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END-USERS PERSONALIZATION POTENTIALS AND FACTORS TOWARDS EFFECTIVE HOUSING OCCUPANCY: MALAYSIAN DEVELOPMENT PERSPECTIVE

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ABSTRACT

This study investigated end-users personalization potentials and factors contributing to efficient housing occupancy that are embedded in the Housing Occupancy Model (HOM). These factors were sourced through literature review, policy documents along with experts' opinions till consensus was reached on five factors, which are: personalization, satisfaction, environmental condition, attitude towards occupancy and subjective norm to occupancy. Thereafter, an instrument based on Structural Equation Model (SEM) was designed and administered to a total of 247 respondents. Subsequently, the inter-relationships between and within these factors were tested and fully investigated towards developing a valid HOM. Therefore, the results obtained indicating that the probability (p-value) of Chi-square value is 0.011 for 'satisfaction' in the prediction of occupier intention is therefore supported. The value obtained for 'environmental condition' in the prediction of occupier intention is 0.242 which is above the supporting threshold range of 0.01-0.0985, hence is not supported. Sequentially, the value of 0.962 obtained for 'subjective norm to occupancy' in the prediction of occupier intention is highly out of range, whereas a value of 0.006 is supported for 'attitude towards occupancy' in the prediction of occupier intention. 'Personalization' in the prediction of occupier intention obtained a value of 0.012 which is thus significantly supported. 'Attitude towards occupancy' in the prediction of subjective norm to occupancy with value of 0.135 is not supported. However, < 0.001 value for 'personalization' in the prediction of satisfaction is highly significantly supported. The outcome of this HOM will help in effective public housing delivery and occupancy among the low and middle-income earners. In addition it will be beneficial to policy makers, academicians and professionals in arriving at sustainable housing decisions relating to occupancy issues in Malaysia and other developing economies.

Keywords: users' involvement, housing occupancy, satisfaction, structural equation model, Malaysia.

1. INTRODUCTION

The provision of adequate and affordable housing, particularly in developing countries, are faced with several challenges including affordability, housing supply shortages, lack of responsible and effective support, recovery, monitoring practices and expert knowledge on long-term funding Un-Habitat (2000) and CIB (2014). This means that housing construction is a long time development project (Petrikova, 2014) and capital intensive. Occupants that are mostly affected are the low and middle income working households. Household vulnerability (Kakota *et al*., 2015) concept with respect to low-income occupants' potential to afford cost can impact negatively on effective housing occupancy. In most cases, the result of inadequate housing supply usually cause hike in the rental price of these houses and consequently unaffordable scenario to the low and middle income earners in most developing countries (Un-Habitat, 2006; Mayor, 2014). Affordable housing potential is a priority to both developed and developing countries. It is usually integrated as part of sustainability in development policy (Mosley, 2014; Taylor, 2014). Moreover, sustainability in development has potential to reduce poverty and advanced economic growth (Deininger and Nagarajan, 2009; Barros *et al*., 2014). Developing countries are mostly faced with housing shortage issues whereas in developed countries, the cost of housing is usually beyond the incomes (Unchs, 1995; Rics, 2014) of low earners. According to Mohit *et al*. (2010) the rate at which the users can afford the housing will also reflects their satisfaction.

In addition, housing satisfaction comprises of the quality of the building and the safety attached. However, dissatisfaction in the quality of housing facilities, amenities and design affects users' occupancy. Accordingly, Colesia and Alpopi (2011) argued that the performance of housing, its quality and facilities can affect the users' quality of life and encourage satisfaction. Public housing is a rental/owner occupancy housing created to provide safe and affordable habitation for low and middle-earning families, the elderly and people with disabilities (Hryshko *et al*., 2010). The importance of housing provision effectiveness lies in its affordability. Lubell *et al*. (2007) suggested that the stability of affordable housing or house rentals might have profound effects on childhood development. In consequence, affordability is an essential feature of housing delivery. The Malaysian

government has for the past 25 years witnessed various problems in their housing policy implementation especially in the recent Five-Year Malaysia Housing Scheme (Tan, 2011). Also, Tan (2011), identified certain factors as critical success factors that must be considered for an achievable and sustainable housing policy implantation. They include social acceptability, economic and technical feasibility. Therefore, the availability, affordability and adequacy of quality housing provision for low and middle income categories of all salary levels, is enshrined in the Malaysia government housing policy target.

