科技部補助專題研究計畫成果報告
期末報告

共乘需求之旅運特性、性別差異與網路效應—以大台北地區為例(L02)

計 畫 主 持 人 ： 王仁宏
共 同 主 持 人 ： 林珮珺
計 畫 參 與 人 員 ： 大專生-兼任助理：陳羽妮

報 告 附 件 ： 出席國際學術會議心得報告

中 華 民 國 108 年 10 月 31 日

中 文 摘 要 ： 本計畫探討大台北地區男、女兩性在共乘（ride-sharing）旅運活動、及運輸需求、及交通運輸相關設施之使用上之異同，藉以規劃良善設施並提供高品質之運輸服務，以滿足兩性在交通運輸上之需要，創造滿足男女兩性之平等交通環境。本計畫針對男、女在共乘運具及Uber使用上的差異進行研究，連結性別與都會區民眾外出最常使用之共乘運具與使用特性，以協助未來相關運輸設施與服務之建置。本計畫透過開放數據庫、問卷設計與調查，協助瞭解男、女兩性在旅次需求及運具選擇之差異。由於交通部於2019年二月預告修訂俗稱「Uber條款」的「汽車運輸業管理規則103-1條」，修訂後的法規於2019年6月6日生效，禁止Uber通過與當地汽車租賃商合作提供出租車服務。引發Uber司機的不滿。超過5000名司機、上千輛Uber上凱道，抗議103-1修法。交通部為了因應Uber的難題，積極推動多元化計程車方案，開放使用「小黃」以外的車色營運，法規的預告修訂造成本研究資料蒐集上一個重大變因。共享經濟應在缺乏供給或供給不足的情況下才能做出貢獻，台北市的人口密度和優質的公共運輸系統導致民眾大量使用公共運輸，台灣大多數城市地區的計程車都供過於求；而台灣偏鄉地區的公共運輸服務嚴重不足。本研究接著討論使用多元計程車或小黃替代傳統公車，形成有時間窗和同時上下車的車輛途程問題，探討當最大乘客座位數改變時對服務品質、業者成本與補貼的影響，目的是減少政府補貼並將服務品質維持在合理的水準。

中文關鍵詞 ： 共乘、性別、旅運特性、旅運需求、優步、空間分析

英 文 摘 要 ： This proposal investigates travel characteristics with gender and analyzes whether the differences between genders has any impact on ride-sharing demand to connect the gender and the transportation demand and behavior. The purpose is to plan good transportation facilities, to provide high-quality transport services to meet the needs of both gender in transport, and to create an equitable transport environment. The proposal focuses on the differences between men and women in the use of ride-sharing services/Uber, and will analyze the differences between the sexes and the commuters who are most commonly heading to in the Taipei metropolitan area. The proposal investigates the diffusion of ride-sharing demand, and illustrates the use of spatial analysis within a regression framework, notably focusing on addressing the spatial autocorrelation model, spatially lagged dependent variable model and spatial error model. The proposal suggests that in addition to population characteristics of individual districts, there is feedback among proximate districts influencing their ride-sharing demand. The proposal adopts open dataset, questionnaire and exploratory tools to evaluate whether the indices of ride-sharing demand are spatially clustered, by taking spatial autocorrelation into account to predict spatial dependence or the similarity of behaviors at neighboring districts in

Taipei Metropolitan area, and model the spatial dependence to draw more valid inferences. The proposal examines a variety of spatial diagnostics and models through ride-sharing demand drawn from the characteristics of riders such as gender or the adjacency of MRT station. Whereas the spatially-lagged dependent variable model sees spatial dependence as substance, in the sense that the ride-sharing demand is influenced by the value of adjacent districts. Network effects exist when people prefer to use ride-sharing transit together with other people as a result of social spill-over. The proposal provides valuable information for evaluating the efficiency of government resource allocation and transport policy for constructing transportation facilities. The proposal empirically examined where the riders are, how ride-sharing/Uber is used to complement existing public transit, whether to make it more accessible and efficient for people to use, or partnered with local transit systems to help solve the first/last mile problem. This study summarizes the requirements that a carpooling system such as the bus-type taxi needs to incorporate and acknowledge that the optimal zone for successful bus-type taxis varies by area. The results of this study will help route planners identify such zones, while the routing and scheduling results will support planners' efforts to provide sufficient transit service in rural areas; the results also suggest that significant reductions in subsidies are possible.

