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全球化、區域經濟、治理結構與發展：渤海灣經濟區域之比較研究

Globalization, Regional Economy, Governance and Development: The Bo-Hai Region in Comparative Perspective

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目錄

摘要

本研究計畫之完整報告，分為兩個部分：第一部份為總計畫，主要陳述環渤海灣區域經濟的形成過程中，政治計畫和全球化經濟之間的角力過程。我們將空間的型塑視為一個政治經濟勢力的鬥爭過程，其中特別重要的是天津與北京之間的競爭，塑造了渤海灣區域的樣態。我們指出，全球資本於京津冀之間看似經濟理性的空間分工，其實深受先前計畫經濟空間戰略所遺留的歷史空間結構牽引與國家空間戰略的引導。因此，全球城市區域並不單單只是經濟空間分工，而是其與國家空間戰略結構，以及歷史空間結構三者間高度複雜的辯證互動過程所持續再生產出的複合空間結構。

第一子計畫則是有關臺灣新竹科學園區、中關村、和南韓大德區的比較研究。對三個科學園區的比較論文，發表在 2010 年的世界社會學年會，論文指出三個科學園區發展的不同路徑，南韓大德園區是遠離城市的科學城，有諸多國家級研究單位，但卻缺乏與生產之間的有機關連；而北京中關村則是城市內的科學園區，有國家級研發單位，但也缺乏與生產之間的連結；相反的，各區政府利用中關村的符號，大搞房地產而致富，研發反而並不重要；三個園區中只有竹科是將研發與生產整合的。第三篇論文中國中關村和上海揚埔區的創新體系比較（與冷則剛合著，他負責第三子計畫），以產學研之間的關係，指出北京中關村海澱區的連結，遠比揚埔強，而後者利用大學來開發區域發展的動力，大於對創新區域的興趣；第四篇則是上一篇的姊妹篇，討論科學園區的空間問題（與冷則剛合著），我們將科學園區視為地方政府的領域計畫，並比較了中關村和上海揚埔區的創新區域作法，發現中關村的創新區域與大學之間有比較多的連結，特別是在海澱區。但其他區域將中關村視為符號來做房地產生意的狀況非常明顯；而上海的揚埔則是利用大學來創造房地產，創新的議題和作法比較不清楚。最後，對於南韓的研究，指出南韓政府改變過去發展型國家直接介入的方式，轉為逐漸支持地方政府打造特有的制度厚度。然而，由於首爾地區的制度厚度遠大於大德地區，加上兩個地方和全球連結程度的差異，導致首爾與大德所累積的地方優勢差距越拉越大。

第一章：

仍然是經濟空間分工？環渤海城市區域的治理與矛盾[1]

Still an Economically Spatial Division of labor? The Governance and Contradiction of the pan-Bohai City-Region

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Abstract

Most of the existing literatures argue that the emergence of a global city-region is a product of spatial division of labor in terms of economic functions. Our study on the formation of the city-region of Beijing-Tianjin-Hebei area however will show that even in the globalization era, the state's spatial strategy still has enormous impact on the formation of industrial space. We argue that the seemingly spatial division of labor in the pan-Bohai region has been actually a product of the combination of the region's historical legacy and state's spatial strategy in economic development. Therefore, we argue, the formation of global city-region should be regarded as the product of a complex, dialectical, and highly complicated process that involve the mingling of economic functions, state's spatial strategy, and historical legacy of the region.

Key words: the pan-Bohai region, Beijing, Tianjin, spatial division of labor

摘　要

許多相關研究主張，全球城市區域只是經濟空間功能分工的產物，但本文透過剖析京津冀城市區域的發展歷程後發現，在經濟全球化下，國家空間戰略對工業空間結構的型塑仍有相當強大的影響力。我們也指出，全球資本於京津冀之間看似經濟理性的空間分工，其實深受先前計畫經濟空間戰略所遺留的歷史空間結構牽引與國家空間戰略的引導。因此，全球城市區域並不單單只是經濟空間分工，而是其與國家空間戰略結構，以及歷史空間結構三者間高度複雜的辯證互動過程所持續再生產出的複合空間結構。

關鍵字：環渤海區域、北京、天津、空間分工

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[1] 本文為國科會研究計畫（NSC97-2410-H-004-007-My3）的部分研究成果。

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一、前言

自中國改革開放以來，世人多將目光聚焦在珠三角與長三角，然環渤海城市區域正悄悄地積聚實力[4]，據中國國家發改委統計，2009 年長三角生產總值（Gross Domestic Product, GDP）達到 5.97 萬億元（下文皆為人民幣）；京津冀 GDP 達到 3.35 萬億元，占全國 10%，超越珠三角 3.21 萬億元，躍居為全國第二大區域經濟體，成長 11.9%，更是超越長三角和珠三角 1.5%和 1.2%。2009 年，在長、珠兩大三角蒙受金融風暴而大幅衰退之際，天津市 GDP 高達 7500.8 億元，連續逆勢成長 16.5%，2010 年更一舉躍升至 9108.83 億元，成長 17.4%，成長速度位居全國第一。在全球關注中國崛起之際，環渤海城市區域可謂是崛起中的崛起。

細察環渤海區域的崛起，中國中央啟動的環渤海區域空間戰略為其主因之一。早在 1994 年，天津市政府就已設立「濱海新區」，但歷年引資額卻未有顯著成長。直到 2006 年，國務院下發《推進天津濱海新區開發開放有關問題的意見》，納入國家整體發展戰略後，2007 年天津外資合同額隨即劇升 42.0%，2008 年的外商直接投資（foreign direct investment,FDI）也升高至 74.2 億美金，暴增 40.6%，顯示國家空間戰略對城市區域空間結構的型塑擁有相當高的主導力。

若從全球經濟與中國經濟連結的角度來觀察，環渤海區域內另一核心城市—北京，自 1980 年改革開放後，外資金融機構與跨國公司總部不斷聚集，據《中國外商投資報告（2007 年）》顯示，2006 年全球 500 強跨國公司在華投資總額中，北京占 21%，勝過上海 17%與廣東 14%；另據北京發改委表示，截至 2010 年，在北京設立的具有跨國公司地區總部性質的外商投資性公司增加到 183 家[5]，經商務部門認定的跨國公司地區總部達到 41 家。而生產者服務業中最重要的金融業方面，北京共有法人金融機構數 551 家，僅金融街金融資產 48.6 萬億元，占全國的 47.6%，均為全國第一。而且 NASDAQ 等證券交易所也紛紛在北京成立代表處，顯示北京已成為吸引全球資本聚集與跨國公司設立總部的全球城市。

《中共中央十一五規劃的建議》指出，「形成區域間相互促進、優勢互補的互動機制，是實現區域協調發展的重要途徑」，要求「有條件的區域，以特大城市和大城市為龍頭，通過統籌規劃，形成若干

[4] 「環渤海」有狹廣二義，狹義係指渤海沿岸到部分黃海沿岸的環渤海灣區；廣義則是從國家經濟規劃的角度而定，1994 年頒佈的《2000 年環渤海地區經濟發展規劃要點》，加入山西省和內蒙古自治區，使環渤海概念擴及遼寧、河北、山東、山西、北京、天津和內蒙古中部地區，共 5 省區 2 直轄市，157 座城市，面積高達 185.82 萬平方公里。由於幅員太過廣大，因此本文主要鎖定觀察環渤海的核心區域—京津冀城市區域。

[5] 所謂投資性公司，依據商務部《關於外商投資舉辦投資性公司的規定》，係指外國投資者在中國以獨資或與中國投資者合資的形式設立的從事直接投資的公司。

用地少、就業多、要素集聚能力強、人口分佈合理的新城市群。」，顯示中國意圖以特大城市為區域龍頭以形成城市群，並透過互動機制的運作來實現區域協調發展。由上述可知，經過多年的全球經濟接軌之後，北京的經濟實力不但大幅提昇，城市功能已由過去的大工業城市轉型成以生產者服務業為主的總部型城市，且與腹地城市開始出現專業分工的徵兆。但另一方面，中國中央意圖透過環渤海區域規劃，將天津市提升為「北方經濟中心」，以承擔引領區域經濟整合的龍頭角色。天津是否能勝任協調環渤海區域治理的重任？北京與天津兩大核心城市間的關係又將如何演變？

目前盛行的「競爭型城市區域主義」（competitive city-regionalism）的學者們認為，全球城市區域（global city-region）、功能性都市區域(functional urban region)、鉅型區域（megaregions）、鉅型城市區域（mega-city regions）或大都會區（metropolitan）基本上是由單一核心城市或多中心城市與其腹地城市群間，透過經濟全球化的市場力量所自然形成的功能分工與經濟連帶城際網絡 (Aguilar and Ward, 2003;Friedmann,1995; Florida,2009;Goei, Burger, Oort and Kitson, 2008; Hamiliton,1999; Herrschel and Newman, 2002; Hall and Pain, 2006; Hoyler ,Kloosterman and Sokol, 2008; Keating, 2003; McCarthy, 2000; Ross, 2009; Sykora, 1999; Sassen, 2002, 2009; Thierstein, Lüthi, Kruse, Gabi and Glanzmann, 2008)。這個強調城市間經濟功能連結的「市場中心」(market-centred)論，甚至直指「城市區域」根本就是個「經濟名詞」(Core Cities Group,2004:25)，或是個經濟活動的功能單位（functional unit）(Contant and Leone de Nie,2009:15)。

相對於上述看法，本文發現京津冀城市區域的崛起過程中，中國中央不但頻頻頒布各項優先試點政策與投入大規模的基礎建設資金給濱海新區，還調動大批國企及國有控股企業投資天津[6]，使京津冀的發展模式相當迥異於西方文獻所指出的市場主導型城市區域。本文將指出：第一，國家空間戰略對以第二產業為主的區域空間結構塑造仍有相當的影響力，但對於以知識經濟為主的生產者服務業的區位選擇影響力則相對較低。第二，國家主導的以天津濱海新區為成長極的城市區域空間戰略，雖也造成天津的高速發展，但也減緩北京首都圈透過整合京津冀來和全球經濟連結的進程。第三，造成如此發展的原因與先前計畫經濟空間戰略所遺留的歷史空間結構與全球勞動分工間的相互作用，為目前影響京津冀整合過程的主要因素。

[6] 據天津市統計局（2010）統計，中央對天津的全社會固定資產投資由 2005 年的 228 億元，2009 年提高到 960 億元人民幣，成長 4.2 倍，國企投資額占全市投資總額的 2.58 倍以上。

二、歷史空間結構、國家空間戰略與全球經濟空間分工

在經濟全球化的競爭壓力下，全球各城市無不致力於提升功能、資源與行動的整合以增強競爭優勢(Begg,1999; Jessop and Sum,2000; Jensen-Butler, 1999; OECD, 2001)，使各城市政府體認到唯有攜手合作形成區域聯盟，聚合成空間節點與領域平臺的全球城市區域，來提升總體競爭優勢，成為國家經濟發展的引擎(Scott, Agnew, Soja, and Storper,2001; Ross, 2009)，方能對抗其他全球城市的競爭(Kearns and Paddison, 2000)。

全球城市區域的許多研究成果，大多立基於運輸與通訊科技創新所導致的「時空壓縮」(time-space compression) (Harvey ,1989: 284-285)，與網際網絡的「流動空間」（space of flows）(Castells, 1996)等「空間轉型」假設上，並融合了全球城市(Friedmann, 1986; Sassen, 2002)、全球城市體系(Taylor,1997)、資源依賴理論（resource dependence）(Pfeffer, 2003)與新功能主義（neo-functionalism）(Haas,1958)等理論的研究成果(Hall and Pain, 2006:13-15 ;Thierstein, Lüthi, Kruse, Gabi and Glanzmann, 2008)。其空間結構類型大致可分為：第一，由位居中央的都會區(central metropolitan area)與其周邊各種發展程度較低的從屬領域腹地所構成；第二，空間上重疊或聚合的都市區，例如也被腹地所環繞的集合城市(conurbation) ；第三，由地理上有所區隔但又鄰近的都市中心群所組成的中等規模「綜效網絡」（synergy network）聯盟。這些城市區域有時可能外溢出傳統國家邊界，如新加坡、馬來西亞的柔佛(Johor)與印尼的巴淡島(Batam) (Scott,1998;Scott, Agnew, Soja, and Storper, 2001)，透過與其他城市區域網絡的緊密連結，不斷強化自身的競爭優勢與提升在全球城市層級網絡中的位階(Douglass, 2000:2318-2321; Friedmann, 2001a:120; Olds and Yeung, 2004:503-506)。這類經濟分工論點的缺失主要有二：

第一，忽視政治力對區域發展的可能影響。新區域主義認為，主權國家對國內事物與經濟發展的管控能力已被削弱(Scott, Agnew, Soja, and Storper, 2001:13)，或被淘空的零合式空間尺度假定（大前研一著，李宛蓉譯，1996），引起許多學者抨擊，彼等認為國家雖因全球化的衝擊而不斷再尺度化（re-scaling）與再領域化（reterritorialisation），但仍為資本積累的關鍵行動者之一，雖然城市政府經濟領導力日益成長，但仍無法全然否定握有立法與財政權的國家機器，在擬定與執行空間戰略時的主導作用，許多跨域事物也仍須中央政府仲裁(Borja and Castells,1997; Brenner, 1998,1999; Pierre and Pters,2000)。Tickell與Peck (2003)也指出，國家機器在新自由主義經濟體中仍扮演重要角色，因為這類「新自由主義國家」（neoliberal state）會積極地去創造親商的商業氛圍，並把自己視為自由市場中的競爭者，有如企業般地去渴求競爭力，因而不斷地調整、創造制度結構，以面對全球市場中的其他國

家的競爭(Harvey,2005: 64)。實際上，國家為了提升全球競爭力，往往把城市當成啟動「發展策略」的物質形式（material form）(Wu, 2006:14)，尤其是國家經濟發展皆大幅仰仗該國首要城市區域的東亞各國（Kim, 2001:266），中央與地方各級政府無不積極提供全球城市／區域形成與發展的各種必要條件（王振寰，2002：90；冷則剛，2002：4；簡博秀與周志龍，2002：143; Hill and Kim, 2000, 2001; White, 1998）。Friedmann與Sassen後來也同意，國家扮演著生產裨益於城市與外資等行動者執行跨界操作的調節環境的關鍵角色(Friedmann, 2001b; Sassen, 2001b;2002)。

第二，忽略各地獨特歷史空間結構的可能影響。許多城市區域研究大多關注當前的各城市間專業功能分工程度（梁琦，2004：1-9），或流動空間中的城際網絡的連結度的測量(Taylor, Evans and Pain, 2006:53-63)。但由於城市與區域的發展歷程與政策規劃，均無法與其所鑲嵌的獨特歷史社經脈絡剝離（王振寰，2002：11），尤其當資本被凝結在具體的「建成環境」（built environment）之後，城市空間結構更是難以一夕驟變(Beauregard and Haila, 2000:22-36)，深深地影響了社會關係的再生產。如德國Rhine-Main大都會區內部城市間的經濟差異、地域性競爭與區域認同感的缺乏，都是因為受到歷史空間結構的影響(Freytag, Hoyler, Mager and Fischer,2006:163)。因此，後社會主義國家的全球城市區域的空間治理，並不單純只是地方層級的問題，而是涉及到更為寬廣的跨界與古今時空接合，以及國家空間再結構策略等問題（王振寰，2007：48-49），所以個別城市所鑲嵌的獨特策略、經濟與歷時空間的動態性，都必須加以深入考量（周素卿，2003：46；Jonas and Ward 2007: 176）。

由上述可知，城市區域研究必須超越以市場中心論，或國家中心論等偏執一方的分析，將城市區域與治理機制的演化放在更為廣闊的政經與歷史演化的動態過程之中（夏鑄九，1993：259；陳東升，2002：317；Brenner, 2004:192; Haughton and Counsell, 2004:47），來考察「社會—空間」（socio-spatial）塑造與演化過程中的尺度政治（politics of scale）的複雜辯證關係(Swyngedouw, 1997:140, 2004, 26)。為釐清分析環渤海區域形成過程中的政治空間戰略、經濟分工與歷史空間等三重結構間的複雜關係，本文設計研究架構如下（見圖1）：

（一）資本運動建構的經濟空間結構：

一般而言，資本的積聚與擴散直接影響城市空間的發展與演變(Harvey, 1989:22;Soja,1989:91-92;Wu, 2006:7)。但在中央計畫經濟體制中，由於資本流動與市場運作被國家所嚴格管制，使國家財政與計畫性投資成為社會主義國家城市化的唯一動力。隨著經濟改革開放，跨國企業與銀行等全球經濟體開始逐漸穿透國界，成為城市區域與地方空間塑造（place-making）與重構的主導力量之一(Kovács, 1999:2;

Sykora, 1999:79;Turnock,1998: 457-464; Wu, 2000:1360)，重新恢復的跨國與城際間資本流動開始不斷解構與重塑各城市與區域內部的歷史空間結構，全球城市區域受此力量擠壓而逐漸擴張(Wu and Radbone, 2005: 275; Zhao and Zhang, 2007:980)。

（二）國家空間戰略的策略空間結構

雖然國內市場日漸與全球經濟緊密接軌，但國家在治理不同領域尺度的連結上，仍扮演相當角色(Jessop, 2002:202)，並紛紛在全球地方資本積累的空間動態中，透過「策略性規劃」（strategic planning）、「成長極」(growth pole)，或「國家空間戰略」（state spatial strategy）等國土或城市規劃[7]，差異化或整合跨地理尺度與國家領域中的不同區位，並為某些特定「策略性位址」（strategic sites）提供稀缺資源或基礎建設，以建構地方專有社經資產，企圖設計與塑造特定區位或全球城市，以吸引、黏住外資，或提升本地既有資本的競爭優勢（周志龍，1999：179；王振寰，2002：90;Borja and Castells,1997:152；Brenner, 2003:198, 2004: 91-94; Jessop, 2002:213; Newman and Thornley, 2005: 256; Wu, 2000:1360）。有些國家空間戰略甚至可以形塑或扭曲跨國資本傳送到地方空間的管道，使全球化對地方經濟發展的影響效果，產生重大差異性(Wang, 2004:386)。

（三）歷史空間結構

基本上，城市的經濟空間結構可被視為一個多層次的歷史層疊產物，是由多年來的新政經投資與社會活動的持續強加（successive imposition）所積累而成，因此空間結構都是層層疊加的，並深受先前空間結構的影響(Massey, 1984: 117-118)。雖然國家空間戰略與經濟全球化，都直接牽動城市與區域空間結構的生產，但這類「共時性」（synchronic）的分析途徑，都忽視了歷時空間結構對當前空間結構演化的可能影響，以致於都無法完全解釋現實空間的發展現狀。

實際上，歷史政經角力所形成的歷史空間結構，如物質性的「營造環境」 (Haevey,1989:83)，與非物質性的「制度厚度」（Institutional Thickness）(Amin and Thrift,1995:100-108; Storper,1997:5)以及社會資本，左右著國家空間戰略的效果與跨國資本的區位選擇，進而持續影響地方資本的積累與新空間結構的生產或重構過程(Nielsen, Jessop and Hausner:1995:8; Sailer-Fliege,1999:7;Sassen,2001a: 349)。尤其是轉型成資本主義國家的「後社會主義國家」（post-socialism states），其歷史空間結構的影響力將更

[7] Brenner(2003: 205)認為，所謂國家空間策略包括：產業政策、經濟發展倡議、基礎建設投資、空間規劃計畫、勞動市場政策、區域政策、都市政策與住宅政策等等。

為明顯，彼等調節經濟的組織結構與模式，與其說深受先前制度遺緒路徑依賴的影響(Nielsen, Jessop and Hausner, 1995:4)，倒不如說是先前計畫體制所型塑的歷史空間結構，仍直接或間接影響新政經制度的運行，導致城市空間結構的轉型過程仍深受當地社經關係遺緒的影響(Kovács, 1999:6)。

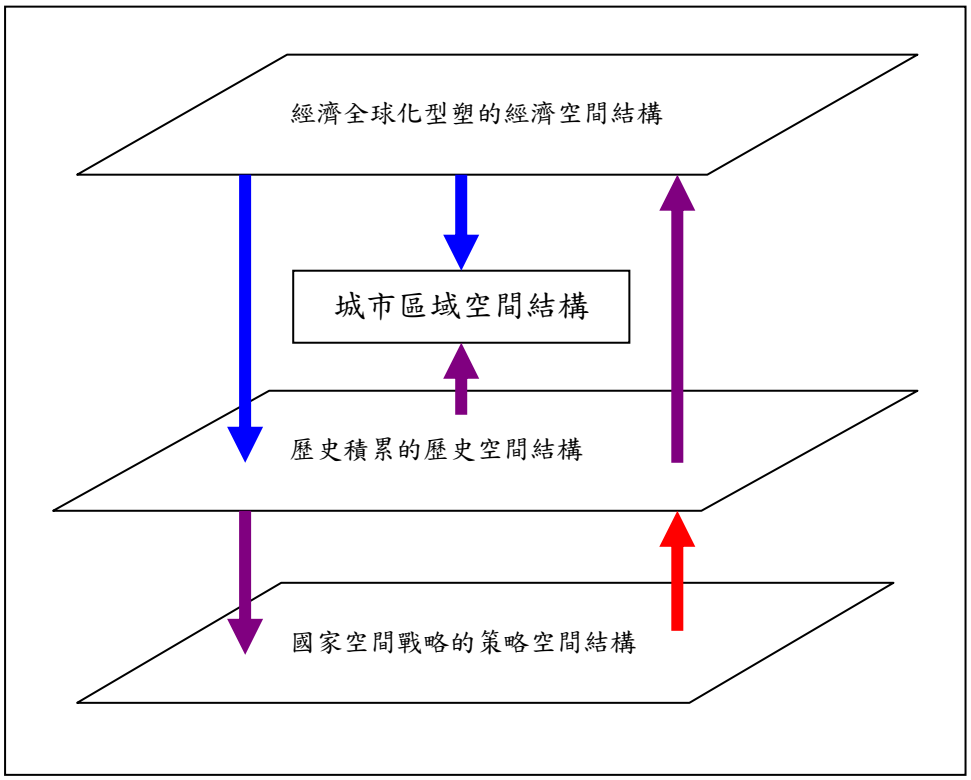

圖 1：研究架構圖

資料來源：筆者自繪。

為了改善多年來不斷積累而成的當地獨特歷史空間問題、抒解全球經濟分工導致的空間兩極化或環境惡化，以及引導國內外資本投資以促進特定區域經濟發展或平衡發展落差，各國政府往往提出相關國家空間戰略以期改造現存空間。導致跨國企業或銀行等全球行動者進行經濟空間分工的區位選擇時，往往深受投資地點所鑲嵌的國家財稅制度、產業政策與空間戰略等制度環境的影響，以及當地歷史空間的特有資源與競爭優勢的吸引。其中，歷史空間結構對全球行動者區位選擇的影響力，可能間接削弱或強化了國家空間戰略的政策效果。然而，既有歷史空間結構也同時受到國家空間戰略與全球經濟空間分工等各項社會活動刻意或非刻意的強化或改造，又持續層層堆積成新的歷史空間結構，進而影響未來的各項社會再生產。

三、國家空間戰略變遷對環渤海區域經濟發展的影響

計畫經濟時期，由於中國中央掌握一切資源分配，使城市與區域空間結構往往服從於中央階段性城市與區域發展政策，與相關制度安排的改變和主導（王振寰與黃書緯，2001：65；張京祥、羅震東與何建頤，2007：37-43）。人為刻意逆轉的京津歷史空間結構，深深地影響了環渤海經濟區域的發展路徑。

（一）計畫經濟空間戰略對京津城市功能逆轉的影響

1860 年簽訂的《中英北京條約》，使位於南北大運河交界的漕糧轉運中心與北方海運樞紐的天津，被迫開埠與劃分租界，吸引中外各大銀行與洋行紛紛聚集，1930 年代開設的本國銀行與票號達到 100 多家，資本額占全國 12.7%；外資銀行 17 家，占外銀在華資本總額的 16%，成為中國第二大金融中心。紡織與麵粉等輕重工業也迅速發展。天津港腹地甚至遠及山西、直隸（河北）、山東、河南北部、陝西和內蒙古地區，對外貿易量約占全國的 1/4，各地客商均以天津為經營基地，物資與資金流動十分頻繁（謝思全、張鶴鳴與劉璿，2008：3-4；樊如森，2007：34-62）。自清朝末年起，北京擔任政治與文化中心，天津則為貿易、金融與經濟中心，兩大核心分工明確，以天津為首的環渤海經濟帶已見雛形。

1949 年天津被「解放」後，該市軍管會接管部金融處立即接管與沒收了「官僚資本」金融機構。1950 年宣佈廢除外國金融機構的特權，建立社會主義金融機構。1952 年收回海關管理權，管制外貿與物資流通，實行外匯與現金統一管理，迫使天津的金融服務與貿易功能日益萎縮。1956 年，中央成立公私合營銀行聯合總管理處，開始徵用、代管與接管境內所有的金融機構與外資企業，天津的外資銀行於是被迫全部歇業清理，使天津第三產業比重由 1949 年的 42%，下滑到 1975 年的 21.6%，1978 年金融業增加值更僅剩 0.1 億元，導致天津金融服務功能消失殆盡。反觀北京，1949 年 2 月，遷入中國人民銀行總行，1953 年建立由人民銀行對全國信貸資金「統存統貸、統收統支」的集中體制，使首都一舉擁有了控制全國政經運作的黨政與金融機器。

此外，中國中央模仿蘇聯實施計劃經濟體制，於1953年頒布《改建與擴建北京市規劃草案要點》，提出「首都應該成為我國政治、經濟和文化的中心，特別要把它建設成為我國強大的工業基地和科學技術的中心」，將北京從1949年前的消費型都市改造成大工業城市，當時中國統一劃分的工業部門有130個，北京就占了120個，重工業產值一度高達63.7%，僅次於瀋陽。反觀天津，中央156項重點工程無一落戶之外（樊傑，2008：25），還將許多工廠都遷址到三線城市去。在中央空間戰略刻意扶持與壓抑的操作之下，兩市製造業結構漸趨雷同，北京的工業實力反超過原為北方工業中心的天津（見表1）。

在北京崛起的同時，天津因此喪失了原本支撐其金融中心地位的廣大內陸腹地[8]。再加上中央鼓勵各地自力更生，如《1976年到1985年發展國民經濟十年規劃綱要（草案）》指示，「一般輕工業產品都要儘可能做到省、自治區自給。」，使環渤海各地逐漸形成「各自為戰」的趨同工業結構；而由國家統一調撥資源的計畫經濟體制，也導致自明清以來天津與各地間綿密的商辦機構網絡被迫撤銷，轉化為行政部門（馬獻林，2006：139）。自明朝以來的「九河下梢天津衛」與第二大金融中心，僅剩海河旁猶如各國建築博覽會的「五大道」，供後人遙想當年的帆檣雲集。

表1：計畫經濟時期環渤海3省2市工業結構表

單位：億元人民幣

年份	1952			1970			1979		
	工業總產值	輕工業	重工業	工業總產值	輕工業	重工業	工業總產值	輕工業	重工業
北京	9.07	5.61	3.46	97.14	33.43	63.7	189.6	76	113.6
天津	19.71	16.36	3.34	102.77	54.83	47.94	175.5	89.7	85.8
河北	16.56	11.74	4.82	89.52	56.58	32.94	228.3	99.4	128.9
遼寧	44.22	13.4	30.8	226.4	55.5	170.9	396	108.5	278.5
山東	20.08	17.84	2.24	141.22	81.88	59.34	314.34	157.52	156.82

資料來源：周立群與張博，「環渤海區域經濟增長及增長極」，收於周立群與謝思全主編，**環渤海區域經濟發展報告 2008** (北京：社會科學文獻出版社，2008 年)，頁 71。

（二）改革開放戰略促進北京全球城市崛起

相對於天津金融貿易功能的窒息，在計畫經濟時期就已建成相對完備的各項基礎建設的北京，改革開放後隨著中國與全球經濟日漸緊密接軌，不斷強化歷史金融空間結構，並逐漸發展出全球城市所具備的各項功能：

1.全國金融管理中心：

為了提供推動市場改革過程中所需要的各項社經功能，中國中央於 1979 年決定打破大一統的金融管理體系，在北京重開「中國農業銀行」，並指定「中國銀行」成為外匯專業銀行、設立「國家外匯管理局」，與重建「中國人民保險公司」。1983 年設立「中國工商銀行」以承擔人行的工商信貸和儲蓄業務，並對人民銀行分支行的業務實行垂直領導。1996 年與 2001 年分別設立「中央國債登記結算公司」與「中央證券登記結算公司」；2003 年人民銀行又進一步將金融監管與股票發行審核等權限，劃分給「銀監會」、「證監會」與「保監會」，使「一行三會」成為中國最高金融決策和監管機構，再加上主管

[8]顧朝林，于濤方與李王鳴等（2008：88）發現北京在 1949 年僅作為受天津吸引的三級節點城市，但在中國建都北京後迅速成為北方的核心城市，而天津的地位則明顯下降。

經貿事務的國務院各部委，使北京成為全國金融政策的決策、監管與資訊中心。

由於計畫經濟體制集權管制金融的歷史遺緒，以及改革開放後提供國家各項政經政策、各大國企或私營企業抒困或信貸等金融供給，以支撐快速成長的資本需求，使北京不但擁有五大國行、招商銀行等 11 家「國」字頭銀行、中國人壽等 14 家保險總公司、郵儲銀行、24 家財務公司、2 家期貨、6 家資產管理公司與銀河證券等 63 家國家級金融集團總部，更掌握了全國金融資產總額的 60%、全國銀行體系總資產的 80％、90%以上的信貸資金與 65%的保險資金，成為全國最大的資金清算中心（趙弘，2005：36），並為全國最大的債券發行、交易與資產託管市場。對外連結方面，據《北京市十一五時期金融業發展規劃》指出，截至 2005 年底，北京共有外資銀行分行 25 家，支行 4 家，代表處 78 家；外商獨資和中外合資保險公司 17 家，其中壽險總公司 5 家，分公司 10 家，再保險分公司 2 家，駐京代表處 87 家。外資金融機構的投入，使原本因為聚集各大國有銀行總部與全國金融管理中心而崛起的北京金融空間結構更加強化，更被「全球金融中心指數報告」，評比為全球第 36 大金融中心(Z/Yen Group, 2007:13)。

2.中外企業總部城市：

首都的特殊象徵意義、廣大的消費市場，以及擁有國內航空與鐵公路交通樞紐等軟硬體建設，使跨國企業、中央國企與國內企業總部紛紛聚集北京，據北京市統計局統計，截至 2004 年底，在京的大型企業集團有 266 家，其中央企總部共有 160 家，北京市屬企業及民營企業達 106 家。而外商部分，經商務部認定的跨國公司地區總部有 16 家，而經北京市認定者則有 29 家。該年 Fortune 世界 500 強企業中，已經有 185 家企業在北京投資，其中 7 家在京設立地區總部，293 家開辦代表處；投資性公司也達到 146 家，占全國總數的 50%以上，成為連結全球或中國市場門戶城市。另據 GaWC 研究指出，北京 2004 年已名列全球第 22 大世界城市[9]。

3.科技研發、生產者服務與資通中心：

1980 年中央書記處指示，將北京建設成全國科學、文化、技術最發達，教育程度最高的第一流城市。此後，歷經中央多年的刻意培植之下，2004 年北京科技單位達到 6590 家，國家工程技術中心 41

[9] GaWC 把北京列為「alpha-」級城市，亦即連結主要經濟區域與國家進入世界經濟的非常重要的世界城市。See, GaWC, "The World According to GaWC 2004," the Globalization and World Cities (GaWC),*http://www.lboro.ac.uk/gawc/world2004.html*.