Despite research efforts in housing occupancy, there are still substantial areas that are yet to be addressed in the domain of housing occupancy. One of such areas is the involvement or participation of the intending user in housing provision policies according to Shuid (2010). Shuid, suggested the need to consider users' views and right from the initiation stage of housing development, as an important influence for housing occupancy sustainability. Consequently, this study focuses on the investigation and determination of the involvement and fulfilment of end-users' for effective Housing Occupancy Model (HOM) in Johor, Malaysia. The investigation and determination carried out are based on satisfaction, environmental condition, subjective norm to occupancy, attitude towards occupancy and personalization.

2. REVIEW OF LITERATURE

Manydeveloping nations have taken several efforts in providing adequate housing for its citizenry (Kolocek, 2013). However, some of these houses are faced with different restrictions centered on occupancy and non-occupancy by the intending users (Wilson, 2014). Therefore, the rate at which the people occupy these houses been provided to reflects its effectiveness. Similarly, effective occupancy implies users' satisfaction (Nour, 2011). As such, housing occupancy is essential for ensuring adequacy of human shelter and values. Accordingly, non-occupancy of housing discourages the housing providers' effort, which may lead to the deterioration of the building value that reflects on the image of the nation's living and environmental conditions. The achievement of adequate housing cannot be successful without addressing the housing occupancy issues.

Housing development in any part of the world is not without end users involvement for the fulfillment of effective housing occupancy. There are some important elements with potential effect on housing users' intention. These concepts are satisfaction, environmental condition, subjective norm to occupancy, attitude towards occupancy and personalization (participation). Moreover, the elements are tie together to housing occupancy. Building designs and constructions are capital intensive project. At the end, users expect that the imaginative and creative efforts exhausted in the design and construction respectively should appeal their mind especially to match with their financial investment. This art of appealing the mind of housing users is known as satisfaction. Satisfaction can be described as a condition for appraising the worth of the housing environment by determining the effect of sensitivity and assessments of the objective environment. In literature, satisfaction was described as a predictor of behaviour (Weidermann and Anderson, 1985). In addition, satisfaction is a subjective evaluation of the performance of products or services in meeting the needs and expectations of users or customers (Parker and Mathews, 2001; Ueltschy *et al.*, 2007; Hanif *et al.*, 2010). The concept of users' satisfaction has been studied in many other literatures (Kian *et al*., 2001; Zagreus *et al*., 2004; Nawawi and Khalil, 2008; Ilesanmi, 2010; Jiboye, 2012). However, dissatisfaction can be adjudged as one of the numerous reasons why housing performs poorly in meeting end-users' expectations. In furtherance, change in housing users' needs and preference play a very significant role in the development of housing scheme. In this respect, housing designers, architects among other professional stakeholders should play along in consonance with housing users' satisfaction as a means of achieving the end-users' goal and help to avoid housing defects.

Secondly, housing environmental condition is another conspicuous effect that is capable of influencing housing occupancy. Housing users' perception of indoor environment is a critical factor. The scenarios of housing occupant satisfaction depend on number of environmental conditions. Regardless of whether the residential housing location is situated in a small scattered rural settlement or urban centre, environmental condition is very paramount. Environmental conditions are critical phenomena towards safeguarding public from unwanted harms and dissatisfaction. During design and construction of buildings, housing occupants are supposed to be involved to ensure that prevailing situation capture their satisfaction. This will also ensure that the aftermath situation is devoid of any means of undertakings which might pose a significant physical or health challenges to the public. To guarantee occupants' satisfaction, environmental conditions by means of provision of housing facilities such as internet system, communication network, nearness to school and market, quality water, sporting facilities, provision of sewage system, solid waste disposal system, landscaping, parking lots and architectural beautification. Other factors with potential to influence occupants' satisfaction are physical view, control over the indoor environment, amount of privacy as well as layout, size, cleanliness and air quality (Marans and Yan, 1989; Veitch *et al.*, 2007; Choi *et al.*, 2009; Schakib-Ekbatan *et al.*, 2010; Bluyssen *et al.*, 2011).

