行政院國家科學委員會補助專題研究計畫成果報告
期末報告

開放式創新的服務脈絡(第 3 年)

計 畫 類 別 ：個別型計畫
計 畫 編 號 ：NSC 99-2410-H-004-013-MY3
執 行 期 間 ：101 年 08 月 01 日至 102 年 10 月 31 日
執 行 單 位 ：國立政治大學科技管理與智慧財產研究所

計 畫 主 持 人：蕭瑞麟

計畫參與人員：學士級-專任助理人員：林華玫
博士後研究：歐素華
博士後研究：廖啟旭

報 告 附 件 ：移地研究心得報告
出席國際會議研究心得報告及發表論文

處 理 方 式 ：
1.公開資訊：本計畫可公開查詢
2.「本研究」是否已有嚴重損及公共利益之發現：否
3.「本報告」是否建議提供政府單位施政參考：否

中 華 民 國 103 年 02 月 07 日

中文摘要：弱肉強食似乎是企業生存的真實處境。強勢者勝，弱勢者敗，自然被奉為競爭下的常態。不過，隨創（bricolage）文獻卻充滿希望地指出，如果弱勢者懂得槓桿身旁資源，仍有可能劣勢創新。本研究以隨創理論為基礎，探索弱勢者如何能重新建構資源以回應強勢者所施加的制約。本文跳脫過去以資源重組為核心的論述，詮釋資源的主觀與客觀建構過程，描繪施展隨創之新樣貌。本研究以研華科技為個案，分析該公司如何回應德國競爭者於中國工業電腦市場的優勢地位。本案例觀察弱勢者如何逆向運用強勢者的優勢，萃取其脆弱點，進而以此弱點建構手邊的資源，逐步改變劣勢地位。本研究發現一種交叉資源建構方式，敘述弱勢者如何能對準強勢者的「阿基里斯之腱」，重新建構自身相對簡約的資源。在學理上，本文提出「逆強式」的資源建構方式，找出強者必然的弱點，豐富隨創理論之多樣性。於實務上，研華科技化敵為友的作法，巧妙建構與經銷商以及客戶的共生關係，可以提供面臨劣勢的各類型企業一個以小勝大的借鏡。了解如何將強勢者的助力變成他的阻力，改變企業競爭之法則將不再是不可能。

中文關鍵詞：開放創新、隨創、資源建構、劣勢創新、制約、弱勢者

英文摘要：'The weak are the prey of the strong' seems to be the reality of business jungle. High-power actors win and low-power actors fail; this is considered as the norm of competition. However, the literature of bricolage hopefully point out that if low-power actors know how to leverage resources at hand, it is still possible to create innovative solutions at a disadvantage. This research employs bricolage as a theoretical basis, and explores how low-power actors could reconstruct resources to respond to constraints imposed by high-power actors. This article aims to go beyond the previous theses which emphasize resource combination, and attempt to interpret the subjective and objective process of resource construction, indicating a new pattern of bricolage. This study examines the case of Advantech's response to its German high-power competitor in the industrial computer market in Mainland China. This case study observes how the low-power actor reversed the high-power actor's advantage into fragileness while constructing resources to change its relative power

position. Our study identifies an interactive way of resource construction, and explains how to expose the high-power actor's Achilles' heel (weak spot) so as to enable the productive construction of relatively frugal resources. Theoretically, this article proposes a reversing-power model for resource construction, which recognizes the inevitable weakness of the hard and strong and enriches the diversity of bricolage theory. Practically, the Advantech case suggests lessons for converting foes into friends, proposes ways to creatively construct a symbiotic embrace between dealers and customers, and explain how the weak might overpower the strong. By turning a stepping-stone into a stumbling block, it might not be impossible to change the law of competition.

英文關鍵詞： Open innovation, bricolage, resource construction, innovation under disadvantage, constraints, low-power actors

□期中進度報告

行政院國家科學委員會補助專題研究計畫

■期末報告

開放式創新的服務脈絡

計畫類別：■個別型計畫　□整合型計畫

計畫編號：NSC 99－2410－H－004－013－MY3

執行期間：99 年 08 月 01 日至 102 年 10 月 31 日

執行機構及系所：國立政治大學科技管理與智慧財產研究所

計畫主持人：蕭瑞麟教授

計畫參與人員：歐素華博士、廖啟旭博士、林華玫

中　華　民　國　103 年 1 月 31 日

摘要

弱肉強食似乎是企業生存的真實處境。強勢者勝，弱勢者敗，自然被奉為競爭下的常態。不過，隨創（bricolage）文獻卻充滿希望地指出，如果弱勢者懂得槓桿身旁資源，仍有可能劣勢創新。本研究以隨創理論為基礎，探索弱勢者如何能重新建構資源以回應強勢者所施加的制約。本文跳脫過去以資源重組為核心的論述，詮釋資源的主觀與客觀建構過程，描繪施展隨創之新樣貌。本研究以研華科技為個案，分析該公司如何回應德國競爭者於中國工業電腦市場的優勢地位。本案例觀察弱勢者如何逆向運用強勢者的優勢，萃取其脆弱點，進而以此弱點建構手邊的資源，逐步改變劣勢地位。本研究發現一種交叉資源建構方式，敘述弱勢者如何能對準強勢者的「阿基里斯之腱」，重新建構自身相對簡約的資源。在學理上，本文提出「逆強式」的資源建構方式，找出強者必然的弱點，豐富隨創理論之多樣性。於實務上，研華科技化敵為友的作法，巧妙建構與經銷商以及客戶的共生關係，可以提供面臨劣勢的各類型企業一個以小勝大的借鏡。了解如何將強勢者的助力變成他的阻力，改變企業競爭之法則將不再是不可能。

關鍵字：開放創新、隨創、資源建構、劣勢創新、制約、弱勢者

Abstract

‘The weak are the prey of the strong’ seems to be the reality of business jungle. High-power actors win and low-power actors fail; this is considered as the norm of competition. However, the literature of bricolage hopefully point out that if low-power actors know how to leverage resources at hand, it is still possible to create innovative solutions at a disadvantage. This research employs bricolage as a theoretical basis, and explores how low-power actors could reconstruct resources to respond to constraints imposed by high-power actors. This article aims to go beyond the previous theses which emphasize resource combination, and attempt to interpret the subjective and objective process of resource construction, indicating a new pattern of bricolage. This study examines the case of Advantech’s response to its German high-power competitor in the industrial computer market in Mainland China. This case study observes how the low-power actor reversed the high-power actor’s advantage into fragileness while constructing resources to change its relative power position. Our study identifies an interactive way of resource construction, and explains how to expose the high-power actor’s Achilles’ heel (weak spot) so as to enable the productive construction of relatively frugal resources. Theoretically, this article proposes a reversing-power model for resource construction, which recognizes the inevitable weakness of the hard and strong and enriches the diversity of bricolage theory. Practically, the Advantech case suggests lessons for converting foes into friends, proposes ways to creatively construct a symbiotic embrace between dealers and customers, and explain how the weak might overpower the strong. By turning a stepping-stone into a stumbling block, it might not be impossible to change the law of competition.

Keywords: Open innovation, bricolage, resource construction, innovation under disadvantage, constraints, low-power actors

圖表目錄

報告目錄

壹、前言與研究目的

競爭是企業成長過程中的現實常態，而取得優勢則是競爭的法則。若要取得競爭優勢，企業理應苦心擷取、累積以及應用有形與無形的資源。當企業取得技術、資金與人才等有形與無形的資源，結合為自身的能力而難以被複製或竊取，便能取得持久性的優勢，成為市場上的強者(Wernerfelt, 1995)。相對地，那些規模小的企業，在技術貧乏、資金匱乏、人才缺乏的狀況下，必然是競局下的弱者，任憑強勢者的宰割。

不過，這樣悲觀的論點並未完全受到認同，至少有三類文獻對此觀點提出質疑。首先，創業文獻認為，只要能敏銳察覺時機，或透過跨界混搭，便有可能將稀少資源做最佳化應用，像是為一項實驗階段之科技找到多種應用方式，便可以於劣勢中創新(Ardichvili, Cardozo, & Ray, 2003; Shane, 2000; Vaghely & Julien, 2010)。其次，權勢文獻也點出，弱勢者運用策略性回應也可以局部解除強勢者所施加的制約，在絕處仍可找到逢生之機會(Bouquet & Birkinshaw, 2008; Casciaro & Piskorski, 2005; Pfeffer, 1992)。最後，隨創（bricolage）文獻（按：隨手拈來皆可創新之作法）則強調，弱勢者居於下風時可以巧妙地拼湊與組合資源，發揮「講究不如將就、將就勝於講究」的策略來化解阻力，甚至將阻力轉為助力，發展出令人意想不到創新(Baker & Nelson, 2005; Bechky & Okhuysen, 2011; Garud & Karnøe, 2003)。

這些文獻給弱勢者的希望是，以謀略迴避強勢者的鋒芒，因地制宜地重組自身的資源，仍然可以與強勢者周旋到底。這些文獻的共同處是，重組有限的資源進行創新，便可找出解除制約的方案。不過，這些文獻卻尚未有機會進一步分析，身處劣勢時，資源到底是如何「無中生有」，弱勢者又是如何結合某種策略來回應制約。這其中有三項研究目標。

第一，我們並不知道制約是如何被解除的。過去的文獻雖然分析各種策略回應的作法，但多著重在策略的描述，並未說明回應的過程(Bouquet & Birkinshaw, 2008; Oliver, 1991)。如此，我們很難了解方案如何形成，制約又是如何被解開。當弱勢者研擬出某種迴避性策略時，並不代表這項策略一定會成功解除制約。我們需要的是解讀過程之細節。此外，我們需要探索更多隨創的可能性，除了被動順從與積極抗爭外，是否有其他策略回應的可能性，是現階段探索的要點之一。

第二，過去文獻雖提出就地取材、將就著用、資源重組等隨創方式，不過這些作法多是來自創業家應付相對簡單的制約狀況，例如將廢置公車變成行動圖書館。當商業狀況變得愈加複雜，弱勢者如何能發展出更細膩的隨創方案呢？特別，當弱勢者手邊沒有足夠的資源來對抗強勢者時，應該如何無中生有呢？這牽涉到「資源建構」議題，也就

是，弱勢者不只要重組資源，而且必須將身旁看似劣勢的資源重新建構為優勢的可能，或由潛在合作夥伴取得資源，加以建構為對自身有利的資源。不過，為何弱勢或強勢的夥伴願意幫助弱勢者呢？這就需要分析弱勢者如何運用主觀與客觀的建構方式，一則以說服對方，一則以建構資源的新價值。這個「資源建構」議題相對複雜，需要更多研究的投注。

第三，過去，策略回應與資源建構的分析一直都是各自獨立。所以，即使弱勢者施展了某種策略回應，我們並無法知道某項策略是否真的動員了某些資源，而產生解決方案。同樣地，我們也不知道資源被組合或建構之後究竟是否支援了某種策略回應。會不會，將資源建構而加值後，強勢者其實無動於衷，劣勢也沒好轉，弱勢者只是空忙一場。因此，調查資源建構如何連結到策略回應，進而產生隨創，也是當前重要的研究議題。

這三個議題構成了本研究的核心探索：弱勢者如何運用資源建構手法，策略性地回應強勢者施予之制約？本文接下來會先疏理劣勢創新文獻的脈絡，再說明研究的設計與操作方式。呈現研究發現時，本文會著重於分析資源的主觀與客觀的建構歷程，藉以分析弱勢者的回應策略。最後，本文以資源建構之分析，歸納出「逆強論」的構想，以期貢獻於隨創理論以及劣勢創新文獻，並探索此論述對企業創新管理的啟示。

貳、文獻探討

劣勢通常會由三種制約狀況所組成：缺乏資源、強勢者威脅或環境的束縛。企業成長過程中都會遇到資源短缺的困境。創業初期，篳路藍縷，資金不時捉襟見肘，人才尋覓不易。當快速成長時，企業會面臨研發瓶頸，新產品難以即時上市，或者推出時機不對。等到稍微穩定時，企業又遭遇強勢對手，於市場上處處制肘，因而舉步維艱，難以開拓規模，又時時擔心被敵手吞噬。過去文獻似乎多著重於順勢中如何創新。殊不知，企業在現實狀況卻是必須於劣勢中創新，或為開發新產品資源不足而煩惱，或因拓展新市場受阻，或為提防強勢對手的攻擊，又或為脫離環境的制約。

劣勢中有三種主角：弱勢者（low-power actor）、強勢者（high-power actor）以及夥伴(Bouquet & Birkinshaw, 2008)。弱勢者與強勢者的差別在於規模的大小、資源的富貧、權勢的高低以及影響力的遠近。劣勢下，弱勢者通常是受制與強勢者，例如小銀行受制於大銀行，而大銀行受制於金融機構。不過，弱勢者不一定是「弱者」（weak）。弱勢是一種相對的概念，一家公司在國際上可能規模不大，資源相對不豐沛，但是這家公司在母國可能具領導地位。本研究所探索的主角並不是不堪一擊的弱者，而是資源相對上比強勢者貧乏的弱勢者。這些弱勢者通常都擁有某種核心能力，只是因位居劣勢，潛力一下發揮不出來。

居劣勢時，弱勢者可以找夥伴協助，夥伴也有強弱。弱勢者可以聯盟許多弱勢夥伴，以增加實力；弱勢者也可以與強勢夥伴合作，設法扭轉局勢。弱勢者與夥伴的互動，牽涉到資源交換問題。聯合許多弱勢夥伴是否能交換到合適的資源？強勢夥伴自己擁有穩定的成長，為什麼要分散資源去協助弱勢者呢？這些都是劣勢創新研究當今亟待探索的議題。目前文獻大約可分為三類論述，分別為：創業察機（entrepreneurial alertness）、權勢回應（power response）、隨創組合（bricolage via combination）。