個，占全國 29.1%；國家重點實驗室 47 個，占全國的 30.5%，科研人員 30.1 萬人[10]。截止 2005 年底，北京技術仲介服務機構共 153 家，流向環渤海地區技術 6246 項（北京技術市場管理辦公室，2009）。為了利用中國大量廉價的研究人力與本土化，外資企業紛紛在北京設立研發部門，自 1994 年加拿大北方電訊公司與北京郵電大學建立北京第一家「北郵—北電研究開發中心」起，迄 2004 年底，北京聚集了各類外資研發中心 239 家（湯平，2008：84-86）。其中海澱園截至 2006 年底，已經聚集 IBM、NOKIA 與 Microsoft 等世界 500 強企業共 113 家研究機搆。

文化創意與傳播中心方面，北京不但擁有央視、人民日報與新華社等各大官方媒體，也聚集了CNN等國際各大媒體的辦事處。硬體方面，中國電信、中國網通、中國移動與中國聯通等四大通信公司，以及2006年市占率前8強的空中網、新浪、搜狐、網易、華友世紀等網路公司也都在北京設立總部與主要機房。

生產者服務業方面：由於北京中資與外資企業總部亟需大量的會計、法律與諮詢等生產者服務，2005年共有58家外國律師事務所在北京執業，占全國獲准家數的41.7%[11]。截至2006年底，北京聚集了麥肯錫等272家跨國諮詢機構（湯平，2008年：84-86）。全球四大會計師事務所普華永道(PWC)、畢馬威(KPMG)、德勤(DTT)和安永(EY)也紛紛進駐北京CBD。

（三）北京功能轉型與首都經濟圈雛形的出現

隨著市場機能的日漸恢復，以及外商投資結構逐漸向第三產業轉型，北京三級產業結構也逐漸由 1978 年的 5.2：71.1：23.7 的大工業型城市，轉型成 2004 年的 1.6：30.6：67.8 的服務業型城市，如中國企業聯合會「2005 中國服務業 500 強企業」評鑑中，北京入圍 98 家，超越上海 54 家、天津的 35 家。城市職能轉型的同時，資本主義都市化的「集聚—擴散」效應也開始在原為社會主義城市的北京出現（周一星與孟延春，2000：220-221；Wu, 2007:88-89）。韓國浦項鋼鐵等在河北等地投資生產基地的外商，紛紛前往北京設立中國區總部，以便打入中國市場。而許多中國企業，尤其是環渤海區域企業，則為了進軍全國與海外市場，也開始出現進京潮，如河北恒利、德龍鋼鐵、大連冰山與保定長城汽車等紛紛將企業總部遷到北京。另據「2005 中國企業 500 強」統計，總部設在北京的企業（含央企）共有 91 家，雄踞全國之首，使北京由計畫經濟時期的工業城市，逐漸轉型成連結全球與國內市場

[10]依單位屬性分，國有獨立科研機構 353 家，高等院校 98 所，企業 5942 家，其他單位 197 家。引自「2004 年北京地區科技活動主要特點」，**北京市科學技術委員會**，*http://www.bjkw.gov.cn/n1143/n1240/n1435/n2021/464057.html*（2011.2.22）。

[11] 「139 家外國律師事務所駐華代表處獲准在中國境內執業公告」，**中國司法部**，2005.9.26。

的門戶城市與總部城市。

在各大企業總部與菁英等資源不斷向北京聚集的同時，北京翻騰的地價與城市擁擠等問題，也促使北京原有的一些技術低、污染重、耗能多的重化工與煉鋼等工業逐漸外移，如首鋼落戶河北遷安與曹妃澱，第一機床廠鑄造車間遷到保定市；內燃機總廠鑄造車間遷到滄州市；白菊公司洗衣機生產基地也遷到霸州市，使河北環京 6 個地級市成為承接擴散最多的地區（北京市發改委，2004），2005 年天津市也引進北京資金 133.1 億元人民幣。再加上交通網絡的日漸完善與汽車的普及，原本位於市中心的各大非金融業總部也開始向望京與亦莊等郊區遷移，許多世居北京市區或工作的市民與上班族也開始向涿州市等環京縣市移居與通勤。此「集聚—擴散」趨勢逐漸削弱產業結構趨同的歷史空間結構，轉變成功能互賴分工的城市網絡。如于濤方等中國學者於 2005 年時發現，分佈在京津周邊的廊坊、燕郊、涿州、宣化、香河、霸州、高碑店、蘆台、張家口、北戴河以及白洋澱等縣市鎮已經成為京津第二產業轉移的重要基地（于濤方，2005：49），城市間初顯連接；而地理距離較遠的衡水、邢臺、邯鄲和石家莊等城市尚還孤立（于濤方與吳志強，2006：36-38）。面對北京經濟結構轉型的契機，原本一直抱怨京津磁吸各項資源而導致經濟衰退的保定、廊坊與張家口等環京津城市紛紛改弦更張，競相提出「對接北京」或「對接京津」戰略，首都經濟圈已現雛形。

相對於北京日益向外擴散，天津為了培植 1994 年自主成立濱海新區，開始推動「工業戰略東移」計畫，鼓勵該市老城區與海河兩旁的紡織與鋼鐵等傳統產業東移濱海新區，而非向周圍腹地城市遷移，以致於天津企業外移相對有限。例如位於京津之間的廊坊，「十五」期間，從北京引進資金 191 億元，占該市省外資金的 60%，其固安工業園 80%的專案都是來自北京，顯見京津對周圍腹地輻射能力的差異。

四、國家成長極空間戰略對天津經濟發展的影響

改革開放之後，雖然中國各級城市可以從招商引資、舉債或銀行貸款中獲得建設資金，但中央政府的空間規劃、特許試點政策、財政挹注或指揮央企大項目投資與否，依然是影響環渤海城市與區域發展的關鍵力量之一。

（一）濱海成長極空間戰略的出臺

為化解地方主義與促進區域整合，中國於 1992 年的十四大首次提出「環渤海地區」的空間概念，1996 年的《國家九五計畫和 2010 年遠景目標綱要》中，首次劃定環渤海的地理範圍為，「遼東半島、山東半島、京津冀為主的環渤海經濟圈」。由地理位置觀之，京津冀位於左翼遼東半島城市群與右翼

山東半島城市群的中心位置（見圖 2），如欲雙翼齊飛就必須先促進京津冀整合；而欲促進京津冀整合，就必須先處理京津分工問題（張可雲，2004：13；肖金城，2008：172）！

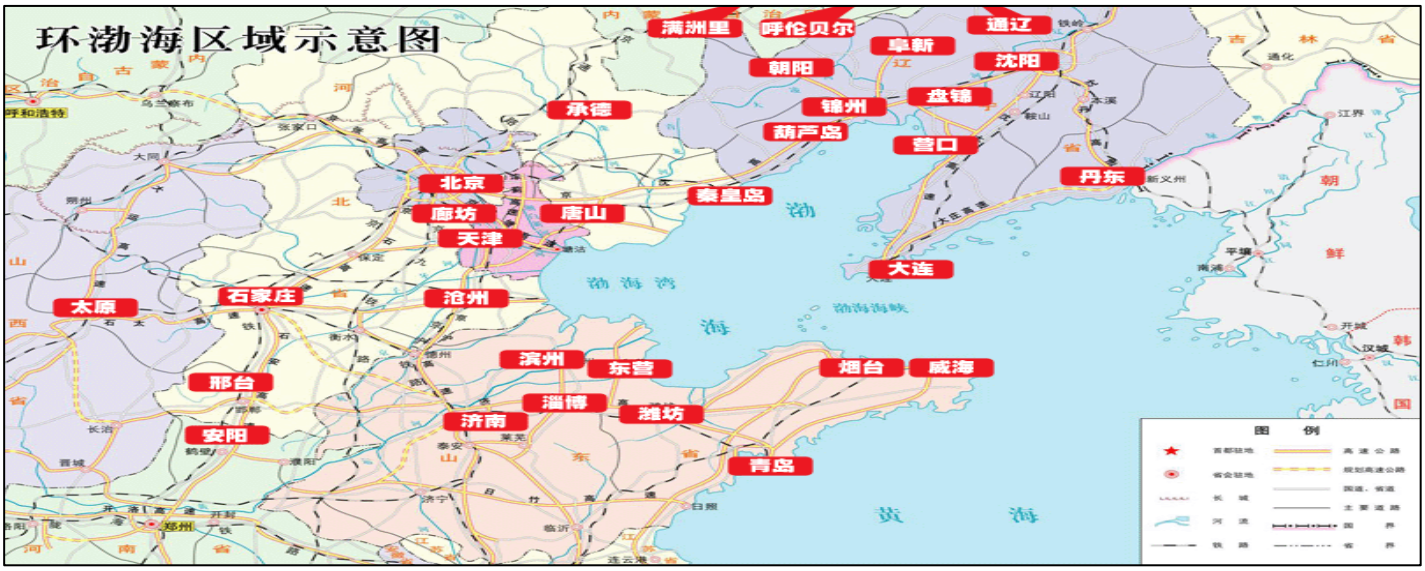

圖 2：環渤海城市區域圖

資料來源：「環渤海區域示意圖」，**環渤海區域信息網**，*http://www.huanbohai.gov.cn/map.asp*。

雖然國家發改委等中央部門多次由上而下推動，但區域整合卻一直未有顯著進展。相對於長三角的日趨整合，促使許多中國學者認為，正是由於環渤海不但缺乏一個如上海般的核心城市，而且京津為爭奪區域龍頭的連年惡鬥[12]，制約了區域進一步合作與發展（樊傑，2008：112）；再者，雖然經濟數據上，北京一市獨強，看似整個區域經濟發展的引擎，但實際上首都城市的自身定位卻是著眼於全國與全球，其發展並未以環渤海區域為依託，故與腹地的功能聯繫偏低，不利於京津冀區域的整合，反而天津的發展與該區域息息相關（樊傑，2008：212）。此類觀點深深影響了中央空間戰略的擬定，如濱海新區管委會高階官員表示：

> 「環渤海之所以無法成為一體，就是因為沒有核心，成為孤立的雙核（京津），各做各的，只想把我這做大，反導致兩者相互排斥，而非相吸，而周邊地區卻是最貧困地區。現在的措施是把這兩個核心融合在一起，這樣對北遼寧，南山東的吸引力就會不一樣，就要把一個蛋的兩個核心，變成一個。」（訪談紀錄，2007.8.11 津 O1）

[12] 除了相互搶奪項目與政策外，據受訪的天津學者表示，北京很介意「經濟中心」的名分，1997 年，當天津首次獲得國務院定位為「北方重要的經濟中心」之後，北京甚至為此棄天津港，改在唐山鉅資建設京唐港（訪談記錄，2009.8.18 津 S6）。

因此，中國國家主席胡錦濤與總理溫家寶於 2004 與 05 年接連考察濱海，並於十六屆五中全會首度將環渤海納入國家整體發展戰略。在中央的運作下，原以全國經濟與金融中心為目標的北京，在其《十一五規劃綱要》中首次不再提出「經濟中心」，而將發展定位改為「國家首都、國際城市、文化名城、宜居城市」，環渤海各省市也在各自的《十一個五年規劃綱要》等官方文件中，表態將擁護國家規劃，參與區域合作。2006 年 5 月，國務院下發《推進天津濱海新區開發開放有關問題的意見》正式批准濱海成為全國綜合配套改革試驗區，並定位為「依託京津冀、服務環渤海、輻射三北、面向東北亞，努力建設成為我國北方對外開放的門戶、高水準的現代製造業和研發轉化基地、北方國際航運中心和國際物流中心」，7 月批覆《天津市城市總體規劃(2005-2020 年)》，首次將天津扶正為「北方經濟中心」。2008 年 3 月，國務院印發《關於天津濱海新區綜合配套改革試驗總體方案的批復》，又給予天津涉外經濟體制改革與金融改革創新等十項試點權，意圖同時推動天津重化工業、金融服務與航運物流三大產業中心的發展，重新恢復天津區域經濟中心的實力與功能，促使京津功能再次轉型，化解龍頭惡鬥與帶動區域整合（周立群與張博，2008：90）。如濱海官員表示：

「……發展這個（環渤海）區域要找一個切入點，中央制訂整個區域發展規劃，這個區域叫做京津冀，也就是這個（環渤海）區域的核心。這個區域規劃制定的實施點選在天津，就像當年的深圳帶動珠三角，浦東帶動長三角，就想用天津濱海新區帶動天津，再帶動兩翼，然後再帶動大西北。」（訪談紀錄，2007.8.11 津 O1）

（二）刺激海內外資金迅速聚集天津與濱海新區

早於1994年，天津市就在渤海海濱的鹽鹼荒灘上獨力創辦濱海新區，但合同外資額卻未有顯著成長。直到2005年起，獲得各項稅收優惠與「先行先試」國家空間戰略扶持之後，引資額才開始迅速揚升。例如2007年天津合同外資遽增115.19億美金，成長42%；2008年在金融風暴肆虐之下，環渤海各省市無一倖免，但天津仍然逆勢成長，引資額更攀升至132.56億美金，成長15.1%（見圖3）。2009年，環渤海招商狀況仍未完全復原，如北京FDI只吸引61.2億美元，下降19.5%；但天津該年FDI卻吸收90.2億美元，成長22%，2010年更突破百億，達到108.49億美元。其中，濱海合同外資和FDI分別達到117和70.4億美元，各成長11.5%和22.2%，維持高速發展態勢（天津統計局，2011）。

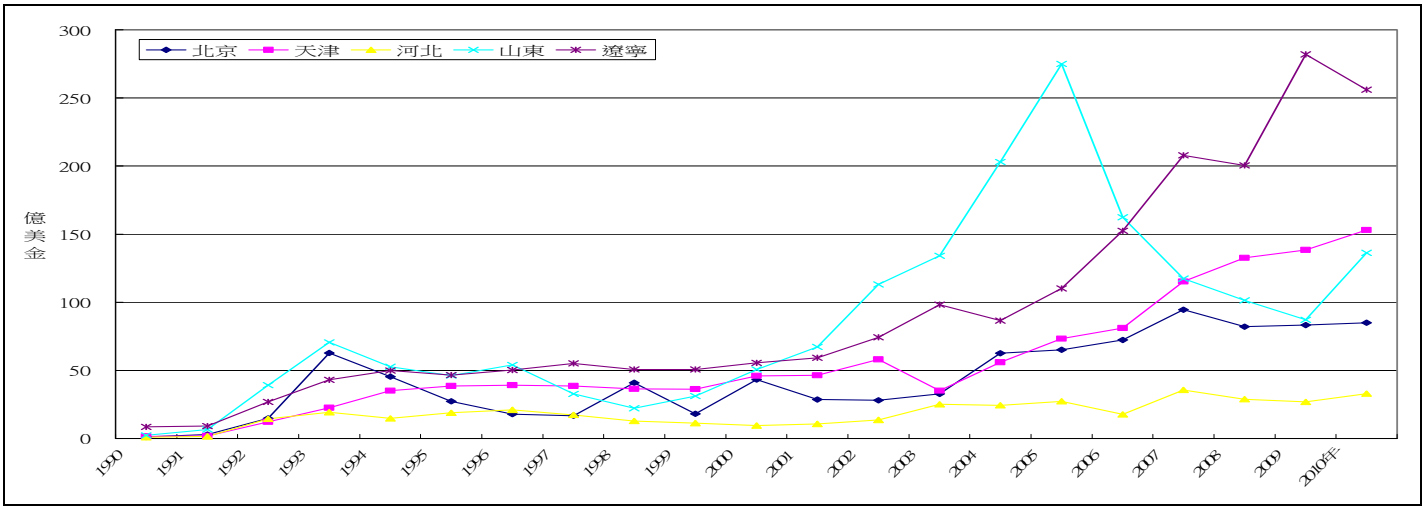

圖 3：環渤海各省市合同外資額歷年變化圖

資料來源：編自北京、天津、山東與遼寧統計年鑑 2010，以及河北經濟年鑑 2010 數據與前列各省市 2010 年統計公報數據。

在國家空間戰略的加持下，天津不僅成功地吸引了外資的目光，連國內資本也紛紛搶進（見表 2），2009 年天津吸收內資 1242.87 億元，成長 35.07%。來自環渤海的內資達到 575.85 億元，占天津總內資的 45.33%，其中，北京資金就占了該區域的 70.2%；而經濟實力遠次於山東與遼寧的河北，其對津投資額也高居全國第三，僅次於廣東省。2010 年，天津引進內資更躍升到 1633.82 億元，成長 31.5%（天津統計局，2011）。

表2：天津引進國內資金表（2005-2009年）

單位：億元人民幣

	2005	2006	2007	2008	2009
北京市	133.1	161.6	208.99	220.3	404.2
河北省	40.3	43.4	51.91	83.4	118
山西省	4.3	3.2	4.19	12.7	8.4
內蒙古自治區	2.9	2	2.9	4.1	4.1
遼寧省	6.1	6.1	13.8	10.7	20.3
山東省	3.5	5	7.7	10.8	20.9
廣義環渤海	190.2	221.2	288.5	342	575.9
全國總計	339.9	431.9	612.9	920.1	1242.9
佔總內資	55.97%	51.23%	47.13%	37.17%	45.33%

資料來源：編自天津統計年鑑2006-2010數據。

（三）推動天津經濟與重工業的再度快速成長

天津市雖於 1994 年自主成立濱海新區，但該年 GDP112.36 億元，僅占全市比重 15.33%，且經濟

成長率卻由 1995 年的 14.9%開始逐年滑落，1998 年甚至跌破 10%，直到被國家空間戰略定位為「**北方經濟中心**」後，2007 年經濟成長率躍升到 15.2%。2008 年在金融風暴橫掃各省市下，為確保國家空間戰略成功，中央大規模挹注國家財政投入天津基礎建設，與指示各大中央企業在濱海投入大乙烯等大項目投資，據國家發改委副主任杜鷹表示，該年央企對津投資額高達 900 億元，使天津 GDP 達到 6354.38 億元，逆勢成長 16.5%，位居全國第二，固定資產投資成長 42.5%[13]。2010 年，據「2010 年天津市內資市場主體發展報告」統計，國有及國有控股企業又增資 1888 億元，成長 25.07%，推升天津 GDP 達到 9108.83 億元，成長 17.4%，位居全國第一。其中，由央企主導的八大優勢產業工業總產值 15268.58 億元，更占全市的 91.6%（天津統計局，2011），使濱海新區 GDP 達到 5030.11 億元，成長 25.1%，首度超越浦東，占全市 55.2%，越來越成為拉動全市經濟發展的成長極（見表 3）。

表3：濱海新區對天津市經濟發展的拉抬效果

年份	外商直接投資（億美金）			總 GDP（億人民幣）		
	天津市	濱海新區	%	天津市	濱海新區	%
2000	25.6	14.3	55.9	1701.9	562.4	34.3
2001	32.2	24.5	76.1	1919.1	667.1	36.5
2002	38.1	8.3	21.9	2150.8	820.5	40
2003	16.3	12.2	74.4	2578	999.8	40.9
2004	24.7	17.4	70.6	3111	1250.2	42.6
2005	33.3	25.3	76	3697.7	1623.3	43.9
2006	41.3	33.5	81	4344.4	1960.5	45
2007	52.8	39.2	74.4	5050.4	2364.1	46.8
2008	74.2	50.8	68.4	6354.4	3102.2	48.9
2009	90.2	53.8	59.6	7500.8	3810.7	50.8
2010	108.5	70.4	64.9	9108.8	5030.1	55.2

資料來源：改編自天津市統計年鑑 2010 與天津 2010 年國民經濟和社會發展統計公報。

中央計畫經濟將天津市由服務型城市轉變成重化工業城市，改革開放後，天津三級產業結構由 1978 年的 6.1：69.6：24.3，逐漸升級到 2002 年的 3.9：49.7：46.4，開始向第三產業經濟轉型。然此趨勢卻於 2004 年總理溫家寶批示《關於進一步發揮天津濱海新區在振興環渤海區域經濟中作用的建議》後開始逆轉，國家空間戰略的各項租稅優惠與政策試點，不但吸引大型外資工業投資，連長城汽車等內資

[13]據天津市經濟和資訊化委副主任賈泓表示，在 23 個重大項目帶動下，天津新增產出 1400 億元，對工業成長貢獻率超過 60%。摘自趙珊，「天津的數字」，**人民日報海外版**，2009.9.2，第 1 版。

製造業也紛紛進駐，再加上國家刻意引導的大火箭、大飛機[14]、千萬噸煉油、百萬噸乙烯與 300 萬噸造船等國有或跨國大項目投產，形成航空航太、石化、裝備製造、電子資訊、生物醫藥、新能源新材料、國防科技與輕工紡織等八大優勢產業，使天津第二產業成長率反而開始超越第三產業，三次產業結構也由 2005 年的 2.9：54.6：42.5 逆轉成 2008 年的 1.9：60.1：38（見圖 4）。

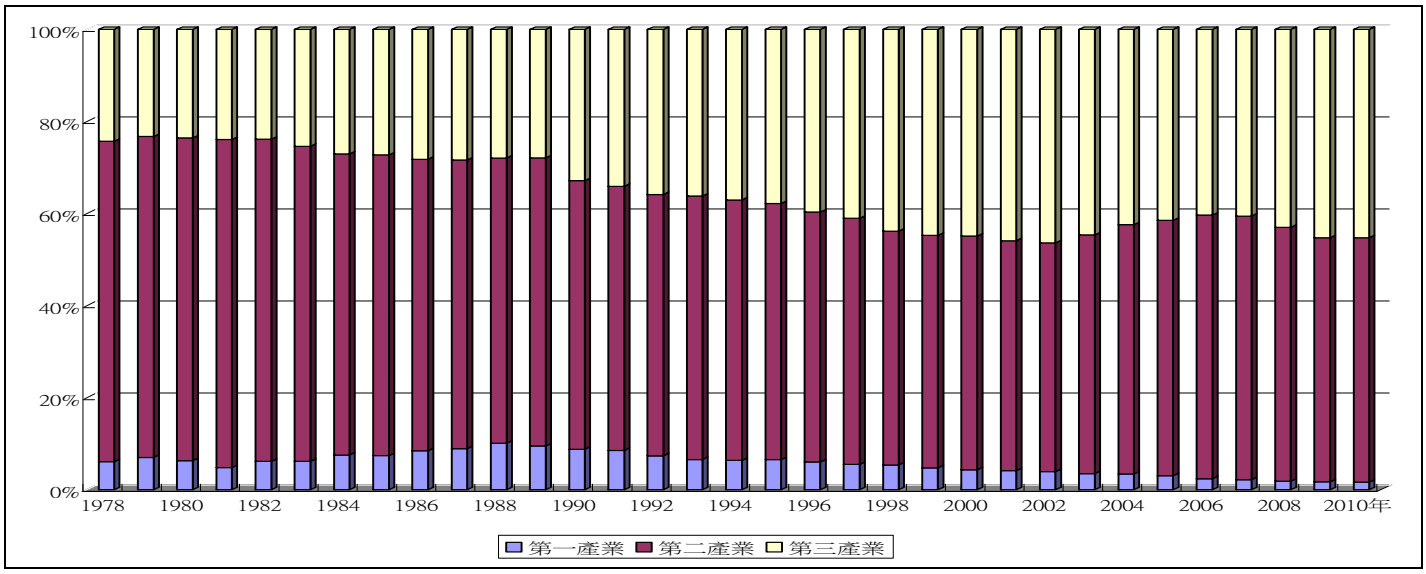

圖 4：天津市歷年三級產業結構變動圖

資料來源：同表 3。

五、空間結構競合對全球城市區域整合路徑之影響

在計畫經濟所堆積出的歷史空間結構上，中央政府透過空間戰略培植的以天津為北方經濟中心的政治空間結構，與透過連結全球經濟的北京首都圈的經濟空間結構之間的競合關係，不但左右了京津兩大城市職能的發展，也同時牽動京津冀經濟區域空間結構的演化。

（一）京、津金融中心的發展

一般而言，外資銀行等金融服務業對東道國金融政策的變化十分敏感(McKinsey, 2007: 86)，按英日各國實例，金融政策的去管制化，往往可以吸引許多國內外金融業進駐(Martin, 1999:8-9; Sassen, 2006:83)。中國在浦東新區的成功經驗上，意圖再次以國家機器操縱金融工具與空間戰略重新扶正天津為「北方經濟中心」，不但特批天津設立中國首家產業投資基金、股權投資基金協會與全國性股份制銀行，在《關於推進濱海新區開發開放有關問題的意見》中，更「鼓勵天津濱海新區進行金融改革和創

[14] 據受訪學者表示，航空產業遠比上海和西安相對薄弱的天津，之所以能獲得空中巴士 A320 系列飛機總裝線的投資，是因為中央的大力支持所致（訪談記錄，2009.8.18 津 S5）。

新……先行先試。」，允許濱海成為保險改革試驗區與設立「非上市公眾公司股權交易市場」(Over-the-Counter Market , OTC)。銀監會官員還親自向外資銀行推銷濱海新區，天津市也提出一系列吸引金融業總部的租稅優惠政策，盼能吸引外資金融機構進駐。

中央一連串的金融創新試點政策，促使各城市商銀與股份制銀行紛紛進駐天津（中國人民銀行天津分行，2007：4；2008：2），截至 2010 年為止，共吸引 917 家私募股權投資基金和基金管理公司註冊，註冊額 1637.38 億元，超越北京的 510 家。基金業的湧入，使天津金融業增加值達到 560.73 億元，成長 18.1%，顯示國家空間戰略的拉抬之功。然而，象徵國際金融中心競爭優勢的外商銀行等跨國金融機構，卻未如預期向天津聚集，如 2009 年天津外銀分行僅比 2006 年的 14 家成長 9 家，法人銀行僅有 Korea Exchange Bank1 家。

反觀北京，據北京市銀監局統計，2007 年北京金融機構吸收外資銀行戰略投資 18.6 億美元，占全國的 21.2%；2010 年又新增外資銀行 1 家，外資參股的期貨、保險、貨幣經紀公司各 1 家。截至 2010 年底，北京共有外資設立或參股的法人金融機構 43 家，其中法人銀行有摩根大通 (JPMorgan Chase & Co.)、德意志銀行(Deutsche Bank Ag)、法國興業銀行(Societe Generale SA)、韓國友利銀行、韓亞銀行、新韓銀行與加拿大 Montreal 銀行等 7 家；非法人外資銀行分行 38 家、400 多家國際金融機構和組織，以及 NASDAQ、紐約證券交易所、德意志、倫敦、新加坡、韓國與東京等證券交易所代表處，北京外資金融規模與擴張速度均遠超獲國家戰略支持的天津。而且，許多在津註冊基金，實際上卻是在北京操作，如 2010 年北京所管理的基金規模 1.04 萬億元，以及獲得創業投資和私募股權投資 259 件，占全國 21.9%；金額 39.4 億美元，占全國 25%（北京金融工作局，2011），均為全國第一，遠超天津（陳工孟，2009；清科集團，2010）。

由上述可知，國家工業空間戰略成功促成濱海工業中心的快速發展，但金融空間戰略重建天津金融中心的速度卻是相對緩慢？許多接受筆者訪談的天津學者與官員大多認為，這是因為：「天津最大的優勢是離北京很近，但最大的劣勢也是離北京很近。」。但我們以為，影響國家金融空間戰略效力的關鍵很可能不在於兩市地理距離的遠近，而是受到知識密集的金融產業的資訊需求特性，以及歷史轉折時所形成的北京國有經濟特性和跨國金融機構的業務需求間的相互牽引所致。

基本上，歷史和偶發事件往往對生產區位的形成與選定產生深遠的影響（Krugman，張兆傑譯，2000：9-19），一旦產業群聚形成，循環累積效果所產生外部規模經濟，將猶如滾雪球般越來越將該產業鎖定在某個地方。更準確的說，是被鎖定在某地方上的社會空間結構之中。因此，金融中心一旦崛

起，其金融與生產者服務業的規模經濟與菁英間社會網絡，很可能使金融中心的地位與功能持續維持(Thrift,1994:336-337)。如 Hall 與 Pain 在比較西北歐八大城市區域之後也發現，跨國公司的地區總部區位仍向東道國生產者服務業與基礎建設齊備的首位城市繼續聚集，即便是多核心城市區域亦然，更加鞏固了首位城市在區域城市體系中的指揮地位(Hall and Pain, 2006:197-198)。

此外，工業與金融業最關鍵的差異是，工業中心只要有廉價的人力、原料與土地等初始生產要素，或是挹注大量資本即可快速發展。但金融中心需要的卻是「資訊」(Porteous,1995)。由於風險越高的產業，企業克服地理距離的成本隨之升高(Storper and Scott,2005: 508)，越需要面對面（face-to-face）的資訊交流與接觸(Massey,1984:191;Thrift,1994:333;Sassen,2006:125)，然而並非所有的資訊都可跨空間流動，複雜玄奧的資訊也需專業社群的解讀，因此「地方仍然重要」(place still matters) (Martin, 1994:255)，越是全球分散佈局的跨國企業越是選擇可獲得相關豐富資訊、設備完善與生產者服務業齊備的大城市做為總部基地(Hall, Evans and Pain, 2006:55; Sassen,2006:96-97)。所以，金融樞紐往往出現在富含國內企業交易、國際政經局勢、科技創新與政府決策等資訊優勢的地理區位之上（Laulajainen，孟曉晨等譯，2001：9-10;Gehrig,2000），尤其是掌握金融決策的首都，極可能吸引與持續強化金融聚集趨勢(Zhao, Zhang and Wang,2004:577)。

自中國建政以來，在中央空間政策的刻意培育下，2010 年全國 121 家中央企業中，有 94 家總部與 17 家政策銀行在京，使北京掌握全國 1/3 國有資產，自然成為全國國有金融與經濟體系的控制中心。單單金融街一處的金融資產規模就高達 49.5 萬億，占全國 52%，控制全國 95%信貸資金、65%保費資金、38%人民幣清算業務、50%外匯清算業務，23%金融服務、56.64%債券市場融資。再加上全國頂尖科研、財經與商管等高校和研究機構雲集，以及便捷完善的陸空與資通基礎建設等逐漸形成的歷史空間結構，使北京國家金融空間結構不斷地厚實。雖然改革開放多年，但中國式社會主義市場經濟體制對各項外資准入、金融與經濟開放政策的掌控，以及企業營運仍具有關鍵影響力，再加上產權保護等商業環境仍有許多灰色地帶，為了獲得官方審批打入市場，及早獲知政策變動以降低高度不確定的政治風險，許多跨國企業高層為了與掌管相關產業的中央官員或央企保持密切接觸和培養良好政商關係（Woetzel 著，齊思賢譯，2003：96），紛紛進駐北京；即便將總部搬到上海等地的通用電氣與大都會保險等外商，也都會在北京設立收集資訊與從事政府公關的辦事處或第二總部，間接促使跨國金融機構等生產者服務業為了「追隨顧客」的投資佈局（Slager 著，樂為良譯，2007：85-86; Esperanca and Gulamhussen, 2001:281-293; Tschoegl, 2000: 14-15），也赴京設點。非但跨國企業如此，許多外資銀行也

將中國金融政策的不透明或頻繁變動，視為不確定性風險的主要來源之一[15]，正如韓國友利銀行行長金大植表示：「選擇落戶北京，是因為北京具有中國其他城市無法比擬的優勢，能最先感知政策和金融環境的變化」（李焱，2008：40-43）。可見藉由投入資源與去管制化政策的國家空間戰略，難以改變企業與金融機構總部尋求知識與資訊密集區位的本能。

