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Supplementary Information – System Dynamics

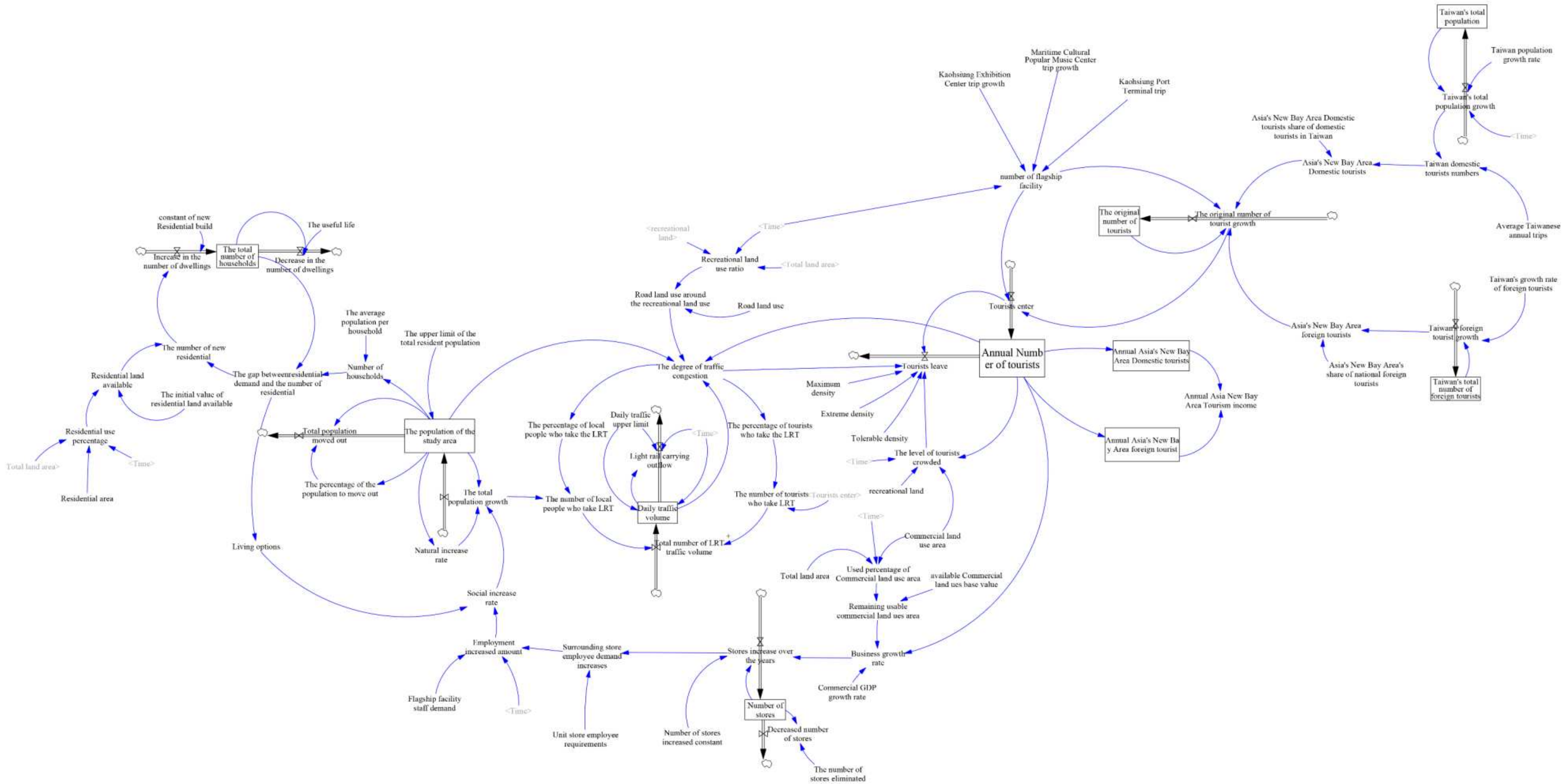

Figure S1. Stock and Flow Diagram for Asia New Bay Area LRT scheme

1.Tourism Subsystem

The tourism subsystem is built with two inputs and one output. The first input focuses on flagship facilities and their annual inflow of tourists. The second input is the projected trend of domestic and foreign tourists' inflow. The output stock is the annual number of tourists in Asia New Bay Area. The variation of annual number of tourists is linked with transport subsystem and economy subsystem in triggering the annual number of tourists' outflow. As mentioned in the 3.1 "System Dynamics modelling" in the main text, the level of road traffic congestion and density of tourists lead to the outflow of tourists in a balancing loop which influencing the output stock of annual number of tourists. The CLD is shown in figure S2 and the data sources for variables are referred to: Taiwan International Ports Corporation, 2017; Chen, 2016; National Statistics, 2017; Flagship facilities' official website.

(1) Flagship facilities Input

To estimate the tourists bringing from flagship facilities and their capacity from 2016 to 2046, this study adopts the initial and projected data from official website of flagship facilities and Kaohsiung Mass Rapid Transit Department as the exogenous variables (Chen, 2016) (Table S1.). The maximum number of tourists on each facility is subject to the ceiling level based on the official data.

(2) Annual number of tourists

The annual number of tourists comprises of two variables: the annual number of domestic tourists and foreign tourists. The initial number of domestic tourists in 2016 is adopted from the domestic tourists' annual trips to Kaohsiung's Asia New Bay Area (National Statistics, 2017). Additionally, the estimation of future domestic tourists for next 30 years is based on the projected population trends in Taiwan in the conservative estimation proposed by the Ministry of Interior of Taiwan that the population are estimated to be declined continuously since 2025 and contributed to a reduction of domestic tourists. For the foreign tourists, they share 13% of annual tourists in Asia New Bay Area according to the historical tourism statistical data in Kaohsiung. The number of annual tourists from both domestic and foreign tourists are then summated to be the inflow of tourists (Table S2.).