在創業察機文獻中，創業家面對劣勢時必須敏銳察覺機會，才能找到增資來源、開發出熱銷產品、取得關鍵元件等資源。但這一系列文獻卻未提及資源取得後發生了什麼事。這些資源如何被有效運用？資源整合之後是否解決了制約？創業家如何籌措與運用有限的資源，是創業文獻尚未處理的議題(Brush, Greene, & Hart, 2001; Mahnke, Venzin, & Zahra, 2007; Phillips & Tracey, 2007)。

創業家可以借助先驗知識（prior knowledge），以跨領域應用找出資源全新的價值。例如，同樣一個三維電腦模具技術可以用於八種行業(Shane, 2000)；例如建築師可用在設計模型上，牙醫可以用於齒模上，而廚師則可以用在餐點的新造型上。這種多元實踐的方式稱之為「資源效能化」（effectuation），可以回應資源貧乏的困境。此外，創業家也可以組成各種聯盟以取得外部資源，像是資金、技術、研發專才、社會網絡等(Eisenhardt & Schoonhoven, 1996; Sarkar, Echambadi, & Harrison, 2001; Steensma, Marino, Weaver, & Dickson, 2000)。不過這些文獻依舊忽略，這些夥伴為何要與弱勢者合作，而不是與強勢者合作。取得資源後，在權力不對等的情勢下，又如何回應強勢者的制約。這些議題也依然尚未解決。況且，強勢者應該也不會坐視不管，讓新進者日益壯大才是。

權力回應文獻處理了這個議題，重點在策略回應（strategic response），分析當強勢者以優勢權力施予制約時，弱勢者會如何回應。例如，在跨國公司中，母公司之行政權大於區域子公司，可決定資源的分配以及支配子公司的存亡。由資源依存論（resource dependency theory）來看，資源的多寡決定了權力的高低，而資源取得與佈局方式則會影響弱勢者的行為(Casciaro & Piskorski, 2005; Pfeffer & Salancik, 1978; Sherer & Lee, 2002)。強勢者握有資源，又操有生殺大權。弱勢者要圖存，必須回應強勢者賦予的制約，而且要有策略地回應，以免慘遭滅頂之災。現有文獻便歸納了三種回應方式：臣服、抗爭、陽奉陰違(Bouquet & Birkinshaw, 2008)。

第一種策略回應是臣服。弱勢者順從市場領導者所制定的遊戲規則，或妥協遵循機構所訂定的標準，是常見的自保之道(Kostova & Zaheer, 1999)。例如，模仿市場領先者的新產品，或採納產業最佳實務，較容易取得正當性。或者，子公司主動向母公司提供在地情報或配合推動全球政策，展示積極性，以便順利增取預算，或在不景氣時不會首

當其衝被裁撤。臣服雖然可以增取創新時間，但略嫌被動。

第二種策略回應是抗爭，對強勢者奮予回擊，是弱勢者另一種突圍之道。子公司可能違背母公司命令，採行「將在外，君命有所不授」的策略，等贏得勝利後再取得母公司認同。例如，Datakom的瑞士子公司決定另闢商業模式，不販售母公司的電腦產品，反而轉向銷售對手的產品，並將維修合約委託給競爭者(Birkinshaw, 2003)。這項舉動背離總部政策，卻成功地改變子公司於在地供應鏈的定位，由硬體銷售轉型為加值服務。這場抗爭行動獲得總部注意，也為子公司爭取到更多資源。不過，雖然抗爭可取得主動權，但也可能激怒強勢者，對弱勢者採取報復行動，在未來埋下縮編、整併或裁員的後果。

如果不想直接衝突，弱勢者也可以採取第三種策略：以權謀影響強勢者。這是一種迂迴轉進方式(Dorrenbacher & Geppert, 2006)。例如，聯合利華的巴西子公司就刻意地輸出 83 名巴西籍主管進入總部。這個作法目的在安排內應，縮短與母公司間的資訊落差，穩定強勢者的權力關係(Bouquet & Birkinshaw, 2008)。另外，弱勢者也可以結盟弱勢夥伴，以集體力量向強勢總部爭取有利條件(Pfeffer & Fong, 2005)。不過，強勢者若發現這些權謀，可能會對弱勢者產生不信任而加以防範，如此未必能長治久安。東窗事發時應如何回應？這點文獻也尚未著墨。

除了權勢文獻，機構理論也提到建立合法性的策略，在不得罪強勢機構的狀態下先取得小規模的成功，再慢慢擴大影響力(Kostova & Zaheer, 1999)。機構理論也歸納出五種弱勢者的回應策略，包括默從、妥協、反抗、操控與規避(Oliver, 1991)。但是這些論述與以上三種回應策略大同小異，於此便不墜贅述。值得注意的是，機構理論提出另一種權謀權謀作法，以「柔韌設計」（robust design）回應，這種方式也是不正面衝突，以迂迴方式解除制約，例如愛迪生便運用瞞天過海的計謀，躲過對手（瓦斯燈產業）的制約，將電線埋設於瓦斯管中，以避開市政府法規限制(Hargadon & Douglas, 2001)。

這些策略回應有兩項共同特徵。第一，以各種回應方式影響強勢者，不論是希望強勢者轉移注意力，或是讓強勢者體會弱勢者的勇氣，施展策略回應之目的通常是為了換取時間，讓創新能稍有喘息的空間。第二，運用不同的資源佈局去轉變不利態勢。為扭轉局勢，弱勢者可以表示臣服，換取強勢者的資源；或聯盟夥伴資源以抗衡強勢者；或以權謀取得談判籌碼。但是，這類文獻依然沒有探討資源應用的過程以及所產生的結果。倒底，在強勢者的控制下，弱勢者如何整合資源以回應制約，權勢回應文獻並未交代清楚。

隨創組合文獻填補了這項理論缺口。「隨創」（bricolage）一字源於法文，由人類學家李維史陀（Claude Levi-Strauss）在《野蠻心靈》（The Savage Mind）一書中提出

(Levi-Strauss, 1968)。他研究工匠如何發揮即興創意，在手邊沒有豐沛的資源，也沒有嚴謹的規劃狀況下，拼湊出令人驚喜的作品。他稱這種類似野地求生的隨意拼湊能力為「隨創」,像是將廢棄的鐘擺櫃子與零散的桌椅拼湊成古董風格的書櫃。理失求諸「野」,管理學者將隨創的觀念系統化為三個原則：就地取材（resource at hand）、將就著用（making-do）、資源重組（resource recombination）。

這三種方式可以讓資源無中生有，使劣勢轉化為優勢(Baker & Nelson, 2005)。就地取材是巧用手邊可取得資源。一般人認為沒用的資源，在隨創者眼中卻富含創作元素。例如，原住民運用漂流木、漁網、螺貝、珊瑚礁石等素材，做成藝術品。將就著用（making do）是不奢求最完美的解決方案。例如，將火車廢棄車廂改造成餐廳、將報廢的公車變成行動圖書館、將廢棄的建築物變成時尚的藝術村等，都是「將就」使用有限資源的作法，卻達成相對講究的結果。一項類似研究發現，美國科學家精於嚴謹的實驗過程，卻一直研發不出風力發電機(Garud & Karnøe, 2003)。丹麥工程師從農民耕種用的簡陋水踏車中，卻找出風力發電的原理，比美國團隊更早推出產品。「講究」不如「將就」地運用資源，是隨創者由實作中創新的務實智慧。

資源組合是重新拼湊資源，找出新的應用方式，這類似之前提到的資源跨領域應用。例如，將蒸汽閥的原理用到球鞋的話，就變成氣墊鞋。資源組合不限於物件，也可能是工作或角色的組合(Bechky & Okhuysen, 2011)。例如，由工作組合來看，特警隊按例規要破門而入去逮捕犯人時，突然發現屋中有人質，因此改變突襲方式，不破壞建築物，又可以救出人質。由角色組合來看，電影公司於外景現場開鏡時，攝影師突然病倒無法到場，導演為了應變，就找略懂攝影的燈光師代班。燈光師的角色變成攝影師時，加入更多柔美光線，使鏡頭更加唯美，是另一種隨創效果。

資源、工作、角色也可以交叉重組，例如印度眼科醫療設備不足，要訓練合格醫師不易（雖然醫師很多），動青光眼手術費用又高，一般平民付不起。一位醫生靈機一動，將手術過程變成流水線生產模式（工作重組），如此醫生不需要學會全部手術知識，只要專精某一步驟即可（角色重組）。因為印度醫師多，所以分工精細後反而促成專業化，增加手術效率（資源重組）。如此，手術費大幅下降，嘉惠低收入病患(Kumar & Puranam, 2012)。

除此三個原則外，當沒有資源時，還可以運用「無中生有」原則，將看似不利的資源轉為有利。舉例來說，一位農夫買了一塊土地，是廢棄煤礦場，其中瀰漫有毒沼氣。農夫找來一座二手柴油發電機，燃燒沼氣來生產電力，將多餘電力出售，並用離峰電力供給溫室，耕種有機番茄。有機植栽排水中有豐富養分，又用來養殖高經濟價值的吳郭魚(Baker & Nelson, 2005)。資源建構比起資源重組更具前瞻性，不只是重新排列資源，

更重新詮釋資源價值。但是，資源建構議題於目前文獻也著墨有限。

由隨創來分析劣勢創新有何不足之處？隨創理論補創業與權勢文獻之缺口，點出貧乏資源的豐富拼湊方式，但卻沒有處理「回應」制約的議題。綜觀之，現階段有兩大理論缺口需待深入探索。

第一，我們需要探索更為複雜的資源建構方式。過去文獻著重的是創業家因漏就簡的組合巧思，卻較少觀察更為複雜的商戰環境中，弱勢者會如何建構資源，以進行「無米之炊」。資源建構牽涉到不只是組合手邊資源，更要轉換資源「看似無用」的價值。不過，資源有侷限性，像是技術未成熟前，即使加倍研發人員也於事無補，因此難以建構之。資源也有主觀性，對弱勢者有價值的資源，不一定對合作夥伴有價值，如果雙方雙方期望有落差，那麼資源建構的努力就白費了。所以，我們除了要考量實體資源的客觀建構外（像是將沼氣變成電力），也不能忽視主觀價值的社會建構（social construction）過程。

社會建構的作法強調議題重塑，配合對方內心狀態去溝通，傳達一種新的價值衡量方式，藉以改變對方對資源價值的認知(Schön & Rein, 1994)。以理論來說，就是改變人對一項「真實」（reality）的理解(Berger & Luckmann, 1966)。通常這種社會性建構方式不會更改資源的客觀價值，而是以語言、修辭來改變人對資源感覺的價值。例如，一項液晶顯示技術，由舌燦蓮花的創業家來解讀，就成了改變人類未來閱讀行為的重大革命。一件行政議題，由巧言的經理人來傳達給高階主管，可能便成公司有史以來最大的危機，藉此增取資源(Dutton, Ashford, O'Neill, & Lawrence, 2001)。一項簡單的校園募款，透過社會建構方式則可以激起師生的使命感，動員各類社會資源投入(Dutton, Roberts, & Bednar, 2010)。

社會建構必須熟知對方的文化脈絡，方能影響對方的意會，打動對方的心，所以學者也稱善用此技巧的人為「文化創業家」(Lounsbury & Glynn, 2001)。這種主觀式建構作法強調的是以說服、溝通、詞令來影響對方的心智框架，改變對方對某項資源的價值(Martens, Jennings, & Jennings, 2007; Van de Ven, Sapienza, & Villanueva, 2007)。簡言之，主觀價值就是一種感受，以修辭進行文化價值重建，便可能重塑一項事件對接受者的價值(Hirsch, 1986)。只可惜，目前文獻仍未進一步探討如何善用社會建構方式來變更資源被認知的價值。弱勢者要如何建構出對合作夥伴有價值的資源？客觀與主觀的資源建構方式如何於隨創中進行？建構資源後，弱勢者又如何讓資源產生創新成效？據此，資源建構是第一項亟需填補的理論缺口。

第二，過去文獻著墨於資源組合與策略回應，卻也因此忽視了兩者之間的關係，以及兩者結合時要如何對付「強勢者」。弱勢者不可能只專致於資源建構而無需顧及強勢

者所施予的制約。同樣地，弱勢者也不可能只發想策略回應，而無需去考量資源建構。畢竟，所有的回應行動都或多或少需要輔以資源。質此，我們不僅要了解弱勢者如何研擬策略回應，更要分析他們如何建構資源來回應制約。我們需要知道強勢者的脈絡；像是，強勢者習慣用什麼攻勢；強在哪裡，又弱在哪裡。這樣的切入角度也許可以協助我們發現新樣貌的策略回應以及資源建構方式。以現今文獻而言，臣服流於偏安；抗爭易成暴虎憑河；權謀又難以不東窗事發。除此以外，難到弱勢者沒有其他回應奇謀以及另類的資源建構方式嗎？了解強勢者的脈絡去找弱點，或許是一項可能的探索方向。以下說明本研究具體的實施方式。