Housing occupants' behavior can help utility consumption effectively. Through passive actions, heating source and water consumption can be reduced for building sustainability. Occupants' behavior can affect consumption efficiencies. Similarly, occupants' attitudes, behavior and values can have impacts on housing decision policy (Levine, 2007; Ben O'callaghan *et al.*, 2012). Other key variables that border on attitudinal influences for

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utility consumption can be attributed to environmental conditions. According to Australian Bureau Statistics (ABS), the number of occupants, size of dwelling and type of construction are important influences on housing occupancy. The ABS (2008), specified that increase in dwelling size, separate houses and more occupants are all connected to greater utility usage. Significant influences on water consumption, socioeconomic status and the age of occupants are also contributing factors (Manfred *et al.*, 2004; Troy *et al.*, 2005; Grafton, 2009). In another incidence, subjective norm is the perception of concerned individual that is given priority as to whether such an action should be respected based on the important of the referent persons who think that the behaviour should be performed. The influence of the opinion of any given person is considered by the enthusiasm that an individual has to fulfil the wishes of that person. In addition, it is a kind of observe social pressure which determine whether to engaged or not in a behaviour.Users' contribution right from the design stage in housing process enables users' needs such as housing spaces to be incorporated right from the starting point of projects. Involvement allows good decision making and enhances satisfaction (Carroll and Rosson, 2007).

3. METHODOLOGY

This section discusses the case study area, the methods for data collection, and descriptive statistics of the respondents.

3.1 The study area

Malaysia is located in the Southeast Asia, north of the equator with a total land mass of 329,847 square kilometres. The country is separated into two regions, Peninsular Malaysia and Malaysian Borneo - by the South China Sea with characteristicstropical climate. The map of the country is shown in Figure-1, and the specific area of the study (Johor-Bahru) is shown with the encircle red script in the map. The Johor Bahru state is one of the fastest growing cities in Malaysia. It is located near Singapore which makes it an important manufacturing and commercial state in Peninsular Malaysia. It has a dense population of more than 2.7millions, and as well dominated by the ethnic Malays, Chinese and Indians of Malaysian origin.

Figure-1. Malaysia map: (accessed June, 2014).
(http://www.worldatlas.com/webimage/countrys/asia/my.htm)

3.2 Data collection

The data collection tools used for this study are questionnaires. Questionnaires were used for initial data collection from selected stakeholders in the construction and housing sectors within Johor State, Malaysia. This included the end-users', government officials, building engineers and project managers (property developers). Based on the outcome of this questionnaire, constructs for the initial contextual model for the study were developed. The choice of using questionnaire inthis research is based on its ability to generalize and draw conclusion for a larger population with respect to a selected sample population. The study population comprises the above mentioned selected group in the state of Johor. The obtained data was used to validate the model towards achieving the objectives of the study based on the responses to the questions asked.

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3.3 Descriptive Statistics for the respondents

The descriptive statistics of the respondents for this research is shown in Table-1. Through the demographic data, the respondents' characteristics differ as revealed in the table. The male respondents accounted for 57.1% while the female respondents' accounted for 42.9%.Married individuals among the respondents' gives 59.9%, while those that are not married accounted for 23.5%. Those within the age range of 30-39years recorded higher with 29.6% and the least above age 60 accounted for 7.7%. In the race category, Malays recorded 59.9%, followed by Chinese 29.6% and Indians the least with 10.5%. By educational qualification, those with diploma recorded the highest value of 36.0% and a least percentage of 5.7% was obtained for the sum of those with Master degree and PhD. Working class recorded the highest with 76.9%, while the unemployed recorded 15.4%, and the retirees respondents, gave the least of 7.7%.Monthly income of RM2500-3999 recorded the highest with 24.7%, followed by those within the range of RM1500-2499 recorded 23.5% and the least RM500 and below with 3.2%. House staying period of between 6-10years accounted for the largest percentage of 46.6% followed by 0-5years accounted for 32.4%, next is those within 11-15years accounted for 16.2% and the least of 4.9% was obtained for 15 years and above.