科技部補助專題研究計畫成果報告
（■期末報告）

共乘需求之旅運特性、性別差異與網路效應─以大台北地區為例(L02)

計畫類別：■個別型計畫　　□整合型計畫
計畫編號：MOST 107－ 2629 － E － 992 －001
執行期間： 107 年 08 月 01 日至 108 年 07 月 31 日

執行機構及系所：國立高雄科技大學運籌管理系

計畫主持人：王仁宏
共同主持人：林珮珺
計畫參與人員：陳羽妮

本計畫除繳交成果報告外，另含下列出國報告，共 _1_ 份：
□執行國際合作與移地研究心得報告
■出席國際學術會議心得報告

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　　列舉提供之單位；本部不經審議，依勾選逕予轉送）
　　　　　中　華　民　國 108 年 10 月　31 日

行政院科技部專題研究計畫成果報告

共乘需求之旅運特性、性別差異與網路效應—以大台北地區為例 (L02)

Travel Characteristics, Gender Differences and Network Effects in Ridesharing Demand: The case of Taipei Metropolitan Area (L02)

一、中文摘要

本計畫探討大台北地區男、女兩性在共乘（ride-sharing）旅運活動、及運輸需求、及交通運輸相關設施之使用上之異同，藉以規劃良善設施並提供高品質之運輸服務，以滿足兩性在交通運輸上之需要，創造滿足男女兩性之平等交通環境。本計畫針對男、女在共乘運具及 Uber 使用上的差異進行研究，連結性別與都會區民眾外出最常使用之共乘運具與使用特性，以協助未來相關運輸設施與服務之建置。本計畫透過開放數據庫、問卷設計與調查，協助瞭解男、女兩性在旅次需求及運具選擇之差異。由於交通部於 2019 年二月預告修訂俗稱「Uber 條款」的「汽車運輸業管理規則 103-1 條」，修訂後的法規於 2019 年 6 月 6 日生效，禁止 Uber 通過與當地汽車租賃商合作提供出租車服務。引發 Uber 司機的不滿。超過 5000 名司機、上千輛 Uber 上凱道，抗議 103-1 修法。交通部為了因應 Uber 的難題，積極推動多元化計程車方案，開放使用「小黃」以外的車色營運，法規的預告修訂造成本研究資料蒐集上一個重大變因。共享經濟應在缺乏供給或供給不足的情況下才能做出貢獻，台北市的人口密度和優質的公共運輸系統導致民眾大量使用公共運輸，台灣大多數城市地區的計程車都供過於求；而台灣偏鄉地區的公共運輸服務嚴重不足。本研究接著討論使用多元計程車或小黃替代傳統公車，形成有時間窗和同時上下車的車輛途程問題，探討當最大乘客座位數改變時對服務品質、業者成本與補貼的影響，目的是減少政府補貼並將服務品質維持在合理的水準。

關鍵詞：共乘、性別、旅運特性、旅運需求、優步、空間分析

Abstract

This proposal investigates travel characteristics with gender and analyzes whether the differences between genders has any impact on ride-sharing demand to connect the gender and the transportation demand and behavior. The purpose is to plan good transportation facilities, to provide high-quality transport services to meet the needs of both gender in transport, and to create an equitable transport environment. The proposal focuses on the differences between men and women in the use of ride-sharing services/Uber, and will analyze the differences between the sexes and the commuters who are most commonly heading to in the Taipei metropolitan area. The proposal investigates the diffusion of ride-sharing demand, and illustrates the use of spatial analysis within a regression framework, notably focusing on addressing the spatial

autocorrelation model, spatially lagged dependent variable model and spatial error model. The proposal suggests that in addition to population characteristics of individual districts, there is feedback among proximate districts influencing their ride-sharing demand. The proposal adopts open dataset, questionnaire and exploratory tools to evaluate whether the indices of ride-sharing demand are spatially clustered, by taking spatial autocorrelation into account to predict spatial dependence or the similarity of behaviors at neighboring districts in Taipei Metropolitan area, and model the spatial dependence to draw more valid inferences. The proposal examines a variety of spatial diagnostics and models through ride-sharing demand drawn from the characteristics of riders such as gender or the adjacency of MRT station. Whereas the spatially-lagged dependent variable model sees spatial dependence as substance, in the sense that the ride-sharing demand is influenced by the value of adjacent districts. Network effects exist when people prefer to use ride-sharing transit together with other people as a result of social spill-over. The proposal provides valuable information for evaluating the efficiency of government resource allocation and transport policy for constructing transportation facilities. The proposal empirically examines where the riders are, how ride-sharing/Uber is used to complement existing public transit, whether to make it more accessible and efficient for people to use, or partnered with local transit systems to help solve the first/last mile problem. This study summarizes the requirements that a carpooling system such as the bus-type taxi needs to incorporate and acknowledge that the optimal zone for successful bus-type taxis varies by area. The results of this study will help route planners identify such zones, while the routing and scheduling results will support planners' efforts to provide sufficient transit service in rural areas; the results also suggest that significant reductions in subsidies are possible.

二、緣由與目的

The canary-yellow taxicabs of Taipei City, Taiwan, are widely recognized icons of the city, but they tend to evoke negative impressions based on, for example, driving aggressively, randomly stopping on the road to pick up passengers, and sometimes even scrambling for passengers. As a result, people are turning to Uber Taiwan for better service quality. The United States-based ride-hailing company Uber Technologies connects passengers to drivers via a smartphone app and hires drivers who do not have vehicles registered for commercial use, both of which are considered against regulations in Taiwan. Unlike taxis, ride-sharing companies are not currently government regulated, and riding with a driver using Uber Taiwan is not insured; consequently, passengers have no protection against car accidents. Although Uber Taiwan insists that its business is based on the sharing economy, the company did not increase localized gross domestic product (GDP) or localized tax revenues. Instead, it inflicted crippling economic hardship on conventional taxi drivers in Taipei. Uber Taiwan has sold this "disruption" as a

positive for riders, but for many taxi drivers, it has been devastating, seriously affecting their livelihood. Not only did the average taxi driver's income drop by 40% but eight drivers suddenly died from overwork in 2018.

