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Investigating the Main Factors of Neighbourhood Morphology Affecting Social Cohesion: SEM-PLS Analysis Approach

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1 ABSTRACT

In a particular geographic location, a collection of individuals who share the same services and a certain amount of social cohesion is referred to as a neighbourhood. This research was conducted to present a model that examines several hypotheses regarding the impact of neighbourhood morphology and its main factors on the social cohesion of a neighbourhood and its subdimensions. To assess the extent of each factor of neighbourhood morphology affecting social cohesion and its subdimensions, a mixed research approach was followed. A structured questionnaire survey was undertaken on a random sample of residents of two neighbourhoods in New Borg Al-Arab City in Egypt with the involvement of 193 participants. After performing a measurement model analysis on the gathered information, the data were then subjected to a structural model analysis using Smart PLS 3.2.6. Internal consistency reliability, convergent validity, and discriminant validity are evaluated during the assessment of reflective measurement models in PLS-SEM. After proving the reliability and validity of the measurement models, the structural model is evaluated including examining the model's prediction ability and the links between its constructs. Regarding the main hypothesis, we concluded that neighbourhood morphology significantly affects social cohesion. Moreover, the subdimensions of neighbourhood morphology affect the subdimensions of social cohesion resulting in 22 hypotheses.

Keywords: New Borg Al-Arab City, SEM-PLS, Design Constraints, Social Cohesion, Neighbourhood Morphology

2 INTRODUCTION

Contemporary neighbourhoods are built for the sole purpose of housing and parking cars. Residents have to rely on their cars because they cannot conveniently get the necessities. Egypt's new cities are a great illustration of these kinds of contemporary neighbourhoods. Egypt’s New Borg Al-Arab City is one example. In the 30 years between 1977 and 2006, the city was supposed to have 1,258,200 residents, but only 500,000 actually called it home. This is due to a lack of adequate infrastructure, including adequate housing, recreational facilities, public transportation, sidewalks, etc., as well as poor planning and design. The strength of the relationships within different networks is sometimes used as a proxy for the health of society as a whole. This causes cities to fall short in meeting the requirements of their residents, drives up the price of supporting infrastructure for parks, and boosts land values without improving community life in residential areas. (Mohamed et al., 2022)

By reviewing previous studies, this research finds that Dempsey (2009), examined the claim that there is an association between good-quality neighbourhoods and social cohesion. This is done through a mixed research approach starting by investigating the theoretical background of such claims and then providing empirical evidence on how the urban form and the built environment’s features influence social cohesion in local neighbourhoods. The empirical stage is divided into two phases: physical site survey and household questionnaire. Statistical methods were used to examine the data, most extensively the SPSS statistical software for the social sciences (SPSS). Descriptive analyses, Spearman’s rank-order correlation coefficient, multiple linear regression, binary logistic regression, factor analysis, and analyses of variance (both one-way and two-way ANOVA) were utilized.

On the other hand, this research developed a model to understand the effect of neighbourhood morphology (and its subdimensions) on social cohesion (and its subdimensions). The model was fabricated from a comprehensive analysis of the literature review of both the main neighbourhood design characteristics and the main dimensions and subdimensions of social cohesion. The model was analyzed using SPSS and the Partial Least Square analysis of SEM (PLS-SEM) technique. This technique combines factor analysis and multiple regression analysis to investigate the nature of the relationship between the empirically observable

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and the more nebulous "latent" variables. Due to its ability to estimate various and interrelated dependencies in a single analysis, this technique is much more favoured.

3 NEIGHBOURHOOD MORPHOLOGY AND SOCIAL COHESION

The literature dealing with the relationship between the morphological composition of the residential neighbourhood and its social cohesion and how to measure this relationship has been numerous. This is evident in Table 1, which summarizes some of this literature and the usual measurement methods used.[1]

Research	Contribution
Are good-quality environments socially cohesive? Measuring quality and cohesion in urban neighbourhoods	Studying factors for both quality of the built environment and social cohesion For measuring: -Physical site survey -Household questionnaire survey
Built environment, urban vitality and social cohesion: Do vibrant neighbourhoods foster strong communities?	Tests a model in which urban vitality link between the built environment and social cohesion For measuring: -Survey and geospatial data
Urban Design, Public Spaces, and Social Cohesion: Evidence from a Virtual Reality Experiment	Investigates the impact of design alternatives on social cohesion through a virtual reality experiment
Social Cohesion in Cairo: Toward a Better Understanding Of The Potential Role Of Urban Design	The potential role of urban design in contributing to the social cohesion among the different components of the society in Cairo -Literature Review
Public Space Design and Social Cohesion: An International Comparison	Main concepts of public space, urban design and social cohesion the intersection of urban design and planning and social cohesion Explores how public behavior evidences ideas about social cohesion
European public space projects with social cohesion in mind: symbolic, programmatic and minimalist approaches	This paper characterizes three distinct open space design approaches – Symbolic, Programmatic and Minimalist – that governments and designers have put forward as best practices to enhance social cohesion
Urban planning, neighbourhoods and social cohesiveness: A socio-cultural study of expatriate residents in Dubai	Assess and analyze the role of the physical planning of the built forms, layout and design in creating socially cohesive neighbourhoods in the multicultural city of Dubai. For Measuring:- -Observation and Spatial Analysis using GIS -Surveys, and semi-structured interviews
Neighbourhood Form and Social Cohesion: What Can We Learn Before and During Social Distancing	This research identifies the importance of suburban neighbourhood form in promoting social cohesion. For Assessing socio-physical relationship for different patterns -Cross-sectional surveys and follow-up interviews
Neighbourhood open spaces for social cohesion	Measure and compare the open spaces in selected neighbourhoods in Europe and India according to Unitary Theory of Production For Measuring:- -On-site observation -Surveys

