5. Did you give up zones totally or just a) monthly tickets b) single tickets?

### **Part 2: Reasoning for changes in relation to timeline**

1. Who (people and/or organisations) has been involved in designing the change of tariff system?
2. Who (people and/or organisations) has been involved in the decision-making process for changing tariff system?
3. Who (people and/or organisations) approved the change of tariff system?
4. What were all the reasons considered for introducing the current tariff system?
5. What were all the reasons considered for introducing the previous tariff system? (if applicable)
6. What were alternative tariff systems considered when deciding about the current tariff system?
7. What were users' opinions about the current tariff system before the change?
8. What are current users' opinions about the current tariff system after the change?
9. Were there any particularly unsatisfied user groups opposing the change?
10. What were the main challenges in the decision-making process?
11. Have you considered distance based or time based differentiation of pricing?

### **Part 3: Effects after introducing flat tariff system**

1. What are the effects from having a flat tariff system in your city on:
  - a) Modal distribution (all modes)
  - b) Number of trips
  - c) Accessibility to jobs and services
  - d) User satisfaction
  - e) Fare recovery ratio (or amount of operational costs covered through ticket revenue)
  - f) Housing pricing
  - g) Land use changes
  - h) Greenhouse gas emissions
  - i) Any other effects
2. What are some main pros/strengths of your current tariff system?
3. What are some main weaknesses/cons of your current tariff system?
4. Would you change your current tariff system in any way?

### **Part 4: Conclusion**

1. Any other comments about your tariff system and lessons learned?

## Appendix 2. List of case study documents

### TURKU

- Kalenoja H., Metsäpuro P. & Wallander J. 2012. Turun seudun joukkoliikenteen maksujärjestelmäselvitys. Joukkoliikenteen maksuvyöhykkeet ja lippujärjestelmävaihtoehdot. Tampereen teknillinen yliopisto: Liikenteen tutkimuskeskus Verne. Tutkimusraportti 82. ISBN 978-952-15-2864-4.
- Ramboll, Turun kaupunkiseudun joukkoliikenteen ennen-jälkeen tutkimus
- Trafifix, 2017. Selvitys nykyisen Föli-alueen tariffivyöhykkeistä.

### STOCKHOLM

- Beslutsunderlag gällande SL:s zonsystem. Delrapport inom Parlamentarisk utredning kring priser, taxesystem och biljett- och betalsystem. Trafikförvaltningen, 2016.
- Utredning gällande prissättning för SL:s enkel- och periodbiljetter. Delutredning inom Parlamentarisk utredning kring priser, taxesystem och biljett- och betalsystem. Trafikförvaltningen, 2016
- Bilagor till Beslutsunderlag gällande SL:s zonsystem. Delrapport inom Parlamentarisk utredning kring priser, taxesystem och biljett- och betalsystem. Trafikförvaltningen, 2016.
- Utvärdering av enhetstaxa. Trafikförvaltningen slutrapport. Susanna Nissar, Fredrik Bergfalk, Jenny Annebäck, 2017
- Zoner från 1 april, press release of SL, <http://www.mynewsdesk.com/se/sl/pressreleases/zoner-fraan-1-april-126519>

### PARIS

- Evaluation committee for the improvement of transit services in Île-de-France. Report for 2016, English translation.
- All-Zone Passes, what are the impacts two years after implementation? Brief summary, English translation, 2018.



## Appendix 3. Interview form for focus groups



### Interview protocol

**Project Title:** Master thesis: Analysis of one zone system effects for HSL and delineation of alternative models

Date and Time: \_\_\_\_\_

Location:

Respondent: \_\_\_\_\_ Title: \_\_\_\_\_

Interviewer: Mari Flink

Time available for interview:

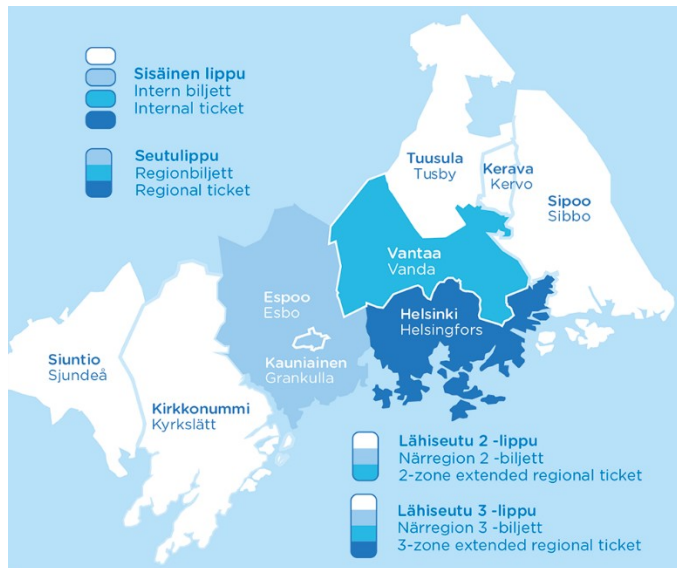
Guidelines for introduction (5-10 mn)

1. Thank informant for the interview. The goal of this interview is to ....
2. An explanation of your rights as a participant in an academic research project, including those that concern the Finnish Personal Data Act. Ask participant if they have any questions. Sign consent form and give them a copy to keep, along with a copy of the Finnish Personal Data Act.
3. The interview will take about 60 min.
4. Ask them if they have any questions before starting.
5. Ask the participant for permission to record (remind him/her of option not to record) and check everyone is comfortable, sound is good etc.

