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Metro station naming strategies in selected megacities and lessons for new metro systems

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Abstract

There were 31 megacities in the world in 2016 and 10 more are expected to join the group by 2030. Most of the old megacities developed their Mass Rapid Transit systems many decades ago, while some of the aspiring megacities are in the process of building their MRT systems today. Building infrastructure is just one aspect of the system, while naming stations is another. This study analysed metro station names in seven selected megacities across five continents in order to understand naming strategies better by looking at patters, rules and any other guidance that could be applied to stations being part of new systems. Results presented in the study reveal that the shortest station names in the sample are in Tokyo (on average 10 characters and 1.3 words) while the longest are in New York City (on average 16 characters and 2.6 words). Also, a closer look at metro maps shows that some systems apply bi-lingual station names with national and English languages used. In-depth analysis of the selected metro systems allowed to identify key drivers for station naming strategies, which often are unique to a system and deeply rooted in a local context. For example, in New York City and Bangkok street-based names are most popular (89% vs. 41%) while in Sao Paulo, Cairo and London an area name is a dominant station name category (53% vs. 33% vs. 24+%). Person's names are quite popular as station names in Cairo (26%) and Sao Paulo (20%). Organisations' names however are not that common, although some systems allow for example university-based names, such as Helwan University (Cairo) or 116 Street-Colombia University (New York City). In addition, New York City, Cairo and Delhi metro systems allow station naming rights to be purchased by a private company, but a scale of this phenomenon and their rules differ. Results presented in the paper review existing metro station naming strategies and provide lessons for new or under construction metro systems. Recommendations include a set of steps which could be taken into account by megacities and other cities debating on best metro station naming strategies to be applied in their unique context.

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Keywords: metro, station names, strategy, policy, megacities

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1. Introduction

In 2018 there are 160+ metro systems in the world, including 63 driverless systems (UITP, 2018). The oldest system is in London, the UK and there are at least 30+ currently under construction (e.g. Sydney, Lagos, Jakarta). One of the smallest systems is in Dnipro, Ukraine and includes 6 stations only while the largest is in the New York City, the US with 360 unique station names. Obviously, each station has a name, but some names are not always unique as sometimes few stations in one system share the same name. As expected, this might bring some confusion to passengers but is also a starting point for the paper.

There are many non-scientific publications investigating station name origins, especially if the name is unique or controversial (Ruggeri, 2017; CODATU, 2017). However, no study has been found to look at station names in terms of its parameters, such as its length, language or name category across different metro systems. These parameters, if considered wisely and applied to a local context carefully at a station naming phase may contribute to a smooth journey of its users, especially for non-locals using a system for the first time.

Many large cities developed Mass Rapid Transit (MRT) in a form of a metro and more of the growing cities tend to follow this trend. Some cities used rules usually applied to public buildings and places (e.g. see Victoria State Government, 2016) to name their stations, while other became more creative in publishing guidelines (e.g. see Metrolinx, 2015 or Metropolitan Council, n.d.), setting up open competitions (e.g. Melbourne, Australia; see MetroTunnel, 2017) or selling station naming rights to a private sector (e.g. Delhi, India; see Delhi Metro Rail Corporation Limited, 2016). Since metro infrastructure development is very expensive various alternative income sources are often sought by investors or operators of such systems. More recently, selling station naming rights to private sector became a popular strategy of raising non-fare income for (still) public transport. This strategy has already been applied in various versions in cities across the world, from New York City to Dubai to Kuala Lumpur. Although investigation into selling station naming rights is not the scope of this paper, it is an important and related issue and it should be mentioned that such a practice not only exists but gains popularity, especially in developing countries, such as India or Malaysia (see CODATU, 2016 and CODATU, 2017 for examples).

Therefore, the aim of the paper is to investigate strategies for naming metro stations by analysing station names of metro systems in selected large cities around the world taking into account all stations in each network. The three key parameters considered are:

- name length (number of characters, number of words);
- language used (national, English, other);
- name category (landmark, street, area, etc.).