Table 1: Neighbourhood Morphology and Social Cohesion in Literature Review. Source: Researchers.

4 METHODS

4.1 Scales

Based on the previous analysis, The developed model in this research is comprised of two main variables which they are Neighbourhood Morphology and Social Cohesion.

Neighbourhood Morphology's main dimensions are Street System and Block System. The Street System is branched into the subdimensions of neighbourhood morphology which they are Street Network, Street Type, Pedestrian Network, and Access Points. The Block System is branched into Perceived Density, and Mixed-land Use.

The main dimensions of Social Cohesion are Participation/Solidarity, Safety/Trust, and Neighbourhood Attachment. Participation/Solidarity is branched into Community, Political, and Solidarity. The Safety/Trust is branched into General Trust and Institutional Trust. Finally, Neighbourhood Attachment is branched into Identity, Ownership and Memory, and Belonging.

4.2 Sample and Data Collection

For the purpose of this research, a structured questionnaire was conducted on a random sample of 193 participants (see Appendx). The participants are the residents of two selected neighbourhoods of New Borg Al-Arab City in Egypt, 95 participants from Neighbourhood Two and 98 participants from Neighbourhood Three. These neighbourhoods differ from each other in their structural composition as shown in Figure 1 and

[1] as an integral part of this paper

Figure 2. The structured questionnaire investigates the inhabitant's perception of both neighbourhood morphology and social cohesion's sub-dimensions. It's divided into thirteen sections: Street Network (6 items), Street Type (4 items), Pedestrian Network (2 items), Access Points (2 items), Perceived Density (2 items), Mixed-land Use (2 items), Community (2 items), Political (2 items), Solidarity (2 items), General Trust (2 items), Institutional Trust (2 items), Identity (2 items), Ownership and Memory (2 items), and Belonging (2 items). A five-level Likert scale with "Strongly Disagree" until "Strongly Agree", comprises the measurement level of the questionnaire. A Partial Least Square analysis of SEM (PLS-SEM) is followed in this study. Analyses are performed in two phases: first, a Measurement Model analysis (Reliability and Validity Test) is performed, and then, a Structural Model Analysis is performed (Hypothesis Testing).

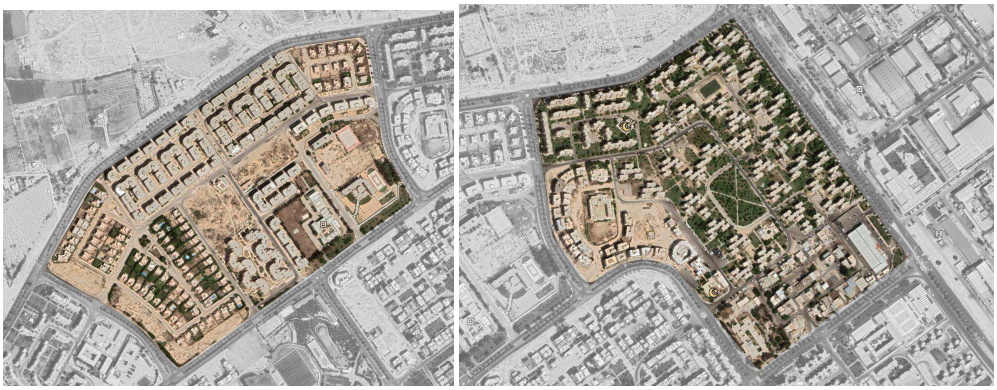

Fig. 1: Neighbourhood Two. Source: Google Earth, Fig. 2: Neighbourhood Three. Source: Google Earth.

4.3 Research Hypothesis

According to the developed model, there are three scales of hypothesis testing which resulted in 55 hypotheses: Hypothesis Testing for the main Variables (1 hypothesis), Hypothesis Testing for the main Dimensions (6 hypotheses), and Hypothesis Testing for the main Sub-Dimensions (48 hypotheses).