To respond to the dispute between Uber Taiwan and licensed taxicabs, the Ministry of Transportation and Communications (MTOC) drafted new taxi regulations that require Uber Taiwan to charge its customers for a minimum one-hour rental, regardless of the distance, while making it illegal to hail an Uber car on the street. The amended regulations, which took effect June 6, 2019, prohibit Uber from offering taxi services through partnerships with local car rental operators. Instead of Uber Taiwan's business model, the Ministry promoted multipurpose taxis or so-called diversified taxis as a legal option, although they are still prohibited from picking up passengers on the streets and the vehicle age requirements are strict. The sharing economy should contribute to society in the absence or lack of supply. Taipei City's population density and quality public transportation system result in high usage of the public transportation mode, while most urban areas in Taiwan are facing an oversupply of taxicabs. On the other hand, the supply of public transit services is seriously insufficient in rural areas of Taiwan. This continuing untenable situation results in scheduled operational shifts being out of work, timetables not meeting demand, old bus and vehicle equipment being put into service, poor management leading to losses, and finally operating routes being terminated.

Mass transit planners' objectives include minimizing total travel time, giving every taxpayer equitable access to the transit system, designing attractive and easy-to-use routes, minimizing operating costs while taking into account acquired rights to certain services, and dealing with political pressure to offer service in individual political jurisdictions. To meet these objectives, this study aims to address the following questions: What requirements does a carpooling system such as the bus-type taxi need to incorporate? How does the optimal zone for successful bus-type taxis vary by area? The results of this study will help route planners identify such zones, while routing and scheduling results will support planners' efforts to provide sufficient transit service in rural areas; the results also suggest that significant reductions in subsidies are possible.

三、研究方法

This section addresses fixed schedule problems and develops in detail the solution algorithm. A bus-type taxi schedule which minimizes total missed passengers for travel along a fixed path, where service times at bus stops are constrained by time windows and where passengers are served/missed, is modeled. The study describes the   capacitated vehicle routing problem with time windows (VRPTW) with simultaneous pickup and delivery for the scheduling of vehicles for pickup and delivery of passengers formerly served by regular buses. The effects of varying

the maximum number of passenger seats on service quality and costs are investigated. The interest in the system considered derived from the goal to reduce government subsidies and maintain the service quality at reasonable levels. The current study characterizes this real-world bus-type taxi routing–scheduling problem as a set-covering and routing problem (Bautista & Pereira, 2006; Overholts, Bell & Arostegui, 2009) complicated by seat capacity constraints at each bus stop. Several heuristic algorithms with stochastic techniques were employed to solve complex vehicle routing problems (VRPs) and were powerful from the management science viewpoint (Tung & Pinnoi, 2000; Golden, Assad & Wasil, 2002). We present an algorithm based on brute force enumeration by generating all the combination possibilities and picking the best one.

Formulation

Below, we present a request-based mathematical formulation for the single vehicle routing problem with time windows and simultaneous pickup and delivery (1-VRPTWPD). The route of a bus-type taxi is defined by a series of bus stops (nodes), where the time spent at each stop is constrained by a time window. This involves n requests with boarding and disembarking bus stops as well as associated demands. It is possible that different nodes may represent the same geographic location. If request i consists of b_i passengers to board and d_i passengers to disembark, let $q_i = b_i - d_i$. Define network $G = (V, A)$ and set $V = N \cup \{O, D\}$ as the set of nodes inclusive of the origin O, and destination D, respectively. The subset A of $V \times V$ comprises all feasible arcs. The capacity of the bus-type taxi is given by C, and its travel time between two consecutive bus stops $i, i + 1 \in V$, by $t_{i,i+1}$. The formulation involves three types of variables: binary flow variable $x_{i,i+1}$, equal to 1 if $d_i > 0$ or a passenger(s) is waiting at bus stop $i + 1$ and the number of net seats is greater than or equal to q_i and 0 otherwise. Let $\wp$ be the route visiting, in sequence, nodes 1, 2, ... , n and let N = {l, 2, ... , n} be the set of these nodes. For each node $i \in N$, the variable s_i, represents the service time, which is defined on the time window $[a_i, b_i]$, and the missed passenger(s) who wait at bus stop $i + 1$ to board is $(1 - x_{i,i+1})b_{i+1}$. We formulate the problem ($\wp$) of finding the vehicle schedule which minimizes total missed passengers for travel along a fixed path, where service times at nodes are constrained by time windows。