Start recording

### Current tariff system

Short presentation of the current model.



1. What do you think about the current pricing model of HSL? Pros and cons?
2. How well does the current system serve customers' travel needs?
3. How fair the current HSL tariff system is now?

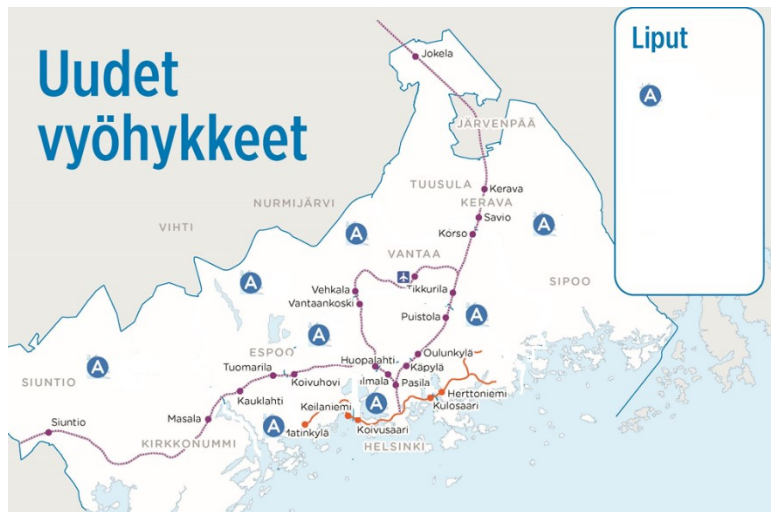
### ABCD-model

Short presentation of the ABCD model: A: 260 000 B: 600 000 C: 240 000 D: 136 000 (inhabitants)



1. What do you think about the ABCD model of HSL? Pros and cons?
2. How well does this zone model support people's travel needs?
3. What do you think about the principle that the price is dependent on the length of the trip?
4. How easy or difficult it is to understand how many zones you need to buy?
5. How easy or difficult it is to understand how much you need to pay?
6. How fair the ABCD model is?
7. What do you think, where and who are the biggest winners and losers of ABCD pricing model?

## 2. Flat tariff model



1. What do you spontaneously think about introducing flat tariff? Pros and cons.
2. If the flat tariff would be the same as AB price now, which model would you choose: flat or ABCD?
3. How much higher price for flat tariff compared to AB price would be justified?
4. Which of the models you believe would promote usage of public transport best?
5. If you could decide whether HSL have zones or flat tariff, which one you would choose?
6. Do you consider flat tariff to be fairer than zone tariff?

### Distance-based tariff:

## Vaihtoehto 5

### Kilometrihinnoittelu

**Hinta perustuu kilometrietyyteen, joka on mitattu ns. linnuntietä.**

Matkan hinta määräytyy suoraan linnuntietä mitatun etäisyyden perusteella. Vaikka todellinen kuljettu reitti kävisikin kauempana, hinta lasketaan lähtöpisteen ja määränpään välisestä etäisyydestä.

1,70 €

1 €

2 €

3 €

4 €

**Justice question:**

1. If you didn't know your place of residence, income level, education, car ownership etc. but randomly end up living at some part of HSL region based on the probability people are now located in the zones, which one of the models would you choose? Why?
2. What does "fairness" of the transport system and pricing mean to you?
3. From your opinion, who are the most disadvantaged people in Helsinki region and whose mobility needs and improvement of accessibility should be ensured particularly?
4. Which one of these three model you consider as fairest to all? Which one of these three model you consider fairest to least advantaged people?

**Conclusion**

2. Any other comments about tariff systems, pricing and paying?
- 3.

**Finish**

1. Thank participant.

## Appendix 4. Interview form and materials for individual interviews

Tunnistepohjaiset taustajärjestelmät: Haastattelurunko (23-31.10)

Haastattelija täyttää

Nimi:

Ikä:

Perhe:

Asuinkunta ja vyöhyke:

Alustus:

Hei ja kiitos ajastasi! Olemme tutkimassa pääkaupunkiseudun asukkaiden ja turistien tottumuksia joukkoliikenteen käytöstä, ja miten uudet mahdolliset hinnoittelumallit ja liikennöinnin muodot voisivat vaikuttaa omiin valintoihin. Kaikkia vastauksia käsitellään luottamuksellisesti, ja haastattelua nauhoitetaan pelkästään tutkimuksen helpottamiseksi. Näkemyksiäsi ja vastauksiasi emme esitä yksilötasolla, ja toivomme, että vastaisit näihin kysymyksiin rehellisesti. Ennen kuin aloitamme, pyytäisimme jos voisit allekirjoittaa tämän tutkimusluvan. Palkkioksi osallistumisestasi on vaihtoehtoisesti 50:n euron HSL:n lahjakortti, jota voit käyttää kaikkiin HSL:n tuotteisiin tai Stockmanin 50 euron lahjakortti. (ojenna tutkimuslomake ja odota, että asiakas perehtyy sisältöön ja allekirjoittaa) Jos ei ole muita kysymyksiä, niin aloitetaan...

Taustatiedot:

- Kerro aluksi nimesi ja ikäsi
- Miten kuvailisit itseäsi joukkoliikenteen käyttäjänä?
- Käyttääkö joku muu perheestäsi joukkoliikennettä?
- Onko perheessänne yksityisautoa(ja)?

### Tehtävä 1: Liikkumisen nykytila

Pyydä asiakasta merkitsemään oma elinpiirinsä pääkaupunkiseudun kartalla.

- Merkitse kartalle paikat, joissa käyt tavallisesti viikoittain.
  - Auta tarvittaessa: esim. koti, työpaikka (jos ei työtön), ruokakauppa, yksi harrastus (esim. kuntosali)
  - JOS asuinkunta ei ole pk-seutu, pyydä merkitsemään paikat, joissa tavallisesti käy vieraillessaan pk-seudulla.
  - Millä tavalla siirryt paikasta toiseen?
  - Mitä reittejä hän käyttää?
  - Onko kyseinen reitti mieluisa vai ei?
  - Mihin aikaan päivästä siirtymiset yleensä sijoittuvat?

Haastattelu tehdään korttien avulla. Ensin käymme 6 tarinaa erilaisista hinnoittelumalleista ja sen jälkeen 3 matkustusalueeseen liittyen. Lopuksi vielä käymme 4 tarinan kautta läpi, miltä joukkoliikenne voisi näyttää tulevaisuudessa tavallisen työmatkalaisen näkökulmasta.

### Tehtävä 2: Hinnoittelumallit

Nyt esitämme sinulle useita eri ehdotuksia joukkoliikenteen mahdollisista hinnoittelumalleista. Toivoisimme, että kerrot rehellisesti mielipiteesi ja näkemyksiäsi jokaiseen ehdotukseen. Yhteensä näitä eri malleja on 6 ja niitä on avattu eri tarinoiden muodossa. Huomioi, että tässä tarkastelussa jokainen vaihtoehto toimii omana itsenäisenä kokonaisuutena, eikä täydennä muita mahdollisia skenaarioita.

Jokaisen vaihtoehdon kohdalla, pyydä asiakasta perehtymään kortin sisältöön ensin, ennen kun hän vastaa kysymyksiin.

### Vaihtoehto 1: Pikalinja vai Maisemalinja

- Miltä tuntuisi, jos joukkoliikenteen hinta määräytyisi reitin suoruuden ja nopeuden perusteella? Miksi?
- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?
- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko matkan suoruteen ja nopeuteen perustuva hinta helppo ymmärtää? Miksi / Miksi ei?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?

### **Vaihtoehto 2: Bussilinjaosuuskunta**

- Miltä tuntuisi, jos joukkoliikenteen vuoroväleihin pystyisi vaikuttamaan maksamalla itse enemmän? Miksi?
- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?
- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko ajatus bussilinjaosuuskunnasta helppo ymmärtää? Miksi / Miksi ei?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?
- Pystytkö samaistumaan Rolfin tilanteeseen?
  - Minkä tyyppisiä haasteita sinulla on liikkumisesi ja vuorovälien tiheyteen kanssa?
- Olisitko itse valmis liittymään bussilinjaosuuskuntaan? Miksi?

### **Vaihtoehto 3: Ruuhkahinnoittelu**

- Miltä tuntuisi, jos joukkoliikenteen hinta vaihtelisi ruuhka-aikojen perusteella? Miksi?
- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?
- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko ruuhka-aikoihin perustuva hinta helppo ymmärtää? Miksi / Miksi ei?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?
- Vaikuttaisiko tämän kaltainen hinnoittelumalli jotenkin sinun omaan liikkumiseesi?
  - Motivoiko halvempi hinta käyttämään joukkoliikennettä enemmän kun ei ole ruuhkaa?
  - Miksi / Miksi ei?

### **Vaihtoehto 4: Päästö pisteet**

- Miltä tuntuisi, jos joukkoliikenteen hinnasta voisi saada alennusta valitsemalla ympäristöystävällisempiä liikkumisen tapoja? Miksi?
- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?
- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko ajatus päästö pisteistä helppo ymmärtää? Miksi / Miksi ei?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?
- Vaikuttaisiko tämän kaltainen hinnoittelumalli jotenkin sinun omaan liikkumiseesi?
  - Motivoisiko tämän kaltainen pisteytysohjelma kävelemään tai pyöräilemään lisää?