4.3.1 Hypothesis Testing for the main Variables

H1: There is a significant relationship between Neighbourhood Morphology and Social Cohesion

4.3.2 Hypothesis Testing for the main Dimensions

H2: There is a significant relationship between Street System and Participation

H3: There is a significant relationship between Street System and Trust

H4: There is a significant relationship between Street System and Neighbourhood Attachment

H5: There is a significant relationship between Block System and Participation

H6: There is a significant relationship between Block System and Trust

H7: There is a significant relationship between Block System and Neighbourhood Attachment

4.3.3 Hypothesis Testing for the main Sub-Dimensions

H8: There is a significant relationship between Street Network and Community

H9: There is a significant relationship between Street Network and Political

H10: There is a significant relationship between Street Network and Solidarity

H11: There is a significant relationship between Street Network and General Trust

H12: There is a significant relationship between Street Network and Institutional Trust

H13: There is a significant relationship between Street Network and Identity

H14: There is a significant relationship between Street Network and Ownership and Memory

H15: There is a significant relationship between Street Network and Belonging

H16: There is a significant relationship between Street Type and Community

H17: There is a significant relationship between Street Type and Political

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H18: There is a significant relationship between Street Type and Solidarity
H19: There is a significant relationship between Street Type and General Trust
H20: There is a significant relationship between Street Type and Institutional Trust
H21: There is a significant relationship between Street Type and Identity
H22: There is a significant relationship between Street Type and Ownership and Memory
H23: There is a significant relationship between Street Type and Belonging
H24: There is a significant relationship between Pedestrian Network and Community
H25: There is a significant relationship between Pedestrian Network and Political
H26: There is a significant relationship between Pedestrian Network and Solidarity
H27: There is a significant relationship between Pedestrian Network and General Trust
H28: There is a significant relationship between Pedestrian Network and Institutional Trust
H29: There is a significant relationship between Pedestrian Network and Identity
H30: There is a significant relationship between Pedestrian Network and Ownership and Memory
H31: There is a significant relationship between Pedestrian Network and Belonging
H32: There is a significant relationship between Access Points and Community
H33: There is a significant relationship between Access Points and Political
H34: There is a significant relationship between Access Points and Solidarity
H35: There is a significant relationship between Access Points and General Trust
H36: There is a significant relationship between Access Points and Institutional Trust
H37: There is a significant relationship between Access Points and Identity
H38: There is a significant relationship between Access Points and Ownership and Memory
H39: There is a significant relationship between Access Points and Belonging
H40: There is a significant relationship between Perceived Density and Community
H41: There is a significant relationship between Perceived Density and Political
H42: There is a significant relationship between Perceived Density and Solidarity
H43: There is a significant relationship between Perceived Density and General Trust
H44: There is a significant relationship between Perceived Density and Institutional Trust
H45: There is a significant relationship between Perceived Density and Identity
H46: There is a significant relationship between Perceived Density and Ownership and Memory
H47: There is a significant relationship between Perceived Density and Belonging
H48: There is a significant relationship between Mixed-land Use and Community
H49: There is a significant relationship between Mixed-land Use and Political
H50: There is a significant relationship between Mixed-land Use and Solidarity
H51: There is a significant relationship between Mixed-land Use and General Trust
H52: There is a significant relationship between Mixed-land Use and Institutional Trust
H53: There is a significant relationship between Mixed-land Use and Identity
H54: There is a significant relationship between Mixed-land Use and Ownership and Memory
H55: There is a significant relationship between Mixed-land Use and Belonging

5 RESULTS

5.1 Data Examination

Missing data, outliers, normality, and Common Method Bias (CMB) are all things that should be checked in the gathered data, as suggested by the literature (Hair et al., 2017). The key data concerns were therefore examined using SPSS in this study. There were no issues discovered after looking at the missing data and the outliers. Researchers can identify the CMB using Harman's single-factor test; the percentage of factors explaining the variance in the data determines the presence or absence of the bias. Common method bias is not an issue if the overall variance attributable to the factor is less than 50%. To our dismay, we found that the first component explained only 17.601% of the total variance. Given that the number was under 50%, it's possible that the CMB issue was overlooked. As displayed in Table.2, Skewness levels between -2 and +2 and kurtosis values between -7 and +7 are regarded as acceptable in displaying normal distribution (Hair et al. 2014; Bryne 2016).

Construct	Notation	N	Skewness	Kurtosis
Street Network	SN	193	-0.463	1.907
Street Type	ST	193	0.354	-1.178
Pedestrian Network	PN	193	-0.574	-1.023
Access Points	AP	193	-0.489	0.187
Perceived Density	PD	193	-0.311	2.53
Mixed Land Use	MLU	193	0.052	-1.342
Community	COM	193	1.331	5.01
Political	POL	193	1.202	1.107
Solidarity	SOL	193	-0.82	0.924
General trust	GT	193	-0.037	0.657
Institutional trust	IT	193	-0.344	-0.806
Identity	IDE	193	-1.633	2.852
Ownership & Memory	OM	193	-1.042	0.596
Belonging	BEL	193	-1.023	0.86
Street System	SS	193	-0.373	-0.653
Block System	BS	193	-0.043	-1.005
Participation	PAR	193	0.416	0.932
Trust	TRU	193	-0.359	-0.503
Neighbourhood Attachment	NA	193	-1.138	0.306
Neighbourhood Morphology	NM	193	-0.128	-1.074
Social Cohesion	SC	193	-0.553	0.248
Remark: Normality assumption attained				

Table 2: Normality diagnostics

5.2 Measurement Model Assessment

PLS-SEM calls for assessing internal consistency reliability, convergent validity, and discriminant validity to validate reflective measurement models.

