Influence of Demographic Factors on the Preference of Future Kuala Lumpur Riverfront

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Abstract- Development of an urban riverfront offers a great opportunity for a city to enrich its social and economic landscape. In the effort to develop a sustainable riverfront development, it is important to understand the key factors that influence the user's preference towards the river. This paper examines the relationship between the demographic characteristics of the users who reside along the river and their visual preferences towards future riverfront in the city of Kuala Lumpur, Malaysia. The study involved a photo-questionnaire survey with 304 respondents coming from different ethnic groups and socio-economic backgrounds. Correlation analysis was used to measure the significant difference between the visual preference dimension and the cultural dimensions of the respondents. This study revealed that the respondents identified strongly with a more organized riverfront setting and also spaces that have greater accessibility to the water body for future image of Kuala Lumpur riverfront.

Index Terms- Urban riverfront, socio-demography, visual preference.

I. INTRODUCTION

In recent years, there has been an increasing interest in accommodating the water and river management, especially in the city region. Revitalization of the river in the city has been done to improve the city image and to provide an opportunity for development close to the city center [2]. Improvement of the waterfront communities and public spaces will contribute into a high quality of life for residents and visitors alike [10]. Even a simple rivers provide a source of enjoyment and tranquillity for many who use only the riverbanks, view the river from afar, or who only know that it is there and available.

Current situation in Kuala Lumpur repeats the history of the other riverfront cities in undergoing the riverfront transformation. The ensuing development that tends to maximize the strategic location near the river and the effort to tackle the flooding problems made the natural river of Kuala Lumpur change into the huge concrete drain [18]. However, it is important to preserve the river in order to sustain the identity of the city towards achieving a sustainable environment. The community should be informed and involved in discussions continuously in any development proposal and intervention.

The purpose of this study is to figure out the influence of socio-demographic factors upon preference which includes gender, ethnic groups, age, level of education and living place. Residents who live near to the river were selected to be a part of this study. It is expected that there will be a logical explanation on the respondents' visual preferences and in the same time, it could benefit for it articulates a more conceptually refined account of memory and its relation to identity and history. This research is important to generate a research framework and approach that integrate the personal background of the respondent and visual dimensions of riverfront. Therefore, this study will identify the impact of the people's background in making an appropriate design for the riverfront area.

II. LITERATURE REVIEW

It has been agreed by many researchers that person's backgrounds are the major factor in influencing the result of the preference study [12]; [19]; [6]; [17]. People grow up in a different cultural setting, thus the differences in lifestyles give informal lessons about how one should perceive their environment. Moreover, people from the same cultural background are likely to have similar preferences because of their similar experiences.Attend conferences, workshops and symposiums on the same fields or on related counterparts.

Numerous findings have proved the assumption above. It is argued that the differences in culture play an important role in their understanding of nature or landscapes and what roles should the people play with nature. Buijs, Elands, and Langers investigate to

what extent immigrants from Islamic countries and the native Dutch have different images of nature and landscape preferences [3]. They found the interesting finding which is Native Dutch people are strong supporters of the wilderness image, while immigrants generally support the functional image. This may be related to the divine task in Islam for humans to manage nature and to bring wild areas into the culture. Another finding outlined the cultural differences in the perception of the world where individuals from Western cultures tend to focus on that which is object-based, categorically related, or self-relevant whereas people from Eastern cultures tend to focus more on contextual details, similarities, and group-relevant information [7]; [13].

Furthermore, a study about culture can also shed lights on reasons why certain society failed to sustain their environment and make this aspect become more pertinent for getting a quality of life. Another finding that resembles the point of view above is the survey which explored Malaysian preferences of the garden scenes and elements seemingly most favorable for Malaysian gardens. The finding shows that the most preferred garden scenes for Malaysians in the iconography of their own gardens include a large area of water and plant. Moreover, a clear, clean and reflective water presented by both lake and geometrical basins are the most preferred types of water scenes [11].

In general, any type of arrangement and intervention such as plantation, hardscape, and landscaping in the cities should comply with the adaptable culture of the area. It is crucial for maintaining the environment of the area which shaped a modern society and has a great value for our understanding of how we should live today. The study needs to explain the reasons why a particular culture becomes a significant predictor for landscape preferences. In this context, a study about the relationship between culture and landscape preference becomes important. Therefore, the cultural background has much effect towards preferences and it is important to look at the relationship between the culture and preferences for the future Kuala Lumpur riverfront since Malaysia is a multi-racial country with three major ethnic groups which is Malay, Chinese, and Indian.

