行政院所屬各機關因公出國人員出國報告書
（出國類別：出席國際會議）

參加亞洲科學園區協會(ASPA) 2007 年韓國年會暨日本參訪 報告

出國人服務機關：科學工業園區管理局	中部科學工業園區管理局	南部科學工業園區管理局
職　稱：副局長	組長	副局長
姓　名：董良生	王宏元	林威呈
職　稱：科長	秘書	助理研究員
姓　名：黃慶銘	林靜慧	咼乃之
職　稱：研究員		
姓　名：馬維揚		
職　稱：副研究員		
姓　名：夏慕梅		

出國地點：韓國、日本
出國期間：96.10.23 – 96.11.2

前言

96 年 10 月 23 日國內三大科學園區 – 新竹科學園區、中部科學園區以及南部科學園區管理局再度連袂出席國際會議，前往韓國安山參加 2007 年亞洲科學園區協會(Asian Science Park Association - ASPA)與世界科學園區協會(International Association of Science Parks - IASP)的聯合研討會，會中新竹科學園區董良生副局長參與論壇討論，黃慶銘科長及馬維揚研究員發表論文報告台灣科學園區的發展，同時竹科的金麗公司參加 2007ASPA Awards 選拔，在各國候選公司中脫穎而出，榮獲首獎。

隨後科學園區代表團轉往日本，首先參加橫濱 FPD 光電展；然後拜會 JSR 株式會社及橫須賀研究園區(Yokosuka Research Park)，討論未來進一步合作的計畫；最後前往北九州市，參加竹科及南科的姊妹園區「北九州產學合作都市」(Kitakyusu Science and Research Park)舉辦的產學合作會議，並於「台灣科學園區論壇」中，分別報告竹科、中科、南科的發展現況及未來的展望。

目　錄

一、參加 2007 ASPA－IASP 聯合研討會

亞洲科學園區協會(ASPA)與世界科學園區協會亞洲區分會(IASP – Asian Division) 聯合舉辦 2007 ASPA－IASP 科學園區研討會，於 10 月 23~26 日在韓國京畿道安山市漢陽大學召開，包括大會前一天的 ASPA 第 14 屆理事會、兩天的會議及會後的科技產業參訪。這是繼去年兩大協會在伊朗聯合舉辦活動後再一次攜手出擊，共有來自 13 個國家 200 以上的人員與會，而國內 3 大科學園區竹科、中科及南科則連袂出席共同參與盛會。

(一) ASPA 第 14 屆理事會議

ASPA 第 14 屆理事會議於 10 月 23 日下午 4 時在京畿科技園區(Gyeonggi Technopark)會議室召開，主要的會議內容包括：

1. 第 13 屆理事會議總報告
2. 報告 2007 年主要事務：
   (1)會員現況：10 國 27 地區共 57 會員(包括園區、公司及個人會員)
   (2)今年舉辦之活動:
   - 2007.4：第 13 屆理事會議及第 2 屆領袖會議(台灣新竹)
   - 2007.5：設立 ASPA 北京辦事處(中國)
   - 2007.8：第 3 屆區域交流會(韓國)

   (3)發行刊物: 3 份季刊、亞洲科學園區名錄
   (4)建構合作網路：包括 ASPA、新竹科學園區、神奈川科學園區
3. 2008 年度預定之活動計畫
4. 第 3 屆領袖會議預告：將於 2008.5.15~16 假日本神奈川科學園區舉行

(二)ASPA-IASP 聯合研討會

早上開幕式由韓國國立首爾大學 Sam Ock Park 教授主講「在服務經濟中的創新、網路和聚落」其結論爲：未來的願景爲：1.在開發中地區以新的模式強化地區創新能力。2.運用地區資源、文化和歷史促進週邊地區的地區創新潛力。3.在亞洲爲某些策略性產業建立世界性的創新聚落。4.發展亞洲的創新聚落模式。5.在知識爲基礎的資訊社會地區發展的藍海爲：創造新的競爭優勢。6.某些自發性個案：韓國的虛擬創新聚落。

接下來由韓國西門子總裁 Dr.Sascha Brozek 演講「西門子全球 R&D 網絡－創新夥伴」介紹西門子公司目前在世界研發佈局及在韓國發展的現況。

下午場分成 A、B 兩個議程，議程 A 的主題爲創造區域和聚落的雙贏策略，包括主辦國韓國、香港、伊朗、越南、馬來西亞、科威特，均發表相關的論文，由於每個國家發展科學園區的環境、政策與階段性均有相當的差異，可供參考的經驗雖然有限，但與會代表強調群落在知識交換中的價值，網絡的重要性以及區域創新體系（Regional Innovation Systom）的重要性等觀念。

本局由黃慶銘科長報告：「Creating Strategic Competitiveness on the Consumer－Centric Services System、Synergies between Innovation Cluster and Networks Development in Hsinchu Sciennce Park,Taiwan」（附件 1）及馬維揚研究員報告：「Research on the Sustainability and Competiveness of Sciennce Park」（附件 2）均以竹科朝創新產業聚落發展願景的做法向與會者報告詳如附件。議程 B 由園區推薦金儷科技（RDC Semiconductor Co,Ltd）（附件 3）爭取 2007 ASPA AWARDS，並於閉幕時接受大會表揚並頒贈獎牌，是園區

的光榮也是傑出中小企業的表率。會議第 2 天閉幕前舉行論壇，邀請包括董良生副局長再內六位園區代表就如何提升科學園區研討會的效益進行討論

重要論文

茲挑選 A、B 兩個議程中六篇較具參考價值的論文摘要如下：

1. 「經由科技園區建立創業區域：北美創新區的經驗」。

這是由由美國 Sarfraz A.Mian 提出的論文：技術導向的區域經濟政策近年來廣受世界關注。各國亟欲複製如美國矽谷、英國劍橋和日本筑波成功經驗。但截至目前爲止，卻又對這些技術區域失敗或成功背後的因素以及怎樣審慎規劃有助於技術創新區（technology innovation pole,TIPs）鮮有共識。

TIP 的概念和推動政策對開發中國家產生高度興趣，其原因有四，第一、找到建立技術能力的方法。第二、指出達到區域發展的方式並可減少地方差距。第三、可以創造出組織性的制度使地區的創業有助於創新活動。第四、許多國家提出吸引和留住地方人才的策略。然而 TIP 的形成卻需要政府以不同形式參與，例如：國家經濟開發策略、產業政策和區域開發政策。這些政策要協調併行不悖。

許多國家有成功的經驗，也歷經很多年的論爭。這些論爭的主要結論是直接干預或以資金育成的機制，諸如育成中心和科學園區並沒有顯示出預期的成果，目前的問題位於：什麼是政府和私部門所該辦扮演的角色？私部門如何參與國家經濟發展政策以對此類計劃持續支持？這些問題與建立成功的 TIP 密切關聯，且必需達成共識。換言之，對國家而言，良好規劃的 TIP 將是一種模式，是以產生自信，而且這種令人印象深刻的概念將可在某些國家檢驗創業性質的高科技發展。

本文也檢驗 TIP 概念的實用性以及直接育成機制運用在高科技發展的策略。在開發中地區對 TIP 形成的規劃和介入的概念激發了作者撰稿的靈感。

作者以其建立的架構檢測 14 個北美開發中的區域。從這些北美案例研究得到的經驗明顯表示創新區成功的開發有賴於區內產、官、學三方共同合作推動當地的基礎建設和在地的企業文化。科學園區和育成中心明顯有助於當地轉換和成長爲一個創新區，但這些條件仍不足以產生這種改變。藉著將地區資源轉換爲成功的科技新興企業，這些機制被視爲重點。他們提供具規模的服務，運用網絡以及在地區研究型大學，研究者與工程師和企業家之間的交易平台，成爲地區發展的重要資產。

深入研究 4 個美國案例則顯示北美既有的科技園區特徵，由此得到的經驗爲：

(1) 以研究型大學和／或主要研究機構爲主的知識基礎可視爲新知識和訓練有素人力資源的引擎，案例中的大學及其研究中心都扮演了重要的角色。

(2) 案例中產學研的夥伴關係可充分分享資源，例如資訊、管理、大學資源及私人創投資本等必要的流動性與有效利用。

(3) 勝出者提供必要的動機持續追求計畫的開發，如科學園區與育成中心的建設。

(4) 共享空間和辦公室，具有商業和技術支持的服務都可以對承租商的

生存與成長加值。本研究的個案都取得足夠資金和專業的管理來經營相關設施。

(5) 透過計畫的持續性和成長、承租商的成功、對使命的貢獻及對區域的影響來評估科學園區和育成中心制度的績效。本研究的個案也透過這些評估活動而成具有標準意義。

本文的建議包括：

(1) 聚焦並支持創業者。建立一至兩個具有國際標準的知識領域／科技區。將有助於吸引並留住人才。

(2) 提供一個商業技術育成機制的平台。可以活化創業人才並吸引卓越人士。

(3) 費心建立和維持產官學的關係。推動地區和國外私部門在經濟發展中的角色。透過媒合資金取代直接的獎補助措施。

2. 「亞洲科學園區知識交易和創新網絡」

這是香港 Waltraut Ritter 提出的論文：重點在討論網絡和商業價值，園區的經營者如何塑造、影響和組織網絡和交易平台，視網絡爲一個更自然的社會行爲或是可加管理的活動。本文以亞洲區域內的科學園區爲抽樣對象。

英國科學園區會議的主席曾對會議的結果摘要成一個字"網絡"，並將會議視爲技術移轉和創新過程需要的技術構想，資源與訊息的互動。有些科學園區以許多型態的資源形成網絡而成爲媒介，並鼓勵技術移轉和創新。應使用科學園區形成跨越國界的網絡以嘉惠租賃廠商。

透過研究發展（R&D）所創造的知識是重建經濟改善競爭力的主要推動力，這是一個加速改變、技術創新和全球市場擴張的年代。

在國家／區域的 R&D 策略中，科學和創新園區的形成已成爲推動知識創造政策的一環。

本文的重點在使讀者更加瞭解網絡如何對知識的創造和激勵有所貢獻，並討論社會網絡的潛力和限制。科學園區經理人的挑戰在於發

現科學社群中形成的網絡組織和參與並指導網絡間的巧妙平衡。

回溯至 1989 年 UKSPA 英國科學園區年會，由 Witholt 強調科學園區網絡的相關性，是源自他回各某些參與創造新技術的機構爲何希望位處科學園區：

“爲何走向科學園區？－因爲那裡有很多事件產生”

這個聲明通常可以證明存在於科學園區中的網絡價值。科學園區是一個節點（node），交織許多與技術相關的組織並且可以發展成爲以公司爲主的動態知識交易場所。可是，許多科學園區如何能聲稱其爲一個真正事件”發生”的場所？

創造這種環境超越傳統的管理方式，並且以財產的觀點來看，提供空間和附加價值的服務仍然主導著科學園區管理的文獻。

嘗試瞭解網絡的價值可能是瞭解成功科學園區和動態創新環境”隱含力量”的一個良好起點。

3.「京都研究園區（KRP）和承租商之間成功的關係」

第三篇由日本 Masao Hashinaga 提出的論文： 1989 年大阪瓦斯公司籌建 KRP，KRP 素以其扮演產學研究機構間的良好角色自豪。它獨特的地位給予我們得以評估科學和技術的新發展以及全球市場與 KRP 承租商間的策略夥伴和研究關係所衍生的財富。

不只位在便利的區位，KRP 還有精良的設施、堅實的商業和學術網絡以及支援性的服務，成爲打開日本市場的關鍵。

KRP 是許多公司的營運總部，領域橫跨 IT、電子商務、諮詢和大學相關研發，以及其他如奈米和生命科學之類的高科技產業。

KRP 之內有超過 200 家的租賃商以及 26,000 人在此工作。出租率超過 95% 。

本文除回顧與展望 KRP，也針對進駐 KRP 的廠商對整理出問卷研究的成果，分析出 KRP 的 4 個優勢與 2 個劣勢。

<u>優勢：</u>

（1） 良好的工作環境。有足夠的公共空間以及重新更新的建物。

（2） KRP 鄰近車站，有足夠的停車位可容納 500 部汽車。

（3） KRP 每年發行關於 KRP 和承租商的新聞超過 80 件。公關活動有效提升 KRP 的地位。某些承租商說因為位於 KRP 使融資較為容易。

（4） KRP 每年舉辦活動與 KRP 內的大廠管理階層聯誼。

劣勢：

（5） KRP 公司是私人性質沒有中央或地方政府資金資助。因此相對租金是其 3 倍。

（6） 在 5 分鐘車程內有一些商務中心如影印及書店，但並無類似的商店在園區內。

平台：

KRP 有許多平台來協助群眾內的企業。KRP 的標語是”Gather,Net Work,Creation”指導了 KRP 的行動，使得 KRP 的地位提昇並且吸引廠商進駐。KRP 必需時時思考增加附加價值以因應未來的永續成長。

4.「科學園區參與者的動態性：泰國科學園區（TSP）案例研究」

第四篇是由泰國 Akeanong Plaeksakul 提出的論文。科學園區主要是以知識為基礎公司的群眾以及接近政府的研究機構或大學，這些單位的設備和基礎設施可以支持這些創新公司的成長。研究中心／實驗室和以技術為主的公司的地理位置接近可以在創新活動中產生綜效。因此，科學園區已經可以推動國際技術創新和移轉，並且創造在地的、區域的以及國家的知識為基礎的經濟。

這方面的研究已開發國家較為多見，本文則以亞洲的泰國做為研究對象。目標在檢驗科學園區內的產官學研間的連繫如何促進定建立一個成功的科學園區。本文以對 TSP 內的承租商訪談做為分析的藍本。本文強調地理上的接近。

以及建立租賃商和研究中心間正式與非正式的關係及未來發展的可能性。發現 4 個國家研究中心因都近 TSP 而且有優勢。可是，地理上的接近並不需要 TSP 內的承租商和地區的研究中心有正式的關係，也不會在承租商間產生綜效。研究顯示：TSP 內的承租商和研究機構僅有些限度的正式連結，而且缺乏承租商間的綜效。因此，TSP 未來的挑戰就是增加並強化上述的關係。

任何科學園區的未來發展有兩種不同的階段：制度性階段以設施和服務的增加吸引承租商。創業的階段則每個園區均有所差異，TSP 正邁入這個階段的發展，將決定園區的成功與永續性。

就前者而言，地區性的科學園區要審慎考慮的不僅僅是設施和服務的可用性，也包括主管單位運用技術知識，基礎建設和人力資源的吸引私部門和合夥者。有良好的制度發展階段將可成功向成功的創業發展階段邁進。

創業階段時的園區要吸引適合的承租商。主管單位要考慮和私部門共同工作的能力，對他們的需求有所反應，並且有創造地區產官學研綜效的能力。這些是地區性科學園區必需反映且自制度性發展階段逐漸起步的重要成功因素。