而且北京龐大且富有的消費人口、跨國公司、央企與全國各大民營企業總部集聚，中資企業海外併購與 IPO 上市，以及有如天文數字般的國有銀行壞帳等業務，更是吸引摩根等跨國投資銀行與投資性公司的注目，幾乎全球各大投資銀行與占全中國半數以上的 183 家具地區總部性質的投資性公司聚集北京，使中國外資金融地理出現跨國投資銀行聚集北京，商業與零售銀行群聚上海的「北投南商」格局。

（二）國家空間戰略對環京津城市群經濟發展的影響

隨著北京越來越向金融與經濟中心城市轉型，原於京郊的京東方與峻凌等京企與外資製造業開始逐漸向河北跨界移轉或開設生產基地，逐漸形成穿透地方政府行政邊界的北京-廊坊電子產業走廊。然而，中央意圖透過重新定位京津城市功能，促進京津冀區域空間再結構的國家空間戰略，卻相當程度地減緩了現今以北京為中心，河北省環京城市為腹地的經濟空間分工進程。

原本向北京聚集的內資，在 2004 年總理溫家寶批示《濱海發展建議》後，該年天津實際外省市內資額高達 112.2 億元，立即遽增 83.7%，2005 年更高達 339.9 億元，暴升 203%。大多向河北移轉的京企也受到影響，2006 年北京對津投資由 2005 年的 133.1 億元提升到 161.5 億元，成長 21.34%，2009 年更增加到 220.34 億元（參閱表 2）。外資方面，2006 年濱海新區才剛被納入國家發展戰略，2007 年天津 FDI 立即遽升 54.6 億元美金，成長 27.8%，首度超越北京的 50.66 億元美金；而原本向北京集中的基金業也被天津試點政策所吸引，2010 年註冊家數甚至超越北京。中外資金與產業的聚集，使濱海人口快速成長，據第六次人口普查初步統計，2010 年底，新區常住人口高達 248 萬，比 2005 年增加 108 萬人，然而新區 2009 年戶籍人口卻僅有 118.57 萬人（天津市統計局，2010b）。

擔任經濟腹地的河北省原為北京技術出口的主要市場，技術成交額隨著兩地經貿往來的日益密切而不斷攀升，2007 年河北更獲得 1,814 項技術，成交額 63.97 億元，天津市僅 17.18 億元；2008 北京輸出到環渤海的技術總成交額 241.19 億元，成長 40.83%，河北卻首次下滑到 40.96 億元，反觀天津市

[15]普華永道會計事務所訪談 42 家投資中國的外資銀行後指出，接近 50%外銀將監管條例不斷增加的監管風險（regulatory risk）視為最迫切的潛在風險(PricewaterhouseCoopers, 2008:28-29)。

則上升到 23.87 億元；2009 年受到金融風暴的影響，技術總成交額衰退到 202.23 億元，下降 16.15%，但北京輸出到天津成交額卻遽升到 72.41 億元，躍居全國第一，河北則持續滑落，僅成交 19.35 億元（見表 4）。

表 4：北京向環渤海輸出技術成交額

單位：億元人民幣

年份	天津市	河北省	山東省	遼寧省	山西省	內蒙古自治區
2003	4.04	7.02	11.9	6.23	4.91	2.83
2004	7	9.71	9.83	9.37	7.31	4.66
2005	8.96	16.59	8.64	13.26	13.16	15.61
2006	10.94	18.71	17.45	13.63	18.6	11.13
2007	17.18	63.97	24.9	14.23	31.97	19.01
2008	23.87	40.96	29.09	38.06	35.77	73.44
2009	72.41	19.35	17.72	23.75	34.2	34.81

資料來源：北京技術市場管理辦公室，2003-2009 各年「北京技術市場統計年報」。

為了承接北京產業轉移，「好多專案天津都在跟河北爭」，津冀競爭日益激烈（孫維晨與劉德炳，2010）。然而京津冀中最貧弱的河北，根本難以匹敵濱海新區廣達 2270 km^2 的低廉土地與國家特許政策的競爭優勢，甚至連許多河北廠商都轉向天津投資，如 2006-07 年，河北分別實際引進省外資金 158.18 與 193.3 億元（河北省商務廳，2007，2008），但省內資金卻各有 43.4 與 51 億元投向天津，09 年更增加到 118 億元，保定惠德風電在天津投資設備總裝基地，長城汽車也在濱海設立裝配廠。河北高級藍領也正快速大量地流向濱海（陳曉永與程桂榮，2008：30），據河北省人力資源和社會保障廳統計，2009 年該省在津就業高達 64 萬人。在人財兩失下，河北總 GDP 成長率從 2005 年開始逐年下滑（見圖 5）。

由上可知，中央所推動的速成式經濟中心戰略，雖成功地促使各地資源向濱海新區聚集，推動天津經濟快速發展，但目前尚未出現一般經濟中心發展過程中常見的向腹地「分散產業」效應，如濱海新區綜合配套改革辦官員表示，天津與周圍城市間「表面上的座談、簽戰略合作我們也都有，……但我們現在還沒有項目上的合作，只是有過溝通、思想的交流，建立形式上的一種契約」。再加上天津又頒佈《關於加快推進全市工業技術改造工作的實施意見》，設立輕紡工業區，鼓勵城區的大型工業東移，截至 2009 年 8 月底為止，已東遷 300 戶，改革辦官員坦承，「我們也有指標的壓力，天津自己都吃不飽了，就不太可能將產業外流。」，僅有少數老舊高污染耗能產業才任其向河北與山東等地遷移（訪談

紀錄 2009.8.26 津 O2)，如保定市 2009 年共引進省外資金 151.68 億元，技術 650 項，其中北京資金 83.67 億元，技術 199 項；但天津資金卻僅 15.02 億元，技術 68 項 （保定市統計局，2010 年），導致天津與周圍腹地分工薄弱。

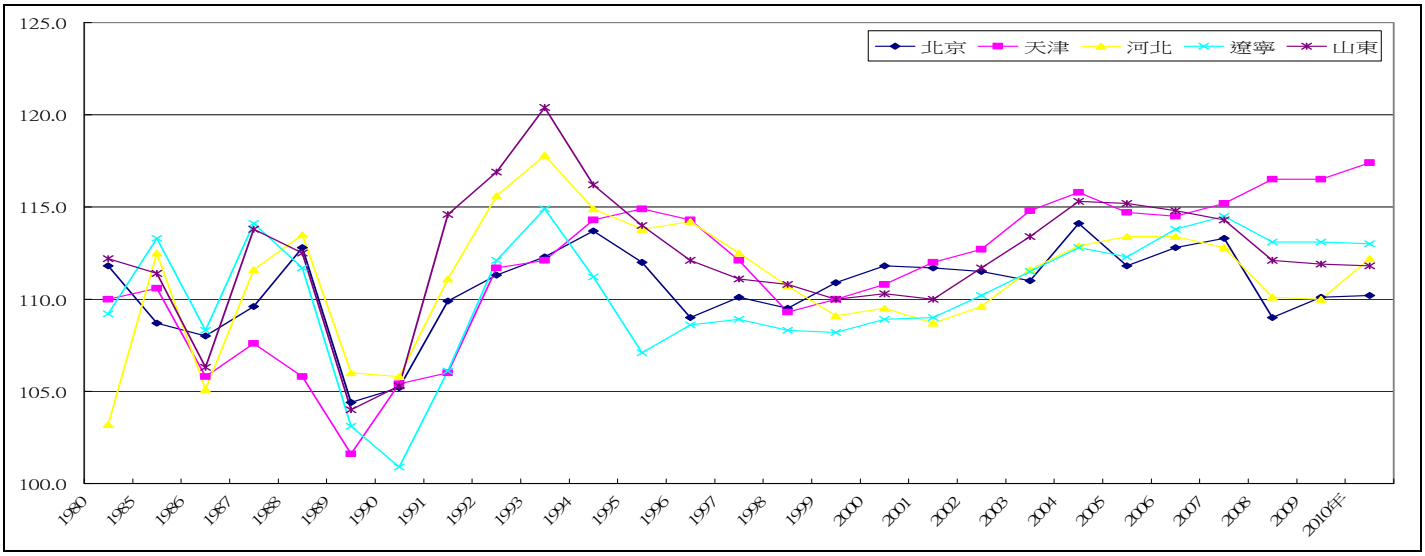

圖 5：環渤海三省二市歷年 GDP 成長率（上年為 100）

資料來源：同圖 3。

（三）空間競合過程中的經濟區域空間結構演化

雖然國家空間戰略相當程度影響了資源流動與中外企業的區位選擇，然而在歷史空間結構的引導下，中外企業總部與生產者服務業仍持續湧入北京，2010 年，北京新認定跨國公司地區總部 24 家，累計達 82 家，其中 62 家是世界 500 強企業；新設外資研發企業 28 家，累計達 353 家；新增 Montreal 銀行等 18 家法人金融機構，累計達 551 家。總計 61.2%的 FDI 投向以租賃商務、批發零售、資訊、科研與交通物流為主的生產者服務業，其中金融業 FDI 達到 1.88 億美元，遽升 139.9%。截至 2010 年底為止，北京聚集了全國百強管理諮詢公司中的 57 家，其中 35 家名列全球前 50 大諮詢公司；全國前 20 強的會計師事務所中的 14 家，其中 6 家為世界十大會計師事務所，全國 188 家外資法律事務所中 74 家，以及全國前 30 強律師事務所中的 22 家。

為了佈局全國與進軍海外，北京齊備的生產者服務業也吸引各地民企總部紛紛進京，如海爾、華龍、中旺與神威等都將總部或研發中心遷至北京，生產基地留在河北或青島。據魏後凱與白玫（2008：1-13）於 2007 年上市公司數據中發現，企業總部遷入北京有 25 家，遷出 1 家，淨遷入最多；天津卻是遷出的 5 家全去北京；總部在京的 100 強總資產集中度，由 2005 年的 40.86%，上升到 2006 年的

86.58%。而武前波與寧越敏（2010：150），檢視 2008 年中國製造業 500 強區位後也發現，北京成為吸收環渤海區域企業總部的主要城市。2010 年，由中國企業聯合會評選的「中國 500 強企業總部城市」，北京市增加 4 家，以 100 家蟬聯第一，天津第四，僅有 22 家，繼 2008 年減少 1 家後，又減少 3 家。

隨著中國經濟日益蓬勃發展，人民收入倍增，以及各大央企總部的信貸、境內外投資、資金調度和結算等需求，又帶動了北京國有金融中心的崛起，如《The Banker》2010 年度世界銀行一級資本總額 1000 強排名中，位於北京的工商銀行位列全球第 7，中國銀行第 14、建設銀行第 15、農業銀行第 28、民生銀行第 80、光大銀行第 136、北京銀行第 155、華夏銀行第 178。而全球最賺錢的銀行排名中，工商銀行以 245 億美元蟬聯全球第 1，建設銀行第 2。截至 2010 年底，北京金融業增加值達到 1838 億元，成長 8.6%，占全市 GDP13.4%，拉動經濟成長 10.1%，三級產業結構提升為 0.9：24.1：75（北京市統計局，2011），越來越成為京津冀的實際金融中心。北京強大的金融實力被 2011 年的「全球金融中心指數報告 9」，由浮現中的全球競爭者（Global Contenders）提升為全球專業金融中心（Global Specialists） (Z/Yen Group, 2010: 18-19,2011:10)（見表 5）。

表 5：中外相關研究報告對京津全球城市排名簡表

研究年報	北京（排名／總數）	天津
The World According to GaWC 2008	alpha+級	suffiency 級
Global Financial Services Centre Index 2008	46／50	無
MasterCard Worldwide Centers of Commerce Index 2008	57／75	無
2010 年中國城市競爭力藍皮書	4	7
2009-2010 年度全球城市競爭力報告	59／500	165
Global Financial Centers Index9 (2011)	16／75	無
新華-道瓊斯國際金融中心發展指數報告（2010）	13／45	無
中國總部經濟發展報告（2009-2010）	1	7
The Global Cities Index 2010	15／65	無
The Wealth Report 2010-THE TOP 40 CITIES	9／40	無
The Knight Frank Global Cities Index 2011: Economic Activity Rank	9／40	無

資料來源：筆者自編。

歷史金融空間結構與全球經濟空間分工兩大空間力量間的相互連結強化，使北京越來越朝向總部經濟，金融服務與高科技研發等知識經濟中心轉型的同時，京郊製造業與中關村科研成果也加快向周圍腹地移轉分散，如 2009 年河北省「經貿投洽會」上，32 個大項目中有 29 個是「京字號」，涿州、廊坊與保定等地紛紛與北京合作共建科技園或工業園，城市間產業結構趨同的歷史空間結構日益轉變

成功能互賴分工的城市網絡，促使河北越來越成為提供給京津農副食品、能源與建材，以及京津研發轉化和紡織、鋼鐵與化工等製造業基地（見表 6）。據河北省發改委表示，2009 年與北京接壤的唐山、滄州、廊坊、保定、張家口、承德市，地區生產總值 10143.6 億元，占全省 59.6%；財政收入 1155.8 億元，占全省 57.3%，首都經濟圈越來越緊密。

表 6：京津冀歷年主要產業生產總值比較表

單位：億元人民幣

	天津市					北京市					河北省
年份	2004	2005	2006	2007	2009	2004	2005	2006	2007	2009	2009
第一產業	105.3	112.4	118.23	110.2	131	105.4	98	98	101.3	118	2218.9
工　　業	1550	1885	2292.7	2662	3750	1290	1707	1822	2083	2191	7902.1
交通運輸、倉儲和郵政	222.8	227.2	252.86	294.1	464.4	144.9	404.7	458.3	502.6	469	1513.9
資訊、電腦服務和軟體	65.14	77.13	84.35	92.82	—	317.8	583.2	688.5	855.9	1108	—
批發和零售	372.3	436.1	468.12	498.6	840.2	263.7	654.1	751.9	879.4	1571	1371.5
金融業	137	159.2	186.87	288.2	421.2	598.6	836.6	974.1	1286	1721	520.9
租賃和商務服務業	26.92	45.6	61.4	69.95	—	165.1	346.8	413.4	554.5	816	—
科研、技服和地質勘查	63.12	78.98	99.23	111.5	—	214.1	341.8	424.5	539.3	794	—

資料來源：編自北京與天津統計年鑑 2005- 2010 與 2010 年統計公報數據。

雖然在國家空間戰略的大力挹注下，使天津自 2009 年起，以房地產、批發零售業、租賃與基金業為主的第三產業類內外資不斷增加，似乎使天津開始向服務型城市轉型，但該類內外資大多集中在批發零售與交通物流，如金融業僅 8043 萬美金，均遠低於北京，只有房地產以 17.92 億美元超越北京 7.97 億美元（見圖 6）。目前，僅有天津製造業獲得製造業外資青睞得以迅速發展，2009 年製造業 FDI 達到 38.76 億美元，上升 50.98%，使全市工業增加值達到 4410.7 億元，成長 20.8%，對全市經濟成長的貢獻率為 63.5%（天津統計局，2009：112，422）。2010 年，製造業 FDI 提升到 49.62 億美元，成長 28%，仍持續投向航空航太裝備、船舶、汽車與石化等重化工業，使三級產業結構形成 1.6：53.1：45.3，天津越來越向高科技製造業、國際航運和物流中心發展。對此，天津發改委外資利用處官員也坦承，許多企業在京津之間自發性地進行功能分工，「好些外資企業總部，如摩托羅拉，總部擱在北京，工廠擱在天津。」（訪談記錄，2009.8.4 津 O5），京津冀經濟空間分工也越來越明顯。

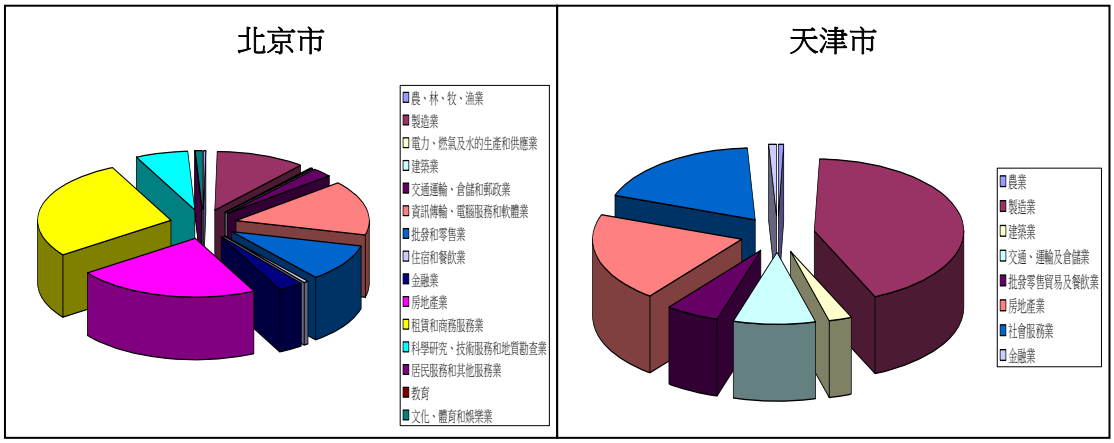

圖 6：2010 年北京與 2009 年天津 FDI 結構圖

資料來源：北京市 2010 年暨十一五期間國民經濟和社會發展統計公報與天津統計年鑑 2010 數據。

六、京津冀區域發展的未來：政治規劃還是政經合作？

許多相關研究主張，全球城市區域只是經濟空間功能分工的產物，但本文透過剖析京津冀城市區域的發展歷程後發現，看似依據經濟理性的全球城市區域經濟空間分工，其實深受歷史空間結構牽引與國家空間戰略的引導，三大空間結構之間呈現高度複雜的辯證互動關係，左右著城市區域空間結構的演化路徑。

雖然全球經濟體依循經濟理性的空間分工，的確正逐漸化解京津冀因計畫經濟體制所導致的第二產業結構趨同的歷史空間結構，促使各城市間開始重新連結，功能分工與資源互賴的首都經濟圈日益成形。然而本文發現，全球經濟體在京津冀所進行的策略空間分工選擇，其實深受計畫經濟時期所確立的歷史空間結構，以及國家主導的濱海新區空間戰略的影響，並非只是單純的經濟空間分工。例如，原非北方經濟與金融中心的北京，受到計畫經濟扶持所形成的國有金融與經濟中心的歷史空間結構，強烈影響中外跨國公司與生產者服務業的區位選擇，不斷聚集成的「總部-生產者服務業複合體」（headquarters-producer services complex）(Sassen,2006:96)，又再強化北京金融中心的競爭優勢，削弱了國家空間戰略意圖恢復天津成為北方金融中心的政策效力。

而中央的強勢介入，也相當程度扭轉了北京工業擴散與外資製造業的區位選擇，促使中外製造業紛紛進駐濱海新區，刺激天津經濟快速成長，顯見國家機器扶持工業中心成為區域成長極的戰略空間型塑能力，並不因為中國經濟與全球經濟的密切接軌而衰減，反而可能隨著國家經濟實力的快速提升而不斷增強，仍為影響區域空間結構演化的主導力量之一。但本文發現，國家對於追求物質性資源的二級產業空間結構仍保有相當強的型塑能力，對於以隱性知識為主的生產者服務業空間結構的型塑能

力則相對較低。

然而，以北京為首的全球經濟空間分工與以天津為首的國家空間戰略兩大空間力量正在京津冀中進行激烈角力，不但造成城市區域空間分工結構的再重構；經濟中心「名分」的芥蒂，也使區域內經濟實力最強的北京對環渤海或京津冀區域整合的推展採取袖手旁觀的消極態度，導致國家發改委早在 2004 年就已經開始編制的《京津冀都市圈區域規劃》，迄今仍然難產。但為了達成「世界城市」的發展目標，化解人口過度膨脹與交通壅塞等困境，2010 年北京與河北達成建設「環首都經濟圈」的共識[16]，並聯手積極遊說中央，於 2011 年被納入《國家十二五規劃》，使京津冀同時出現「濱海新區」與「首都經濟圈」兩大國家戰略，也是中國首次於同一經濟區域內同時出現兩個國家空間戰略。這一新的發展，勢必牽動新一輪的區域空間結構轉型，也使京津冀區域空間結構的未來發展方向，越來越充滿經濟與政治角力的不確定性。

最後，雖然許多學者在探討東亞各全球城市／區域的發展歷程後，也發現國家對全球城市區域發展具有相當關鍵的影響力，但彼等與市場中心論學者的基本假定卻相當相似，大都直接忽視城市本身的歷史空間特性，致使歷史空間結構的空間路徑依賴或鎖定效應，對政治或經濟力量的可能影響，甚少被觸及。本文透過對京津冀發展歷程的分析，發現城市區域的發展路徑其實深受歷史空間結構的影響，並非如國家中心論者（state-centred）所示 (Hill and Kim, 2000)，單憑國家意志就能任意改造；也非如市場中心論者所持，只是個經濟空間分工的產物。

[16]即環繞北京的涿州市、淶水縣、涿鹿縣、懷來縣、赤城縣、豐寧縣、灤平縣、三河市、大廠縣、香河縣、廣陽區、安次區與固安縣。

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第二章：

The evolution and innovation of industrial clusters in East Asia: Taiwan's Hsinchu, China' Zongguancun, and Korea's Daedock

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The existing literatures on industrial cluster are either focusing on the formation of innovative clusters in advanced countries or on the learning capability of industrial clusters in developing countries to catch up through the engagement of global production networks, few have studied the issues of evolution of state-created science parks in developing countries from catching up to indigenous innovation. By comparing three science parks in East Asia, China's Zongguancun (Beijing), Taiwan's Hsinchu Science based industrial park, and Korea's Daedock's science parks, this paper argues that different geographical and institutional factors determine these three cases' path of evolution. For the Korean Daedock case, resolving its *geographical and institutional isolations* have been the major factors leading to its evolution; For Beijing' Zongguancun, its evolution has been focusing on encountering the *institutional isolation* among domestic R&D institutes and universities and firms. For Taiwan's Hsinchu's cluster, its evolution has been mainly following the pressure from the leading firm of the global production networks. Finally, this paper concludes that encountering both the *geographical and institutional isolations, and increase the degrees of* global-local linkage and interactive learning among firms and R&D institutes are the most important factors that determine a cluster's evolution to maintain its sustainability.

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1, Introduction

This purpose of this paper is to compare the innovation system of Hsinchu Science Industrial Park (HSIP) in Taiwan, Beijing's Zhongguancun (ZGC) industrial park in China and Daeduck science town in South Korea (DST), with special attention is paid to their respective technological development and evolution toward innovation. HSIP was established by Taiwan's state in the late 1970s with the intention to upgrade its labor-intensive economy. After decades' development, HSIP currently has become a successful innovative information technology (IT) cluster that has attracted many foreign and domestic firms to reside. Beijng's ZGC is arguably the most innovative region in China, or called the Silicon Valley of China, due to its high concentration of R&D personnel and institutes (Segal, 2003; Yu, 2008). ZGC was originated in the initial stage of the Chinese economic reform and currently it has agglomerated many of the innovative Chinese IT and multinational firms to set up R&D centers. ZGC now has become the most important center for technology innovation in China. Finally, South Korea's DST was established by the Korean state in 1973 adjacent to the city of Daejeon, about 170 KM south of Seoul as a pure science town under the consideration of decentralization. Due to its initial design as a pure science town, DST was once recognized by authors such as Castells and Hall (1994), and Oh (1995) as a failed project which did not create enough linkage between R&D and production. Nevertheless, it has changed dramatically since the late 1990s where many research institutes began to nurture venture firms by linking R&D activities with production function in the advanced fields. Today, DST has become one of the most innovative clusters in South Korea.

The above three clusters was initially designed for different purposes, but they have converged into similar innovative clusters that have integrated R&D activities with production functions. HSIP was initially designed to lead the Taiwanese economy to upgrade by promoting the development of information technology (IT) in the park that mainly focused on production rather than on advanced R&D functions. ZGC was created as a comprehensive cluster, due to its high concentration of R&D institutes, which was designed to become the leading innovation center of China. Finally, unlike the former two, DST was initially designed as a research town which has provided no space for industrial production (Park, 2002:107). But overtime DST finally evolves into one that has combined innovative activities with production functions. These three clusters have gradually evolved from their initially designed function and moved toward innovation clusters.

How have they changed and why can they learn to become innovative?

Recently, studies of industrial clusters have emphasized the factors of knowledge learning (Bathelt et al, 2004; Malmberg and Maskell, 2002; Maskell, 2005; Morisini, 2002) and the global-local relational networks (Amin, 2002) that may enhance regional innovation and competitiveness. This paper intends to use the above theoretical tradition to investigate the development of the above three clusters and their learning capability. This paper will argue that HSIP's sustainability of innovation has been due to its full insertion into the global production networks (GPNs) of the IT industries, together with its strong supports from local institutions in upgrading the ladder in GPNs; whereas ZGC's technological learning mainly comes from its obvious linkages within GPNs that support it to learn codified knowledge. Currently, ZGC's R&D institutes and local firms began to integrate with foreign firms' technology to facilitate technological upgrading that has largely reduced the institutional barriers for technological learning as it had occurred before. Finally, DST has also become the leading innovation cluster in Korea owing to the state's reforms of policy to facilitate the synchronization of R&D and production functions. DST has evolved into an innovation cluster because of the performance of its national research institutes and their role in nurturing large amount of spun-off venture firms.

2, From catching up to innovation cluster

A cluster can be very loosely defined as 'sectoral and spatial concentrations of firms' (Schmitz and Nadvi, 1999: 1503). Recent studies on industrial clusters in developing countries highlight that learning is essential for a cluster to become competitive due to its crucial role in disseminating knowledge and generating possible innovation (Humphrey and Schmidt, 2002; Giuliani et al, 2005). There are two essential elements that have been stressed in the literature of a cluster to become innovative (Bathelt et al, 2004; Lundvall, 1990; Camagni, 1991; Stoper, 1995; Malmberg and Maskell, 2002; Maskell, 2005; Morisini, 2002). The first is a thick local institutional infrastructure that supports collective learning. This involves the intertwining of R&D institutes, networking among firms and a shared cultural tradition that facilitates information flow and knowledge diffusion. The second consists of the extra-local linkages that enable information and knowledge to flow in and out of the area so that local firms not only can learn technologies form local settings but also from outside actors through social interactions, which can avoid lock-in effect and facilitate knowledge creation. Bathelt et

al, (2004) vividly use concepts of local buzz and global pipeline to describe these two separated features for generating innovation.

Local buzz (noise) refers to the phenomenon in which information can be and communicated by face-to-face contacts within the same industry and place or region. This buzz consists of specific information that disseminated in organized or accidental meetings, which can contribute to intended and unanticipated learning processes. As Bathelt et al, (2004:38) describe, ‘actors continuously contribute to and benefit from the diffusion of information, gossip and news by just being there.’ Global pipeline refers to the extra-local linkages of a locality to global settings which can access new knowledge. The major advantage of global pipelines is the integration of local knowledge with multiple outside resources that may open different potentialities for new interpretations. New and outside knowledge may stimulate new ideas that may generate innovation. This echoes Granovetter’s (1973) concept of weak ties that describes the advantage of distant relationships for an actor. According to the weak-tie theory, infrequent relationships (i.e., weak ties) are efficient for knowledge sharing because they provide access to novel information by bridging otherwise disconnected groups and individuals in an organization. Strong ties, in contrast, are likely to lead to re-dundant information because they tend to occur among a small group of actors in which everyone knows what the others know. Therefore, a local buzz will not create new knowledge, because it generates lock-in effect. Thus, it is necessary for a local cluster to synergize global pipelines with local buzz in order to generate knowledge innovation.

Moreover, both local buzz and global pipelines are not occurred spontaneously. Local institutions have to be built in order that information can be disseminated and interpreted effectively; global pipelines also have to be developed, either by the state, local states, or firms, in order that extra-local knowledge can be transmitted into the localities. ‘To successfully establish a global pipeline therefore requires the development of a shared institutional context which enables joint problem-solving, learning and knowledge creation. This involves intense efforts to develop joint action frames and projects’ (Bathelt et al, 2004: 43).

While most of the researches on innovation of industrial clusters are focused on localities of advanced countries, researches on the sustainability of industrial clusters in developing countries are increasingly brought to the concern from development studies (Humphrey and Schmitz, 1996; Schmitz and Nadvi, 1999;

Humphrey and Schmidt, 2002; Giuliani, et al, 2005). It is because most of the industrial clusters in developing countries are in the stage of technological catching up, they need both local institutional setting to generate knowledge dissemination and extra-local resources in order to learn from advanced countries. Mere establishing science industrial parks itself does not guarantee knowledge learning will occur. In fact, most of the current studies on foreign direct investments (FDI) have shown that foreign firms are more interested in taking the advantage of low cost production in developing countries, they showed low interest in technological cooperation or transfer to local firms (Stenfeld, 2007; Lemonie and Unal-Kesenci, 2004; Wang, 2006). Even when they were requested by host countries to transfer technology to local firms, they were reluctant to do so unless there were more advantages to be shared in the market (Zhou, et, al, 2010). Therefore, industrial clusters in developing countries if they want to escape from low cost trap in competition, they need to build up local learning institutions to digest and learn knowledge from extra-local resources as to progress from mere imitation to innovation.

An urgent issue of the sustainability of industrial clusters in developing countries is thus on constant industrial upgrading – meaning 'to make better products, make them more efficiently, or move into more skilled activities (Humphrey and Schmidt, 2002:1017) - which may generate innovative capability of local firms and clusters' competitiveness. The states in developing countries need to build clusters that can integrate R&D institutes, universities, and local firms with extra-local resources as to upgrade its technological level. Global pipelines can be done purposefully by different actors, but most importantly, local institutional settings have to be built to integrate with knowledge learned from global sources. In this sense, local institutional building is even more important if industrial clusters in developing countries intend to upgrade their technology to innovation.

Nevertheless, the building of local institutional structure is not out of vacuum, it has its institutional roots that have inherited from historical legacy. It is because of the vested interests in the system has been established, people tend to choose paths that are more familiar with to adjust to the new environment. Thus, we propose that the existing industrial system of a late industrializing region in which institutional arrangements are the major components will continue to play a dominant role in its strategy selection in pursuing for innovation. The existing socially-embedded institutional arrangements which exist in a region's

industrial system may create conditions either enabling or constraining local firms' ability to adjust and to transition toward innovation. In the next sections, we will show how HSIP in Taiwan, ZGC in China, and DST in Korea have evolved and built local infrastructure to synchronize with global pipelines.

3, The Hsinchu Science Industrial Park

HSIP was a state-led development project that the state wanted to use it to upgrade Taiwan's economy. HSIP was located 100 KM south of Taipei that was started operation in 1980. This place was selected due to its geographic adjacency to two prestigious universities, Tsinghua and Chiaotong, and one major state-sponsored R&D institute, the Industrial Technology Research Institute (ITRI, established in 1973) that might provide necessary human capital and knowledge transfer to local firms. HSIP was designed as a science park that targeted at IT industry, including computer and peripherals, as well as semiconductor. In its initial stage, the state collaborated with RCA to build experimental facilities in the park, transfer knowledge to local engineers, providing technical training overseas in order to initiate the IT industry. In the process, ITRI collaborated closely with RCA and began to design memory chips, as well as to manufacture chips. Moreover, HSIP provided good investment environment for firms to locate, therefore more and more firms, foreign and domestic, resided into the park. In the process of its development, HSIP was regarded by Castells and Hall (1994: 100-110) as a a successful cluster even in the early 1990s.