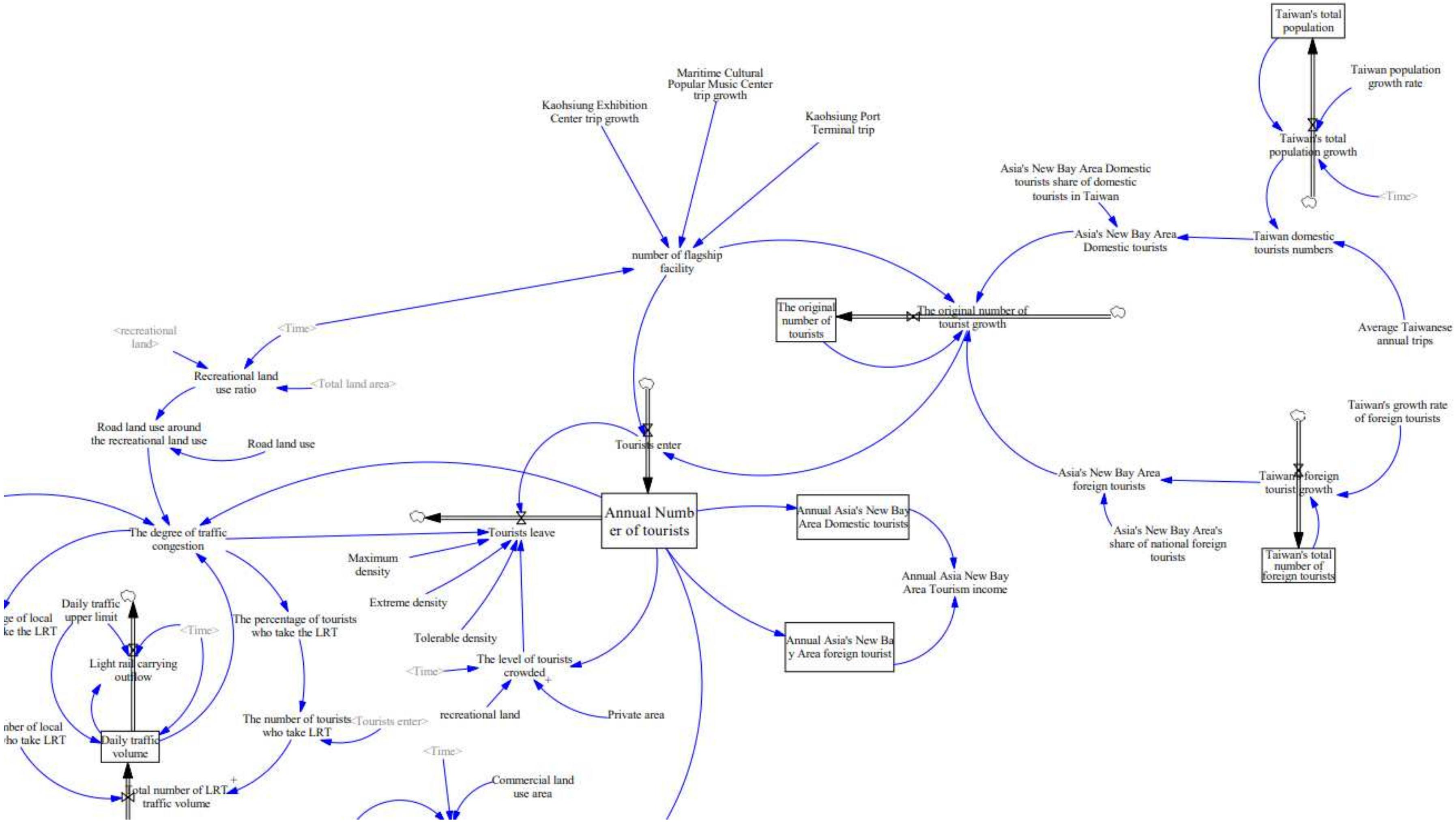

Figure S2. The framework of Tourists subsystem

Table S1. Variables and equations in Tourists subsystem

Item	Formula
Annual Number of Tourists	Tourists enter - Tourists leave Initial value: 6e+06 (people)
Tourists enter	Growth number of flagship facility+ The original number of tourist growth
Tourists leave	IF THEN ELSE(The degree of traffic congestion+ The level of tourists crowded >Maximum density , Tourist enter, (IF THEN ELSE (The degree of traffic congestion+The level of tourists crowded >Extreme density , Tourist enter *0.6, (IF THEN ELSE (The degree of traffic congestion+The level of tourists crowded >Tolerable density, Tourist enter *0.4,0)))))
Maximum density	2.1
Extreme density	1.18
Tolerable density	0.78
The original number of tourist growth	IF THEN ELSE (The original number of tourists>=1e+07, (Asia ‘s New Bay Area Domestic tourists + Asia’s New Bay Area foreign tourists)-Growth number of flagship facilities tourists*0.5, (Asia‘s New Bay Area Domestic tourists + Asia's New Bay Area foreign tourists))
The original number of tourists	The original number of tourist growth
Annual Asia's New Bay Area Domestic tourists	Annual Number of tourists*0.72
Annual Asia's New Bay Area foreign tourist	Annual Number of tourists*0.28
Asia's New Bay Area foreign tourists	Taiwan's foreign tourist growth*Asia's New Bay Area's share of foreign tourists