The Internal Consistency and Reliability of the measurement model evaluate a construct to determine whether or not all of the indicators connected with it are truly measuring the construct. Despite its widespread use, Cronbach's alpha has been called into question due to its implicit assumption of equal outer loadings among all indicators (Hair et al., 2017), and because the number of indicators affects the calculation of Cronbach's alpha, with a smaller value being obtained for scales with fewer than 10 items (Pallant, 2010, Hair et al., 2017). Hence, additional methods of internal consistency assessment, including composite reliability (CR), are recommended. Values above 0.6 are also considered acceptable for CR, but 0.7 is the established norm (Fornell and Larcker, 1981; Hair et al., 2017; Taber, 2018). Values for internal consistency are shown in Figure 3 as composite reliability (CR). While evaluating internal consistency, the composite reliability takes into consideration the fact that each indicator has a unique external loading.

The Convergent Validity assesses the degree to which the variables used to measure one construct are correlated with one another. The Convergent Validity was assessed using AVE and Item Loadings. The AVE, also known as the grand mean of the squared loadings of the indicators measuring a construct, is a standard measure that is used to show convergent validity. Values for average variance (AVE) are shown in Figure 3. Although values of AVE greater than 0.5 are preferred, those greater than 0.4 are also acceptable so long as CR values are greater than 0.6. (Fornell and Larcker, 1981). Another measure of Convergent Validity is the item loading, and the minimum outer loading that must be met is 0.70. (Hair et al., 2014, Hair et al., 2017). When an item's outer loading is 0.70, it means that the construct can explain approximately 50% of the item's variance (Hair et al., 2017). On the other hand, the authors proposed that if the outer loading is

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between 0.4 and 0.7, the effect that indicator deletion has on the reliability of the internal consistency should be investigated. the reflective indication ought to be kept if the deletion does not result in an increase in a measure above the threshold. As a result of low factor loadings, three items were eliminated from the analysis (Q4, Q10, and Q11), but all of the remaining items in figure 4 satisfy the criterion.

Discriminant Validity is tested by looking at how the construct compares to other constructs. The fornell-Larcker criterion is commonly used to demonstrate discriminant validity, which guarantees that the indicator only loads highly on the construct it is linked with. Indicators sometimes load to many constructs; however, the loading on the target construct must be greater than any other correlations the indicator may have with other constructs. The Fornell-Larcker criterion compares the square root of AVE to the correlations of the construct. The AVE of the construct should be greater than any of the construct's correlations with other constructs, as measured by its square root. As the square root values of the AVE for the construct were greater than the construct's correlations with other constructs, as shown in table 3, the discriminant validity was developed using these principles as a basis.

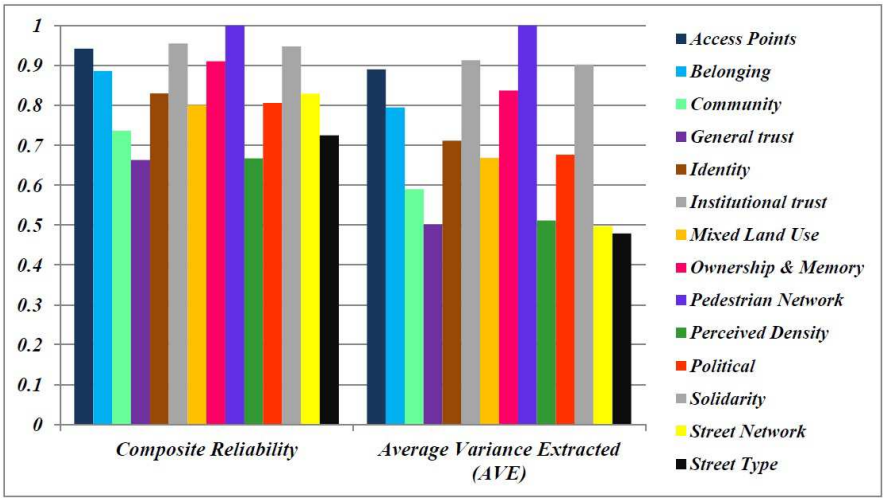

Fig. 3: Summary of internal consistency reliability and convergent validity. Source : By Researchers