The successful story of HSIP and its learning capability has been documented by many studies (Saxenian and Hsu, 1999; Hu, et al., 2007; Mathews and Cho, 2000). The major findings of the above studies includes: the closer relationship between Silicon Valley and HSIP which facilitates the global-local linkages and knowledge diffusion; the closer network relationship between R&D institutes and local firms that provide valuable contribution to technological learning; the closer networking relationship among firms, especially the upstream and downstream firms in the production chains in PC-related and semiconductor industries in the areas; and most of all, the informal network relationships exist in HSIP that help to disseminate information and knowledge (including university alumni, peer in MNCs in the US, and peers in ITRI before working in private firms in HSIP). All these elements contribute HSIP as a learning region. Not to repeat the above research findings, this paper will use semiconductor in general and the IC design sector in particular to

illustrate how HSIP sustain its development and innovation.

HSIP has evolved from producing mainly PC and related peripherals in the 1980s and early 1990s to mainly semiconductor industry after the late 1990s. In terms of proportion of sale value in HSIP, Computer and peripherals changed from its highest 72.1% in 1988 to only 8.3% in 2007; whereas semiconductor (Integrated Circuit) increased from 19.3% to 71.6% during the same period. It is because many of Taiwanese IT hardware firms already moved their production facilities to China (the last production line of notebook PC move to China in 2005), the related semiconductor industry in HSIP however is still continued to grow over the years. Clearly, the semiconductor industry has not followed the outward migration route of the computer and peripheral industries and has become a predominant sector in HSIP.

Table 1. Sales ratio of HSIP by industry, 2007

Year	Total	Integrated Circuits	Computers & Peripherals	Tele-Communi-cations	Opto-electronics	Precision Machinery	Bio-technology
1986	100.0	19.3	69.6	5.7	3.5	1.6	0.3
1987	100.0	13.7	71.8	8.5	4.4	1.0	0.7
1988	100.0	13.9	72.1	9.2	3.3	0.6	0.9
1989	100.0	20.8	61.9	12.5	2.5	1.0	1.3
1990	100.0	22.3	56.5	17.3	1.7	1.2	0.9
1991	100.0	30	48.1	17.5	2.3	1.3	0.7
1992	100.0	37	44.3	14.3	2.3	1.5	0.5
1993	100.0	43.3	42.0	10.4	2.8	1.3	0.2
1994	100.0	47.3	40.5	8.3	2.7	1.1	0.2
1995	100.0	49.4	40.6	5.7	3.4	0.8	0.1
1996	100.0	49.4	38.1	6.1	5.5	0.0	0.1
1997	100.0	50.0	35.3	6.8	7.0	0.9	0.1
1998	100.0	50.7	35.1	5.8	6.5	1.6	0.1
1999	100.0	55.5	30.8	5.0	7.9	0.7	0.1
2000	100.0	61.9	22.3	5.4	9.5	0.8	0.1
2001	100.0	56.8	22.6	8.0	11.6	0.8	0.2
2002	100.0	62.5	15.4	7.1	13.9	0.9	0.2
2003	100.0	61.7	13.3	5.6	18.2	0.9	0.2
2004	100.0	61.5	10.4	4.6	22.3	1.0	0.3
2005	100.0	54.9	7.4	3.5	32.8	1.1	0.3
2006	100.0	53.6	5.9	2.7	36.0	1.6	0.3

2007	100.0	71.6	8.3	3.3	15.6	1.0	0.2

Souce: MIC, (2008)

3.1, The emergence of an innovative semiconductor cluster

The emergence of the semiconductor industry in Taiwan was almost a state creation (Mathews and Cho, 2000, Amsden and Chu, 2003, Breznitz, 2005, Chen, 2003). In a nutshell, beginning in the late 1970s, the state decided to establish the semiconductor industry as a tool to deepen its industrialization and to upgrade its technological level. Rather than to depend on MNCs for transferring technology, the state established experimental factories through technology acquisition from abroad (mainly RCA), and then later spun off to the private sector (late became UMC). During the process, the ITRI was the main actor and later became a facilitator in accessing new technology and then transferred to local firms.

The most significant contribution of Taiwan's semiconductor industry in the world was the establishment of Taiwan Semiconductor Manufacturing Company (TSMC), which was the first pure play foundry in the world. Foundry companies in the semiconductor industry do not design chips, but only manufacture the chips designed by other companies. Before the emergence of TSMC, the standardized feature of the semiconductor companies was to keep all activities, including IC design, fabrication, and test and assembly, in-house. This is also referred to as the IDM (Integrated Device Manufacture) model, notable examples such as Intel, Motorola and Texas Instruments.

The establishment of TSMC thus became a catalyst in Taiwan's semiconductor industry that enabled many domestic fabless IC design houses to emerge and take advantage of existing fabrication facilities. The emergence of a vast number of small IC design houses led Taiwan to become one of the major IC design countries in the world that eventually caused Taiwan's semiconductor industry to concentrate on the area of application-specific integrated circuits (ASIC) that could be used in various areas of the PC system. This in turn largely enhanced the competitiveness of Taiwan's PC industry. Currently, Taiwanese firms have taken over 70% of the world market share in the activity. On the other hand, the concentration of pure play foundry also generated effect on the increasing of IC design houses in Taiwan. Now Taiwan has 261 IC design firms whose sale value reaches over U.S. $10 billion and has about 23% of world market share, secondary only to

the U.S. (MIC, 2007). These IC design firms are clustered in HSIP and nearby areas. The related semiconductor firms, from IC design to foundry and Mask are densely located in the area that takes less than 30 minutes by car or by motorbike.

3.2 local networking in HSIP

The booming of Taiwan's IC design houses in HSIP in a large degree has to do with the prosperity of two related industries: the first is the strong production capability of Taiwanese computer industry (Dedrick & Kraemer, 1998; Wang, 2007). Currently, Taiwanese PC firms produce over 80% of notebook PCs for the world market (MIC, 2007). Although all the major PC manufactures have moved their production bases to China (Wang and Lee, 2007), the headquarters are still located in Taiwan (mainly in HSIP or nearby area) whose design teams are working closely with Taiwanese IC designers that provide most of the chips to the formers' end products. Secondly, in addition to the PC firms, IC design firms in HSIP are also closely connected with nearby foundries. It is imperative for the IC designers to collaborate closely with engineers of the foundry in each stage of the chip design to avoid the possible low yield rate. Therefore, the spatial proximity of IC design houses and foundry not only largely reduces the transportation and transaction cost, but also benefits the IC design firms in learning new knowledge and technology. According to a survey (Deng, 2005), Taiwanese IC design firms use as high as 85% of local foundry service for their own products. This shows that spatial proximity matters for the IC design industry and this in turn creates a cluster effect.

The semiconductor cluster in HSIP has created an environment that facilitates collective learning and continuing upgrading. This in turn sustains HSIP's innovation and competitiveness in the semiconductor industry. There are at least three mechanisms that are favorable for HSIP to constitute an innovative environment.

First of all, the state continues to play an important role in facilitating learning (Wade, 1990; Mathews and Cho, 2000; Mathews, 2002; Amsden and Chu, 2003). Currently, ITRI has transformed from knowledge transmitter to platform builder that assisted smaller firms to learn and develop new products. For example, in the 1990s, ITRI developed IC design software and standards as well as set up 'Common Design Center' to assist the IC design industry to diffuse the knowledge and to develop sophisticated IC components (Chang and Tsai, 2002:109). It also facilitates the formation of R&D consortium in developing new 3D IC and memory chips for next generations. The members of these consortiums share the knowledge and new technologies being developed, which largely help the IC design firms to upgrade their technology capability.

Secondly, the networking and collaborations among the PC firms, IC design houses, and foundries, and most of all the dense linkages between HSIP and Silicon Valley (Saxenian and Hsu, 2001) are mechanisms that facilitate collective learning. The engineers in HSIP are flying back and forth between HSIP and Silicon Valley for business and technological exchanges. All these are beneficial for HSIP's collective learning as a whole and link the local to the innovation center in the world.

Thirdly, the adjacent elite universities, Tsinghua and ChiaoTong, also play the role of knowledge mediators that facilitate collective learning. As documented by Chen (2003) and Hsu (2000), because many of the founders of PC and IC design firms were graduates from the above universities, they constantly engage in formal and informal activities that disseminated market information and technological knowledge. Moreover, these universities not only supply necessary technological manpower for the firms, but also serve as the bridge that disseminating knowledge as well as forming alliance for co-developing new technologies.

In sum, the above networking among firms, R&D institute and universities, together with the networking between Silicon Valley and HSIP , contribute HSIP as a learning region of the semiconductor industry as a whole in upgrading its technological level. Nevertheless, the development of HSIP still has its weakness. That is, its innovation pattern is mainly based on fast follower model which is very much in engineering technology. If HSIP wants to upgrade further to frontier innovation, it needs more R&D in basic sciences which it currently lacks.

4, Zhongguancun's innovation pattern

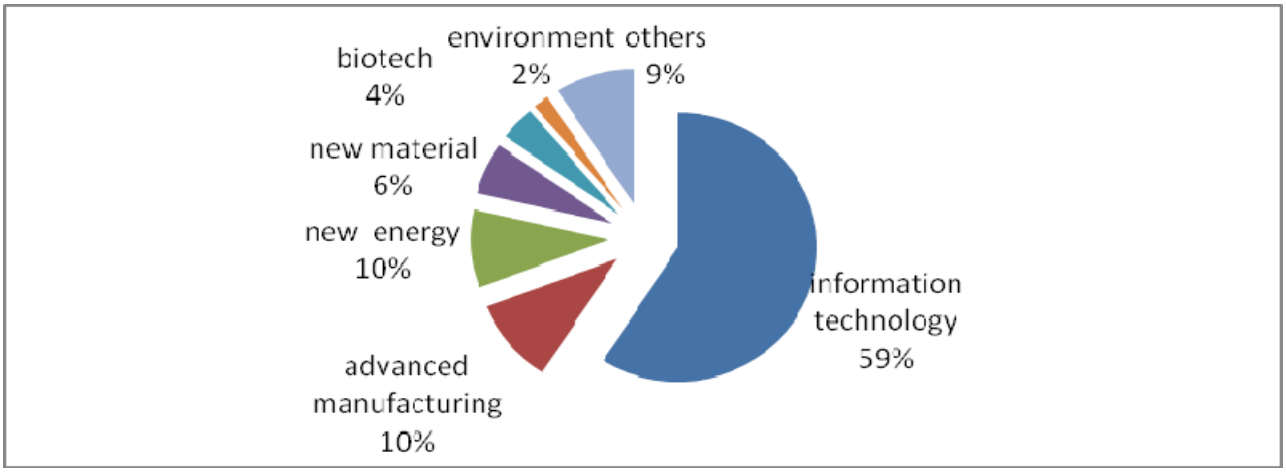
Beijng's ZGC has been regarded as the most innovative region in China. There are 68 universities (including China's most prestigious universities, Peking and Tsinghua), 213 state-sponsored R&D institutes (including the Chinese Academic of Science, CAS) and over 300 thousand students in Beijing. Moreover, Beijing hosts over 36% of the honorary fellows of the CAS and Chinese Academic of Engineering. All these indicate that Beijing has more affluent S&T personnel as compared to other cities in China.

During the early stage of economic reform, some scholars had utilized their scientific research results to build their own enterprises and created many famous *mingying* (none-governmental owned) high-tech enterprises such as Legend (spun-off from the CAS) and Stone. In 1988 the central government decided to

develop this area as the ‘Silicon Valley of China”, a well-defined area was delineated as the Beijing Experimental Zone for New Technology Industries (BEZ). Since then, new start-ups led by research scientists have mushroomed throughout the 1980s and early 1990s. Over the years, the development of the ZGC has been largely transformed into ‘One valley multiple parks’ (*yiquduoyuan)* arrangement. That means, ZGC can indicate many sciences parks in Beijing city, adding the Haidian district only in 1988, to 3 parks in 1997, to 5 parks in 1999, and to 10 parks at the current stage that are located almost around the city. Thus, the statistics used by ZGC refers to the establishment of all the parks rather than just the Haidian district.

Currently, ZGC has gathered over 13000 firms in the area in 2006 (mainly in the Haidian area), including Legend (later renamed as Lenovo), Stone, Fangzheng, and MNCs such as Lucent, HP, Ericsson, Hitachi, Siemens, etc (2008, Annual report of ZGC). But different from other regions in the south, especially Shanghai and Shenzhen, where the IT hardware is the dominant sector, the ZGC has concentrated more on the IT software development and production than on those of the hardware assembly. Many MNCs also established their R&D centers in this area. Until 2006, 95 among the top 500 largest firms in the world have set up branches in this area, among them, 65 were R&D centers (ZGC report, 2008). Even the biggest domestic firm, such as Leveno, has established it R&D center in this area and moved it hardware production and assembly into Suzhou and Shenzhen areas. Currently, many of China’s most notable ICT companies can be found in this area. Besides Lenovo, they include Baidu (百度), China’s leading Internet search engine company; UFIDA (用友), China’s largest privately owned software company; Datang (大唐), one of China’s largest telecommunication solution companies; Aigo (愛國者), China’s leading portable storage and digital entertainment product maker, etc. Together with the high concentration of R&D personnel and institutes in the Beijing area, ZGC has become the most important center for technology learning and innovation. For example, now over 70% of software developed and used in the domestic market are produced in Beijing (Beijing Statistics, 2004). The importance of IT industry in ZGC can be shown in fig. 1.

Figure 1: composition of industrial sector, ZGC



4.1 ZGC's IT industry and innovation

The specific features of ZGC to become an innovation center have to do with the local state's provisions of incentives and encouragement of R&D investments into the areas. Besides the usual approaches of tax break and other incentives that have been used in other areas, the Beijing municipality encouraged information flows and fostered economic and research links between enterprises, such as supporting meetings, publicizing new technological or organizational innovations, organizing job fairs for graduates of business, etc. It also asked enterprises to use funds derived from tax breaks for further development of new technologies and forbade them to be used for collective welfare or be distributed among employees as bonus. In this sense, high-tech enterprises were required to consider tax breaks as government investment (Segal, 2003: 80). As a result, enterprises in ZGC invested more funds in R&D activities than other areas. In 2001, enterprises in ZGC invested 8 percent of their income in R&D, and technological developments contributed more than 50 percent to their profits; both figures are the highest for any enterprise in China (Segal, 2003: 78).

Moreover, due to the institutional segregation which was inherited from the socialist legacy that the Chinese state in the early 2000s forced many R&D institutes to become R&D centers of big state-owned firms and push universities to build incubation centers for nurturing venture firms. Under this new institutional arrangement, the linkage between universities, R&D institutes began to integrate, though in a very slow manner.

ZGC has also attracted large amount of overseas returnees to start their own adventures which has increased rapidly over the years (ZGC annual report, 2008). For example, the rising star Vimicro (中星微) is

founded by a returnee, whose specialties are on wireless communication chips and handheld equipments' panel drivers. The products of Vimicro now are used widely in PCs and handsets. This type of design firms is the national hero that is highly supported by the Chinese state for its 'independent innovation' (z-zhu-chuang-xin) effort. Therefore the Chinese state supports this emerging firm to link closely with local handheld and service providers as to largely expand their market share.

Due to the abundant human resources in ZGC, many foreign IC design firms have set up their R&D centers in this area to take the advantage of low cost and of the local state's favorable tax reduction. Since the MNCs pay good salary[17], therefore they can recruit the most talented engineers at the expense of local IC design firms. In general, the R&D centers of MNCs in ZGC rarely have local connection with local firms. The only connection that these R&D centers have established in the area is the elite universities where they have donated labs so as to find talented students for future recruitment.

In contrast to the IT hardware industry, the IT software industry currently is the most innovative sector in ZGC. MNCs' strategy in software industry in ZGC has mainly focused on office application and middleware software. Due to the widespread and extensive piracy rate in China's software market, the MNCs have almost lost their competitiveness in the consumer software market field. Therefore, in this sector of the software industry, MNCs are the major system and application suppliers, including office application, enterprise management software such as enterprise resource planning (ERP), data base, etc. It is also in this sector that MNCs have interest to collaborate with Chinese firms in the expectation of high market growth.

Different from IT hardware, whose production procedures can be universalized, the IT software has to consider and adjust to the language, needs and customs of local users. That is, the utilization of office and middleware software has to be indigenized. To fulfill this demand, the MNCs can only depends on local people and local firms to expand the market share. Therefore, all the major software MNCs, such as Oracle, Sun, Cisco, collaborate with local firms to sell their products. It is also through this collaboration, the MNCs have trained local engineer related knowledge and through which knowledge diffusion has occurred (Zhou and Tong, 2003). In some cases, the local firms may develop their own products but target at lower end market in order to avoid directly confronting the interests of the MNCs. The lower end market is neither the

[17] The salary for the engineers work for MNCs is average RMB 7000 per month, higher than that of local firms, average from RMB 3000 to 4000 (interview data, 2008).

place where MNCs have the interest to step in nor have the capability to enter. Our interviews in ZGC found that the high end office software market is dominated by MNCs. The lower end however is dominated by local firms whose technological capability has largely learned from MNCs. For instance, the most innovative local ERP firm UFIDA (用友) learned extensively from Oracle in its early stage and then began to develop its own office software that targeted at enterprises of smaller cities or smaller enterprises in big cities. Since UFIDA was able to enter the market where MNCs was not able to enter, it then began to take off and recently has become the biggest ERP software firm in China. In the process, UFIDA has collaborated with university professors to develop and improve new products and begun in recent year to enter into the higher end market that intend to confront with MNCs head by head in big cities.

4.2 Institutional weakness

The transformation of ZGC has largely reflected the historical transition of China' innovation system since the early reform ear. ZGC indeed has agglomerated large amount of enterprises and R&D institutes in it since the late 1980s, which was naturally favorable for learning activities to take place. Also, due to the close connection between MNCs, abundant overseas returnees, and the synchronization of R&D with hardware production in the south, ZGC has shown strong capability in technological learning. Nevertheless, as compare to Silicon Valley and HSIP, GZC lacks a friendly institutional environment that is favorable for networking and deep technological learning to occur. This relates to the following institutional arrangements that generate the fragmentation of R&D system and de-linkage of R&D institutes and firms.

First of all, the R&D institutes tend to do researches that are not directly related to the needs of the industry. The state-sponsored R&D institutes are targeting frontier technologies or basic researches, however what the local firms need are not the frontier technologies but the middle level technologies which can support them to catch up rapidly. As a consequence, as our interviews show, managers of local firms indicate that the local R&D institutes can only provide them information and consulting functions rather than R&D collaboration. What the local universities function to them is mainly providing them future engineers than product development.

Secondly, as compared to HSIP, ZGC is a low trust cluster; enterprises show little interests in building

local networks. Local firms are more interested in seeking opportunity to expand their market share in this booming economy rather than to cooperate with other firms to deepen their technological capability. As Zhou (2005: 1127) shows in her field research, 'When we asked the manager of a Chinese hardware company about the company's partnership with other Chinese firms, the immediate response was blunt: ZGC firms do not cooperate with one another.' Our field research in ZGC shows similar result. Zhou (2005:1128) attributes this lacking of networking among local firms to the institutional root of *Danwei* (單位) mentality, or so-called `big and complete' or `small and complete' systems. We suggest instead that it is also due to the legacy of socialist system that generate distrust among people on the one hand, and the high competition among firms due to their similar level of technologies which engenders horizontal competition than collaboration on the other.

Finally, there is also downside of the rapid development of ZGC. Similar to other rapidly developing regions in China, both the leaders of the local state and enterprises in ZGC are more interested in the development of real estate than on technological innovation. This has led to the decline of entrepreneurialism that ZGC had been very proud of (Tan, 2005). In addition, this rapid development of real estate sector has also pushed up the prices of rent to a level that was not favorable for the start-ups or smaller firms to survive in this area[18]. Many smaller star-ups already moved out of this expensive area and sought cheaper places at the outskirt of the city to survive. The local state's GDP-ism has greatly improved the image of this area which however is a strategy that pursues for short term growth at the expense of long term innovation investment (see also Wang, 2007).

5, Daedeok Science Town, South Korea

Compare to ZGC, where most of the R&D institutes were located in the city center of Beijing, Daedeok Science Town (DTS) in South Korea was initially designed as a pure research area in a very remote city away from Seoul. DST was entirely the creation of the central government in the early 1970s under the consideration of decentralization. On the one hand, the capital city, Seoul, was located very near to the border that was considered too dangerous once the war was started; on the other hand, because too much resources had been concentrated in the capital region, which had created serious regional unbalance and political

[18] The rent reached as high as RMB 7 dollars a day per square meter in ZGC. The outskirt areas of Beijing city is about RMB 4 dollars.

ramification. Therefore the central government chose Daedeok, which located 170 KM south of Seoul, near Daejon in the middle of the Korean countryside to build a science town for facilitating scientific and technological research. The city was chosen for the DSP because it had ample cheap land and was located away from the border with hostile North Korea.

5.1 Stages of development

At the initial stage, the Ministry of Science and Technology (MOST) was assigned to be responsible for the planning, overseeing the process and the management of DST. In this early stage of developing the DST, the Korean government faced difficulties in recruiting research institutions, most of them located in Seoul, to move to the park, due to the fact that Daejeon was considered to be in the countryside where no decent educational, cultural, or commercial infrastructure were yet available. MOST therefore had to urge some government-funded research institutions to move to the DST, because their budgets were funded mainly by MOST (Shin, 2001). By 1978, the science park mainly was populated with national research institutes, i.e., the Korean Research Institute of Standards and Sciences (KRISS), the Korean Institute of Machinery and Materials (KIMM), and the Korean Electronics and Telecommunications Research Institutes (ETRI). At the same time, a major prestigious university, the Korean Advanced Institute of Science and Technology (KAIST) was established and a local university (Chungnam National University) also completed the relocation of its facilities from the city centre to the DST site by 1980.

From its inception that had only few state-funded institutes to reside, DST has been gradually evolving from a pure science town into a cluster that has involved both research and production functions. The evolution can be roughly divided into 3 stages. The first stage was ranged from 1973 to 1993 when the Korean state started to build DST as a major center for basic and applied research in technology. The second stage ranged from 1993 to 2004, in which the Korean government began to promote the synergy between R&D and industrial productions. The third stage was from 2005 till now when DST was renamed as Daedeok Innopolis (DI) and intended further enhance the synergy effect so as to build DI a world-class innovation cluster.

In the initial stage, MOST not only forced stage-funded research institutes to reside in DST, it also urged

many private firms to establish R&D center in this park. In this authoritarian period, the state's funding and authority was difficult to reject. Therefore, in the early 1980s, some large research institutes of major private corporations, such as Samsung, LG, and the Hanhwa Group, were also induced to build their R&D facilities in DST. Due to the gradual improvement of living conditions, since the mid-1980s, there has been an increasing number of large corporations attempting to establish their research units within the DST. The total number of the institutions located in the DST increased significantly from 13 in 1985 to 52 in 1995 (Shin, 2001:106). Because DST was initially designed as a research town, it thus provided no space for industrial production. In fact, the Law of Managing the DST, promulgated in 1993, even prohibited such activities in order to protect the park from becoming an industrial district (Shin, 2001: 107). As a result, DST was described by Castells and Hall (1994:63) as a failed project which had 'no linkage or feedback developed with manufacturing or applications of any kind."

The second stage of the development of DST was ranged from 1993 to 2004. In 1993, when most of the planning sites of the research park were completed, the DST Administration Law was passed, giving the cluster unprecedented authority to promote itself as an international research cluster. Nevertheless, this law still prohibited manufacturing activities to occur in DST. The Korean government also realized that without developing R&D and industrial production synergy effects, technology development couldn't be achieved efficiently. Thus, it on the one hand called for the techno-belt concept that attempted to connect research and industry through which, the Daejeon city government established an industrial park adjacent to the DST in order to connect the fruits of R&D to local production. On the other hand, the Korean government in the 1990s began to promote the emergence of venture firms in order to boost the emergence of small science firms to generate industrial innovation. The 1993 law was changed in 1999 which finally allowed venture business to run in DST.

To take the advantage of the Korea law that promote venture firms, or "Law for Special Measure to Support Venture Business" (1997), and the change of the DST Administrative law in 1999, many ventures firms began to spin-off from major R&D institutes in DST. For example, the most successful research institute, ETRI, had created 100 firms by 1998. KAIST also created many spin-off firms, among them 65 firms organized as an association, called the "Daedeok 21st Century" (Shin, 2001:109). Moreover, many

research institutes began to provide production spaces for venture firms. KAIST, for example, has provided spaces for some 100 companies. Through these efforts, the linkage between R&D institutes and venture firms is expected to establish.

To further the tendency of the linkages between R&D institutes and venture firms, on 28th of September 2000, the former president Dae-Jung Kim has named the area DST, together with adjacent Industrial Complex, Yuseong Tourist Zone, and Dunsan Administrative Town as Daedeok Valley. In order to boost up the R&D capacity, Daejeon City now has been more active in attracting foreign companies and research institutes to reside in DST. Since this stage, progress of synergy at DST has accelerated that set the stage for the next stage's reformulation into Daedeok Innopolis.

In 2005 the DST was renamed again as Daedeok Innopolis (DI) and was formally established by a special law. This begins the third stage of DST in which the Korean government wants to build this area as a world-class innovation cluster compared to Silicon Valley in the U.S. The main role of DST has now changed from its initial design as a research town to an industrial park that links R & D results with local industries. It can be argued that the core function of DI now has to become an innovative cluster and to become the brain for Korean economy for the new century. Currently, DI has more than 800 high-tech companies, 70 government and private research institutes, and 6 universities to reside. Its innovation capability can also be shown in the following figures. It has over 18,000 researchers and more than 10% of all Korean patents. As Park (2009:7) observes, because DI has integrated R&D institutes, universities, and venture firms, it 'has completed is habitat from a R&D hub function to a production function. It may be safe to say that a core function as an innovative cluster has been fully completed.'

5.2 performance of DI

Currently, the distribution of venture business in DI is still mainly largely concentrated in ICT category, which has 45% of the firms. This may related to the active role and stronghold of ETRI and KAIST in this area that created many spun-off firms. The second largest category is in environmental science (15.4%), the third category is precision mechanics (10.4%), and the fourth category is biotechnology (9.8%).

The concentration of national research institutes in DST has created an effect that scientists working in

these institutes have published large amount of international scientific papers and filed more patents in the U.S. than in the domestic bureau (Park, 2009). But on the other hand, because of the promotion of technological transfer and creation of venture firms, technological transfer case and transfer fees have increased rapidly in recent years. For example, the number of technology transfer has increased from 577 cases in 2005 to 815 in 2007; the amount of transfer fees also increased from Korean Won $50,715 million to $77,798 million during the same period (Park, 2009:5).

Among the above cases, the most profound performance of DST was the role of ETRI in collaborating with global telecommunication leader, Quacomm, to develop CDMA technologies and its role in incubating new venture firms. ETRI's development of CDMA technology has led Korea to become one of the leaders in 3G communication. It is also due to ETRI's active role that many of its stuff went out to build their own businesses (Shin, 2001; Lee and Kim, 1997). Also, due to the promotion of building up incubation centers in universities and R&D institutes, venture businesses have increase rapidly. The number of venture businesses was merely 65 up to 1998, but it increased rapidly to 898 in 2007.

Table 2: Venture firms in DST

year	Up to 1998	2001	2002	2005	2006	2007
Venture business	65	108	149	687	786	898

Source: Park, 2009:9

Although the above figures have shown that DI has increasingly changing from an isolated science town to become an innovative cluster, there are still many institutional weaknesses that may hinter its further development. First of all, the items that national research institutes transfer to venture firms are still mainly products that related to national priorities rather than products that can be easily commercialized. Sawng and Kim (2007) found that the collaboration between Research institutes and venture firms in DST was much less on developing products that can be commercialized. To the latter, the Tehran area in Seoul has outperformed that of DST (also Yusuf *et al*., 2003: 239; Sohn and Kenney, 2007). In fact, the major functions of many R&D centers of big private firms are to do marginal research, the major R&D function still located in their

headquarters located in Seoul (Park, 2009; Shin, 2001).

Secondly, most of the venture firms are still very small, there is no major large firms in DI to create a localized production network so as to generate local supply chains and cooperation relations (Park, 2009; Shin, 2001). Local customers are necessary condition for innovation (Lundvall, 1990) due to their intensive interaction, but DST obviously lacks that type of networks. However, most of the networks are binary relationship between research institutes and their supported venture firms. A complex production network which generate extensive interaction and knowledge sharing is still lacking in this area.

Finally, due to the shortage of production networks, Daejeon lacks most of all the necessary business services for business to operate. Most of the functions are located in Seoul metropolitan area. These functions include accounting, legal services, financing, etc. (Park, 2009). It is therefore that DI still needs infrastructural software building to become an innovation cluster.

6, Discussion and Conclusion

This paper uses the perspective of industrial cluster to investigate technological development and innovation in HSIP in Taiwan, ZGC in China, and DST in Koera respectively. It is found that HSIP's development in the semiconductor industry in general and IC design in particular has been closely linked to the prosperity of PC industry in the world market, as well as to the state's support and strong institutional networking. These factors synchronize together to push IC industry and the cluster to upgrade continuously; whereas ZGC's picture in technological learning is not so clear as compared to HSIP, which mainly comes from its obvious de-linkages among actors in local settings that inherited from its socialist institutional arrangements and hampered technological learning and upgrading. However, firms in ZGC can directly access the enormous Chinese domestic market that support them to grow through strategies such as entering the low end and second tier markets. These firms are able to accumulate knowledge in the process and in the end can compete directly with MNCs in major markets. Finally, DST was initially designed as a pure science town with no production facilities. However, in due course, it gradually evolved into one that combined R&D and production functions. It currently has become an innovative cluster in which national research institutes have continuously spun-off new venture firms in DST. Nevertheless, the major problems that DST has to face are

its lacking of production networks and its lacking of bigger firms that can generate supply chain to nurture a regional innovation system.

The three cases that this paper has discussed have evolved from different original designs to the current similar pattern. HSIP was designed to integrate research institutes, universities and local firms to upgrade the economy by collaborating closely with foreign firms. In the process, HSIP has changed from mainly producing PC related products to mainly focus on semiconductor sector. Nevertheless, as local PC firms become key PC suppliers to the world market, and as TSMC was established to generate the booming of IC design industry, the whole value chain of semiconductor has been established and networked in HSIP. Together with the existing universities and ITRI, HSIP becomes an innovative cluster that can generate innovation through integrating various sources of networks. ZGC emerged spontaneously in the early days of China's economic reform, it was however assigned the mission as an innovation center due to its high concentration of R&D institutes and elite universities. In the process, ZGC has indeed nurture many spun-off firms due to China's continuous institutional reform that relieved the burden of institutional fragmentation and gave scientists incentives to create their own firms. The integration of R&D with production, together with the investment of MNCs, has indeed occurred, especially in the software industry. Nevertheless, the institutional legacy of low trust as well as the economic booming agitated local firms to diverge their energy in real estate and stock market than on technological innovation. Finally, DST was originally designed as a pure science town with no manufacturing activities. Nevertheless, it has evolved into a type that is similar to ZGC where many national research institutes are located to generate spun-off firms. But different from ZGC, DST does not have large firms and production networks, as well as software infrastructure to sustain its innovation. DST's future is still needed to be observed.