從前－階段邁向下階段的速度強烈決定生存與繁榮的能力，它將影響科學園區開發曲線。而許多園區卻只抓住前一階段停留在”高科技奇幻”的形狀，值得省思。

5.「地區創新系統的必要性和科技園區的角色」，

第五篇是由韓國 Ji－Won Lee 發表的。21 世紀的競爭力需要創新系統以有效產生、分配和應用知識。發展地區創新系統尤其重要。1990 年代中期歐盟開始瞭解社會－文化政策以及在實體基礎建設外機構的重要性，這些機構在促進地區性公司、大學、研究中心和政府間的合作網絡。

而韓國缺乏類似的組織與參與。地區性的創新本身未被充分認知。地區性團體沒有在技術投資提供足夠的資金，也未被良好組織，

所有的資源集中在首爾都會區和大田。因此需要一種動態的創新政策以改善中央和地方的合作網絡，本研究以建立 Gangwan 省地區創新的正確方向為主軸。

其結論為：第一、必需處理成功網絡的架構。換言之，所有成功的地區創新體系（RIS）都有一個創新網絡，健康的合作和競爭併存。成功網絡的營運有更多的考量。第二、針對大學、公司、研究者和創新領導者設計有效的誘因。第三、考慮地區的特色，決策者要仔細分析地區的特徵並發展相關的創新項目，最重要的是，地區創新計畫要經由地區創新委員會宣佈，委員會必需假設在創新過程中的主導性。為達此目標，統一委員會創新和營運的方向十分重要，這樣才能產生有效的領導者，確保這個體系的建立和營運。

6.「瀏覽清華科學園區的服務系統」。

由中國 Herbert Chen 發表。清華科學園區擁有鄰近清華大學和來自政府和社會充分支持的優勢，自 1993 至 2007 年已在主園區建設 20 棟商業建築物，並在中國開發 10 個次園區。北部主園區部分已完成建設並進入完全營運和開發階段。

該園區是由清華大學主導，已成為推動中國成為創新國家的主要力量。優美的環境、完善的功能及悠久的文化氛圍，使得園區多元發展並已達成超過原先預期的商業成就，對於奠基於此的企業發展奠定良好的基礎。

該園區朝世界一流園區目標邁進，故長久以來改辦於將大學的服務轉換至社會，並考慮區域經濟結構性升級的需求。如何主導服務系統；將是本文探討的重點。

服務系統是核心競爭力最重要的象徵，藉由大學及其他資源的使用，使得地區性產業升級和公司的成長。這個系統有 3 個主要的功能：第一、滿足產業規劃。透過地區產業協會和清華大學技術整合，勾勒出產業升級的藍圖。第二、對不同產業集中的型態及特殊產業的需求提供空間規劃的服務。第三、提供整合服務的平台，包括政策與來自

政府的資金，來自社會資源的資金與媒介服務，以及來自大學的技術和專業人員。爲協助公司客戶，服務系統的必要角色是執行和管理的服務或提供人力、資本和技術方面的特殊服務。

執行清華科學園區創新導向服務系統已引起客戶及社會密切注意，是由累積效果開始可見，園區的聲譽也在上升中。累積的策略集中在「鑽石計畫」支持了新階段開發的營運，園區的核心競爭力愈來愈受到注意。

2006 年，園區進一步強化系統運作，新的進步放在客戶服務、附加價值服務、育成服務以及財產管理服務。爲了加速顧客反映速度提高服務水準並增加服務水準，2006 年在園區的行銷中心下設立客服部門以充分取代基本的客服。客服工作已持續標準化並且提高至新的水準。

經過一年的開發和營運，園區的服務網絡已普遍得到區內廠商的認知。至目前爲止，有 2765 位個人及 250 家公司會員上網註冊。網站的消息成爲園區和客戶、財產管理公司和客戶以及客戶本身的溝通橋樑。經由不同的娛樂和運動組織，園區塑造出快樂工作和快樂生活的文化氣氛。

一年中，服務中心、育成中心和財產管理公司召開了 54 次研討會並獨立、共同或與其他區外機構共同舉辦交易活動，吸引了將近 400 家企業客戶滿意度高達 80% 以上。透過經常性造訪企業，得以拉近與企業的關係，充分了解企業需求且加深並改善服務品質的內容。2006 年又成功舉辦了清華學園區創新展覽，年底調查園區內工作客戶的滿意度達 89% 大客戶並達 85% 大幅高於前一年。

當然，這個系統還有進一步改善空間，管理當局正經由固定的使用和規則朝一個完整、有效和標準的營運系統精進。

(三)ASPA Awards

自 2005 年起，ASPA 爲了鼓勵設於科學園區的公司致力於研發創新進而創造利潤，每年舉辦 ASAP Award 選拔，由各理事會成員提名其園區內設立 10 年之內的中小企業，或上市 5 年以內，育成中心內之公司或畢業 3 年內的的傑出廠商，請各位理事並就公司的成長率，獲利能力,穩定度，活耀度及技術水準等加以評分，選出 5 爲入圍者，然後邀請入圍公司到年會簡報介紹該公司，理事會再根據各公司簡報的內容選出 1 個 Grand Price，4 名 Excellence Price。今年入選的家公司如下：

1. Techno Medica Co., LTD (日本神奈川園驅的)
2. RDC Semiconductor Co., LTD. (新竹科學園區金麗公司)
3. Glowin Co., Ltd. (韓國大邱科學園區)
4. Azar Jam Espada (伊朗 伊斯法罕科技城)
5. Atto Display Co., Ltd.(韓國 京畿科技園區)

5 家入圍公司做完簡報後，1 位韓國籍的理事有感而發，以前大家知道在日本從事很多 SOC 方面的活動，而韓國也常自詡是半導體王國，其實只限於記憶體方面，從金麗公司的簡報他才驚覺台灣在半導體 SOC 方面的成就驚人，是個強勁的對手。

(四)科技參訪

本次年會科技參訪行程起於出席安山創新科技及產業展覽會開幕式，參觀 70 多家公司及機構之創新技術及產品，此外，大會安排參觀安山濕地公園、韓國測試中心及 LG 研發單位等地。

安山濕地公園 (Ansan Wetland Park)

安山濕地公園是始華湖天然的淨水系統，透過大面積蘆葦的種植，過濾污物達到淨化水質的目的，約 256 英畝，係韓國最大的人工濕地，也是觀察自然生態系統的最佳景點。過去當地水質污染嚴重，但研究顯示自濕地公園建立後，該區水質已從 20ppm 降到 4ppm，且適合所有魚類生長。始華湖是蘊藏豐富生態資源，其中鳥類有 150 種計 150,000 隻，359 種植物，12 種哺乳類動物。該區目前計畫設立潮汐發電廠、自然館及海洋館，規劃成為景觀豐富的旅遊勝地。

韓國測試中心 (Korea Testing Lab)

位於安山的安山操作中心(Ansan Operation Center)係韓國測試中心及工商及能源等相關政府部門於 2003 年 5 月 6 日共同成立，職掌標準檢驗、電磁波(EMC/EMI)測試、能源設備之功能測試、環境科技等項目。

韓國測試中心 2002 年 5 月與安山市政府簽署共同成立安山操作中心合約，包含設立 4 間研究室，分別為電池波研究(electromagnetic wave testing lab)、標準測試(standard lab)、動力測試(dynamic testing lab)及一般測試(general testing lab)。

LG 研發中心(LG Research Institute, InnoTek/Micron)

2005 年 2 月 2 日漢陽大學與 LG InnoTek 及 LG Micron 共同簽訂協議於漢陽大學安山校區內成立研發中心(LG Research Institute)；LG InnoTek 及

LG Micron 在韓國電子業佔有領導性地位，因此，這項合作計畫在產學研合作歷史上留下深刻的一頁。

LG InnoTek 及 LG Micron 近年爲重整公司，積極與研究及學術單位建立良好互動關係；此位於漢陽大學的研發中心，由漢陽大學興建，提供 LG InnoTek 及 LG Micron 25 年免租約的優惠，之後，所有權則歸漢陽大學。

(伍)國際合作：

昌原產業集群於本次 ASPA 韓國年會前，即表達與我方簽署合作備忘錄之意願。爰此，雙方於會議期間就合作之可行性及日後進行國際交流之模式進行初步討論，昌原產業集群更表示會後定擇期參訪我園區，以深入瞭解我科學園區運作方式及發展規模，進而推動雙邊國際合作業務。

昌原產業團地位於慶尚南道昌原市。昌原市以工業立市，位於韓國的東南端，襟江濱海，是廣尙南道的首府。1974 年根據韓國化學和機械工業培育政策，成立昌原開發區，6 年後升格爲市，乃因昌原地區蘊藏豐富的鐵礦，很早就出現了煉鐵業所致。昌原市面積 297 平方公里，人口 53 萬，

距韓國第二大城市、著名的海港釜山僅 40 公里，是一座充滿活力的年輕城市。它以規劃嚴密、工業帶動、健康宜居而聞名遐邇，是世界上少有的嚴格按照規劃建設的城市，昌原產業集群是韓國五大開發區之一。目前，昌原市已發展成爲中南部產業經濟的中樞，是韓國舉足輕重的製造業重鎮。昌原產業集群是機械工業專用工業園區，1973 年 11 月建設，1974 年完工，總面積 2,530.2 萬平方米。

目前入駐昌原產業集群的企業計有 1,716 家(其中，機械業有 1,269 家，占 74%)，昌原產業集群內員工人數多達 7 萬 1,000 餘名。2006 年昌原產業集群生產總値爲 32 兆韓元，出口總額爲 141 億美元，分別較 2005 年增長 15.0%和 24%。目前昌原產業集群的工業呈蓬勃發展之勢，機床、汽車、工程機械、光學電子、家電、鋼鐵業在韓國乃至國際上的地位與日俱升。世界知名的企業如 LG 電子、起亞重工業、GM 大宇、大宇綜合機械、三星 TechWin、斗山重工業等均已入駐於昌原產業集群。昌原工業的發展還得益於國家機械研究所、電氣研究所均設在昌原產業集群，使產、學、研、市場開拓緊密結合，在不斷精進品質、推出新產品的同時，於第一時間掌握商機。

二、日本參訪

結束韓國的會議之後，科學園區一行隨即轉往日本，進行一連串的參訪及拜會，先於東京附近參加橫濱 FPD 光電展、拜訪 JSR 株式會社總部、橫須賀研究園區及駐日代表處，然後飛往北九州市，參加竹科與南科的姊妹園區 – 北九州學術研究都市所舉辦的第 7 屆產學合作會議，並於其中「台灣科學園區論談」中介紹台灣三大學園區的發展。

(一) 橫濱 FPD 光電展

全球光電產業目前係由我國、日本及韓國形成三強鼎立之局勢，而日本橫濱舉辦亞洲最大平面顯示器（FPD）光電展，即吸引世界面板大廠如我國友達光電、奇美電子；日本 Panasonic 及 Sharp；韓國三星、LG 等廠商租用大面積之場地，展現出最先進之平面顯示器研發成果。

友達光電展出以 1.9~65 吋大中小尺寸多樣化產品為主，中小尺寸技術包括內嵌式多點觸控功能面板及全球最薄的手機應用面板；大尺寸技術包括靜態對比 5,000:1 的第三代 AMVA 技術。另展出 42 吋以上全系列 Full HD 120Hz 電視面板，及全系列運用白光 LED 背光之筆記型電腦面板等產品。本團前往參觀時，巧遇正在會場的李焜耀董事長。

奇美電子於展覽中發表「雙邊 COG+WOA」技術所開發之全球最薄 13.3 吋筆記型電腦面板、動畫反應時間 5 毫秒之「Clear Motion II」技術與 LED 高彩度背光源「變色龍」技術。

其他廠商展出之技術涵蓋廣泛，尤以解析度方面，呈現出穿透式和半穿透半反射式顯示器；另為因應 3G 網路戶外行動裝置，展現出具有減少反

射和炫光的廣視角之顯示面板，以提高戶外可視性；而尺寸上有更大之突破，日商 Panasonic 及 Sharp 二大廠分別展示出超大尺寸 103 吋及 108 吋之顯示器。

光電產業係政府刻正推動二兆雙星重點產業之一，且光電產業在台灣之科學園區已形成龐大之產業聚落及完整之上、中、下游產業供應鏈，藉由參觀本次之 FPD 展，更瞭解全球平面顯示器產業發展之趨勢，以利未來之招商引進。

(二)JSR 株式會社

本次行程中並拜訪中科廠商台灣捷時雅邁科股份有限公司，位於東京之母公司 JSR 株式會社，其社長 吉田先生、董事 宮部先生及台灣捷時雅邁科公司董事長 辻昭先生等與我們會面。

JSR 株式會社是全球第一大 TFT-LCD 重要材料—彩色光阻液之製造廠，全球市占率逾 50%，該公司於 1957 年成立，原爲從事橡膠產業，嗣不斷擴充，現所涉及之產業已涵蓋家電、製紙、汽車、半導體及光電產業等。且原以泛用化學品事業爲主之經營形態，轉換成增加機能性化學品事業的事業結構，展現出爲了改變事業結構，開創以技術和人才爲核心，擁有獨自專門技術的新事業。

台灣捷時雅邁科公司係於 94 年 10 月核准進駐中科虎尾園區設廠之第一家廠商，其以短短 9 個月時間於 95 年 7 月完成第一期之建廠、正式營運商。吉田社長表示，台灣科學園區超高之行政效率，促使其第一期建廠計

畫如期完成，第二期廠亦已興建完工，另將加強在台之研發能力，以確保在台之永續經營。

鑑於 JSR 株式會社非僅限於 TFT-LCD 之上游材料之生產，亦致力於 IC 產業之彩色光阻液之研發及生產，IC 產業不論在中科或竹科，均有完整之產業結構，如台積電、世界先進、瑞晶、華邦、茂德等國際大廠，均在園區內設廠，爰我們建議 JSR 株式會社於園區內增加 IC 產業之彩色光阻液之生產，除可就近供應我國廠商外，該公司亦可獲取頗高之商機。

(三)橫須賀研究園區

日本的橫須賀自古即爲通商貿易繁忙的口岸港市，對於外來新知頗爲包融，設立研究科學園區之構思始於一九八七年，當年成立的目的即在於發展日本通訊產業技術，一九九七年第一棟研發大樓落成，陸續有廠商進駐，現今已成爲日本通訊技術研發的重鎮，例如日本電話電報公司(NTT DoCoMo)、松下行動通訊(Panasonic Mobile Communications)、富士通

(Fujitsu)、日本電氣(NEC)、沖電氣(Oki Electric Industry)、日立(Hitachi)、東芝(Toshiba)、三菱電氣(Mitsubishi Electric)、新力(SONY)、德州儀器(Texas Instruments)以及東京大學、京都大學、早稻田大學、慶應義塾大學等皆爲橫須賀研究科學園區的成員，設有研發中心或實驗室，研發成果的質與量相當可觀。

基於近年來我國的通訊產業以及使用人口在通訊需求的量與質上的的快速成長，同時有鑑於亞洲人口已屆臨全世界 60 億人口之半，亞洲地區人民平均所得的快速成長，對於通訊產業的消費需求日亟殷切，而我國近年來高等教育在通訊技術知識方面日益普及，擁有充沛的人才和產業經驗，可望繼半導體產業之後發展通訊產業成爲我國的下一個明星產業。因此如雙方攜手合作咸信對於彼此均將可帶來正面積極的效益，對於國內的通訊產業更將可帶來新一波的動能和可觀的商機。