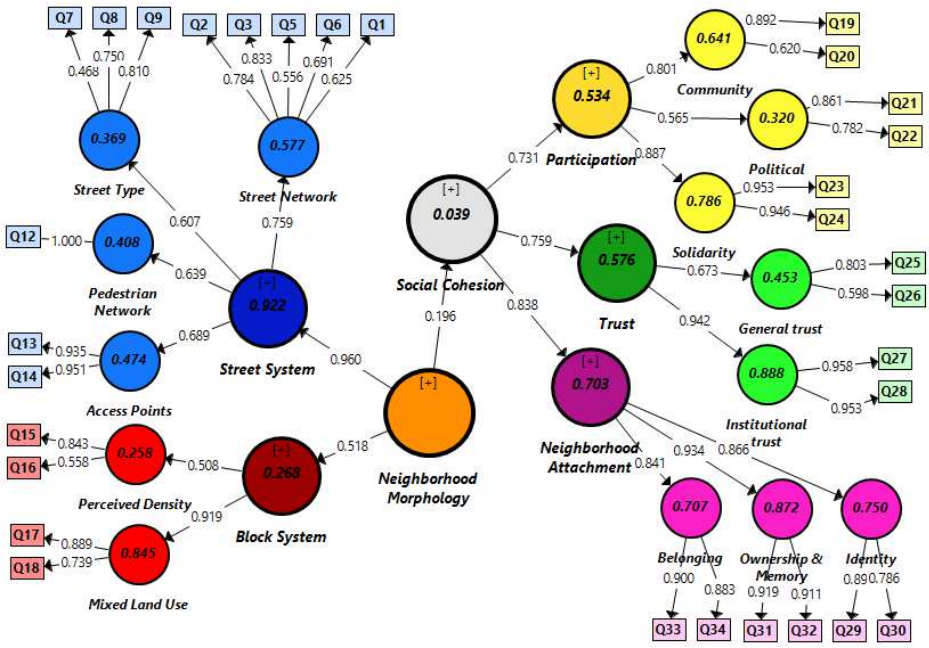

Fig. 4: Measurement model assessment (factor loadings). Source: Researchers.

	AP	*BEL*	*COM*	*GT*	*IDE*	*IT*	*MLU*	*OM*	*PN*	*PD*	*POL*	*SOL*	*SN*	*ST*
AP	**0.943**													
BEL	0.085	**0.892**												
COM	-0.128	0.145	**0.768**											
GT	0.137	0.299	0.151	**0.708**										
IDE	0.219	0.549	0.183	0.257	**0.843**									
IT	0.04	0.312	0.338	0.387	0.402	**0.956**								
MLU	0.053	-0.14	-0.015	-0.023	0.099	-0.138	**0.817**							
OM	0.101	0.677	0.127	0.304	0.764	0.339	-0.004	**0.915**						
PN	0.39	0.215	-0.075	0.173	0.319	0.052	0.343	0.25	**1**					
PD	-0.133	-0.086	-0.075	-0.149	-0.115	-0.155	0.138	-0.194	0.086	**0.715**				
POL	-0.049	0.078	0.339	0.061	0.069	0.234	0.08	0.084	-0.065	-0.093	**0.822**			
SOL	0.18	0.341	0.551	0.387	0.386	0.446	-0.22	0.367	0.056	-0.227	0.247	**0.95**		
SN	0.338	0.14	0.197	0.262	0.236	0.105	-0.055	0.131	0.176	-0.038	-0.139	0.241	**0.705**	
ST	0.12	0.122	-0.002	0.206	0.28	-0.008	0.579	0.244	0.509	0.23	-0.164	0.016	0.235	**0.692**
***Remark*:** Discriminant validity through the Fornell-Larcker criterion attained														

Table 3: Discriminant Validity (Fornell-Larcker criterion). Source: Researchers.

5.3 Structural Model Assessment

The structural model was analyzed using path coefficients, collinearity diagnostics, the coefficient of determination (R2), effect size (f 2), predictive relevance (Q2), and goodness of fit criteria.

Estimates of the relationships between model constructs are referred to as "Path Coefficients" (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). These coefficients lie on a scale from +1 to -1, with plus one indicating a highly positive relationship, zero indicating no relationship at all, and minus one indicating a highly negative relationship (Garson, 2016). Studies should also report the path coefficients alongside the significance level, t-value, and p-value when evaluating the PLS path (Hair, Sarstedt, Ringle, & Mena, 2012). It has been determined whether or not there is a statistically significant relationship between the two constructs by evaluating the hypotheses pertaining to the signs, sizes, and statistical significance of the calculated path coefficients. In general, bigger effects between a predictor and a predicted variable are indicated by higher path coefficients. It is possible to evaluate the reliability of the estimated path coefficients by comparing their p-values to two predetermined thresholds, set at 0.05 and 0.01. This procedure establishes the significance of the hypothesized relationships (Henseler et al., 2009; Hair et al., 2017). Conclusions were formed for each hypothesis later by comparing their p-values to the aforementioned traditional thresholds. The results of the hypothesis testing for the main hypothesis, main dimensions, and subdimensions are shown in Figures 5, 6, and 7, and in table 4.

Fig. 5: Structural model for the main hypothesis. Source: Researchers.