### **Vaihtoehto 5: Kilometrihinnoittelu**

- Miltä tuntuisi, jos joukkoliikenteen hinta perustuisi suoraan paikkojen väliseen

etäisyyteen? Miksi?

- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?
- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko etäisyyteen perustuva hinnoittelu helppo ymmärtää? Miksi / Miksi ei?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?

#### **Vaihtoehto 6: Matkustusaikahinnoittelu**

- Miltä tuntuisi, jos joukkoliikenteen hinta perustuisi suoraan matkustusaikaan? Miksi?
- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?
- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko matkustusaikaan perustuva hinnoittelu helppo ymmärtää? Miksi / Miksi ei?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?
- Kumpi on mielestäsi reilumpi hinnoitteluperuste: etäisyys vai matkustusaika? Miksi?

Lyhyt tauko (5 min).

Nyt käydään vielä läpi 3 erilaista vaihtoehtoa siitä millä perusteella matkustusalue voisi määräytyä. Voit käyttää näiden arvioimisessa apuna tätä karttaa, joka piirrettiin sinun omasta liikkumisestasi.

#### **Vaihtoehto 7: Omavyöhyke**

- Miltä tuntuisi, jos matkustusalueen rajat saisi määritellä itse? Miksi?
- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?
- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko ajatus omavyöhykkeestä helppo ymmärtää? Miksi / Miksi ei?
- Pystyisitkö helposti määrittelemään omavyöhykettäsi?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?
- Kuinka usein uskot että matkustaisit omavyöhykkeen ulkopuolella? Viikottain? Kuukaudessa?

#### **Vaihtoehto 8: Vyöhykemalli**

Tämä on malli joka on astumassa voimaan ensi vuonna.

- Onko tuleva vyöhykemalli sinulle entuudestaan tuttu?
- Miltä tuntuu että matkustusalueet on rajattu kuntarajoista riippumattomina vyöhykkeinä? Miksi?
- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?
- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko vyöhykemalli helppo ymmärtää? Miksi / Miksi ei?
- Osaatko suurin piirtein sanoa millä vyöhykkeillä oma elinpiirisi sijaitsee?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?

#### **Vaihtoehto 9: Tasatariffi (eli tasahinnoittelumalli)**

Tässä mallissa kaikki matkat ovat saman hintaisia, pituudesta ja ajasta riippumatta.

- Miltä tuntuisi, jos samalla hinnalla saisi matkustaa koko HSL-alueella? Miksi?
- Miltä tämä hinnoittelumalli näyttäisi sinun omassa arjessasi?
- Mikä hinnoittelumallissa on hyvää? Miksi?

- Mikä hinnoittelumallissa on huonoa? Miksi?
- Onko tasahinnoittelu helppo ymmärtää? Miksi / Miksi ei?
- Miten uskot että tällainen hinnoittelu vaikuttaisi oman matkustuksesi hintaan? Miksi?
- Vaikuttaisiko tämän kaltainen hinnoittelumalli jotenkin sinun omaan liikkumiseesi? Jos, niin miten?
- Kuinka reilulta tai epäreilulta tasatariffi vaikuttaa seudun eri ihmisten näkökulmasta?
  - Kuinka reilua tai epäreilua se on henkilökohtaisesti?
  - Entä miten reilulta tai epäreilulta se vaikuttaa pääkaupunkiseudun eri ihmisten näkökulmasta?

### **Tehtävä 3: Teemalliset skenaariot**

Seuraavaksi käymme läpi neljä erilaista tarinaa siitä, miten eri tavoin toimiva joukkoliikenne vaikuttaisi tavallisen työmatkalaisen liikkumiseen. Tarinoiden pohjalta keskustelemme siitä, että millaiseen suuntaan joukkoliikenteen pitäisi sinun mielestäsi kehittyä.

Esimerkit 1-3, käydään läpi yksi kerrallaan:

- Miltä tuntuisi, jos oma päivittäinen toistuva matkasi, esimerkiksi työmatkasi, toimisi tällä tavalla? Miksi?
  - Mikä tarinassa on hyvää? Miksi?
  - Mikä tarinassa on huonoa? Miksi?
- Miten hyvin tätä tarinaa ohjaavat arvot heijastelevat sinulle itsellesi tärkeitä asioita? (kortin alalaita)

Esimerkki 4

Tämä tarina kuvaa sitä miten joukkoliikenne nykyään toimii.