The paper is structured as follows. Section 2 looks at megacities and their populations as well as their transport systems in general. Section 3 first explains criteria used for selection of megacities for the study and next lists metro system characteristics and the five parameters studied. Next, Section 4 presents analyses of results divided into four sub-sections on: general results, name length, name language and other unique characteristics of station names. Section 5 presents conclusions on the work conducted in the paper. Section 6 lists lessons regarding station naming strategies for new and under development metro systems across the world. Finally, section 7 suggests avenues for further research in the area of station naming strategies and rights.

2. Megacities and transport

2.1 Definition of a megacity and their populations

Megacity is a city with 10 million inhabitants or more (UN, 2016; Allianz, 2015; Taiyab, 2008). Table 1, based on data provided in UN (2005) and UN (2016), shows the growth in the volume and numbers of megacities across the globe since 1950 and up to the predicted numbers in 2030. Country classifications "intended to reflect basic economic country conditions" (UN, 2018, p. 139) and divide the countries into three exclusive groups: developed economies (rows highlighted in Table 1), economies in transition and developing countries.

In 1950 there were only two megacities and both were located in developed countries: Tokyo in Japan with 11.3 million people and New York in the US with 12.3 million people (UN, 2005). Over the next half a century 16 new

megacities emerged with majority of them being located in developing countries of Asia and Africa. In 2016 there were already 31 megacities across the globe with Tokyo being the largest (38 million people) and Lima, Peru being the smallest (just over 10 million people). 10 new cities are predicted to join the megacities group by 2030 and all are located in developing countries in Asia, Africa and South America (UN, 2016).

Table 1. Population in megacities from 1950 to 2030 [in millions]

Continent	Country	City	MRT	1950	1975	2000	2005	2016	2030
Asia	Japan	Tokyo	Yes+	11.3	26.5	34.4	35.2	38.1	37.1
South America	Mexico	Mexico City	Yes		10.7	18.1	19.4	21.1	23.8
North America	USA	New York	Yes+	12.3	15.9	17.8	18.7	18.6	19.8
South America	Brazil	Sao Paulo	Yes+			17.1	18.3	21.2	23.4
Asia	India	Mumbai	Yes			16.1	18.2	21.3	27.7
Asia	China	Shanghai	Yes+			13.2	14.5	24.4	30.7
Asia	India	Kolkata	Yes			13.1	14.3	14.9	19.0
Asia	India	Delhi	Yes			12.4	15.0	26.4	36.0
Asia	Argentina	Buenos Aires	Yes			11.8	12.6	15.3	16.9
North America	USA	Los Angeles	Yes			11.8	12.3	12.3	13.2
Asia	Japan	Osaka	Yes+			11.2	11.3	20.3	19.9
Asia	Indonesia	Jakarta	U/C			11.1	13.2	10.4	13.8
South America	Brazil	Rio de Janeiro	Yes			10.8	11.5	12.9	14.1
Africa	Egypt	Cairo	Yes			10.4	11.1	19.1	24.5
Asia	Bangladesh	Dhaka	U/C			10.2	12.4	18.2	27.3
Europe	Russian Federation[1]	Moscow	Yes			10.1	10.7	12.2	12.2
Asia	Pakistan	Karachi	No			10.0	11.6	17.1	24.8
Asia	Philippines	Manila	Yes			10.0	10.7	13.1	16.7
Asia	China	Beijing	Yes+				10.7	21.2	27.7
Africa	Nigeria	Lagos	U/C				10.9	13.6	24.2
Asia	Turkey	Istanbul	Yes					14.3	16.6
Asia	China	Chongqing	Yes					13.7	17.3
Asia	China	Guangzhou	Yes+					13.0	17.5
Africa	Congo[2]	Kinshasa	No					12.0	19.9
Asia	China	Tianjin	Yes					11.5	14.6
Europe	France	Paris	Yes+					10.9	11.8
Asia	China	Shenzhen	Yes					10.8	12.6
Asia	India	Bangalore	Yes					10.4	14.7
Europe	United Kingdom	London	Yes					10.4	11.4
Asia	India	Madras	No					10.1	13.9
South America	Peru	Lima	Yes					10.0	12.2
Africa	South Africa	Johannesburg	No						11.5
Africa	Tanzania[3]	Dar es Salaam	No						10.7
Africa	Angola	Luanda	No						10.4
Asia	Pakistan	Lahore	U/C						13.0
Asia	India	Hyderabad	Yes						12.7

Asia	Thailand	Bangkok	Yes	11.5
Asia	India	Ahmadabad	U/C	10.5
Asia	Viet Nam	Ho Chi Minh City	U/C	10.2
Asia	China	Chengdu	Yes	10.1
South America	Colombia	Bogota	No	11.9

[1] economy 'in transition'; [2] Democratic Republic of the Congo; [3] United Republic of Tanzania; U/C – under construction; Yes+ - metro system includes at least one automated line.