Asia's New Bay Area's share of foreign tourists	0.13
The level of tourists crowded	(Annual Number of tourists/365)/ (Recreation land use area(time)+Commercial land use area(time))
Annual Asia New Bay Area Tourism income	(Annual Asia's New Bay Area foreign tourist*5700*(RANDOM UNIFORM (0.9, 1.1, 93)) *RANDOM UNIFORM (1, 2, 45)) +(Annual Asia's New Bay Area Domestic tourists*RANDOM UNIFORM (1900,2100, 512))
Kaohsiung Port Terminal trip growth	[(0,0)-(3000,1e+006)],(2016,100000),(2017,576),(2018,575),(2019,845),(2020,864),(2021,1009),(2022,993),(2023,826),(2024,983),(2025,1096),(2026,716),(2027,1065),(2028,1115),(2029,825),(2030,690),(2031,839),(2032,857),(2033,647),(2034,924),(2035,1087),(2036,1265),(2037,1275),(2038,804),(2039,1167),(2040,1417),(2041,1007),(2042,1264),(2043,891),(2044,1484),(2045,983),(2046,1292)
Kaohsiung Exhibition Center trip growth	[(0,0)-(3000,1e+007)],(2016,75000),(2017,7808),(2018,9472),(2019,9660),(2020,9737),(2021,8465),(2022,10553),(2023,9370),(2024,9424),(2025,11366),(2026,9335),(2027,10505),(2028,11693),(2029,10676),(2030,12260),(2031,12220),(2032,11170),(2033,10970),(2034,13630),(2035,12610),(2036,13320),(2037,13840),(2038,13740),(2039,13370),(2040,15000),(2041,14780),(2042,13910),(2043,16150),(2044,13940),(2045,17240),(2046,16800)
Growth number of flagship facilities tourists	Kaohsiung Exhibition Center trip growth (Time)+Kaohsiung Port Terminal trip (Time)+Maritime Cultural Popular Music Center trip growth (Time)
Maritime Cultural & Popular Music Center trip growth	[(0,0)-(3000,200000)],(2016,350000),(2017,3791),(2018,4088),(2019,4459),(2020,4363),(2021,4233),(2022,5347),(2023,4792),(2024,5933),(2025,5932),(2026,5492),(2027,4633),(2028,4834),(2029,6510),(2030

	,5665),(2031,5100),(2032,7033),(2033,6428),(2034,6077),(2035,6635),(2036,5980),(2037,7105),(2038,6760),(2039,6662),(2040,6890),(2041,8194),(2042,7125),(2043,7683),(2044,9090),(2045,9326),(2046,10378)

Table S2. The figure of annual tourists of flagship facilities

Time (Year)	Kaohsiung Exhibition Center trips	Kaohsiung Port Terminal trips	Maritime Cultural & Popular Music Center trips	Kaohsiung Exhibition Center trips growth	Kaohsiung Port Terminal trips growth	Maritime Cultural & Popular Music Center trips growth
2016(opening)	750000	100000	350000	-	-	-
2017	766616	101521	357424	7808	576	3791
2018	785236	102960	366478	9472	575	4088
2019	803251	104394	375896	9660	845	4459
2020	821288	106201	385262	9737	864	4363
2021	839994	107944	394362	8465	1009	4233
2022	860141	109921	404167	10553	993	5347
2023	879935	111759	413398	9370	826	4792
2024	900326	113442	423715	9424	983	5933
2025	922152	115219	434531	11366	1096	5932
2026	941295	116634	445680	9335	716	5492
2027	963384	118804	456844	10505	1065	4633
2028	984967	121099	466647	11693	1115	4834
2029	1006680	122683	479647	10676	825	6510
2030	1029980	124513	490685	12260	690	5665
2031	1054690	126026	502964	12220	839	5100
2032	1078660	127870	516185	11170	857	7033
2033	1100980	129447	529226	10970	647	6428
2034	1125650	131120	543216	13630	924	6077
2035	1150570	133125	555416	12610	1087	6635
2036	1176930	135392	567751	13320	1265	5980
2037	1204070	137992	580648	13840	1275	7105

2038	1231680	139822	593594	13740	804	6760
2039	1258920	141984	608938	13370	1167	6662
2040	1287520	144729	624957	15000	1417	6890
2041	1317060	147154	641332	14780	1007	8194
2042	1344290	149760	655037	13910	1264	7125
2043	1374200	152012	669492	16150	891	7683
2044	1404070	154582	687660	13940	1484	9090
2045	1438020	156578	707263	17240	983	9326
2046	1470540	159357	726069	16800	1292	10378

Table S3. The number of annual tourists on scenarios (thousand)

TIME(year)	BAU(two-phases LRT)	CLRT(without two phases LRT)	C2LRT(without second phase LRT)
2016	6000	6000	6000
2017	6530	6530	6530
2018	6674	6674	6674
2019	6837	6837	6837
2020	7021	6989	7021
2021	7227	7127	7227
2022	7460	7282	7460
2023	7723	7458	7723
2024	8021	7656	8021
2025	8344	7881	8344
2026	8599	8136	8599
2027	8887	8424	8887
2028	9212	8749	9212
2029	9580	9118	9580
2030	10000	9537	10000
2031	10476	10014	10476
2032	11019	10556	11019
2033	11635	11173	11635
2034	12338	11875	12338
2035	13137	12675	13137
2036	14047	13585	14047

2037	15083	14621	15083
2038	16263	15491	16263
2039	17607	15491	17607
2040	19138	15491	19138
2041	20882	15491	20425
2042	22869	15491	20425
2043	22869	15491	20425
2044	22869	15491	20425
2045	22869	15491	20425
2046	22869	15491	20425

2.Transport Subsystem

The transport subsystem focuses on the patronage on LRT and the number of tourists on road traffic. Based on the hybrid discrete choice model conducted in previous study, there are 59.75% of tourists versus 23.35% of local citizens prefer to take LRT in Kaohsiung (Yang, 2014), the daily patronage of LRT is summated in terms of locals and tourists who take LRT. As for the carrying capacity of LRT, the upper limit of daily passenger is inputted as an exogenous variable according to the government plan (Kaohsiung rapid transit corp., 2017; Tourism Bureau, 2015). The upper limit of passenger will reach the ceiling level at 21,250 per day since 2019 in the C2LRT scenario which excludes the installation of extra carriages. Following up on the daily patronage limit, the exceeded number of tourists are affiliated to the volume of road traffic which contributes to the variation of traffic congestion level. It links with tourism subsystem in causing an outflow of the annual number of tourists when the patronage of LRT reaches the maximum carrying capacity.