Several types of research suggested that the potential outcomes of the subcultural show substantial difference in preferences occurred when samples are sharing the same landscape [21]; [8]; [14]. In terms of gender and age, the effect has regularly been found in the environmental studies. However, the effect is still ambiguous caused many different findings have been found. Studies report that women tend to be more concerned about the environment rather than men in particular landscape setting which had more flower. Thus, females gain more benefits from passive recreational activities in urban green spaces since they more concerned with it [21]; [1]. In other finding, females are more hesitant to participate in outdoor recreation than men [24]. The same pattern was shown in another finding where parks with sports fields are actively dominated by men and under-utilized by women [25]. However, both male and female show a similar preference towards flora and fauna. Moreover, urban and rural residents from all gender and ages show the similar preference when it comes to the natural setting.

In term of age, several researchers indicate the importance of it to influence the environment changes for the future. Nearly one-quarter of Generation Y from the previous sample research says it's very important to work in a green, environmentally conscious workplace even down to the details of office energy use (Reshape et al., 2009). The people awareness towards their environment change with time and also with age. Yamashita (2002) found the difference respond between adult and children mainly in evaluating a river landscape. Therefore, the age of the participants did affect their level of preferences [26]; [16].

Education has been shown to be the most consistent predictor of environmental concern. A lot of the work indicates that individuals with high levels of education tend to concerned more about the environment [5]; [28]. Instead of it, most of the researchers have explained these preferences in socio-economic terms, showing for example that preferences for managed landscapes are positively correlated with age and negatively correlated with education [23]; [14]. In line with it, Tveit (2009) found that the students in design field preferences do not reflect the landscape preferences of the wider public and that future landscape professionals have a different appreciation of visual scale in the landscape than the general public. It may not be surprising that professional and academic expert has a different preference that differs from those of the general public. Moreover, employment is including in this research considering students and other groups might affect the preferences differences though it is not a popular predictor.

Despite that, public spaces have been found work well when they establish a direct relationship between the space and the people who live and work around it [27]. Evidence for the importance of community in creating the public spaces can be found in numbers of studies. In Singapore, Yuen & Hien examines residents' perceptions and expectations of rooftop gardens. Moreover, these physical and visual experiences will help to create lively and diverse places to encourage a sense of community and an appreciation for nature [4]. In addition, Hoyle agreed that community groups provide a significant influence on the processes of change in waterfront zones [9]. The residents' images were more extensive, more detailed, and less amorphous than the visitor images [15]; [20]. Generally, this group hopes for a more ecologically sound relationship between the cities and rivers.

III.   METHODOLOGY

Visual preference survey (VPS) with the 5-Likert scale was conducted in this study to discover the residents' preference of the visual image for the future Kuala Lumpur riverfront. This analysis employed the factor analysis (Principal Component Analysis or PCA). The PCA is a data reduction technique for grouping the photographs to certain dimension based on internal consistency in response.

The means of 80 scenes were calculated and by using the Principle Component Analysis (PCA), the data has been reduced to five dimensions which represent the type of the riverfront.

The independent t-test was applied to identify the impact of age on each preferences dimension while one-way between groups ANOVA (Analysis of Variance) was applied to identify the impact of age, ethnic groups, and level of education, employment and living place. This finding is to answer the objective of the study which is to identify the possible effects of personal factors on residents' priorities towards the future of the Kuala Lumpur Riverfront.

IV. SAMPLE

Residents at Kampung Bharu, Brickfields, Titiwangsa, and Chow Kit were selected to be surveyed since they were expected to be the frequent user and they recognize the river better than others. The selected study area was in the residential area near to the Kuala Lumpur riverfront area which is Kampung Bharu, Brickfields, Titiwangsa, and Chow Kit. The respondents for this study have various backgrounds in term of gender, age, ethnicity, education level, place of living and employment status. Based on the data, they are 136 males (44.7%) and 168 females (55.3%). Most of the respondents are in the group of 18 to 24 years (n=182, 59.9%), followed by 25 to 34 years (n=90, 24%) and the above 34 years old group are the nominate group (n=31, 10.2%), while one respondent missed to indicate the gender. Rather than questioning the real age of the respondents, the age is categorized into three roughly equal quotas to make the comparison more reliable.