參、研究方法

本研究調查重點是：劣勢下創新者如何改變資源，以回應制約，有兩項調查主軸。第一，為了解策略回應以及隨創作法，我們分析弱勢者於制約條件的工作實務。這樣的分析不只需要調查弱勢者回應時所做的各類型活動，更要以微觀的角度分析弱勢者如何調度資源，像是資金、經銷商、維修人員、技術支援、採購服務等。這些都是有關實體資源的運用實務，而運作這些實務也都會受到某種結構性的制約，例如想要建立經銷商體系，可是經銷商卻都隸屬強勢者旗下。

因此，分析劣勢創新時，我們必須分析弱勢者的兩類實務。其一，弱勢者如何回應強勢競爭者，這也是制約來源之一。其二，弱勢者與潛在合作夥伴如何互動，與弱勢夥伴合作會面臨利益衝突；可是與強勢夥伴合作又會遭遇意願問題，此乃另一制約來源。分析制約脈絡下的實務內涵與過程，是本研究的首要核心任務，也因此質性研究是比較適合的方法論。

第二，本文另一個研究重點是分析資源的「社會性建構」。這是一種主觀的建構方式，端視社會成員心智認知而決定對真實的定義。例如，一個魚缸的客觀價格只有 500 元，但被賦予「風水改運」的主觀詮釋後，對商人的價值可能就變成數萬元。一項資源的價值並非一成不變，對不同的人具有不同意義。不同合作夥伴對某一種資源所投射的價值不完全相同。能投其所好，善用主觀詮釋者，就有機會轉換資源的價值。以社會性建構的視角來分析資源，則是需要摻入詮釋性質性研究的分析手法。前者以實務為主的分析著重的是社會結構所帶來的制約，後者則是強調成員基於某種社會背景而產生的價值觀解讀與文化性意會。

本研究乃由劣勢創新文獻以及隨創理論的基礎上發展理論，並非建構全新的理論，故不適合採用紮根理論的研究方法。這是一種理論驅動式（theory-driven）的研究方法。據此，以下說明研究整體之設計，含理論抽樣原則、分析架構、資料收集以及資料分析

方式。

一、案例選擇與設計

本案例有四位主角。前兩位主角分別為研華科技（弱勢者）、德國控創（強勢者）；後兩位主角則為經銷商（弱勢夥伴）以及客戶華東所（強勢夥伴）。第一位主角是研華科技，在台灣該公司是在地公司國際化品牌前二十名，也是工業電腦的領導廠商。當時，研華進入中國經營工業電腦模組板市場才三年，遇上已經營十年的德國強勁對手。這合乎我們第一項取樣原則：相對於德國強勢者，研華是弱勢者，但不是弱者。其次，研華於重重限制下，成功地與弱勢夥伴（經銷商）以及強勢夥伴（大陸國營企業）建立合作關係。這合乎我們第二項取樣原則：該公司於制約況下仍能聯盟夥伴，並切入市場，展現某種以匱乏資源回應強勢者的策略。這兩個取樣原則符合劣勢創新文獻之要求，以符合隨創理論（匱乏中組合資源）的特質。

創立於 1983 年，研華科技看到工業電腦的利基，導入介面設計讓工業電腦更容易操作。當時，工業電腦一台要價一萬美元以上，只有軍方和研究機構能負擔得起。市場規模小，技術規格高，因此競爭者不多。研華很快成為工業電腦領導廠商。之後，研華將電腦應用到工業自動控制，監控精密儀器以及生產機器設備。近幾年來，隨著通訊、網路、軟體及光電技術整合，工業電腦也延伸到各層面，包含售票機、刷卡機，收銀機、提款機、資訊站（Kiosk）、自動販賣機、樂透彩券系統、全球衛星定位系統（GPS: Global Positioning Systems）以及智慧型大樓監控系統等應用。研華逐漸發展為全球供應商，分為六個產品事業群，涵蓋嵌入式電腦事業群、工業自動化事業群、應用運算與嵌入式系統、通訊與網路、醫療運算、數位看板與智能服務。

工業電腦必需適應特殊工作環境，例如軍事器材要能防震、防水、防電磁干擾。除需達到準確度要求，還要承受高低溫差與濕度變化，產品穩定性是首要考量。工業電腦需依據客戶需求量身訂做，產品少量而多樣，但相對的報酬也高。工業電腦廠商的平均毛利率可高達 30%~40%（個人電腦廠商只有 3%~4%）。創立至今，研華持續維持獲利記錄，股權權益報酬率（ROE：Return on Equity）維持在 15%。研華每年投入約 5%年度營收在研發投資上，每年創造 30 種以上新產品以及 100 多項專利，公司產品線多達 400 多種。研華全球員工數高達 5390 人，台灣員工人數佔三分之一，約 1807 名，研發人員約佔總員工之 20%。全球支援佈點多達 21 個國家、71 個主要城市。

第二位主角是控創亞洲（Kontron Asia）。控創是工業電腦模板（Computers-on-Modules，又簡寫為 COM，以下簡稱電腦模板）全球規格的制定者。研華是技術跟隨者，位居第四，需配合控創制定的技術標準。控創較早進入中國市場，取

得先行優勢，電腦模板產品年營業額達 1100 萬美元以上，指標性客戶多由控創經營。研華較晚進入中國市場年營業額約 400 萬美元。控創研發的電腦模板商品訂價在 400~800 美元之間；研華訂價則是在 250~400 美元間。

控創透過併購擴大公司規模。在 1998 到 2002 年，控創併購了三家企業來增強產品線的不足。在 2001 年，控創併購美國最大的工業電腦通路商 IPC Advance，改名稱為控創美國（Kontron American）。在亞洲，控創併購了世普（Ispro），成為其亞太區分公司，改名為控創亞洲（Kontron Asia），發展亞太區業務，含括韓國、日本、中國大陸、台灣、東南亞、澳洲、印度以及中東地區。Jumptec 在 1998 年開發 ETX 標準，也就是名為「嵌入式技術延伸標準」（ETX, Embedded Technology Extended），也就是 COM 技術標準。2002 年，控創收購 Jumptec。為擴大電腦模板市場，控創開放 ETX 規格，與工業電腦競爭者共同組成電腦模板技術聯盟，共十一家廠商加入。研華公司在第一階段加入聯盟，參與開拓電腦模板市場。

第三與第四位主角分別是經銷商（弱勢夥伴）以及上海華東所（強勢夥伴）。由於本案例中經銷商多達三十多家，以及客戶數百位，所以研究團隊選定其中最具代表性的客戶上海華東所做為強勢夥伴的分析重點，再延伸相關上海地區的經銷商做為弱勢夥伴的分析重點。由於研究團隊無法親洽大陸採訪，因此僅能運用間接採訪資料。例如，研究團隊採訪駐地工程師、中國區業務同仁以及負責的高階主管，由他們口中了解當時經銷商的回應及客戶端活動的證據。雖然這不一定是最完美的安排，但卻可以協助本研究在時間與空間的侷限下完成田野調查工作。

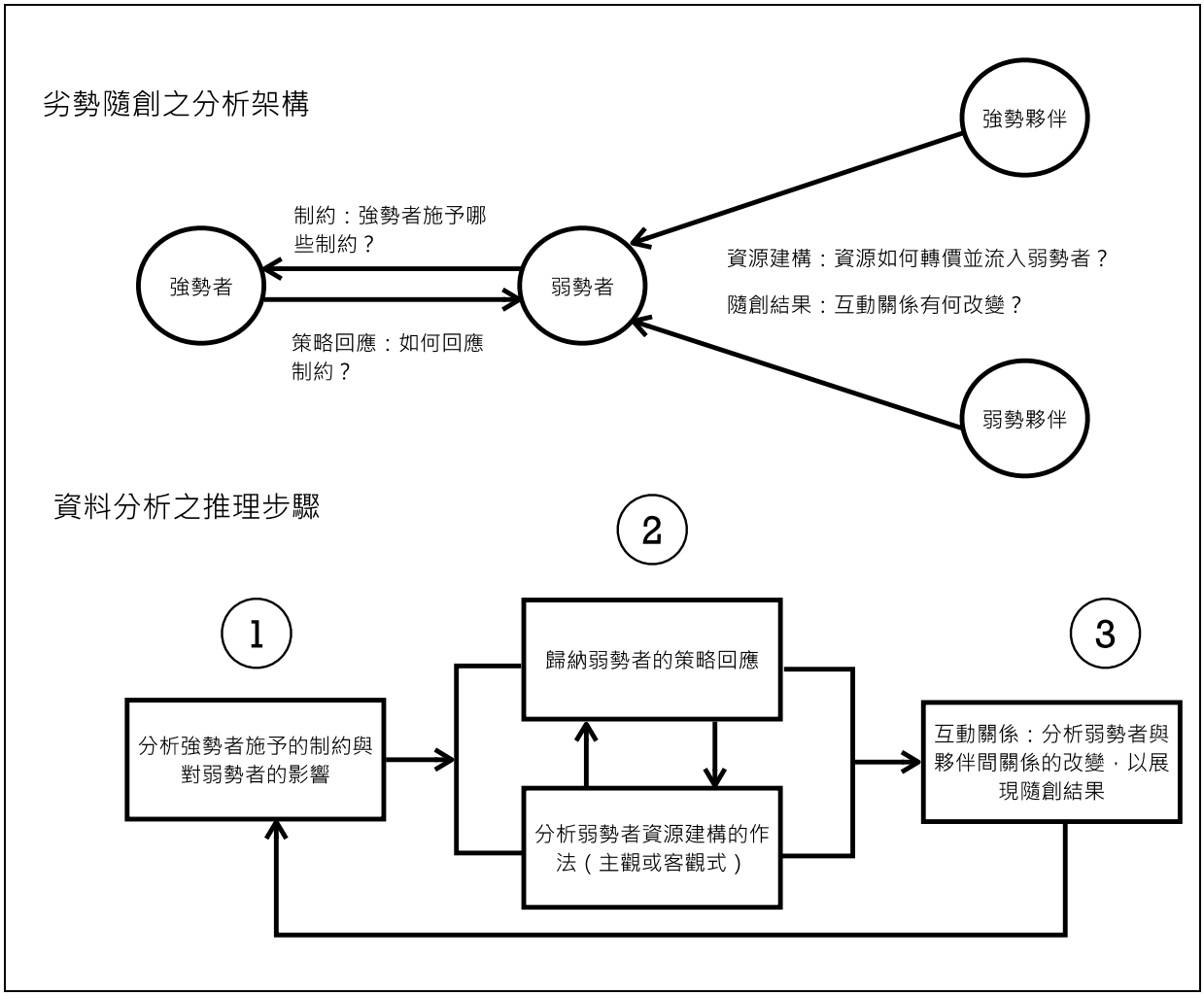
本研究分析的重點是研華（弱勢者）如何取得經銷商（弱勢夥伴）與客戶支持（強勢夥伴），由對手轉化為合作夥伴的過程。這其中牽涉到幾個議題：弱勢夥伴為何能冒著得罪強勢者的風險，與弱勢者聯盟？強勢夥伴擁有豐沛的資源，為何需要與弱勢者合作？不論是「弱弱聯盟」或是「弱強聯盟」，都只是完美的理論，現實上要實踐是窒礙難行的。因此，分析研華如何克服這兩項不易達成的聯盟關係，將有助於理解制約下隨創的展現方式。

二、分析架構與資料蒐集

依據之前文獻的討論，本文的分析架構有兩個主要構念：策略回應以及資源建構（建圖 1）。第一，本研究中，弱勢者與強勢者是處於競爭狀態。強勢者所施予的是制約，弱勢者必須回應某種策略以解除制約，而這樣的策略回應中雖然通常不一定會成功，但是也可能被弱勢者摸索出劣勢創新的辦法。因此，觀察弱勢者與強勢者之間的互動，可以統整出具研究價值的策略回應。

第二，弱勢者回應時，必須有資源才能劣勢中創新，所以資源取得是重點。由於弱勢者本身資源是相對匱乏的，所以弱勢者如何建構資源而「無中生有」成為重要觀察點。弱勢者有兩類重要夥伴，一為弱勢夥伴，另一為強勢夥伴。當弱勢者與這兩類夥伴合作時，必然有會遭遇困難，而且通常夥伴是不會因憐憫而協助弱勢者。弱勢者如何運用某種主觀或客觀建構方式來取得或形塑資源，是另一個分析重點。

圖 1：本研究之分析架構



根據此設計，本研究的分析重點是偵察弱勢者（研華）如何回應強勢者（控創），並且聯盟弱勢夥伴（中國在地經銷商）以及協同強勢夥伴（控創的客戶）。本研究蒐集資料時會提出六類問題。第一，弱勢者所遭遇來自強勢者的制約為何？第二，弱勢者缺乏哪些資源？這些資源在誰手上？第三，弱勢者如何與這些對象合作？弱勢者運用哪些主觀的方式建構資源？這裡指的是資源客觀價值不變，但弱勢者改變了對方對資源的認知價值。弱勢者運用哪些客觀的方式建構資源？

這裡指的是資源客觀價值被改變，像是「維修員」變成「駐地工程師」，後者的實

際價值高於前者。唯需注意，主觀與客觀的建構方式不一定是涇渭分明，弱勢者可能會交叉運用（文獻中已說明，此不再複述）。第四，弱勢者所取得的資源，在建構前與建構後有哪些改變？第五，資源建構之後，弱勢者提出了哪些創新以回應制約？第六，資源建構過程中，弱勢者與互動者之間的關係是否產生什麼變化？這其中包含弱勢夥伴與強勢夥伴兩位互動者。

本研究調查工作主要分為兩個時期（參見表 1）。第一時期是歷史回顧和產業背景資料蒐集時期，本階段開始於 2012 年 12 月到 2013 年 5 月。資料蒐集重點為熟悉工業電腦產業與市場、了解研華的組織架構和產品特質等。由於工業電腦牽涉許多專業術語，這段時間研究團隊採訪各部門以了解內部運作方式與研華擁有的資源，並前後派遣研究助理進駐研華收集資料，以加速研究進度。