Under the dynamic equilibrium in the system, the operation of light rail transit is the regulation factor that eases the severeness of traffic congestion. The level of traffic congestion is calculated based on the road traffic density and interpersonal distance preference (Sorokowska, 2017). Three levels of density are adopted in the SFD are maximum, extreme and tolerable density, inputted as 2.1 (person/m^2) based on the ceiling level of tourists' density preventing infinite tourists' inflow, 1.18 (person/m^2) as the severe density, and 0.78 (person/m^2). Each range of the density contributes to the tourists leaving rate in order to evade the congestion influence (Institute of Transportation, 2011, Shailes, A. et al., 2001). Similarly, for the level of tourists crowded variable in stock-flow model, it is estimated by an annual average ratio of tourists to recreational and commercial land area.

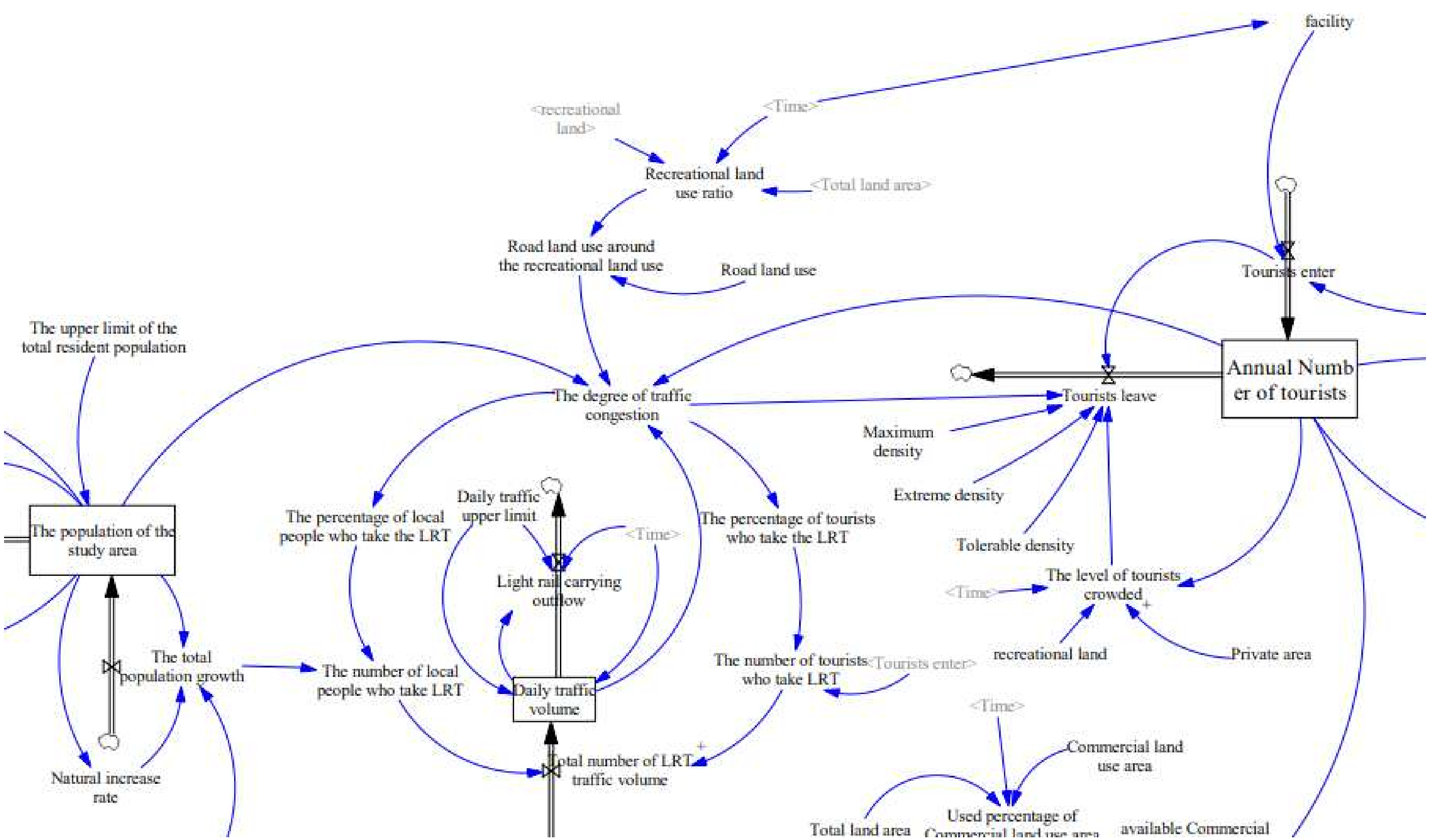

Figure S3. The framework of transport subsystem

Table S4. Variables and equations in transport subsystem

Item	Formula
Daily traffic volume	IF THEN ELSE (Daily traffic volume>=Daily traffic upper limit (Time), 0, (Total number of LRT traffic volume-Light rail carrying outflow))
Light rail carrying outflow	IF THEN ELSE (Daily traffic volume>=Daily traffic upper limit (Time)*0.8, Daily traffic volume*0.1, Daily traffic volume*0.05)
Daily traffic upper limit	Simulation1: Original [(0,0) -(3000,40000)], (2016,20000), (2019,21250), (2027,30600), (2046,30600) Simulation2: Cancelation of 2 phase LRT [(0,0) -(3000,40000)], (2016,20000), (2019,21250), (2027,21250), (2046,21250)
Total number of LRT traffic volume	(The number of local people who take LRT +The number of tourists who take LRT/365)
The number of local people who take LRT	The total population growth*The percentage of local people who take the LRT
The percentage of local people who take the LRT	IF THEN ELSE (The degree of traffic congestion>1, 0.2335*The degree of traffic congestion, 0.2335)
The degree of traffic congestion	(Annual Number of tourists/365+The population of the study area*0.5-Daily traffic volume)/Road land use around the recreational land use
The percentage of tourists who take the LRT	IF THEN ELSE (The degree of traffic congestion>1, The degree of traffic congestion*0.5981, 0.5981)
The number of tourists who take LRT	The number of tourists who take LRT
Road land use around the recreational land use	Road land use*Recreational land use ratio

Item	Formula
