行政院國家科學委員會專題研究計畫 成果報告

土地混合使用概念、指標、影響機制的多面向再檢視
研究成果報告(精簡版)

計 畫 類 別 ：個別型
計 畫 編 號 ：NSC 97-2410-H-004-105-
執 行 期 間 ：97 年 08 月 01 日至 99 年 07 月 31 日
執 行 單 位 ：國立政治大學地政學系

計 畫 主 持 人：蔡育新

計畫參與人員：碩士班研究生-兼任助理人員：林煥軒

處 理 方 式 ：本計畫可公開查詢

中 華 民 國 99 年 10 月 27 日

行政院國家科學委員會補助專題研究計畫成果報告

土地混合使用概念、指標、影響機制的多面向再檢視

計畫類別：個別型計畫
計畫編號：NSC 97-2410-H-004 -105 -
執行期間：97 年 8 月 1 日至 99 年 7 月 31 日

執行機構及系所：政治大學地政學系

計畫主持人：蔡育新
共同主持人：
計畫參與人員：林煥軒

成果報告類型(依經費核定清單規定繳交)：精簡報告

本計畫除繳交成果報告外，另須繳交以下出國心得報告：
□赴國外出差或研習心得報告
□赴大陸地區出差或研習心得報告
□出席國際學術會議心得報告
□國際合作研究計畫國外研究報告

處理方式：除列管計畫及下列情形者外，得立即公開查詢
□涉及專利或其他智慧財產權，□一年□二年後可公開查詢

中　　華　　民　　國 99 年 10 月 26 日

解析可及性、密度與混合使用的概念、指標與應用

Disentangling Accessibility, Density and Mixed Use -- Concepts, Measures, and Applications

The concept of accessibility can provide a useful measurement of the joint result of what and how can be reached from a place, such as home. Accessibility can, when appropriately defined, be directly related to the intergration of both the qualities of the transport system (i.e., travel speed and travel distance) and the qualities of the land use system (e.g. functional densities and mixes), that is accessibility can be the result of transportation and land use. In land use and transportation areaa: one definition of accessibility is‘the ease and convenience of access to spatially distributed opportunities with a choice of travel’ (U.S. Department of Environment, 1996). The difficulty is how to quantify this‘ease and convenience,’which is particularly complex as it is a function of varying types of trips and activities and most likely varies across people according to their tastes and preferences.

Meaning of aceessibility

At the same time, it can be directly related to economic goals (access to workers, customers, suppliers), social goals (access to employment, goods and services, social contacts), sustainablity goal throught low transportation energy consumption and air pollution as a result of sustainable urban form (Bertolini, Clercq, and Kapoen, 2005, p.207).

Types of accessibility and the underlying meanings.

A range of accessibility types exist for examing different aspects. For example, in transportation, people primarily travel for activities to participate in, the most part not just for the sake of it, but in order to participate in spatially disjointed activities (e.g. living, working, shopping, or visiting in different places); in other words, transportation help resolve the spatial capacity limit issue of land through chaneling different points in space. Accessibility measures with a transport and land use component can be divided in three broad types: cumulative-opportunities accessibility, gravity-based accessibility, and utility based accessibility (Handy and Niemeier, 1997; Geurs and Ritsema van Eck, 2001; Halden, 2002; Geurs and van Wee, 2004). Other than culmulitive opportunities, closest opportunity is another type of accessibility, which is a one-to-one type of accessibility.

1. Culiulative-opportunities accessibility

Why accessibility of accumulated opportunities or one-to-many type of accessibility works is based on the assumption that, for example, people want to have a choice among as large the number and as diverse a range of activities as possible, as opposed to the cloest opportunity. Example includes the total number of employment opportunities within 30 minutes by transit. The advantages of this measure primarily exist in its

ease to compute and understand. However, this measure of accessibility is highly sensitive to the size of the range (in the example, 30 minutes) and the representation of opportunities (in the example, total employment), both of which are difficult to determine, that is what opportunities or dis-opportunities to measure (See below).