四、成果與討論
Figures 1 to 7 demonstrate travel characteristics of ride-sharing demand to connect the gender and the transportation demand and behavior.
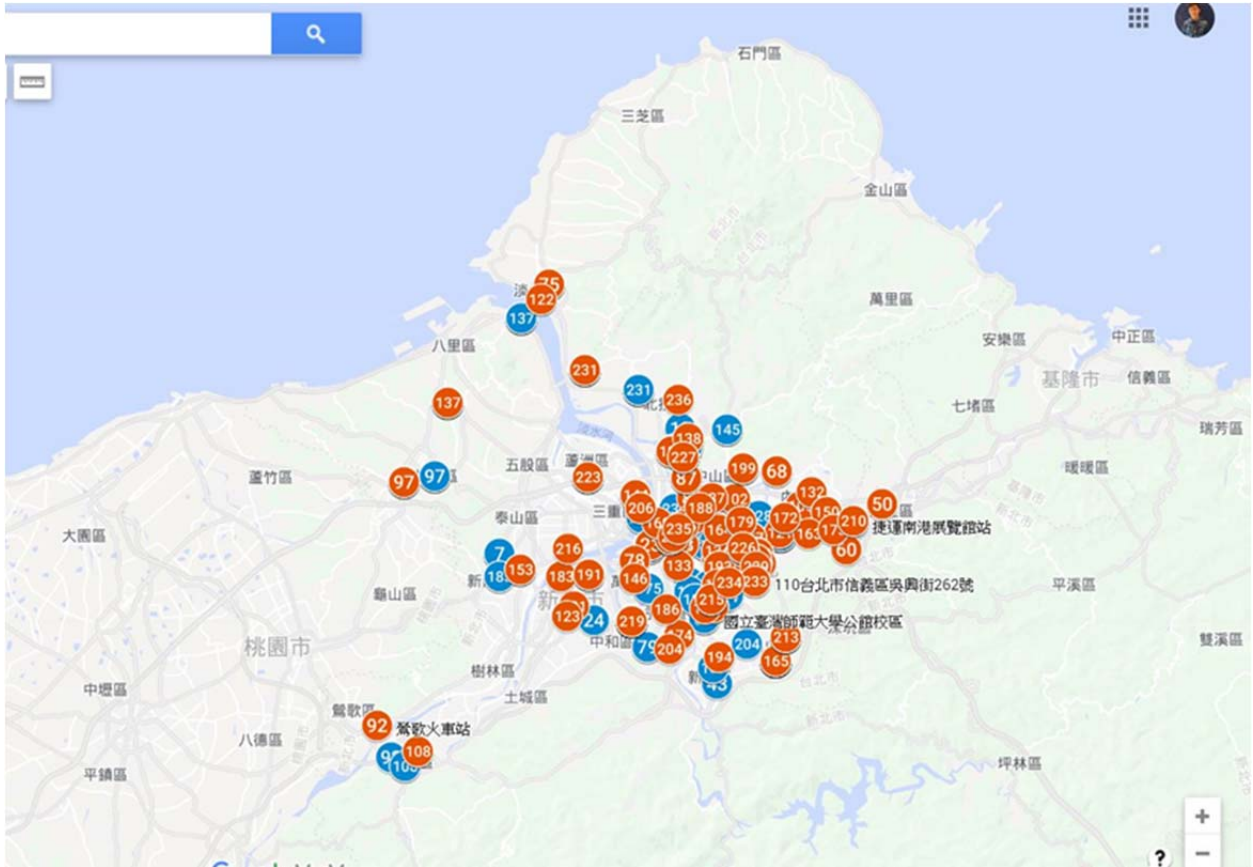
Fig 1. The O-D pairs of taking Uber sampling before the announce of Auto Vehicle Transport Rules and Regulations 103-1

	八里區	三重區	三峽區	士林區	大安區	大同區	中山區	中正區	中和區	文山區	北投區	松山區	林口區	信義區	南港區	泰山區	新店區	新莊區	萬華區	蘆洲區	內湖區	永和區	汐止區	鶯歌區	淡水區	板橋區
數列1	5	2	3	17	46	0	17	47	11	15	5	14	4	32	2	4	3	2	6	1	0	0	0	0	0	0