Source: UN, 2005; UN, 2016.

2.2 MRTs in megacities

Currently, 160+ cities in the world have a metro system in operation (UITP, 2015). As presented in Table 1, 28 out of 41 megacities use an MRT system and further six megacities are currently developing such a service. Out of ten busiest metro networks in the world, seven are located in megacities and four of those are in Asia (Tokyo, Beijing, Shanghai and Guangzhou). The busiest metro system in the world is in Tokyo with 3,294 million annual passenger trips (UITP, 2014). In terms of network length, the top three metro systems have over 400 km each and are located in megacities of Shanghai, Beijing and London.

In addition, Asia-Pacific region has the highest proportion (43%) of automated metros in the world with 342 km spread across megacities (e.g. Tokyo, Shanghai, Osaka) and other large cities (Singapore, Kuala Lumpur, Taipei) of Asia (UITP, 2016). Europe is second region with highest proportion of automated metros, and this is due to the length of Paris metro (200 km), which is the only European city using this type of a system. In total, there are 1,000 km of automated metros in the world in 2018 (UITP, 2018) and it is expected that this number will double in the next few years with new systems being currently under construction (UITP, 2016).

Automated metros play an important role in terms of technological development in rail. Currently there are over 55 fully automated metro systems in the world (UITP, 2016). Some research work on driverless metro systems includes issues of safety (Zhang et al, 2016), rail optimisation (Rao et al., 2016) or public perception of driverless trains (Fraszczyk et al., 2015; Fraszczyk and Mulley, 2017). However, no research work has been found to look at station names, whether in the context of traditional MRT or automated metro systems. This paper addresses this research gap and methodology applied in data collection and analysis is explained in the next section.

3. Methodology

3.1 Criteria for selection of megacities

As mentioned earlier, there were 31 megacities in 2016 and 10 more are expected to emerge by 2030 (UN, 2016). To learn about metro station naming strategies from megacities with MRT systems and to allow a fair comparison between them a set of criteria were introduced before the final selection was decided.

Criteria for selection of megacities for analyses were as follows:

- old and new megacities;
- capital cities with metro systems;
- having various sizes;
- representing both developed and developing countries;
- located at different continents, if possible;
- English and non-English as primary language;
- total number of seven megacities (representing 15+% of all megacities).

3.1.1 Shortlisted megacities

Based on megacities listed in Table 1 and selection criteria specified in Section 3.1, Table 2 presents seven megacities shortlisted for the final comparison.

Out of the seven megacities selected, three represent developed countries (Japan, USA and the UK) and four developing countries (Brazil, Thailand, India and Egypt). The seven countries are located at five continents, where Asia is represented three times by Japan, India and Thailand. The selection presents a good mix of cities with various 'megacity age': two cities are 'old' megacities (Tokyo and New York since 1950), three were included in the list in the year 2000 (Sao Paulo, Delhi and Cairo), London has just joined the megacity group in 2016 and Bangkok is expected to become a megacity in 2030. In terms of languages spoken, two cities are native English (New York and London) while New Delhi is bi-lingual (Hindu and English) and the remaining three cities (and their countries) use their own native languages and alphabets. As predicted for 2030, the two largest megacities' populations from the selected group will be in Tokyo (37.1 mln) and New Delhi (36 mln) and their populations will be over triple the size of populations in London (11.4 mln) or Bangkok (11.5 mln), the smallest populations in the group.

Table 2. Selection of megacities for metro system analysis.