Choice of opportunities: This notion of opportunity seems concern about supply of target use, without considering consumption or demand side, e.g., residents (Ratio: supply/demand or demand/supply). If it is concerned, the measure can be modified into service level. Such accessibility concerning demand side includes jobs/housing balance, measuring jobs accessibility standerized by job demand represented by housing amount, and per capita miles of bicycle facility infrastructure, (Nelson and Allen, 1997), representing accessibility of bicycle facility adjusted by number of potential users.

Choice of distance: What should be considered in chosing distance or boundary for calculating culiulative-opportunities-based accessibility may depend on priori knowledge/hypothesis on the geographic scale at which the accessibility in question is most likely to affect the phenomenon in question. The primary issue of adopting a cumulative opportunities measure exists in the choice of the cut-off travel distance or time. Past literature, however, provide limited rule on how to make this choice (Handy and Niemeier, 1997). For this chosen distance/boundary, it should be meanful for the evaluation in question; hence the distance/boundary may very from discipline to discipline, or from topic to topic.

How the distance/boundary is chosen largely depend on spatial scale that the impact may occur, which may be derived from theory/logic, accumulated knowledge based on empirical evidence (Bertolini, Clercq, and Kapoen, 2005, p.211), or sensitivity test, leading to a complicated boudnary/distqance choosing issue not very well addressed in general. For example, based on theory or logical reasoning, to evalate local land use policy to promote walking for non-work activities, the distance choesen to evaluate land use setting may be more like within walking distance, generally five-minute walk or 400 meters. If it is for work trip, the distance could be 30-minute commute distance (Bertolini, Clercq, and Kapoen, 2005, p.211). What is even more complicaed is multiple-laced cause-effects are involved, such as mixed-use on housing prices, which involves ammenities of serving land uses, and negative impact of noise, smell, affecting at various geographic scale, addressed in more detailed below. If distance of impact matters, the concerns of distance may be interdiscinplenary, e.g., mixed use causing negative effect may occur at close proximity, however, its benefit may occur at larger proximity.

Choice of accessibility: Choice of accessibility may differ in different reseach or fields, such as transportation, health, land value, and urban diaster primarily due to diffent concerns, such as description of urban settings, such as land use, transportation as an individual input, or as a whole, or different cause-effect considerations. For example, in assessing land-use-transporation relationship, the theory is that higher development density and reduced segregation of land uses should reduce the distance between the location of activities that require travel. In turn, shorter trips are thought to be more likely carried out on foot or via transit (Chatman, 2003).

Distance-based or travel time/isochrone accessibility? Travel costs, and most importantly travel time,

rather than travel distance, increase the level os accessibility of the same land use at different locations. In the cut-off-point thinking, in the form of total daily travel time budgets, travel-to-work time budgets etc, accessibility can be defined as‘the amount and the diversity of places of activity that can be reached within a given travel time and/or cost (Bertolini, Clercq, and Kapoen, 2005, p.209). Distance can be furthered divided into direct/Eucledean distance or network distance; the latter is more related to travel behavior, while the latter may concerns amenities impact, such as noise, smell, vibration. When accessibility incorporate travel time, such as isochrone accessibility, the index change of the output of land use along to land use and transportation together. Here the transportation incorporated majorly concern mobility affected by highway levels, and level of service. Hence, the impact evaluated using isochrone accessibility can not single out that of land use, or transportation alone.

The negative side of accessibility, or disaccessibility: Accessibility is more related to positive impact of land use rather than negatives. Hence its term may need to be modified in different situation since accessibility by nature means ammenity to which how can be reached. it is called opportunities when it is needed, but called NIMBY when it is not needed.

Typology of mixed use is shown below:

- Measure accumulating opportunity (Total) within a chosen boundary:
    - Total quantity of target use (Total quantity) within a chosen boundary:
        - Total number of jobs accessible within 30 minutes by car or transit (Quade and Douglass (1993)).
        - Percent of residents with businesses or institutions within ½ a block of their Homes. Aggregated measure for metropolitan area, composed of each residents (Mix, Knapp, 2003). Disaggregated measure of the accessibility of each resident, i.e,, whether there is businesses or institutions within1/2 a block of their home (dummy variable). The aggregated index is certainly accessibility indicator; The disaggregated indicator is intermingled of both, but maybe more of an accessibility than an mixed-use indicator since it is more accessibility-driven.
        - Percent of residents with“satisfactory”neighborhood shopping within one mile (Mix, Knapp, 2003). Mixed use is barely measured at very large area. This is more an accessibility index.
        - Fraction of population with neighborhood shopping within ¼ mile (Holdsclaw 1994)
        - Proportion of single family housing units within a TAZ that are located within ¼ mile of a commercial use (Song and Knaap, 2003)
        - Percent of residents with a public elementary school within one mile (Mix, Knapp, 2003).
        - Availability of convenience services within ¼ mile of a transit station (Cambridge Systematics, 1994)
        - Number of commercial and nonresidential buildings within 300 feet of a residence (Cervero 1996)
        - Transit-oriented residential density (Accessibility): number (or portion) of housing units that are within a ¼ mile walk of a transit stop (Mix, Knapp, 2003) (Percentage of trip origins within TOD area)
        - Transit-oriented employment density: average number (portion) of employees per net

nonresidential acre that is within a ¼ mile walk of a transit stop (Mix, Knapp, 2003)((percentage) TOD commercial opportunities)

- Total quantity of types of target uses (Total number of types) within a chosen boundary:
- Closest opportunity of one type of target (Distance)
- Distance to the CBD (Quade and Douglas (1996))

2. Gravity-based accessibility

A possibly more delidated calibration of distance than the cut-off travel distance is weighted distance based on the reasonable relationship that the impacts fades along with distance. The opportunity can be weighted by incorporating distance in gravity model (Kockelman, 1997), which may lead to modified indexes. This is an revolution from dummy-based (0/1) variable, i.e., within or outside of the distance of choice, to ratio variable as long as distance is concerned. Further more, as long as data are available, opportunity can also be weighted actual friction, for example network distance or street network, instead of direct distance. This gravity-based accessibity and the above cumulative-opportunity based accessibility indexes are the results of land use along, that is it measures the output of urban form characteristics, mostly density and mixed use. Hence they are more appropriate when quantifying urban form alone than the accessibility incorporating travel time, which is an integrated accessibility of land use and transportation supply.

3. Utility-based accessibility

For practical planning purposes, an accessibility measure are suggested to meet two basic requirements: being consistent with the uses and perceptions of the residents, workers, and visitors of an area in question. Different evaluation research may have different stakeholders, and same stakeholder may hold different stake at different evaluation, and it must be understandable to those taking part in the plan-making process. Accessibility that meet the requirement may need to incorporate the characteristics of the demanders or stakerholders. Opportunities is weighted by user characteristics, e.g., personal socio-economic characteristics (Handy and Niemeier, 1997; Geurs and Ritsema van Eck, 2001; Halden, 2002; Geurs and van Wee, 2004; Bertolini, Clercq, and Kapoen, 2005, p.210). As a results, this type of utility-based accessibility incorporate not only land use characteristics and/or transportation characteristics, but also socio-economics characteristics of demanders; in other words, accessibility is a joint result of land use, transportation of the supply side, and socio-economics characteristics of demanders.

4. Activity-based accessibility/ABA)

Opportunities is weighted by user activity behavior (Dong, et al., 2006). The issue concerning the ABA involves data demanding, such as trip diary, characteristics of users. ABA measures all activities in which an individual engages, incorporating constraints such as scheduling, and such travel characteristics as trip chaining. Hence, the ABA is significantly different from the traditional trip-based accessibility, which focus on one trip purpose without incorporating scheduling or trip chaining (Dong, et al., 2006). Equally important, the ABA, like all utility-based accessibility measures, can capture taste heterogeneity of each individual (Dong, et al., 2006).

In what regards do variables intermingled with land use, transporation, and even socio-econmic variables, e.g., isochrone accessibility and above better or worse than in the form of invidivual variables chararacterizing land use, transortation, or socio-economic variables, and their mutula interaction forms. The latter can surely be input variables, and the former can be taken as either input or output variables. The advantages can be discussed from aspects of both ease of data collection, as well as clearance of singling out impact of each individual acpect, or interaction of two input variables. When connected with 3D, density and diversity concerns land use, the design may concern both land use and transportation plan or design. If design concern routing or block design, it is more related to transportation; however it concerns quality of walking settings, then it iis related to urban desing/pland/land use elements.