透過駐日科技組的介紹，新竹科學園區於今年 4 月份邀請該園區代表來新竹科學園區於 ASPA 第二屆領袖會議中演講，並且討論雙方合作的可能性；這此台灣科學園區回訪，對於橫須賀園區的情況有更詳細的認識，雙方決定進一步簽署合作備忘錄，加強園區間技術合作及發展。

三、北九州第七屆產學合作會議

北九州學術研究都市(Kitakyushu Science and Research Park)與新竹科學園區及南部科學園區於 2004 年 12 月參署合作備忘錄後，雙方來往密切，每年皆派人員互訪，並參加對方園區的產業研討會。北九州學術研究都市每年舉在該園區辦產學合作會議與產業展覽，除了提供我方免費的展覽攤位外，並開闢「台灣科學園區論壇」邀請我們介紹台灣的科學園區發展現況及展望。

10 月 30 日傍晚園區一行抵達北九州市，受到該園區熱烈歡迎。第二天上午前往北九州學術研究都市拜會，與阿南惟正理事長洽談，並為我們介紹北九州學術研究都市的現況及未來發展，北九州市市長也特地趕來與本代表團會面。下午一行前往產業展會場參觀研究機構、大學及公司所展示的新技術與產品。

(一)北九州學術研究都市

北九州學術研究都市設立的宗旨在於匯聚尖端的研發機構與大學，整合地方產業並加強與鄰近各國的合作，將北九州市建造成亞洲核心的學術研究據點，預計總開發面積為 335 公頃分 3 期開發，目前開發至第二期。發展的重點在於「環保」、「資訊」、「半導體」，區內進駐的機構包括大學及研究所、研究機構及企業：

1. 大學：

   (1) 北九州市立大學國際環境工程系及研究所(公立)

   (2) 九州工業大學生命體工程學研究所(國立)

   (3) 早稻田大學資訊生產系統研究所(私立)

(4) 福岡大學工程系統研究所(私立)

2. 研究機構

(1) 早稻田大學信息生產系統研究中心

(2) 九州工業大學人際生活 IT 開發中心

(3) 克蘭菲爾德大學北九州分校

(4) 福岡縣資源再利用綜合研究中心

(5) 廣島工業大學共同研究實驗室

(6) 清華大學信息科學技術學院計算機科學與技術系 北九州研究室

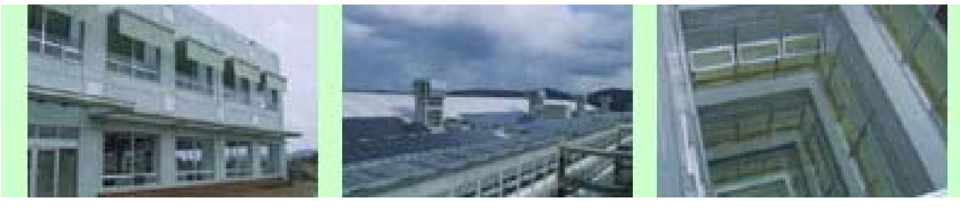
(7) 財團法人九州人類媒體創造中心北九州 IT 公開研究室

3. 企業：

進駐的目的在與園區大學以產學合作方式，進行最尖端的研究與開發。目前共有 43 家公司：資訊領域 33 家、環保 3 家、生物工程 4 家、其他 3 家。

園區內提供的設施包括產學合作中心、共同研究發開中心、資訊技術中心、事業化支援中心、學術資訊中心、會議室及體育設施。整個園區以與環境共生爲目的，重視自然能源的使用、節省及在利用。

1. 環境共生：建構自然能源的利用系統，包括自然風及自然光的利用、屋頂及牆壁的綠化，利用第熱的預冷及預熱。
2. 水的再利用：水資源的有效利用和排水的淨化，包括水的再利用系統與水生態化及自然行水路的整建。
3. 發電、發熱：新能源的利用，包括太陽能電池、燃料電池、汽電共生方式的供電及供熱。



(二)台灣科學園區論壇

「台灣科學園區論壇」於 11 月 1 日上午 10~12 時在產學合作中心第二會議室舉行，會場中 80 個座位座無虛席， 原先準備與會的竹科管理局黃得瑞局長與中科楊文科局長，因臨時有要務不克前往，因此由董良生副局長及王宏元組長代表竹科及中科出席，南部科學園區則由營建組沈世琨組長代表出席。三個園區的演講者及題目如下:

1. 竹科園區：「新竹科學園區創新產業聚落」
2. 中科園區：「中科的世界舞台願景」
3. 南部園區：「南部科學園區的發展現況及未來的產業發展」

於台灣科學園區的現況及未來的規劃於遠景有詳細的闡述。與會者反應熱烈，其中包括北九州大學的教授、媒體及科技公司業者，尤其科學園區得產值在國家製造業佔如此重要的份量感到敬佩。


台湾サイエンスパーク
11月1日
80名

四、心得與建議

國際化是我國各界極為重視的一環，不論是政府機構、學界或產業界，加強國際合作一直是工作的重點，科學園區也不例外。而議論壇交流是科學工業園區網絡的一個重要場合，無論是透過參與大會活動、參訪、發表論文或論壇，我們可從中得知世界科學園區的動態與趨勢，國內三個學工業園區管理局可以把握機會觀摩與學習；同時我們也可將國內的發展成果展現於國際，如同這次 ASPA 會議中新竹科學園區 3 位代表發表論文演講及參與論壇、金麗公司的簡報、以及北九州產學會議中的台灣園區論壇，給我們很好的機會讓國際社會了解台灣的科技成就。總結此次出差之心得，提出下列建議：

1. 積極參與國際會議

雖然今日網路極為發達，許多溝通皆可以透過網路完成，但是當大家共聚一堂面對面的溝通，更容易達成效果。中科於今年（96）年 1 月 26 日甫升格為管理局，朝國際化發展即列為首要目標之一，藉由本次參加於亞州科學園區協會（ASPA）年會期間與韓國昌原創新園區接洽、拜會東京橫須賀園區及日本北九州產業學術振興局等機構均有進一步之洽商，雙方亦有國際合作之意願，將有利日後簽定姐妹園區達成國際交流之效果。

2. 考慮園區擴建

FPD 展中，日本廠商已展現出超大尺吋之面板，為促使台灣大型 TFT-LCD 產能居全球領導地位，國內之光電廠商勢必擴建更高次代之面板廠房，而中科及竹科之土地已呈供不應求情況下，應考慮園區擴建之需求。

附錄一：黃慶銘科長之論文

Creating Strategic Competitiveness on the Customer-centric Services System

- Synergies between Innovation Cluster and Networks Development in Hsinchu Science Park, Taiwan -

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1. INTRODUCTION

Globalization and digitalization are two major trends of global industry development. Facing the challenges of the worldwide keen competition, HSP, the best science park in Taiwan, has to transform into an innovation cluster offering customer-centric services, become superior and take a vigilant approach to compliment the changing needs of the Park's resident companies.

Over 26 years efforts, the HSP has effectively elevated domestic high-tech industry and contributed to the local blooming economy. Today the HSP is not only a high-tech industry cluster but also a knowledge innovation powerhouse. Business globalization and labor specialization result in a multi-competition in human resources, materials, capital, and technology. Owing to the lower labor cost and cheaper leased land emerging China become "world factory". Facing the substantial change of global economic structure, Taiwan is under the pressure of transformation. To dramatically change the existent high-tech industry operation model is the way to ensure sustainability. This paper serves as a supporting document to prove that practicing CCSS is the right thing to do for HSPA and is in conformity with the conclusion of the exports' meetings and questionnaire survey. The demand of knowledge sharing and networks development in science park community drives the formation of customer-centric value. In accordance with the value, a platform strategy for CCSS is created and focuses on knowledge creation, interaction and value-added core knowledge.

HSPA has applied CCSS to business operation and offered quality services by means of working with the synergy of innovation cluster and networks cooperation. This practice represents a prime strategy to transform HSP into the most competitive innovation cluster in the world.

2. RELATED STUDIES

2.1 Innovation Cluster

The role of service of innovation cluster (Lourens Broersma, University of Groningen, Oct. 2001) had stated "Alliance can make innovation successful because they facilitate knowledge spill-over (synergy) and cooperation in the adjustment process to change customer preference, pattern of competition and so on. These alliances or networks can lead to the formation of cluster of firms.

2.2 Networks among Science Parks

Luis Sanz states that a new methodology of global networking within and among science parks - Strategigram to deepen our understanding the strategic position of SPs (Luis Sanz, 2005). The Strategigram based on the six strategic axes that include: location, position in the technology stream, target firms, technology fields, target markets and governance may provide the position for networking between parks.

2.3 Customer-centric Services

The value integration model allows customers to configure networks of suppliers, intermediaries and other organizations, including public service agencies that dynamically collaborate to produce offerings that bring significant outcomes to customers. (Garyfallos Fragidis, Konstantinos Tarabanis, Adamantios Koumpis, 2006).

3. Current Developments of Hsinchu Science Park

3.1. Developments of Hsinchu Science Park

The development of Taiwan first science park began in 1980 – the Hsinchu Science Park. The current development status of each park as of the end of 2006 is described as follows: (See Figure 1.)

a. Currently there are 3 major science parks and 8 affiliated science parks in Taiwan, which are located in northern, central, southern, and eastern regions attracting more than NT$ 4 trillion of capital. The total area of the 11 parks adds over 3,700 hectares and the distribution of the science parks is illustrated in the following diagram. The total revenue of HSP contributes about 1/10 of the total revenue in the domestic manufacturing sector. The outstanding performance is attributed to the competitiveness in technology development.

b. The HSP is commonly ranked one of the very successful science parks in the world. HSP currently covers 6 Parks, which include Hsinchu, Jhunan, Tongluo, Longtan, Hsinchu Biomedical, and Yilan Science Parks, with a total development area of more than 1,300 hectares.

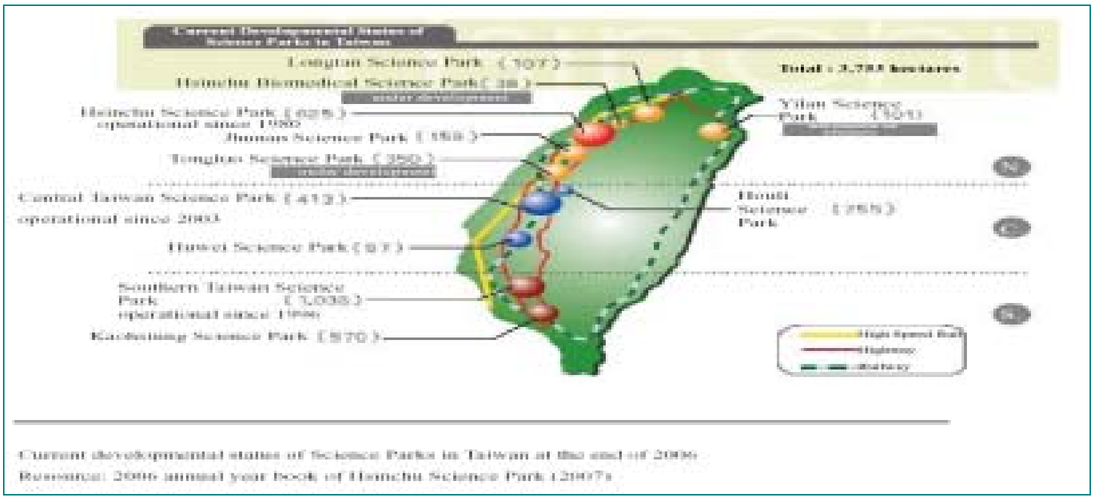

Figure 1. Current Development Status of Science parks in Taiwan

3.2.Current Status of Hsinchu Science Park

Following years of effort, there is a sustainable growth of industry in HSP at the end of 2006(see Table 1.). There are six main industries in HSP, namely integrated circuits, computers and peripherals, telecommunications, opto-electronics, precision machinery and biotechnology. The majority are IC, opto-electronics and PC/peripherals. The Top-1 is IC industry; there are 181 IC companies in the park, with almost half of tenants.

Performance of the HSP in sales revenue is quite outstanding. In 2006, the total sales revenue of the park reached almost USD 34 billion, which shared 1/10 of Taiwan's overall manufacturing revenue, with a compound annual growth rate of more than 30%, in comparison to 7% of Taiwan's overall manufacturing industry. That's why the HSP is so important for Taiwan's economic development. A total of 395 hi-tech companies to date, mainly involved in semiconductor, computer, telecommunication, and opto-electronics industries. Among all park tenants, 85% are domestic companies and 15% are foreign. The companies in park employed 121,762 workers equally split between males and females, with average age of 31 years old.

Table 1. Current Status of Industry in HSP

Industry	No. of Company	No. of Employee	Sales Revenue (US$M)	Percentage (%)
IC	**181**	**68,727**	**24,085**	**70.9**
PC/Peripherals	**55**	**12,694**	**3,075**	**9.1**
Telecom	**47**	**5,772**	**1,372**	**4.0**
Opto-electronics	**65**	**28,187**	**4,867**	**14.4**
Precision Machinery	**21**	**1,468**	**402**	**1.2**

Biotechnology	**23**	**985**	**93**	**0.3**
Other	**3**	**3979**	**71**	
TOTAL	**395**	**121,762**	**33,985**	**100**

Note. Excerpted from Hsinchu Science Park "2006 Annual Report"（ 2007 ）, Hsinchu Science Park Administration, Taiwan

4. RESEARCH DESIGN

4.1 Methods

This study begins with a brief review of the innovation cluster performance in Taiwan ranked in 2007 Silicon index and aim at investigating the correlations among industries, government, and academia under a harsh industry environment changes, so as to figure out industry-academia resources link based on the customer demand analyses of industries and academia in terms of establishment of a platform-based service value system through an exploration of official event records and statistical data, drawing evidence from HSP.

a. Literature survey method & Case study

b . Expert group meeting

c. Questionnaire survey of sustainable and innovative factors for the next era of science parks.

4.2. Research Process & Analysis

The research process will begin with verification on the research problem with reviewing on the related international studies. Theories and topics of globalization and science park transformation will be collected and be analyzed to spur out the new concept on the service model for HSP. Finally, the data collection will go through secondary information, Expert group meeting and questionnaire:

1. Literature Survey Method:

A brief review on innovation cluster in Taiwan performed in 2007 Silicon index suggested that HSP left behind on VC, patent growth, R&D, Engineer talent. Deok Soon Yim presented another relevant paper in IASP 2006 annual conference, which used a 5 points Likert scale to evaluate the Key Success Factors (KSF) of world-class innovation clusters - 8 Science Parks includes HSP. HSP won good rankings on vision, entrepreneurship, and finance etc. Only KSF on R&D takes the 8th ranking left behind the rest science parks in the research.