Number	Continent	Country	City	Old vs. new MC	Developed vs. developing	English vs. non-English language as official	Population in 2030 [mln][1]
1	Asia	Japan	Tokyo	Old	Developed	Non-English	37.1
2	North America	USA	New York	Old	Developed	English	19.8
3	South America	Brazil	Sao Paulo	New	Developing	Non-English	23.4
4	Asia	India	Delhi	New	Developing	English[2]	36.0
5	Africa	Egypt	Cairo	New	Developing	Non-English	24.5
6	Europe	United Kingdom	London	New	Developed	English	11.4
7	Asia	Thailand	Bangkok	New	Developing	Non-English	11.5

Source: [1] UN, 2016; [2] Hindu and English are two of the official languages in Delhi

3.2 General metro system characteristics

Five general parameters are calculated and taken into account for each of the metro systems:

- number of metro lines (total number of individual metro lines as classified by the system);
- average number of stations per line (total number of stations divided by number of lines);
- total number of unique station names (each station name counted once only);
- total number of all stations on all lines (the same station counted n-times if an interchange with n-lines);
- number of interchange stations (each interchange station name counted once only, this includes interchanges with other metro lines or metro systems as well as junctions (hubs) where links with other modes of transport exist (e.g. rail, coach, ferry; buses are excluded due to their large city coverage)).

3.3 Station-name related parameters

Five more parameters specifically related to the station names have been identified:

- average number of characters in a station name (total number of characters in all unique station names divided by the number of unique station names);
- average number of words in a station name (total number of words in all unique station names divided by the number of unique station names);
- number of unique station names translated: 1) either into English meaning or 2) with English alphabet only;

- station name category (landmark, building, street, person's name, organization, sub-district/area, sponsored, other);
- other naming system (acronym, numerical, mixed, etc.).

4. Analysis of results

4.1 General results

Seven metro systems in the selected megacities were analysed and their general characteristics as well as station-name specific parameters are displayed in Table 3. The two smallest metro systems out of the seven megacities are located in Cairo (86 unique station names) and Bangkok (76), while the largest are in New York (360), London (302) and Tokyo (216). Altogether, the seven megacities share 1,372 unique station names which are analysed in more details in the next sections.

Table 3. General characteristics of metro systems and station-name related parameters in selected megacities.

No	City	Number of metro lines	Average number of stations per line	Total number of unique station names	Total number of all stations on all lines	Number of inter-change stations[1]	Average number of characters in a station name	Average number of words in a station name	Number of station names translated into English meaning [%]	Other naming system (numbers, letters, mixed)
1	Tokyo[2]	13	22	216	290	106	10.33	1.37	0%	Yes (C01)
2	New York	25[3]	35	360	881[3]	160+	16.01	2.62	N/A[4]	No
3	Sao Paulo[5]	13	14	161	181	42	12.34	1.81	0%	No
4	Delhi[6]	9	20	171	184	21	12.25	2.02	43%	No
5	Cairo	3	29	86	91	5	11.06	2.14	12%	No
6	London[7]	13	35[8]	302	419	130[9]	12.06	1.81	N/A[4]	No
7	Bangkok[10]	5	15	76	78	3	11.67	2.04	13%	Yes (N1)
		-	-	=1,372	-	-	Av.12.25	Av.1.97	-	-

Note: Updated in March-April 2018. [1] includes interchanges with 1 or more (other system) metro lines and junctions with other modes of transport, e.g. railway system; [2] metro system in Tokyo includes two systems: Tokyo Metro Lines and Toei Lines; [3] number is calculated for services (not lines) on New York City Subway; [4] not applicable, all names in English; [5] metro system in Sao Paulo includes two systems: Sao Paulo Metro (6 lines) and CPTM (7 lines); [6] metro system in Delhi includes two systems: Delhi Metro and Rapid Metro; [7] metro system in London includes: London tube (11 lines), DLR and London Overground; [8] average number of stations for 12 lines excluding London Overground (when 122 stations of London Overground are included the average is 42); [9] approximate; [10] metro system in Bangkok includes three systems: BTS, MRT and ARL.