The ethnicity of the Malay group reported significantly higher than the other three groups. There were 218 Malays (71.7%), 50 Chinese (16.4%), 26 Indians (8.6%) and 10 were from another ethnicity (3.3%). In terms of the education level 23.4% SPM level has been stated while 21.4% demonstrate the STPM (Sijil Tinggi Pelajaran Malaysia), Diploma and Certificate level. The following group of Undergraduate level is 53.3%, significantly more than others and only 1.6% are post-graduates group while one participant missed to indicate the education level. A relatively high level of education is very secure because the more educated respondents represent a low human error in academic research.

Employment information of the respondents in the student group is 51.3% are the big number of other groups followed by 22% of Private sector. The government sector is 10.2%, self-employment is 8.9%, while about only 7.2% is unemployment. This data has one missing to indicate the employment detail. As there are several educational institutions nearby the residential areas, the number of students becomes the dominant amount as respondent in the study results. Furthermore, they are willing to spend time for this study.

The participants were distributed almost equally based on where they live. There were 27% live at Kampung Bharu, 30.6% at Chow Kit, 23.7% at Titiwangsa and about 18.8% were from Brickfields. This is due to the fact that if a sample is taken from a particular group is too small, it does not give a robust result. These results are instructive in two major respects. Some striking differences identified in preferences might be considered to be cross- cultural.

V. RESULT AND DISCUSSION

The purpose of this analysis is to figure out the influence of socio-demographic factors upon preference which includes gender, ethnic groups, age, level of education and living place. The independent t-test was applied to identify the impact of gender on each preferences dimension while one-way between groups ANOVA (Analysis of Variance) was applied to identify the impact of age, ethnic groups, and level of education, employment and living place. This finding is to answer the objective of the study which is to identify the possible effects of personal factors on residents' priorities towards the future of the Kuala Lumpur Riverfront.

1. Gender

Based on Table 1, the statistical analysis of an independent sample t-test was carried out between all types of dimension and the gender of female and male to compare their means. The result revealed that gender of the respondents did not affect their visual preferences on four dimensions which are Unorganized Riverfront Landscape Dimension, Organized and Open View Riverfront Landscape Dimension, Shaded Riverfront Landscape and Organized Narrow Riverfront Landscape Dimension but did affect one dimension which is Natural Looked Riverfront Landscape Dimension. Females differ from that of males only in reaction to the preference Dimension 2, Natural looked riverfront. Male preferred this dimension in which a group of scenes presents a greenery along the river and also a green forest river.

Table 1: Result of Independent Sample t-test comparing preference dimension between males and females.

Preference dimensions	Mean		T-test for Equality of Means		
	Male	Female	t	Df	Sig. (2-tailed)
Dimension 1 Unorganized riverfront landscape	3.6410	3.5456	1.048	298	.296
Dimension 2 Natural looked riverfront	**3.9985**	**3.8457**	**1.973**	**298**	**.049**
Dimension 3 Organized and open view riverfront	3.8528	3.7909	.719	298	.472
Dimension 4 Shaded riverfront	3.8531	3.7752	.904	297	.367
Dimension 5 Organized narrow riverfront	4.1630	4.0561	1.412	298	.159
Total Visual Preferences	3.9017	3.8037	1.423	298	.156

The result shows that the female mean ranking for all dimension is lower than male. As indicated in the literature review, females were more concerned with passive recreational activities in urban green spaces than male. Therefore, while ranking the preferences to select the ideal visuals for riverfront view in the future, they are more likely to observe detail elements in the surrounding areas that can reduce their stress and balance their mood to gain a benefit from it. However, in this study, both gender preferred the Organized Narrow Riverfront Landscape Dimension than another dimension.

2. Age

The analysis of variance, ANOVA was applied to explore the impact of age on visual preferences in each dimension. Respondents were divided into three groups according to their age (Group 1: 18 to 25 years old; Group 2: 25 to 34 years old; Group 3: 35 years old and above). According to Pallant (2005), Welch test is one of the appropriate tests should be applied if Levene's test has significant value < 0.05. As stated in Table 2, the significant value for all dimension is p< 0.05. All dimensions show a significant difference between the age group. This result of this part was consistent with Yamashita's (2002), Reshape, Sherbin and Sumberg (2009), which stated the age of the respondents did affect their level of preferences.