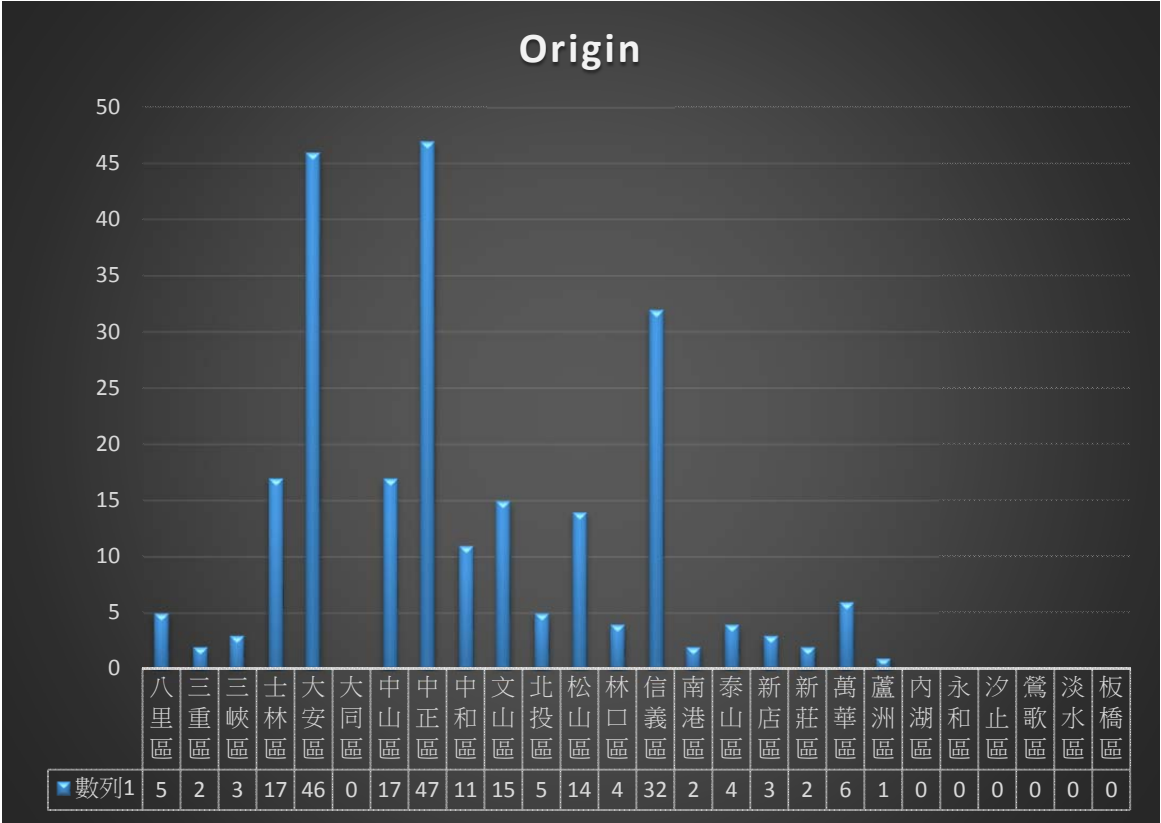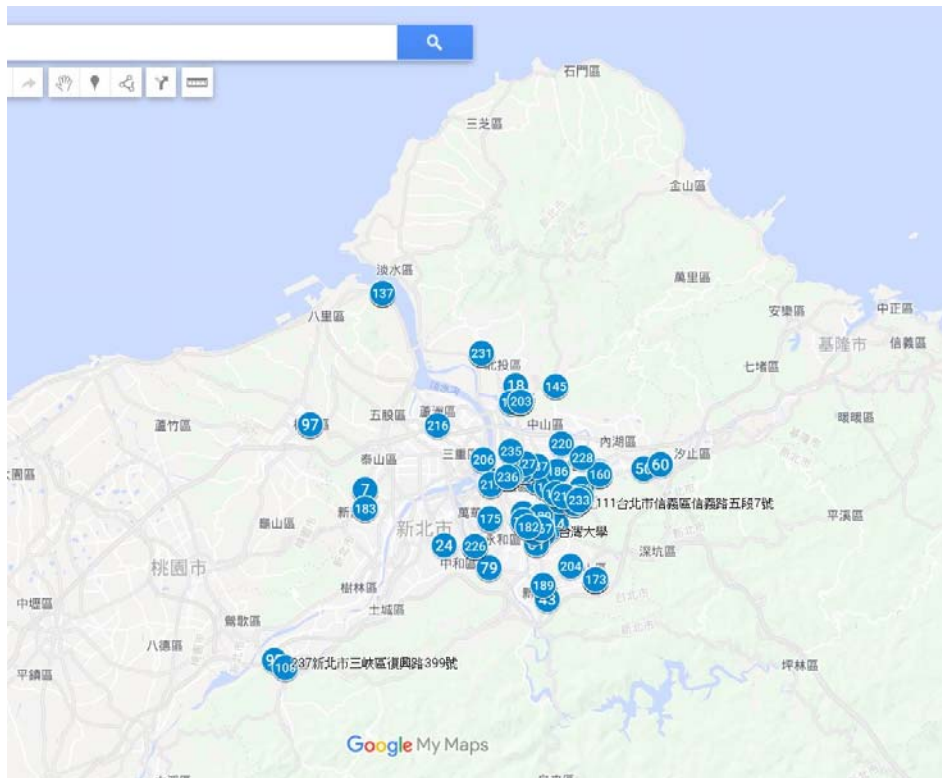Fig 2. The origins of taking Uber by district