Furthermore, the living occupancy of those with owner occupier recorded the highest with 83.0% followed by rental respondents with 17.0%. Those respondents who added more rooms to the needs of their family sizes revealed that 4-bedrooms accommodation recorded the highest with 56.7% followed by 5-bedrooms with 26.3% and the next is 3-bedrooms with 10.1%, while the least, 6.9% for 2-bedrooms.Household family size (number of individuals per family) within the range of 1-4 recorded the highest with 57.1%, followed by 42.1% within the range of 5-7 and the least of 0.8% within the range of 8-10 family size. Living house type of single-storey terrace recorded the highest with 42.5%, followed by double-storey terrace house with 22.3%, next is semi-detached with value of 17.8%. However, condomium recorded 16.6% and the least is apartment with 0.8%.

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Table-1. Descriptive Statistics of Respondents' characteristics.

Gender	Frequency		Marital status	Frequency	
	(N)	(%)		(N)	(%)
Male	141	57.1	Married	148	59.9
Female	106	42.9	Single	58	23.5
Total	247	100	Widow/Widower	41	16.6
			Total	247	100
Age range			**Race**		
18-29	48	19.4	Malay	148	59.9
30-39	73	29.6	Chinese	73	29.6
40-49	69	27.9	Indian	26	10.5
50-59	38	15.4	Total	247	100
60 above	19	7.7			
Total	247	100			
House staying period			**Working status**		
0-5yrs	80	32.4	Working	190	76.9
6-10yrs	115	46.6	Not Working	38	15.4
11-15yrs	40	16.2	Retired	19	7.7
15yrs above	12	4.9	Total	247	100
Total	247	100			
Educational status			**Monthly income**		
Primary School	2	0.8	RM500 Less	8	3.2
Secondary School	49	19.8	RM500-1499	42	17.0
Diploma	89	36.0	RM1500-2499	58	23.5
Bachelor Degree	77	31.2	RM2500-3999	61	24.7
Master or PhD	14	5.7	RM4000-5999	55	22.3
Professional	16	6.5	RM6000 above	23	9.3
Total	247	100	Total	247	100
Family household size			**Living occupancy**		
1-4	141	57.1	Owner Occupier	205	83.0
5-7	104	42.1	Rental Occupier	42	17.0
8-10	2	0.8	Total	247	100
Total	247	100			
Living house type			**Number of bedrooms currently**		
Semi-Detached	44	17.8	2	17	6.9
Double-Storey Terrace House	55	22.3	3	25	10.1
Single-Storey Terrace House	105	42.5	4	140	56.7
Condomium	41	16.6	5	65	26.3
Apartment	2	0.8	Total	247	100
Total	247	100			

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4. RESULTS AND DISCUSSIONS

The quantitative data findings are presented in this section from the survey carried out. The questionnaire survey established the aspects for effective housing occupancy which addressed the objectives of this research. The results were used to develop housing occupancy model (HOM) in line with the following: personalisation, satisfaction, environmental condition, subjective norm to occupancy and attitude towards occupancy. A total of 46 measuring items was used to measure the observed variables for the housing occupiers in the case study area. The standardized regression weights comprising the standard estimate (S.E), critical ratio (C.R) and the probability (p-value) of Chi-square value were obtained based on structural equation model (SEM) by using the analysis of moment structure (AMOS) software package as shown in Table-2. The AMOS software also plot the structural model linking all the factors investigated and the result is shown in Figure-2.

Table-2. Standardized regression weights.

Constructs/variables			Estimate	S.E.	C.R.	P-value
OI	**<---**	**SAT**	**0.244**	**0.050**	**2.541**	**0.011**
OI	<---	EC1	0.085	0.040	1.170	0.242
OI	<---	SNO	-0.003	0.019	-0.048	0.962
OI	<---	ATO	0.210	0.047	2.736	0.006
OI	<---	PERS	-0.206	0.024	-2.513	0.012
SNO	<---	ATO	0.089	0.120	1.495	0.135
SAT	<---	PERS	0.375	0.041	5.163	***

***indicate a highly significant at <0.001

OI: occupier intention, SNO: subjective norm to occupancy, SAT: satisfaction, EC1: environmental condition, ATO: attitude towards occupancy, PERS: personalization.