1. Expert Group Meeting:

After 6 expert group meetings, HSPA management team concluded 8 key factors rendering the HSP outstanding worldwide in terms of Industry-Government-Academic-Research networks:

(1). Foresight and policy support from the government
(2). Convenient geographical access
(3). Sound industry cluster effects
(4). Collaboration among park, industries, government, academic sectors, and research institutes
(5). Abundant high quality of human resources and venture capital
(6). Venture and technology brought by returned expatriates
(7). Smooth transformation of domestic traditional industries
(8). One-stop administrative services

2. Questionnaire Survey:

There are totally over 500 science parks in the world, over 3/5 of these parks are the members of International Association of Science Parks (IASP). This study delivers an open questionnaire survey to 318 science parks in 26 countries. It included some important parks, but not the members of IASP, such as Silicon Valley, USA, Sophia-Antipolice, France and so on. Finally, the data of 97 science parks had been collected and studied in this research. Due to the limitation of time and budget of the case, the first and second survey sent out total 348 questionnaire via the email to the experts, 97 elected science parks and 18 sister parks of HSP on August 31, 2006 & September 15, 2006 respectively. Although, for its low returned rate of questionnaire, the result of the 68 returned questionnaire still illustrated the nature of the problem. The samples in this case are all science park related experts and researchers.

The questionnaires had been divided into two parts:

(1). First part included basic data of each science parks, such as total numbers of tenants, employee, sales, park area, etc.
(2). Second part included with open questions on future development, new model with strategic plan, and indicators of competence of science park.

The competence of the science park may be assessed by the ability of integration of the new challenges. New model with strategic plan will be left out for the variation of different parks for lack of returned answers. The evaluation on each index is varying for the difference attribution of each park. The experts and administrator suggested that it's difficult to compare for the variation on each indicators. We sum up the results from questionnaire survey and discuss on the expert group discussion. To achieve the objective, the HSPA plans to provide a wide variety of services- the CCSS, as mentioned in strategic plan with a vision on the synergies of innovation cluster and networks development. The HSPA practices the innovative model, in an eye of providing park tenants with efficient and superior quality of services.

5. Creating Strategic Competitiveness on the Customer-centric Services System - Synergies between Innovation cluster and Networks Development in HSP -

5.1 Background of Architecting Customer-centric Services System

In the near future, the cross-field integration and cooperation between industry-university sectors shall generate innovative results and initiate a new market technology for our industries in order to bring higher added value, furthermore to make innovation and quantum leap development for Taiwan's industries. Therefore, the shift in power to customers in today's demand/supply process requires HSPA as a service provider to implement a more robust customer centric strategy with this ultimate goal in mind to serve the park tenants.

To achieve the objective of fostering a science park as a innovation cluster, the HSPA provides a wide variety of services- the CCSS. With a strategic thinking of vision, the progress of network service technology and telecommunications innovation, brand new model of park administration is a must, in an eye of providing park tenants with efficient and superior quality of services.

5.2. Design Framework of the Customer-centric Services System

The system is designed in a manner of custom- centric service model and knowledge-based sharing mechanism, synergies between 2 key aspects, "Innovation cluster and Networks development". The theoretical framework may influence the success or failure in industry-university collaboration and the formation mechanism. Therefore, the service system framework and the optimal platform proposed are to respond to the new business models for technology service units of the science parks, such as tenants, colleges and universities incubation center, science and technology parks, global firms and organizations, etc. The system design chart looks as follows: （See Figure 2）

Figure 2. Structure of Innovative Customer-centric Services System

5.3 Operating Characteristics of Innovative Customer-centric Services System

The operating characteristics of the innovative CCSS are composed by two parts, namely the "Services Platform System" and the "Network System.":

a. Services Platform System

Government management platform, public platform, firm's management platform and firm's external platform will virtually link locally and internationally.

b. Networks System

Network linkage can collaborate and integrate the sectors i.e. the park administration, related government organizations, alliance partners and customer e.g. tenants, university, research institute, and external customer, and also global firm & organization, e.g. IASP, ASPA, etc.

Tenants, partners, and administrators can just click the mouse virtually or contact physically to each other for completing all related services in an efficient manner. The system framework looks like: （See Figure 3）

To provide park tenant efficient and superior quality of services, the innovative CCSS works with synergies between innovation cluster and networks cooperation, where four operation portions are closely linked, namely the e-application management system, the filing management system, the file consulting system, and the report management system. Besides, the innovative industry-academia services system works in the same manner of friendly one-stop service model, where on-line application, supporting inquiries, Q&As, operation guides, etc., are incorporated into the system.

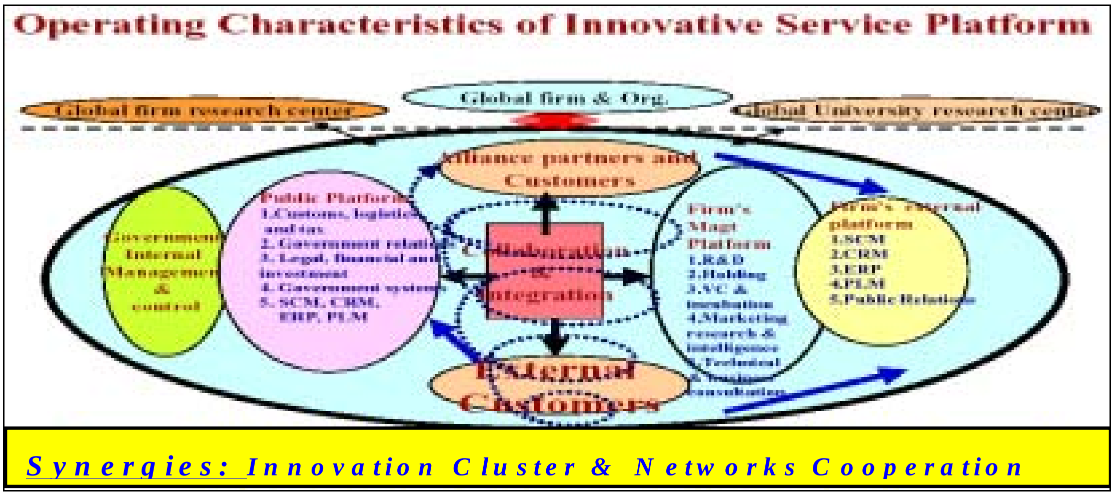

Figure 3. Operating Characteristics of Innovative Services Platform

Tenants are required to get the identification certificate beforehand to fulfill related administrative services. HSPA and partners of the science park agree upon the co-operation in order for technology exchange and cooperation between regions to establish international cooperation network through the innovative CCSS**,** which will purpose:

(a). To play a role as a strategic base of operation to establish international technology cooperation with each other.

(b). To architect a platform in charge of information exchange and service for each other.

(c). To provide information about excellent enterprises, technologies, product and IP etc. to all partners of the science park upon consultation between the parties.

(d). To utilize information established in each region and international linkage through cyber service system.

6. Implementation of Innovative Customer-centric Services System

Innovative CCSS is the prime goal that HSP actively pursues. Dr. Der-Ray Huang, Director General of HSPA states “with excellent interaction that permits efficient industry vertical integration and horizontal labor of division, formation of the world's most innovative high-quality science park community - especially innovation cluster for the semiconductor industry.” (Der-Ray Huang 2007) Currently, strategy of HSPA is to strengthen innovation cluster and networks development included:

6.1. Innovation Cluster（See Figure 3）

(a). Establishment of IP innovation center
(b) . Bring-in of high added-value industry (e.g. Si-Soft RD Center) under the visionary concept of “Parks in Park”.
(c) . Establishment of versatile technology exchange platform
(d) . Development of knowledge-based science parks
(e) . Strengthen global networks (e.g. Global entrepreneur lab- MOU with IMEC)

Figure 3. Implementation on Innovation Clustering

6.2. Networks from Networking（See Figure 4）

(a). International cooperation on sister parks relationship
(b). Sign MOU with ASPA on “Cyber ASPA” cooperation.
(c). Industry-Government-Academic-Research networks

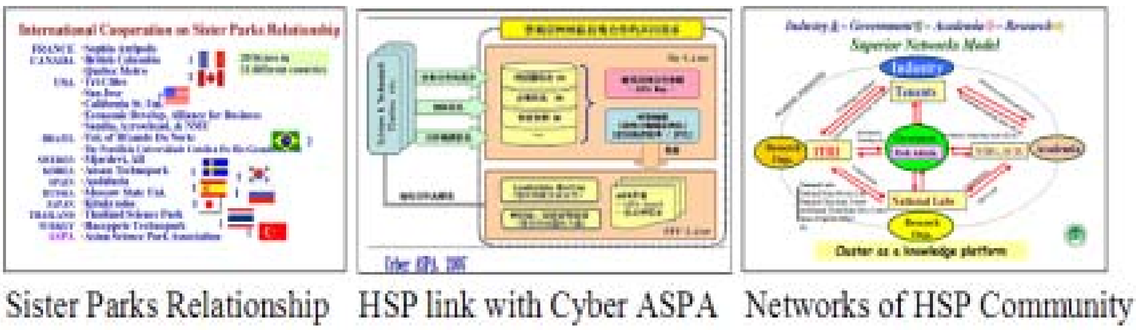

Figure 4. Implementation on Networks from Networking

Besides, the innovative CCSS can also wildly apply not only to administrating affairs of domestic science parks, e.g. Central Taiwan Science Park and Southern Taiwan Science Park but also to servicing the tenants who may easily access linkage and constructing the international network. The system where a virtual science park administration can be realized, which will meets the initial goal of the pilot project- the future of science park in Taiwan as a worldwide customer-centric innovation cluster.

7. CONCLUSIONS

The HSP shoulders national high-tech industry development missions coincided with government's policy of promoting Taiwan as a Green Silicon Island, pursuing a sustainable and client-oriented investment environment for flagship enterprises all over the world. "Only efficient and effective administrative services system may guarantee, HSP have recently set up " innovation cluster" and " the creative, vitality and ecological environment" as the "twin engines" of the strategic planning started to shape the HSP as the world's most innovative Science Park." (Der-Ray Huang 2007)

This realization is especially true for administration organizations in offering public services. The platform service system is a useful tool, which may yield under mentioned advantages for the prospect of HSP:

a. Proximity to world-class science and technology development
b. Easy access to talent, funding, and patents
c. Quality to life factor
d. Appropriate space
e. Entrepreneurial environment
f. Inter and intra-institutional collaboration
g. Availability of support service
h. Favorable incentive

To cope with trend of globalization, the HSPA seeks foreign collaborative partnership to extend linkage with global community, and to diffuse the successful experience of the HSP. The HSPA is expected to serve as the engine and powerhouse for domestic high-tech industry development and regional economic prosperity. With novel service ideas and administration approaches, the HSP will transform into one of the best world-class innovation clusters and can definitely help Taiwan realize its vision of becoming a Green Silicon Island in the near future.

Key Words: Strategic Competitiveness, Innovation Cluster, Networks,
International Cooperation, Customer-centric Services System

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附錄二：馬維揚研究員之論文

Research on the Sustainability and Competitiveness of Science Parks

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1. Introduction

The Silicon Valley effect spawned a global wave of 'Siliconia' on different scale all over the world. Interest in this development model increased in the US in the 1960s, reached Europe in the 1970s, and started to intensify and spread throughout the world in the following decade. In fact, it was in 1980s that the science park movement really emerged as a global phenomenon. It became one of the most appealing local-regional development models expected to provide a shortcut to restructuring local economy and to getting a grip on desired growth sectors.

Take a look at the development experience of Taiwan's science parks, with the Hsinchu Science Park debuting in 1980 renowned for its absolute advantage gained through industrial clusters formed under well supported infrastructure, facilitated cooperation among industrial, governmental, academic and researching sectors, as well as established local production networks. Followers have been springing up trying to copy the Hsinchu Science Park's successful development path: the Southern Taiwan Science Park, the Central Taiwan Science Park, etc. Together with the ever-emerging export zones and industrial parks, the flourishing phenomenon can only be seen in the recently deregulated university and educational industries. However, these ostensibly promising developments do not prevent hi-tech voluminous ODM- or OEM-based production from trickling westwards to China, leaving Taiwan with not much of its process-oriented edge. Science parks in Taiwan are at a stage calling for an overall plan that will enable them to restart for seizing new opportunities. With county and city governments eager to build local science parks, it's one of the government's major tasks to define each park's position in terms of its competitiveness and to make optimal allocation of resources accordingly.

Part of the problems and certain specific cases can be effectively solved following market principles and flexible management models that are common among development companies in the private sectors. However, the national efficiency issues in resource allocation regarding the science parks are not so easily addressable. Besides, cities and regions have become independent actors that compete with one another for the flows of investment, capital and expertise in order to create employment opportunities and to secure the welfare of the local community. There is an evident need for a reference model based on foreign success cases in science park development. This paper studies the science parks worldwide by focusing on their development experiences, where the governmental policies relevant to sustainability and competitiveness will be further explored.

The role and position of the science parks will be carefully examined. What are the most stringent challenges facing the Hsinchu Science Park? We clearly see the trend of society shifting from information- to knowledge- oriented and from manufacturing- to service- based. How does this trend affect the development of the science parks? What are the new roles for the science parks to play in face of these changes? How to proactively promote for the companies' growth? The existing and working development model for the science parks must be replaced by innovative and newly developed business models and models for public services.

This research will investigate the development experiences of science parks worldwide from a global perspective to explore several topics including:

1. Challenges facing other countries in their keeping up the science parks' sustainability and competitiveness. What new models or frameworks have they come up with to deal with such a situation? What are the characteristics of these new models and frameworks?
2. What new strategies should a science park be pondering about? What should the science parks' leaders do to update their strategies, to discover new methods and to develop new models or new frameworks?
3. What indicators can be used to measure the competitiveness of a science park?

2. Science Parks Evolution – Review and Challenges Ahead

The competition between high tech centres is best viewed neither as a playground of international organizations and macroregional institutions nor as competition between nation states, but in 'pointillist' style as a mosaic-like setting in which more or less independent high-tech centres compete with each other. Stories from Silicon Valley to Cambridge to Sophia-Antipolis that reflect this approach are well known and documented. The Silicon Valley effect spawned a global wave of 'Siliconia' on different scales all over the world . Interest in this development model increased in the US in the 1960s, reached Europe in the 1970s, and started to intensify and spread throughout the world in the following decade. In fact, it was in the 1980s that the science park movement really emerged as a global phenomenon. It became one of the most appealing local-regional development models expected to provide a shortcut to restructuring local community and to getting a grip on desired growth sectors. The urban-regional level is of vital importance because cities and regions have become independent actors that compete with one another for the flows of investment, capital and expertise in order to create employment opportunities and to secure the welfare of the local community. This highlights the necessity to integrate the core value-added functions of the community into the global economy . This view has also attracted special attention due to global rankings of high-tech centres (e.g. the ranking published in Wired Magazine in June 2000, .

The number of science parks rose dramatically in the 1990s and it seems that it is continuing to go upward in the early 2000s. It is difficult to give even an approximation of the number of science parks, for the figure depends on the criteria used. The most important thing is to define whether the figure includes innovation centres and incubators or not . The International Association of Science Parks (IASP), for example, tends to be rather strict when labeling any project as a science park, for they give this status only to those projects that fulfill the criteria of the approximation of the number of genuine science parks as defined by the IASP in the world in the early 2000s may be between 700 to 850. When a looser definition is applied, the total number is probably closer to some 1,240.