Recreational land use ratio	recreational land (Time)/Total land area
Recreational land (Input by Netlogo)	[(0,0)-(3000,2e+006)],(2016,1.0368e+006),(2017,1.016e+006),(2018,1.0024e+006),(2019,991200),(2020,976400),(2021,966800),(2022,953600),(2023,945200),(2024,924400),(2025,924400),(2026,914400),(2027,912400),(2028,903600),(2029,894000),(2030,888800),(2031,888400),(2032,867600),(2033,858800),(2034,856400),(2035,853200),(2036,846400),(2037,844400),(2038,840800),(2039,833600),(2040,823200),(2041,820400),(2042,818800),(2043,814800),(2044,809600),(2045,804800),(2046,804800)
Road land use	527600

3. Population and Housing subsystem

The population and housing subsystem are inter-related with transport, economy subsystem. The annual residential population is related to: (1) natural increase/decrease of population, (2) traffic subsystem: road traffic congestion level and traffic volume of light rail, (3) economy subsystem: social increase/decrease of population, (4) housing subsystem: the ceiling on residential population and households. The Housing Subsystem depicts the households, residential land use, and residential population limit. The number of available residential land come from the annual land use transition run in ABM simulation as the capacity of local residential development. The CLD framework is shown in figure S4. The data sources for parameters calculation and setting include Jiang, 2014; Socio-Economic Spatial Database; Statistical yearbook of Kaohsiung city 2011; Department of Statistics, Ministry of the Interior.

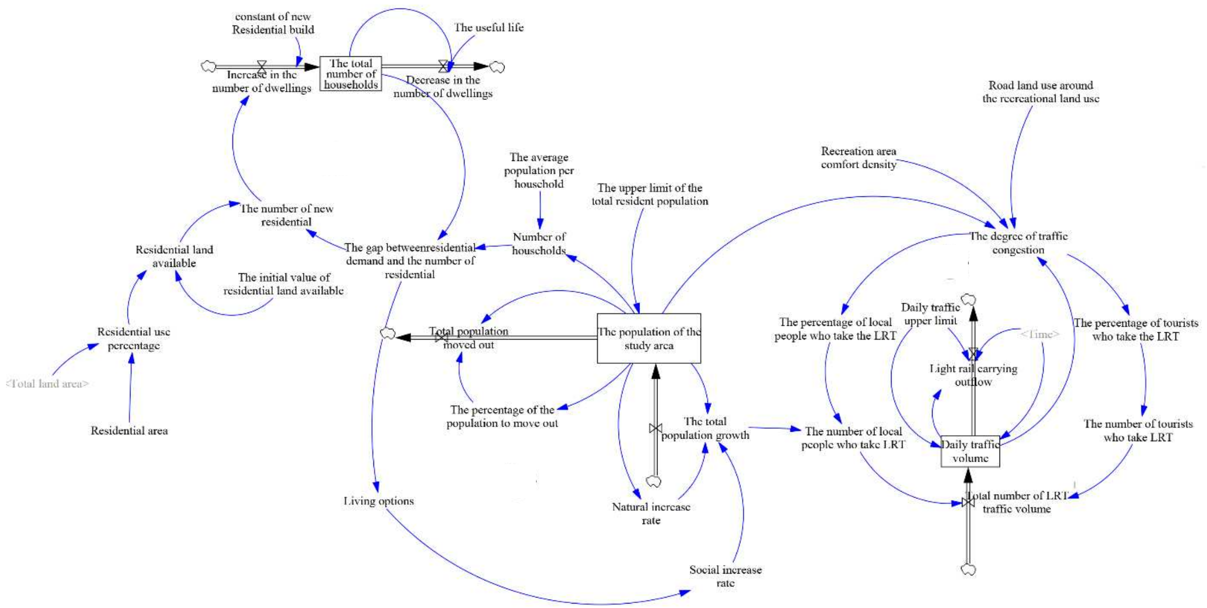

Figure S4. The framework of Population and Housing subsystems

Table S5. Variables and equations in population and housing subsystem

Population

Items	Formula
The population of the study area	IF THEN ELSE (The population of the study area>=The upper limit of the total resident population,0, The total population growth-Total population moved out)
Total population moved out	Total population moved out
The total population growth	The population of the study area*Natural increase rate + Social increase rate
The percentage of the population to move out	IF THEN ELSE (The population of the study area<=150000, RANDOM UNIFORM (0.004, 0.009, 25), RANDOM UNIFORM (0.002, 0.003, 200))
Total population moved out	The percentage of the population to move out*The population of the study area
Natural increase rate	IF THEN ELSE (The population of the study area>=120000, RANDOM UNIFORM (-0.002, 0.001, 89), RANDOM UNIFORM (0.001, 0.006, 99))