From Table-2, the probability of getting a critical ratio of 2.541 in absolute value is equal to 0.011. In other words, the regression weight for satisfaction in the prediction of occupier intention is significantly different from zero at the 0.05level (two-tailed). Therefore, the hypothesis that the influence of satisfaction on occupier intention is significant has been supported for this purpose. The probability of getting a critical ratio of 1.170 in absolute value is equal to 0.242. In other words, the regression weight for environmental condition in the prediction of occupier intention is significantly different from zero at the 0.05 level (two-tailed). Therefore, the hypothesis that the influence of environmental condition on occupier intention is not supported. The probability of getting a critical ratio of0.048 in absolute value is equal to 0.962. Subsequently, the regression weight for subjective norm to occupancy in the prediction of occupier intention is significantly different from zero at the 0.05 level (two-tailed). Therefore, the hypothesis that the influence of subjective norm to occupancy on occupier intention is not supported. The probability of getting a critical ratio of 2.736 in absolute value is equal to 0.006. Hence, the regression weight for attitude towards occupancy in the prediction of occupier intention is significantly different from zero at the 0.05 level (two-tailed). Thereafter, the hypothesis that the influence of attitude towards occupancy on occupier intention is significant and has been supported.

The probability of getting a critical ratio of2.513 in absolute value is equal to 0.012. This regression weight for personalization in the prediction of occupier intention is significantly different from zero at the 0.05 level (two-tailed). Consequently, the hypothesis that the influence of personalization on occupier intention issignificant and has been supported. The probability of getting a critical ratio of 1.495 in absolute value equal 0.135. As a result, the regression weight for attitude towards occupancy in the prediction of subjective norm to occupancy is significantly different from zero at the 0.05 level (two-tailed). Furthermore, the hypothesis that attitude towards occupancy influence subjective norm to occupancy is not supported. The probability of getting a critical ratio of 5.163 in absolute value isless than 0.001. As a result, the regression weight for personalization in the prediction of satisfaction is significantly different from zero at the 0.001 level (two-tailed). In addition, the hypothesis that the influence of personalization on satisfaction ishighly significant and as well supported.

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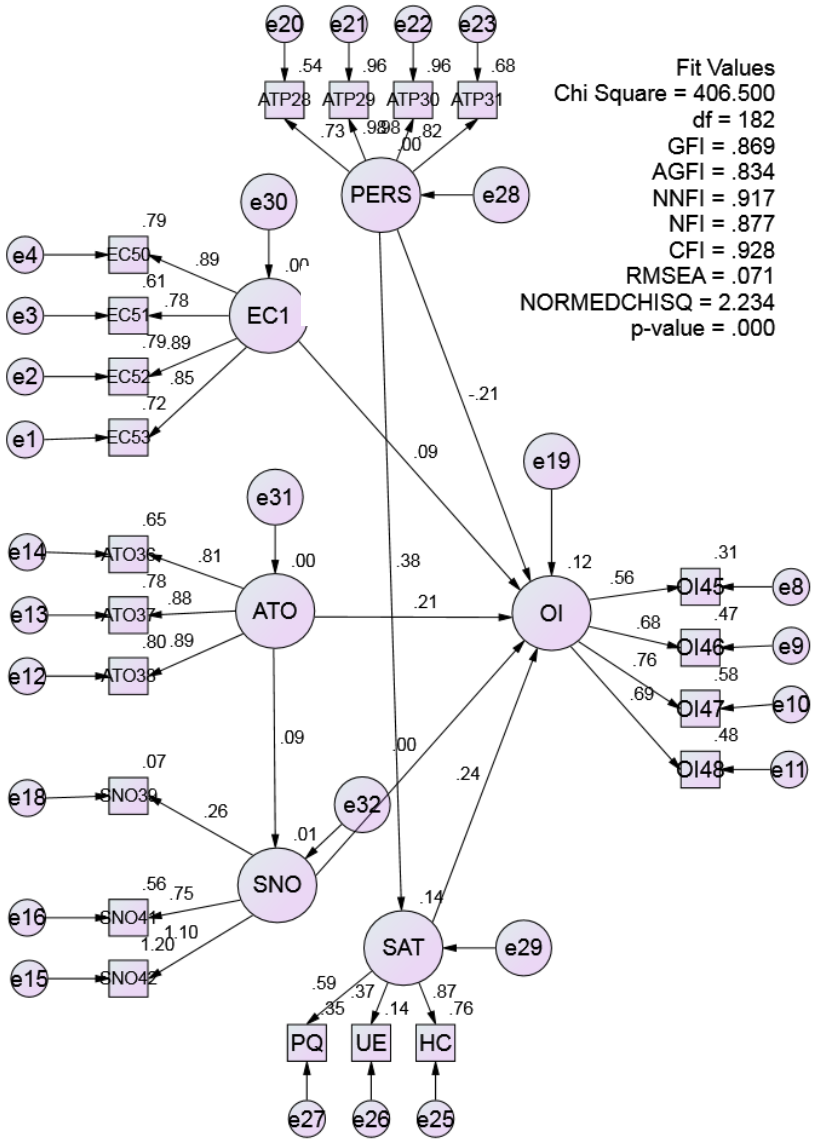