Table 3: Three clusters in comparison

	HSIP, Taiwan	ZGC, China	DST, Korea
Found	1978	1988	1973
Covered area	6.3 KM^2	100 KM^2	27.8 KM^2
Type	Industrial park	Industrial park	Science town to Industrial park
Industries	Mainly IT (hardware) and others	Mainly IT (software) and others	IT, biotech, space, nuclear
Main actors	National research institutes, universities, IT firms and venture firms	National research institutes, universities, IT firms and venture firms	National and private research institutes, universities, venture firms
Linkages among actors	Strong	Weak	Weak
weakness	Weak in basic research	Lack of trust; actors are more interested in real estate than in innovation	Lack of production networks

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第三章：

Local States, Institutional Changes, and Innovations Systems: Beijing and Shanghai Compared[19]

Tse-Kang Leng and Jenn-Hwan Wang[20]

Abstract

The purpose of this paper is to look into the transformation of local innovation systems in Shanghai and Beijing's high-tech parks and their technological learning and upgrading. The areas that we have chosen to investigate are Beijing's Zhongguancun and Shanghai's Yangpu District. The main reason that we selected these two areas for study is because they are home to most of these two cities' top universities and R&D institutes. Our main focus will be on how institutions—the local state, inter-firm relations and the relationship between R&D institution and firms—are co-evolving to shape and constrain a local system of innovation. Our research finds that capacities and autonomy of the Zhongguancun of Beijing's Haidian District and Yangpu District of Shanghai differ in various aspects, but both regions are struggling to upgrade innovation and enhance economic development. The "high tech cluster" provides a useful instrument or label to achieve goals other than innovation and R&D. Elite universities are regarded as engines for network formation, but visible and invisible walls of Chinese universities discount efforts to foster a university-centered innovation hub which especially shows in the Yangpu case.

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1. Introduction

Since China began its economic reform in 1978, economic development has become a dominant policy at different levels of government. Various policy tools were used to spur economic growth, most notably the experimental zones or high tech parks. The governments at the central and local levels intended to use special tax incentives to attract both local and foreign firms to set up operations in the zones in order to generate economic growth. The competition among local governments in building these economic zones to attract foreign investments has become so widespread that some authors have even called China's model of economic development as a type of economy of special zones.[21] In contrast to special zones in other cities and regions, where foreign investment was the major concern, economic zones in Beijing and Shanghai were assigned and expected to perform functions not only to develop the local economy but also to upgrade the technological level at the national level.

Under these circumstances, both Beijing and Shanghai have intended to fully utilize the endowment of the concentration of elite universities and R&D institutes in their cities to create a synergy effect with local firms so as to generate indigenous innovation. The model which both cities have been imitating is Silicon Valley in the U.S., where universities, R&D institutes and firms reside nearby and together can generate an innovative environment. The purpose of this paper is to look into the transformation of local innovation systems in Shanghai and Beijing's high-tech parks and their technological learning and upgrading.

The existing literature on China's local innovation system mainly focuses on the role of the local state in building infrastructure to attract foreign capital as to create a technological diffusion effect,[22] or to look into state actions that may stimulate cooperation among R&D institutes, universities and firms into specific areas.

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[21] Wei Ge, 'Special Economic Zones and the Opening of the Chinese Economy: Some Lessons for Economic Liberalization', *World Development* 27(7), (1999), pp. 1267-1285; Adam Segal, *Digital Dragon: High-Technology Enterprises in China* (Ithaca: Cornell University Press, 2003).

[22] Y. Zhou and X. Tong, 'An innovative region in China: interaction between multinational corporations and local firms in a high-tech cluster in Beijing', *Economic Geography* 79(2), (2003), pp.129-152; J. H. Wang, 'China's dualist model on technological catching up: a comparative perspective', *The Pacific Review* 19(3), (2006), pp. 385-403; Yu Zhou, 'Synchronizing Export Orientation with Import Substitution: Creating Competitive Indigenous High-Tech Companies in China', *World Development* 36(11), (2008), pp. 2353-70.

Nevertheless, few studies have investigated the questions regarding how the local state at different levels in one specific area concurrently pursues technological upgrading and innovation which may or may not be able to create a local innovation system.

The purpose of this paper is to fill this theoretical gap. The areas that we have chosen to investigate are Beijing's Zhongguancun (ZGC) and Shanghai's Yangpu District. The main reason that we selected these two areas for study is because they are home to most of these two cities' top universities and R&D institutes. Our main focus will be on how institutions—the local state, inter-firm relations and the relationship between R&D institution and firms—are co-evolving to shape and constrain a local system of innovation.[23] Our study will show that ZGC has outperformed Yangpu in terms of creating an innovation system due to its better institutional arrangements in linking various actors in the region.

Adopting the institutional approaches to study technological innovation and scientific parks in China, the authors will first analyze the theoretical dimension of local states in high-tech development. In order to demonstrate the similarities and differences of the two cases, Section 3 provides contrasts of institutional evolution and transformation of Zhongguancun and Yangpu. In section 4, the authors try to identify the interaction of key actors—research universities, business communities, local states—in the process of institutional transformation and innovation. Section 5 will continues to discuss the institutional limitations of such interaction, including institutional embeddedness, bureaucratic constraints, innovative culture, and dilemmas of urban development. The concluding remarks provide a tentative assessment of the performance of the two cases under study.

2. Local state and China's local innovation system

One of the major characteristics of the Chinese economic reforms has been its local state activism[24] that

[23] The reason that we did not select Zhangjiang Science Park in Shanghai is that Zhangjiang is designed to host foreign manufacturing firms rather than to create an environment for linking domestic R&D institutes and firms.

[24] Jean C. Oi, 'Fiscal Reform and the Economic Foundations of Local State Corporatism in China', *Woeld Politics* 45(1), (1992), pp. 99-126; Jean C. Oi, 'The Role of the Local State in China's Transitional Economy', *The China Quarterly* 144, (December 1995), pp. 1132-49; Nan Lin, 'Local Market Socialism: Local Corporatism in Action in Rural China', *Theory and Society* 24(3), (1995), pp. 301-54; Andrew Walder, 'Local Governments as Industrial Frms: An Organizational Analysis of China's Transitional Economy', *American Journal of Sociology* 101(22), (1995), pp. 263-301.

results in, as Segal describes, 'a national economy that looks like a mosaic of regional economies'.[25] Most of the existing studies either focus on local states' role in manipulating regulations by allowing local and foreign enterprises to receive maximum tax advantages and exemptions,[26] or on local officials' active role in facilitating the collaboration of foreign firms with local firms to maximize local firms' market share,[27] or on local bureaucrats' actions that try to integrate the local R&D system with domestic firms in shaping the local innovation system and promoting industrial upgrading.[28] Few studies, however, have investigated how the local state at different levels uses strategies to concurrently pursue technological innovation that may or may not be able to create a local innovation system.

China's R&D system has undergone a thorough transformation since 1978. In general, the tendencies of the reform were from centrally planned to local and market-oriented, from stressing state-owned enterprises' role in innovation to emphasizing the importance of non-state, high-technology enterprises, from isolation of R&D from industrial production to an increase in their integration.[29] One of the most representative policies to do with local and regional development was the Torch Program which was initiated in May 1988.[30] The main task of the Torch Program was to establish high- and new-technology industry development zones in select cities that would create the environment for the linkage between R&D (universities and research institutes) and production activities in high-technology industries so as to raise the productivity of the national economy. Many MNCs also established their R&D centers in Beijing, Shanghai, and Shenzhen to take advantage of tax

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[25] Adam Segal, *Digital Dragon: High-Technology Enterprises in China* (Ithaca: Cornell University Press, 2003), pp. 9.

[26] You Tien Hsing, , *Making Capitalism in China: The Taiwan Connection* (New York: Oxford University Press, 1998); David Zweig, *Internationalizing China: Domestic Interests and Global Linkage* (Ithaca, NY: Cornell University Press, 2002); Jenn-Hwan Wang and Chuan Kai Lee, 'Global Production Networks and Local Institutional Building: The Development of the Information Technology Industry in Suzhou, China', *Environment and Planning A* 39(8), (2007), pp. 1873-88.

[27] Eric Harwit, *China's Automobile Industry: Policies, Problems and Prospects* (Armonk, Ny: M.E. Sharpe, 1995); Weidong Liu and Peter Dicken, 'Transnational Corporations and Obligated Embeddedness: Foreign Direct Investment in China's Automobile Industry', *Environment and Planning A* 38(7), (2006), pp. 1229-47.

[28] Weiping Wu 'Cultivating Research Universities and Industrial Linkages in China: The Case of Shanghai', *World Development* 35(6), (2007), pp. 1075-93; Zhou, 'Synchronizing Export Orientation with Import Substitution: Creating Competitive Indigenous High-Tech Companies in China'.

[29] Evan A. Feigenbuam, 'Who's Behind China's High-Technology 'Revolution?', *International Security* 24(1), (1999), pp. 95-126; Xielin Liu and Steven White,'Comparing innovation systems: a framework and application to China's transitional context', *Research Policy* 30(7), (2001), pp. 1091-1114.

[30] S. L. Gu, *China's industrial technology: market reform and organizational change* (London; New York: Routledge,1999); Segal, *Digital Dragon: High-Technology Enterprises in China*; C. Huang, C. Amorim, M. Spinoglio, B. Gouveia, and A. Medina, 'Organization, program and structure: an analysis of the Chinese innovation system policy framework', *R&D management* 34(4), (2004), pp. 367-87.

incentives. It is against the above background that local governments everywhere in China have made an effort to develop their local economies through the projects of high-tech parks. Due to their abundance of local intellectual endowments, the Beijing and Shanghai municipal governments have not only developed their own high-tech parks but also intended to utilize the elite universities and R&D institutes located in their cities to generate the linkage of R&D and local firms in order to facilitate a so-called indigenous innovation.

The local state's role in helping the formation of a regional system of innovation has been theorized and intensively studied by many scholars.[31] In these studies, some common elements are stressed, including the state's role in building a friendly environment for innovation, legal framework for intellectual property rights protection, good infrastructure for firms to reside, comfortable living conditions for scientists and engineers, etc. In sum, what is needed is a milieu of innovation rather than the friendly environment for production.[32] Lundvall even stresses that innovation needs an environment that can generate collective learning, in which different actors can easily communicate and share ideas with others which may generate new ideas and innovation.[33]

In order to generate a milieu of innovation, the local state has a critical role to play. That is, it not only needs to become an active actor in building good infrastructure, but also has to attract capital to reside so as to take advantage of R&D institutes nearby. Many already have found that local states in China are very active in promoting local economic development.[34] Nevertheless, this local developmental state perspective mainly focuses on how a local state provides necessary and almost unconditional services to businesses, for instance, it provides specific service to returnees and foreign capital, as to attract them to invest in the localities. This

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[31] Bengt-Åke Lundvall, ed, *National System of Innovation: Towards a Theory of Innovation and Interactive Learning* (NY: Pinter, 1992); R. Camagni, 'Introduction: from local 'milieu' to innovation through cooperation networks', in Camagni, R., ed, *Innovation networks: Spatial perspective* (London: Belhaven Press, 1991), pp. 1-9; A. Saxenien, *Regional advantage: Culture and competition in Silicon Valley and Route 128. Cambridge* (MA.: Harvard University Press, 1994); A. Malmberg and P. Maskell, 'The elusive concept of localization economies: towards a knowledge-based theory of spatial clustering', *Environment and Planning A* 34, (2002), pp. 429-449; H. Bathelt, A. Malmberg, and P. Maskell, 'Clusters and knowledge: local buzz, global pipelines and the process of knowledge creation', *Progress in Human Geography* 28(1), pp. 31-56.

[32] Lundvall, *National System of Innovation: Towards a Theory of Innovation and Interactive Learning*; M. Castells, *The Rise of Network Society* (London: Blackwell, 1996).

[33] Lundvall, *National System of Innovation: Towards a Theory of Innovation and Interactive Learning.*

[34] Oi, 'Fiscal Reform and the Economic Foundations of Local State Corporatism in China'; Andrew Walder, 'Local Governments as Industrial Firms: An Organizational Analysis of China's Transitional Economy', *American Journal of Sociology* 101(22), (1995), pp. 263-301; Zweig, *Internationalizing China: Domestic Interests and Global Linkage*; Segal, *Digital Dragon: High-Technology Enterprises in China.*

perspective, however, has not paid too much attention to the relationship among different levels of the local state and their role in building infrastructure so as to facilitate an innovation milieu. Our case study on both Beijing's ZGC and Shanghai's Yangpu will show that the former's institutional arrangements have outperformed the latter in terms of creating a local innovation system.

3. Institutional changes and local state dynamism

3.1 The Beijing Case: ZGC and local state corporatism

Beijing's ZGC is described as the most innovative region in China. There are 68 universities (including China's most prestigious universities, Peking and Tsinghua), 213 state-sponsored R&D institutes (including the Chinese Academy of Science, CAS), and over 300 thousand students in Beijing. Moreover, Beijing hosts over 36% of the honorary fellows of the CAS and Chinese Academy of Engineering. These figures all indicate that Beijing has more abundant science and technology personnel compared to all other cities in China. Together with the high concentration of R&D personnel and institutes in the Beijing area, ZGC has become the most important center for technology innovation in China. Even the biggest domestic firm, Lenovo, has established its R&D center in this area and moved its hardware production and assembly into the Suzhou and Shenzhen areas. Currently, many of China's most notable ICT companies, such as Baidu (百度) and UFIDA (用友) can be found in this area.

ZGC originally was a marketplace that existed in the Haidian District of Beijing. The emergence of this district was totally an historical incident rather than planned by the state.[35] In the early stages of economic reform, many non-state enterprises emerged and increasingly concentrated in Beijing's Haidian District. Most of these enterprises were spun off from state-owned units, either from the academic institutes or the SOEs.[36] By seeing the potentiality of further development due to the high concentration of prestigious universities and R&D institutes, in 1988, the Beijing government decided along with the central government to develop this area as the Beijing Experimental Technology Zone. Therefore, in contrast to other areas where the experimental zones were created by local states, ZGC was unique in that the Beijing government created the

[35] Segal, *Digital Dragon: High-Technology Enterprises in China.*

[36] *Ibid*., pp. 71.

zone mainly in response to and after the rapid growth of non-state enterprises.

Nevertheless, while the Haidian District of ZGC emerged due to the increasing concentration of non-state technology enterprises, there are many other local districts which are also called ZGC and were well planned by the local states. In 1997, ZGC was expanded to three zones, including Fengtai (豐台) and Changping (昌平) zones, at the same time the ZGC administrative office, under the Beijing city government, was established to oversee coordination. In the process, the zones continued to expand. Currently, there are ten ZGC zones which are located around the Beijing municipality. These zones were created by local district governments for the purpose of attracting capital so as to create economic growth in the name of high-tech development. These zones, their locations, and major economic functions are described in table 1.

As zones in the ZGC have steadily increased from just Haidian to ten units, the obvious fact is that the ZGC administrative office has had to bear the burden of coordination. On the surface, the functions of the ZGC administrative office are similar to other administrative offices in China, including setting up the target industries to develop, assisting firms in getting more information on financial support, bridging firms with R&D institutes, as well as mediating talents and firms, etc. In reality, what the ZGC administrative office has to do is to negotiate with district governments. One of these tasks has been to collaborate closely with district governments to set up specialized zones. The district government has its own motivation to set up a special zone for a science park, as stated above, but this has to be approved by the city government and ZGC administrative office. Therefore, the district government must convince the city government and ZGC administrative office that its plan can fit the level and types of technology that ZGC needs. Once these have been approved, the district government can then establish a special office run by a semi-governmental company to direct and manage the zone, which, in turn, is also partially monitored by the ZGC administrative office. Since the district government has the incentive to develop the local economy, it has the motivation to collaborate closely with the ZGC administrative office and follow its regulations.

Therefore, it is clear that the development of ZGC has been based on a similar local state corporatist development model as Oi describes.[37] The responsibilities of the city government and ZGC administrative office are to set the required policies, to promote the ZGC label, and to attract domestic and foreign

[37] Oi, ‘Fiscal Reform and the Economic Foundations of Local State Corporatism in China’.

investments. The same measurements were also applied to universities.

3.2 The Shanghai Case: local state initiatives and the realization of scientific parks

Similar to Beijing and other areas, Shanghai also has created many science-based industrial parks in order to attract foreign and domestic high-tech investments. In late 1990s, a new Yangpu project was installed, with the intention of imitating Silicon Valley (or ZGC) to create a new science park that is located in the area where the most prestigious universities and research institutes are based.

Yangpu is among the biggest administrative districts of Shanghai. In the 1960s, Yangpu accommodated more than half a million workers and became the major industrial center in China. The reform of Shanghai and the launch of the Pudong project in 1991 marked the beginning of the decline of Yangpu District. By contrast, the traditional industries in Yangpu failed to upgrade and lost their competitive edge. In the late 1990s, Yangpu accommodated only around sixty thousand workers. The economic output of Yangpu was among the bottom of Shanghai's ten metropolitan districts.

The major turning point for Yangpu was another attempt by the Shanghai metropolitan government to rebuild Yangpu as the "knowledge-based center" and "innovation hub" at the turn of the century. The idea for transforming Yangpu is based on the design to utilize the intellectual resources of fourteen universities (including Fudan and Tongji) and numerous research institutions located in the northern part of Yangpu. The Yangpu district developed the concept of "tri-parties cooperation" to integrate academic institutions, high-tech parks, and local communities. The tri-parties cooperation thus serves as the engine to boost the high-tech developments, amenities, and urban development of Yangpu.

Given its special historical background and existing burden in urban development, Yangpu is not able to "build" a science-based park like Zhangjiang in Shanghai's Pudong District. However, at least at the beginning stage, the local state still intends to take the lead in the tri-party cooperation framework. Reforming an area as complex and burdensome as Yangpu is a tough job. The Yangpu District government thus designs a new concept of a "Central Intelligence District, CID" to distinguish itself from the existing CBD (Central Business District) of the Pudong District. The core of the CID is the integration of universities, high-tech human resources, and community restructuring in the northern part of the Yangpu District. On the other hand,

the old factory buildings along the Huangpu River is planned to be transformed into enterprise incubators and recreation centers such as the Fishermen's Warf.[38]

The first institutional establishment as the symbol of a scientific park is the birth of the Shanghai Yangpu Technology Business Incubator, SYTBI. Instead of direct intervention from the city or district government, SYTBI is the product of the cooperation among the Shanghai Start-Up Center of the city government, Yangpu District government, and the Scientific Center of Fudan University. The Shanghai State Property Company and Yangpu District government also created a joint venture, the Yangpu Knowledge Incubator Company, to shoulder major responsibilities in the construction of a new university town in Yangpu. This district-owned enterprise is the combination of constructors, investors, and administrators. The Office of the Leading Group of Yangpu Knowledge-based Park is also located within the enterprise. The major task of this office is to coordinate various sectors to facilitate the growth of the start-ups.

In contrast to the outmoded top-down thinking of "creating" a knowledge-based community, the Yangpu government perceived the need for fostering an innovative culture in the community. In the early stage of the tri-parties cooperation project, the Yangpu leadership indicated the adjustment of the role of the government to one of encouragement instead of guidance. In addition to the improvement of urban infrastructure, the improvement of the regulatory regime is also the core of perfection.

Another salient characteristic of the Yangpu case is the rising role of the district government in economic policymaking and implementation. In contrast to the ZGC and Zhangjiang cases with strong state directives, the district government took the initiative to push the Yangpu case forward. According to the authors' interviews, the Yangpu District government provided the grand design to reconstruct the region and introduced the concept of tri-party cooperation to elevate the knowledge-based economy. [39]Based on the blueprint of the Yangpu project, the Shanghai metropolitan government offered related institutional support. In addition, the Yangpu District government enjoys more autonomy in public finance. Financially speaking, the metropolitan and district governments are in a situation of being "upside down" (倒掛 dao gua). A leading scholar in a public think tank in Shanghai indicated that the Yangpu District government has reached even

[38] Jianqiang Li and Qiyu Tu, *Daxue Xiaoqu, keji yuanqu , gonggong shequ liandong fazhan (Cooperative development between universities, high-tech parks, and local communities)* (Shanghai: Shanghai Shekeyuan chubanshe, 2007).

[39] Yangpu interview, Feburary 20, 2009.

outside the Shanghai metropolitan area to expand its influences. Recently the Yangpu District government has reached a deal with the Yancheng City in northern Jiangsu Province. According to the deal, Yancheng City will provide a large piece of land for start-ups from incubators in Yangpu District. This deal was solely negotiated between Yangpu and Yancheng, and the Shanghai Metropolitan government did not intervene.

4. Universities , Institutional Innovation , and Local Development

4.1 Beijing: Alliances between top brains and business incentives

In addition to efforts of district governments to build scientific parks, universities in Beijing are granted the right to develop and they are also interested in creating special zones for high- tech development. The universities, following the guidelines of the Torch Program, tend to establish their own high-tech industrial parks to generate university-firm relationships. They have their own interest and autonomy in developing a science park. Almost every prestigious university in Beijing has its own industrial park, including the most prestigious Peking and Tsinghua Universities. We can use Peking University as an example to see how the university develops its industrial park. For example, according to our interviews[40], Peking University has its own incubation center and industrial park. The former currently has 40 small firms within its campus borders, many of which were started by professors of this university, while some of them by returnees, and the rest are from other areas in Beijing or other localities in China. These start-up firms can stay in the incubation center for about three years. In the incubation stage, the center helps the firms look for knowledge and technologies in the university. In the process, the firm can also apply for the seed fund provided by the center (up to RMB 300 thousand, equivalent to USD 42 thousand, 1 USD=7 RMB) to develop and to look for further investment from venture capitalists.

Peking University has established a science park on campus with investment that includes a five-star hotel. Our interviewees informed us that this investment amounted to about USD 250 million and was totally funded or borrowed from banks by the university. Many factors contribute to the university's ability to sustain such an enormous investment. First, it was due to the Chinese government's ambitious policy in higher education that sought to bring China's elite universities up to the level of the world's best. Some of the elite universities,

[40] Beijing interview (Peking University), Aug. 10, 2009

including Peking University, gained enormous financial support from the central government. Second, it was also due to the fact that many top universities have their own enterprises that can generate revenue in contributing to the universities' financial leverage. For example, Peking University has Fangzheng (方正) Electronics, while Tsinghua University has Tsinghua Unis (紫光) Corp. Third, it was also due to the fact that universities in China have the flexibility to receive loans from state-owned banks to aid development. In most cases, the state-owned banks like to loan money to universities due to the low risk of the universities' defaulting on repayment. Therefore, the banks were not very worried about their loans potentially not being paid back.

The university's activities in bridging R&D and industry indeed have created some positive effects. Many emerging firms have been created by the university's incubation center. The university's science park also has hosted many global and domestic firms, both small and large. The most successful example is Tsinghua Science Park, in which Google, IBM, Oracle and many others are located. The park, which is affiliated with CAS, is also home to Intel and AMD. ZGC indeed has attracted many domestic and foreign firms to take up residence; also, due to the abundance of R&D resources, many new firms have been created in this area to take the advantage of these R&D resources.

The achievement of ZGC to become the most innovative area in China has been a process of institutional evolution and learning. At the initial stage in the early 1980s, the area emerged spontaneously. As the state recognized it as the most important technology zone in China, ZGC adopted a local state corporatist model in developing high-tech industry in the process. When the existing areas were full, it also allowed other district governments to join in the high-tech zone development game. Therefore, ZGC has transformed from only one zone first to three, and then finally to ten zones in 2007. In addition, it is also due to the financial incentives of district governments, universities and R&D institutes in promoting local and institutional development that ZGC has been able to expand at such a high speed. The synergy of state policies and local states' initiatives has created an effect of high-tech booming in ZGC. We can use the development of the software industry, which up until now is the most successful one in ZGC, as an example to illustrate the formation of its local innovation system.

The core area of ZGC in developing its high-tech industry was located in Haidian District where major

universities and R&D institutes were located. As the ZGC science industrial park was created and universities' science parks were built, many multinationals (MNCs) and domestic firms moved into these parks to enjoy tax incentives and abundant human resources nearby. From the other side, firms have strong incentives to locate (or establish operations) in ZGC. The MNCs' motivations were to utilize the low-cost human resources from the top universities to lower their costs and to penetrate the domestic market. One reason for this is, in contrast to IT hardware whose production procedures can be universalized, IT software products have to adjust to local language, special needs and customs. That is, the utilization of office and middleware software has to be indigenized. To fulfill this demand, the MNCs have little option but to depend on local people and local firms to expand their market share. Therefore, all the major software MNCs, such as Oracle, Sun, and Cisco, collaborate with local firms to sell their products. It is also through this collaboration that the MNCs have trained local engineers on related knowledge and through which knowledge diffusion has occurred.[41]

Secondly, those large state-own firms also have incentives to locate in ZGC due to the convenience in consulting with top scientists in universities and R&D institutes. In general, these firms are mainly targeting at developing embedded software to be used in IC chips or software based on alternative systems such as Linux. According to our interviews[42], although they may not be able to attract the most talented engineering graduates from top universities, due to level of salaries, they still offer highly competitive positions when compared to private firms. Moreover, Beijing's city government established a semi-official association based in the Haidian District to promote the collaboration of state-owned firms with universities to develop software jointly. One of the most significant developments was the Changfeng (長風) Open Standard Software Platform Alliance through which the Chinese state intended to use the collective resources to develop a Linux-based system that could compete with the Microsoft-dominated system.

Thirdly, big private-owned local firms also wanted to use the abundant human resources in Haidian District to develop their own products. There are a number of very successful firms in ZGC that originally were key agents for MNCs to distribute and install software products, for example, UFIDA (用友) was originally an

[41] Zhou and Tong, 'An innovative region in China: interaction between multinational corporations and local firms in a high-tech cluster in Beijing'.

[42] Beijing interview (manager), Nov. 21, 2008. We have conducted intensive interviews in Beijing during Nov. 2008, Aug. 2009, and Jan. 2010. The total interviewees were about 30.

agent for Oracle. In the Chinese market now, the high-end office software market is mainly dominated by MNCs. The lower end, however, is dominated by local firms whose technological capabilities have largely been learned from MNCs and from collaborating with local scientists. For instance, the most innovative local Enterprise Resource Planning firm UFIDA learned extensively from MNCs (mainly Oracle) in its formative stages and then began to develop its own office software that was targeted at enterprises in smaller cities or smaller enterprises in big cities. Since UFIDA was able to enter the market where MNCs were not operating or instead had chosen to ignore, it then began to take off and recently has become the biggest ERP software firm in China. In the process, UFIDA has collaborated with university professors to develop and improve new products, and in recent years it has begun to enter into the higher-end market with the intention of confronting MNCs head on in big cities.

The transformation of ZGC has largely reflected the historical transition of China' innovation system since the early years of reform. The development of the software industry in ZGC has shown that the geographical proximity between firms and R&D institutes indeed is convenient for firms to look for scientific advice. The R&D institutes in ZGC have also played a role in nurturing new small scientific firms. Those factors, together with local states' endeavor to promote their local economies, have helped the formation of a local innovation system.

4.2 Shanghai: reinforcing entrepreneur universities and the " Tongji Model"

As the preceding analyses on ZGC demonstrate, higher educational and research institutions play key roles in facilitating institutional innovation and change. The "tri-party cooperation" is more than the creation of interface mechanisms between university and industry such as a liaison or transfer office to assist existing firms or create new ones. Most fundamentally, the faculty of universities view their research and teaching in a new light, looking to contribute to technology transfers and firm-formation as well as to the education of students and advancement of knowledge.[43]

Similar to ZGC, the anchor university of Yangpu has played a key role in promoting the emergence of start-ups through university-owned incubators. Fudan University, for example, hosts the national scientific

[43] Henry Etzkowitz and Chunyan Zhou, 'Regional Innovation Initiator: The Entrepreneurial University in Various Triple Helix Models', paper presented at Triple Helix VI Conference, hosted by National University of Singapore, Singapore, 16-18 May 2007.

parks and incubators located in Yangpu District. Tianchen, one of the Fudan-incubated companies, has successfully promoted itself as the leading firm in anti-counterfeiting and other related fields. Companies like Tianchen have used Fudan as a label to upgrade their status as high-tech companies. However, the major task of Fudan is to foster these start-ups and transform them into "normal" instead of "university-owned" enterprises.[44] Normally the Yangpu District government holds 20% percent of these university-based scientific parks. These university parks co-exist with other district-owned parks such as the Wujiaochang High-Tech Park. The major administrators of the latter are also former faculty members of universities within the Yangpu District. In other words, the 15 universities of Yangpu have provided ample human resources to connect the academics and new start-ups in the region.

However, there exists a gap between the "ideal type" of university-led knowledge-based economy and the current situation in China. As the analysis on ZGC shows, China is strong in the basic research areas. However, only about ten percent of its research outputs are transferred into industrial products with market values. Moreover, most of the Chinese universities establish links only with big enterprise groups. Small and medium-sized firms are excluded from such limited alliances. Universities in Yangpu District have begun to undertake the task of integrating with the local communities by spreading knowledge. Since 2006, prominent professors from Fudan and Tongji have established contacts with the local communities by organizing forums in the general fields of natural and social sciences. Topics of these forums include issues within the domains of environmental protection, international affairs, urban management, general physics, and bioscience. These prominent professors have also visited local elementary schools and high schools to give talks. This extension education is a common practice of the universities in the West. However, a closer interaction with the local communities is still a new phenomenon in China at the current stage.

Our field researches and interviews demonstrate that the Tongji experience has far-reaching effects for developing a knowledge-based economy in the region.[45] The cluster of design houses around the Tongji campus was not "invented" by the university or the district government. Compared with its more prestigious neighbor, Fudan University, Tongji does not boast the large-scale affiliated enterprises and incubators. The

[44] Ronghua Wang, ed, *Shanghai yangpuqu chanye fazhan yu minsheng wenti diaoyan baogao* (Shanghai: Shanghai Academy of Social Sciences, 2008), Chapter 8.

[45] Intensive field researches in Tongji University area were conducted in August , 2009 and January , 2011.

design cluster is purely bottom-up and grassroots oriented. The surrounding area gradually creates the spill-over effects to attract small firms from other areas. The regional amenities and culture of sharing still need a period of time to grow. However, the nascent atmosphere of a breeding ground of innovation has gradually emerged.

In contrast to the ZGC model of IT-oriented incubation, Yangpu has attempted multiple forms of fostering innovation and new industries. For instance, Tongji University identifies itself as the “Silicon Valley of Design” in China. Tongji also emphasizes its strength in the fields of urban planning and architectural design. In the beginning stages of Yangpu’s development about eight years ago, Tongji professors and graduate students established numerous small-sized design houses along Chihfeng Street outside the Tongji campus near Wujiaochang. The mushrooming of such small companies created autonomous, bottom-up dynamics of cluster formation in the region. The university and district government will intervene after the formation of a design cluster. For instance, Tongji University recently purchased a big piece of land along neighboring streets and attempted to transform it into a world-class design center for automobiles. After the realization of the Chihfeng street experience, Tongji University has selected urban planning, environmental protection, and industrial design as their three pillars of a university-supported incubator.

In the case of rejuvenating the Tongji University and surrounding areas, Management Committee of Yangpu High Tech Park (MCYHTP)MCYHTP coordinated with the district government to transfer the abandoned bus station on the Siping road into a creative and innovation complex for the school of design. The alliance between Yangpu and Tongji even negotiated with the Shanghai Metropolitan Government about the location of exits of subway lines. The new exit is now just outside the Tonji Square, with steps away from the creative and innovation complex. Another case of Tongji circle of Knowledge is the renovation and transformation of the existing city-owned design houses into a complex of Tongji Science Park. This project also accommodates the Shanghai International Design Center designed by famous Japanese architect Tadao Ando.