- Miltä joukkoliikenteen nykytila tuntuu äsken näkemiisi tarinoihin verrattuna?
  - Mikä nykytilassa on hyvää? Miksi?
  - Mikä nykytilassa on huonoa? Miksi?
- Miten hyvin tätä tarinaa ohjaavat arvot heijastelevat sinulle itsellesi tärkeitä asioita? (kortin alalaita)

Näissä neljässä tarinassa kerätään dataa ja tietoa ihmisten liikkumisesta ja hyödynnetään eri tavoin. (jos asiakas kysyy: tällä hetkellä kerätään tietoa eri liikennevälineiden matkustajamääristä, mutta ei esimerkiksi tiedetä minne ihmiset ovat matkalla ja missä jäivät pois kyydistä)

- Miltä tuntuisi, jos tietoa sinusta ja sinun liikkumisestasi käytettäisiin liikenteen suunnitteluun?
  - Mitä hyvää datan käyttöön liittyen tarinoissa on? Miksi?
  - Mitä huonoa datan käyttöön liittyen tarinoissa on? Miksi?
- Miltä tuntuisi, jos joukkoliikenteen toiminnan takana olisi nykyistä kehittyneempää teknologiaa?

○ Esim. esimerkeissä 1 ja 2 palvelu osaa aikatauluttaa Annan matkoja automaattisesti. Miltä tämä tuntuu?

○ Tai esimerkiksi tunnistautumiseen liikennevälineessä ei enää käytettäisi matkakorttia, vaan tunnistautuminen tapahtuisi esim. Matkapuhelimen tai kasvojen tunnistuksen tai sormenjäljen avulla.

- Mikä esimerkeistä on mielestäsi kerätyn tiedon ja datan sekä teknologian näkökulmasta paras? Miksi?

Tarinoista osassa joukkoliikenne keskittyy enemmän yksilön hyödyn tavoitteluun, kun taas toisissa yhteinen etu ja tasa-arvo ovat tärkeämpiä.

- Miten paljon yksilön edusta voi mielestäsi tinkiä, jotta kaikille pääkaupunkiseudulla pystyttäisiin takaamaan tasavertainen ja tasalaatuinen



palvelu? Miksi?

- Mikä esimerkeistä on mielestäsi yksilön ja yhteisön etujen tasapainottamisen näkökulmasta paras? Miksi?

#### Tehtävä 4: Oma malli

Seuraavaksi pääset rakentamaan sinun omasta mielestäsi parhaan mahdollisen joukkoliikenteen hinnoittelumallin. Voit valita sinisistä korteista 1-2 parasta ja vaaleanpunaisista korteista yhden. Jos hinnoittelun pitäisi mielestäsi toimia ihan jollain muulla tavalla kuin mitä näissä korteissa on esitetty, voidaan yhdessä piirtää sinun oma ideasi ylös.

(Anna asiakkaalle aikaa valita kortit)

- Esittelisitkö, millaisen mallin olet rakentanut?
- Miksi hinnoittelun pitäisi mielestäsi toimia tällä tavalla?
- Mitkä asiat eniten vaikuttivat päätökseesi? (valinnat paperin alalaidassa) Miksi?
- Hyötyisitkö itse jotenkin siitä, jos joukkoliikennettä hinnoiteltaisiin tällä tavalla? Miksi?
  - Vaikuttaisiko tämän kaltainen hinnoittelumalli jotenkin sinun omaan liikkumiseesi?
  - Miten tällainen hinnoittelumalli vaikuttaisi muihin ihmisiin?
  - Kuka tällaisesta hinnoittelumallista mielestäsi hyötyisi eniten?
  - Kenelle tällaisesta hinnoittelumallista olisi haittaa?
  - Mikä on tärkein nykyisen joukkoliikenteen ongelma, jonka tämä hinnoittelumalli mielestäsi korjaisi?


Kiitos paljon haastattelusta:

- Kiitoksena ajastasi HSL antaa sinulle lahjakortin, voit valita joko Stockmannin lahjakortin tai HSL:n 50 euron lahjakortin.
- Onko sinulla vielä jotain kysyttävää?

#### TARIFFISKENAARIOT

## Vaihtoehto 1

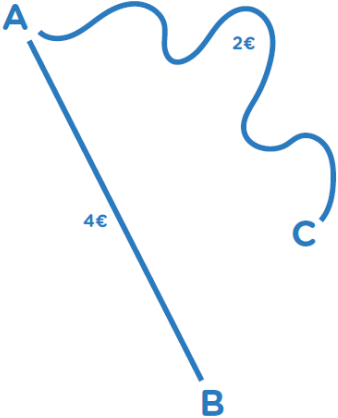
### Pikalinja vai maisemalinja?



**Matkan hinta määräytyy joukkoliikenteen vuorovälien ja nopeuden mukaan.**

Riku kulkee työmatkansa junalla. Hän merkitsee määränpääksi työpaikan ostaessaan lippua, ja hinta määräytyy sen mukaan. Ehdotetun junan vuoroväli on tiheä, yhteys on suora ja nopea, joten hän maksaa matkasta 4 €.