Figure-2. The structural model.

5. CONCLUSION BASED ON THE SIGNIFICANCE OF THE STUDY FROM ARCHITECTURAL STANDPOINT

Conventionally, architects not often receive valuable feedback about the performance of completed buildings, except there is dissatisfaction from the housing users. Thus, the evaluation of the factors contributing to non-occupancy that are embedded in the Housing Occupancy Model (HOM) is a very significant concept in the context of public housing. Summarily, effective housing occupancy highly depend on the factors investigated so far in this work in addition to others such as external visual quality of buildings, maintenance quality of buildings, structural quality of buildings, quality of landscaping, quality of environmental layout and the quality of location thereby bringing satisfaction towards housing occupancy. In consequence, this study appraised some users' potential factors towards effective housing occupancy model and the information provided in this framework will enhance the skills of architects and housing stakeholders.

6. CONCLUDING REMARKS BASED ON THE STUDY

In this research, the factors responsible for occupancy issues in Malaysia were investigated with reference to the case study of Johor. To achieve this stride, a newly integrated Housing Occupancy Model (HOM) was

proposed and validated, through an empirical modeling approach. Out of the seven hypotheses formulated, four were supported while three were not. The implementation of this SEM for the HOM makes the realization of the research aim and objectives to be achieved. The findings from this study showed that satisfaction has direct and positive influence on occupier intention. For this reason, it is supported in line with the previous studies (Tse and Wilton, 1998; Masrom and Hussein, 2008; Salamiah, 2011; Masrom, 2012; Zainudin, 2012). However, environmental condition has no direct, positive significant influence on occupier intention. As such it is not supported and not in line with the previous studies (Govender *et al.*, 2011; Zainudin, 2012). In addition, subjective norm to occupancy has no direct and positive influence on occupier intention, hence not in line with previous studies (Fishbein and Ajzen, 1975; Ramayah and Aafaqi, 2005; Masrom and Hussein, 2008; Fishbein and Ajzen, 2010).

A finding for attitude towards occupancy on occupier intention is supported in line with the works conducted and reported in literatures (Fishbein and Ajzen, 1975; Ramayah and Aafaqi, 2005; Fishbein and Ajzen, 2010; Kianpisheh *et al.*, 2011). In addition, personalization has a direct and positive influence on occupier intention. The result obtained for personalization shown a supported scenario on housing occupier intention. This has also been proved in previous researches (Bentler and Bonett, 1980; Barki and Hartwick, 1994). However, ATO has no direct and significant influence on SNO. For this reason, it is not supported and not in line with previous works (Fishbein and Ajzen, 1975; Ramayah and Aafaqi, 2005; Masrom and Hussein, 2008; Fishbein and Ajzen, 2010). In furtherance, personalization has a direct and noteworthy influence on satisfaction. The outcome of this investigation showed that it is supported and it is in line with the previous works (Bentler and Bonett, 1980; Yang and Peterson, 2004). Conclusively, the contribution of this work to the body of knowledge would therefore be beneficial to policy makers and professional stakeholders towards achieving sustainable decisions about the housing non-occupancy issues in Malaysia among other developing economies in the world.

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