Another thinking dissecting 3D is that density and diversity, utilizing gravity model as thinking framework, concerns nominator, which design associated with travel distance or time, such as street networking concerns denominator.

Aggregated accessibility vs. disaggregated accessibility: Accessibility should be weighted by users, such as population, to gain overall accessibility level, e.g., neighborhood accessibility should be multiplied population or othre targets group so gain metropolitan accessibility. Hence, wheter mixed use proportions is in proportion to over distributions, or higher proportion of serving jobs, may depend on the overall accessibility.

Meaning of density

For land use and transportation planners, density measures provide information on the number of potential trip origins and destinations (Knapp et al., 2005). Density can be a standardized accessibility index, i.e., accessibility within the same boundary. It measures space-standardized opportunity of one type of target in an unit area (opportunities/area). To provide accessibility in terms of quantity. It may be regarded as space-standardized index of quantity-based accessibility. It can be for one type of destinations, such as population (as customers), household (as household-based customers), or multiple destinations, such as jobs, composed of all sorts of land uses, or total person density, composed of residents plus jobs per acre.

Typology of density is shown below:

- Measure space-standardized opportunity of one type of target in an unit area (opportunities/area)
  - Gross density, minimum, mazimum, median, percentile density of population, employment, total population, households, residential or commercial floor area ratio.
  - Lot size: weighted average size of single family lots.

Choice of distance: If distance or boundary used to measure density used is accepted, then it should have a priror assumption that density is used as accessibility index or the like, where the distance or boundary happen to be the same as selected ones. This leads to two thinkings: one density is intermingled with accessibility, second, if the impact is not significant as expected, it may simply because the distance is not chosen correctly, since it is applied out of convenience.

Meaning of diversity

Measures of diversity capture the mix of activities (Knapp et al., 2005). It should describe the distribution of no less then two types of land uses. For transportation planners, measures of diversity offer the proxy of the distance between trip origins and destinations. Greater mix can also mean a more diverse urban environment and thus encouragse more inter-zonal travel. For example, greater mix may offer a more inviting route for walking or biking. Greater jobs-housing balance, suggests shorter commute distances or to be more correct, more inter-zonal commutes at the geographic scale selected, and perhaps more nonmotorized travel (Knapp et al., 2005).

Mix can be measured in many ways. The simplest involve proportions and ratios. Boarnet and Sarmiento (1998) measure retail and service employment levels in census tracts and zip codes. Messinger and Ewing (1996) measure the proportion of commercial jobs within a TAZ. Ewing et al (1996) for example, measure the ratio of jobs to houses. To further measure the mixed-use level for lager gergraphic area, proportions and ratios can be aggregated in certain way into summary statistics, such as entropy measures and Gini coefficient. All of this type of variables are area-based, such as TAZ.

Mixed use can also be measured as dummy variable, e.g., residents with businesses or institutions within ½ a block of their homes (Knapp et al., 2005), which can be regarded case-based since each case has its specific mix use level, though this type of thinking is not very accurate. This case-based mixed use indicator can be aggregated for the research area too: Percent of residents with businesses or institutions within ½ a block of their homes.

Mixed use measure share of one target use or more (%) or the relationtive shares of two or more target uses (Ratio)(Ratio-based mixed use seems intermingled with accessibility since it also carries the supply/demand, or service meaning.), number of land use types within a chosen area (this can confuse with accessibility). To provide accessibility in terms of amount of types, or a target shares of various types. It may be regarded as space-standardized index of type-based accessibility, however, it is hardly like density, where selected area is more metric, and more like selected area such as building, block, surrounding blocks. This may one of the reason why accessibility is intermingled closely with mixed use.

Typology of mixed use is shown below:

- Measure share of one target use or more (%)
  - Employment diversity: proportion of jobs of various types (submetropolitan, diversity)
  - Housing type mixed-use: Single family-multiple family housing share: number of single family or multiple family housing units divided by total housing units (submetropolitan, diversity)
  - Entropy measures (Frank and Pivo (1994a, 1994b), Kockelman (1997))
- Relationtive shares of two or more target uses (Ratio).
  - Balance of jobs to residents (mixed-use), or service level (supply/demand), so mixed use and service is intermingled. This can be used to evaluate work-trips.
  - Balance (mix) of population-serving jobs to residents. Population-serving jobs include retail, personal services, entertainment, health, education, and professional services. Is this supposed to be used for

evaluate non-work trips?