Illalla Rikun ystävä tulee hänen luokseen kylään. Ystävä hakee Reittioppaasta parhaan reitin, ja saa samalla tiedon matkan hinnasta. Tämä matka maksaa 2 €, koska reitti on mutkitteleva ja matka kestää etäisyyteen nähden kauan.



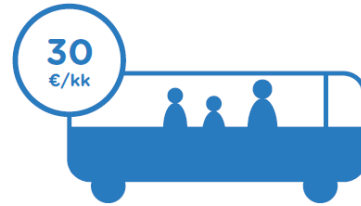
## Vaihtoehto 2 Bussilinjaosuuskunta



Ihmiset voivat itse vaikuttaa palvelutasoon maksamalla enemmän liityntäliikenteestä runkolinjaan.

Rolfin perhe asuu Långvikissa, ja lasten kuljettaminen harrastuksiin vie arki-iltaisin paljon perheen aikuisten aikaa. Myös muissa naapuruston perheissä on tunnistettu sama ongelma.

Naapurusto päättää muodostaa bussiosuuskunnan, jotta lapset pääsevät itsenäisesti harrastuksiin. Jokainen osuuskunnan jäsen sitoutuu maksamaan kuukausimaksua, jonka avulla Långvikiin saadaan tiheämmin kulkeva bussilinja.



## Vaihtoehto 3 Ruuhkahinnoittelu



Hinta määräytyy liikeneruuhkan ja matkustajamäärän mukaan. Joukkoliikenteen käyttö on kalliimpaa silloin kun liikennevälineet ovat täynnä, ja edullisempaa kun niissä on väljää.

Veera on töissä asiakaspalvelutehtävissä Helsingin keskustassa ja hän kulkee työmatkansa metrolla. Veeran tulee olla työpaikalla arkipäiväisin kello 8. Hän maksaa aamun ruuhka-aikana matkasta 3 €.

Veeralla on perjantaina vapaapäivä ja hän menee Lassilaan linja-autolla kampaajalle. Linja-autossa ei aamupäivällä ole juuri muita matkustajia, ja Veera maksaa matkastaan 1,5 €.



ma 7.40  
3€



pe 10.30  
1,5€

## Vaihtoehto 4 Päästöpiisteet



Hinta määräytyy asiakkaiden omien ekologisten valintojen perusteella. Lisäämällä kävelyn tai pyöräilyn joukkoliikenteen käytön rinnalle asiakas saa edullisempia matkalippuja.

Mikko käy laulutunneilla Kaapelitehtaalla Ruoholahdessa. Opiskelupäivän jälkeen hän ottaa kaupunkipyörän ja pyöräilee Viikistä Itäkeskukseen metropysäkille. Valitsemalla pyöräilyn linja-auton sijaan Mikko kerää matkakorttiinsa niin sanottuja päästöpiisteitä, joilla hän saa etuja ja alennusta matkalippujen hinnasta.

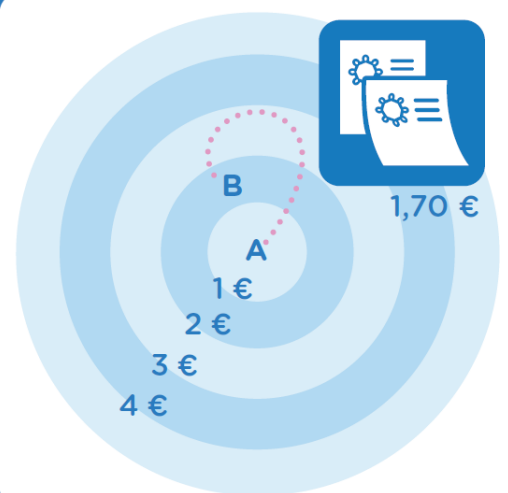


## Vaihtoehto 5 Kilometrihinnoittelu



Hinta perustuu kilometrietäisyyteen, joka on mitattu ns. linnuntietä.

Matkan hinta määräytyy suoraan linnuntietä mitatun etäisyyden perusteella. Vaikka todellinen kuljettu reitti kävisikin kauempana, hinta lasketaan lähtöpisteen ja määränpään välisestä etäisyydestä.



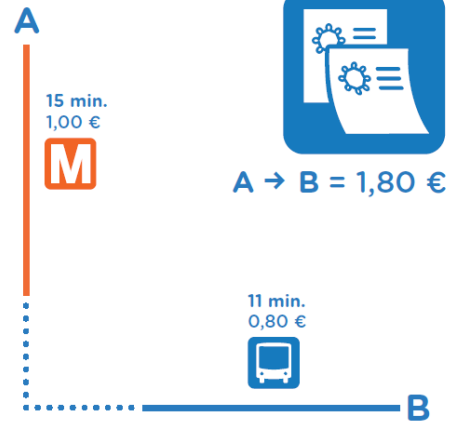
## Vaihtoehto 6 Matkustusaikahinnoittelu



**Hinta määräytyy toteutuneen matkustusajan mukaan.**

Päivi on menossa tapaamaan eläkeläisystäviään käsityökerhoon Ruoholahteen. Hän asuu Kalasatamassa, ja valitsee metron ja bussin päästäkseen sovittuun paikkaan. Metromatka kestää 15 minuuttia, jonka jälkeen Päivi jatkaa matkaa vielä 11 minuuttia linja-autolla.