How successful these science parks will develop and achieve their goals are determined in part by their own intrinsic R&D and production capacity and in other part by external global market competition. With these conditions in constant change over time, the parks' development strategy must adapt accordingly or, in some extreme situations, be restructured based on abrupt environmental turn. Take, for example, the Hsinchu Science Park. It has for decades propelled the rapid growth of Taiwan’s hi-tech industries, with an unprecedented satisfactory outcome. It’s without doubt that the Hsinchu Science Park possessed unique edge at its beginning. However, the domestic and global business environment has since then experienced dramatic change and the Hsinchu Science Park needs to find its new edge in the rapidly changing business environment.

In the United Kingdom, for example, the development of science and technology parks (STPs) have achieved quite impressive progresses, with increasing number of STPs generating good commercial rewards. The British science and technology park development can be traced back to early 1970s when the Heriot-Watt University Research Park and the Cambridge Science Park began their operation. According to the United Kingdom Science Park Association (UKSPA), its listed 61 regular and standby members all have seen a ten-year steady and continued growth in the number of accommodated firms, from an average of 29 firms in 1999 to 39 in 2003, with an average number of employees of the accommodated firms rising from 15 in 1991 to 24 in 2004. At this moment, more new parks are under development.

With existing science parks in successful operation, each new park can not but face competition with at least one in the same region. Recent flourishing in science park development further created an over-supply situation and even brought about an issue of improperly located park buildings. The British cases should provoke some good thought, as Taiwan’ s science parks will soon have to deal with looming pressure of resource integration and the inevitable choice between competition and cooperation with each other.

All existing British science and technology parks provide services similar to each other: well-equipped factories supported with a full range of services, flexible lease terms and tight links with renowned academic and research institutions. A newly developed science and technology park is therefore hard to differentiate itself from other existing parks, while many new parks in other countries are also offering all they can to attract tenant firms.

Further taking the Singapore Science Park (SSP) as an example, the previously government-built park is now operating as a private entity upon takeover by the Ascendas Land Group which has claimed to be the biggest R&D conglomerate in Asia. The SSP, acclaimed for its R&D and science

& technology center, is one of the science parks successfully developed by the Ascendas Land Group, which also owns and operates several successfully developed industrial parks both in Indonesia and in India. It is gaining footsteps in the biomedical industry as well. The SSP is itself a paradigm in which the management system, innovation clustering and transition positioning set good examples for other similar parks.

From the perspective of competitive advantage, the science parks are experiencing pressure of competition caused by (1) globalization shifting towards regional links, with a good example being the manufacturing sector of hi-tech industries spreading from the United States to Japan, then to Taiwan and then to Southeast Asia and/or China. Division of labor together with popular outsourcing has created significantly high competitiveness between all these countries. With each government striving for development of hi-tech industries, heavy investments are pouring into development and construction of more science parks. The massive crowd-out effect will imminently reflect in the fierce competition of the hi-tech industries; (2) slowed innovation in technology; Taiwan has been relying on the United States and Japan as the major source of hi-tech innovation, especially with the US Silicon Valley fueling the whole world in hi-tech innovation and development for over a decade. But recent years have seen a downturn in the United States economy and wide-spread uncertainty among hi-tech industries which are trying to recover from the Internet bubble, both rendering new players with unclear prospect for technology innovation; and (3) myth of guaranteed success through simple copying of other park’s experience; Most of the success cases of science parks entails a unique experience and, as a matter of fact, the highly different subjective and objective factors have limited the possibility of full-scale replication. Industries can be easily replicated only if they emphasize mass production or require rapid development. For an operating science park embarking on strategic transition for next stage of development, the pressure is extremely high as it is virtually impossible trying to replicate or catch up with those science parks hosting mainly biotech-intensive and pharmaceutical industries.

A science park is built to promote the development of hi-tech industries and to encourage technology innovation. Just like all products have to go through the lifecycle of budding, growing, maturing and recession, the park's tenant firms are experiencing their own lifecycles with many loosing competitiveness and phasing out in the hi-tech industry. Science parks operated by private development companies tend to maintain fit by following market principles to allow nature deselect those firms or industries that compete poorly. However, many of the parks under the government operation are less market sensitive and it has therefore emerged as a major issue to create an effective updating mechanism that ensures better resource allocation and up-keeping of park’s vitality (sustainable development).

3. Research Methodology

This research will be qualitative as well as quantitative, covering both management and policy dimensions. A multi-aspect approach will be taken for the research, including comprehensive interviews and questionnaire surveys to be conducted on managers and academicians of science parks worldwide (the Hsinchu Science Park included).

A. Research Methods

The following methods are used for data collection:

1. Literature survey: Collect domestic and foreign literatures that are relevant to this research for thorough analysis.
2. Case study and secondary data collection: Build a database of park-specific secondary data collected for specific parks.
3. Experts' opinions: By seeking experts' opinions, explore issues on park's sustainable development and re-innovation.
4. Questionnaire survey: Through questionnaire-based survey, find out factors that govern park sustainable development and innovation, as well as indicators for competitiveness measurement.

B. Research Process

As shown in the diagram below, this research first conceives and identifies the problem, followed by data compilation based on collected domestic and foreign literatures. The data are compiled along two axes: the theoretical one covering the background of globalization, the perspective of science parks as being policy options, categorization theory of science parks, and designs for park sustainable development and re-innovation. Primary data are collected and analyzed along this axis. The second axis is mainly on the secondary data for each science park under investigation. The data covers park-specific basic data and answers on open-form questionnaire. The following diagram shows the steps and processes involved in this research.

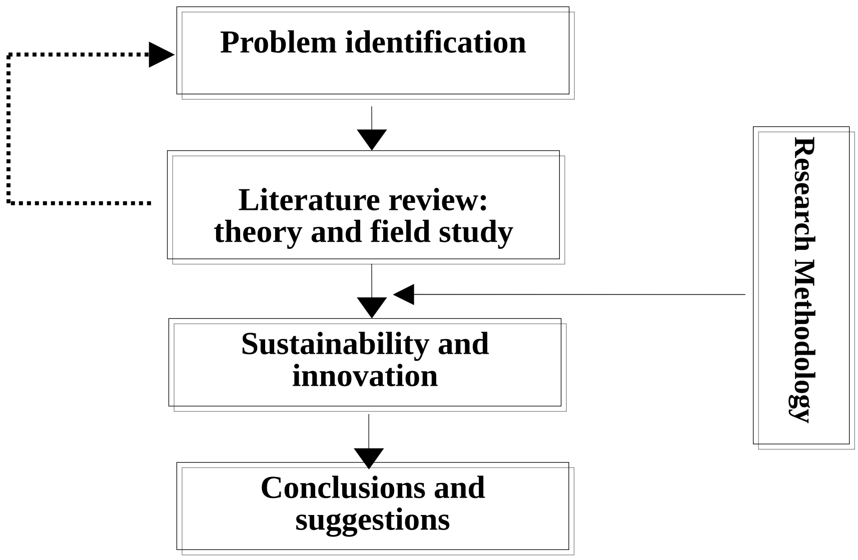

Fig 1. Research Process Diagram

Statistics shows that there are more than 500 science parks in total around the world as of today, of which around 300 (the number is changing as this research progresses) have joined the International Association of Science Parks (IASP). From the 300 some science parks out of 26 countries, together with other renowned science parks such as the US Silicon Valley and the French Sofia Science Park that are not IASP members, this study tries to filtered out those representative parks (97 in total) for building park-specific database.

4. Research Analysis

Considering the cost, the questionnaire survey will be conducted in email. The target base will cover academicians doing research on science parks and staffs of science parks selected for study. The Hsinchu Science Park and its sister parks are naturally included. 180 emails were sent out with 40 failed in delivery by mail systems. By the cut-off date (August 31, 2006), 10% surveys were returned with answers. The second-round survey was issued via 168 emails which excluded those recipients who had responded in the first-round. The second-round generated an undeliverable set of 30 mails and got back 7% responses by the cut-off date of September 15, 2006.
With questionnaire survey targeting carefully selected professionals, science park academicians and park managers who are familiar with the science parks, the representativeness of the collected data is not discounted by low response rate.
The questionnaire is divided into two parts. The first part covers basic information of the science park such as the number of tenant firms in the park, total number of employees, total revenue, total floor area of the park, etc. The second part contains open-end questions addressing issues such as how the park should develop in the future, what strategic move should be taken, and what indicators serve to measure the park's competitiveness, etc.

B. Open questions

The second part of the questionnaire contains three open-end questions which are to be answered by the respondents based on their professionalism and experiences.

(I) What new challenges is a science park to face in order to maintain its sustained development and competitiveness? What new model or framework may emerge? What will be their characteristics?

The results are as shown in the table. It is seen from the table that the issue for science parks to maintain sustainable competitiveness is mainly combined with the new challenges facing the park. As answers to the question of new model or framework are too few in sample sizes, it will not be discussed here. In summary, the science parks all over the world are concerned with the following issues:

1. Park's financial independence and stability: This is an issue brought up in responses from South Korea, France and the United States. The underlying meaning of this issue is that, despite steady development that brings in revenue, many parks still see maintaining a steady economic source as an ordeal. As science parks always rely on government fund for developments and updates of equipment or environmental infrastructure, limit of governmental support and over-budgeted park construction usually leads to slow development. It is therefore a major issue for a park to maintain its financial independence and stability.

2. Human resources management: Some science parks around the world have experienced shortage of quality manpower, which is an issue brought up by South Korea, France and the United States. Despite the fact that the science parks amass hi-tech talents, the demand is still far from met. It is therefore a science park's challenge to keep down the brain drain and to manage well the talents required for its tenant firms. The human resource issue also is related to the park's under-budget issue, which causes limitation in all aspects of talent acquisition, selection, education and retaining. The overall result is slow-down of park development that is negative impact on all tenant firms.

3. Looking for multi-party cooperation model: Both France and the United States

strengthen the professionalism and the development of the park through multi-party cooperation, which also induces infrastructure changes. The park is able to develop the capability and build up advantage it lacks before through complementary research activities carried out by governmental, industrial, academic and research units that are in full cooperation. The cooperation will also promote the state's overall industrial growth and economic development. Most importantly, cross-nation cooperation enables the science parks to have foreign contact with other nation's parks that could sparkled new models and knowledge for an overall change of domestic science and technology.

4. Other issues: Some of the issues brought up by science parks in Japan, Australia, Germany and Sweden include: eliminating legal barriers, difficulties to overcome in the face of new competition and selection of locations. In the aspect of legal barriers on development density, relevance, as well execution of software plans, harsh restrictions have caused losses on the park side due to lagging behind in development. In facing new competition such as the incubator centers, it is an aspect provoking careful thought as how to cope with the emerging incubator centers. As for the selection of park location, it has to be taken into consideration that future trend will be cost and innovation based, and the stringent challenge is for a science park to achieve rapid development either by relocating its R&D core businesses to where the cost is lower or by staying but focusing on boosting its regional innovation capability.

All of the views of domestic and foreign scholars are summarized as follows:

1. Improve on environment: the so-called environment covers every part of the environment where the staff work, live, habitat, and learn. Facing a trend of demanding for high living standard, many scholars have brought up the improvement on park environment as the top issue. Through perfect overall quality of living and infrastructure, the company staff will enjoy a stably convenient and comfortable working environment, which will enable him to focus better on his work. A good living environment further reduces the park's overall pressure index for the staff. A well designed learning environment empowers park staff to engage in self-development, which in turn adds to the park's capability of education. As a result, most scholars see improvement on environment as the top challenge facing the science park.

2. Seeking multi-party cooperation model: Scholars also show concerns on how industrial and academic units should cooperate in the science park's development. Most science parks that claim industrial and academic cooperation have mainly focused on campus recruiting of talents, instead of going into detail for planning and execution of practical cooperation. Furthermore, cooperation needs to be enforced not only between industrial and academic units, but also among tenant firms and with other science parks. All kinds of cooperation have to be carried out through integrated planning and well designed systems. Cooperation is therefore one of the future challenges facing the science parks.

(II) What kind of new strategies need a science park to consider? How should the leader of a science park update his strategies, discover new methods, and develop new model or framework?

As for the park's new strategies, the summarized survey results are as shown in the table, from which it is seen that the park has several proposed strategies and direction for development, as listed below:

1. Emphasizing globalization and worldwide networks: This issue has been brought up by parks in Germany, France and Australia. This issue can be addressed by enabling IASP and its members to interact with each other, giving project leaders and venture managers all necessary support in the aspects of technology, finance and networking with tenant firms of all science parks worldwide. This link will bring positive impact to the science park, including exchange of complementary technologies and professional talents.

2. Flexible management: Both Australia and the United States have science parks adopting this new strategy. Flexible management means synchronization of change in operation with development in technology. The science park needs to change its overall strategy from local-oriented to service-oriented and global-oriented R&D, besides lifting the whole environment to a 'not-only-for- work environment' level. Through flexible management, it is possible to meet the above-mentioned 'improve-on-environment' challenge and stimulate the park's productivity by changing the park's way of operation.

3. Seeking more opportunities and cooperation: Japan's and Australia's science parks have brought up the issue of strengthening cooperation between government and enterprises, and seeking more opportunities for cross-field science and technology. Strengthening government-enterprise cooperation entails more than proforma cooperation. It covers legal and policy aspects as well. It is fundamentally different from the well known government-contracted projects and the government-sponsored research and development. As for the cross-field science and technology opportunities, the Australia's Thebarton Advanced Technology and Bioscience Hub has been excelling in this respect. The micro-bioscience and university research oriented Hub features new strategies that emphasize communication between different fields of technologies, in order to discover new business opportunities that eventually provides for the park's development. This strategy has proven, based on the survey, very successful. Much can be learned from it.

All scholars' views are summarized below:

1. Emphasizing globalization and worldwide networks: Most scholars propose moving towards global market and entrepreneurship, viewing human creativity as a value. The purpose is to merge traditional and technology-based enterprises to create a new market. The science park is treated as a local innovation system through which the park's increased impact will help the region to gain advantage.

2. Flexible management: including integration of the science park with the city community, providing enterprises with full-scale all-in-one services, providing innovation capability and entrepreneurship via good innovative environment, encouraging hi-tech enterprises with new methods, marketing and operating on top of internal virtual environment, using network to create coalition for facilitation of resource integration, building up reputation, cooperating with rural districts, and managing regional development. With such extensive scope of management, the science park's campus and peripheral environments are included.

Implementation of the strategy need to take into account the local characteristics of the park, including the nature of the park's industry, the number of employees, the area's customs, public feelings and habits. A new strategy however good will not implement successfully unless it copes well with the characteristics of the region.

(III) What indicators best measure the science park's competitiveness?

As for a science park's competitiveness, many parks and academicians have proposed indicators for measuring, to be described below:

1. Indicators proposed by science parks are categorized as:

(1) Ratios: Overall / foreign enterprises; Patents owned by the enterprise / patents of this field; Rate of employment of local graduates; Incubator facilities / funds.
(2) Research and development: Research and development investment; Number of employees directly involved in research and development activities; Number of scientific journals published by scientists in the science park; Number of databases for small & medium enterprises and for venture capitalists; Number of intellectual properties.
(3) The science park's resources owned: Annual sales of tenant enterprises; Number of new investment projects; Number of hi-tech enterprises or hi-tech related service enterprises; Government funding and R&D subsidization; Park vacancy rate; Number of employees of high-pay industries; Level of increments in tenant enterprises.
(4) Other indicators: job categories; private-sector management type; Per-employee profit.