Tongji Knowledge Circle provides a vivid case of combining district development and science park development. The formation of the cluster of design is more or less an unexpected result of the real estate investment. During our interviews and field researches in Tongji University, we noticed that the most

successful incubator on the Guokang road adjacent to the Tongji campus was originally used as a commercial residential house for sale. Due to its design as small apartment units, small and medium sized design companies found its convenience and gradually formed a cluster within the apartment building. Hudong Science Park, located on the Chifeng road in the southern rim of Tongji campus, is now one of the most successful design clusters in the area. Siping Street Office of Yangpu formed a strategic alliance with the state owned Fishing and Machine Research Institute to develop the old courtyard and transfer it into office building. Because of its closeness to the Tongji University, the commercial building gathered more than 50 design companies. The district government then undertook the improvement and renovation of Chifeng street areas. A design cluster finally emerged after 2005.

5. Coping with Institutional weakness in supporting innovation

Both Zhongguancun and Yangpu are facing institutional constraints to enhance and deepen innovation. This relates to the following institutional constellations that generate the fragmentation of R&D systems and de-linkage of R&D institutes and firms. These institutional weakness could be analyzed by the following dimensions:

5.1 Institutional embeddedness of the Chinese system.

The two local cases discussed in this article are embedded in the existing institutional arrangements of China as a whole. As ZGC has evolved to become a local innovation system, it nevertheless has its own weaknesses. For instance, the university-firm collaborations mainly occur in transferring existing knowledge rather than generating new knowledge through mutual collaboration and co-development. As Liu and White stressed, the Chinese tapping of foreign sources has focused more on embodied and codified technology (instruments and equipment, drawings and software, production lines) rather than intangible assets.[46] This is because ZGC, in contrast with Silicon Valley and Hsinchu Science Industrial Park in Taiwan, lacks a friendly institutional environment in which favorable conditions for networking and deep technological learning can

[46] Liu and White,'Comparing innovation systems: a framework and application to China's transitional context', pp. 1103.

develop.

The Chinese national innovation system induces competition rather than collaboration between R&D institutes and industrial firms due to the fact that most R&D funding up until recently has been supplied mainly by state agencies.[47] Although there is a tendency for the state to encourage in-house R&D at the firm level, the major funding for R&D still comes mainly from the government's budget. In this case, state-sponsored R&D institutes, universities and firms that are applying for funding are largely overlapping, which, in consequence, results in competitive rather than collaborative relationships between R&D institutes and firms.

Furthermore, the R&D institutes tend to conduct research that is not directly related to the needs of the industry.[48] The state-sponsored R&D institutes are targeting frontier technologies or basic research, however, what the local firms need are not these frontier technologies but the mid-level technologies which can support them to compete in the market. As a consequence, as our interviews[49] show, managers of local firms indicate that the local R&D institutes can only provide them information and consulting functions rather than R&D collaboration. The purpose of local universities to them is essentially for supplying them cheap and good graduates, not product development.[50]

5.2 Bureaucratic hurdles to link universities with innovational mechanism

In additional to the lack of cooperation between major research institutions and firms, the universities themselves fail to play the role as a bridge to integrate regional innovation interests with research capacities. Such constraints are rooted in the bureaucratic culture and hierarchies in Chinese universities. The case of Yanpu demonstrates such puzzles. The university, the scientific park, and the district government have their separate calculations of interest. Policy supports to the innovation business are still limited to the "hardware"

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[47] *Ibid.*, pp. 1091-1114; Cong Cao, 'Technological development challenges in Chinese industry', in Elspeth Thompson and Jon Sigurdson, eds, *China's science and technology sector and the forces of globalization* (Hackensack, N.J.: World Scientific Pub, 2008)

[48] *Ibid.* ; X. L. Liu and N. Lundin, 'Toward a Market-based Open Innovation System of China', paper presented at Orebro University and Research Institute of Industrial Economics (10 September 2010), available at http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN027030.pdf.

[49] Beijing inverview (manager), Nov. 19, 2008.

[50] Zhou, 'Synchronizing Export Orientation with Import Substitution: Creating Competitive Indigenous High-Tech Companies in China'.

construction in the Yangpu District.

Our interviews show that among the three parties of interaction, the district government is still the most active.[51] In theory, Yangpu is home to "four bigs"—big enterprises, big universities, big hospitals, and big research institutions. These "big" institutional settings provide rich resources and human power to buttress Yangpu's economic development. In practice, however, these "bigs" have their own administrative affiliations with the central government. They operate according to "national" instead of local interests.[52] In other words, they are "enclaves" instead of integrative components of Yangpu. The "spill-over" effects from these institutions to local economy are therefore limited.

In practice, "localization" is not high on the agenda of prestigious universities like Fudan. There exists a huge gap of capacities, resources, and enthusiasm between major universities and the Yangpu District government. In addition, universities like Fudan enjoys a prestigious status under the Ministry of Education at the central level. Yangpu is a metropolitan district, and the status of the leader of Yangpu is equivalent to the "bureau" level in China's bureaucracy. However, Fudan recognizes themselves in the "central" instead of local level. They even focus on their status as a "global university" or "top university in China."

The top-down decision making process at the highest level within the knowledge-based networks may encounter distortion during the process of implementation at the grassroots level. Silicon Valley grew up from the incentives of engineering schools and individual departments at Stanford University to transform basic research projects into innovative spirits. In the case of Yangpu, decisions from the top leadership of the universities could guide the general direction, but fail to provide enough incentives for individual departments and research faculty to descend from the ivory tower.

In brief, the district government is indeed in urgent need to utilize the alliances of innovation to upgrade and rebuild the outdated city landscape and infrastructure. According to the preceding analyses, the universities have visible and invisible walls to isolate themselves from the other two parties. Practically speaking, a substantial "scientific park" does not exist in Yangpu District. The district government has to cope with numerous small- and medium-sized enterprises (SMEs), MNCs, and development complexes like KIC. In the case of Yangpu, the scientific park is an abstract entity, not a concrete one. Moreover, the Yangpu

[51] Yangpu interview, August 13, 2009.

[52] Jianqiang Li and Qiyu Tu, *Daxue Xiaoqu, keji yuanqu , gonggong shequ liandong fazhan*, p. 148.

District government is short of providing substantial financial support to these SMEs. Large construction projects are supported by the Shanghai Metropolitan government. The linkage between the district government and enterprises becomes ambiguous. The three parties have separate institutional constraints. Ideas and calculations of these three parties are also different.

5.3 Culture factors of Institutional innovation in ZGC and YP

Our study also finds out that the innovation system in China seems to have the feature of low levels of trust and show little interests in building local networks. This can be shown in ZGC's innovation system. The interest of MNCs in setting up R&D centers in this area is to recruit the most talented people without an interest in networking with local firms. The universities and research institutes are interested in applying for grants out of the state's science budget and have little interest in building local industrial networks. Moreover, the local firms are more interested in seeking opportunities to expand their market share in this booming economy rather than to cooperate with other firms to deepen their technological capability. As Zhou shows in her field research, "When we asked the manager of a Chinese hardware company about the company's partnership with other Chinese firms, the immediate response was blunt: ZGC firms do not cooperate with one another."[53] Our field research in ZGC shows similar findings. Zhou attributes this lack of networking among local firms to the institutional roots of Danwei (單位) mentality, or so-called 'big and complete' or 'small and complete' systems.[54] We suggest instead that it is also due to the legacy of the socialist system that generates distrust among people on the one hand, and the high competition among firms due to their similar level of technologies which engenders horizontal competition rather than collaboration on the other.

The problem of low-trust society also influences the innovation mechanism in Yangpu. However, the case of Yangpu reflects the emerging culture of social networks between SMEs and second-tier universities. Instead of the traditional style of strong intervention by central and local states in providing preferential treatments, the Yangpu District relies on more flexible social networks to attract start-ups and local firms. During our field researches, employees of Wujiaochang Science Park (WSP) indicated that the major focus of

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[53] Y. Zhou, 'The making of an innovative region from a centrally planned economy: institutional evolution in Zhongguancun Science Park in Beijing', *Environment and Planning A* 37, (2005), pp.1127.

[54] *Ibid.*, pp. 1128.

their networks is embedded in the existing social capital with SMEs. Some of these smaller firms have prior connections with university faculties and alumni. The general manager of WSP, for example, was a professor at Shanghai Ocean University. Adopting a relatively low profile, the WSP and local Yangpu cadres have developed a network of co-existence to develop new connections with SMEs. Currently, within the two humble buildings of WSP, about 1000 small firms have developed their bases for further expansion.

5.4 Urban development as the core of institutional innovation of local states

Both ZGC and YP are undertaking dual tasks of institutional innovation and urban district reconstruction and development. In some aspects, these two tasks may have conflicts of interest. Similar to other rapidly developing regions in China, the leaders of the local state in ZGC put economic growth in the area as their major political mission in order to enhance their future political career prospects. In an urban area such as the Haidian and Fengtai Districts, the real estate sector naturally becomes the major target for promoting economic development. The urban restructuring of the area and the emergence of blocks of high-rises indicate the booming economy, which in turn becomes the basis for the local state to persuade MNCs to locate R&D centers in the area. The strategy has been very successful indeed. However, the downside of this rapid development of the real estate sector in recent years is that it has pushed up the rent costs to a level that is not conducive to the start-ups or smaller firms' survival in this area. According to our interviews[55], many smaller start-ups have already moved out from this expensive area and sought cheaper places on the outskirts of the city in order to survive. The local state's pro-growth strategy has greatly improved the image of this area. This, however, is a strategy that pursues short-term growth at the expense of long-term innovation investment.[56]

The culture factor and the learning curve are two important components for a new model of innovation to emerge. Since Deng Xiaoping's southern tour in the early 1990s, Shanghai has accumulated experiences in the manufacturing industries and transformed the Yangtze River Delta region into the "world's factory." District governments in Shanghai have learned how to attract foreign direct investment to boost manufacturing capacities in the region. Local governments are also adept at building development zones and technology

[55] Beijing interview (manager), Nov. 15, 2008

[56] J. H. Wang, 'Divergent routes from catching up toward innovation: South Korea and Taiwan compared', *The Journal of Development Studies* 43 (6), (2007), pp.1084-1104.

parks to host foreign as well as domestic enterprises. However, promoting a knowledge-based economy is a novel idea for most of the district governments in Shanghai. Most of the local districts in Shanghai have launched their programs of “innovative industries” and adopted attractive slogans like “modern service industries.” However, they only copy the experiences from the manufacturing sectors and try to apply them to the service sector. District governments endeavor to “rebuild” facilities for innovation and in so doing, raise the prices of the real estate market. As the district governments get rich and apartment buildings become more luxurious, the goal of becoming an innovation hub becomes more remote.

6. Conclusion

The cases of Beijing and Shanghai provide two contrasting models of innovation developments in China. Zhongguancun, the hub of China’s IT software industry, is characterized by the interaction among the administrative office, elite universities, and clusters of IT companies. Although the ZGC administrative office has limited power to intervene and control university-based science parks, these parks nevertheless have created the “cluster effect” that is buttressed by the geographical adjacency of IT firms and China’s top research units. Our research also indicates that due to the overlapping fund sources and the missing linkages between basic research and applied sciences, ZGC is handicapped by the lack of trust among firms. Such institutional weakness is worsened by the fact that local leaders put economic development ahead of innovation as their top priority to protect their political futures.

In contrast, the development of Shanghai’s Yangpu District provides another case of attempts at creating a local innovation system in China. We argue that the Yangpu case symbolizes a hybrid model of reforming the innovation system. Similar to ZGC, major universities operate their own science parks in the district. However, the Yangpu District government promotes actively in the formation of a “tri-parties cooperation” among university campuses, scientific parks, and local communities. The district government even established its own scientific parks and incubators to facilitate the transition to a knowledge-based economy. Nonetheless, while we have witnessed a prestigious university like Fudan’s endeavoring for building national-level labs and incubators, other leading universities such as Tongji also helping to breed small and medium-sized indigenous design houses, the institutional barriers between district government and universities are still too huge to bring

them together to form an active innovation system. Instead of promoting the combination of homegrown IT firms and MNCs as we have observed in ZGC, the Yangpu District government until recently has better performed in building infrastructure and real estate sector than in creating networks among universities, firms and R&D activities together. There are huge institutional hurdles to be overcome (table 2)

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Table 2 is here

In contrast to the traditional approaches of treating the city government as a whole, our research relegates the level of analyses and focus on urban districts of China's two centrally administered metropolitan areas. Our research also finds that capacities and autonomy of the ZGC of Beijing and Yangpu District of Shanghai differ in various aspects, but both regions are struggling to upgrade the real estate market and enhance economic development. The "high tech cluster" provides a useful instrument or label to achieve goals other than innovation and R&D. Elite universities are regarded as engines for network formation, but visible and invisible walls of Chinese universities discount efforts to foster a university-centered innovation hub. Last but not least, the innovation cultures of mutual trust, sharing, and tolerance are absent in the two regions under study. In this sense, capacities of urban districts to promote innovation and institutional change reach their limits. Removing these institutional constraints requires continuous efforts of social engineering and political maneuvering. Bottom-up dynamics of major metropolitan areas and top-down political will of institutional changes collectively shape the future path of China's development of innovation industries.

Table 1. Economic zones of ZGC

year	zone	district	specialization
1988	Haidian Park	Haidian	ICT, all high-tech types
1991	Fengtai Park	Fengtai	headquarters
1991	Changping Park	Changping	All types including biotechnology
1997	Electronic Town	Chaoyang	Electronics and others
1997	Yizhuang Park	Daxing	Manufacturing for all types
1999	Desheng Park	West City	Cultural creativity
2006	Yonghe Park	East City	Cultural creativity

2006	Daxing CBP	Daxing	Biotechnology, pharmaceutical
2006	Tongzhou Park	Tongzhou	Electro-optical industry and others
2007	Shijingshan Park	Shijingshan	Media and Cultural creativity industry

**Sources: ZGC administrative office web, http://www.zhongguancun.gov.cn/*

Table 2: Comparison of ZGC and Yangpu's innovation system

	ZGC, Beijing	Yangpu, Shanghai
The major promoter	District governments, then city and central state	District government
Inter-firm relations	Increase	limited
Relationship between universities, R&D institution and firms	Incubation, consultation, and science parks	Incubation, consultation, and science parks
Government	Vertical guidance by ZGC administrative authority	Mainly by district government with little authority on universities and R&D institutes
Appearance	Strong performance in attracting high-tech firms and leading to the booming of real estate sector	Weak in terms of luring high-tech industry, but shows strong performance in urban re-development
Local innovation system	Stronger	Weaker

第四章：

High Tech Industrial Parks in Beijing and Shanghai: The Production of Space and Space of Production

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Abstract

The development of high-tech industrial parks (HTIPs) has become a salient phenomenon in China's economic and urban development. Current studies regarding the development of HTIPs tend to focus either on the active role of the local government or on the consequences of technological innovation that those parks may have brought about. Very few studies have paid attention to the intrinsic relationship between the process of space production in building HTIPs and the effect on urban development. To fill this theoretical gap, this paper considers developing HTIPs as a territorial project through which both central and local states seek to promote economic growth by reorganizing their territories so as to facilitate capital accumulation based on high-tech industries. We use Beijing's Zhongguancun and Shanghai's Yangpu areas as examples to show the active role played by district governments in promoting and using the HTIP symbol to develop the designated land. In the end, due to the quick tax-generating potentiality, the construction of HTIPs has given rise to property-led projects which district governments are much more enthusiastic in pursuing. The property-led development projects paradoxically, as we argue, may have generated some negative effects on the promotion of high-tech development, which especially shows in the case of Yangpu district.

1. Introduction

During the past two decades, high-tech industrial parks (HTIPs) have increasingly been promoted as growth engines in various cities in China to facilitate regional and urban development as well as generate technological innovation. Large areas of urban and rural lands have been developed and redeveloped to support the dream of becoming high tech nodes in the global technological production networks. Among them, Beijing's Zhongguancun (ZGC) science park was the earliest (1988) and has been regarded as the most ambitious project that might not only have been able to attract a huge amount of foreign investment but also to generate indigenous innovation due to the abundant human resources in the city. Shanghai and other cities have followed suit.

Indeed, the Chinese state in the late 1980s had installed two very important reform programs to rejuvenate the aged R&D system in China, the first one being the 863 plan (1986) and the other the Torch Program (1988). The former aimed to pool resources and scientists together wherever possible to serve as a bridge and to keep up with international high-technology development in several high technologies. The latter, by contrast, was intended to learn the experiences and successes of Silicon Valley in order to build China's technopoles so as to revitalize China's traditional industries, and also promote the creation of new and high-technology enterprises (Wang et al., 1998; Zhou, 2005; Segal, 2003). It was in such circumstances that ZGC was designated as China's first HTIP in 1988. By 1993, 52 nationally recognized zones existed throughout the country, covering 28 of the 31 provinces, autonomous regions and centrally-administered municipalities. These HTIPs soon became the growth poles in each region, especially in the cities, and thus high tech industrialization has become intertwined with high rise urbanization, especially in the two major world cities in China, namely, Beijing and Shanghai.

We regard the creation and re-creation of HTIPs in China in general, and in Beijing and Shanghai in particular, as a process of space production in which spatial transformation concurs with China's pursuit of modernity through the strategy of territorialization. In this respect, as Harvey argues, modernity entails the conquest of space, the tearing down of all spatial barriers, and the ultimate 'annihilation of space through time' (Harvey, 1989:205). Thus, the central state wants to open its territory to global capital so as to attract foreign investments and to demand the most updated technologies. The municipal governments in turn want

to reorganize urban space through the strategy of building new HTIPs so as to pursue rapid capital accumulation and technological innovation. Finally, the district governments are able to use the high-tech banner to attract capital investment, especially in the real estate sector. The High Tech Park has become a representation of progress which is hoped to bring high value-added economic activities to the locality and ultimately contribute to the district governments' revenue. Ultimately, the HTIP has become a territory that has become fused with various forces contesting for its formation and space production.

Existing studies on China's development of HTIPs are mainly focused on two issues: the first approach emphasizes the role of the local state in building HTIPs and promoting local economic development (i.e., Segal, 2003; Hsing, 1998; Zweig, 2002; Wang and Lee, 2007), whereas the second stresses the importance of cluster effects in generating technological innovation and shaping the local innovation system (Zhou, 2005, 2008; Zhou and Tong, 2003 Wu, 2007). Very few studies, however, have paid attention to the intrinsic relationship between the process of space production in building HTIPs and the effect on urban development. To fill this theoretical gap in the literature, this paper regards developing HTIPs as a territorial project through which both central and local states seek to promote economic growth by reorganizing the spatial structure in their territories so as to facilitate capital accumulation based on high-tech industries.

We use Beijing's ZG and Shanghai's Yangpu area as examples to show how district governments in both cities have actively promoted the construction of HTIPs and have used them as symbols to develop the designated land. In the end, due to the quick tax-generating potential, the construction of HTIPs has given rise to property-led projects, if not replacing high-tech development, which district governments are much more enthusiastic in pursuing. The property-led development projects, we argue, may have created unexpectedly negative effects that have affected the promotion of high-tech development, which especially shows in the case of Yangpu district.

2, High-tech industrial parks as territorial projects

Urban development has been experiencing a great transformation in the age of globalization. In a world of fast information flows, cities and regions are regarded as being more flexible in terms of adapting to rapidly changing conditions in markets and technology than are national governments. Technopoles, of which HTIPs

are a representative form, have been planned and installed everywhere to promote knowledge learning and creativity in order to generate both national and regional wealth. Technopoles here are defined as cities or regions that 'contain significant institutions of a quasi-public or nonprofit type, such as universities or research institutes, and which are specifically implanted there in order to help in the generation of new information' (Castells and Hall, 1994:1). In order to build technopoles, cities or regional governments have to create conditions for firms to reside, negotiate with multinationals for them to stay and foster conditions to nurture small venture firms. In other words, an innovation milieu that involves favorable conditions for social, economic, institutional and cultural environments that may create a synergy effect for knowledge creation has to be implanted (Castells and Hall, 1994:9; Camagni, 1991). The development of Silicon Valley has become an embryonic model for the rest of the world to imitate.

To create an innovation milieu is in fact not only a project for spatial reorganization, but is also an image-making venture that is central to market competition for investment. In order to create a new space for innovation, leaders of a city government become entrepreneurs that engage in reorganizing the city's physical space as part of a global campaign to attract both foreign and domestic firms. Thus, technopoles are also space projects that involve creative destruction whereby certain old historical spaces are destroyed and new spaces are created for building an environment for knowledge creation. Urban entrepreneurialism becomes the political and social representation of the current stage of city and regional competition (Harvey, 1989).

According to Harvey (1989), capitalist accumulation can only continually accelerate temporally and spatially. It is based on both an immobile configuration of territory and socially constructed institutions that enable capital circulation. Therefore, each successful round of capital accumulation has been built upon the existing socially produced infrastructures that facilitate the accelerated circulation of capital through space. Harvey's perspective on the historical and spatial dimension of capital accumulation can better be described by Massey's (1984) view that emphasizes the sedimentation of historical layers of a local area. Massey argues that each local area contains not only one form of economic structure; instead, it is a product of long and varied histories. Some forms of organization die away, while some still linger on and continue to have influence over new rounds of development. Therefore, when viewed from this perspective, 'the structure of local economies can be seen as a product of the combination of 'layers' of the successive imposition over

years of new rounds of investment, new forms of activity' (Massey, 1984:114).

In the globalization stage, the central and local states' efforts in strengthening the economy's competitiveness reflect a multi-scalar reconfiguration of the territory (Brenner, 1999; Jessop, 2002). For the central state, globalization conditions have facilitated the loosening of domestic regulations in favor of the imperatives of capitalist accumulation. The competitive state has emerged to create a friendly investment environment in order to keep the economy innovative and competitive (ibid). This re-articulation of the global with the local is an attempt to create a new spatio-temporal fix for managing the local economy to meet the globalization demand through which the valorization of capital can be progressing on a much more globalized scale toward a knowledge-based economy.

For city managers, current urban governance has become much more oriented toward the provision of a 'good business climate' through which all sorts of construction are embarked on to lure capital into the local territory. Although there are no clear recipes to determine which types of plan will be successful in bringing new investments, city governments are forced to adopt approaches that increase the amount of fixed local infrastructural investments to attract mobile global capital. Space reconstructions and various image-making programs are undertaken to promote the city's competitiveness. A new growth machine, which especially contains the real estate sector, is formed to promote the city's rejuvenation and re-orientation (Logan and Malotch, 1987; Wu, 2002; Jessop and Sum, 2000).

To sum up, space is not merely a physical container within which capitalist development unfolds. It involves social and political elements that ultimately shape the ways in which the economy is developed. By encountering the increasingly globalized world, the state, local government and related actors are continually constructing, deconstructing, and reconstructing the historically specific areas through which multi-scalar territorialization has proceeded to facilitate capitalist accumulation and innovation (Brenner, 1999:42).

China in this specific historical era has focused much on using the HTIP strategy to develop its economy and to enable its technology to catch up with the advanced countries (Ge, 1999; Wu, 2002; Zheng, 2010). As can be imagined, due to each city's history and various types of heritage, city governments have different capacities and ways of building HTIPs. As will be shown, Beijing's and Shanghai's district governments have fully utilized the HTIP strategy to develop their economies and to upgrade their development level. In the

process, not only have the city spaces been transformed, but the city's territorial organizations have also been altered to fit the demands of capital accumulation on a global scale. The production of space in the high-tech industry in the end has been transformed into the space of production leading to the booming of the real estate sector. The details are discussed in the sections that follow.

3. Beijing's ZGC – Silicon Valley is everywhere in the City

Beijing's ZGC is described as the most innovative region in China (Segal, 2003; Zhou, 2005, 2008). The achievement of ZGC has been an accumulated and evolutionary process of institutional reforms. At the initial stage of the reform in the early 1980s, the area emerged spontaneously due to the increasing emergence and concentration of non-state-owned enterprises in Haidian district where Tsinghua University, Peking University and the Chinese Academy of Sciences (CAS) were located. As the state recognized the potential it had to imitate Silicon Valley in the U.S., because of its high concentration of prestigious universities and R&D institutes[57], ZGC was granted the status of an experimental zone for its development.

3.1 ZGC as a technopole project – The central state's policy

During the earlier stage of China's economic reform, the central state undertook various incremental approaches to reform the stagnant economy. One of them was the fiscal reform that unleashed the material incentives for local officials to promote their local economies (Oi, 1992, 1995). The second was the reform of the science and technology (S&T) policy that encouraged local government to establish HTIP in order to promote foreign investment.

China's fiscal reforms in the early 1990s clearly redefined the localities' share of the tax revenues and granted them the rights to a fiscal surplus, or residual. In 1994, China experienced a fundamental fiscal decentralization reform called the tax assignment system reform, which included central-local revenue sharing on a more transparent, objective basis. Local government was granted the power to generate extra-budget revenue besides the fixed ratio of tax. For example, according to the regulation of the state, 60% of land taxes belonged to local government, while the remaining 40% belonged to the central state. However, among the

[57] There are 68 universities (including China's most prestigious universities, Peking and Tsinghua), 213 state-sponsored R&D institutes (including the Chinese Academy of Sciences, CAS), and over 300 thousand students in Beijing (ZGCAO, 2008).

40% of the taxes, 35% were to be reimbursed to local government. Therefore local government had a strong incentive to lend the land to developers, because as much as 95% of the income generated by leasing the land would return to the pockets of the local government (Zheng, 2010:93). This financial decentralization led to the emergence of 'local state corporatism' (Oi, 1992, 1995), through which local officials routinely manipulated regulations to allow enterprises to receive the maximum tax advantages and pushed local economic development to the point of sometimes even disregarding national objectives (Segal, 2003; Zweig, 2002).

The unleashing of the local government's drive for economic development was also related to the policy of developing the Economic Technology Development Zone (ETDZ). Local governments used tax incentives or subsidies to attract foreign capital into the zones to create economic growth. These zones needed to be approved and regulated by the central state (the Ministry of Commerce), or by higher levels of government. The HTIP was one of the special types of development zones which was promoted and administered by the Ministry of Science and Technology (MOST) in the central state through the Torch Plan which was initiated in 1988. By studying the success of the development of Silicon Valley, the Chinese government wanted to use the Torch Plan to promote high-tech parks in the country so as to create environments conducive to the development of high-tech industries by combining research with production activities. In 1988 the central government decided to develop Beijing's Haidian district as the 'Silicon Valley of China" and called it the Beijing Experimental Technology Zone (BEZ). This was the first high-tech zone recognized by the central state.

In the initial stage of BEZ's development, the main administrative office that was responsible for the management of the zone was established under the Haidian district government. In the process, because of the inclusion of other parts of the city into BEZ, a new administrative office was set up under the city government in 1997 to perform the coordination work among the districts; whereas the zones in the various districts were still managed mainly by their own district governments. In 1999, the central state approved the city's application to reform the administration and to rename BEZ as ZGC. A new administrative office was set under the city mayor, called the ZGC administrative office, which had an advisory committee consisting of members such as the City Mayor, Minister of Science and Technology, Minster of Education, Deputy

President of the Academy of Sciences, the Deputy Mayor and some university presidents (ZGCAO, 2008). The central state determined to establish ZGC as one of the most innovative regions in the world.

ZGC has developed rapidly since its inception in the late 1980s and has included even more zones developed by different district governments as part of it. Over the years, the development of the ZGC has created an agglomeration effect for the high-tech industries, especially the IT industry. It gathered over 13,000 firms in the zones in 2006, including Legend, Stone, Fangzheng, and MNCs such as Lucent, HP, Ericsson, Hitachi, Siemens, etc. (2008, Annual report of ZGC). In 2009, the State Council supported Beijing government's proposal to re-create ZGC as a National Innovation Demonstration Zone so as to speed up innovation and to create world class enterprises.

3.2 ZGC as the city government's territorial project

Differing from HTIPs in other places, such as Taiwan's Hsinchu HTIP, in which case the park was originally located in a rural agricultural area that was much easier to clean up for development, Beijing's BEZ was initially located in an established city district. The initial plan of BEZ in the earlier stage was to develop 100 acres in Haidian district to host high-tech enterprises; however, because of the concentration of buildings in this area, the lands that were able to be developed covered only 10 acres. In the meantime, both the Changping county and Fengtai district governments were eagerly applying to Beijing city for new ETDZs in their jurisprudence in order to boost their local economies. These two districts were finally included as part of BEZ in 1991 as the Beijing city government and the central state decided to expand the development area of BEZ in order to provide the needed lands for hosting incoming enterprises, especially for manufacturing activities that were not suited to locations in the inner city.

As BEZ became a symbol of high-tech development that was able to generate economic growth, many other district governments also began to apply to be included in BEZ. The district governments of Beijing city were eagerly applying to become part of the booming high-tech industry after 1999 when BEZ was renamed ZGC. Therefore, ZGC thereafter continued to expand. Currently, there are ten zones under the ZGC banner which are located in various unconnected localities within the Beijing municipality. For example, Fengtai zone is located in the southwestern area of the city, Beijing's Economic and Technology zone is located in the

eastern end of the city known as Yizhung, and Changping zone is located in the northwestern end of the city. In 2006 the state council finalized the ZGC development plan with a total development area of 232.52 KM^2, of which 131.84 KM^2 was located in the inner city and the remaining 100.68 KM^2 consisted of new land for development that was mainly located in rural areas (ZGCAO, 2008). These zones, their locations, and their major economic functions are described in Table 1 below.

Table 1: Economic zones of ZGC

Year	Zone	District	Specialization
1988	Haidian zone	Haidian	ICT, all high-tech types
1991	Fengtai Zone	Fengtai	Headquarters
1991	Changping Zone	Changping	All types, including biotechnology
1997	Electronic Town	Chaoyang	Electronics and others
1997	Yizhuang Zone	Daxing	Manufacturing for all types
1999	Desheng Zone	West City	Cultural creativity
2006	Yonghe Zone	East City	Cultural creativity
2006	Daxing CBP	Daxing	Biotechnology, pharmaceutical
2006	Tongzhou Zone	Tongzhou	Electro-optical industry and others
2007	Shijingshan Zone	Shijingshan	Media and cultural creativity industry

Sources: ZGC administrative office web, http://www.zhongguancun.gov.cn/

The development of Beijing's ZGC also has a lot to do with science parks established by universities and R&D institutes. These institutes, following the guidelines of the Torch Program and supported by MOST and the Ministry of Education, tended to establish their own parks to generate university-firm relationships. The earliest university's HTIP was established by Peking University in 1992, and then Tsinghua University and other institutes followed suit. Now Beijing has 10 university HTIPs.

The universities' HTIPs indeed have created some smaller firms by their incubation centers and have hosted many global and domestic firms, both small and large. One of the most successful university HTIPs is

Tsinghua's. It is located in the center of Haidian district, using 25 acres of campus land that have been redeveloped into an area that is inhabited by many high-rise office buildings, including a 5-star hotel. Due to the university's reputation as China's MIT and its good location, this HTIP has attracted many well-known enterprises such as Google, Sun, P&G, NEC and Tsinghua University enterprises such as Tsinghua Unis Corp. to locate there.

ZGC has indeed attracted many domestic and foreign firms to take up residence, especially in the Haidian district, due to the abundance of R&D resources and generous tax incentives provided by those HTIPs and universities' science parks. It has become the most innovative HTIP in China. Currently, not only many renowned MNCs have established their headquarters in China there, but also many of China's most notable ICT companies, such as Lenovo, Baidu and UFIDA can be found in this area (Zhou, 2008; Leng and Wang, 2012).

Despite its success in terms of developing high-tech industries, ZGC has become filled with many glamorous buildings and famous MNCs. ZGC thus signifies riches and fame for the district which in turn has driven district governments and universities to join the high-tech and speculative game. One of our informants said very clearly, 'once the ZGC label is used, the price of the real estate jumps' (Interview data). This echoes what He and Wu (2009) observe in Shanghai, where district governments have a strong incentive and high degree of discretion in land development to pursue instant returns and visible achievements, 'of which property-led redevelopment is the most common form' (p.298). This property-led redevelopment project, combining the label ZGC, can be best illustrated in the Fengtai district's "Headquarter Economy Project" as discussed next.