4.2 Station name length

Number of characters in English station names across the seven metro systems analysed covers a wide spectrum from 2 and 3 (e.g. 2 – Sé station in Sao Paulo, 3 – Ari station in Bangkok) to 40 and 41 (e.g. 40 - Queen Sirikit National Convention Centre in Bangkok, 41 - São Caetano do Sul-Prefeito Walter Braido in Sao Paulo) characters. Fig. 1 displays results as a bell-shaped graph, where a number of characters in a station name is on average close to 12, with the greatest average per megacity for New York (16.01) and then Sao Paulo (12.34) and Delhi (12.25), the smallest for Tokyo (10.33) and medium values for Cairo (11.06), Bangkok (11.67) and London (12.06). Fig. 1 also shows that most of the stations have between 7 and 16 characters in their names.

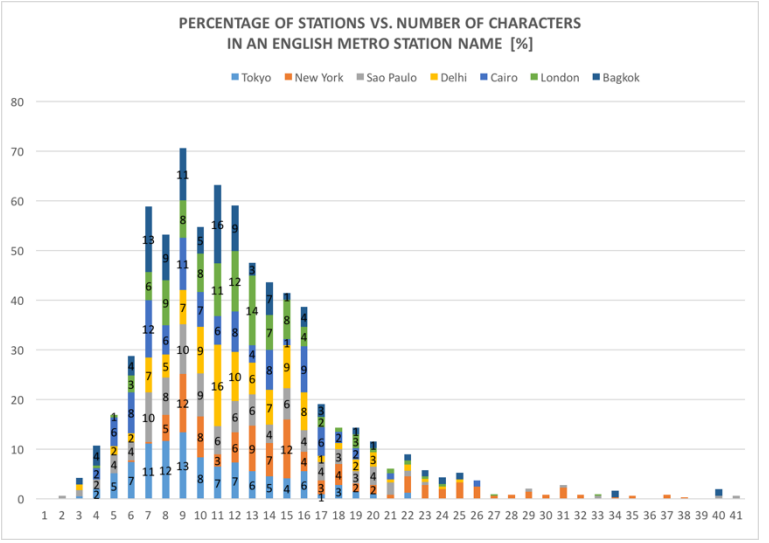

Fig. 1. Percentage of stations vs. number of characters in an English metro station name.

In terms of number of words used in a station name in the seven metro systems the names are between 1 and 7 words long. Tokyo metro station names are unique in this context because 64% of all have a single-word name, followed by 35% of stations with 2-word names and only 1% with 3-word station names. A 2-word names are the most popular across the seven systems covering over 50% of stations for all but Cairo (37%) and Sao Paulo (45%) metro systems. 3-word names are quite popular in Cairo (29%), and Delhi (21%), but in the remaining metro systems they total to less significant numbers. In New York City 17% of stations use 4-word names, which is the highest number across the seven systems. Also, 5- to 7-word names are much less common and occur at 6% or less of stations in each system.

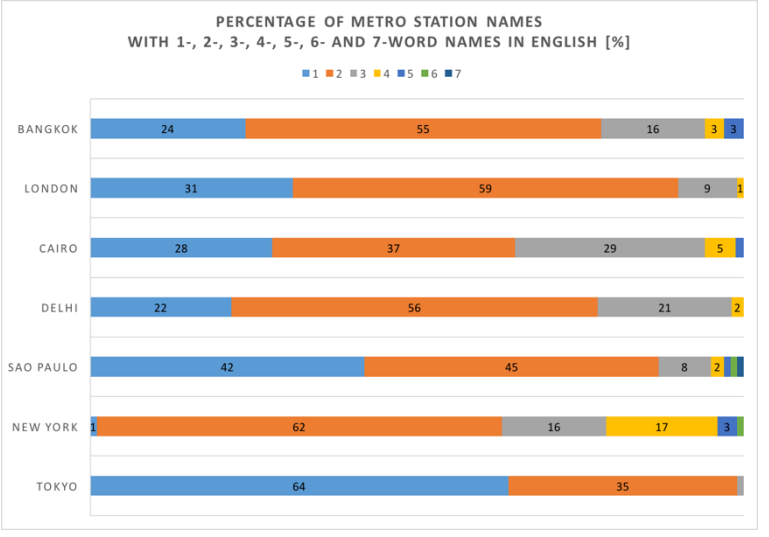

Fig. 2. Percentage of metro station names with 1-, 2-, 3-, 4-, 5-, 6- and 7-word names in English.