表 1：本研究實地訪查安排一覽（2012 年 12 月～2014 年 1 月）

蒐集方式	類別	職稱	人數	次數	時數
正式訪談	弱勢者	研華公司：嵌入式運算部門主管、研發人員、駐地工程師。研華總部財務夥伴以及採購人員。	13	24	48
	強勢者	控創公司:曾任職控創公司主管、員工(含間接採訪)	6	4	8
	弱勢夥伴	大陸經銷商（透過採訪三位駐地工程師、負責協理、事業部副總經理）	5	12	26
	強勢夥伴	大陸國營企業主管(透過採訪三位駐地工程師、負責協理、事業部副總經理)	7	11	20
活動參與	工業電腦參展活動、內部創新研討會、演講活動、高階經理人課程			4	15
資料檢核	舉辦內部主管研討會（董事長主持），呈現階段性發現並聽取反饋。				6
時數總計					123

第二時期開始於 2013 年 5 月到 2014 年 1 月，著重在研華與控創的競爭過程。資料收集著重控創的技術優勢、產品特色、大陸經營策略等。首先，研究團隊採訪曾任職控創主管與員工，了解德方在大陸的佈局，包括產品規格制定、維修服務、採購活動、系統升級的作法。技術資料部分主要取材自控創原文之白皮書。接著，我們了解研華的產品技術和控創的差距，了解研華與大陸經銷商的往來，以及對指標性客戶的服務。我們關注研華如何與夥伴交換資源，分析資源前後差異與資源如何佈局。由於我們無法親自前往大陸調查，所以必須藉由採訪事業部主管了解大陸特殊的經銷體系與民間交易機制、國營企業的採購實務等。我們於研華舉辦一次主管研討會，每次約 30 位個事業部主管參與，協助我們檢驗案例資料的準確度。

本研究在資料收集上亦仍有一些不足之處。首先，我們可以增強資料的豐富性。本研究雖訪談研華主管、曾任職德國控創公司的高階主管、駐大陸人員，但還可以增加控創以及大陸國營企業的實地採訪。目前許多資料礙於時空限制，必須透過間接採訪取得。雖是應變之道，但卻也失去了深化弱勢者與夥伴間的細膩互動過程。這是未來還可以多著墨之處，以剖析資源主觀與客觀的交互建構過程。

三、資料分析

參考圖 1 之分析架構（對應下半部，資料分析之推理步驟），本研究之資料分析可以大分為四個推理步驟。第一，分析強勢者施予弱勢者哪些制約，又對弱勢者產生哪些影響。例如，相對德方，研華面臨技術後進劣勢，大陸高階市場受到幾乎壟斷的局面。

第二，分析弱勢者的回應方式，因為「回應」是相對抽象的觀念，必須由相關的實務著手分析，因此我們由資源著手。於本研究中，「資源建構」指的是對選定資源進行某種轉換價值的行動。如前所述，本研究著重主觀與客觀兩種方式的建構作法，也分析兩者之間的交叉互動，像是主觀建構是否引導出客觀資源建構的作法，或是客觀建構是否輔助主觀建構的。主觀建構強調的是以話術或比喻等社會性修辭方式取改變對方對於某資源投射出更高的價值；客觀建構則是透過組合、交換的方式，提升資源的實體價值，像是維修員變成駐地工程師，又變成採購顧問。

第三，透過這些資源建構作法後，分析弱勢者是否達到某種隨創成效。這不只是要了解這些資源建構方式產生哪些具體成果，像是「隱經銷商」、「駐地服務」等作法，也需要分析弱勢者與夥伴之間的互動產生哪些實質的變化。例如，弱勢者與夥伴之間原本扮演的「角色」有哪些改變；他們之間的「關係」有哪些改變（會由敵人變成朋友嗎？）；這些改變又與「時機」有何關連，特別是弱勢者如何運用哪些天時地利來促成資源的建構。

第四，歸納弱勢者資源建構的實務，推理出弱勢者策略回應之作法。整個分析有兩個重點。首先，分析弱勢者與弱勢夥伴的互動。此部份主要是分析研華如何建立與大陸經銷商的合作，特別是由一開始並不友善的關係。其次，分析弱勢者與強勢夥伴的互動。此部份主要是分析研華如何建立與關鍵客戶（國營企業）的合作關係，特別這些公司原本都是德方的客戶，合作可能性並不高。本研究中，若符合「策略回應」則必須建構過程有重新定義資源、取得或交換資源，運用資源達成某種創新作法，進而局部解除制約以及改變劣勢之證據。這也才符合隨創之行為。

肆、研究發現

研究發現分為兩大部分，先分析弱勢者如何重新建構資源來連結弱勢夥伴，再分析弱勢者如何重新建構資源來連結強勢夥伴。這兩項互動中可以看出弱勢者如何施展隨創的方式，主軸為了解弱勢者的資源建構方式、如何策略回應以及隨創方案的形成。資料分析的重點是弱勢者逐漸發展出的「逆強式」的策略回應，分「隱分銷」與「類軍規」兩項作法，並將其中複雜的過程逐一呈現。

一、隱分銷：弱勢者與弱勢夥伴互動的改變

第一部分所要呈現的是研華（弱勢者）如何由德方（強勢者）的強處中找到第一項弱點，並且藉「危機意識」建構出弱勢者原來沒有的資源，以「隱形」策略，將經銷商逐一變成盟友。這個建構過程改變了經銷商原有的角色，善用大陸在地的經商脈絡，也發展出「複合式分公司」的經營模式，以下解析其過程。

（一）制約：市場劣勢

德國控創公司以研發見長，重視技術創新。針對電腦模板技術，總公司成立專屬業務部門，研發編制總共 100 多人，在中國的研發人員就有 10 多人，約是研華同產品約八倍的研發人力。電腦模板產品的原理就是把核心運算元件（CPU Module, Central Processing Unit，也就是電腦機板的心臟）縮成約如火材盒之尺寸，透過管腳定義（Pin Definition），與電腦基板（Base Board）做結合，成為類似主機板的元件。電腦模板加上周邊連結，就可以成為電腦控制元件，應用於軍事裝置、醫療設備、自動控制、交通運輸、數位看板、衛星通訊、電力傳輸、行動裝置、博奕機台等監制。客戶改用電腦模板產品是為了降低維修成本。最大的困擾是機構設計問題，過去模板故障時必須整塊板子換掉，但使用電腦模板則只要抽換板子便可以完成維修，大大降低成本。此外，系統升級時，工程師也不需要換新整套系統，只要換模板，測試硬體功能與軟體相容性即可完成技術更新。

控創品牌知名度高，產品優良，以「軍規」（軍事用電腦規格）聞名，在高階市場有獨佔優勢。以醫院為例，奇異、西門子的電腦斷層掃描儀、輔助診斷設備等，都是用控創的電腦模板。除此之外，軍事用監測儀器、衛星系統、通訊與交通監測等系統也都是控創的專長領域。鎖定關鍵客戶、提供高規格技術、搭配嚴謹維修服務，讓控創獲得高利潤。控創之技術優勢成為客戶的首選，不需仰賴大陸在地經銷商。控創在 2002 年併購 Jumptec 後，不但取得技術標準制定權，也一併取得 Jumptec 在大陸設置的經銷網

絡。一位控創產品經理指出：

「這群重視高階技術的客戶，比較在乎功能與升級應用，比較不在乎價格。穩定、擴充性高、安全是最重要考量。高規格的品質標準，讓控創享有高同業一倍以上的利潤。而且許多精密的檢測，我們都是送回德國原廠進行，絲毫不馬虎。很多原旗下經銷商想與控創合作電腦模板，但是控創都請他們將客戶引薦過來就好。」

這可能也是因為控創擔心經銷商的技術能力不夠，難以符合德方對支援服務的要求。中國當地經銷商只能供應比較低階的零件與周邊商品。電腦模板的關鍵零組件仍必須由控創公司直接供應與維修，也因此經銷商的利潤不大。為服務頂級客戶，2002 年控創在上海設立中國區總部，德國總部的技術人員頻繁前來提供技術支持。2003 年，控創總部從上海遷移至北京，以服務軍方客戶並延展華北、東北、西北市場。控創的標準制定能力、垂直市場整合能力以及專屬維修體系，讓後進廠商難以匹敵，也讓大陸在地經銷商逐漸淪為配角。

（二）資源建構：化敵為友，經銷商隱形化

負責銷售電腦模板的是研華的嵌入式運算核心事業群旗下部門，當時整個團隊不到十人，產品上不穩定，模組化設計能力也還未成熟。電腦模版在大陸市場有三類客戶，分為高、中、低階，高階是外商，中階是國營企業，低階屬於中小企業。大陸的外商客戶多不熟悉研華，是控創的忠實客戶。國營企業不理解電腦模板規格，採購時只能認品牌，控創自然是電腦模板的首選。中小企業不會採用控創的產品，技術要求不高，只要應用商規（商業用電腦規格）的低階產品即可。

在此狀況下，研華的「工規」（工業用電腦規格）恰好卡在中間。對高階與中階客戶，研華的技術規格不夠高；對低階客戶，研華的技術規格又過高；因此不得其門而入。此外，原屬控創旗下的經銷商雖無法經營電腦模板這塊生意，但是仍可由其他週邊產品獲取薄利，因此雖對控創有微言，但仍需表達效忠。這也讓經銷商與研華成為敵對關係，更何況經銷商對研華的產品仍不具信心。研華團隊要如何克服此制約呢？

主觀建構法：曉以大義，放大邊緣化的危機感。研華了解到控創的品牌優勢，難以接近外商高階客戶。不過大陸中階客戶似乎是有機會的，因為控創產品的售價相對高，這些中階客戶多為國營企業，預算常逐年刪減。研華計畫鎖定這些中階客戶做為切入點，對大陸經銷商提出三項訴求。第一，研華是控創的電腦模板研發聯盟創始會員，產品完全遵循控創所制定的技術標準，因此技術具有相容性；也就是，過去用控創產品的

客戶，如果改用研華的電腦模板，也不會產生技術相斥的問題。第二，研華同樣的產品，雖然技術等級不同，但價格比控創低三成。因此，如果客戶不需要用到軍規產品，便可以考慮研華的產品。第三，研華除了電腦模板商品之外，還有一系列工業電腦相關產品，可以讓經銷商配套銷售，而且維修服務由研華支援，可以減低經銷商的負擔。

這項提案對經銷商有很大的吸引力。一家在地經銷商便指出，研華的產品其實與控創很相似，除了技術等級外，但價格相對優惠，比較容易賣得出去。此外。因為同文同種，經銷商與研華專案溝通上也更為便利。然而，更多經銷商開始陸續與研華合作並不是因為產品的優惠價格，而是研華指出了經銷商的隱痛。一位研華協理點出：

「基本上，在大陸，代理外商產品的經銷商心中都是很清楚的。不管你賣的是服飾或科技產品，一做得不好就會被收回代理權，或取消經銷資格。但是，做得太好，又會被總公司取代，自己下來做以取得高利潤。經銷商被邊緣化或是拋棄是常有事。所以，這些經銷商也很清楚，我們只不過幫他們點出他們不願意面對危機而已。今天，控創把電腦模板的客戶攬來自己做；明天，不難保證控創就將所有工業電腦產品都包了。這樣，他們這些經銷商只好喝西北風了。」

這套說法很快就幫研華招來許多經銷商的詢問。但是多數經銷商還是不敢公開與研華合作，因為那樣會馬上得罪控創。研華招攬經銷商遇挫之後，馬上轉換另一策略，結合大陸當地非正式的經商手法。

客觀建構法：複合式分公司，建立隱形分銷體系。在大陸，由於經營公司有許多難以遇見的風險，所以一家企業會同時設立很多公司去分散經營風險，一家公司不幸倒閉，還可以將資產轉到其他公司名下，或者可以迴避清算資產與負債的風險。針對此在地脈絡，研華於是提出「隱形分公司」策略，讓各家經銷商成立另一家公司，與研華合資，可是名義上卻是研華的地區分公司。一位研華在大陸駐點的主管說明，

「大陸的經銷商很有彈性，可以依不同客戶的需要成立分公司或子公司。例如，福升這家經銷商可以和研華成立『福研』，成為研華的子公司；還可以另外成立『福華』，成為凌華的子公司。這樣福升就同時代理了兩家公司的產品。其實，他只是把原本屬於福升內部的各個業務部門獨立為子公司而已，卻能讓客戶有獨家代理的感覺。這樣也不得罪每一家原廠。」

這個作法很跨就擴散到各區域經銷商，研華也用很少的資金，就在各城市建立了「分公司」。對經銷商而言，這樣的複合式分公司經營起來也不會很費力，又不會得罪控創。

例如，一家華東的經銷商就將公司分為兩部分，將原公司放在右邊，將電腦模版部門與研華業務放在左邊。兩邊的人員每天還是相互交流，可是左邊的員工會穿上研華的制服，讓客戶來洽公時感覺像是不同家公司。

對經銷商而言，複合式分公司的另一個好處是取得「合格供應商」(Approved Vendor List）資格。多數經銷商都因為規模小，很難有資格去大企業參與採構競標。為管控浮濫報帳的風險，大陸國營單位要求各參與廠商都要提出「合格供應商」證明，才能列入採購名單。經銷商可以借助研華的國際性知名度，被列入合格採購清單，是一項利多。

