Jaka Veber:
JAVNI PROMET KOT PROSTORSKI OZNAČEVALEC
PUBLIC TRANSPORTATION AS A SPATIAL MARKER

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POVZETEK

Besedilo obravnava potencialne koristi javnega potniškega prometa kot elementa v prostoru. Ta vidik se lahko nanaša na grajeno oz. stalno infrastrukturo; tiri, fizično ločeni avtobusni pasovi, postaje podzemne železnice itd. Gre za vizualno izstopajoče ali kako drugače izrazite, grajene prostorske elemente. Ti lahko potencialno pripomorejo k večji popularnosti javnega potniškega prometa, saj s svojo stalnostjo pri uporabnikih ustvarjajo vtis strateške zavezanosti k zagotavljanju kvalitetne storitve javnega prevoza, prav tako pa lahko prestavljajo pomemben del prostorske identitete nekega območja. Drugi fizični elementi oz. njihova oblikovna zasnova – napisi oz. znamenja, izgled vozil, javni prostori ob koridorju itd. – pa lahko pripomorejo k poudarjanju prednosti grajenih oz. stalnih elementov, ali pa se za dosego prej opisanih pozitivnih učinkov uporabljajo samostojno.

Uspešnost opisanih elementov pa je odvisna tudi od njihove prostorske porazdelitve, kar se v članku obravnava skozi zasnovo omrežja linij. Ta mora biti jasna in razumljiva, s čimer se uporabnikom olajša orientacijo, prav tako pa takšna zasnova omogoča učinkovitejšo prezentacijo sistema skozi prostorske elemente. Uspešnost javnega potniškega prometa kot prostorskega označevalca je torej odvisna od njegove zastopanosti v prostoru skozi opisane prostorske elemente in od lokacijske razporeditve le teh.

KLJUČNE BESEDE

prostorska identiteta, mentalne karte, stalnost, fizična prisotnost, javni potniški promet

ABSTRACT

Potential benefits of public transportation as a spatial element are going to be examined. This can relate to permanent infrastructure such as rail tracks, physically separated bus lanes, subway stations etc. These are visually noticeable or otherwise significant built spatial elements and are relatively permanent, which might increase the popularity and use of a public transit service in an area by reassuring potential users of the authorities' strategic commitment to providing high quality transit as well as by becoming part of an areas' identity. Other physical elements and their design – signage, vehicle appearance, public space redevelopment along corridors etc. – are important in this regard as well, and could either enhance the benefits of permanent infrastructure, or they could be used alone to attempt to achieve the same positive effects.

The degree to which these elements can be successful depends also on how they are distributed through space, which in this paper is linked to network or line structure. The network should be clear and easy to understand, enabling users to orient themselves, while also making it easier to apply physical elements which represent the system in space. Thus, the degree to which a public transportation service is represented in space through described elements and their spatial distribution, determines its strength as a spatial marker.

KEY-WORDS

spatial identity, mental maps, permanence, physical presence, public transportation

1. INTRODUCTION

This text refers to public transportation (PT) mainly through its physical presence in space. It explores whether the presence of infrastructure and other physical elements related to PT could have a positive impact on the image of a PT service, as well as the surrounding areas, and thus possibly facilitate ridership, encourage urban (re)development and enhance spatial identity and readability.

Primarily, this paper refers to the presence of permanent infrastructure such as rail stations, light rail tracks, elevated or underground heavy rail tracks, busways etc. However, the design of these or other spatial elements tied to a transit service might be important as well, with potential examples being; signage, transit stop design, vehicle design, green corridor design, public space redevelopment etc. Furthermore, the positive effects of these elements could be enhanced through service quality, and based on how they are distributed in space, which I relate primarily to network structure. All this determines how well can a PT service mark the space and achieve the above described benefits, therefore becoming a successful spatial marker.

In an attempt to look beyond spatial factors such as urban density and land use policies, as variables determining the success of PT, what I wish to express in this text is the tangible value of PT serving not simply as an anonymous service, and of infrastructure not as just a technical tool, but of PT serving as a spatial feature that can contribute to a readable environment and enhance spatial identity – something well captured in the following quote by architect and poet Dolores Hayden: "Like the dwelling, which may be typical of the way millions were sheltered, something as basic as a railroad or streetcar system changes the quality of everyday life in the urban landscape, while marking the terrain" (Hayden, 1995, p. 22, found in: Douglas, 2010).