- Jobs-housing Gini coefficient: measure of difference in job-housing ratio from even distribution. This is an aggregated index for an ratio-based mixed use/accessibility variable)

- Number of land use types within a chosen area (this can confuse with accessibility)

Ratio-based mixed use or supply/demand is intermingled with accessibility index. The key may exist in distance or boundary chosen. If they happen to be identical, then they are intermingled. If the distance or boundary is not chosen purposefuly, and meanfully, then it is a description of urban form. If it is chosen, then the accessibility is selected. In other words, mixed use will carry the meaning of accessibility when the distance or boundary is selected delicately for evaluate the impact of mixed use-based accessibility. If not, mixed use basically play the role of characterizing urban form. Mixed use hold broader roles than accessibillity, e.g., urban from + mixed-use-based accessibility vs. accessibility. This idea may apply to the relationship between density and density-based accessibility.

Types of ideal mixed use: ideal mixed use can be one of the following: the higher portion (no, this is accessibility), balance (Ratio = 1, good for the area in questions), in propotion to overall proportion (i.e., overall good, or overall bad for the system), and diversity (i.e., as many types as possible). Which type of mixed use is seeking depends on the theorical causal relationship. Based on the causal relationship, it seems that if distance to evaluate mixed use is chosen pruposefully for the resaech topic, mixed use can mingle with accessibility.

If this hypothesys exist: what residents need for non-work services is certain amount of choices, of an array of services, which determine the travel radius, then when this level of services is provided in smaller radius, it is more sustainable. However, if another hypothesis exist that residents hunt for best choice within the travel budget, then higher level of accessibility will not work. If the distance to CBD and UGC is replaces by accessibility in terms of amounts and types of sercies, then it might be proved. These two hypothesese/theories have to do with the jobs/housing balance, or higher opportunities, that can lead to sustainability.

Below are typology of aggregation of mixed use:

-- different level of aggregation or disagreetion of mixed use:

Proportion of housing

Proportion of single family housing, or multifamily housing (Knapp et al., 2005)

Proportion of jobs

Proportions of jobs of variaous types (Knapp et al., 2005).

--Different level of aggregation or disaggregation of density

Total person density: residents plus jobs per acre

Person density: residents per acre

employment density: employment per acre

Choice of distance: If distance or bourndary is not purposefully selected, or tested, the impact of setting constributed by mixed use may not be examined correctly if distance matters, which is some cases carry the meaing of accessibility, explaining the intermingle of mixed use and accessibility. If it is to characterize urban form along, then distance may not matter.

Since distance or bounday distinghish density and mixed use from accessibility, choice of boundary, distance may affect the sifnificance test in evaluating the impact of urban form factors on observing behaviors in questions. Hence, the impact of land use on transportation statistically found not significant may only indicate that at this spatial unit, land use does not affect travel behavior.

Choice of land uses: mixed use with private sectors, or public facilities, or by employment, i.e., a combination of both.

The relationship between accessibility, density, and mixed use

Accessibility is more like the output of density and mixed use (practices), which can be policy variable, while accessibility in general cannot be policy variable. The interaction between density and mixed use may constitute the accessibility, i.e., the proportion of certain land use type * (building) density * boundary, or to be more specific, e.g., to be the proportion of jobs of certain types * jobs density * area = accessibility. This may involve more thinking. Hence, in the above issue, the area is equal to one when radius or boundary to measure accessibility happen to be the one used for measuring density. In short, the policy input, for example, incorporates lanned density cap, planned mixed use cap; actual output contains actual density and actual mixed use, which constitute actual accessibility, a joint out of density and mixed use.

References:

L. Bertolini, F. le Clercq, L. Kapoen, 2005. Sustainable accessibility: a conceptual framework to integrate transport and land use plan-making. Two test-applications in the Netherlands and a reflection on the way forward. Transport Policy 12 (2005) 207–220

Dong, Xiaojing, Moshe E. Ben-Akiva, John L. Bowman and Joan Walker (2006). Moving from Trip-Based to Activity-Based Measures of Accessibility, Transportation Research Part A, 40(2006), pages 163-180.