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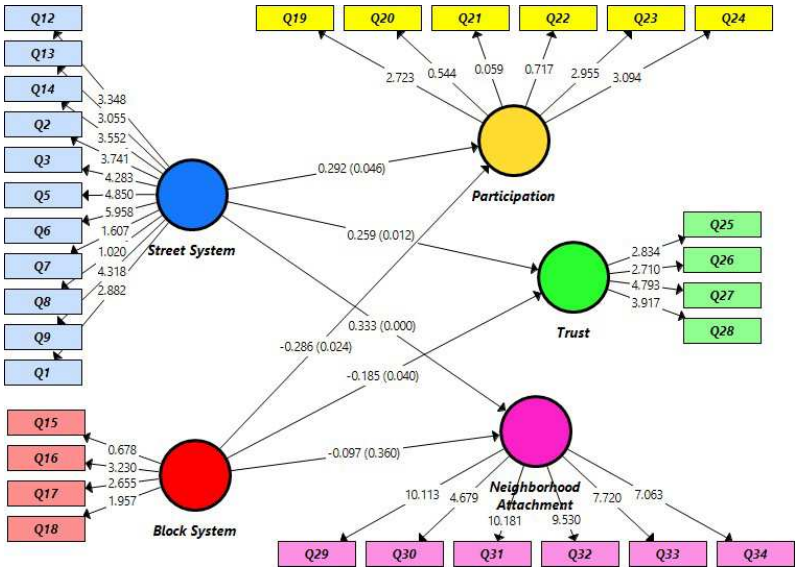

Fig. 6: Structural model for testing the hypotheses concerning the dimensions of the variables. Source: Researchers.

The effect of the subdimensions of neighbourhood morphology on social cohesion's subdimensions was the subject of 48 hypotheses. Therefore, another test was conducted as shown in figure 7, and disregard the non-significant association for the sake of clarity.

Hypothesis	B	t-value	P-value	Remark
H1: Neighbourhood Morphology -> Social Cohesion	0.461	2.389	0.017	Supported
H2: Street System -> Participation	0.292	1.993	0.046	Supported
H3: Street System -> Trust	0.259	2.523	0.012	Supported
H4: Street System -> Neighbourhood Attachment	0.333	4.115	0	Supported
H5: Block System -> Participation	-0.286	2.258	0.024	Supported
H6: Block System -> Trust	-0.185	2.058	0.04	Supported
H7: Block System -> Neighbourhood Attachment	-0.097	0.916	0.36	Rejected
H8: Street Network -> Community	0.382	4.468	0	Supported
H10: Street Network -> Solidarity	0.222	2.586	0.01	Supported
H11: Street Network -> General trust	0.315	4.361	0	Supported
H17: Street Type -> Political	-0.264	2.67	0.008	Supported
H21: Street Type -> Identity	0.229	2.812	0.005	Supported
H22: Street Type -> Ownership & Memory	0.304	3.915	0	Supported
H23: Street Type -> Belonging	0.344	3.751	0	Supported
H29: Pedestrian Network -> Identity	0.209	2.501	0.012	Supported
H32: Access Points -> Community	-0.259	2.832	0.005	Supported
H37: Access Points -> Identity	0.206	2.783	0.005	Supported
H46: Perceived Density -> Ownership & Memory	-0.253	2.974	0.003	Supported
H49: Mixed Land Use -> Political	0.203	2.178	0.029	Supported
H50: Mixed Land Use -> Solidarity	-0.191	2.224	0.026	Supported
H52: Mixed Land Use -> Institutional trust	-0.16	2.063	0.039	Supported
H55: Mixed Land Use -> Belonging	-0.271	2.715	0.007	Supported

Table 4: Results of Hypothesis testing. Source: Researchers.

There are interpretation problems caused by Collinearity when there is a high correlation between two constructs (Hair, Hult, Ringle, & Sarstedt, 2017). The variance inflation factor (VIF) is a measure of collinearity. High collinearity is indicated by a VIF value of 5 or higher (Hair, Ringle, & Sarstedt, 2011; Hair, Hult, Ringle, & Sarstedt, 2017). All VIF values in Table 5 are below the threshold, indicating that collinearity does not exist amongst the several independent constructs.

Path	VIF	Path	VIF
Neighbourhood Morphology -> Social Cohesion	1	Mixed Land Use -> Political	1.157
Block System -> Neighbourhood Attachment	1.015	Mixed Land Use -> Solidarity	1.02
Block System -> Participation	1.015	Pedestrian Network -> Identity	1.52
Block System -> Trust	1.015	Perceived Density -> Ownership & Memory	1.006
Street System -> Neighbourhood Attachment	1.015	Street Network -> Community	1.097
Street System -> Participation	1.015	Street Network -> General trust	1
Street System -> Trust	1.015	Street Network -> Solidarity	1.02
Access Points -> Community	1.097	Street Type -> Belonging	1.157
Access Points -> Identity	1.195	Street Type -> Identity	1.299
Mixed Land Use -> Belonging	1.157	Street Type -> Ownership & Memory	1.006
Mixed Land Use -> Institutional trust	1	Street Type -> Political	1.157
Remark: No problem exists			

Table 5: Variance inflation factors. Source: Researchers.