2. PHYSICAL PRESENCE AND PERMANENCE

Infrastructure, apart from serving its technical purpose, can also create benefits stemming from its physical presence alone. In this regard, it is important to understand the perception of permanence, mentioned in literature with regards to rail tracks and other fixed infrastructure. Dittmar and Poticha (2004) state that "developers and home buyers alike seem to be attracted to the permanence of rail transit". Devney (2011) compares buses to rail services: "Bus routes can be changed more easily and are considered less permanent than rail systems", while Parker et al. (2002) comment on the lack of permanence of bus routes: "Because the locations of bus routes are not fixed or permanent, this greatly increases the risk of investing in transit-supportive land use development". It can therefore be speculated that different PT modes may have different levels of permanence, and thus accompanying benefits.

In this chapter, literature exploring the influence of PT infrastructure on surrounding property prices, development and the overall image of a city is going to be reviewed, in an attempt to see whether these factors may be dependent on perceived permanence. We will first look at research addressing benefits of rail infrastructure – as it is most commonly linked to permanence – and then move on to Bus Rapid Transit (BRT) systems. Next, we are going to move beyond permanent infrastructure and explore how PT can establish a physical presence in space through other elements and design decisions.

2.1 Rail – a benchmark spatial marker

A comparison between three PT systems – one light rail and two heavy rail – is provided by Lewis-Workman and Brod (1997), who explore non-use benefits of transit (i.e. regardless of whether or not a particular resident uses transit). Specifically, the authors focused on the effect transit has on property values. They found measurable property benefits of proximity to three stations (Forest Hills, 67th Avenue, and Rego Park) of the New York City MTA subway and to the Pleasant Hill Station of the San Francisco BART transit system, both of which are heavy-rail systems. Less prominent benefits were discovered for property values in the proximity to three stations of the Portland MAX light rail – the 148th Avenue, 162nd Avenue, and 172nd Avenue stations. We could see these results as hinting to the superiority of transit modes with more extensive infrastructure, i.e. with greater permanence (in this case, heavy rail as compared to light rail). Another possible explanation provided by the authors (ibid.) however, is the lower speed and capacity of light rail vehicles compared with heavy rail transit. Furthermore, the benefits that were evident in the Portland example were present only for properties located between 610 m and 1.6 km from stations. The authors (ibid.) explain this with heavy traffic of the major arterial road which Portland's light rail runs along. Traffic levels may conflict with the positive effects of the light rail line.

Similarly, Huang (1994) explores the effects of transportation infrastructure on nearby property values, stating that public programs can change the value of real property if they produce new private benefits or impose new private costs on landowners. Construction of a highway interchange, for example, can increase nearby land values by lowering the transportation costs associated with particular uses. If the availability of public utility connections decreases construction or operating costs or makes profitable, higher-density development possible, those effects will be reflected in higher property values (ibid.). According to the author, such capitalisation effects are predicted by theory; "Highways and fixed-rail systems directly affect the transportation costs associated with nearby sites, and classical location theory identifies such costs as the primary determinant of urban land value" (ibid.).

The two sources presented above suggest reasons for why infrastructure has an effect on surroundings – namely service quality (speed), noise levels, and a change in transportation costs. The next source, apart from such tangible benefits, also indicates a symbolic value of infrastructure.

Siemiatycki (2005) provides an account of PT infrastructure projects in Bilbao, Spain – particularly a Metro underground – serving as a catalyst for urban redevelopment while also carrying a symbolic meaning. The author describes a sense of community and local pride regarding the Metro;

> *The functionality and architectural splendour of the Metro symbolizes that the Basque people have the technical proficiency, institutional stability and long-term vision to carry out large scale public work projects. Furthermore, the Metro project is a concrete sign of modernity, and the active process of recovering from an economic recession that had crippled the local economy and shattered the city's social stability. (Siemiatycki, 2005)*

Obviously, ambitious projects cannot be justified merely by symbolism however, as the main goal was to achieve tangible effects of urban redevelopment. To face the post 1970 manufacturing decline and overcome the natural barrier of the river

Nervion dividing the city along its length, the authorities relied on emblematic, large scale redevelopment projects, in order to reinvigorate the economic, political, cultural and environmental landscape. Improvements to the city's PT infrastructure played a central role in this strategy. Concrete effects in the form of improved public spaces and increased investment were envisioned, and "the Metro became a symbol of the new dynamism driving public intervention in the city and of Bilbao's evolving image" (Rodriguez & Martinez, 2003 in: Siemiatycki, 2005)). Evidently, the idea of a major infrastructure investment provided a basis for a wide reimaging of the city.