Housing

Item	Formula
The total number of households	IF THEN ELSE (The total number of households<=0, 0, (Increase in the number of dwellings-Decrease in the number of dwellings))
Decrease in the number of dwellings	IF THEN ELSE (The total number of households<=0, 0, (The total number of

Item	Formula
	households/The useful life))
The useful life	60 (years)
Increase in the number of dwellings	constant of new Residential build*The number of new residential
Constant of new Residential build	1
The gap between residential demand and the number of residential	Number of households-The total number of households
The upper limit of the total resident population	183,600 (people)
The average population per household	2.42 (The average population per household in study area)
Number of households	The population of the study area/The average population per household
The number of new residential	IF THEN ELSE (The gap between residential demand and the number of residential<0, 0, (Residential land available+1) *The gap between residential demand and the number of residential)
Residential land available	The initial value of residential land available-Residential use percentage
The initial value of residential land available	0.3
Residential use percentage	Residential area / Total land area
Residential area (Input by Netlogo)	1.81033e+06 [(0,0)-(3000,3e+006)],(2016,2.0416e+006),(2017,2.0608e+006),(2018,2.076e+006),(2019,2.0952e+006),(2020,2.1164e+006),(2021,2.1392e+006),(2022,2.1536e+006),(2023,2.1744e+006),(2024,2.1976e+006),(2025,2.2112e+006),(2026,2.2216e+006),(2027,2.24e+006),(2028,2.2676e+006),(2029,2.2844e+006),(2030,2.3028e+006),(2031,2.3204e+00

Item	Formula
	6),(2032,2.3412e+006),(2033,2.3616e+006),(2034,2.3784e+006),(2035,2.3976e+006),(2036,2.41e+006),(2037,2.4308e+006),(2038,2.4564e+006),(2039,2.4784e+006),(2040,2.4992e+006),(2041,2.5188e+006),(2042,2.5348e+006),(2043,2.56e+006),(2044,2.5808e+006),(2045,2.5932e+006),(2046,2.5932e+006)

4.Economy subsystem

For the Economy subsystem, as the scale of business stimulates the growth of tourism and population, it focuses on the number of stores in Asia New Bay Area which is linked by available commercial land, elimination of stores, GDP rate, and tourists' trips. The number of stores contributes to the employment opportunities while drives the social increase/decrease of population. The annual available commercial land use is adopted from the ABM simulation as an exogenous variable of the capacity of business i.e. the number of stores. The CLD framework is shown in figure S5. The data sources include: Department of Statistics, Ministry of the Interior; Industry and Service Census, 2015;