2. Indicators proposed by scholars are categorized as:
(1) Ratios: Number of medium enterprises / Number of large enterprises; Ratio of high added-value employees.
(2) Research and development: Time-to-market innovation; Innovation index (patents, new products and new businesses, etc.); Efficiency in scientific and academic exchange.
(3) The science park's resources owned: Number of employees; Employees' talents; New district start-ups and globalized start-ups.
(4) Growth indicators: economic growth (sales, growth rate); Regional economic added value; Growth potential; Impact on immediate environment; Value of exports contribution.
(5) Other indicators: Customer satisfaction.

Many indicators are proposed by science parks and scholars for measuring a science park's competitiveness. To derive a representative and meaningful indicator, a science park's objective, industrial types, number of employees, size and regional characteristics must be taken into account. Our survey shows that many parks and scholars have pointed out that a universal indicator for all science parks does not exist and it is difficult in fact to measure all science parks with one single indicator. As parks vary with regions, meaningful measurement will be possible only among parks with similar unique characteristics. An overall measurement carried on all science parks inevitably will produce distorted outcome.

5. Conclusions and Suggestions

The science parks are facing a major transition, in business management method, in software or hardware servicing method, and in industrial restructuring. Many science parks are trying various new funding paths, pursuing cross-nation or cross-region alliances and promoting networked cooperation (especially in the EU countries). These changes are closely linked to many factors, among them the first is the fact that all nations are competing to build science parks, even making the parks universal. Secondly, along with the rise of the knowledge economy, intangible assets such as research and development, innovation, patents and marketing gain much attention that makes the original hardware infrastructure inadequate and requires considerable enhancements in software services. Thirdly, the international division of labor has created dramatic changes in enterprises and science parks. Just like an enterprise can outsource its business functions, so can a science park commission a professional team to plan for its operation. Fourthly, with ever-intensifying competition, each science park has to strive for more tenant enterprises.

The key success factors for all world-renown science parks fall under three categories: talents, good envirment and full governmental support. Although the situation may vary depending on each country's political, social and economic conditions, full governmental support plays the most important role in Asia. We make two suggestions here: (1) diversify source of fund; with the era of full government support long gone, independent financial resources have to be sought for sustaining the park's operation; (2) the government has to provide extra services besides administrative convenience in order to attract and recruit tenant enterprises. In different era, under varying situations, a science park needs to provide flexible services in order to pursue after different targets. This is the principle of survival – flexible adaptivity enables a science park to sustain in its development or to innovate for new game.

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附錄三：ASPA Awards 首獎得主 金麗公司簡報

RDC @ Science-Based Industrial Park, Hsinchu City, Taiwan

RDC

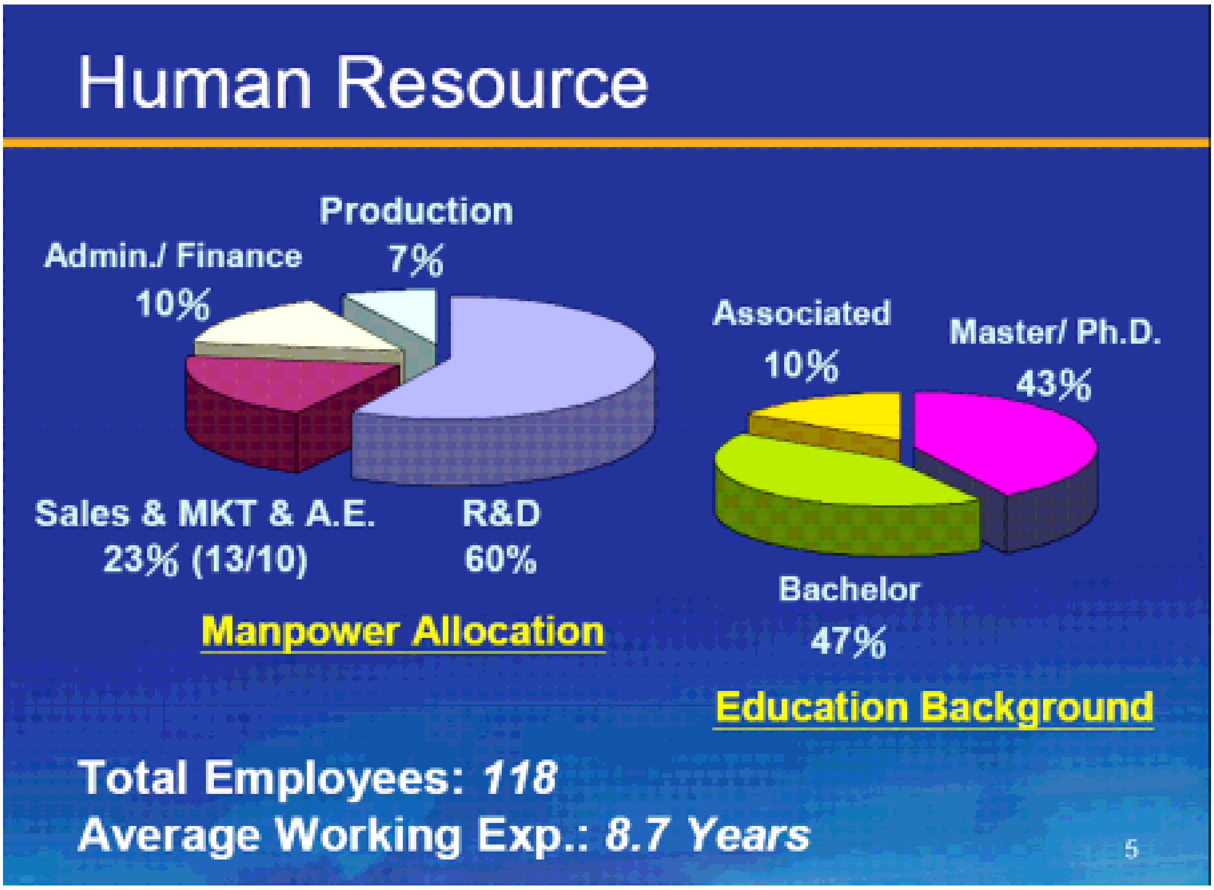
3

Company Overview

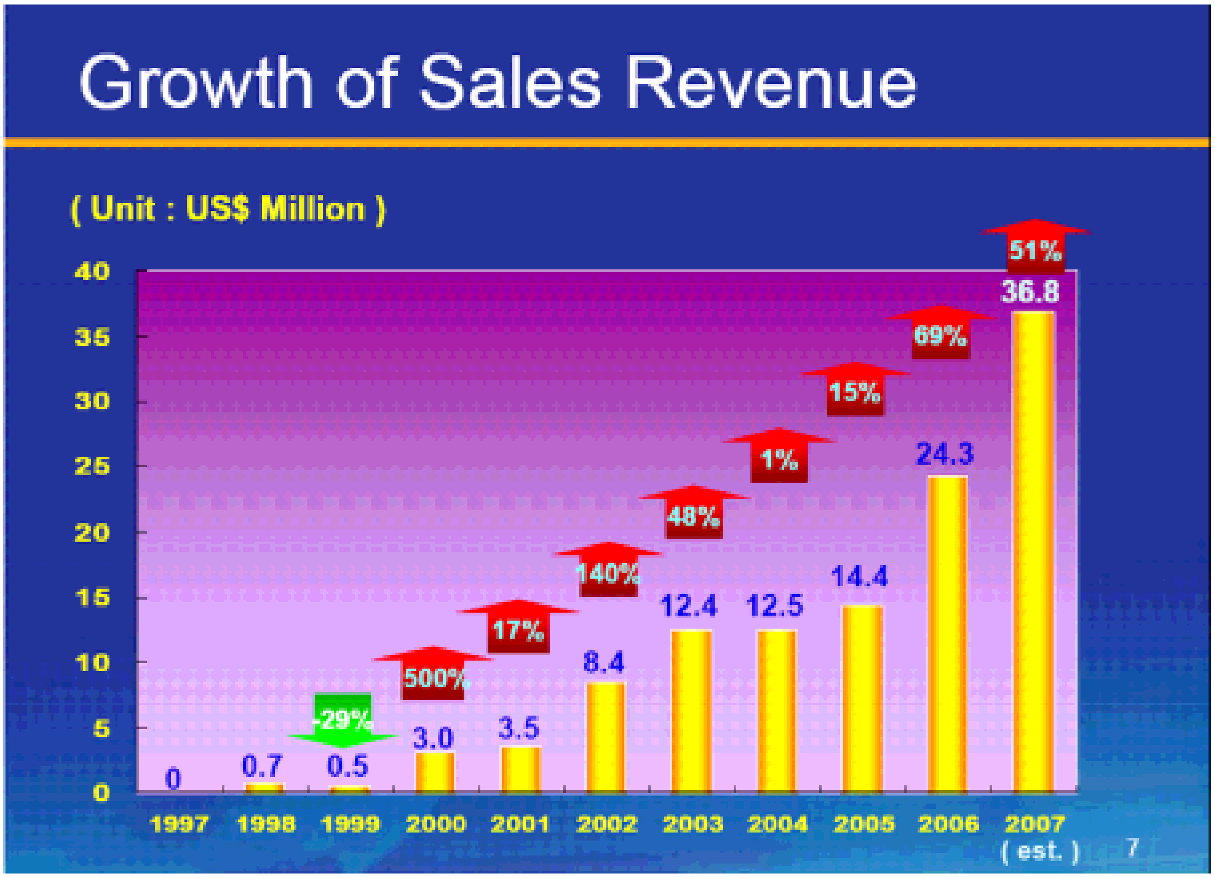
RDC
Your Best Route

- **Founded** - August,1997
- **Headquarters** - Hsinchu SBIP, Taiwan
- **IPO** - March 2, 2005
- **Market Capital** - US$ 260M
- **Employees** - 118 (@ 2007/10/01), ~ 70% Engineers
- **Business Type** - A Fabless IC Design House
- **Main Products** - 8-bit/16-bit CPU IP Licensing, MCU, NPU, MPU SoC IC's
- **Target App.** - Networking (WLAN & LAN in SOHO), Broadband Access, Digital Home, Industrial Controlling, Specialty PC

4


Human Resource
Production
7%
Admin./ Finance
10%
Sales & MKT & A.E.
23% (13/10)
R&D
60%
Manpower Allocation
Associated
10%
Master/ Ph.D.
43%
Bachelor
47%
Education Background
Total Employees: 118
Average Working Exp.: 8.7 Years
5


Global Sales / Distribution Channels
Physical Map of the World, April 2001
Germany
Russia
USA
Korea
China
Japan
Israel
Taiwan
SE Asia
Brazil
6


Growth of Sales Revenue
(Unit : US$ Million)
40
35
30
25
20
15
10
5
0
0
0.7
0.5
3.0
3.5
8.4
12.4
12.5
14.4
24.3
36.8
-29%
500%
17%
140%
48%
1%
15%
69%
51%
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
(est.)
7


Technology Development
and Core Competence
RDC
8

RDC in a Nutshell

RDC
Your Best Route

Every RDC chip comes with one unique trait …

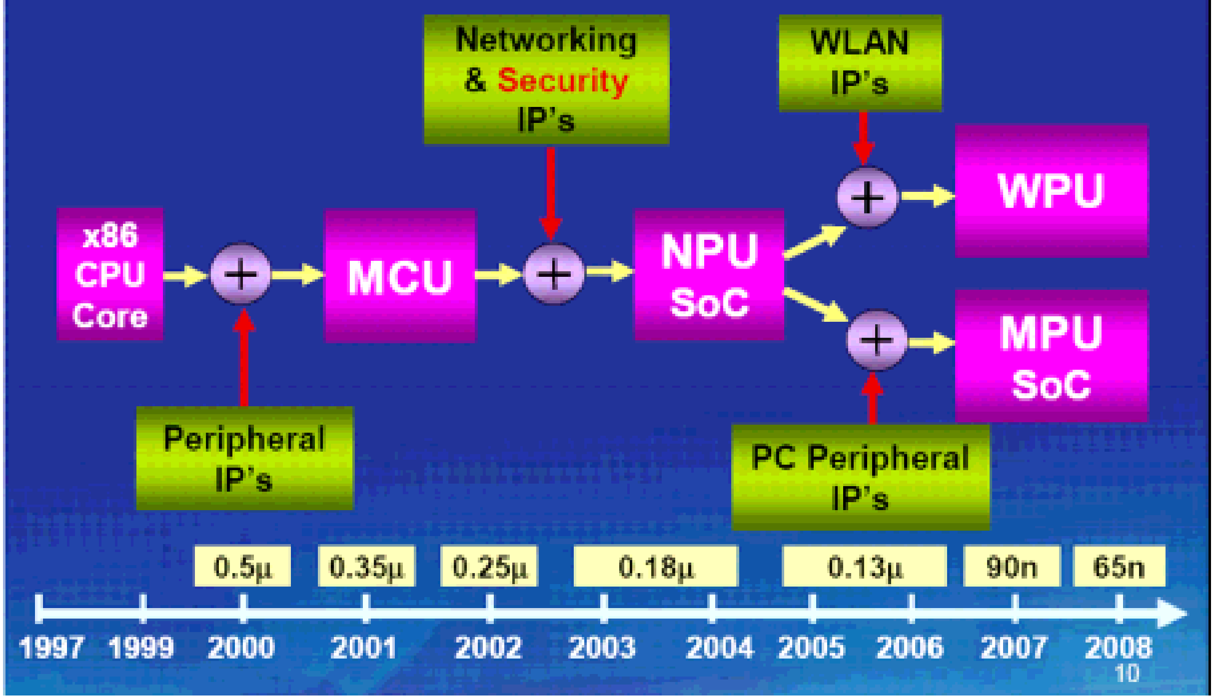
x86-PC-on-a-Chip

- It provides an x86 instruction-set 100% compatible development platform.
- It is a silicon integrated with x86-CPU, South-Bridge, North-Bridge, peripherals plus application specific engines.