3.3 ZGC as a form of representation – *Fengtai*' s Headquarter Economy

The Fengtai zone was established by the Fengtai district government in 1991 and was included in BEZ in 1994. It is located in the southwest corner of Beijing city where 5km^2 of the land is allocated to BEZ. The motivation behind developing this area into ZGC was mainly due to the efforts of the district government in promoting this area's economic development. Owing to its historical legacy, the southwest end of Beijing city was described as one of the poorest areas, just as the statement 'The East is rich, the West is prestigious, the

North is poor, and the South is despicable' sums it up. The competition among districts drove local governments to use the special economic zone approach to stimulate the economy to grow.

The first stage of the development of Fengtai zone was initiated in 1992 when many local lands were converted for either industrial or residential use. However, after the lands had been developed, within a period of a few years, due to the rising rents, most manufacturing activities moved to Hebei province or to the outskirts of Beijing city and the industrial lands were once again converted into office buildings. In the second stage of Fengtai zone's development that started in 2002, the district government thus gave up developing manufacturing land, due to the failed attempts in the former stage, and instead stressed the importance of office buildings. At this stage, the district government collaborated with a British company (*Daofeng*[58] Co. which actually was a company led by an overseas Chinese) to develop this area into a so-called 'Advanced Business Park'. However, it might have been due to this term having a too obvious connotation of real estate development that it was later changed by the Fengtai district government to 'Headquarter Economy'. The business park consisted of over 500 office buildings, thousands of apartment buildings, a 6-star hotel, and other related recreational facilities and shopping centers. The whole park was obviously a huge property-led project that intended to use the ZGC label to promote local economic development.

The district government worked very closely with this Daofeng company to clean the land, paved the road, and solved many related administrative barriers in order that this 'Headquarter Economy' could proceed smoothly. All the expenses of those works were met by the district government and the company devoted very few resources at this stage[59]. Even more interesting was the fact that the district government granted the Daofeng Company the manufacturing land, whereupon the company developed this area into luxurious residential and office buildings and generated enormous profits from the price differences. Moreover, the Fengtai district government granted the Daofeng company to right to use ZGC's tax incentives to attract firms to locate themselves in the park, including tax exemption for the first three years of investment, and reduced

[58] According to a news report, not even one reporter has ever found the headquarters of this company in the UK. Neither can anyone find the details of this company. The authors of this paper also tried to find this company's details from the Web, but we are not able to find any such details and were not even able to be sure what its name was in English from the Web.

[59] Data adapted from http://www1.ce.cn/cysc/fdc/fc/201009/19/t20100919_20505782.shtml, Accessed on September 19, 2010.

the tax rate from the fourth to the sixth year to 7.5% annually. In addition, it also granted the privilege of paying half of the utility fees, and granted residence permits to professionals from other provinces, etc.

The example of the Fengtai zone clearly shows how the district government used the ZGC label to develop the real estate sector in the name of an HTIP. The real content of Fengtai zone is in fact company headquarters that have little relationship with the high-tech industries[60]. Currently, the Headquarter Economy has attracted many companies to locate themselves there. Most of them had been Beijing-based state-owned companies, some were big state-owned companies from other provinces, and only a very few were MNCs (Zheng, 2010:150). As a result, the originally very small Daofeng Company became a giant real estate developer[61] in the process and the district government gained a huge amount of revenue.

3.4 ZGC as a contesting space

As has been shown above, HTIP has been regarded by different levels of the state in China as promoting both local economic development and technological innovation. ZGC in Haidian district, due to the concentration of R&D institutes and the state's support, achieved a successful increase in high-tech industries, especially in the IT sector, and then the ZGC label was expanded to other districts. Now ZGC has become a real estate label that has sometimes outpaced the value of developing high-technology industries. This is because technology learning and innovation need time to be nurtured, while the real estate sector can by contrast generate an immediate capital return for both investor and local government.

The booming of the real estate sector, however, has had its downside in terms of the development of technology, because it has pushed up the rental costs to a level that is not conducive to the start-ups' or smaller firms' survival in the Haidian area in recent years. Many smaller start-ups have already moved out from the expensive area in Haidian district and sought cheaper places on the outskirts of the city in order to survive (Interview data). The booming of the real estate sector in ZGC has in fact created an economy that is favorable to large firms and actually stifles the spirit of entrepreneurism which brought about ZGC in the first place.

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[60] Data adapted from http://www1.ce.cn/cysc/fdc/fc/201009/13/t20100913_20501044.shtml, Accessed on September 13, 2010.

[61] Chen, Haibao, "Revealing the Secrecy of the Headquarter Economy" (Zongbu jidi jiemi), China's Real Estate Newspaper [January 25, 2007] http://blog.linkshop.com.cn/u/chb2323/archives/2007/89070.html, Accessed on August 14, 2011.

4. Shanghai's Yangpu— Transferring the old industrial space

Shanghai demonstrates a different case to Beijing's ZGC. The rebirth of Shanghai began with the Pudong redevelopment project after Deng Xiaoping's southern tour in 1992. Integrated with the Pudong project to construct Shanghai's service and financial center, the Zhangjiang HTIP was developed to promote new fields of manufacturing and design, such as IT, semi-conductors, and biotechnology. A more recent attempt to imitate the HTIP development method but adopt a bottom-up approach to rejuvenate urban space is the Yangpu case. In contrast to ZGC's nurturing of new none-state-owned enterprises based on the IT industry, the Yangpu case demonstrates the district government's efforts to renovate and upgrade the heavy and old industries, such as steel, embedded in the old urban center. However, similar to ZGC, the Yangpu district government fully utilized the HTIP banner to re-territorialize its urban space.

4.1 Yangpu as a fresh model of space reproduction

The start of the new Yangpu project began with the launch of the "Guideline of the Yangpu Knowledge Innovation District" document released in 2004. In this guideline, the Shanghai metropolitan administration reconfirmed its policy to integrate three development elements in this district: university campuses, high-tech parks, and local communities. It was dubbed the "tri-party cooperation".[62] After less than a decade of development, the new project of rejuvenating Yangpu did not stop at "breeding" or "building" a high-tech center. It had a much more comprehensive goal of urban redevelopment and space utilization. The master design could be realized by Yangpu's project of establishing the developmental framework of "one center, one city, one river, three quarters". According to the design, one center refers to the sub-urban center of the Wujiaochang-Jiangwan area, and consists of the Central Intelligence District, southern business center, and knowledge innovation center; one city refers to the new Jiangwan township; one river refers to the creative and cultural center on the north bank of Huangpu river; three quarters refer to the Fudan-Tongji university science zone, Dalian-Kongjiang road's modern service zone, and modern textile industry clusters along the Huangpu river. The urban renovation project was implemented by branding the old area with a knowledge-based economy. As demonstrated in the example of ZGC, the Yangpu case also provided proof of

[62] For a more detailed analysis on institutional innovation and tri-party interaction, please refer to T. K. Leng and J. H. Wang, 2012.

the active participation of the entrepreneurial-oriented local government. It reflected the important factors of territorial formation and space adjustment in the process of rebuilding a fresh Yangpu. Table 2 lists the university science parks in Yangpu and their specialties.

Table 2. Specialties of University Science and Technology Parks in Yangpu District

	Item 1 /%	Item 2 /%	Item 3 /%	Item 4 /%	Item 5 /%
Fudan Scientific Park	IT/ Electronics 45%	Consultation Services 17%	Bio-Medicine 8%		
Tongji Scientific Park	Architectural design 46%	IT/ Electronics 22%	Consultation Services 17%	Bio-Medicine 2%	
Yangpu Technology Innovation Center	IT/ Electronics 40.9%	Creative Industries 17%	Machinery & Electricity 13.2%	Bio-Medicine 12%	Environ. Protection 9.6%
Shanghai Institute of Technology Scientific Park	Manufacturing Industries 64.1%	Technology 24.8%	Commercial Facility 2.6%		
Shanghai Ocean University Scientific Park	Aquatic Products 58.3%	Creative Industries 12.5%	Machinery & Electricity 8.3%	Construction 4.2%	
Shanghai Intellectual Property Park	Technology 50%	Consultation Services 27%	Culture communication 13%		
Shanghai University of Finance and Economics	Technology 42.8%	Finance 31.4%			

Source: Revised from Wang (2008), p. 148

Among the various actors of urban development and space rejuvenation, the district government of Yangpu played the key role in leading and coordinating. Being in charge of the distribution of urban land, the district government shouldered the task of land replacement, reservation, and capital accumulation. The establishment of the Yangpu Knowledge Innovation Region was a major vehicle for “branding” the old district with new content. Our interviews with local residents in Yangpu indicated that in the early stage of Shanghai’s development in the 1990s, Yangpu was totally neglected. Even the public transportation system of

urban overpass did not provide access to the Yangpu district. Yangpu was more or less isolated from the booming urban service sectors in Puxi and Pudong. This situation did not accord with Yangpu's potential as an area where major universities were located. Well-known universities such as Fudan and Tongji also suffered from an outdated urban district infrastructure. These universities thus established visible and invisible walls to separate themselves from the surrounding decaying environment.

4.2 Yangpu's HTIP branding strategy

The Yangpu experience provides an illuminating case that shows how a local government engages in space production in entrepreneurial ways. As Jane Zheng indicates, local governments have demonstrated a clear "entrepreneurial state" characteristic in their manner of pursuing both local urban growth and their own economic profits. The culture and innovation industry has been a powerful new tool in generating revenues (Zheng, 2010:143). In other words, cultural and creative industries provide fresh "labels" for the local state to ally with various actors, such as land developer and foreign capital, to boost the real estate market in particular and urban development in general.

In 1996, Shanghai established the Center for Land Development, which was to function as a land bank for the city. The land bank would purchase land-use rights, negotiate a profit-sharing plan with current users, and put the land parcels in a reserve for resale on the market in open-land auctions or through public tender. A successful land bank could help municipal governments centralize land supplies and coordinate land management and planning (Hsing, 2010:48). In the case of Yangpu, the main body of land banking has been the Yangpu Land Development Center (YLDC), under the direct supervision of the Housing and Land Management Bureau of Yangpu district. YLDC regained state-owned lands under the urban development plan, and put them into reserve. In the process of Yangpu's transition toward a knowledge-based region, YLDC has played a pivotal role in promoting the transformation of the territory through land use policies. YLDC controls most of the industrial lands which occupy 17.6% of the total land of Yangpu. YLDC has also established cooperative ties with the Management Committee of Yangpu High Tech Park (MCYHTP) in utilizing newly acquired land. The major function of such ties is to link policies of land use with the purposes of industrial upgrading and service enhancing.

Through the process of institutional linkages and branding, the Yangpu district government has successfully transferred many industrial lands into both service and commercial usages. According to 2010 statistics, the growth rate of Yangpu's service sector reached 76.5%, while the knowledge-related service business grew by 23%. [63] Tax revenue rose from 3.5 billion in 2003 to 10 billion in 2008. As to the disposable finance of the district government, it increased from 1.6 billion in 2002 to 7 billion in 2008 (Chen, 2009:5).

This transformation process has indeed brought about lucrative economic benefits to the district government. In addition to the transformation of the university region and surrounding areas, the new Jiangwan Town in the north and new creative and business district in the east have become the new focus of development. For instance, the last case of land bidding in 2010 reflected the ambition of the Shanghai 17th Cotton Textile Company to transfer the idle factory house on the northern bank of the Huangpu River into a fashion and creative center. Such efforts have been promoted collectively by the textile company and the Yangpu district government.

The University City project promoted by the Yangpu district government is another illuminating case. Different from other University City projects like Songjiang University city, the Yangpu project did not start the construction from scratch. The issue of land cleaning, road construction, and resettlement are crucial challenges to policy-makers and developers. According to various estimations, the total investment amount of the Yangpu University City for land use has reached 100 billion Yuan (Wan, 2004:94). The rise of the real estate market in Yangpu has been significant since the release of the "knowledge Yangpu" project[64].

Almost all the actors involved in the Yangpu project have served as engines of land development in the region, especially from the universities located in this area. For instance, Tongji Technology, a Tongji University holding company, established Tongji Real Estate Management Corporation (TREMC). Under TREMC, there are more than 14 branch companies engaging in various land development projects. These projects in the Yangpu district include Tongji Square, containing four-star hotels, restaurants, and shops outside the main gate of Tongji University. Other projects include residential housing units under the brand

[63] http://www.cqcb.com/cbnews/instant/20110-1-08/800765.html. Accessed on April 11, 2011.

[64] In June 2007, a piece of land in the New Jiangwan Township reached the price of 12,509 Yuan per square meter. The price was 6,677 Yuan 7 months earlier. http://news.sina.com.cn/c/2007-07-04/093113372324.shtml, accessed on April 10, 2011.

name of Tongji in surrounding areas.

4.3 The district government and real estate market

The Yangpu district government itself also controls several real estate related development companies. For instance, companies like Weibaixin and Xinyangpu mainly undertake the business of developing residential housing areas. Even the Yangpu Knowledge Innovation Investment Company is engaged in various fields of real estate development, including hotels, restaurants, and other recreational facilities (Chen and Yu, 2005, p. 57).

As the former party secretary of Yangpu Du Jiahao argued, knowledge-based clusters are closely related to the improvement of the investment environment in Yangpu. The new attempt to establish a fresh image of Yangpu has provided opportunities for developers to promote real estate markets. College parks around Fudan, Tongji and other famous universities, along with green lands of Huangxing Park, provide amenities for better living in the region. The Wujiaochang business district and New Jiangwan Township project will also enhance the urban function and livability in Yangpu. Together with the relocation projects to move 4 million old housing units and reconstruct 4.35 million square meters of land, the Yangpu project is a social engineering project that requests the participation of all the parties involved.[65]

Expansion of the land used by the universities has become a major strategy for the Yangpu district government to promote new brands of a university and knowledge-based Science Park. The Yangpu district government released lands around major universities for the purpose of university high-tech parks and new branch campuses. The lands of university campuses in Yangpu have been expanded from 4.2 km^2 to 6.54 km^2. For instance, Fudan has been expanded from 1,600 acres to 4,000 acres, and Tongji has been expanded from 1,500 to 2500 acres, respectively. The Yangpu district government has certain shares of the stock in most of the university-affiliated scientific parks. Our interviews show that in the case of Fudan Scientific Park, the district government relocated the existing residents and sold the land to Fudan at very low price. Due to the recent booming of the Wujiaochang area, the market price of the real estate of Fudan Scientific Park has been soaring.

[65] Data adapted from http://news.eastday.com/epublish/gb/paper224/1/class022400001/hwz778163.htm, accessed on April 10, 2011.

The district government has also actively renovated the area surrounding Wujiaochang, and has promoted it as the Knowledge and Innovation Community (KIC). Wujiaochang, located in the heart of Yangpu district, was an outdated urban commercial center surrounded by major universities and public facilities. Since the very beginning, the reconstruction of the Wujiaochang project has not merely been a Research Park project. The main investment and development body of CID is Yangpu Knowledge Innovation Investment Company (YKIIC). The Yangpu district government holds 75% of its stock, while the Shanghai Metropolitan Administration holds the remaining 25%. YKIIC later formed a joint venture with Qiaoguang Corporation which is an affiliated company of the Sui-On group of Hong Kong. Qiaoguang holds 70% of the stock of the new Shanghai Yangpu CID Development Corporation. The YKIIC is in charge of the tasks of relocation, land procurement, and pubic administration. The Hong Kong counterpart undertakes the tasks of financial management, business operation and planning (Wang and Tian, 2008:53-55). This partnership is similar to the Xintiandi project in the urban center of Shanghai. The major difference with Wujiaochang is the "branding" of a knowledge-intensive center within a university town. The current price of housing in the CID is about 4,000 Yuan per square meter, or 50% higher than the average prices of surrounding areas. [66]

The KIC project is a typical case of the collaboration between the district government and private companies. During the field trip, the authors found out that the main concern of the local government in the KIC project was to attract private investments to reconstruct the old district. Located in the Wujiaochang district of northern Shanghai, the KIC is surrounded by around fourteen universities, including the prestigious Fudan and Tongji universities. The goal of KIC is to utilize the attractiveness of major universities, and transfer the old Wujiaochang circular area into a service hub. The KIC thus serves as a mediator between the universities, district development, and the private enterprises. During our interviews in the Wujiaochang area, one senior manager of KIC indicated that the idea of reconstructing the Wujiaochang area is promoted and implemented mainly by the Yangpu district administration. It is totally different from the Zhangjiang model in Pudong in the 1990s.

In brief, the northern Yangpu area, with KIC as the core, has gradually been transferred into a multi-functional business district. The "scientific park" is embedded within a reconstructed auxiliary urban

[10] Data adapted from http://sd.zhaoshang-sh.com/zsdt/133550822.html, accessed on April 5, 2011

center. In addition to the Wujiaochang—Fudan area, the Yangpu district administration has also signed agreements with Tongji University to promote the “Tongji Knowledge Economic Circle.” Located in the south of Wujiaochang district, the focus of such a new initiative is to promote new service clusters such as architecture, environmental protection, machinery, and other related business pertinent to Tongji’s specialties (Leng and Wang, 2012).

Both Yangpu and ZGC, as demonstrated in the previous sections, are attempting to use symbols and labels of high-tech development to boost urban development. In terms of high-tech clustering, Yangpu has achieved a certain degree of success as demonstrated by the Wujiaochang project. Since 2006, Wujiaochang and the surrounding areas have formed clusters of IT and service-oriented domestic as well as multi-national corporations. However, such achievements have been accompanied by space re-production and branding of HTIP. Transferring space and combining it with new brands of high-tech zones have become rational decisions of Yangpu leaders to pack major urban areas with an integrated package of scientific parks.

The intervention of the real estate developers, however, creates a dilemma in promoting talent flows and a knowledge-based economy. Under the branding of major universities and knowledge innovation centers, the prices of housing and office spaces have escalated. Start-ups and even research faculties can no longer afford to live in the neighboring areas. In other words, the original idea of knowledge-intensive clusters was distorted due to the commercial and real estate development of the region. Scholars and experts have also raised sharp criticisms, arguing that many scientific parks have already become real estate parks. From this aspect, both ZGC and Yangpu are facing a similar dilemma of urban development and technological innovation.

5, Discussion and Conclusion

This paper regards developing an HTIP as a territorial project through which both central and local states seek to promote economic growth by reorganizing the spatial structure in their territories so as to facilitate capital accumulation. In this territorialization process, the central state, the municipal government and especially the district government have played important roles in reshaping the landscape of each city for the purpose of economic upgrading. Differing from other property-led development projects in China, this HTIP

plan has involved not only local states and developers but also universities and R&D institutes that have collaborated together to develop the territories in the name of high-tech development and knowledge innovation. Thus the planned areas, regardless of whether they are agricultural or established urban settlements, have had to be reshaped for hosting foreign and domestic firms or for office buildings. It is in this process that territorial places have been transformed into globalized spaces where capital has been able to move more freely to engage into manufacturing and commercial activities.

Indeed, if we compare the development of HTIPs in ZGC and Yangpu, there are more similarities than differences. Beijing's ZGC and Shanghai's Yangpu cases show that district governments have played an important role in enabling their localities to become part of the booming high-tech or knowledge creation zones in China. By observing the success of Haidian district in promoting economic growth through HTIPs, the Fengtai district government in Beijing has followed suit to uphold the Headquarter Economy in affiliating it with the label ZGC. Similarly, in following the success of the former cases, the Yangpu district government has also taken advantage of the concentration of universities in its area and used the HTIP label to regenerate its economy. Innovation centers and high-tech parks have thus become banners for district governments to promote the construction of office buildings and lure commercial activities into the area. In the process, the real estate sector, along with the construction of HTIPs, has brought about the growth of the local economy.

The main differences that enable us to differentiate Yangpu from ZGC are factors of timing and the effect of HTIP. As regards the timing issue, it is obvious that Yangpu learned from the former success stories of the district governments of ZGC. Yangpu was discriminated against in Shanghai's ambitious Pudong project before 2000. Thanks to the institutional reform in the 1990s that gave district governments the power to develop their local economies, the Yangpu district government was able to utilize the HTIP banner to develop the local economy. This was very different from ZGC where the city and central states had supported its development at the initial stage.

Secondly, with regard to the social and economic effects, the development of ZGC combined technological innovation more fully with the booming of the real estate sector than did the development of Yangpu. ZGC's development has been an evolutionary process through which various district governments in

Beijing have been able to learn from the successful economic growth of the Haidian district by way of establishing an HTIP. Nevertheless, while the Haidian district has been a dynamic region in terms of technological innovation (Zhou, 2005, 2008), the followers have not necessarily been able to perform the same level of technological development. Indeed, the Yangpu case is simply an example of a district government intending to develop the local economy by using the HTIP label. Until recently, the development of the real estate sector has been much more successful than that of technological innovation. Most of the technological development in Shanghai has still been concentrated in Zhangjiang as opposed to in Yangpu, in which Wujiaochang KIC has looked more like a property-led project than a real innovation center.

Currently, the HTIP label is an attractive commodity and a label that can be sold. An interesting development in China now is that the ZGC label has been extended beyond the territory of Beijing city. Currently, the ZGC administrative office has worked with the Hebei and Liaoning provincial and Tianjin city governments to create more ZGC zones in those places in order to generate economic value based on the label and to enhance technological development in those places[67]. ZGC as China's Silicon Valley has now become a symbol in campaigning for economic development all over the country. Shanghai's district governments have also established their affiliated HTIPs in other provinces to promote economic development. The HTIP label has become a fictive commodity that can be sold and extended to the rest of China to lure district governments to join the high-tech and innovation game.

However, there are dark sides of the dazzling HTIP phenomenon. First, the booming of the real estate market has created an environment in which it is difficult for SMEs to survive. This is because the district governments have been more interested in luring MNCs or big companies' headquarters to inhabit the zones, and the rents and prices of the land have been escalating so that small venture firms have been forced to escape from the city centers where the universities and R&D institutes are concentrated. This in turn has enhanced the image of the HTIP as creating good business environments rather than constructing innovation milieus. Second, the re-settlement of the inhabitants in the planned areas has often created resentment on the part of the local population towards the zones because the district governments' compensation fees were too low for local people to survive. As shown in the Fengtai case, many local people are still living in slums

[67] Data adapted from http://report.qianlong.com/33378/2011/03/05/1060@6694853.htm, accessed on March 5, 2011.

where the lands were planned but have not yet been developed.

Indeed, HTIP has become a branding competition. However, as we have shown, this branding game has been favorable to the property-led development of urbanization. As long as the branding of the HTIP, regardless of whether it is ZGC or the Headquarter Economy, can effectively generate successful economic growth for the local economy, space will be produced and reorganized along with the property-led development approach in China in the foreseeable future.

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第五章：

國家再尺度化與區域路徑依賴：南韓首爾市與大德科學園區的比較

論文所屬領域：都市及區域發展

蔡青蓉[68]、陳俊銘[69]

摘要

本文探究近來因為中國的崛起與新興的生物科技產業浮現，南韓政府如何再尺度化首爾與大德；並以國家與地方兩個尺度，來分析國內政治的角力對此的影響。結果發現國家面對全球化還是可操弄空間，而改變過去發展型國家直接的方式，轉為逐漸支持地方政府打造特有的制度厚度。然而，過程中兩個地方的差異包括有：（1）國家分權給地方層級參與型塑空間的時間點，以及（2）國家與地方政府之間的競合關係。加上兩個地方和全球連結程度的差異，導致首爾與大德所累積的地方優勢差距越拉越大。

關鍵詞：國家、全球化、再尺度化、首爾、大德

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STATE RE-SCALING AND REGIONAL DEVELOPMENT: THE CASE OF SEOUL AND DAEDEOK IN SOUTH KOREA

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Abstract

This paper aims to explore how Korea state rescales Seoul and Daedeok. We investigate at both national and local scales, and analyze the impact of domestic political struggle on state rescaling efforts against globalization, such as rise of China and emergence of innovative-oriented bio-technology industry. The results are that Korean state can still manipulate space by gradually supporting local state in building local-specific "institutional thickness", instead of developmental state way. However, (1) the timing of such changing role of state; and (2) relationship of central and local governments, are different for Seoul and Daedeok, respectively. As a result, the regional advantages, accumulated from the varying "institutional thickness" and degree of local-global linkage, lead to increasingly polarized development.

Key words: State, Globalization, Re-scaling, Seoul, Daedeok

一、 前言

國家對於地理空間的影響分為兩派說法：首先，主張「地理已死」的學者認為，受到跨國企業的在全球金融和服務產業發展影響，造成全球空間的流動(space of flows)(Harvey, 2001; Castells 1996)。故國家的角色被全球化所弱化，無法再對地理空間的型塑有所影響，取而代之的是跨國企業所形塑的全球城市；即資本主義全球化帶領下，各國地理空間去領域化(de- territorialization)。但是，另一派學者認為國家可透過再領域化(re- territorialization)城市或地方來對抗全球化；換言之，國家還是可操弄空間的型塑，只是干預的手段改變與重整調節層級降到次國家層級(sub-nation scale)(Brenner, 2000)。因此國家的角色轉化為支持區域的創新與學習，建構地方特有的「制度厚度」(institutional thickness)，以加深區域的競爭優勢(Lundvall, 1992; Amin, 1999; Cooke and Morgan, 1998; Stroper, 1997)。

另方面，東亞的城市或區域本質上就是國家型塑的空間產物，例如先前研究首爾、台北或新加坡等全球城市，或者新竹科學園區等，都是在東亞發展型國家直接干預，但略有不同的產業政策下形成的(Him and Kim, 2000;周志龍, 2001; 王振寰, 2002; Olds and Yeung, 2004; Yeung, 2006)。故反思全球化如中國崛起對東亞國家的衝擊，中央與地方政府如何再領域化，來應對與改變干預則為近來研究的關注焦點(王振寰, 1999; 廖淑容、周志龍，2000; 金家禾、周志龍, 2007)。其次，東亞身為後進國家，過去資本積累的方式是透過國家引導廠商出口，切入全球生產網絡(Global production networks, GPN)而和全球連結，所產生的製造積累(王振寰, 1999)。因此如何轉換到創新，改為熊彼特式的智慧資本積累則是一大挑戰(Jessop, 1999)。

不過，東亞各國家面對的全球化的挑戰與衝擊有所差異，故國土再尺度化的(re-scaling)策略也有所差異(周志龍, 2001)。例如台灣的企業為了降低製造成本而遷移到中國投資設廠，國家為政治而控管產業無效，顯現了國家再領域化與產業之間的拉扯與矛盾(王振寰，2007)。但另方面南韓國家力量被削弱，卻是發生在開放金融管制，讓外國的資本自由地進入國內之故(Haggard et al., 2003; Weiss, 2003)。此外，各國的政經結構有所不同，也導致國土再尺度化作法與成果差異。不同於台灣，南韓強烈受到 97 金融風暴後的改革壓力，經歷從發展型國家轉向新自由主義的過渡(Piere, 2005)；也因此，南韓體現在空間的再領域化上，中央政府也漸漸走向分權，但還是保有一些權力。例如，一方面地方政府因為擁有相對自主權與財政權(Kang, 2006; Bae and Sellers, 2007)，開始有以省長或市長為中心的成長聯盟浮現；而另方面，國家重新規劃南韓在東北亞的定位(周志龍, 2001)。

所以，本文欲探討南韓國土再尺度化的過程中，國家和次國家兩個尺度(scale)政治角力的過程，究

竟產、官、學各方行動的複雜交疊情況為何。其次，在面對新興生物科技產業的發展機會，過去的制度厚度累積，包括國內各地方和全球連結(global-local nexus)程度，是否會影響到國土再尺度化的努力。本文研究架構為國家的再尺度化的調節轉型，和區域的制度建構與優勢累積。個案則以南韓首爾(Seoul)城市與大田市(Daejeon)的大德區(Daedeok)為例，來比較與說明南韓此兩地方，在全球化下發展趨向兩極化的過程。首爾是產業和官方群聚之所在地，且有歷史發展的背景；另方面大德為國家從無到有打造的科學園區，集聚全國的公私部門研究機構。不過，和台灣新竹科學園區比較，南韓大德卻無法吸引廠商進駐，廠商還是集聚在首爾。因此，雖首爾是全球城市、而大德是科學園區，但這樣產官和學分離的對比性，符合本文欲展現國家與地方關係，與各地方特有之制度路徑依賴，如何影響到全球化下區域發展的議題。本文章節順序如下：第二小節文獻回顧；第三小節個案討論，先回顧首爾與大德經從工業化、後工業化的歷史，並聚焦檢視知識經濟階段；第四小節結論與討論。

二、 文獻回顧

(一) 去領域化與再領域化[70]

主張全球「去領域化」的學者認為跨國企業的製造外包，並後續在全球城市設立相關的金融和服務產業，造成全球動態地理空間的流動，而超越國家的干預與建構空間的努力(Harvey, 2001)。但在這樣的流動空間下，並不表示全球的城市與區域的水平化；相反地，少數城市因為集中權力、資本與技術於一身，而成為全球資訊網絡的上階層的節點。如倫敦、東京、紐約等城市，就是由資本家建構的階層化全球城市(Castells, 1996; Sassen,1990)。如此一來，全球城市透過資訊科技的網絡，不但成為全球經濟的指揮節點，城市內聚集的是創新、金融與特殊服務產業，製造產業外移到城市的腹地。故城市與其腹地的兩者結合，擴大為「全球城市區域」(global city -regions)以強化競爭優勢(Scott, 2001)。總之，資本主義所導致的空間流動與城市階層化，是國家無力阻止的。

相對地，主張國家可「再領域化」地方或城市的學者認為，全球化並沒有讓國家力量完全消失，而是國家需轉變角色與性質來重新建構空間，並成為全球化活動的協調者或中介者(Jessop, 1999; Brenner, 2000; Macleod, 2001)。過程中，雖然國家把權力移轉給城市或區域去治理地方，但也因此增強了國家的優勢。於是，國家與城市或區域在地理空間的重組並非是互斥或競爭的，而是透過國內的社

[70] 本文雖聚焦討論「再尺度化」國家重整調節空間，和地方政府之間的政治角力，但主要聚焦在兩個層級對地方制度建構「再領域化」的討論。

會政治的再建構，而重疊在一起與相互依賴的(Macleod, 2001)。此外，國家再領域化的制度需轉型，而改以流動的制度組合與統治機制，取代原有的干預模式(Brenner, 2000, 2003)。例如：西歐福利國家開始去法規化(de-regulation)，且為避免讓製造產業僵化，國家開始把過去「福特—凱因斯」以製造為導向的資本積累與干預模式，變遷到「熊彼得」以創新為導向的新積累與新的干預模式(Jessop, 1999)。

故無論是在生產、調節與轉型都市，內容包括在基礎建設、空間規劃、產業政策等領導地理區位上，國家不再以「大量製造，大量消費，不斷投資」的舊思維保護勞工充分就業；相對地，國家的政策需能夠促使區域的企業群聚與創新。故在空間規劃上，國家不再以固定國界為思考，並提出流動的制度組合。而國家的角色也轉化為支持次國家(sub-nation)層級的區域或城市。換言之，中央透過地方政府，和當地的文化、制度、社會、政治領導等元素組成成長聯盟(growth coalition)去推動創新與成長(Macleod, 2001)。故全球化下的「再領域化」是都市或國家地域空間上，政治、經濟與社會重新建構的一個過程(Brenner, 1999)。