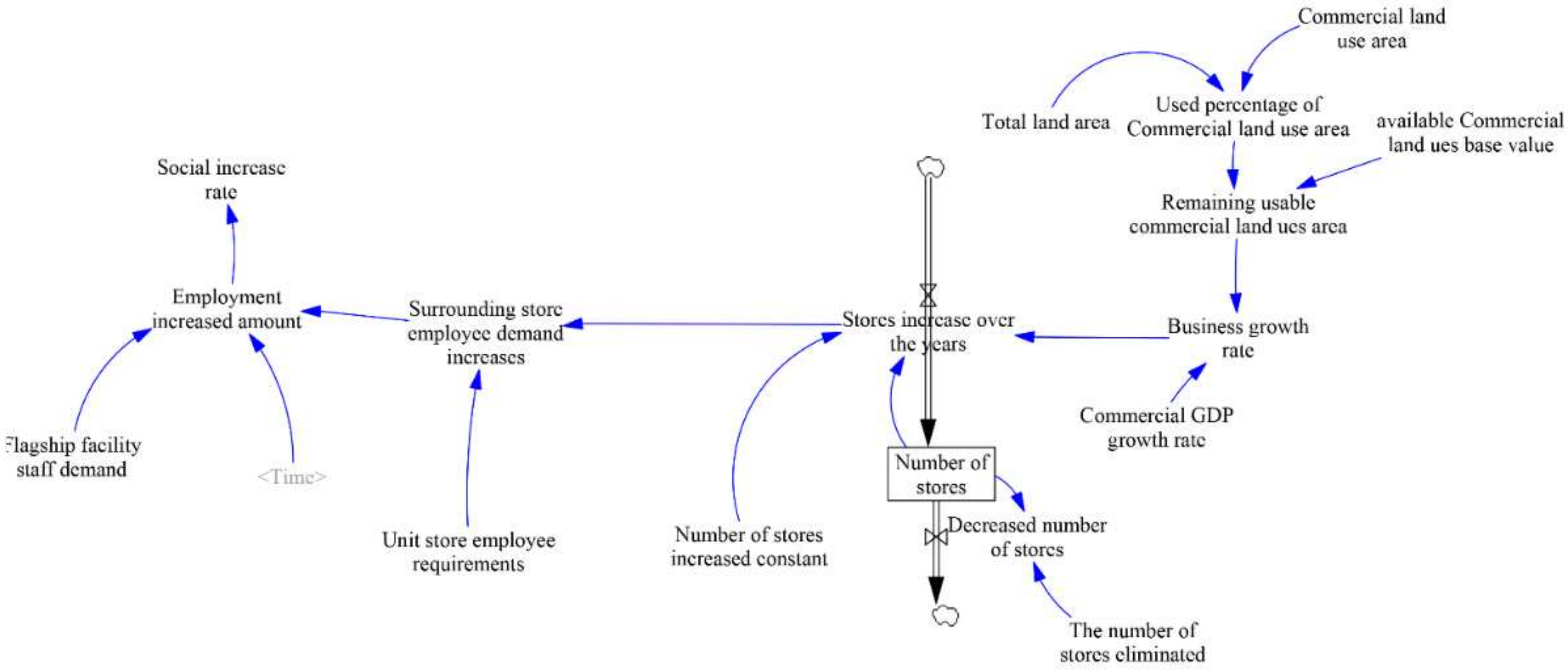

Figure S5. The framework of economy subsystems

Table S6. Variables and equations in economy subsystem

Item	Formula
Number of stores	Stores increase over the years-Decreased number of stores
Stores increase over the years	Business growth rate*Number of stores*Number of stores increased constant
Decreased number of stores	Number of stores/The number of stores eliminated
The number of stores eliminated	INTEGER (RANDOM UNIFORM (30, 40, 77))
Commercial land use area (Input by Netlogo)	[(0,0)-(3000,600000)],(2016,471200),(2017,472800),(2018,476800),(2019,479200),(2020,481200),(2021,483600),(2022,482800),(2023,483600),(2024,480400),(2025,486400),(2026,488800),(2027,493200),(2028,497600),(2029,500800),(2030,503200),(2031,504400),(2032,502400),(2033,501200),(2034,507600),(2035,508400),(2036,513600),(2037,518400),(2038,519600),(2039,517200),(2040,514800),(2041,520000),(2042,524400),(2043,524000),(2044,524000),(2045,524000),(2046,524000)
Used percentage of Commercial land use area	Commercial land use area / Total land area (m^2)
Total land area	7.8224e+06 (m^2)
Available Commercial land use base value	0.1
Remaining usable commercial land use area	available Commercial land use base value-Used percentage of Commercial land use area
Business growth rate	(Remaining usable commercial land use area+(IF THEN ELSE (Annual Number of tourists<=8e+06 , Commercial GDP growth rate, Commercial GDP growth rate*1.01)))

Item	Formula
Commercial GDP growth rate	RANDOM UNIFORM(0.0124, 0.0325 ,123)
Number of stores increased constant	1
Surrounding store employee demand increases	Stores increase over the years*Unit store employee requirements
Unit store employee requirements	4
Employment increased amount	Surrounding store employee demand increases + Flagship facility staff demand (Time)
Flagship facility staff demand	[(0,0) -(2046,2000)], (2016,1000), (2017,1000), (2018,1500), (2019,1500), (2020,1000), (2021,1000), (2022,500), (2023,500), (2024,0), (2046,0)
Social increase rate	Employment increased amount*RANDOM UNIFORM (0.6, 0.7, 88) +Living options

Agent-based model

To illustrate the agent-based model in orderliness, the ODD protocol is adopted to explain the model from the overview, design concepts to the details (Grim et al., 2010).

1. Overview

1.1 Purpose

The ABM simulation aims at investigating the land use transition and tourists' behaviours around the implementation of LRT from 2016 to 2046.

1.2 Entities, state variables, and scales

The simulation model consists of three entities of environment, grid cells, and agents. Firstly, the environment includes CA-markov and touristic suitability that function as the overall condition to drive the dynamics of grid cells. Secondly, as the simulated spatial unites, grid cells are characterised by the land use type and touristic suitability degree as descriptors of environmental condition varying over space. Thirdly, agents are represented by the annual number of tourists in ABM, the state variable of agents is characterised by the location of grid cells where tourists are situated. A time step in ABM simulation denotes 1 year. A grid cell represents 20m x 20m area in reflecting the areal building unit. The simulation is run in Netlogo 6.0.2.

1.3 Process overview and scheduling

The simulation consists of an initialization setup model and seven sub-models run chronologically as the following order in every simulation time step: "Tourists update", "CA-markov", "Update plots", "Tourism potential", "Tourists movement", and "Export plots and environment". This section introduces an overview of the process while the detailed description on sub models will be delineated in the sub-model section.

Setup: Inputs the number of tourists, land use map, and touristic suitability map into ABM.

Tourists update: Inputs annul number of tourists from SD model.

CA-markov: Executes CA-markov on land use transition based on the transition matrix and the spatial proximity rule.

Update plots: Updates the plots of tourists and the amount of each land use in the observer interface.

Tourism potential: Updates the touristic suitability degree based on the previous land use change.

Tourists movement: Tourists adapt the change on their surrounding touristic suitability degree and move.

Export plots and environment: This part is based on two actions. First, it exports the simulated environment as plot. Second, it exports the amount of touristic related land use which serves as feedback on the stock-flow model.

2.Design Concept

2.1 Basic principles

The land use transition is based on the CA-markov theory with the pre-defined transition matrix and the proximity of land use state to assign the transition likelihood to spatial units. Tourists' travel behaviours are grounded in the hypothesis of tourism movement priority, as the travel choices of tourists is led by a touristic suitability degree in proximity to move into destinations with a higher value (Burton, 1995; Lau, G., & McKercher, B. ,2006)

2.2 Adaptation

Two adaptation behaviours of grid cells and agents are presented. First is the land use transition laid in the sub-model "CA-markov", each cell changes to another type of land use based on the markov transition probability and the surrounding state of land use. Secondly, in the sub-model "Tourists movement", the tourists adapt to the touristic suitability degree of their surrounding cells as the spatial travel pattern of tourists.

2.3 Prediction

Through the simulation run in annual time step, the model predicts the future tourism environment across space and time, i.e. the travel patterns of tourists and the state of land use.