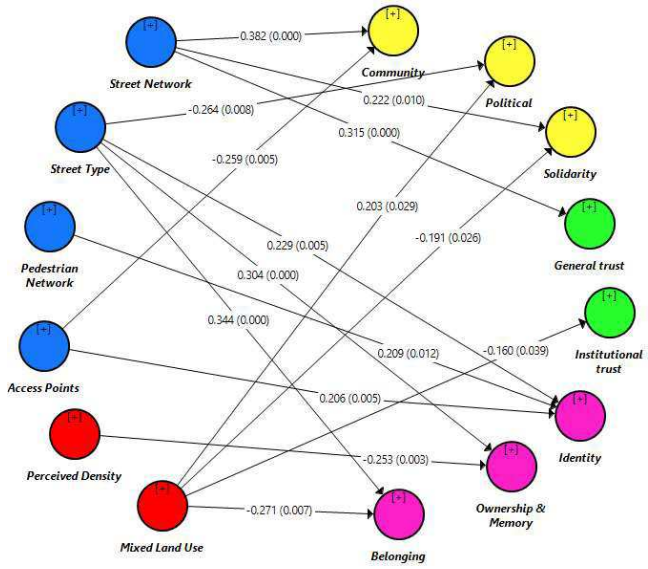

Fig. 7: Simplified structural model for testing the hypotheses concerning the SUB-dimensions of the variables. Source: Researchers.

Coefficient of determination (R^2) is a structural model quality measure that assesses the effect of independent factors on dependent latent variables (Hair, Sarstedt, Ringle, & Mena, 2012). (Hair, Sarstedt, Hopkins, & Kuppelwieser, 2014). From 0 to 1, coefficient of determination estimates range from low to high explained variance. Researchers used a different cutoff. Chin (1998) classified values below 0.19, 0.19-0.33, 0.33-0.67, or above 0.67 as very low, low, moderate, or high. Falk & Miller (1992) defined R^2 as negligible if $R^2<0.1$ and adequate if $R^2>0.1$. Table 6 shows that most R Square values were adequate. The R-Square of Social Cohesion was 0.213, indicating that Neighbourhood Morphology explained 21 % of its variation. Identity R Square was highest and Institutional trust lowest.

Dependent Variable	R Square	R Square Adjusted
Social Cohesion	0.213	0.209
Neighbourhood Attachment	0.128	0.119
Participation	0.187	0.178
Trust	0.113	0.104
Belonging	0.123	0.114
Community	0.154	0.145
General trust	0.099	0.094
Identity	0.225	0.212
Institutional trust	0.026	0.021
Ownership & Memory	0.144	0.135
Political	0.071	0.062
Solidarity	0.097	0.088

Table 6: R Square and Associated R Square Adjusted. Source: Researchers.

The effect size f^2 measures how much the endogenous construct will affect the model if an exogenous construct is eliminated. A construct has a small influence if its value is between 0.02 and 0.14, a medium effect between 0.15 and 0.34, and a high effect above 0.35. An endogenous construct with a value < 0.02 has no effect (Hair et al., 2017). Table 7 shows construct effect size f^2. Neighbourhood Morphology has moderate effect on Social Cohesion ($f^2=0.27$). Street network affects community moderately ($f^2=0.157$). Except for block system-neighbourhood attachment ($f^2=0.011$), all other effect sizes were accepted since.

Path	F^2	Path	F^2
Neighbourhood Morphology -> Social Cohesion	0.27	Mixed Land Use -> Political	0.038
Block System -> Neighbourhood Attachment	0.011	Mixed Land Use -> Solidarity	0.04
Block System -> Participation	0.099	Pedestrian Network -> Identity	0.037
Block System -> Trust	0.038	Perceived Density -> Ownership & Memory	0.075
Street System -> Neighbourhood Attachment	0.125	Street Network -> Community	0.157
Street System -> Participation	0.103	Street Network -> General trust	0.11
Street System -> Trust	0.075	Street Network -> Solidarity	0.053
Access Points -> Community	0.072	Street Type -> Belonging	0.116
Access Points -> Identity	0.046	Street Type -> Identity	0.052
Mixed Land Use -> Belonging	0.072	Street Type -> Ownership & Memory	0.107
Mixed Land Use -> Institutional trust	0.026	Street Type -> Political	0.065

Table 7: f^2 Effect Size. Source: Researchers.

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The out-of-sample prediction capability of the model is represented by the Predictive Relevance Q2 value. If a model is stated to have predictive power or predictive relevance, this indicates that it is able to reliably forecast data that was not used in the process of estimating the model. The Q2 values that were determined from the research are detailed in Figure 8. As the values of Q2 are more than 0, it is safe to say that the study model has a good predictive relevance.

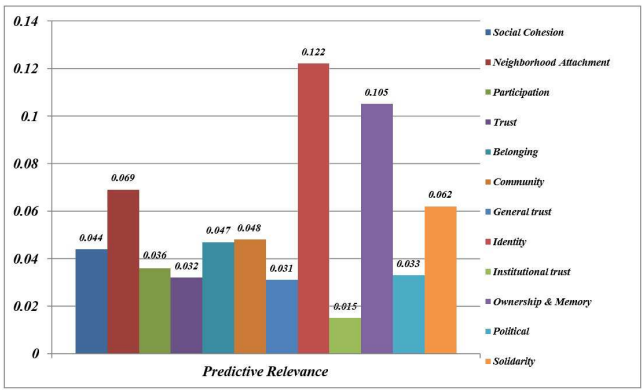

Fig. 8: Predictive Relevance. Source: Researchers.