Fig 3. The origins of taking Uber on map

Fig 4. The origin hot zone of taking Uber

Fig 5. The destinations of taking Uber by district

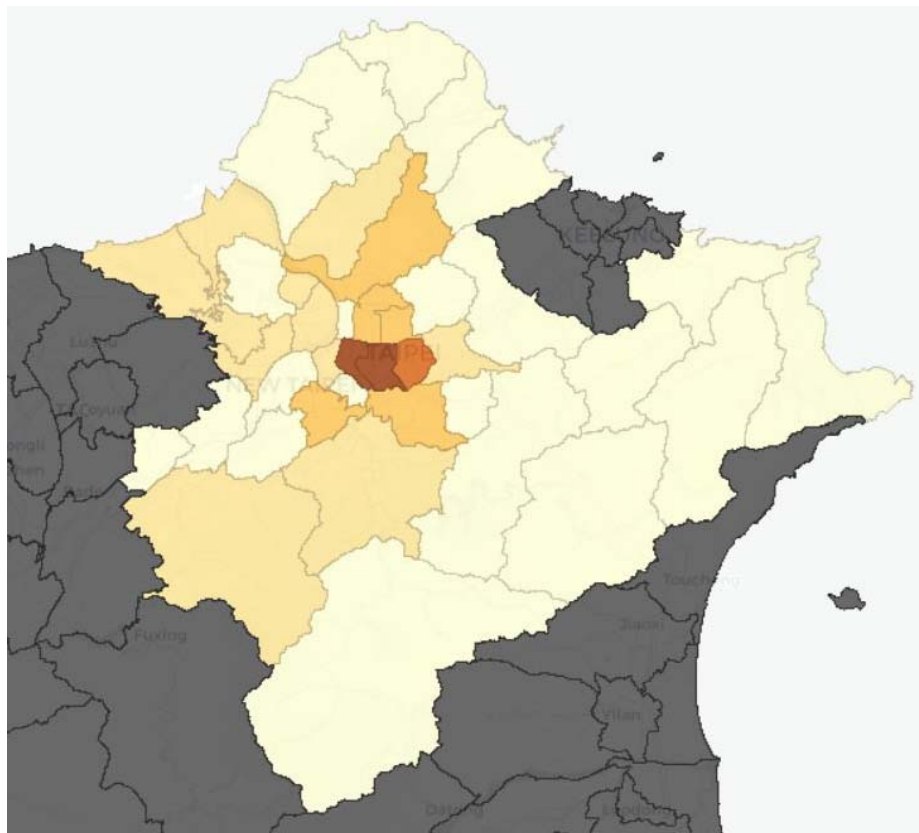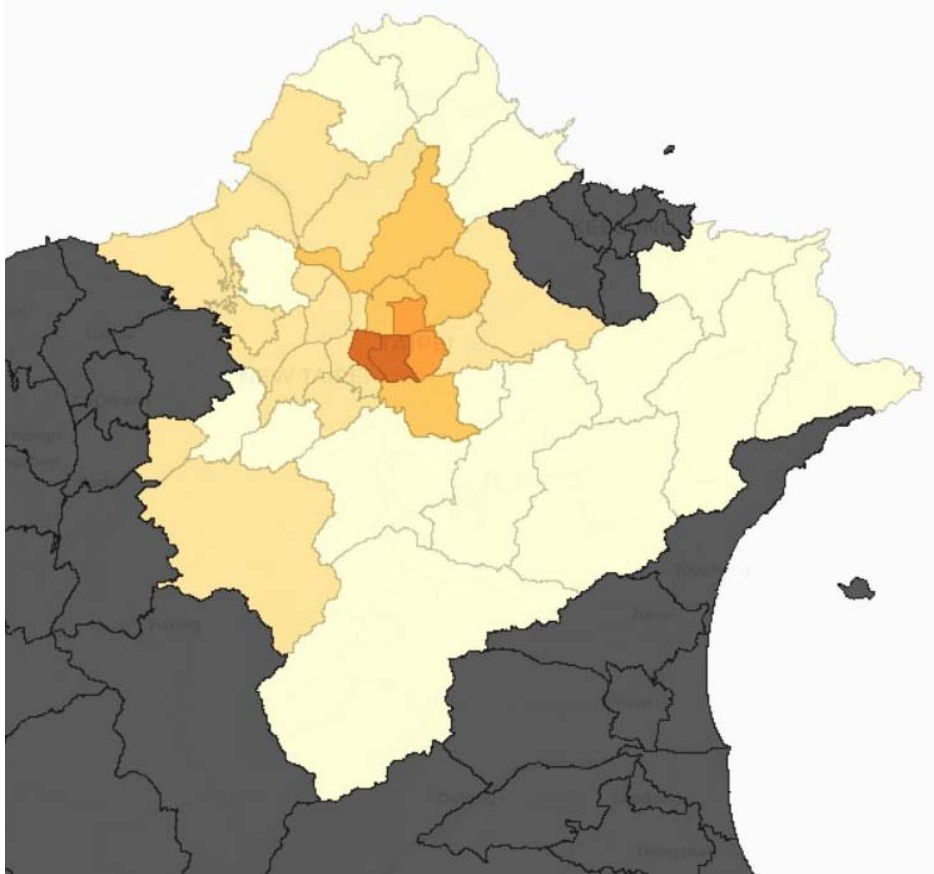|	八里區	三重區	三峽區	士林區	大安區	大同區	中山區	中正區	中和區	文山區	北投區	松山區	林口區	信義區	南港區	泰山區	新店區	新莊區	萬華區	蘆洲區	內湖區	永和區	汐止區	鶯歌區	淡水區	板橋區
數列1	5	5	2	13	36	2	17	33	5	11	6	28	4	24	5	3	0	1	2	4	13	2	1	1	6	7