Table 2: Results of a One-way ANOVA comparing preference dimension among participants according to age group

Preference dimensions	Sig.	Anova		Mean		
		F	Sig	<25 years old	25-34 years old	>34 years Old
Dimension 1 Unorganized riverfront landscape	.292	6.067	.003	3.4665	3.8067	3.6900
Dimension 2 Natural looked riverfront	.000	9.624	.000	3.7827	4.1165	4.1280
Dimension 3 Organized and open view riverfront	.493	6.501	.002	3.7060	3.9396	4.1452
Dimension 4 Shaded riverfront	.018	10.154	.000	3.6702	3.9775	4.1944
Dimension 5 Organized narrow riverfront	.003	3.934	.021	4.0223	4.2416	4.2177
Total Visual Preferences	.111	10.076	.000	3.7295	4.0164	4.0777

The post-hoc comparison using the Tukey HSD (Honestly Significant Difference) verified that all age group had significant differences in visual preference scores in all Dimensions. In Unorganized Riverfront Landscape Dimension, the HSD analysis indicated only the 18 to 25 years old group had a significant difference with the 25 to 34 years old group. The similar result goes to the Organized Narrow Riverfront Dimension which indicated the significant difference between the 18 to 25 years old group and the 25 to

34 years old group. While for the Natural Looked Riverfront Dimension, Organized and Open View Riverfront Dimension and the Shaded Riverfront Dimension had a significant difference between the group aged 25 years old and below 25 to 34 years old age group. The 25 years old and below age group also had a significant difference with the 34 years old and above age group. Table 2 summarized the descriptive analysis for each dimension. For Natural Looked Riverfront Dimension, Organized and Open View Riverfront Dimension and the Shaded Riverfront Dimension, as the respondent's age increased, their preferences towards these dimensions were increased too. While for Unorganized Riverfront Landscape Dimension and Organized Narrow Riverfront Dimension indicated that the middle age group which is 25 to 34 years old respondents, had a higher mean score for the age groups followed by the below 25 years old age group and above 34 years old age group. However, there was an agreement among the age groups, the respondents of all age groups preferred the Organized Narrow Riverfront Dimension the most and preferred the natural embankment the least. The possible explanation for the age group below 25 years old had a lowest mean score for all dimension is because this group represents the highest number of respondents and this group also represent the Y generation who are expecting more from their environment.

3. Ethnicity

In order to determine if there is a significant difference in visual preference according to ethnicity, repeated measures of ANOVA were used. Table 3 shows only Shaded Riverfront Dimension indicated the significant difference for ethnic group, $p < 0.05$ (0.015), while there is no significant mean difference for Unorganized Riverfront Landscape Dimension, Natural Looked Riverfront, Shaded Riverfront Dimension and Organized Narrow Riverfront Dimension, $p > 0.05$.

Table 3: Results of Levene's test of homogeneity of variances, ANOVA and Robust test to identify visual preference according to ethnic groups.

Preference dimensions	Sig.	Anova		Mean			
		F	Sig	Malay	Chinese	Indian	Others
Dimension 1 Unorganized riverfront landscape	.101	.479	.697	3.5646	3.6586	3.7026	3.4533
Dimension 2 Natural looked riverfront	.044	2.219	.086	3.8679	3.9280	4.2038	4.0900
Dimension 3 Organized and open view riverfront	.100	1.851	.138	3.7810	3.8625	4.1154	3.6375
Dimension 4 Shaded riverfront	**.038**	**3.545**	**.015**	**3.7823**	**3.7167**	**4.2500**	**3.7333**
Dimension 5 Organized narrow riverfront	.498	1.206	.308	4.1028	4.0500	4.2981	3.9000
Total Visual Preferences	.019	1.979	.117	3.8205	3.8431	4.1140	3.7628

The post-hoc comparison using the Turkey HSD shows that for Shade Dimension, there is a significant difference between Malay and Indian, and Chinese with Indian ethnic group. Table 3 shows the descriptive analysis for Shade Riverfront Dimension, which indicates the significant difference. Shaded Riverfront Dimension, which provides shades from trees or sheltered spaces to the user was mostly preferred by the Indian respondents but least preferred by the Chinese respondents. However, all the ethnic groups preferred the Organized Narrow Riverfront Dimension the most, which emphasized on wall attraction that attracted the respondent's eye. The findings from the above analysis support the previous study which found that Malaysian enjoys the area that includes a large area of water and plant.