Matkan aikana Päivi on kulkenut eri liikennevälineillä yhteensä 26 minuuttia ja hän maksaa matkastaan 1,80 €.



## Vaihtoehto 7 Omavyöhyke



**Hinta perustuu asiakkaan itse valitsemaan pääasiallisen matkustusalueeseen. Tällä alueella matkustaminen on edullisempaa kuin sen ulkopuolella.**

Rekisteröityessään HSL:n asiakkaaksi Yasmine valitsee pääkaupunkiseudun kartalta paikat, joissa hän arjessaan käy usein: koti, työpaikka, päiväkotia, sali ja ruokakauppa. Näiden valintojen perusteella rajautuu Yasmine Omavyöhyke. Vyöhykkeen koon mukaan määräytyy hinta, jonka Yasmine maksaa sen sisällä matkustamisesta.

Omavyöhykkeen sisällä matkustaminen on edullisinta, ja lisämaksulla Yasmine voi matkustaa Omavyöhykkeen ulkopuolelle.

Lisämaksullinen  
alue



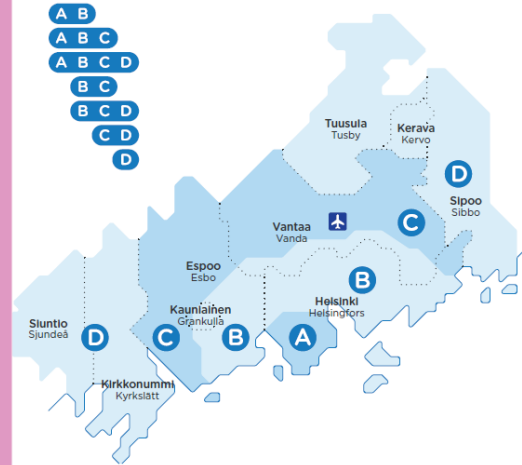
## Vaihtoehto 8 Vyöhykemalli



Helsingin seutu on jaettu vyöhykkeisiin, jotka piirtyvät noin 10 km levyisiksi kaariksi Helsingin keskustan ympärille. Lippujen hinnoittelu perustuu matkan pituuteen Helsingin keskustasta.

Orvokki asuu Masalassa (D-vyöhyke) ja käy fysioterapiassa Tikkurilassa (C-vyöhyke). Hän valitsee BCD-lipun joka maksaa matkakortilla 6 €.

Andréas asuu Kampissa ja Kulosaarissa melomassa. Hän valitsee AB-lipun joka maksaa 2,90 €.



## Vaihtoehto 9 Tasatariffi

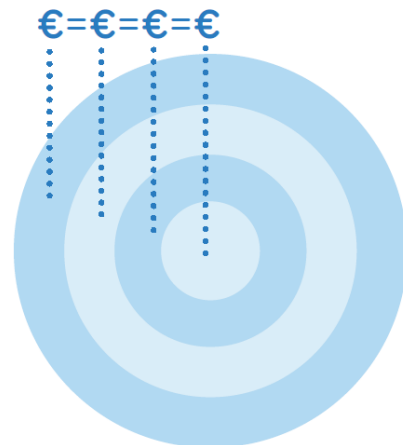


Matkan hinta on sama koko matkustusalueella matkan pituudesta tai ajasta riippumatta.

Kaisa asuu Lauttasaarissa ja käy talvisin hiihtämässä Paloheinässä. Hän matkustaa ensin Sörnäisiin metrolla, ja vaihtaa linja-autoon joka vie hänet hiihtoladulle. Matka maksaa 3 €.

Keijo asuu Kalliossa ja menee maanantaisin Hakaniemeen seniorijumppaan raitiovaunulla, alle kilometrin matka maksaa 3 €.

Lassi asuu Suurpellossa ja käy töissä Vuosaarissa. Hän ajaa omalla autollaan liityntäpysäköintiin ja menee metrolla työpaikalleen. Matka maksaa 3 €.



## TEEMALLISET SKENAARIOT

# Annan tarina...

## Esimerkki 1



Anna on 55-vuotias ja asuu perheensä kanssa itäisessä Helsingissä 3 km päässä metrolta. Hän käyttää päivittäin julkista liikennettä työmatkoihin Helsingin keskustaan.



Anna käy töissä yleensä aina samaan aikaan klo 8-16. Tietoja Annan työmatkoista käytetään liikenteen suunnitteluun, jotta bussit kulkisivat mahdollisimman sujuvasti. Aamulla hän saa puhelimeensa viestin, joka kertoo mihin aikaan bussi noutaa hänet ja naapurit ja vie heidät metrolle, jolla Anna jatkaa matkaa keskustaan.