Fig 6. The destinations of taking Uber on map

8

Fig 7. The destination hot zone of taking Uber

[Section content omitted here]

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…. （以下略）

五、成果自評

　　本研究成果與計畫書之相符，由於本專題計畫補助的經費補助，計畫內容已執行完成，並獲致完整結果。目前完成英文編修，2019 年 12 月 5-6 日共同主持人將於在國立新加坡大學舉辦的第三屆國際複合式運輸研討會（the 3rd International Symposium on Multimodal Transportation，ISMT 2019）進行報告。本次研討會主軸是運輸中的自動化，共享和電動化（Automation, Sharing, and Electrification in Transportation），與本計畫成果高度相關，將爭取被收錄於 Transportation Research Part E: Logistics and Transportation Review（TRE）（SCI 索引源）特刊的機會，本結案報告僅摘錄部分內容。

科技部補助專題研究計畫出席國際學術會議心得報告

計畫編號	MOST 107－2629－E－992－001		
計畫名稱	共乘需求之旅運特性、性別差異與網路效應─以大台北地區為例(L02)		
出國人員姓名	林珮珺	服務機構及職稱	國立成功大學交通管理系教授
會議時間	2019 年 07 月 16 日至 2019 年 07 月 18 日	會議地點	日本札幌
會議名稱	(中文) 管理與社會科學年度論壇 (英文) Annual Symposium on Management and Social Sciences (ASMSS)		
發表題目	(中文) 共乘需求之旅運特性與網路效應─以大台北地區為例 (英文) Travel Characteristics and Network Effects in Ridesharing Demand: The case of Taipei		

一、 參加會議經過

　　2019 管理與社會科學年度論壇（Annual Symposium on Management and Social Sciences，ASMSS）為期三天，主辦單位是高等教育論壇（HEF），該國際學術會議組織全名 the Higher Education Forum（HEF）。HEF 是一個國際學術會議組織者，自 2010 年起，持續深耕國際學術會議，每年在全球主要城市約舉辦 20 場學術研討會，以舉辦高品質的國際學術會議、加強高等教育的發展、促進知識的傳播與國際學術交流。所主辦研討會多以跨領域形式，本年度與教育、心理與社會國際研討會（The International Conference on Education, Psychology and Society，ICEPS）同步舉行，以達規模經濟，後學曾經參加過三次以上 HEF 舉辦、提供相關領域的研究人員交換意見的平台，HEF 與特定研究領域的研究人員每年固定出席的研討會（例如管理科學領域的 INFORMS、運輸年會）大相逕庭。較無機會可認識特定領域的

知名學者、期刊編輯，但論文發表者的領域和參與者本身的多樣性，往往令人耳目一新，讓我們重新思考既有的觀點，擴張既有的知識並建立更廣泛的聯繫。本次研討會在北海道的交通和金融樞紐 — 札幌舉辦，札幌與其它日本大城市相仿，交通系統的核心是地鐵，擁有完善的交通基礎設施。

2019/07/16首先登場的是大會安排北海道的富良野、美瑛區域一日遊。2019/07/17 一早則先以一場平行的分場報告開始，中場交流休息後，接者才是大會專題演講安排的是三位來自學界的專家共 90 分鐘的接力報告，包括 Prof. Huk Yuen Law 分享其博士論文內容，談 21 世紀的人們需要為終身學習而努力，我們如何發展學習機制，通過行動創造意義，從而了解在生活中所經歷的事情。Prof. Mizuno Norihito 討論了第二次世界大戰後海外日本學校所面臨的持續挑戰。日本的海外教育是在 19 世紀末至 20 世紀初，與對外開放以及海外擴張開始及發展。日本海外人口的增加，增加了對其子女各種教育機構的需求，但一直無法克服從站前就存在的類似問題。後學個人報告被安排在也在 2019/07/18 日進行，除分場主席來自香港外，其它報告者為逢甲大學的在職專班研究生，可看出該學院對於鼓勵研究生參與國際研討會的態度積極。

二、與會心得

後學在完成投稿後有相當寬裕的時間安排行程，感謝大會系統性、有組織地安排。舉辦地點國家日本因治安良好、交通便捷，旅遊相當安全，加上國內各大學積極補助國內研究生出席國際學術會議，本次大會有機會聆聽來自台灣的碩士生進行口頭報告。後學參與的分場，除分場主持人之外，作者大多都來自台灣，但在台灣卻不必然有此吸引力舉辦國際研討會，讓學者們齊聚一堂，分享各項研究主題與成果。

三、發表論文摘要

Travel Characteristics and Network Effects in Ridesharing Demand: The Case of Taipei Metropolitan Area

Jenhung Wang[1] Pei-Chun Lin[2]