4.3 Station name language

Metro station name translations into English for the metro systems analysed can be divided into two types: translation into English meaning or translation of a sound with the use of English alphabet only.

As displayed on Fig. 3, it is clear that majority of the selected megacities' station names, or rather their name sounds, are simply written with English alphabet. Excluding the English-native megacities (London and New York), the greatest number of metro station names' translations into English meaning is for Delhi metro (43% of stations). This could be explained by the fact that the city is already bi-lingual and the local population is using both Hindu and English languages in their daily communication. For the non-native English speaking countries, like Egypt, Brazil or Thailand, their megacities metro systems have majority of their native station names written in English alphabet, with only 12% of station names for both Cairo and Bangkok translated into English meaning. Sao Paulo and Tokyo have 100% of their metro station names in their native languages, where in Tokyo, due to the original use of Japanese alphabet, the names are also written in English letters.

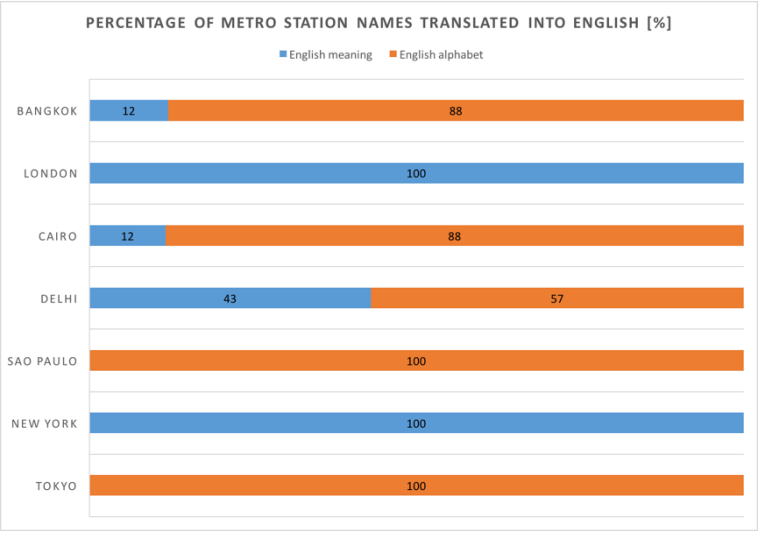

Fig. 3. Percentage of metro station names translated into English.

4.4 Other unique characteristics of station names

4.4.1 Street-based names

In New York City metro system there are 321 (89%) unique stations named after street names. More specifically, 48% include a 'street', 33% 'avenue', 3% 'boulevard' and 2% 'road' word, but some names include a mix of two (e.g. 3 Avenue-138 Street) or an additional name category (e.g. 116 Street-Columbia University). In addition, due to the city's topography with long streets and avenues sometimes one street is crossed by more than one metro line and more than one station is located at a certain street. For example, as presented on Fig. 4, there are four 125th Street stations, each on a different line. Majority of the remaining stations are named after landmarks, such as parks or plazas (e.g. Botanic Garden, Queens Plaza), buildings (e.g. World Trade Center) or areas (e.g. Broadway). In Bangkok, 41% of metro stations are named after streets, however the names themselves do not include word 'street' or similar. For example, Sukhumvit, Ratchadaphisek or Ari stations are all street names in Bangkok, but some could be also considered as area names. The names are unique and there are no two stations sharing the same name, unless it is an interchange for two or more systems (e.g. Phaya Thai).

Fig. 4. A graphic representation of metro stations with 125th Street name in New York City.

4.4.2 Direction-based names

There are 302 unique metro station names in London. Out of these, a large group of stations is named after an area name (24+%), for example Acton Town, Greenwich or Wimbledon. Interestingly, as many as 12% of stations have a geographical-direction based name and includes either 'North' (2%), 'South' (3%), 'East' (3%) or 'West' (4%) word. More specifically, some examples include names such as: West Acton, East Acton and North Acton or North Ealing and South Ealing. In addition, 2% of stations includes a word 'Central' in their name suggesting a central location in a given area. An example of six stations in London metro with 'Acton' area name as part of their official names is presented on Fig. 5.