4. Level of education

In this section, respondents from four different levels of education were compared against the total preference score and five dimension groups. The results shown in Table 4 indicate that there is a statistically significant difference in mean scores for all dimensions according to the respondents' level of education at $p < 0.05$.

Table 4: Results of Levene's test of homogeneity of variances, ANOVA and Robust test on visual preferences according to level of education.

Preference dimensions	Sig.	Anova		Mean			
		F	Sig	SPM	STPM/ DIP/ CERT	Under- graduate	Post- graduate
Dimension 1 Unorganized riverfront landscape	.000	5.383	.001	3.7136	3.8483	3.4287	3.6000
Dimension 2 Natural looked riverfront	.000	6.891	.000	3.9563	4.2057	3.7748	4.0600
Dimension 3 Organized and open view riverfront	.060	10.271	.000	3.8856	4.2090	3.6359	3.7250
Dimension 4 Shaded riverfront	.018	9.975	.000	3.8991	4.1878	3.6310	3.5333
Dimension 5 Organized narrow riverfront	.059	4.322	.005	4.1373	4.3359	4.0031	3.9000
Total Visual Preferences	.000	10.695	.000	3.9184	4.1586	3.6947	3.7637

As can be seen from the Table 4 above, in Unorganized Riverfront Landscape Dimension, the most preferred for this dimension was by the respondents from STPM, Diploma and Certificates group while the least preferred for this dimension was by respondents from Undergraduates group. The findings are similar to the Natural Looked Riverfront Dimension group and Organized and Open View Riverfront Dimension. These groups also reported that respondents from level STPM, Diploma, and Certificates group preferred the most and Undergraduates group preferred the least. The score means for the Shaded Riverfront Dimension and the Organized Narrow Riverfront Dimension interpreted that the most preferred respondents for those dimensions were from the STPM, Diploma and Certificates group also but in this case, the least preferred was from the Post-graduates groups. Therefore, it would be the valuable finding that respondents with higher education (Group Undergraduate and Post-graduates) giving a lower scale on the majority of the dimensions available for visual preferences in riverfront of Kuala Lumpur, while those with lower education (Group SPM, STPM, Diploma, and Certificate) giving a higher scale. The result is supporting the previous research that individuals with high levels of education tend to concern more about the environment. This shows that they have a higher taste and a deeper desire to choose the ideal visuals for the river.

5. Location of residence

As mentioned in the literature review, it is clear that community groups provide a significant influence on the processes of change in riverfront zones. Therefore, four locations were chosen for this research from four ports cities that located near to the Kuala Lumpur riverfront. This research was focused only on residents at Kampung Bharu, Brickfields, Titiwangsa and Chow Kit. It is apparent from Table 5 that total preference score of residents toward the study area differs significantly in accordance with their location of residence. Surprisingly, all the dimensions of visual preference show the significant difference at p<0.05.

Table 5: Results of Levene's test of homogeneity of variances, ANOVA and Robust test on visual preference according to locations of residence

Preference dimensions	Sig.	Anova		Mean			
		F	Sig	Kg. Baru	Chow Kit	Brick- fields	Titiwang -sa
Dimension 1 Unorganized riverfront landscape	.000	34.124	.000	3.8115	3.3112	4.2351	3.1704
Dimension 2 Natural looked riverfront	.000	13.604	.000	4.0481	3.8941	4.2158	3.5460
Dimension 3 Organized and open view riverfront	.000	19.403	.000	3.9167	3.8585	4.2215	3.3327
Dimension 4 Shaded riverfront	.000	22.694	.000	3.9712	3.7611	4.2632	3.3258
Dimension 5 Organized narrow riverfront	.000	11.363	.000	4.1296	4.2418	4.2982	3.7430
Total Visual Preferences	.000	27.897	.000	3.9754	3.8152	4.2468	3.4236