The geometric mean of the average and average variance retrieved from endogenous variables is the Goodness of Fit (GoF), a global fit indicator established by Tenenhaus et al. (2005). GoFs consider the measurement and structural models throughout the research process, focusing on model performance (Henseler & Sarstedt, 2013). The criteria for determining whether GoF values are unacceptable, small, moderate, or large for a globally adequate PLS model are as follows: GoF less than 0.1, no fit; 0.1–0.25, small; 0.25–0.36, medium; and 0.36+, large. These criteria and the GoF value (0.306) indicate that the GoF model is moderate to sufficient viable global PLS model.

6 DISCUSSION AND CONCLUSION

The main goal of this research was to investigate the influence of Neighbourhood Morphology and its subdimensions on Social Cohesion and its subdimensions and which subdimensions affects the other. Depending on extensive literature review, a structured questionnaire was conducted on a random sample consists of 193 participants of two neighbourhoods in New Borg Al-Arab City in Egypt. The questionnaire was divided into 3 scales which they are: the main variables, the main dimensions, and the subdimensions.

After that the data collected were analyzed using SEM-PLS model which is comprised of two phases. Phase 1 the measurement model assessment and phase 2 the structural model assessment. The model developed resulted in 55 hypothesis, only 21 of them are supported which are demonstrated in table 8.

Hypothesis	Remark
H1: Neighbourhood Morphology has a statistically significant effect on Social Cohesion	Supported
H2: Street System has a statistically significant effect on Participation	Supported
H3: Street System has a statistically significant effect on Trust	Supported
H4: Street System has a statistically significant effect on Neighbourhood Attachment	Supported
H5: Block System has a statistically significant effect on Participation	Supported
H6: Block System has a statistically significant effect on Trust	Supported
H8: Street Network has a statistically significant effect on Community	Supported
H10: Street Network has a statistically significant effect on Solidarity	Supported
H11: Street Network has a statistically significant effect on General trust	Supported
H17: Street Type has a statistically significant effect on Political	Supported
H21: Street Type has a statistically significant effect on Identity	Supported
H22: Street Type has a statistically significant effect on Ownership & Memory	Supported
H23: Street Type has a statistically significant effect on Belonging	Supported
H29: Pedestrian Network has a statistically significant effect on Identity	Supported
H32: Access Points has a statistically significant effect on Community	Supported
H37: Access Points has a statistically significant effect on Identity	Supported
H46: Perceived Density has a statistically significant effect on Ownership & Memory	Supported
H49: Mixed Land Use has a statistically significant effect on Political	Supported
H50: Mixed Land Use has a statistically significant effect on Solidarity	Supported
H52: Mixed Land Use has a statistically significant effect on Institutional trust	Supported
H55: Mixed Land Use has a statistically significant effect on Belonging	Supported

Table 8: Hypothesis testing summary. Source: Researchers.

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9 APPENDIX

Domain		Subdomain	Questions (Qs)
Neighbourhood Morphology (by researchers)	Street System	Street Network	The Visual Permeability in the street network is high The Physical Permeability in the Street network is high I can remember the streets that I have passed through before There are many junctions in the neighbourhood where I live There are many landmarks in the neighbourhood where I live I feel that the streets and open spaces are well defined by the buildings
		Street Type	The street where I live is Narrow The street where I live has shopping services The street where I live is a Cul de sac The street where I live is pedestrian only
		Pedestrian Network	There are enough crossings in the neighbourhood I live I am satisfied with the quality of the pavements in my neighbourhood
		Access Points	The access points are well distributed in the neighbourhood The access points are clear and well defined
	Block System	Perceived Density	I feel that my neighbourhood is overcrowded There is lack of parks in my neighbourhood
		Mixed Land Use	There is a mix of land uses where I live The neighbourhood center isn't so far from my home/work
Social Cohesion (Aliaa, Yuki et al., Gianmaria)	Participation/ Solidarity	Community	I take part in social activities in my district (Greetings in holidays, weddings, new practice openings …) I participate in cultural events in my district (concerts, exhibitions, festivals…)
		Political	Vote in the elections of community organizations such as neighbourhood committees and village committees I volunteer in charitable associations
		Solidarity	I contact my neighbours constantly I participate with neighbours in solving the building/ street problems
	Safety/ Trust	General trust	I spend much time in public places (parks, squares, etc.) I witness crimes against myself or others in public spaces
		Institutional trust	When I witness an accident, I report to the police When I witness a domestic problem, I report to family/ child services
	Neighbourhood Attachment	Identity	I feel attached to where I live\ work My place is well identified
		Ownership & Memory	I have the feeling of ownership due to the long stay The place around reminds me of good old times
		Belonging	I feel an urge to move out of this neighbourhood I feel isolated in this neighbourhood

Table 9: The structured questionnaire that conducted on a random sample of 193 participants. Source: Researchers.