對研華而言，複合分公司模式可以逐漸打入國營企業，並借力使力建立服務體系。研華在大陸原已建置十多個服務據點，但熟悉電腦模板產品的工程師仍不多。透過複合分公司模式，研華可以專注服務較高階的技術問題，像是底板相容性或專屬設計，而一般基礎性服務，如例常機台維修、訂單處理以及客戶服務，研華則轉給經銷商負責。經銷商對這些任務則是樂此不疲，因為可以經常接觸客戶（不會被架空），可以接到訂單，維修工作又不會太困難。這些經銷商開始引薦研華電腦模板產品，研華也因此在中國市場漸漸打開知名度。一位研華中國區業務主管說明：

> 「其實大陸的經銷體系很像日本的代理商，和大企業間都有長期往來合作默契。他們熟門熟路，也幫忙介紹生意。我們就是善用這個網絡進入國企。我們還常常半買半送，像是送個 2000 美元的散熱器，或是免費的維修訓練。策略上，我們是讓經銷商先協助我們拓展知名度，接著再建立一個供貨體系。例如，中國電子部是依地區別分工，西安所專長衛星通訊，成都所負責電子監控，上海華東所負責華東地區的網路安全。這些部門每年在自動控制採購上的預算約 100 多萬美元。經銷商幫我們把 COM 產品推薦給這些指標性客戶，比我們自己去推銷來的有效。」

透過經銷商，研華取得進入國營企業的「敲門磚」後，又遇到另一項挑戰。大陸國營企業因制度問題，通常會有三到六個月的應收帳期，實際收款則約需九個月。研華透過複合分公司模式與經銷商建構出另一項財務操作方法。大陸經銷商為因應長期應收帳款，經年來發展出一套「放帳」的交易機制。大陸公部門每年編列的預算看似固定，但卻會技巧性地進行內部調節，讓營收符合計畫編列。所以，經銷商多做的生意不一定收得到款；少做生意也不一定會虧本。國營企業與經銷商之間逐漸形成一套非明文規定的結帳制度，稱之為「溢出報價」，讓「應收」先變「實收」帳款。經銷商報價時會多出5~10%的溢價，作為放帳利息。這種隱性作法需要有人脈做為基礎，也只有大陸公司之間才能操作。研華便透過經銷商協助調度資金。

一位外商高階主管指出，這種交易模式在外商體系很難實施。歐洲企業為了符合廉能原則，必須落實準時收款、精確出帳。因此，外商不易洞察這種「放帳」模式所扮演的交易潤滑功能。一位研華主管解釋：

「說到來，經銷商其實就像是國企的『小金庫』，協助調度資金。一家年營業額 3000 萬人民幣的經銷商，當然不會只做幾家國企的生意，這樣風險太高。經銷商間也會彼此合作，相互調度頭寸。有來有往，生意就會做得長久。」

掌握大陸的「放帳」脈絡，研華建構出經銷商成為「內部帳房」角色，使應收帳款作業得能順利進行，穩定現金流並降低交易不確定性。這種「彈性掛帳」的作法讓研華逐步切入國營企業，逐漸強化與中階客戶的連結。可是，當經銷商引薦研華進入國營企業體系後，客戶早已經運用控創產品多年，研華又要如何才能贏得客戶的訂單呢？

（三）隨創結果

策略回應：研華面對技術與市場劣勢時，並未臣服或抗爭，而是由強勢者的強處找出其弱點。控創之強項是技術，可以直接掌握大陸主要客戶。可是這樣一來，經銷商就面臨客戶流失，被邊緣化的危機。控創的技術強，也壟斷中高階市場，但是經銷商就成了它的弱點，忠誠度產生動搖（參見表 2）。

表 2：弱勢者對弱勢夥伴的隨創作法

分析要素	之前	之中（隨創作法）	之後
策略回應	研華之電腦模板技術尚起步中，又是市場後進者，處於劣勢。	因為技術強，有能力壟斷市場，反而造成經銷商流失客戶的恐慌，成為弱點。	攏絡經銷商，反而形成通路優勢。
資源建構	沒有資源。	利用邊緣化危機感，曉以大義（主觀建構）。運用複合式分公司，建立「隱形」的分銷體系，經銷商可以重新經營客戶關係（客觀建構）。	資源之一：研華將對手的經銷商變成自己的分銷通路。 資源之二：研華讓經銷商取得「合格供應商」，轉而讓自己迅速建立起服務體系。 資源之三：研華藉由經銷商的「放帳」機制減

			低金流風險。
互動關係	角色：經銷商是控創的正規軍；研華是敵手。	研華運用客戶之不便（維修不即時、採購不友善、規格與價格沒彈性），建立起新的互動關係。	角色：雙重身分（控創的支援經銷商、研華的隱形分公司與帳房），形成共生體系。

資源建構：透過被邊緣化的風險（主觀建構），研華激發經銷商「鞏固客源」的危機意識，在不得罪控創的情況下，攏絡經銷商形成弱勢者聯盟。當經銷商紛紛表示願意投靠時，研華又利用在地脈絡實施「複合式分公司」策略（客觀建構），以最快的時間，最少的資源，建構起「隱形」的分銷體系。

這個建構過程又蘊含了資源交換策略。經銷商由研華取得中價位電腦模板產品，並可以銷售一系列工業電腦零件與系統，讓他們可以維持客戶關係，又有利可圖。經銷商又藉由研華取得「合格供應商」資格，參與更多大企業投標案。透過複合分公司模式，經銷商又讓客戶覺得有獨家代理的信賴感。另外一面，研華則是藉由經銷商的引薦，快速進入中階市場，提供服務據點。研華更藉由經銷商的「放帳」手法，穩定營運資金，讓經銷商從調度貨源的工作拓展到調度資金的任務。經銷商則扮演起「帳房」的角色，替研華承擔資金調度風險。

互動關係：研華建構出經銷商的雙重身分（dual identity），改變了雙方的互動關係。身分之一，經銷商是控創「正規軍」。客戶若需要技術支援，經銷商可以合法地讓研華工程師提供維修服務。客戶在「軍規」產品之外，如果需要任何相關零件，經銷商可以透過「自己的」複合式分公司進貨。研華隱身在經銷商身後，了解客戶的技術需求，並設法強化研發實力。身分之二，經銷商是研華的「隱分銷」與服務體系，提供客戶較便宜的產品選項、較便捷的維修服務以及較彈性的產品搭售。

由此，研華與大陸經銷商形成「共生」關係。經銷商像「變色龍」般，一則扮演服務控創的經銷商，與控創共生，維繫與客戶的往來關係；二則扮演研華的合夥經銷商，與研華共生，滿足客戶採購與服務需求，包括較便宜的價格、較快速的維修服務、較有彈性的產品搭售等。經銷商因研華而免除被邊緣化危機，研華因經銷商而快速建構在地經銷網絡。

二、駐地服務：弱勢者與強勢夥伴互動的改變

控創以軍用規格標準、原廠維修服務，以高價鎖定產業頂級客戶，處於強勢。處於劣勢的研華，運用客戶的「不方便」找出強勢者的弱點。利用客戶這些不方便，研華建

構出「駐地服務」，探索出客戶的「換代商機」，並且發展出「類軍規」策略，在劣勢中開拓出新的格局，以下詳述之。

（一）制約：技術劣勢

控創在大陸的經營策略是鎖定高階客戶，以技術團隊提供解決分案，包括銷售、專案經理、應用工程師、研發工程師。控創的解決方案團隊除了電機與電子工程師外，還配置 BIOS（Basic Input and Output Systems）韌體程式設計師參與系統建置，確保嚴謹的規格制定、原型設計到功能測試。控創的核心客戶多為外商，像是奇異醫療（GE Medical）、西門子（Siemens Medical）、與愛普生的機器人（Epson Robot）等。這些公司擁有充沛的預算，關心的是品質，可以容忍較長的維修期間。一位任職控創經理指出：

> 「我們是靠著口碑起家的。我們這行靠的是技術專業，得要有成套的解決方案，所以進入門檻很高。只要突破一家客戶，透過口耳相傳，那整個頂級客群就都是你的了！像研華這種以產品為主的廠商，沒有軍規產品，又沒有能力解決方案，是很難打入這個客群的。產品，研華也許三到五年可以趕上；但是要能提供解決方案，我保守的說，最少需要五十年吧。坦白說，研華並不是我們的對手。」

控創精良的技術帶來議價優勢。控創的產品較一般同業高出二到三倍，年年漲價，而且少有議價空間。在維修品質上，控創也不輕易讓步。任何維修問題都必須經過嚴謹的診斷，關鍵零組件更換也必須送回德國檢測，以確保系統穩定性。即使會延遲交貨，控創也堅持必須送回原廠維修。依複雜程度而異，控創的維修期間約需 6~24 個月。不過，大陸國營企業卻深感困擾，因為他們無法購買很多備用設備。一旦送到德國維修，便會影響正常作業。控創昂貴的維修服務也墊高國營企業客戶的成本。

（二）資源建構：木馬進城，駐地工程師推出「類軍規」

研華固然在工業電腦佔有一席之地，但是短期內在電腦模板的技術不可能馬上到位。短期內並不容易切入外商高階客戶。於是，研華透過經銷商進入國營企業，放大作業中斷的危機感，提供駐地維修服務。研華善用國營企業的不便，包括維修的不便、採購的不便、與規格制定的不便，由駐地工程師提供管家服務（in-house service），建立雙方密切關係，共同對付德國的「技術霸權」。

主觀建構法：仗義相助，作業中斷的危機感。對國營企業客戶來說，控創其實並非最佳選擇。每次採購時，這些客戶都會擔心價格又飆漲，而且因為客戶對技術不熟悉，

所以主導權落在德方手中。由技術規格制定、購買方案研擬到維修合約，客戶多是被動接受。對中國企業來說，這種技術霸權會隱約地喚起中國人的歷史沈痛，受到列強的欺侮。一位研華主管分析：

「控創技術的確是沒話說。但是它錯在把客戶壓的死死的，沒顧及到這些國營企業的難處，像是預算也許是有一年少，有一年多。還有，並不是所以的模板都需要用那麼昂貴的軍規啊。再加上，每次維修都那麼長、那麼貴，很少有企業能承擔得起。國營企業有國家預算限制，更是為難。或多或少，面對這種外國『技術霸權』時，中華民族都會有一種同仇敵愾的氣節吧。我們就和經銷商談，讓我們進去，來個仗義相助，我就不信我們華人破解不了德國人的技術。」

研華透過經銷商推薦，開始提供駐地服務給指標性客戶，並先鎖定上海華東所，是大陸軍方以電訊技術為主的研究所。因為必須取得客戶對研華能力上的信任，所以研華給進駐的維修人員改名為「駐地工程師」，先由維修電腦模板的底板開始。電腦模板其實是半成品，必須配合底板設計才能導入。研華派出具有系統設計能力的駐地工程師進駐上海華東所。一位駐地工程師解釋：

「為了因應客戶需求，我們必須具備研發、BIOS（韌體）、軟體三項設計能力。控創雖然品質比較好，對 COM 的技術水平也比較高，但是服務不夠到位，沒法即時解決客戶在底板設計上的問題。我們進去後，就和客戶的工程師變成技術團隊，我們當作是客戶端的工程師，控創的人來的時候，如果說這不能修，要送回總部，我們就問他為什麼，把他們技術一項一項摸清楚。一次學會一點點，一年下來我們對控創的技術就熟悉了，也可以自己修了。我們自己很有成就感，華東所的哥們也很開心。」

幾年下來，研華與華東所的工程師成為團隊，更成為盟友，共同為為解開德方維修技術而努力。華東所逐漸仰賴研華的服務，也縮短維修期間。當控創從德國派工程師進行年度檢修說明時，華東所邀請研華駐地工程師以經銷商身分（如上海福研）一起參與。這樣讓研華取得控創在電腦模板的設計知識以及產業應用知識。漸漸，研華已經可以參與規格制定，協助華東所規劃技術採購需求。

客觀建構法：建立專屬帳號，統籌採購需求。因為長期與華東所共事，研華駐地工程師經常聽到上海華東所主管抱怨控創嚴格的付款條件、沒有議價空間、採購服務太慢等問題。研華的駐地工程師與台灣總部協調，為華東所建立「專屬帳號」（key account），提供整套採購服務。一位研華主管說明：

「維修過程不可能不採買零件。客戶需要電子料號、關鍵元件或周邊零組件時，我們都可以在最短的時間內找到合格供應商，因為研華早有一套全球尋購系統；甚至連辦公設備的採購或其他運輸機具等非電子周邊商品，我們的駐地工程師也都可以幫忙找廠商議價。然後，我們會把最後的工作交給經銷商，讓他們在客戶面前有功勞，也可以分享利潤。」

駐地工程師不只提供電腦模板產品，研華其他產品線也都在採購服務中。例如，研華會提供電子購料的比價分析及合格廠商名單，幫華東所縮短採購流程，有「買一贈多」的實惠感。提供整套的採購服務，讓上海華東所無後顧之憂，反成為研華的通路優勢。一位研華業務主管指出：

「本來我們是沒有這種專屬帳號的制度，各區分公司原本是要根據產品別來規劃業績達成率。可是，這樣對剛剛起步的 COM 產品就很不利，因為銷售額還沒起來。為了解決華東所的問題，我們就成立專屬帳號，不以產品計算，而是總採購貢獻值。上海華東所發現，研華連 COM 都作得出來，又有板端產品、LCD 模組等；他們的採購部門就願意和我們談。然後一個 COM 產品會帶出一連串其他採購需求。最後，連國際客戶，像是奇異，後來都派一組採購人員來跟我們談年度採購。」