As noted by Siemiatycki (2005), it is the "coalescence of the tangible and the intangible that explains why capital intensive rail based transit solutions were selected over other modal alternatives such as an intensification of the existing bus network". He also further explains the mechanism of how ambitious projects benefit the urban economy; "such New Deal type policies represent a major subsidy to private industry, as the state coordinates massive pools of funds which drive private wealth creation. Through economic trickle down, this pool of resources gets redistributed throughout the broader economy" (ibid.). The strategy of relying on megaprojects appears to have been successful, as reference is again made to Rodriguez and Martinez (2003), according to which unemployment dropped from 27% in the mid-1990s, down to 16% in 2000. By 1999, over 55% of the city's gross output was derived from the tertiary sector, while the contribution of manufacturing has declined from 43% to 28% in the period between 1975 and 1996. In terms of ridership, Siemiatycki (2005) noted an increase in ridership since 1995 to 56 million passengers annually, referring to the Bizkaia Transport Consortium (2003). Since 2003, ridership has been increasing even further, to more than 91 million annual passengers in 2019, according to Metro Bilbao (2020).

The case of Bilbao demonstrates the potential of an ambitious transit project serving as a frame for urban redevelopment and rebranding of a city. It was chosen instead of a bus option and served as a driver of change and a major attractor for private investments. As can be assumed from the Bilbao example, the decision makers believed that an improved bus system would not have the potential to achieve the same effect as a new rail system. In the context of this paper, it shows how a fixed guided system with high permanence can serve as a framework for facilitating redevelopment.

2.2 Looking beyond rail

Currie (2006) identifies challenges and strengths of bus based transit systems for transit oriented development (TOD) and compares them to rail based systems. Bus systems are considered either as BRT – frequent, high-quality mass transit systems with much fixed infrastructure – or local/suburban bus – with low frequency services operating on-street with minimal fixed infrastructure. Rail services examined refer to urban commuter mass transit systems. Permanence of infrastructure is tied with magnitude and implications for development risks. This is related to observations by Parker et al. (2002) who state that "because of the magnitude of rail investments and the "newness" of the investments, rail development is more likely to have supportive public policies". The permanence of rail is also said to increase "the ability of developers and financiers to invest in transit supportive development near rail stations, as compared to bus stations and corridors" (ibid.). As Currie (2006) puts it: "Certainly, significant investment suggests significant commitment. Commitment and developer risks are linked".

Permanence of rail is questioned however, as the author (ibid.) refers to Niles and Nelson (1999), who give examples of Chicago bus routes that have existed for almost a century, while numerous tram systems have been removed in the 1930's and 1940's in North America. Still, in Ottawa, according to Bonsall (1997 in; Currie, 2006), "it was a busway that achieved densification of development around busway stations". Thus, although the Ottawa system is bus based, its busway and related facilities are a significant spatial element. Rathwell and Schijns (2002) note that the stations of the busway in Ottawa are substantial, distinct facilities, that enable stronger branding. They state that "bright red steel frames, curved glass, and concrete bases were far more substantial than bus passengers had been used to and signified that their comfort was being taken seriously for a change" (ibid.).

According to the same source (ibid.), in the first week after the opening of the South East Busway in Brisbane, Australia, the city owned transport operator, Brisbane Transport, recorded a 25.7 % increase in patronage on core busway services. After 6 months, the increase grew to 40 %. This again may indicate the potential of BRT permanent infrastructure (as well as permanent infrastructure in general) for increasing ridership.

However, as has already been implied previously, permanence and presence alone are not enough for infrastructure to produce benefits. If we exaggerate – an abandoned rail station, although relatively permanent, probably does not produce much benefit to development in surrounding areas, while its contribution to spatial image is probably low or even negative. Taking this into account – to requote Currie (2006): "significant investment suggests significant commitment" – it can then be claimed that the higher the perceived permanence, the better is the impression of PT quality, while at the same time, permanence itself may somehow force authorities to maintain a high quality PT. Service characteristics are an issue we will later be addressing more closely.

Next, we should seek a wider collection of physical elements that can be included into this supposed link between service quality and the physical manifestation of it. For this purpose, bus based systems – mostly BRT systems – are going to be examined more closely, as they do not necessarily require extensive infrastructure as rail based PT does, but can establish a presence in space through various other elements.