2.4 Observation

Throughout the simulation, the number of tourists is adopted the variable from the SFD as the number of simulated agents, likewise, the annual amount of touristic related land use is exported from the simulation to feed into the SFD as the capacity of tourism development.

3. Details

3.1 Initialization

The initialization comprises four parts. Firstly, the initial temporal state of the model is set as 2016 (tick=0 in Netlogo environment). Secondly, the annual number of tourists (600 thousand) is inputted in the simulation environment. Thirdly, the initial grid cells are characterised by the state of land use according to their location. The nine types of land use and total amount are : Rail (76,400m^2), Road (527,600m^2), Commercial (469,600m^2), residential (2,004,400m^2), Industrial (778,000m^2), Cultural (5,600m^2), recreational (596,000 m^2), idle (1,229,200 m^2), Other (2,135,600 m^2) including (agriculture, forests, ports, rivers, government agencies, public facilities, schools, medical). Fourthly, the initial touristic suitability map is inputted based on the classification from fuzzy membership.

3.2 Input data

Grid cells' initial state of land use is referred to the 2014 National Land Use Investigation Data of Kaohsiung. The markov transition probability matrix is calculated by the Tabulate Area function in Geographical Information System ArcGIS 10.2 with source data of 2006 and 2014 National Land Use Investigation Data of Kaohsiung.

3.3 Sub models

Setup: In the setup, it inputs the number of tourists, land use map, and touristic suitability map. Firstly, the number of tourists in 2016 is inputted into the model. To mimic the general movement trend of tourists and ensure the computational efficiency, the number of tourists are divided by 10 thousand as the simulated entity in Netlogo. Secondly, the land use type of cells in 2016 is inputted, the global variable indicating the type of land use, display colour and symbol are set as figure S6. Thirdly, the initial touristic suitability degree of cells is imported.

Tourists update: Executing from the sub models of "Tourists update" to "Export plot", it is programmed inside a for loop with asynchronous update. For every simulation year, the number of tourists will be updated based on the annual number of tourists' variable in the System Dynamics Model.

CA-markov: The land use change probability of cells are executed by the Markov transit matrix and proximity rule set in Netlogo. The proximity rule is grounded in 3x3 Moore spatial contiguity and is based on the transition probability ranges from 0% to 100%. Each cell draws a number between 0 to 100 in each year that represents the transition probability to another land use, if equal or higher than 4 out of 8 neighbor cells are same as the drawn transition land use, the cell will change to that type of land use in next simulation year.

Update Plots: It updates the plots of the number of tourists and land use in the observer interface.

Tourism potential: This part updates the touristic suitability degree based on the previous land use change. After the land use transition, if the cell changes from non-touristic related land use (residential, industrial, idle) to touristic related land use (commercial, cultural, recreational) the touristic suitability degree of the cell will be added 1.Reversely, the suitability degree of cell will be deducted 1.

Tourists movement: In this model, the movement of tourists is based on the touristic suitability degree of their situated cells and their surrounding cells. The spatial range of surround cell is defined as Moore 5x5 contiguity. If there is any surrounding cells' suitability degree are higher than itself, the tourist will move to that cell, if not, the tourist will remain unmoved.

Export plot and environment: In every simulated year, the plots of environment and the amount of land use in commercial, residential, and recreational is exported. The latter is imported as a variable in the stock-flow model influencing the capacity of housing, commercial, and tourism development.

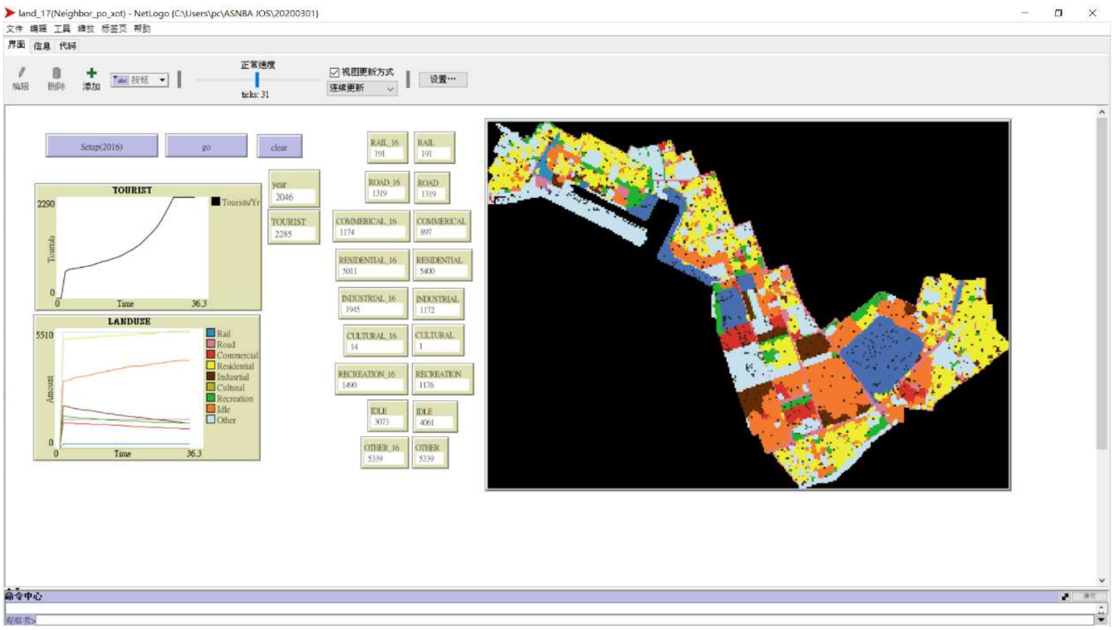

Figure S6. ABM's simulation interface in this case study

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