Rickwood, P. & Glazebrook, G.J. 2009, 'Urban Structure and Commuting in Australian Cities', Urban Policy and Research, vol. 27, no. 2, pp. 171-188.

P. Filion, K. McSpurren and B. Appleby, 2006. Wasted density? The impact of Toronto's residential density distribution policies on transit use and walking, Environment and Planning A 38, 1367-1392.

Buliung, R.N. and T.K. Remmel. 2008. Open source, spatial analysis, and activity-travel behaviour research: capabilities of the aspace package. Journal of Geographical Systems 10(2):191-215

Daniel G. Chatman, 2003. How Density and Mixed Uses at the Workplace Affect Personal Commercial Travel and Commute Mode Choice. Transportation Research Record 1831, pp. 193-201.

Galster, George, Royce Hanson, Michael R. Ratcliffe, Harold Wolman, Stephen Coleman, and Jason Freihage. 2001. Wrestling sprawl to the ground: Defining and
measuring an elusive concept. Housing Policy Debate 12: 681-717.

Ewing, Reid, Rolf Pendall, and Don Chen. 2002. Measuring sprawl and its impact. Washington, DC: Smart Growth America.

Knapp, G, Song, Y, Ewing, R, Clifton, K. (2005). Seeing the Elephant: Multi-disciplinary Measures of Urban Sprawl. National Center for Smart Growth Research and Education, Urban Studies and Planning Program, University of Maryland.

Krizek, K.J. 2003. Operationalizing neighborhood accessibility for land use-travel behavior research and modeling, Journal of Planning Education and Research 22:270-
287.

Parsons Brickerhoff Quade Douglas. 1996. Transit and urban form – commuter and light rail transit corridors: the land use connection. Transit Cooperative Research Program Report. Washington, DC: TRB, National Research Council. 8-22.

Kockelman, K.M. 1997. Travel behavior as a function of accessibility, land use mixing, and land use balance:

evidence from San Francisco Bay area. In Transportation Research
Record 1607. Washington, DC: TRB, National Research Council. 116-125.

Frank, L.D. and G. Pivo. 1994. Relationships between land use and travel behavior in the Puget Sound region. Seattle, Washington: Washington State Department of Transportation. 9-37.

Holtzclaw,J. 1994. Using residential patterns and transit to decrease auto dependence and costs. San Francisco, California: Natural Resources Defense Council. 16-23.

Song, Yan and Gerrit-Jan Knaap. 2003. New Urbanism and Housing Values: A Disaggregate Assessment, Journal of Urban Economics, 54: 218-238.

Cervero, Robert. 1996. Mixed land uses and commuting: evidence from the American Housing Survey. Transportation Research A. 30:361-377.

Cambridge Systematics, Inc. 1994. The effects of land use and travel demand management strategies on commuting behavior. Washington, DC: US Department of
Transportation Technology Sharing Program. 3(1):3-25.

Nelson, CA and Allen, D. 1997. If you build them, commuters will use them: association between bicycle facilities and bicycle commuting, Transportation Research Record 1578 p 78-88.

L. Bertolini, F. le Clercq, L. Kapoen, 2005. Sustainable accessibility: a conceptual framework to integrate transport and land use plan-making. Two test-applications in the Netherlands and a reflection on the way forward. Transport Policy 12 (2005) 207–220

無衍生研發成果推廣資料

97 年度專題研究計畫研究成果彙整表

計畫主持人：蔡育新	計畫編號：97-2410-H-004-105-
計畫名稱：土地混合使用概念、指標、影響機制的多面向再檢視	

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	1	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	0	1	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	0	1	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	1	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	無

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：□已發表 □未發表之文稿 ■撰寫中 □無

專利：□已獲得 □申請中 ■無

技轉：□已技轉 □洽談中 ■無

其他：(以 100 字為限)

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）(以 500 字為限)

本研究為土地使用規劃、交通規劃、乃至於土地估價、健康都市等研究的基 礎議題分析，用以釐清過去常用的量性指標間，其混搖不清的概念與應用上 的情況。此質性研究的方向於過去文獻中極為少見，希望本研究成果能對相關研究的觀念與方法提供另一種思考方式。