This study investigates travel characteristics with gender and analyzes whether the differences between genders has any impact on ride-sharing demand to connect the gender and the transportation demand and behavior. The purpose is to plan good transportation facilities, to provide high-quality transport services to meet the needs of both gender in transport, and to create an equitable transport environment. The study will focus on the differences between men and women in the use of ride-sharing services/Uber, and will analyze the differences between the sexes and the commuters who are most commonly heading to in the Taipei metropolitan area. The study investigates the diffusion of ride-sharing demand, and illustrates the use of spatial analysis within a regression framework, notably focusing on addressing the spatial autocorrelation model, spatially lagged dependent variable model and spatial error model. The study suggests that in addition to population characteristics of individual districts, there is feedback among proximate districts influencing their ride-sharing demand. The study adopts open dataset, questionnaire and exploratory tools to evaluate whether the indices of ride-sharing demand are spatially clustered, by taking spatial autocorrelation into account to predict spatial dependence or the similarity of behaviors at neighboring districts in Taipei Metropolitan area, and model the spatial dependence to draw more valid inferences. The study examines a variety of spatial diagnostics and models through ride-sharing demand drawn from the characteristics of riders such as gender or the adjacency of MRT station. Whereas the spatially-lagged dependent variable model sees spatial dependence as substance, in the sense that the ride-sharing demand is influenced by the value of adjacent districts. Network effects exist when people prefer to use ride-sharing transit together with other people as a result of social spill-over. The study will provide valuable information for evaluating the efficiency of government resource allocation and transport policy for constructing transportation facilities. The study will empirical examine where the riders are, how ride-sharing/Uber is used to complement existing public transit, whether to make it more accessible and efficient for people to use, or partnered with local transit systems to help solve the first/last mile problem.

四、建議

得外國學者討論的機會，也提升對研究論文品質的自信心，深感不虛此行，若能持續積極補助、鼓勵研究人員或學者參與國際研討會，營造研究人員更佳的研究環境，並與國際學術交流、接軌，作專業上交流，必能提升研究水準與國際能見度。

五、攜回資料名稱及內容

名牌，大會議程檔案。

六、其他

無。

107年度專題研究計畫成果彙整表

計畫主持人：王仁宏	計畫編號：107-2629-E-992-001-

計畫名稱： 共乘需求之旅運特性、性別差異與網路效應—以大台北地區為例(L02)

成果項目				量化	單位	質化 （說明：各成果項目請附佐證資料或細項說明，如期刊名稱、年份、卷期、起訖頁數、證號...等）
國內	學術性論文	期刊論文		0	篇	
		研討會論文		1		2019 Annual Symposium on Management and Social Sciences (ASMSS 2019), Saporro, Japan. July 16 - 18, 2019.
		專書		0	本	
		專書論文		0	章	
		技術報告		0	篇	
		其他		0	篇	
	智慧財產權及成果	專利權	發明專利 申請中	0	件	
			發明專利 已獲得	0		
			新型/設計專利	0		
		商標權		0		
		營業秘密		0		
		積體電路電路布局權		0		
		著作權		0		
		品種權		0		
		其他		0		
	技術移轉	件數		0	件	
		收入		0	千元	
國外	學術性論文	期刊論文		0	篇	
		研討會論文		0		
		專書		0	本	
		專書論文		0	章	
		技術報告		0	篇	
		其他		0	篇	
	智慧財產權及成果	專利權	發明專利 申請中	0	件	
			發明專利 已獲得	0		
			新型/設計專利	0		
		商標權		0		
		營業秘密		0		
		積體電路電路布局權		0		
		著作權		0		

		品種權	0		
		其他	0		
	技術移轉	件數	0	件	
		收入	0	千元	
參與計畫人力	本國籍	大專生	0	人次	
		碩士生	0		
		博士生	0		
		博士級研究人員	0		
		專任人員	0		
	非本國籍	大專生	0		
		碩士生	0		
		博士生	0		
		博士級研究人員	0		
		專任人員	0		
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。）			協助地區政府交通局，規劃可有效節省補貼金額，並達成民眾使用滿意的小黃公車路線。		

科技部補助專題研究計畫成果自評表

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（簡要敘述成果是否具有政策應用參考價值及具影響公共利益之重大發現）或其他有關價值等，作一綜合評估。

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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：

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2. 研究成果在學術期刊發表或申請專利等情形（請於其他欄註明專利及技轉之證號、合約、申請及洽談等詳細資訊）
   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200字為限）

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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）
   使用開放數據和優步（Uber）數據理解共乘如何與公共運輸互補，使用數據分析和地理資訊系統解決複雜的運輸問題。幫助了解乘客在何處，如何以及在何種程度上使用共乘（優步）銜接公共運輸，檢視共乘是否有效降低整體交通運輸上的不平等。

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4. 主要發現
   本研究具有政策應用參考價值：□否　■是，建議提供機關交通部,
   （勾選「是」者，請列舉建議可提供施政參考之業務主管機關）
   本研究具影響公共利益之重大發現：■否　□是
   說明：（以150字為限）