研華整合產品線，提供上海華東所整套服務，也發展出「專屬帳號」機制。這是以總產品銷售額計算（除電腦模板銷售額外，還含控制模板與其他工業電腦零件與設備），而不是以電腦模板單項產品來計算績效。相較於控創僵硬的付款規定，研華以專屬帳號提供三到六個月的付款彈性，配合經銷商資金調度需求。研華推出整合採購模式後，議價也更有迴旋空間。

客觀建構法：參與技術採購，發現換代商機以及開發「類軍規」。研華駐地工程師在協助華東所維修控創產品的過程中，漸漸熟悉年度升級時機與技術規格。研華發現，控創通常會提供最新技術，藉此提高價格優勢，但這些新技術未必符合華東所的需求，原因有二。首先，前瞻技術超過需求。華東所除了軍事作戰時需要用到「軍規」產品外，其它控制系統、通訊設備或網路服務並不需要購買到「軍規」等級的產品。例如，通訊設備通常放置在室內，不需容忍極度溫差或強震。

其次，年度預算會波動。華東所的預算需配合國家政策刪減，時有波動。在預算有限時，華東所未必有充裕經費採購控創的產品。這給了研華可趁之機，駐地工程師會在「技術換代」時提出搭配方案，以該年度預算為基準，協助評估配套專案。一位研華研

發主管分析：

「客戶未必需要提供最前瞻的技術，卻不能沒有實惠的維修。趁客戶設備換代時，我們會幫他們規劃哪些產品可以用軍規，哪些可以用工規，用現有預算幫他們作 design-in（按：就是以現有預算倒推，算出應有的產品組合）。需要高技術含量的產品，客戶還是可以向控創買，我們還是可以幫他們維修，反正我們工程師對控創產品已經很熟了。更何況，COM 模組的技術已經不再是那麼難了。這樣一混搭，他們可以省下一大筆預算，又可以達到預期的效果。」

研華駐地工程師以維修服務提升研發能力，取得指標客戶信任。了解客戶需求，研華也協助客戶省去不必要的過度設計。此外，利用客戶系統升級的時機，研華提供優惠的價格。研華稱這種配套策略為「類軍規」（quasi-military specification）。一般工業電腦可分為「軍規」、「工規」、與「商規」三種規格。「軍規」可以承受最高攝氏 85 度，最低攝氏-45 度的高低溫差，並能承受高震動、高濕度等，這樣的規格讓系統相當穩定。相較之下，「工規」可以承受的高低溫差在攝氏 65 度到攝氏-20 度之間；「商規」則在攝氏 45~0 度之間。「軍規」主要有四項標準。第一是溫度，必須能耐攝氏-45 度的低溫。例如在大陸瀋陽的冬天約在攝氏零下 45 度，這樣的極冷環境才會需要軍規產品。但像是在軍事通訊單位的主控室，都在室內，原有恆溫空調設計，就不需要用到軍規標準。第二是震動，例如悍馬車就必須耐劇烈震動，但一般坦克車就不太需要。第三是急速墜落，必須忍受在 1.5 公尺落下後，還能馬上開機。這是特種部隊才會需要的設計。第四是在陽光下能清楚讀取資料。一般工業電腦的螢幕會因為反光而難以閱讀，但軍規電腦必須做到在強光下使用者仍能清楚閱讀。一位研華技術主管解釋：

「其實有些電子材料不一定要用到最頂級的，尤其上海華東所的電腦設備都有空調，溫濕調節合宜，還不需要全部都用『軍規』產品。在西安的軍事單位，冬天幾乎不可能出現-45 度的超低溫，只要能承受-25 度或-15 度就可以了。又例如，坦克車就不需要像悍馬一樣，需要耐強震設計。在野戰部隊，就算是常常需要「拋摔」電腦，也不需要像特種部隊需要在急速摔落後要立即啟動。你可以找出客戶的設備中有哪些不需要用到軍規的元件，把工規產品配套軍規，然後跟客戶說這是『類軍規』，但還是軍規喔，這樣他們就很能接受。如果你跟客戶說，這是配套工規的產品，他們就會皺眉頭了。」

「類軍規」產品的價格比控創軍規預算要便宜 15%~30%，對於某些預算受限的單位，是很大的誘因。「類軍規」產品既符合客戶在成本上的考量，也沒有品質的憂慮。

控創雖挾技術優勢取得規格制定權，研華則是用「木馬進城」的模式，讓駐地工程師結合華東所去熟悉控創的技術規格。研華沒有技術優勢，於是提供多元產品線、即時維修服務、整合採購優惠、彈性付款機制等來贏得客戶。

外商客戶如奇異，也注意到研華的維修設計能力。奇異拿一項控創的電腦模板產品給研華，要求做出同樣規格的產品。駐地工程師費時兩年才設計好，但產品卻已經過時，無法交貨。不過，研華卻因此通過奇異的技術審核，贏得低階超音波產品開發案。一位研華主管說明：

「控創產品雖然堅固耐用，但維修成本很高，維修時間也很長，這讓客戶感到不便。研華的出現讓這些客戶有了另一種選擇。研華產品比控創便宜三成，另外加送駐地維修服務，建立起奇異研發團隊的信任感。最後，他們就邀請我們先參與幾項較低階的醫療設備研發案。拿到國際大廠訂單，等於幫研華取得國際品質認證。而且，這些大客戶需求少量多樣，一次開出十幾個專案，單一採購量約 3000 個單位。控創對這種『小案子』興趣不大，可以對我們工業電腦廠商，這就是一筆可觀的生意了。」

研華由換代商機，發展出「類軍規」的策略，不但讓取得客戶訂單，也成為開發新興市場的戰略。近兩年，大陸市場中小型廠商崛起，脫離外商自己開創事業，包括製作測試設備或訊號檢測儀器；但為了節省成本，他們多運用商規的電腦模板產品，可是用在工業環境就時常發生故障。研華主管分析：

「最早有一家山東廠商，他們做強固型電腦，要非常耐摔，就找到我們幫忙。另外像華南的邁瑞醫療，做超音波、血球分析儀器，是從外商跑出來自己開業的，也是我們的客戶。這些中小型廠商常常要我們協助修改系統。要是找控創協助，一次大概會要價一千美元；但是我們就當做交個朋友，不收錢。但是，也因為這樣我們才知道原來他們用的商規等級實在太低了，那是給辦公室用的等級，不適合工廠的作業環境。研華的工規等級比他們高。所以，我們就對他們說，你們要不要稍微升級一下，讓研華來提供『類工規』的配套，辦公室的就用商規，工廠的就用工規。這樣聽起來更好，只要多付一點錢就有工規的產品，客戶感覺就很划算。」

研華用「類軍規」商品給中高階客戶，反過來以「類工規」手法給低階客群。「類軍規」比上夠用，讓電腦模板平易近人；「類工規」比下有餘，解決產品不穩定問題。對中高階客戶，研華透過經銷商提供駐地服務，取得技術又贏得訂單，以服務帶進工規

到軍規產品；對中小型客戶技術尚不成熟，研華則提供底板設計服務，以技術帶進工規到商規產品。

（三）隨創結果

策略回應：控創強在技術，維修過程嚴謹，為求最高水準品質，部分維修與檢測作業必須送回德國。但這也變成控創的弱點，資源投注於照顧高階客戶，就不免忽略中階客戶。控創無暇顧及客戶的中低階維修作業，此時研華提出著駐地服務正好解決客戶的痛點，同時也藉機切入中階客戶市場（參見表 3）。

表 3：弱勢者對強勢夥伴的隨創作法

分析要素	之前	之中（作法）	之後
策略回應	研華的工規產品低於中高階市場的軍規需求，對低階市場又高於商規需求，處於劣勢。	因為技術強勢，維修講求精密，價格居高不下，反而造成客戶不方便，成為其弱點。	透過經銷商推薦，提供著駐地服務，反而成為中階客戶的親密戰友。
資源建構	沒有資源。	研華以作業中斷的危機感，仗義相助提供駐地服務（主觀建構）。研華統合本身採購機制，，幫客戶建立「專屬帳號」以及發展「類軍規」採購模式（客觀建構）。	資源之一：研華變成客戶的維修中心。 資源之二：研華成為客戶的採購平台。 資源之三：研華取得技術規格制定的參與權。
互動關係	原本角色：經銷商的維修人員。	統籌維修、採購與技術諮商等工作。	角色：駐地工程師，演變成技術顧問。經銷商則演化為「管家」的角色。

資源建構：研華與強勢夥伴建立聯盟過程，更是交錯運用主觀與客觀的建構手法，讓資源逐漸建構成形，可歸納為四個步驟。第一，研華透過經銷商提供「仗義相助」的駐地服務（主觀建構），這對客戶來說無疑是是及時雨，解決作業中斷的危機感。研華可以藉此取得合法性，與客戶建立緊密的合作關係。這與特洛伊戰役的木馬（Trojan Horse）進城計類似，希臘人假裝撤軍，留下一隻木馬，號稱是雅典娜女神的現獻禮。不知情的特洛伊人將木馬帶進城。入夜後，希臘士兵由木馬鑽出襲擊，特洛伊敗。研華藉著客戶對控創維修服務不逮之處，協助客戶解決維修問題，成功進入客戶採購體系，

瓦解控創技術獨霸的局面。

第二，研華的技術服務自然演變為技術轉移（客觀建構）。客戶無法理解控創維修人員艱澀的技術語言，研華駐地工程師成為中介者，先學會控創的技術，在教會客戶端工程師。如此一來，研華工程師也就漸漸了解電腦模板技術細節。這使得研華不但理解客戶端的需求，更知道控創如何制定技術規格。

第三，當控創分身乏術，無法顧及中階客戶的採購需求時，又幫研華製造出機會。研華運用本身既有的全球採購機制，以「專屬帳號」協助客戶處理技術與零件採購事務。研華不但成為客戶的維修中心，更成為採購平台（客觀建構）。

第四，研華成為對應控創的技術窗口之後，深入了解客戶的採購需求，便知道系統何時需要升級，技術何時需要換代。這些情報也讓研華知道如何配套可以幫客戶省錢，也因此發展出「類軍規」的產品組合方式。「類軍規」同時涵蓋主觀與客觀的建構技巧。主觀而言，類軍規讓客戶不會覺得規格被降級了；客觀而言，類軍規是一套混搭方案，讓客戶在有限的預算下，購買到最佳的產品組合。

互動關係：在第一階段，研華與經銷商建立了共生關係；在第二階段則與客戶建立了另一種相生關係。研華與客戶之間原本沒有相依性，透過駐地工程師的角色，研華先寄生於客戶的維修部門，漸漸從系統維修涉入到採購服務與規格制定。研華又透過這個角色去強化經銷商的「管家」角色（行政、收帳、關係維護），使得三方關係更加密切。如此一來，就算控創想提供類似服務，也不易打破這種依存關係。更何況，控創的資源投注在高階客戶與技術上，也難以在短期內轉換經營模式。

伍、討論與結論

劣勢創新理論仍在持續發展中，現階段的研究任務是分析弱勢者的策略回應是如何結合資源建構以解除制約。於學理上，本研究歸納出逆強式的策略回應以及交叉式的資源建構法，而資源建構又改變弱勢者與夥伴的關係。於實務上，本研究指出劣勢隨創如何成為創業者與經理人未來實施創新的重要技巧，以下詳述之。

一、理論意涵

本研究指出，強勢者有各種不同的型態，所擅長之強處與所擁有的優勢皆不同。了解強勢者與所處的在地脈絡，弱勢者方能構思出異於常理的回應方式。我們也不要忘記，強勢者不可能全然沒有弱點；最強的能力總會隱含最脆弱的一面。如果，在資源建構時弱勢者的工作是要改變其價值，那麼策略回應時弱勢者的任務則是找出強勢者的脆

弱點。例如，巨人力大無比，卻行動遲緩；富者錦衣玉食，卻易生心血管疾病。本研究提出隨創之「逆強論」，分析一種新的策略回應以及資源建構模式，學理上之貢獻可分為兩點說明。

第一，本研究點出「逆強式」回應法，也就是由強勢者的逆勢脈絡萃取出其最為脆弱之處，藉以融入策略回應之中。過去文獻分析過臣服、抗爭、權謀、合法性、默從、妥協、反抗、操控、規避、柔韌設計等弱勢者策略回應之作法。本文提出了另一種弱回應的方式，可以由研華連結經銷商以及客戶的過程一窺其貌。

其一，以強勢者的弱點改變與經銷商的互動。經銷商原屬德方陣營，與研華是敵對關係，但德方因技術強項而讓經銷商憂心忡忡，反而成為德方的弱點。研華善用經銷商的危機意識化敵為友，秘密運用「隱經銷商」方式成立合資子公司，讓經銷商取得雙重身分，而演化為共生關係。其二，以強勢者的弱點改變與客戶的互動。德方有技術優勢，配合嚴謹的測試流程，維持高品質的服務。但是，此強項卻成為德方的弱點，因為對客戶的維修時程變長，反應不夠即時。其實，大多數中國的客戶不需要「嚴謹」的保固，而是需要即時的維修，以免作業中斷。研華善用國營企業的擔憂，提供駐地維修服務，又演化為以專屬帳戶提供採購服務，「寄生」於客戶的技術體系之中，最終掌握到客戶的換代技術需求。