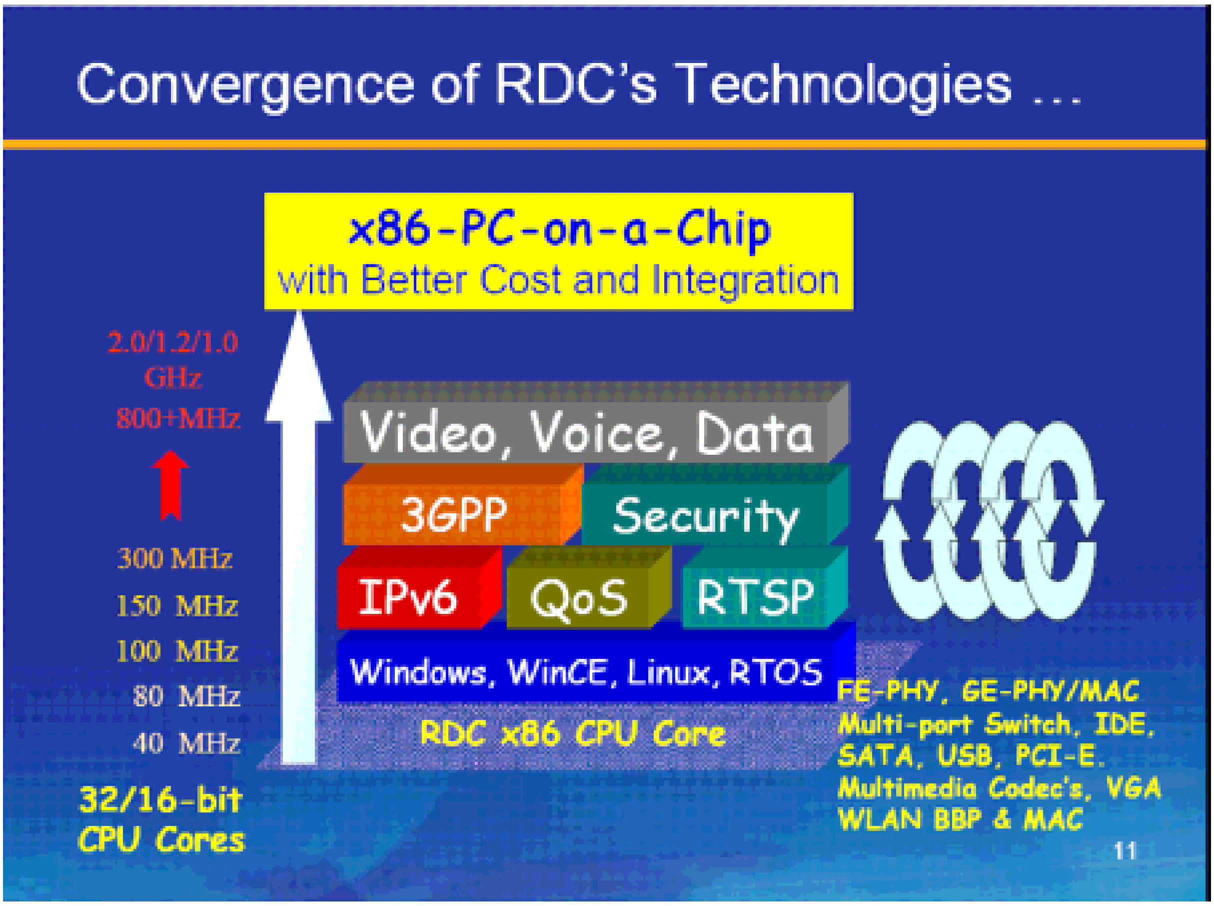
RDC is the only IC company in Taiwan
(and one of the few, in the world)
that owns in-house developed x86 CPU technologies

9

Technology Development Paradigm



10


Convergence of RDC's Technologies …
x86-PC-on-a-Chip
with Better Cost and Integration
2.0/1.2/1.0 GHz
800+MHz
300 MHz
150 MHz
100 MHz
80 MHz
40 MHz
32/16-bit CPU Cores
Video, Voice, Data
3GPP
Security
IPv6
QoS
RTSP
Windows, WinCE, Linux, RTOS
RDC x86 CPU Core
FE-PHY, GE-PHY/MAC
Multi-port Switch, IDE,
SATA, USB, PCI-E,
Multimedia Codec's, VGA
WLAN BBP & MAC
11


Prospects of
Business and Products
RDC
12

Growth Strategy

- **Stable Income**
  - ✓ **Micro Controller Unit (MCU)**
- **Growth & Income**
  - ✓ **Home Networking applications (NPU)**
  - ✓ WLAN 802.11a/b/g and 802.11n router, Home Storage, Print-Server/MFP, IP-CAM/DVR for surveillance, Digital-Home Gateway or Base-station, Internet Telephony (VoIP), etc.
- **Aggressive Growth**
  - ✓ **Industrial Controlling/PC (IPC), Thin Client,** etc.
- **Emerging Future**
  - ✓ **Embedded Applications** wherever the built-in PC-compatible capability can provide greater advantage
  - ✓ **Specialty PC's** for kids, senior citizens, commercial promotion, smart information query, etc.
  - ✓ **Internet-Dedicated Easy Access Solution (IDEAS)** for Consumer Electronics applications

13

RDC 16-bit MCU Application Examples


LCD TV & Projector


e-Book


Sawing Machine Controller


I/O Expansion Board


CD/DVD Copier


GPS Controller


Media Converter

ADVANTECH
BenQ
CULTURECOM
ingrasys
MOXA
LG.PHILIPS LCD
Technology You Can See!

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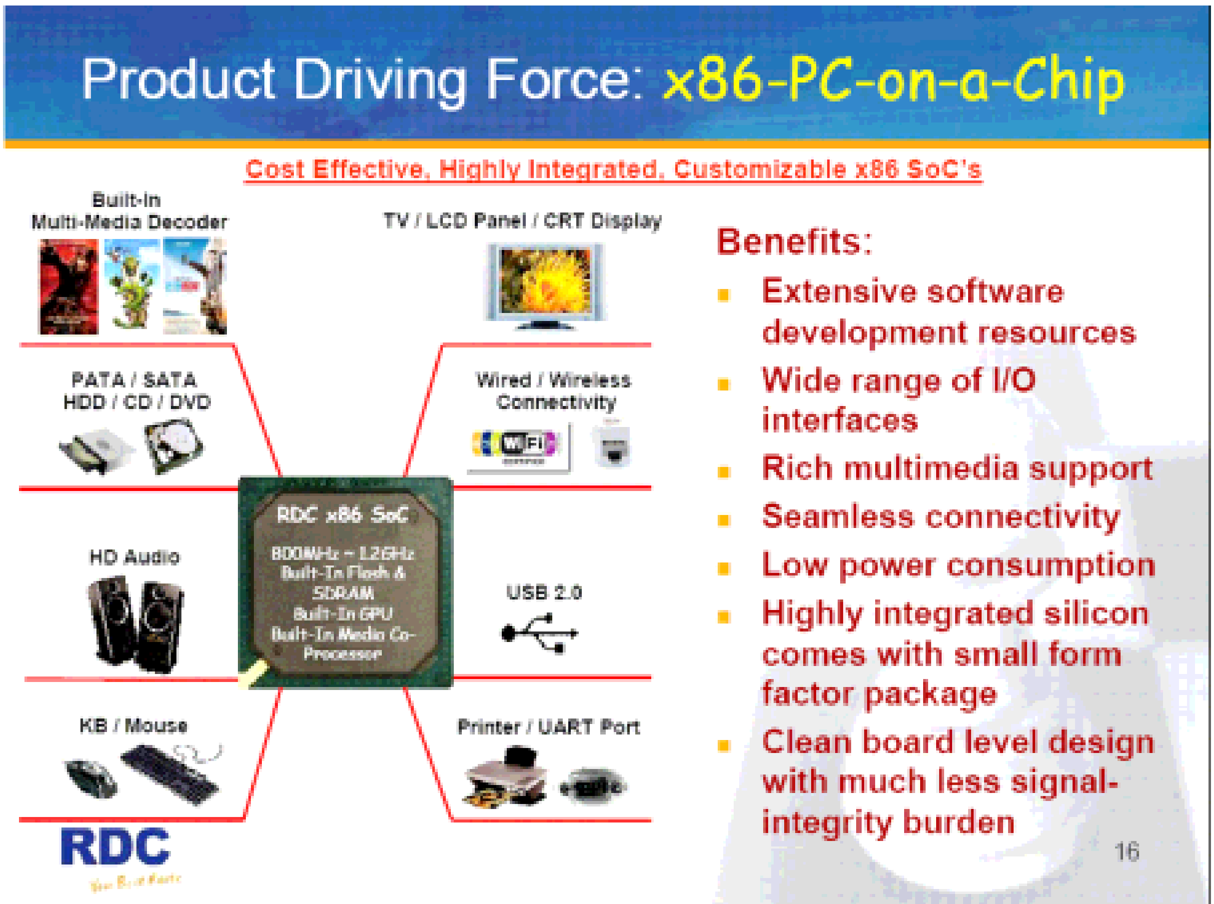
RDC 16/32-bit NPU Application Examples
AP Router
Access Point
Home NAS
Print/MFP Server
Gaming Adaptor
Internet Camera
Video Server
Wired Router
amit
CAMEO
CyberTAN
Cellvision SYSTEMS
D-Link Building Networks for People
EDIMAX
Gemtek
LINKSYS
NETGEAR
SERCOMM
15


Product Driving Force: x86-PC-on-a-Chip
Cost Effective, Highly Integrated, Customizable x86 SoC's
Built-in Multi-Media Decoder
TV / LCD Panel / CRT Display
PATA / SATA HDD / CD / DVD
Wired / Wireless Connectivity
HD Audio
USB 2.0
KB / Mouse
Printer / UART Port
RDC x86 SoC
800MHz ~ 1.2GHz
Built-In Flash & SDRAM
Built-In GPU
Built-In Media Co-Processor
RDC
Benefits:
Extensive software development resources
Wide range of I/O interfaces
Rich multimedia support
Seamless connectivity
Low power consumption
Highly integrated silicon comes with small form factor package
Clean board level design with much less signal-integrity burden
16