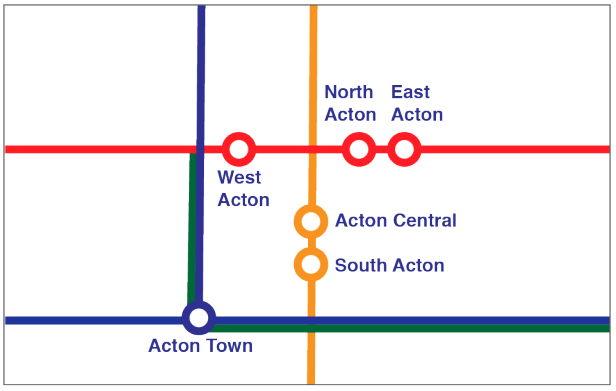

Fig. 5. A graphic representation of the Acton stations on London Tube map.

4.4.3 Line-coded abbreviations

The official Tokyo Metro map (Tokyo Metro, 2018) includes names of stations as well as their line-coded abbreviations, which consist of 1 letter and 2 digits. For example, Ginza Line starts at station Shibuya (G01) and ends at Asakusa (G19). If more than one metro line stops at the same station, the station full name remains the same, but the line-coded abbreviation changes. For example, as presented on Fig. 6, five different lines have their stop at Otemachi station and each of the lines refers to the stop differently (I09 – Mita Line, C11 – Chiyoda Line, T09 – Tozai Line, M18 - Marunouchi Line and Z08 – Hanzomon Line).

A similar system is also used on Bangkok metro network, where the first two BTS lines use direction-specific abbreviations, e.g. Siam – CEN (interchange between two BTS lines), National Stadium (W1) or Ratchathewi (N1),

while the MRT lines (different operator in Bangkok) use colour-coded abbreviations, e.g. Tao Poon (BL10 – Blue Line) and Tao Poon (PP16 – Purple Line).

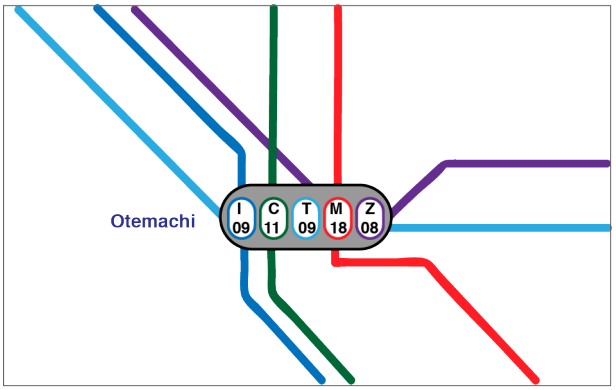

Fig. 6. A graphic representation of selected stations with their names and line-coded abbreviations on Tokyo Metro map.

4.4.4 Two language names

Two of the seven metro systems analysed are located in English speaking countries, so their official metro maps display station names in English language only. Interestingly, Delhi Metro uses English-only maps, while as mentioned earlier the two official languages in the megacity are English and Hindu. Sao Paulo Metro uses Brazilian-only maps, which are still readable for English-language users. Two out of five non-native English megacity metro systems, in Bangkok and Cairo, use a local language and English on their metro maps. Bangkok metro map uses Thai and English languages, where original name is written first, and then the English name is provided. Interestingly, majority of station names in Bangkok are written in English alphabet, but only for few their name's meaning is translated. An example presented on Fig. 7 is Victory Monument station sign displaying the station name in Thai, English (meaning) and in line-coded abbreviation.

Cairo Metro map also applies two different alphabets for their station names, which are written first in Arabic and then in English, but again majority of the names are written in English alphabet only and not translated into an English meaning. Tokyo metro maps are available in different languages but the names of stations are not translated with their meaning but with the sound only.

Fig. 7. A graphic representation of a station name sign used on a metro in Bangkok.

4.4.5 Station naming rights on sale

Although not a scope of this paper, it should be mentioned that Delhi Metro, Cairo Metro and New York City Subway are three out of the seven metro systems selected which allow station naming rights sale to a private sector. Examples of such names include: Honda 2 Wheelers Vishwavidyalaya (and many others) in Delhi, Tora El-Asmant and Tora El-Balad (the only two) in Cairo and Atlantic Avenue-Barclays Center, the only commercial station name in New York City.