2.3 BRT – building identity through design

Bus Rapid Transit (BRT) systems provide an interesting midpoint between rail based PT and bus services. BRT often gets compared to light rail: "in many respects, BRT is rubber-tired light rail transit (LRT), but with greater operating flexibility and potentially lower capital and operating costs" (Levinson et al., 2002). According to Hess and Bitterman (2008), "BRT can later be useful as a means to phase in fixed transit infrastructure, such as light rail or heavy rail". Currie (2005) summaries evidence from a range of studies and shows that BRT has generally similar performance to light rail in the perception of passengers. However, "where BRT vehicles (buses) operate totally on exclusive or protected rights-of-way, the level of service provided can be similar to that of full Metrorail rapid transit" (Levinson et al., 2002). BRT systems can cost significantly less to establish than rail based options, and, as shown by Currie (2005), are also generally more cost effective. BRT's feature various levels of infrastructure, from dedicated lanes marked only with different color or signage to physically separated right of ways. In the context of this paper, an analysis of BRT can be used to assess the benefits of fixed

infrastructure, and to explore how certain design principles can facilitate their benefits or compensate for the lack of permanent infrastructure altogether.

Stokenberga (2014) reviewed literature of BRT's influence on urban land development and property values, and among other factors addressed technical specifications. Permanence proved to be a central issue. The importance of significant physical running ways was recognised (suggesting permanence), while BRT flexibility was noted as a drawback. Station structures were also found to be influenced by the need to express permanence. To give a real world example, according to Hinebaugh (2009) the presence of identifiable station structures was cited as a key reason for speculative development when plans were unveiled for a BRT line along Cleveland's Euclid Avenue, as well as extensive streetscape renovations (here, we can see similarities with public space redevelopment in the Bilbao case described previously). Furthermore, Vincent and Jerram (2008) report that many developers agree on permanence of BRT to be an important factor for investment, with exclusive running ways and dedicated lanes as well as the size and quality of stations contributing to perceived permanence. Regarding permanence and land use strategies, Stokenberga (2014) concludes:

> *positive property development effects have been observed in cases where the BRT has been part of an integrated transit and land-use strategy and where significant investments have been made to create a sense of permanence of the system and to improve its environmental and aesthetic quality.*

Still, supportive policies – most often this relates to land use policies – are crucial in providing benefits of transit. According to Miller and Buckley, (2000 in: Stokenberga, 2014), in Curitiba, the government instituted strong land-use controls and was thereby able to effectively guide growth to encourage development patterns along structural axes that reinforce and encourage use of the bus system. Also, Thole and Samus (2009), conclude that policies and the local climate are potentially more important than the physical permanence of a PT system. However, Levine (2006 in: Stokenberga, 2014), emphasizes the limited power of zoning and other regulations, and argues that, although requirements for dense development can accommodate market forces that are present, they cannot force a product the market is not willing to provide. It could thus be said, that the characteristics of a PT system itself may produce benefits which cannot be attributed solely to policies. These benefits could be tied to – among other characteristics – permanence, the impression of which should be encouraged when designing BRT.

Providing an expanded view of permanence regarding buses are Bitterman and Baldwin-Hess (2008), who arrange BRT identity components according to a continuum of physicality. On one end of the continuum are thus elements having a degree of permanence (namely; vehicles, stations, shelters, kiosks, street furniture, running ways and ITS displays), while the opposite end of the spectrum includes perceptual elements, or those with a lesser degree of permanence that change frequently (namely; website, timetable, logo/system name, colour palette, brochures, system maps, telephone information systems, wayfinding signage, system signage), in response to seasonal and route changes. The authors state that "users are typically more aware of changes to physical elements than to perceptual elements" (ibid.).

When talking about peoples' awareness of changes to physical elements, we should understand that this refers to a wide array of visible spatial elements. Apart from busways/running ways, all the elements mentioned above can be used to design a PT service with a noticeable presence in space. Because BRT is a mode which founds itself on the border between the perceived permanence of rail and the perceived arbitrariness of on street buses, design decisions and technical characteristics can tilt the qualities of each individual BRT system closer towards one or the other. As we have already addressed the infrastructure aspects of BRT, we are now going to address design decisions in a broader sense in order to explore ways in which BRT can solidify its presence in space.