Eräänä päivänä Anna sairastuu kesken työpäivän. Hän lähtee töistä aikaisin ja menee työterveysaseman kautta kotiin. Illalla hän saa puhelimeensa viestin, jossa häntä pyydetään vahvistamaan meneekö hän huomenna töihin. Järjestelmä on huomannut tavallisesta poikkeavan liikkumisen, ja haluaa tietää odotetaanko Annaa seuraavana päivänä bussille.

### Yksityisyys



Oma data  
jaetaan

### Aika



Joukko-  
liikenne on  
aikataulutettu

### Raha



Kaikille sama  
palvelu

### Minä & Me



Yhteisö-  
keskeinen

### Teknologia



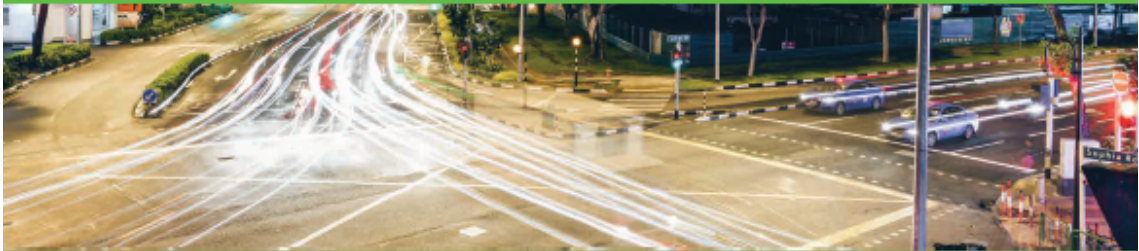
"High tech"

# Annan tarina...

## Esimerkki 2



Anna on 55-vuotias ja asuu perheensä kanssa itäisessä Helsingissä 3 km päässä metrolta. Hän käyttää päivittäin julkista liikennettä työmatkoihin Helsingin keskustaan.



Anna maksaa kuukausimaksua yksityisestä palvelusta, joka kattaa kimppakyydit, taksit, vuokra-autot ja julkisen liikenteen pääkaupunkiseudulla. Palvelu kerää tietoja Annan työmatkoista, jotta hän pääsisi joka aamu mahdollisimman nopeasti töihin. Annan kalenterin perusteella palvelu osaa automaattisesti lähettää kimppakyytiauton hakemaan häntä joka aamu oikeaan aikaan. Anna saa viestin muutama minuutti ennen kuin auto on ovella. Auto vie hänet suoraan metrolle, jolla Anna jatkaa keskustaan töihin.

### Yksityisyys



Oma data  
jaetaan

### Aika



Liikkumaan  
pääsee milloin  
haluaa

### Raha



Rahalla  
parempaa  
palvelua

### Minä & Me



Yksilö-  
keskeinen

### Teknologia



"High tech"



# Annan tarina...

## Esimerkki 3



Anna on 55-vuotias ja asuu perheensä kanssa itäisessä Helsingissä 3 km päässä metrolta. Hän käyttää päivittäin julkista liikennettä työmatkoihin Helsingin keskustaan.



Arkipäivisin Anna tilaa aamulla taksin, joka vie hänet metrolle. Vakiokäyttäjänä Anna saa taksiyhtiöltä alennusta työmatkoista. Anna maksaa mielellään palvelusta, jotta hänen ei tarvitse kävellä 30 minuuttia joka päivä.

Metro kulkee tiheästi ja tehokkaasti, ja keskeisille paikoille pääsee joukkoliikenteellä nopeasti. Raideverkoston ulkopuolella liikkuminen sujuu kätevimmin taksilla ja muilla tilauspalveluilla.

### Yksityisyys



Oma data pysyy yksityisenä

### Aika



Liikkumaan pääsee milloin haluaa

### Raha



Rahalla parempaa palvelua

### Minä & Me



Yksilö-keskeinen

### Teknologia



"Low tech"



# Annan tarina...

## Esimerkki 4



Anna on 55-vuotias ja asuu perheensä kanssa itäisessä Helsingissä 3 km päässä metrolta. Hän käyttää päivittäin julkista liikennettä työmatkoihin Helsingin keskustaan.



Työpäivinä Anna menee joko pyörällä tai linja-autolla metrolle, joka vie hänet kaupungin keskustaan. Kesäisin Anna kulkee mielellään pyörällä, koska silloin parin minuutin myöhästyminen lähtöajasta ei haittaa. Bussi kulkee sen verran harvakseltaan, että talviaamuina aikataulusta on oltava tarkka.

### Yksityisyys



Oma data pysyy yksityisenä

### Aika



Joukko-liikenne on aikataulutettu

### Raha



Kaikille sama palvelu

### Minä & Me



Yhteisö-keskeinen

### Teknologia



"Low tech"