March into the Future –
Biz Opportunities Generated from
RDC's Open-x86 Platform
RDC
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x86 – More Than Just a PC CPU
e-Book
LCD TV & Projector
CD/DVD Copier
WiFi Router
Internet Camera
Print Server
Gaming Adaptor
Fingerprint ID
Vehicle Locator
Fiscal Printer
Embedded Controller
Home NAS
Video Server
Media Converter
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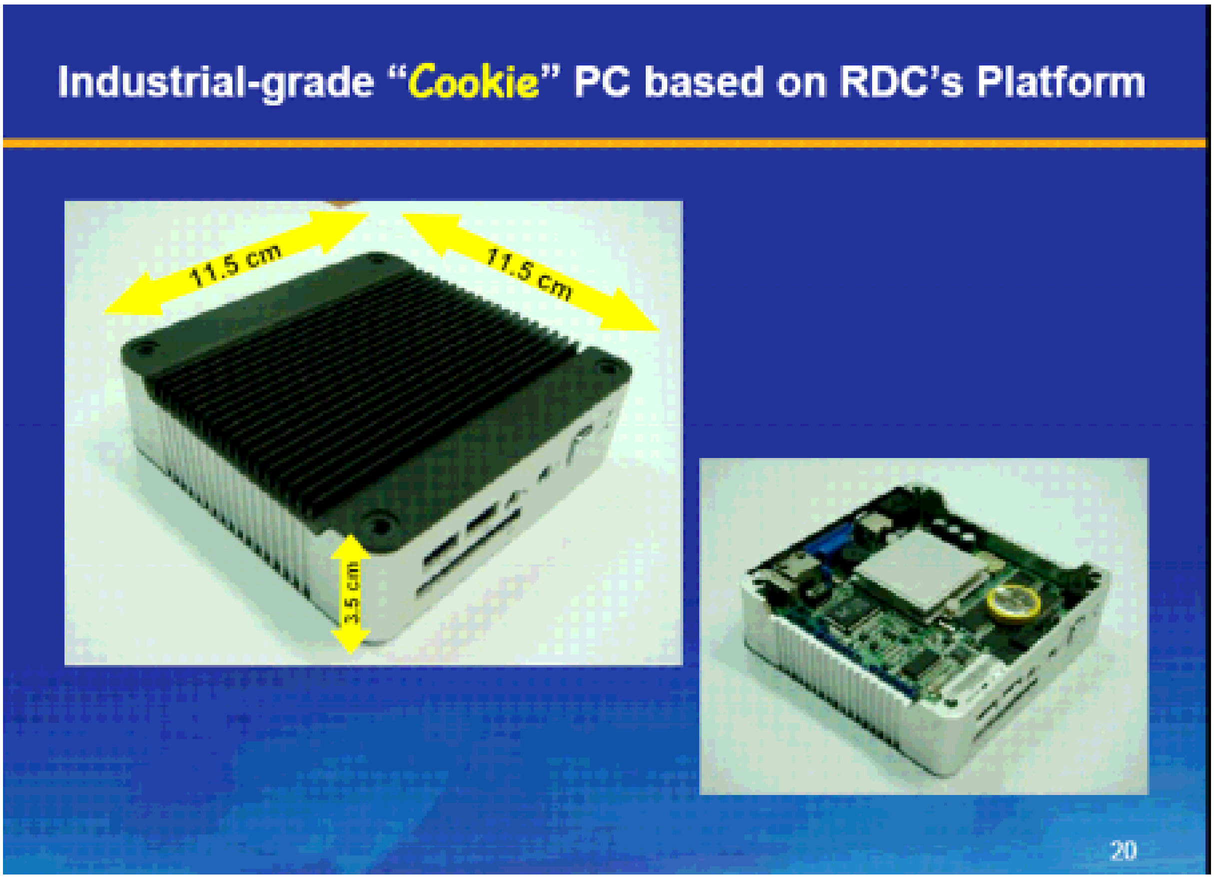
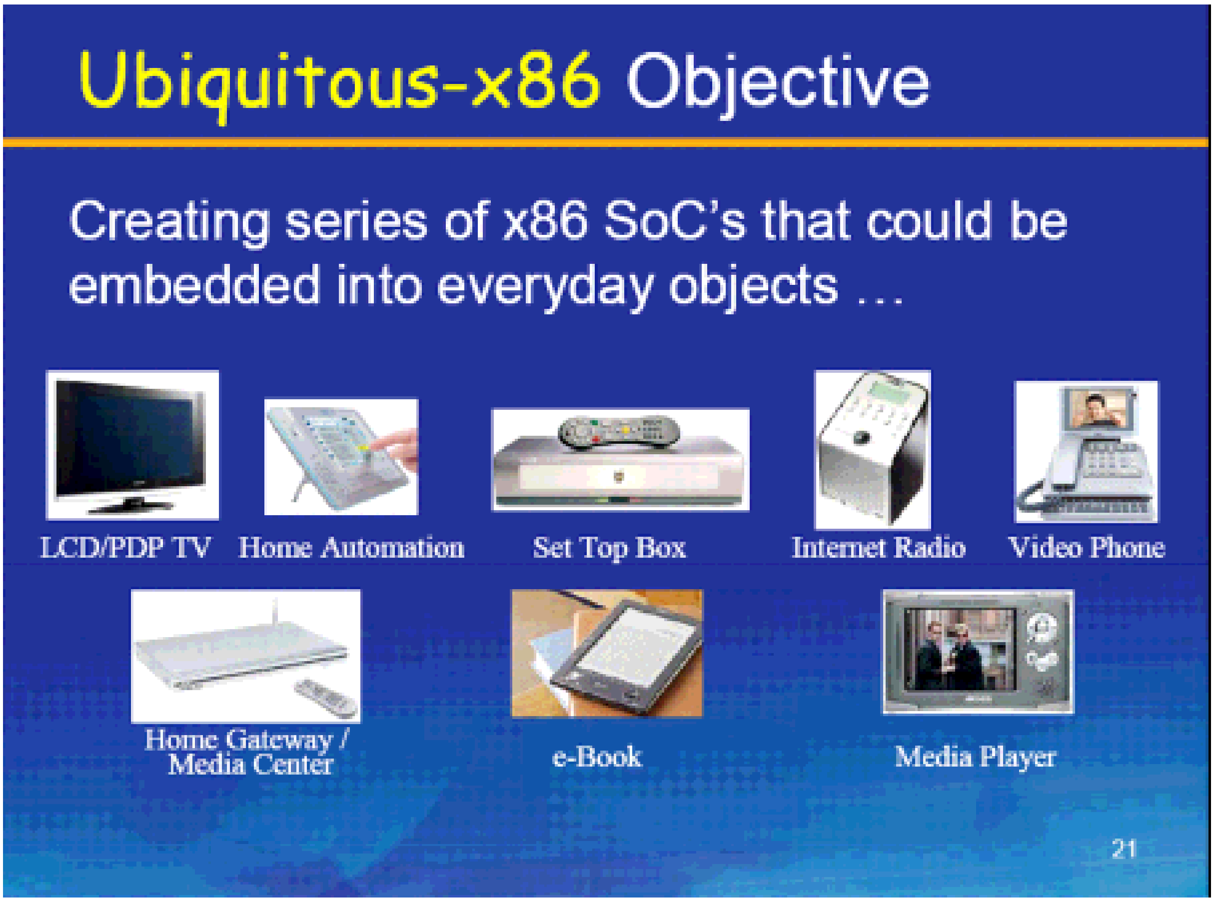
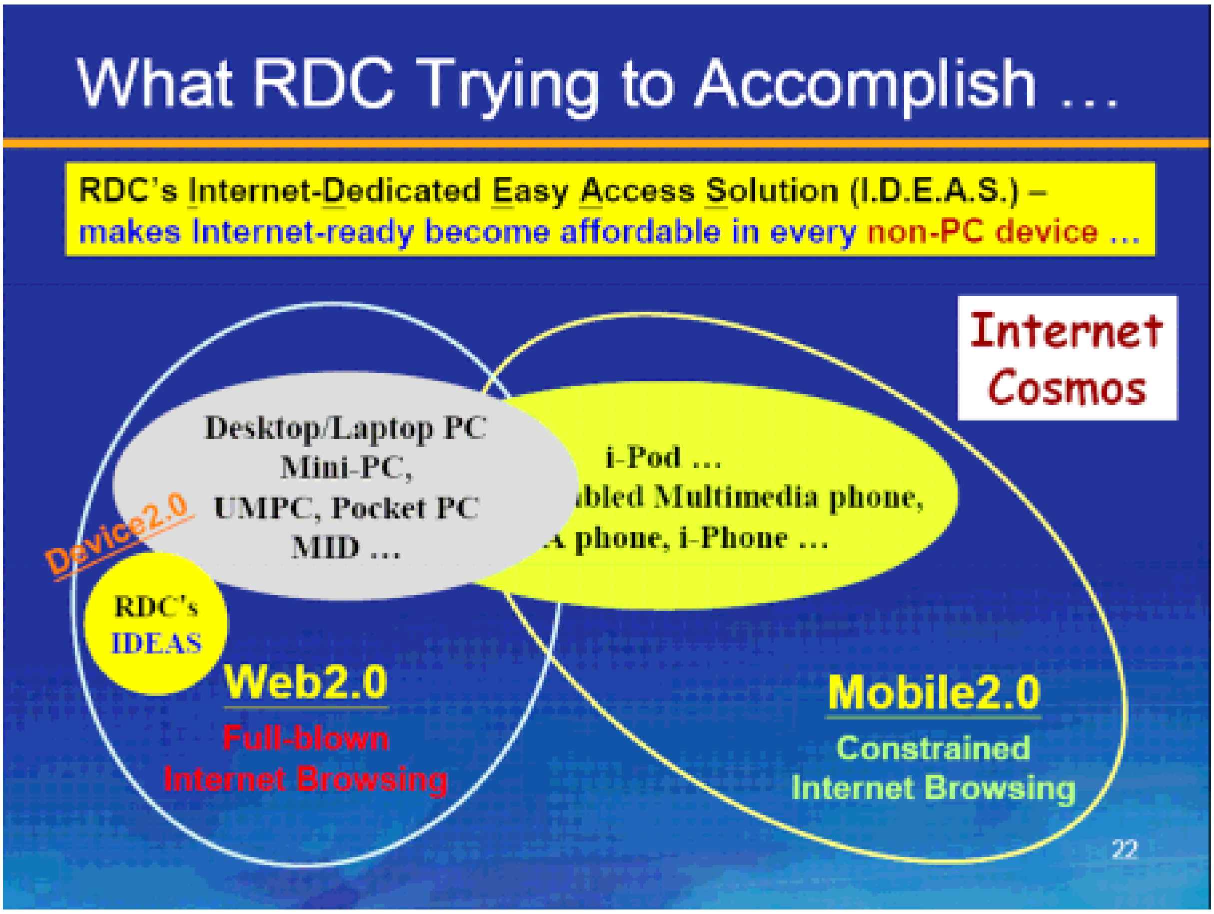
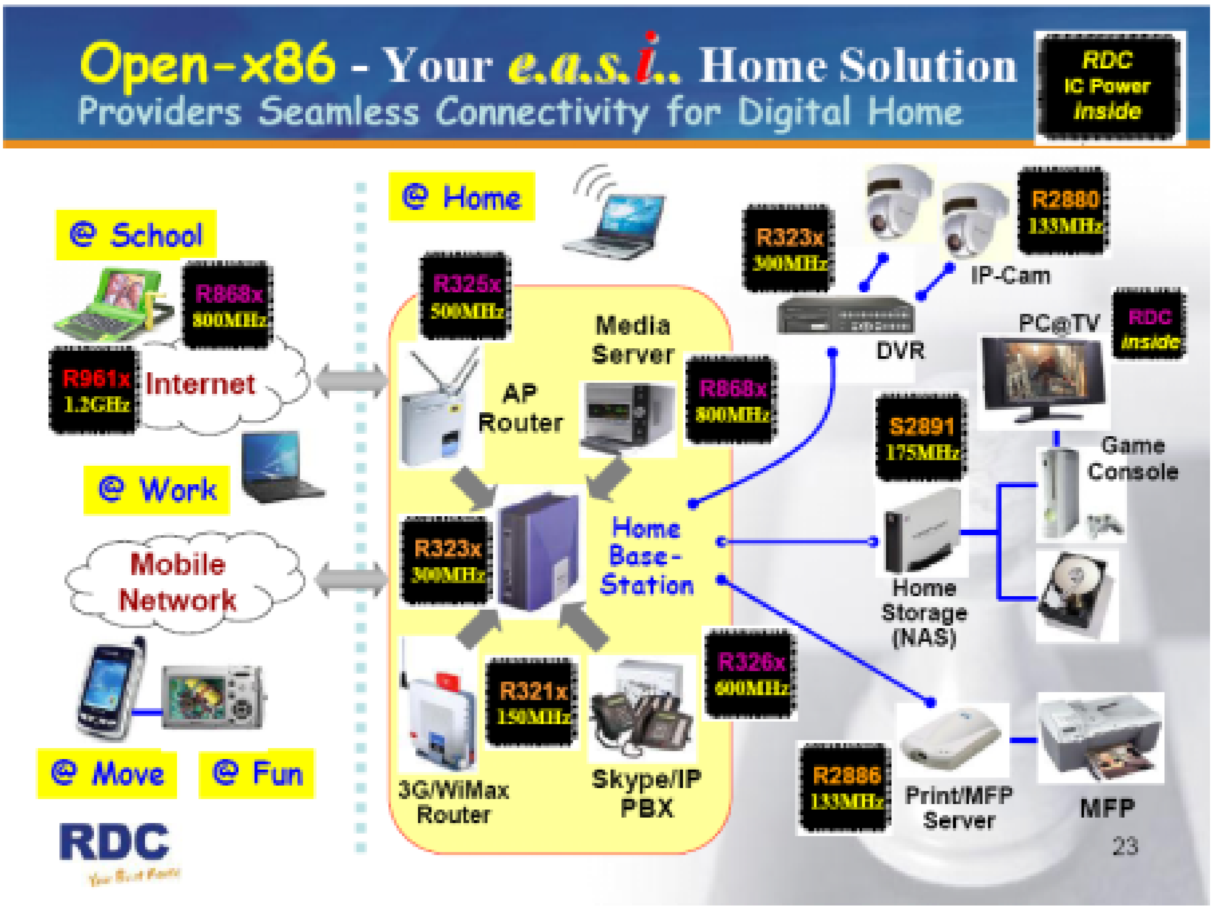
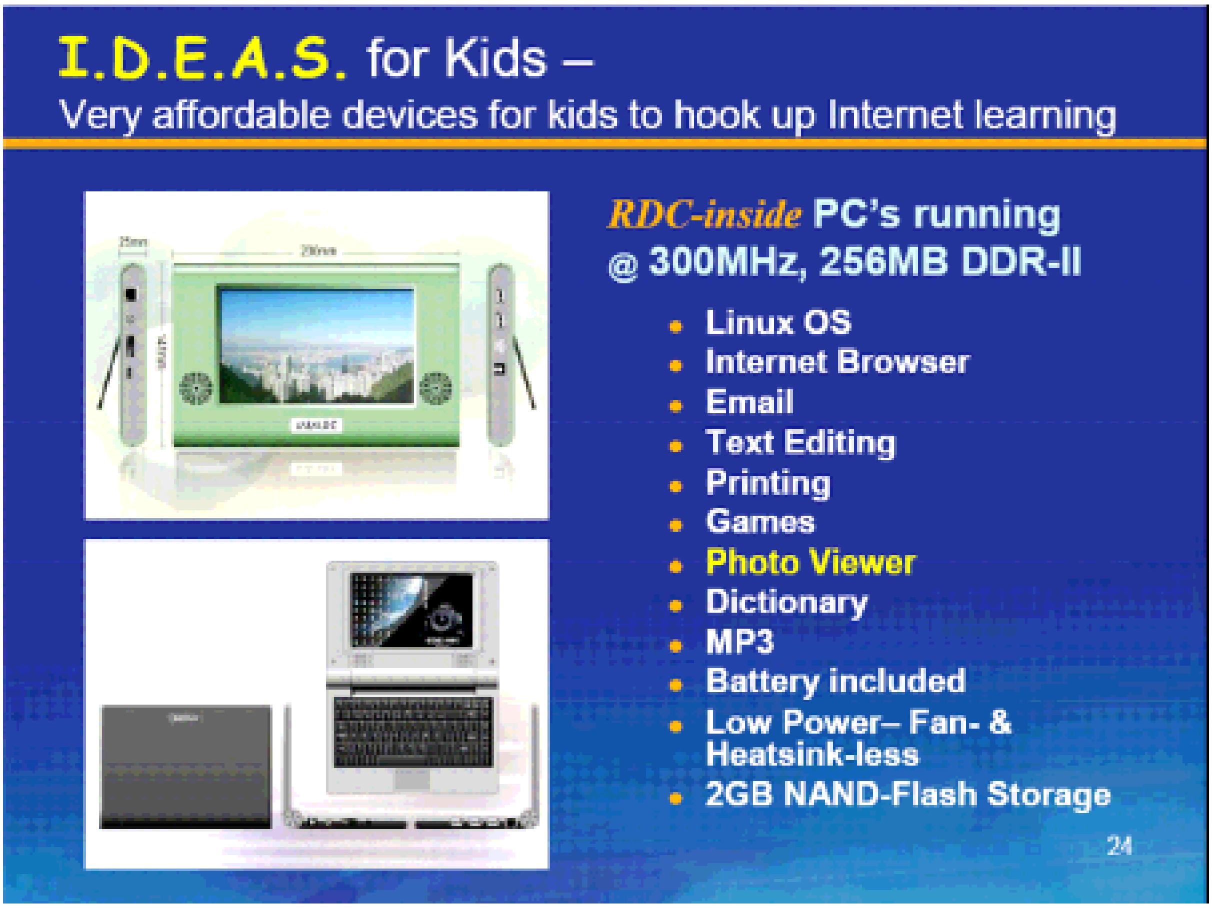
x86 for Infrastructure Booming –
Management of Goods, Money and Information Flows
RFID Kits
Fiscal Printer / PoS
Fingerprint ID
Thin Clients
Vehicle Locator
Kiosk
Electronic Sign Board
19


Industrial-grade "Cookie" PC based on RDC's Platform
11.5 cm
11.5 cm
3.5 cm
20


Ubiquitous-x86 Objective
Creating series of x86 SoC's that could be embedded into everyday objects …
LCD/PDP TV
Home Automation
Set Top Box
Internet Radio
Video Phone
Home Gateway / Media Center
e-Book
Media Player
21


What RDC Trying to Accomplish …
RDC's Internet-Dedicated Easy Access Solution (I.D.E.A.S.) –
makes Internet-ready become affordable in every non-PC device …
Internet Cosmos
Desktop/Laptop PC
Mini-PC,
UMPC, Pocket PC
MID …
i-Pod …
abled Multimedia phone,
phone, i-Phone …
Device2.0
RDC's
IDEAS
Web2.0
Full-blown
Internet Browsing
Mobile2.0
Constrained
Internet Browsing
22


Open-x86 - Your e.a.s.i.. Home Solution
Providers Seamless Connectivity for Digital Home
RDC IC Power Inside
@ School
R868x 800MHz
R961x 1.2GHz
Internet
@ Work
Mobile Network
@ Move
@ Fun
RDC
@ Home
R325x 500MHz
AP Router
Media Server
R868x 800MHz
R323x 300MHz
Home Base-Station
R321x 150MHz
R326x 600MHz
3G/WiMax Router
Skype/IP PBX
R323x 300MHz
DVR
R2880 133MHz
IP-Cam
PC@TV
RDC inside
S2891 175MHz
Game Console
Home Storage (NAS)
R2886 133MHz
Print/MFP Server
MFP
23


I.D.E.A.S. for Kids –
Very affordable devices for kids to hook up Internet learning
RDC-inside PC's running @ 300MHz, 256MB DDR-II
Linux OS
Internet Browser
Email
Text Editing
Printing
Games
Photo Viewer
Dictionary
MP3
Battery included
Low Power– Fan- & Heatsink-less
2GB NAND-Flash Storage
24

Value Added to Customers

RDC

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RDC Products' Competitive Edges

- Proprietary RISC CPU Architecture →
  Low Power / High Efficiency
- Support for RTOS, Linux, DOS, Windows →
  Flexible Platform & Plenty of Software Solutions
- Small Memory Footprint →
  Lower BOM Cost
- Complete Development Tools
- Optional Turnkey Solutions

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RDC's Advantages

- Excellent Financial Health
- Self-owned CPU Technologies
- Competitive Solutions
- Flexible Business Model
- High Quality Service
- Customizable SoC Service

Win-Win Solutions !

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RDC

Your Best Route

Think Big - *IBM*

Think Different - *Apple*

We Think Things Even Beyond - *RDC*