The task of improving BRT image is linked to either identity and branding in reviewed literature (see: Hess & Bitterman, 2008; Devney, 2011; Bitterman & Baldwin-Hess, 2008; Polzin & Baltes, 2002). It is often emphasized that BRT should be given a unique identity separate from other modes, particularly other bus based systems. "Bus routes that have a distinctive brand have a much higher awareness by the general public and are more legible for new users to understand than the rest of the bus network" (Devney, 2011). According to Hess and Bitterman (2008), mature BRT systems make use of a well-defined, simple colour palette that distinguishes BRT service from local bus service. Stokenberga (2014) – apart from dedicated or segregated right of way infrastructure and frequent operations – also emphasizes distinct branding and marketing as features through which BRT can be characterized as a high quality bus service.

Also, it is often implied that BRT's should try to emulate the characteristics of rail based PT. According to Devney (2011), branded bus services are important to increase the profile of bus services when commuter rail and light rail transit are well identified by tracks, stations and rolling stock. "Branding can be used to give buses a stronger identity. Bus service branding can be done with the vehicle livery, route design, service frequency, infrastructure, signage, information and promotion" (ibid.). According to Polzin and Baltes (2002), BRT options need to offer logical responses to traits of "physical presence and permanence" of rail investment. The authors (ibid.) note that customers, adjacent residents, businesses, and the general public traveling past a BRT alignment should be able to identify its physical presence, and mention features ranging from exclusive rights-of way, to signage, stations, electrification, which can establish the presence of BRT.

The approaches that have been described, although discerned from BRT literature, can be used to strengthen the identity of rail based PT as well. Branding can give BRT an identity which is separated from other modes, and convey information about a PT service to its users, in turn making it easier to use and understand. However, the extent to which the system can be made understandable probably depends also on the system itself, namely – on the network structure. As I will argue next, the network itself can have an effect on how successfully a PT service can be represented in space through physical presence and branding.

3. NETWORK LAYOUT – A FRAMEWORK FOR APPLYING PHYSICAL ELEMENTS

The evidence assembled by Currie (2005), mentioned earlier, sought to investigate the attractiveness of BRT compared to other transit modes from a passenger perspective. Insight is offered into how BRT systems could be improved in order to match rail based modes. Potential weaknesses of BRT compared to rail are said to be ride quality, vehicle design and lastly, general perceptions of system route and network knowledge. If we return

our focus to the perception of permanence, particularly the last point is relevant, and it is suggested that the scale of rail transit infrastructure, including stations and rights-of-way, is a significant factor in helping passengers understand how the system operates and also where transit stops are located. The author (ibid.) suggests; "The complexity of conventional bus-based systems, in terms of route structure and the large range of services offered, could be a weakness compared to rail. This needs to be addressed to achieve equivalent patronage levels to rail."

The requirement for network simplicity which is implied above, signals the need to further explore network structure. Here, there is a possibility to link the perception of permanence, or designed spatial elements in general, with network structure. Regarding rail systems; because they require extensive built infrastructure with high permanence, this may signal a simple network layout to users, which can be easy to understand and useful for navigation. The same may be said for BRT depending on their technical characteristics and design.

This first leads us back to Currie (2006), who compares bus TOD (BTOD) and rail TOD (RTOD). Aspects other than permanence that have an effect on TOD are outlined. For example, the situation where the number of stations is potentially too great to concentrate development is called "scale dilution". However, while concentrating development around a large number of bus stations can be difficult, compared to a small number of rail stations, a concentration of intense development around a few sites can have its own limitations as well. Luscher (1995 in: Currie, 2006) modelled the impacts of RTOD and BTOD projects in reducing auto use in San Francisco, and found that RTOD is more effective than a BTOD, but the number BTOD sites is so greater than the RTOD's that overall, BTODs are more effective. BRT systems however, can have qualities similar to rail systems in this regard, as BRT stations can be very limited in number compared to on street bus. Currie (2006) nevertheless emphasizes that a large number of stations typical for bus systems can be "an opportunity for cities to obtain the higher benefits from TOD on a system wide basis and increase the community's range of choice".