由強項萃取弱點的作法雖在現今劣勢創新文獻上不多見，但卻可由希臘神話智慧略見一斑。阿基里斯（Achilles）出生時眾神預言他將成為希臘最偉大的英雄，不過會英年早逝。所以，他母親就將他倒栽泡入聖河之中洗禮，以打造金剛不壞之身。造化弄人，母親的手抓住了阿基里斯的腳踝，因而沒泡到神水，成了他的罩門。在特洛伊戰爭中，阿基里斯雖然武藝高超，刀槍不入，但是因脾氣暴躁，戰爭中意氣用事而失去援軍。神射手帕里斯由太陽神口中套出阿基里斯的秘密，以毒劍射中阿基里斯的腳踝，一代英雄身亡。讓阿基里斯倒下的是他的腳踝；可是讓阿基里斯毀滅的卻是他易怒的性格。

每一位強勢者都有他脆弱的一面，每一個弱勢者也都有他不為人知的堅強。本研究的發現呼應了這個令人遺忘的歷史智慧。

第二，本研究提出交叉資源建構模式。這種隨創模式同時蘊含客觀與主觀的建構手法。相較於過去文獻，本文更注重呈現資源建構的前後差異，以凸顯資源建構如何形成策略回應。這樣的對比更有助於分析弱勢者資源建構背後的原則，檢視資源的佈局如何解除制約，或只是華而不實的計畫。本文指出，將對手的經銷商「建構」成自己的分公司，需要主觀與客觀交互的建構技巧。

對經銷商「曉以大義」，放大客戶流失的恐懼，是主觀（社會性）的資源建構方式。

配合中國在地脈絡，將經銷商變成隱形分公司，並槓桿其「放帳」資金調度作法，讓他們順勢將二級客戶引介給研華，是客觀的資源建構方式。此外，對客戶「仗義相助」，及時伸出援手提供駐地維修，讓他們不至於中斷供應鏈作業，是主觀的資源建構方式，讓研華得以順利「潛入」客戶端，也讓客戶認知到駐地工程師這相資源的價值。除了維修工作外，駐地工程師漸漸負責技術尋購顧問任務，讓工程師得以了解國營企業的預算波動問題，掌握換代商機，這是客觀的資源建構方式。研華體察大陸廠商「夠用就好」的心理，因此衍生出「類軍規」策略，這又是主觀與客觀的交互應用。

弱勢者交互運用主觀與客觀的建構，使資源有了串聯效用。例如，經銷商利用複合式分公司經銷工業電腦模組板，促發代理銷售研華系列產品，並扮演緩和資金流的角色。駐地工程師由一開始只是維修的角色，變成協助客戶解決德方產品故障的技術顧問（同時學習對手技術），又演變成採購顧問，由一站式採購延伸到換代技術輔導，再延伸到技術規格制定。如蛹化身為蝴蝶，資源的建構過程有了層次式的發展。這樣的分析有別於過去文獻只是觀察資源組合或多樣性應用，更能呈現資源轉價過程的豐富內涵。

由此，本研究更點出資源建構中角色與時機的變化。進行隨創時，不僅要重新建構資源，更需配套「角色」的建構，改變弱勢者與對方的互動關係；以及「時機」的建構，用以借力在地脈絡。例如，要建構「隱分公司」這項資源，必須配合建構經銷商的曖昧角色，不妨礙他們同時與德方合作。理解「腳需踏兩條船」的現實，弱勢者便可以弱勢夥伴合法叛變強勢者。但為何研華知道可以如此建構資源？

這就與時機有關。當時雖然進入中國不到三年，但由於同文同種的優勢，研華很快就了解到企業的在地運作模式。研華知道多數中國代理商對「外來統治者」有某種敵意。代理不好會被換掉；代理太好卻又會被換掉（外商取而代之，自己經營）。對外商的不信任感是普遍現象。經銷商有放帳能力，又有設置多分公司的營運手法。這些灰色地帶的在地脈絡，德方於中國經營十年還是不甚理解。

另一方面，要建構「駐地工程師」這項資源，也是需要配合角色的建構。讓維修技術員增值為駐地工程師，需要「仗義相助」的崇高目標，真正要履行的卻是「採購顧問」的角色，讓研華與客戶變成「醫生與病人」關係，也讓客戶對研華的依賴度不斷提升。這樣的建構如果不是對軍方預算波動時機有深刻的理解，又對當時德方不具彈性的行政體系瞭若指掌，也難以成局。資源建構必須配套角色與時機的並行建構，也是本研究對於劣勢創新文獻的一項微薄貢獻。

二、實務意涵

在實務上，了解劣勢創新對新一代經理人有重要的啟示。我們更常面對的，並不是

順境下的創新，而是時時在逆境中與制約鬥智。資源是匱乏的，又需要面臨強勢對手的威脅，這似乎才是多數經理人所處的真實環境。劣勢下如何隨創呢？本文試著提供心態上與做法上的借鏡。心態上，我們需體會，弱勢者不一定是弱者，若能夠了解策略回應之道，仍有創新致勝的可能。

做法上，我們可以將劣勢創新歸納為四個步驟供經理人參考。第一，遇見困境時，切勿懷憂喪志，先試著了解弱勢者與強勢者的「反向脈絡」。弱勢者若能反其道而思，必能觀自身之強項；若耐其性而慮，亦能查出強勢者之弱點。找出弱勢者之強與強勢者之弱，便可以研擬「以弱之強，攻強之弱」的逆強回應策略。劣勢者設身處地思考對手的弱點，洞察利害關係人的隱性需求或潛在危機，就能找到創新契機。以本研究為例，研華洞察到經銷商被邊緣化的危機、客戶作業中斷的擔憂以及夠用就好的心態，因而找到轉化劣勢的機會。

第二，依據此回應策略，開始思考建構資源的作法。首要之務在盤點弱勢者手上的資源，挑出最能支援逆強之策的關鍵資源，從而思考如何由看似無用的資源中，建構出新的價值。除了客觀地建構實體資源，弱勢者也千萬不能忽視主觀資源建構方式。越能解構社會文化底蘊者，弱勢者就越能開創機會。

第三，資源建構也要配合角色以及時機的布局，改變與強勢者的互動關係，使之朝向自己有利的方向發展。

第四，導引資源建構成為某種創新方案，例如隱經銷等，以解決環境制約或強勢者威脅。這四個步驟為大原則，經理人採用時需因地制宜方可驟奏效。至於本案例中所的施展的做法，例如駐地工程師、換代商機、類軍規等等，不僅是科技業公司可以現學現賣的技巧，也是其他行業可以酌用之借鏡。

三、研究限制與未來方向

本研究雖能發展出劣勢資源建構理論，但理解此原則也必須考慮其限制以及思考未來改善之道，可分為三點說明。

第一，深化逆強策略的分析。本文之逆強分析豐富了策略回應的文獻，提出另一種回應強勢者的策略。我們需要多由企業內的「策士」來檢視此類回應，他們不一定是高階主管，許多策略進行細節必須要透過他們的經驗敘說，才能觀其全貌。由此，本研究也發現需要更深入地探索此類逆強原則。例如，針對不同類型的強勢者，如何找出其弱點？如果遇到老謀深算的強勢者，施展出連環攻勢，那麼弱勢者又應該如何回應？如果遇見多個強勢者（例如，五個競爭對手，而不是一個），弱勢者又應該如何回應？這些

議題不但是劣勢創新文獻下一階段的調查任務，也是動態競爭文獻尚未有機會深研之處。

第二，強化交叉資源建構的調查。本研究歸納出交叉資源建構的隨創模式，也點出未來可探索的豐富議題。客觀式建構固然要緊，但是身處劣勢之中，有時主觀式建構也同樣重要。兩者都是在進行一種轉價過程，需要依照在地情境調適資源，更需要入境隨俗將資源重新脈絡化。弱勢者如何能交叉運用主觀與客觀資源建構法，將資源再脈絡化，予以加值，更予以回應劣勢制約？這些議題可以強化創新採納與轉移文獻對於「再脈絡」的探討。

第三，探索資源綜效的形成。面對劣勢，弱勢者無可避免地必須與組織內部或者是外部企業合作，引進所需資源。除了上述以交叉建構方式取得資源，弱勢者的下一個挑戰是如何整合這些資源。由外部流入資源，必然需要與內部資源進行結合。但是，哪些資源結合後會形成綜效？哪些資源碰撞後又會產生衝突？弱勢者如何得知兩項(或三項以上)資源整合後可以產生令人驚喜的物理變化？哪些資源整合後又可能出現產生令人驚恐的化學變化？資源如何相生相剋？弱勢者如何處理資源整合問題將是另一個值得探索的精采議題。

結論

劣勢中亟思創新之道，不只是一件創新議題，更是一項跨組織、策略、創業文獻的研究任務。劣者，少力也。在人微言輕的環境中找出解決方案，需要同時考量資源建構以及策略回應之難處，找出以少力釋放出創意的槓桿點。這也是本研究要探索的主軸。聖經之哥林多後書有云：「我以弱勢、凌辱、艱難、脅迫為喜樂，因為我什麼時候軟弱，就什麼時候剛強了。」本文分析弱勢者逆強之道，善用強勢者的脆弱，弱勢者便可以找到由弱變強的契機，不正面衝突也可以扭轉劣勢。察覺「強者必弱」的脈絡，對手邊僅有資源進行巧思建構，這種剛柔並濟的創新法則便是未來企業亟需學習的新課題。

陸、研究成果與預期效益

在本結案報告中是以研華科技之研究做為範例，說明本計畫典型案例的作品風格。本屆中將由整體觀點來解釋本計畫成效。本計畫歷時 3 年，目標為以深入的質性研究探討開放創新領域的前瞻性理論。雖服務創新是其中的重要議題，但本研究更著重於開放創新的應用，而不僅限於服務業的創新議題。綜觀之，本研究涉及兩大產業，第一為媒體產業，第二為科技業。探索之議題為開放創新所引導出的新商業模式，以及微觀實務面的運行方式。

本計畫供達成兩項預定研究目標，研展延伸開放創新的理論並且擴展其應用範圍。第一，探討開放創新中各方合作者的資源流動脈絡。開放創新過程中企業會尋找不同合作伙伴，而這些夥伴會與該企業交換某些資源。如此，企業中會透過各種資源的流入與流出，去加速創新的腳步或者產生不同型態的創新方案。了解資源回收的流動樣貌，就能了解開放創新的內涵，以及檢視那些號稱「開放」的做法是否真的帶來了創新。

第二，探討劣勢下如何進行開放創新。過去文獻多著眼於技術、商業模式或服務來進行開放創新(Chesbrough, 2003; Chesbrough, 2011a; Chesbrough, Vanhaverbeke, & West, 2006)。但卻未考量到多數合作的過程中是充滿了挑戰與挫折。企業推動開放創新時也都會遭遇競爭對手。在強勢對手的挑戰下以及資源短缺的制約中，企業如何實施開放創新？這是本計畫的第二項研究目標，分析的重點是「資源建構」，也就是無中生有的策略，讓有限的資源發揮最佳的效用(Baker & Nelson, 2005)。

為達成這兩項目標，在三年中本研究完成十多項案例，去掉不符合研究目標的個案後，留下七個相關的案例。第一項目標是分析資源流（resource flow），因為資源的流動需要長期的觀察，所以本計畫選擇以行動研究法，長期追蹤聯合報系作為主要個案(Eden & Huxhm, 1996; Reason, 1988)。本研究分析深入聯合報系各部門，包含聯合報（內容發展處）、聯合線上、聯合買東西（也就是電子商務事業部）、金傳媒（包含經濟日報）、捷運報、新媒體中心（也就是行動應用軟體app開發）、以及聯合數位電視（也就是原來的影音事業處）。本研究盤點內部創新，了解各單位的創新歷程，深入了解各部門之間的合作動態以及對外聯盟做法。分析的重點是資源流的樣貌。並且追蹤資源如何整合而達到開放創新的任務。本研究的探索時間頗長，因為聯合報系是一個相對龐大複雜的組織。本研究與聯合報系媒體創新中心合作，取得創新過程的資料，並且深入聯合報系各項串媒體（trans-media）實務。本項研究的重要發現是複合式商業模式（hybrid business model）的形成(Bonaccorsi, Giannangeli, & Rossi, 2006)。

過去我們對商業模式促成開放創新並不陌生。但是在開放創新的脈絡中，商業模式會有什麼新的變化，我們卻所知不多。而且，當資源流動時候會出現相生相剋的效果，對商業模式又會有什麼影響呢？商業模式開放之後又會如何轉型為多元樣貌？有些商業模式會相輔相成，有些商業模式則會相沖相剋。當複合式商業模式形成的時候又會是什麼樣的風貌？資源之間又會產生哪些綜效？本項研究即著眼於回答以上問題。

本研究已經完成初稿，投到歐洲組織學會（EGOS: European Group of Organization Studies）2014 年於鹿特丹之國際年會，論文題目是：《導航資源流：開放創新下複合式商業模式的形成》。與此主題相關之國際會議論文已經於期中報告說明，在此不贅述，目前正在準備期刊發表中。

第二項研究分析劣勢下開放創新，重點是調查弱勢企業在進行開放創新的時候要如何回應強勢對手。以及聯盟夥伴。這項研究引進「競爭」以及「劣勢」兩個觀點到開放創新文獻中，其中存在著三個挑戰。第一，強勢者進擊弱勢者的時候，必會處處予以制肘。那麼弱勢者如何才能夠回應呢？第二，弱勢者本身受到資源的制約，巧婦難為無米之炊，弱勢者又是怎麼樣克服的呢？由沒有資源變出資源，需要各種創新；拼湊出資源後，需要變成解決方案，更需要創新。弱勢者如何做到呢？第三，弱勢者與弱勢伙伴合作時，可能會變得更弱；而與強勢夥伴結盟的時候，可能遭到拒絕。因此，分析弱勢者與兩種夥伴的合作模式將有助於了解他們取得資源的方式。這類創新又稱之為隨創（bricolage）。如何用隨創的手法達成開放創新，是很具挑戰的研究工作，牽扯到分析資源回收建構的多樣做法(Baker, 2007; Baker, Miner, & Eesley, 2003b; Garud & Karnøe, 2003)。這部分目前已經有六項初步成果。