This is parallel to the theory of literature reviews where public spaces work well if they create a direct connection between space and people living or working around it. Residents nearby the river are more aware of the wants in their public space as they are the users who will often use the river area. Moreover, this finding emphasized that the respondents that live in Brickfields preferred most for all five dimensions while the respondents that live in Titiwangsa shows the least preferred for all dimension. A possible explanation for this is that the respondents from Brickfields interest in the expanded area of a natural embankment that full of greenery on it and provides the shelter area and street arts rather than the respondents that live in the Titiwangsa. This is because the differences in current rivers in each settlement area have influenced their visual preferences. The area in Brickfields has been found to have green areas whereas the areas in Titiwangsa and others are mostly being concrete drainage areas. Therefore, they have higher expectations and know well their needs for the river as the existing river conditions have the opportunity to be made as in the choice of the given picture. The scenery for the current riverside visual for each residential area can be referred to the study area in chapter three. It is parallel with the previous theory by Kaplan which people with different experience might have different preferences towards nature.

6. Employment

Table 6 shows that there is a statistically significant difference in mean for the visual preference scores for all dimensions among the respondent's employment groups at $p < 0.05$. This indicates a similar finding with the visual preference according to the age groups, level of education and location of residence.

Table 6: Results of Levene's test of homogeneity of variances, ANOVA and Robust test on the visual preference in relation to employment.

Preference dimensions	Sig.	Anova		Mean				
		F	Sig	Gov. Sec.	Pri. Sec.	Un-employ	Self-employ	Stu-dent
Dimension 1 Unorganized riverfront landscape	.012	8.680	.000	3.8301	3.8828	3.6970	3.8885	3.3431
Dimension 2 Natural looked riverfront	.000	5.178	.000	4.0871	4.0965	4.0636	4.1062	3.7477
Dimension 3 Organized and open view riverfront	.027	5.580	.000	3.8710	4.0152	4.0227	4.1528	3.6381
Dimension 4 Shaded riverfront	**.004**	**9.710**	**.000**	4.0000	4.1313	4.0076	4.0513	3.5717
Dimension 5 Organized narrow riverfront	.022	2.521	.041	4.2177	4.1023	4.2955	4.3611	4.0147
Total Visual Preferences	.001	8.669	.000	4.0012	4.0456	4.0173	4.1160	3.6631

The post-hoc comparison using the Tukey HSD on all dimensions found that there are significant differences for the respondents who are self-employed and the respondents who are the students. The descriptive analysis in the Table 6 reveals that the respondents who are under the self-employment group prefer all five preferences dimension the most which are Unorganized Riverfront Landscape Dimension, Natural Looked Riverfront Dimension, Organized and Open View Riverfront Dimension, Shaded Riverfront Dimension and Organized Narrow Riverfront Dimension. In contrast, the student groups prefer the least from all the five preference dimensions. The possible explanation from the result above will be the same as the age group which is because most of the students are Y generation. They are more exposed to the worldwide through the internet and they are more aware of the importance of the environment as mentioned by Reshap W. and others. Therefore, this leads them to be more expectation in creating their future surrounding based on their imagination.

Respondents who are under the self-employment group prefer all five preferences dimension the most which are Unorganized Riverfront Landscape Dimension (URLD), Natural Looked Riverfront Dimension (NLRD), Organized and Open View Riverfront Dimension (OORD), Shaded Riverfront Dimension (SRD) and Organized Narrow Riverfront Dimension (ONRD). In contrast, the student groups prefer the least from all the five preference dimensions. The possible explanation from the result above will be the same with the age group which is because most of the students are Y generation. They are more exposed to the worldwide through the internet and they are more aware of the importance of the environment as mentioned by Reshap W. and others. Therefore, this leads them to a higher expectation in creating their future surrounding based on their imagination.

VI. CONCLUSION

In conclusion, certain aspects of demography had a significant correlation with landscape preference. It would affect the people preferences and would make some gaps in the outcomes. Thus, a limitation to present the study is related to the fact that all participants were the residents in the area in question and the number of the participants for each group of socio-demographic should be equally distributed to represent the findings. Subculture for this study is referring to the gender, age, the level of education, place of residence and employment. The findings are important to ensure that the newly revitalized riverfront in Kuala Lumpur will suit the need of the city inhabitant psychologically and aesthetically.

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