Huang (1994), states that an effect of infrastructure on nearby land values is confirmed by nearly all of the reviewed studies, although the magnitude and extent of the effect varies. He gives three plausible theoretical explanations for such variation; cost and performance characteristics of the studied transportation systems, the time period in which each study has been made, and variations in supply. The last explanation refers to accessibility in other parts of the region: "if highly accessible sites within the relevant market are already plentiful, then new transportation facilities may have little or no effect on nearby land values" (ibid.). This last point is interesting as it hints towards limited supply or "rareness" having a measureable effect on the surroundings of infrastructure. As the author then explains, "in theory, consumers assess (1) the likelihood that benefits to a particular site will continue, increase, or decrease in the future; and (2) the comparative advantage of that site, ***vis a vis*** other locations in the future" (ibid.). We can link this to the difference between PT modes based on infrastructure – for example, rail based PT or even BRT can be considered both rarer and more permanent than compared to on street bus, thus implying long term benefits and greater accessibility compared to other sites, which can have a measurable effect on surrounding property values.

Frequency should be mentioned briefly. Dittmar and Poticha (2004), note that "after density, the most important questions about transit have to do with service frequency and speed". Frequency can make a service more practical and a more common site in space, resulting in people accepting it as part of the environment and as a frame based on which they orient themselves due to the practicality derived from frequency. Also, higher frequency can result in branded vehicles (with distinctive livery promoting PT) to become a more common sight in space, thus increasing its physical presence.

We can therefore recognise the importance of line structure and hierarchy, where limited supply can improve the readability of the system, as well as other service characteristics. As Douglas (2010) notes – discussing PT and local identity – "tourists regularly depend on mass transit… to get around cities and form mental maps of their layouts". A clear and easy to understand line structure is therefore crucial in order for users to get an understanding of the system and implement it into their mental maps. Also, such a network layout can also entail easier marketing and identification through signage and colour. We could then say that spatial elements linked to PT – from rail tracks to stop signage and stations – are not only establishing or emulating a perception of permanence, or are merely an aesthetic element. They are also a materialisation of a simple and readable network structure and high quality service marked in space, according to which people can orientate themselves and rely on. The reverse relationship must be emphasized as well; a simple structure with frequent service can more easily tie itself onto permanent infrastructure and other spatial elements, and can then be more effective if it does so. Such a successful merger of these qualities results in PT acting as a successful spatial marker.

4. DISCUSSION

To outline the process of a PT system becoming a significant spatial marker; An understandable network layout can more easily be transferred into the physical reality of urban space through infrastructure or designed spatial elements. This in turn further strengthens the clarity of the system and makes it more noticeable, making it more possible to become part of peoples' mental maps. This improves the identity of both the PT service and the surrounding environment, while also signifying a commitment of authorities for maintaining transit quality levels, thus incentivising surrounding development. Higher ridership is facilitated throughout the progression of this process.

This however, is only one (idealised) representation of the process. The described steps could also be put in a different order. Also, not necessarily all the steps of this process need to be taken. For example, simply updating the signage on a system in order to make the signs more noticeable and/or visually appealing, will improve the presence of the system and therefore make it a stronger spatial marker as before the update. Therefore, we can also say that there are different degrees to which PT can fill this role.

4.1 Public transportation as a spatial marker in Ljubljana

Finally, we should apply the information, gathered in this paper, to the analysis of PT in Slovenia. The usage of PT in Slovenia is among the lowest in the European Union. According to the data by the European Commission (2019), in 2017, only 13,5 % of passenger miles in the country were done by PT – the third lowest number among European Union members.

Noticeable is the lack of – particularly urban – PT in Slovenia for which it could be said can play the role of a strong spatial marker. The dominant form of urban PT in the country currently are city buses. However, from 1901 till 1958, a tram system used

Figure 1: Dedicated bus lane on Dunajska cesta, marked with yellow. Photo: J. Veber

Figure 2: Slovenska Cesta, with bus lane and patterned pedestrian surfaces. Photo: J. Veber

to operate in the capital city, Ljubljana, while trolleybuses were in use there from 1957 till 1971 (see Brežina & Lokar, 2009). If we apply the knowledge from our review, both systems possessed a higher degree of permanence and physical presence than a bus system due to their technical characteristics of having rails and/or overhead wires as necessary infrastructure. Looking at the number of users through the years, we can see that, in Ljubljana, according to Koblar (2017), ridership on urban buses is in decline, as it has fallen from just under 43 million annual passengers in 2010, to under 38 million in 2015. Although we must be careful at making such connections, since traffic situation in Ljubljana followed trends tied to suburbanisation in Western Europe (see Šašek-Divjak, 2004), it is nonetheless interesting to note that the rise of buses, according to Bole (2004), coincided with the beginning of the end of PT (in Ljubljana) and the rise of personal vehicles.