（二）建構區域優勢

不過，國家「再領域化」是選擇性集中在某些具有特色的地方來發展，以和全球的其他區域以差異化競爭(Brenner, 2003)。因此，國家不應是全面性、而應選擇性強化各地方的歷史發展，再加深地方特有的「制度厚度」(Institutional thickness)，並促進區域內的行動者學習與創新，以保有區域獨特的優勢(Storper, 1997 ;Malmberg and Maskell 1997 ; Morgan, 1997; Cooke and Morgan, 1998)[71]。一區域制度厚度累積是該地方特殊制度所形塑出來的，故具有特殊的社會鑲嵌(Thift, 1994)，與路徑依賴的特性(MacKinnon *et al.*, 2002)。況且，構成地方特殊的元素深藏在行動者的社會網絡關係內，包括有社會不可交易的相互依賴(untraded interdependence)(Storper, 1997)、社會資本或信任等。這樣的地方特殊社會網絡促成知識的交流與學習，而導致廠商創新並享有競爭優勢(Saxenian, 1996)。

另在正式網絡形成方面，國家與地方政府可介入建構創新的制度與環境—例如制度化廠商和大學或研發機構的連結以促進區內廠商學習(Lundvall, 1992; Cooke et al., 1997; Cooke and Morgan, 1998)。結合綿密的正式與非正式社會網絡，可讓區域從降低交易成本的工業區，升級到以社會網絡為基礎的創新區域(Gordon and McCann, 2002)。不過，這樣的區域的演化與升級，需要另一套制度和空間的安排(Gordon and McCann, 2005)。例如高科技群聚的矽谷，在新經濟時代的制度元素為高科技人才供應以及

[71] 類似的概念有「學習型區域」(Learning regions)、「區域創新系統」(Regional systems of innovation)或「創新的群聚」(Innovation cluster)等。

和市場連結，取代了過去舊經濟時代的制度元素(Bresnahan et al., 2001)。

除此之外，因為科技知識之內隱特性，使得和全球新知識連結的重要性不低於和區域內學習的連結(Simmie, 2004)，特別是在以科學研究為基礎、知識不確定性高的群聚，需考慮到全球與在地連結網絡的議題(Global-local nexus) (Wolfe and Gertler, 2004; Iammarino and McCann, 2006)。因為，行動者除了需要在地的社會鑲嵌(local buzz)來促使廠商之間相互學習之外(Storper and Venables, 2004)，還需要適當地往外與全球的技術網絡連結 (global pipelines) (Bathelt et al., 2004)，以避免區域內的技術過度鑲嵌而技術套牢(lock-in) (Grabher , 1993)。故創新區域有社會網絡為基礎外，還需制度化區域廠商和與外部全球的連結。

綜合以上，國家透過「再領域化」地方區域，從後工業化製造邁向研發與創新發展，以發揮該區域擁有社會的、歷史路徑依賴的累積優勢；此外，除了建構創新群聚促進本地網絡連結與擴散技術之外，也需要建構和外部技術的連結，以適時地和全球新技術交流。這便是國家改變調節方式，與地方政府在重組制度時，轉為集中與選擇性支持某些區域，與促進創新型區域發展的焦點。

（三）東亞國家的轉型

相對於西方先進國家跨國企業的外包活動，導致東亞全球生產網絡的興起，東亞的工業區群聚與都市化也一樣，是因其特殊的制度組合而發展起來(Dicken et al., 2001)。過去在福特資本積累時期，東亞發展型國家的角色對空間形塑本來就是扮演積極與重要的角色，包括設立或維持種種法治與金融制度，因而從下而上形塑了首爾、台北或新加坡等東亞全球城市(Him and Kim, 2000;周志龍, 2001; 王振寰, 2002; Olds and Yeung, 2004; Yeung, 2006)，而有別於資本主義跨國企業所塑造出的全球城市(Sassen, 1990)。包括東亞國家對工業區如何出口切入全球生產網絡，以及後工業化的區域升級，皆是透過國家力量建構不同的制度體系：即從進口技術協助廠商從事代工(OEMs)，變遷到產業升級讓廠商進一步提供產品設計等服務(ODMs)(Kim, 1997; Mathew and Cho, 2000; Humphrey and Schmitz, 2002)。這是後進國家透過制度安排，不但讓切入全球生產網絡和快速學習技術追趕，也促成製造群聚的浮現(Perez-Aleman, 2005)。

然而，國家如何將這一套制度適用在福特資本積累、型塑製造工業區的制度與調節模式，轉換到另一套適用在全球創新知識體系內，則是一大挑戰(王振寰, 1999)。其次，東亞各國也的確面臨全球化削弱國家的力量。例如，台灣國家再尺度化台灣為亞太營運中心時，廠商卻為降低生產成本而外移中

國，另方面國家鑑於政治因素管控往中國的資金流出。因此，即便台灣政府提出種種策略欲吸引廠商再鑲嵌在台灣，製造產業卻因為全球化資本流動的本質，和國家之間發生衝突與矛盾(王振寰, 2007)。

不過，也有部分廠商繼續在台灣，如新竹科學園區從事技術升級。原因在於這些電子廠商和和矽谷之間—即全球與在地的科技聯繫(王振寰、高士欽, 2000; Saxenian and Hsu, 2001)路徑依賴地發展下來。並加上國家對本地園區提升的計畫等的「再領域化」政策，促成了竹科成為學習型區域，而不斷地技術創新(金家禾、周志龍, 2007)。以上台灣個案顯示從舊經濟的製造工業區，提升到新經濟以知識為基礎的學習區域，有國家與產業的衝突、也有仰賴過去區域與全球的連結的歷史關係，而能夠使得國家再領域化也有成功的案例。

本文欲探討南韓也面對中國崛起等全球化的衝擊下，從過去發展型國家從上而下直接干預的作法，轉變到新自由主義的政治經濟體系，並嘗試提供另一套制度與產業政策來型塑空間。但再領域化的過程中，中央與各地方之間究竟是分工或抗爭？各地方累積的制度優勢，如何影響到它們在全球化下發展趨兩極化？

三、 個案：南韓首爾與大德之比較

（一） 首爾城市

1. 工業化階段

二次世界大戰後，南韓政府主導以種種干預的制度安排－如引導性的貸款、國家引進技術和研發補貼，扶持大財閥(Chaebol)進入策略性的產業，以利出口導向之經濟規劃。而這樣的發展型國家建設下，具有 600 百年首都歷史的首爾在戰後便成為財閥與製造產業的集中點(Hill and Kim, 2000)。在發展型國家的擴張政策下—即國家提供財閥低於市場利率之鉅額貸款，財閥可以大量生產與製造(Amsden, 1990)，與多角化產業發展。故首爾在空間上為本國銀行、政府機構與財閥總部集中所在，而開始了首爾都市化的發展（王振寰, 2002）。

進一步來看，首爾的地理空間被國家的出口導向政策，以及財閥所選擇切入全球生產網絡的方式所形塑(Yeung, 2006)：其中，紡織與家電低科技等製造工廠群聚在首爾市西方九老(Guro)工業區，故此階段工業化與都市化的發展是腳步一致，因從事工業的人口急速增加，從郊區移居到都市，尤其是首爾市吸收了最大宗的移居人口。從 60 年以後首爾市的地位就穩定下來，之後 70 年代的重工業發展並沒有太大變化。但到了 80 年代附加價值比較低的製造活動，包括電子與機械等製造等搬往首爾周圍的

郊區的仁川(Inchon)與京畿道(Kyonggi)移動。例如：1973 年三星電子把工廠遷移到京畿道的水原市(Suwon)，而大宇重工業把運輸業如汽車工廠等遷移到仁川。1998 年的統計顯示，水原市有 6 千多家機械類廠商，而仁川有 730 家電子類廠商群聚(Lee, 2001)。

因此，工業化階段的首爾與其周圍仁川與京畿省的群聚，是出自於政府提供優惠誘因給財閥如大宇、現代、三星與 LG 等，發展工業而形成製造的城市與周邊區域群聚(Lee, 2001)。之後，首爾開始轉型為財閥總部，與逐漸搬遷郊區工廠構成首爾大都會(Metropolitan)的雛形。首爾市的產業與就業結構，逐漸從製造導向轉變到電子服務導向(Choi, 2005)。

2. 後工業化階段

90 年代後，越來越多跨國企業進駐首爾，加上漸增的外資與創投，首爾市轉變為財閥總部、本國和外資銀行聚集之地，成為東亞的全球城市之一(Hill and Kim, 2000)。這歸因於南韓國家對首爾的空間政策，從過去往內(inward)發展，轉變為往外(outward)發展之故(王振寰, 2002; Choi, 2005)。也包含財閥受惠於國家重金資助，透過全球的半導體企業策略聯盟，發展出更快的產品而追趕成功(Kim, 1997; Mathew and Cho)—即財閥從早期國家出口導向政策，變遷到自有品牌(OBM)策略而需與世界技術與資金接軌，因而型塑了位於首爾的財閥，在全球生產網絡從過去代工升級到創新的轉變(王振寰, 2002; Yeung, 2006)。

不過，財閥漸漸轉向與全球化更密切的連結的同時，卻也要求國家把經濟計畫院(EPB)解散。此時發展型國家對本國產業與銀行體系的控制不再(Piere, 2005)；但另方面，國家角色並非完全消失(Weiss, 2003)，產業升級上企圖將首爾發展轉向後工業化服務產業，並再地域化首爾升級成為南韓的矽谷。首先，南韓政府利用全球化電子商務風潮，開放外資與創投的法規，吸引創投與電子服務類的新創企業，群聚首爾南部的江南(Kangnam)區德黑蘭谷(Teheran valley) (Bae et al., 2006)。此外，透過國家提出的「電子多媒體谷」(Digital media valley)與「九老電子谷」(Guro digital valley)計畫，並建設網路寬頻和交通網絡，以企圖再加深江南和九老區的制度厚度，來分別發展新的電玩產業以及升級為電子零件製造產業群聚(Yusuf and Nabeshima, 2006)。故江南區的電子新創企業，共佔據全國一半以上的數量。而原本從事電子製造的九老區，也成功深化為硬體製造的集中地，和江南區對比呈現構成垂直分工的網絡(Park, 2008)。其次，因為財閥的總部多半位在江南區，且財閥和美國矽谷的技術聯盟和知識交流，而促成江南區成為南韓最大的電子商務群聚(Park, 2008)。

另一方面，由於民主化的關係，各地方政府因為擁有相對自主權與財政權(Kang, 2006; Bae and Sellers, 2007)，以市長為中心(mayor-center)的成長聯盟浮現主導改造城市，特別是在財閥所在的首爾。例如，首爾市政府提出「迎接 21 世紀的都市計畫」，將位於本市北方 6 百年歷史的鍾路(Chogro)區規劃為中央商業區(CBD)，也很積極推出各項大型的改變市容朝向全球化市容的計畫，包括在改裝舊市政府、舊龍山火車站大樓、新建江南區國際城等。總之，首爾市基礎建設約花 9 千億韓元，以迎接全球化的競爭(Paquin, 2001)[72]。

不過，即便有地方政府分權—即以市長為中心的成長聯盟浮現，但此並沒有和國家型塑首爾為南韓矽谷或電子產業升級有所衝突(王振寰, 2002; Sohn and Kenney, 2007)。因此，在後工業時期，首爾經過國家與城市兩個尺度的再領域化，而路徑依賴地驅動南韓後工業化的產業升級。換言之，首爾不但成為以財閥為首的高科技業企業網絡，也成為本國銀行體系、外資與創投聚集的金融中心，以及政府部門的所在地。這是首爾在多年來發展型國家的產業政策下，所逐漸建構起本地特有的制度厚度。

3. 知識創新階段

南韓政府因應面對中國的崛起，重新定位首爾成為「東北亞運輸(logistics)中心」(Kim, 2001)，企圖讓南韓為中國與日本之間的橋樑(Choi, 2005)，2000 年起國家加強公共建設的投資計畫，包括有擴建仁川(Inchon)新機場、仁川港口以及縱貫南北從首爾到釜山的高鐵等。接續在 2002 年 4 月，國家把首爾定位為「東北亞商業中心」(Northeast Asian Business Hub)，企圖吸引外資到首爾與其腹地仁川投資(Park, 2005)。故為了應付全球化，南韓國家的再尺度化首爾都市，將首爾和鄰近仁川合併使得腹地變廣，也更拉大首爾與其他都市的階級差距。

但不同於過去發展型國家支持財閥的重度干預，新任總統盧武炫(2002 年底當選)傾向採取新自由主義(neo-liberalism)的經濟政策。且和香港與新加坡比較後，盧武炫新政府考量外資搬遷到首爾的可能性，提議「經濟自由特區」(economic free zones)並通過相關法案，改以提供如減稅、免土地費用等各項優惠條件，吸引外資進入仁川自由經濟區群聚投資後，以實踐先前政府對首爾「東北亞商業中心」的規劃。不過，對外資的優惠卻引發來自勞工階級、學校與醫院等行動者抗議。故不同於電子產業升級時期，國家與市長的一致性再領域化首爾，在此轉型到新自由主義的階段，反而是公民社會拖延了國家再領域化首爾。

[72]不過，有部分建設中央也參與，例如為了辦 2002 年世界杯足球賽，中央政府花費鉅額預算於全球各地建設足球場，包括首爾也是(Choe, 2005)。

而在產業升級方面，隨著都市化人口大量集中，東亞各國後工業化的論述(narratives)－無論是在南韓、新加坡或台灣，開始朝向生物科技產業的發展，並模仿美國矽谷的環境頂尖大學、豐富的專業人才、創投機構與大製藥廠等創新的機制(Choi et al., 1999; Yusuf and Nabeshima, 2006; Wang et al., 2009)。但南韓在新自由主義思維下，國家採取分散策略，規劃全國為不同省市為專精不同領域的生物科技群聚(bio-clusters)；其中，首爾被中央政府定位為全國生物科技產業樞紐(bio-hub)。此外，生物科技產業政策也是轉為支持中小型企業而非財閥(Weiss, 2003)；故干預廠商進入市場的技術與資金等制度誘因也跟著變遷，而不再給於特權給財閥(Wong, 2004)[73]。結果顯示生物科技開發新藥的新創企業在全國浮現，但大部分還是集中在首爾 (南韓生化新創協會, 2009)。

尚且，南韓也模仿美國矽谷創新模式，開始資助大學研發，並通過相關法案鼓勵大學與研究人員創業與開發新藥(Wong, 2004; Wang et al., 2009)。但是因為新藥研發時間長，花費金額高，且首爾為全國生物科技產業的樞紐計畫才剛剛起步，規模還小，故產學交流都還在初步階段（訪談記錄 S1）[74]。相對地，目前開發出新藥在國際市場上市的，卻是 LG 生命科學公司和 SK 化學兩家大財閥。不過他們不是跟首爾內大學或中小企業互動共同創新，而是透過全球化的大藥廠策略聯盟，並通過美國食品藥物管理局的驗證(FDA)在美國市場行銷(南韓製藥產業報告, 2006)。亦即，財閥在沒有國家緊密資金資助、或與國內本地的公部門研究機構或大學連結，反而是透過與全球連結所發展出來的結果(Wang et al., 2009)。

總之，在知識經濟時代，首爾不斷經過國家再尺度化。但是，這一次國家與地方政府分工合作對抗全球化，卻因公民社會抬頭國內多方行動者的抗爭，導致自由經濟特區計畫一直是備受阻礙 (Park, 2005)；第二，直到 2004 年為止，進駐首爾的跨國企業與設立研發中心極少，更挫敗國家首爾再尺度化東亞商業中心的計畫(Yusuf and Nabeshima, 2006)；第三，不同於先前發展型國家時期，財閥接受國家的資助而能切入全球與產品創新(Yeung, 2006)，此階段的財閥並不對政府的空間與產業政策有所回應而產生互補性(Yusuf and Nabeshima, 2006)。相對地，財閥利用其大量資本與全球連結的經驗優勢繼續深化往外發展，而與全球的技術和資金流動。因此，在財閥在首爾往全球化深化的發展，和國家再領域化首爾空間上的政治、經濟與社會重建(Brenner, 1999; Macleod, 2001)方向並非一致。

[73] 亦即，（1）過去國家直接決定產業投資決策；後改為支援創投、再由創投去分散投資在各中小企業；（2）過去科技進口集中在控制在國家，再從上而下移轉給大財閥；後改為科技進口分散在國家和各研究單位與育成中心，再擴散給私部門中小企業。

[74] 2009 年 8 月訪談首爾大學內負責 bio-hub 計畫的副主管(vice director)。

（二）大德區

1. 工業化階段

大德區也是發展型國家朴正熙總統(1961-1978)塑造的空間產物，在他任內大力發展科學基礎建設大德科學城(Daedeok Science Town, DST) (Sung, and Plein, 1997)，企圖提升當時南韓的低成本生產優勢(Lee, 2001)。不過，中央政府選擇大德區成為科學城地點的考量：一來是地理位置居中，北韓鄰近首爾的威脅感而一度想遷都到受到反對而作罷；二方面不像南部光州的政治抗爭強，本地政治立場比較中立（訪談記錄 S2）[75]。故不同於首爾有六百年的歷史背景，本區是國家從空白開始建設起的科學城。

從 1973 年政府和民間企業挹注 30 百兆韓元開始建設大德。到 1992 年 11 月大德科學城建設完畢，強制公部門研究機構從首爾搬遷並進駐到此；隔年，〈大德科學城行政法案〉(Daedeok Science Town Administration Law)頒佈。1992 年大德科學園區內主要是以官、產、學研究機構和企業的研究單位為主體，公部門研究機構如科學技術院(KAIST)、電子通訊研究院(Korean Electronic and Telecommunication Research Institute, ETRI)等等，私部門研究機構有三星重重工業研究機構(Samsung Heavy Industries Research Institute)，大學方面有忠南大學(Chungnam National University)等 3 所大學 (Shin, 2001)。

但是，廠商不入駐園區的原因在於缺乏本地缺乏像首爾擁有的社會網絡(Yusuf et al., 2003: 239)；加上國家研究機構的研發優先目標是國家設定的，而非配合產業發展的(Park,2004)。故即便有少數廠商進駐，但科學導向的研究機構和產業之間缺乏互動，無法吸引財閥進駐。且這些被強迫搬遷進的科學家，無論是首爾來的，或是海歸派，也跟本地人之間有鴻溝無所互動（訪談記錄 S2）。總之，在南韓工業發展階段的大德科學園區，實際上是發展型國家建設的「科學孤島」，與本區的廠商和社會、甚至是區域外部幾乎沒有互動。

2. 後工業化階段

科學園區理論上對於東亞後進國家，技術的升級扮演重要的角色。然而，南韓進入後工業化階段的電子產業，如前述主要的創新者是財閥與全球連結所帶動，南韓公部門研究機構作用不大，例如在半導體產業即是(Kim, 1997; Mathew and Cho, 2000)。但是，在手機通訊技術 CDMA(code division multiple access)則不同，南韓公部門研究機構帶領國內廠商技術升級下，曾經帶給大德科學園區可以發展起來的契機。國家規劃介入手機產業的背景，財閥幫國際手機大廠代工作組裝，但無法從中獲取關

[75] 2009 年 8 月訪談大德科學園區主管(director)

鍵技術[76]。因此，國家便扮演中介技術進口與學習的角色，安排公部門研究機構電子通訊研究院(ETRI)，直接引進技術給廠商和推動大型科技計畫的角色。國家對外與 CDMA 技術驅動者美商高通(Qualcomm)結盟，取得關鍵技術來源(Choung et al., 2006; Lee, 2007)。

在國內網絡連結方面，電子通訊研究院負責核心研發，並和組織起數家大財閥討論授權金費用分攤，且仲裁技術標準等爭議性(Lee, 2007)。換言之，國家主導公部門為連結全球—本地的技術學習平台，並組織起和財閥之間的學習網絡。一時之間，南韓透過位於大德區電子通訊研究院，提升本土廠商國際分工的角色[77]，並讓大德科技園區成為學習型區域(Poon et al., 2006)。況且，本地公部門研究機構衍生的企業漸增(Shin, 2000, 2001)，一度讓大德區的發展被看好。

但是，這樣的產學合作是暫時的，大德科技園區並沒有發展太久的學習型區域。雖然電子通訊研究院和位於首爾的財閥合作，但並沒有吸引廠商進駐。實際上財閥的總部還是位於首爾，且如上述全國電子類的新創企業主要集中在首爾的江南區 (Yusuf et al., 2003: 239; Sohn and Kenney, 2007)。此外，研究比較顯示，位於首爾的廠商，其商品化程度比大德的廠商較強(Sawng and Kim, 2007)。換言之，大德的研究機構只一度扮演技術引進的平台，之後商品的應用研發都主要還是位於首爾的企業自行完成。在此專案之後，國家角色轉變為只提供研發資金，而不再主導技術(Choung et al., 2006)。

總之，大德科學園區電子通訊研究院曾一度發揮國家大型計畫的作用，但無法吸引廠商長久進駐大德，故本區只扮演暫時性的學習平台角色。況且在 CDMA 大型計畫之後，大德的各研究機構都停滯不動，而沒有找到新的角色去領導廠商學習與技術升級（訪談記錄 S2）。故大田斷掉與國內企業、甚至與國際的連結，也讓南韓政府計畫本區成為學習型區域的目標再度失敗。

3. 知識創新階段

不同於首爾，大德區方面在 2000 年時還是完全以國家為中心，主導此區的再地域化並改名為「大德谷」(Daedeok valley, DDV)。然而，2003 年盧武炫總統上台後，想放棄繼續支援發展型國家的產物—即大德科學園區，導致本地方的企業、與市政府及媒體一起聯合與中央抗爭。故中央於 2004 年立法通過〈大德研發特區〉(Daedeok R&D Special Zone)法案，一方面確保大德研發特區可獲得中央預算的支持獲取部分營運園區的資金，另一方面成立財團法人園區管理中心，讓地方負責剩餘資金的籌措、技

[76]此外，各部會與產業多方行動者的利益衝突情況下，南韓政府最後決策的考量，是發展與保護國內產業具有競爭力。故選擇發展 CDMA 屬於政治的決策，而非經濟效率的考量，而付給高通高額的權利金(Jho, 2007)。

[77]在國家領導的產業政策下，成功地發展南韓的手機產業，三星與 LG 學習到關鍵技術，並保護國內市場防止外資入侵，例如本土品牌市佔率 70%，而 Motorola 只有 7%。甚至並後來還可外銷，，2001 年南韓 CDMA 手機出口額為 38 億美元，CDMA 系統出口額為 2 億 8 千萬美元(Jho, 2007)。

術輔導園區內的廠商，包括審核招商廠商的計畫書，並替代政府撥預算款項給這些申請的企業（訪談記錄 S2），以在地規劃地方獨特的發展。隔年 2005 年科技部再將本地重新命名為「大德創新科技城」(Daedeok Innopolis, DI)。中央政府規劃首爾為「東北亞的商業與運輸中心」的同時，也基於大德現有科學/研究單位的群聚優勢，規劃大德創新科技城為「東北亞的研發樞紐群聚(Northeast Asian R&D hub cluster)」。

另外在生物科技產業政策上，南韓科技部(MOST)於 1994 年推行〈生技 2000 計畫〉(Biotech 2000 Program)，當時就計畫推動位於大德的公部門研究機構，即南韓生命科學與生物技術研究所(Korea Research Institute of Bioscience and Biotechnology, KRIBB，以下簡稱生技所)為主要執行單位(Swinbanks, 1998)。為改善生技所的成果為市場導向，還設立產官學合作的機制，以促進生技所企業技術移轉給廠商，建構為本區為創新區域(Shin, 2000)。事實上，新創事業進駐在 97 金融風暴後的確增加 (Park, 2004)（見表一）。但它們是大德各公部門研究機構裁員後，研究人員利用和原本單位之間的關係創業之故（訪談記錄 S2）。故表面上，本區暴增公部門研究機構的衍生企業，和南韓轉向扶持中小企業的調節效果有關。即便如此，這些新創企業規模小，且大多從事生化食品的生產與貿易，而不是新藥的開發(南韓生化新創協會, 2009)。況且，生技所還是政府導向的任務，而非商業導向的研發本質，使得生技所研發新藥的成果不太成功（訪談記錄 S1）。因此，並沒有如國家預期由公部門研究機構帶動成為創新區域。

表一 大田新創事業數量

年	1995	2000	2001	2002	2003	2005
新創事業數目	40	500	776	811	850	2000

資料來源：大田大都會(2007)

最後，不同於新竹和矽谷的連結，或北京中關村許多跨國企業進駐的研發中心，大德兩者都沒有，且本地與國際連結還是很弱（訪談記錄 S2）。缺乏和國際的連結反映在科學成果上，雖專利、研發費用漸增，但首爾與其腹地即財閥工廠所在的仁川與京畿道，才是全球研發的主要區域（見表二）。且漸增的專利大多為國內註冊、而非在國際註冊的(Park, 2009) （見表三）。因此，不同於首爾，本區經過發展型國家多年來的扶持下，不但缺乏企業網絡、金融中心與政府部門，充其量只能說是國家引導公部門研究機構從事國家任務導向的研究下，研究人員在區域內創業的衍生企業網絡。但即便如此，

該企業網絡數量相當少，且長期下來和區域外的首爾與全球並無太大連結關係。

表二 區域的研發支出的分佈

(單位：億韓元)

區域	2004 年		2005 年	
	研發支出(A)	佔全國比例	研發支出(B)	佔全國比例
首爾(Seoul)	39,828	18.0%	46,329	19.2%
仁川市(Incheon)	8,804	4.0%	11,802	4.9%
大田市(Daejeon)	25,446	11.5%	29,201	12.1%
京畿道(Gyunggi)	96,263	43.4%	96,141	39.8%
全國總數	221,853	100.0%	241,554	100.0%

資料摘取自：南韓科技部(2007)

表三 大德區的專利註冊數量

年度	1995	1996	1997	2002	2005	2006	2007
國內	1,115	1,082	1,376	7,447	5,924	4,992	7,065
國際	317	259	262	1,760	2,576	1,926	3,246

資料來源：Park (2009:6)

總體看來，不同於 90 年代首爾就已經以市長為中心推動首爾開始建構制度厚度，本地政府與民間力量浮現，參與規劃大德發展的時間點較晚，且和中央的關係是抗爭的。且因進駐大德的廠商不多，故在預算上還是仰賴中央，而無法靠本區營收來自給自足。其次，即使有國家指定區域內生技所來執行國家大型生物計畫，但本地的生技所與其衍生的企業網絡是比較封閉地在地發展，而缺乏與首爾或全球連結。故長期下來，本區研究機構和企業之在地化創新，與首爾財閥全球化深化的創新發展結果有擴大的趨勢。

四、 結論與討論

本文檢視南韓對抗全球化，以國家與地方兩個尺度角力來分析，比較國家再領域化首爾與大德兩地之差異，並說明地方制度厚度的歷史累積，對地方發展兩極化之影響。結論發現：（1）東亞南韓面對全球化下，國家雖還可操弄空間的型塑，但再尺度化的作法上漸漸轉為支持地方建構地方特殊的制

度，不過產、官、學各方行動者複雜的權力交疊與拉扯，且地方與中央政府的關係有時是互補、有時是抗爭的；（2）同樣在國家國土重新規劃下，首爾與大德的發展結果差距越來越大，是源自於路徑依賴的「制度厚度」累積優勢差異，包括兩個地方和全球連結的程度不同所致。

第一，南韓個案顯示國家再尺度化，國家面對全球化還是可操弄空間的塑造，且從過去發展型國家轉型到新自由主義的過渡，轉變不同的調節空間與干預產業的手法。但中央與各地方政府關係的競合關係，以及分工的時間點上略有不同。本文發現首爾 90 年代時開始以市長為成長聯盟，和國家一起建構首爾特有的制度厚度，而 2003 年後才有公民社會和中央抗爭；相對地，大德一直以來都是國家主導空間發展，直到 2003 年後才有地方政府與人士聯合和中央抗爭。簡言之，在首爾個案顯示，在 70 到 80 年代工業化時期為出口導向工業化所聚集之處；90 年代，隨工廠往首爾以外郊區仁川和京畿道遷移，首爾轉變為財閥與世界金融與商品接軌的所在地方，此時以市長為首的成長聯盟已經出現。不過和國家支持財閥全球化的政策並無矛盾之處，而是朝一致性的方向建構首爾的制度厚度。但是，隨著 2000 年知識經濟與全球化的加速，國家企圖再領域化首爾成為「東北亞運輸與商業中心」以面對東亞城市之間的競爭，但主要的阻礙卻是來自國內公民社會的抗爭。

另在大德方面，一開始就是發展型國家建構科學孤島的產物，雖有公部門研究機構的群聚，但一直無法吸引廠商進駐。到 90 年代透過國家大型 CDMA 專案，本區公部門研究機構一時成為全球和財閥之間的技術平台，但隨財閥技術學習吸收後，本區也完成暫時性任務。到了 2003 年新總統上任，更欲轉型而計畫中斷過去發展型國家的科學城計畫，導致大德地方政府與人士聯合和中央政府抗爭。也因此，為大德打造的 2004 年特區法案的通過，並讓地方政府自負盈虧去規劃大德科技園區的藍圖。不過國家在大德還是扮演相當重要與主導性的角色。特別是生物科技產業，南韓政府還是寄望大德區內的公部門研究機構帶動。故大德區是否在未來能夠發展起特殊群聚的優勢，則有待觀察。總之，個案結果顯示南韓國家隨著全球化，國家調節能力轉為支持次國家尺度，並逐漸放手讓地方政府打造與建構特有的制度優勢來競爭(Brenner, 2003)。

第二，基於同樣有國家調整干預產業與空間發展，首爾與大德再領域化結果差異，是與其路徑依賴的區域優勢累積，包含兩個地方和全球連結的程度不同所致。如前述南韓發展生物科技產業，處於政經體系的轉型過渡，故生物科技的產業政策與配套的制度安排是鼓勵中小型創新企業，包括國家再尺度化的將首爾定位生物科技樞紐，轉為扶持首爾大學等衍生企業。類似地，國家也規劃大德區成為「東北亞研發樞紐群聚」，企圖國家以生物科技方面的公部門研究機構來推動技術與區域創新，但因規

模小與缺乏與全球連結而無法發展起來。

故表面上看來國家對產業與空間調節方式轉型，模仿矽谷朝向創新經濟(Weiss, 2003; Jessop, 1999)。但弔詭的是，財閥利用本身在電子產業與全球化流動的資本與技術經驗，延伸到生物科技產業發展出新藥，不再仰賴國家資金或公部門技術的前導功能(蔡青蓉, 2009)。本文發現首爾特有的財閥在地化全球之社會鑲嵌(Thift, 1994; MacKinnon et al., 2002)—即仰賴國家資金所建構的大規模製造和研發模式，並和全球資金與技術流動後的產品創新(Yeung, 2006)，路徑依賴地在生物科技產業延續下來。故這樣南韓變遷到新自由主義的調節模式轉變，是否真能夠扶持南韓各地方成為生物科技的創新區域，其成效有待觀察。

回顧台灣的新竹或台中區域，是基於原有的和全球的科技聯繫，國家的再領域化，促成了它們成為學習型區域與不斷地的技術創新(王振寰、高士欽, 2000; Saxenian and Hsu, 2001;金家禾、周志龍，2007)。因此，區域優勢累積和國家再領域化的作法，南韓和台灣明顯是對比而不同的。故未來東亞各國在空間與產業政策的反思，除了國家選擇某些地方並集中支持來建構制度厚度對抗全球化(Brenner, 2003)之外，各地方與全球連結的路徑依賴程度也應納入考量。

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