5. Conclusions

The paper presented a selection of metro systems in seven megacities around the world. It reviewed the metros characteristics in terms of their sizes measured in numbers of stations. The main scope of the paper was to analyse unique station names in each of the seven selected systems in order to search for patters and strategies, if any, applied to the station naming process. The results revealed that each of the systems has its own unique characteristics, but some patters were observed as well.

The metro stations analysed had on average 12.25 characters and 1.97 words in their name. The shortest (10.33 characters on average) station names are in Tokyo metro and this could be explained by the nature of Japanese language, which in general uses short words. On the other hand, the longest (16 characters on average) metro station names out of the selected sample were observed in New York City, which is because of the fact that many names use two parts, for example 42 Street-Times Square or 116 Street-Columbia University. This is related to topography of the New York City where long streets are typical and often cross various metro lines. Therefore, street-based names compose 89% of all unique station names in New York City, which is the highest result for a name category in the sample.

Second most popular category name is related to an area and 53% of unique station names in Sao Paulo, 39% in Bangkok and 33% in Cairo use this strategy. Third most popular category name is person's name, but this is only popular in Cairo and Sao Paulo which have 26% and 20% of stations with such names, respectively. Also, two language names are becoming more popular and this could be seen as a positive trend, especially when taking into account growing populations in megacities and their multicultural contexts.

Another issue touched upon was related to station naming rights, which some systems put on sale offered to a private sector. Old metro systems are not keen on this strategy and New York City has only one station name sold to read as: Atlantic Avenue-Barclays Center. However, the new metro systems, especially in developing megacities, see opportunities this option brings in terms on non-fare income, which can be re-invested in the system. These systems offer various options to a private sector, from full names to prefix/suffix name options, and this phenomenon gains popularity in developing countries.

6. Lessons for new metro systems

Based on the results presented in the paper a number of lessons have been identified for new metro systems considering their station naming strategies.

Firstly, studying the existing strategies applied to metro station naming in other countries can help with deciding on which strategy to apply to a new system. However, these solutions should not be copied from other systems but rather filtered through a local topography (street design and landscape) and local context. For example, if a local language typically uses long words and phrases it would be natural to apply the same to the new station names.

Secondly, a language used in metro names matters. This is especially important for touristic megacities which experience large amounts of visitors who use their metro systems for the first time without knowing a local language. Having station names written in English language on metro maps and at stations would help to smooth their journeys across the system and add to a positive experience of the city. Alternatively, double naming system where full names as well as abbreviations, for example using a letter (in English) and a number (in Arabic), are applied is also an intuitive avenue for station naming and idea worth considering.

Finally, giving people choice to name their stations is a way to engage them in metro from a very beginning. If people are given a right to name stations via competitions or public engagement events, the outcomes of such exercises

could send clear messages to decision makers on what people's preferences are. At the end of the day it is the local people who will use metro systems most, so listening to their advice at the station naming stage could save time and cost at a later stage, if stations have to be re-named due to users' confusion or other reasons.

7. Future research

Based on the work presented in this paper, a number of recommendations for further research in the area of station naming strategies and rights have been identified.

Firstly, studying station name categories more deeply will allow to identify patters, if any, in naming stations. It is however recognized that language barriers might occur in translating station names or documents needed for analyses. Therefore, resources in terms of time, costs and skills needed should be planned in advance and carefully when deciding on such a work.

Secondly, asking metro users about station names could guide decision makers in their future (station) naming exercises. A survey targeting local and tourist metro users could shed some light on how these two groups of users perceive the station names and how their travel flow is influenced by station names and whether they contribute to seamless travel or confuse passengers. This could not only help to better understand the role which station names play in their use of the system (also on passengers demand), but also differentiate the perspectives of users who are familiar with the system from new users (e.g. tourists).

Thirdly, it would be interesting to study station naming rights strategies applied in various countries which already sold their station names to private companies. Avenues for this type of research could include issues related to monetary profit (in terms of income from selling rights), image of new stations (in terms of advertising and coherence with the whole system branding) and public attitudes to such a scheme (in terms of users' acceptance of private-public partnership in public transport).

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