The bus system of Ljubljana, operated by *Ljubljanski potniški promet* (LPP), possesses many traits which prevent it from becoming a significant spatial marker. First of all, there is very little physical separation from the remaining traffic, and thus perceived permanence. Dedicated lanes do exist on some sections, however they are not physically separated from automobile traffic (Figure 1). We can claim that only in the city centre do the bus lanes have a level of permanence or presence higher than in other parts of the city, due to them being an integral part of a public space redesign – that of the central "Slovenska Cesta" street (Figure 2). Furthermore, the exteriors of buses are often covered in wrap advertising (see: Granda, 2018), preventing a unified appearance of vehicles and blocking views from inside. This can create confusion for the strength and importance of the brand and image, when vehicle livery is less distinctive or noticeable. Finally, there is also the issue of network structure, addressed by Koblar (2017). The large number of bus routes running on the same sections, and a lack of hierarchy among them, create confusion among users and a poorer understanding of the system (for the map of routes, see LPP, 2020). All this could hinder the introduction and efficiency of branding, noticeable physical elements such as distinctive signing, and separation from other traffic. All of the above is decreasing the systems prospects of becoming a meaningful spatial marker.

Although plans for the re-introduction of tram/light rail in Ljubljana have been a popular idea and entertained in several traffic studies (see: Koželj, 2005), in recent times, the viability of such plans has been questioned (see: Bole, 2004; Koblar, 2017; Koželj, 2005). Due to its permanence, such a system would have advantages for establishing itself a spatial marker. However, permanence of guided PT modes, as we saw in the literature review, can be compensated for by other means.

Two recent bus based proposals for Ljubljana, which both introduce line hierarchy, could provide solid ground for strengthening PT's role as a spatial marker. The first one is by RRA LUR (2010), proposing a system of 4 so called "Modern Fast Lines" (Slovene: *Sodobne Hitre Linije* – abbreviated as SHL) beside regular urban bus services. It is also implied that this system could form the basis for possible future upgrade to light rail. The other was developed by Koblar (2017; see also Koblar et al., 2018), who re-designed the urban bus network in Ljubljana, dividing it into 3 main lines, 2 circle lines, 6 secondary lines and 11 feeder lines.

If implemented, both these proposals could serve as a framework for applying spatial elements in order to improve their physical presence. Particularly the second proposal by Koblar (2017) is interesting, as it proposes just 3 main lines, making the system very easily understandable (potentially providing also benefits from limited supply described earlier), while also establishing differentiation among the remaining bus services, thus opening opportunities for further clarification of the network through design decisions or possible permanent infrastructure. For example, each of these line categories could be marketed differently (different logo, different vehicle colours etc.), while physical separation from other traffic could be encouraged on main lines. The author (ibid.) himself proposes an eventual upgrade of the system with the introduction of double articulated buses or trolleybuses on main lines, in case the increase in ridership would show the need for vehicles able to carry more passengers.

Both proposals provide an opportunity to begin the process of PT in Ljubljana gaining a distinct identity, by making it better represented in space. People could orient themselves according to it and accept it as part of the urban environment, whose identity would get improved as well. PT in Ljubljana could thus strengthen its role as a spatial marker. This does not necessarily mean an introduction of a new technology (light rail for example) however, as this text has examined how bus based systems can be successfully branded and their image improved through design of spatial elements.

5. CONCLUSION

In the text, I have attempted to outline ways in which PT marks the environment, particularly urban settings, and why this is beneficial. This is done primarily through the visible physical mark it has in space, but also through its spatial distribution. Furthermore, service quality also plays a role. Thus, a bond must exist between the physical characteristics of PT, its network organisation or hierarchy, and service quality. For example, high permanence with a confused line structure and infrequent service (as is the case with many main line trains services) performs poorly as a spatial marker. Similarly, a clear network structure which is not properly represented in space, cannot reach full potential.

What this paper attempted to argue for is that the appearance of PT simply matters. It is important that PT establishes a proper relationship with the environment, not just through supportive policies to facilitate TOD, but that PT itself must have a physical and aesthetic dimension, which may invite new users and encourage new development. This also extends to its spatial organisation, which should be clear enough for people to understand. It could also make it easier to apply spatial elements when we have a recognisable spatial organisation. This way, PT could more effectively form the backbone of people's cognitive maps, which Lynch (1960) claimed are often based on transportation networks.

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