案例一、研華科技：這篇論文探討弱勢者如何對抗強勢者德國公司，提出逆強論的回應方式以及資源建構的做法。本論文點出預期臣服、抗爭或權謀，弱勢者如何由強勢者的強項去萃取其弱點，用強者脆弱的地方去思考回應之道。逆強不一定能夠擊敗強勢者，但是卻可能讓弱勢者找到一線生機。這篇論文的題目是：《逆強論，由強勢者之脆弱點建構資源的作法》。這篇文章預計到搞到策略管理協會 2014 年馬德里國際年會議。

案例二、梵谷策展（聯合報系）：本文探討劣勢下的隨創做法，其中特別分析弱勢者在制約下資源建構的原則，分析各種社會性建構手法。這篇論文已經被《中山管理評論》接受，論文主題是：《劣勢隨創新：梵谷策展中的隨創行為》。

案例三、Intel 亞洲研發中心（台灣）：這篇論文分析弱勢者如何找出資源交換的路徑，並且由角色的改變以及資源互換中分析弱勢者的隨創原則。這篇論文的題目是《尋找影響路徑：弱勢者如何以創意回應取得影響力》(Routes into influential: How low-power actors gain influence through creative interaction)，目前在修訂重審中。

案例四、三立電視台：這篇論文探討劣勢中弱勢者如何對外開放，並且巧妙組合手邊僅有的資源回收，完成研發任務（也就是戲劇製作）。本文提出了「少力設計」的原則，解讀弱勢者以小勝大的智慧。這篇論文的題目是，少力設計：制約下資源建構的實務。這篇論文已經投稿到歐洲組織學會鹿特丹 2014 年國際年會，論文題目為：《少力設計：創業隨創中資源的重新建構》(Less for More: Resource Reconstruction in Entrepreneurial Bricolage)。

案例五、華研音樂：這篇論文用文創產業下手，分析跨界如何引領的開放創新。弱勢者如何透過異花授粉的方式，由稀少建構出豐沛資源。本論文分析華研音樂的資源效能化做法。這篇論文已經投稿到歐洲組織學會鹿特丹 2014 年國際年會，論文題目為：《文

創產業於資源制約下的跨界創新》(Cross-Boundary Innovation under Resource Constraints in Creative Industry)。

案例六、曜越科技：這篇論文分析商業模式的轉變過程，探討弱勢者如何引進外部資源巧妙融合本身資源，創新出一系列的商業模式以及新產品，打入國際市場。這篇論文的題目是：《守弱學：制約下資源的社會建構》(Leverage with Disadvantages: Social Construction of Resources under Constraints)，預計將投稿到策略管理學會 2014 年馬德里國際年會。

在這兩項目標中，本研究提出一系列的原創性理論，例如資源流、逆強論、守弱學、少力設計、劣勢隨創等觀念與實務。這些構想不僅可以補開放創新文獻的不足，更豐富了劣勢創新的探討。除了上述籌備的學術論文之外，本研究也將這些案例轉為個案教材，陸續將發表在國際案例平台，包括瑞士 IMD 案例庫（與 Pasha Mahmood 合作，研華科技個案）以及 Richard Ivey 案例庫（與 Jean-Louis 合作，聯合報系）。

由實務來看，本計畫也目標達成產學橋接的功能，對企業產生一定的影響，可以分為兩點來探討。第一，透過行動研究合作，聯合報系已經漸漸採用了「資源流」的分析架構來考慮內部與外部的資源整合，探索複合式商業模式的各種可能性。這使得聯合報系研發人員由「串媒體」作法演變成「串資源」的思維。第二，研華科技也採用了本計畫「逆強式」隨創策略，分析各部門每年度的開放創新活動，包含新事業育成、併購、策略聯盟、新產品開發。提升各事業部的創新策略的規劃品質。

整體而言本計畫於三年之中，在開放創新文獻中發展出初具原創性的學術理論，以資源流、逆強守弱等新觀念，見聞於與國際社群，也延續上一期計畫對「脈絡」的研究成果。這些研究成效尚待發酵，期望這些新發現能夠持續在企業實務中發揚，讓學理更臻完備。放眼未來，本計畫除持續將這些成果發表之外，也會嘗試將研究發現融入課程之中，讓這些知識能夠有效分享給學術界與業界，以期拓展本研究的社會影響力。

參考文獻

Achtenhagen, L., Melin, L., & Naldi, L. 2013. Dynamics of Business Models – Strategizing, Critical Capabilities and Activities for Sustained Value Creation. ***Long Range Planning***, 46(6): 427-442.

Amit, R., & Zott, C. 2012. Creating Value Through Business Model Innovation. ***Sloan Management Review***, 53(3): 41-49.

Ardichvili, A., Cardozo, R., & Ray, S. 2003. A theory of entrepreneurial opportunity identification and development. ***Journal of Business Venturing***, 18(1): 105-123.

Baden-Fuller, C., & Haefliger, S. 2013. Business Models and Technological Innovation. ***Long Range Planning***, 46(6): 419-426.

Baker, T. 2007. Resources in play: Bricolage in the toy store(y). ***Journal of Business Venturing***, 22(5): 694-711.

Baker, T., Miner, A. S., & Eesley, D. T. 2003a. Improvising Firms: Bricolage, Account Giving and Improvisational Competencies in the Founding Process. ***Research Policy***, 32(2): 255-276.

Baker, T., Miner, A. S., & Eesley, D. T. 2003b. Improvisingfirms: Bricolage, account giving and improvisational competencies in the founding process. ***Research Policy***, 32(2): 255-276.

Baker, T., & Nelson, R. E. 2005. Creating something from nothing: Resource construction through entrepreneurial bricolage. ***Administrative Science Quarterly***, 50(3): 329-366.

Baldwin, C., Hienerth, C., & von Hippel, E. 2006. How User Innovations Become Commercial Products: a Theoretical Investigation and Case Study. ***Research Policy***, 35(9): 1291-1313.

Barney, J. B. 2001. Is the Resource-Based 'View' a Useful Perspective for Strategic Management Research? Yes. ***Academy of Management Review***, 26(1): 41.

Bechky, B. A., & Okhuysen, G. A. 2011. Expecting the unexpected? How SWAT officers and film crews handles surprises. ***Academy of Management Journal***, 54(2): 239-261.

Berger, P., & Luckmann, T. 1966. ***The Social Construction of Reality***. New York: Penguin.

Birkinshaw, J. 2003. The paradox of corporate entrepreneurship. ***Strategy and Business***, 30(30): 46-57.

Bock, A. J., Opsahl, T., George, G., & Gann, D. M. 2012. The Effects of Culture and Structure on Strategic Flexibility during Business Model Innovation. ***Journal of Management Studies***, 49(2): 279-305.

Bonaccorsi, A., Giannangeli, S., & Rossi, C. 2006. Entry strategies under competing

standards: Hybrid business models in the open source software industry. ***Management Science***, 52(7): 1085-1098.

Bouquet, C., & Birkinshaw, J. 2008. Managing Power in the Multinational Corporation: How Low-power Actors Gain Influence. ***Journal of Management***, 34(3): 477-508.

Brush, C. G., Greene, P. G., & Hart, M. M. 2001. From initial idea to unique advantage: The entrepreneurial challenge of constructing a resource base. ***Academy of Management Executive***, 15(1): 64-78.

Casciaro, T., & Piskorski, M. J. 2005. Power imbalance, mutual dependence, and constraint absorption: A closer look at resource dependence theory. ***Administrative Science Quarterly***, 50(2): 167-199.

Chatterjee, S. 2013. Simple Rules for Designing Business Models. ***California Management Review***, 55(2): 97-124.

Chesbrough, H. W. 2003. ***Open Innovation: The New Imperative for Creating and Profiting from Technology***. Boston, Mass.: Harvard Business School Press.

Chesbrough, H. W. 2006. ***Open Business Models: How to Thrive in the New Innovation Landscape***. Boston, Mass.: Harvard Business School Press.

Chesbrough, H. W. 2010. Business Model Innovation: Opportunities and Barriers. ***Long Range Planning***, 43(2–3): 354-363.

Chesbrough, H. W. 2011a. Bring Open Innovation to Services. ***Sloan Management Review***, 52(2): 85-90.

Chesbrough, H. W. 2011b. ***Open Services Innovation: Rethinking Your Business to Grow and Compete in a New Era***. New York: Jossey-Bass.

Chesbrough, H. W., & Rosenbloom, R. 2002. The Role of the Business Model in Capturing Value from Innovation: Evidence from Xerox Corporation's Technology Spinoff Companies. ***Industrial and Corporate Change***, 11(3): 529-555.

Chesbrough, H. W., Vanhaverbeke, W., & West, J. 2006. ***Open Innovation: Researching a New Paradigm***. Oxford: Oxford University Press.

Cleaver, F. 2002. Reinventing Institutions: Bricolage and the Social Embeddedness of

Natural Resource Management. ***European Journal of Development Research***, 14(2): 11.

Collis, D. J., & Montgomery, C. A. 1995. Competing on Resources: Strategy in the 1990s. ***Harvard Business Review***(July-August): 118-128.

Conner, K. R., & Prahalad, C. K. 1996. A Resource-based Theory of the Firm: Knowledge versus Opportunism. ***Organization Science***, 7(5): 477-501.

Dahan, N. M., Doh, J. P., Oetzel, J., & Yaziji, M. 2010. Corporate-NGO Collaboration: Co-creating New Business Models for Developing Markets. ***Long Range Planning***, 43(2–3): 326-342.

Denzin, N. K., & Lincoln, Y. S. (Eds.). 1994. ***Handbook of Qualitative Research***. London: Sage.

Dorrenbacher, C., & Geppert, M. 2006. Micro-politics and conflicts in multinational corporations: Current debates, re-framing, and contributions of this special issue. ***Journal of International Management***, 12(3): 251-265.

Dutton, J. E., Ashford, S. J., O'Neill, R. M., & Lawrence, K. A. 2001. Moves That Matter: Issue Selling and Organizational Change. ***Academy of Management Journal***, 44(4): 716-736.

Dutton, J. E., Roberts, L. M., & Bednar, J. 2010. Pathways for Positive Identity Construction at Work: Four Types of Positive Identity and the Building of Social Resources. ***Academy of Management Review***, 35(2): 265-293.

Dutton, J. E., Worline, M. C., Frost, P. J., & Lilius, J. 2006. Explaining Compassion Organizing. ***Administrative Science Quarterly***, 51: 59–96.

Duymedjian, R., & Rüling, C.-C. 2010. Towards a Foundation of Bricolage in Organization and Management Theory. ***Organization Studies***, 31(2): 133-151.

Eden, C., & Huxhm, C. 1996. Action Research for the Study of Organizations. In S. Clegg, C. Hardy, & W. Nord (Eds.), ***Handbook of Organization Studies***. Beverly Hill: Sage.

Eisenhardt, K. M. 1989. Building Theories from Case Study Research, ***Academy of Management Review***, Vol. 14: 532-550: Academy of Management.

Eisenhardt, K. M., & Schoonhoven, C. B. 1996. Resource-based view of strategic alliance formation: Strategic and social effects in entrepreneurial firms. ***Organization Science***, 7(2): 136-150.

Galunic, D. C., & Rodan, S. 1998. Resouces Recombination in the Firm: Knowledge Structure and the Potential for Schumpeterian Innovation. ***Startegic Management Journal***, 19(12): 1193-1201.

Garud, R., & Karnøe, P. 2003. Bricolage versus breakthrough: Distributed and embedded agency in technology entrepreneurship. ***Research Policy***, 32(2): 277.

Haefliger, S., Jäger, P., & von Krogh, G. 2010. Under the Radar: Industry Entry by User Entrepreneurs. ***Research Policy***, 39(9): 1198-1213.

Hansen, H. 2008. A grammar of organizing. ***Organization Studies***, 29(12): 1591.

Hargadon, A. B., & Douglas, Y. 2001. When innovations meet institutions: Edison and the design of the electric light. ***Administrative Science Quarterly***, 46(3): 476-514.

Hienerth, C., Keinz, P., & Lettl, C. 2011. Exploring the Nature and Implementation Process of User-Centric Business Models. ***Long Range Planning***, 44(5–6): 344-374.

Hirsch, P. M. 1986. From ambushes to golden parachutes: Corporate takeovers as an instance of cultural framing and institutional integration. ***American Journal of Sociology***, 77: 800-837.

Jarzabkowski, P., & Whittington, R. 2008. A Strategy-as-Practice Approach to Strategy Research and Education. ***Journal of Management Inquiry***, 17(4): 282-286.

Johnson, G., Langley, A., Mein, L., & Whittington, R. 2007. ***Strategy as practice: Research, Directions, and Resources***. Cambridge: Cambrige University Press.

Johnson, G., Melin, L., & Whittington, R. 2003. Micro Strategy and Strategizing: Towards an Activity-based View. ***Journal of Management Studies***, 40(1): 3-22.

Karim, S., & Mitchell, W. 2000. Path-dependent and Path-breaking Change: Reconfiguring Business Resources Following Acquisitions in the US Medical Sector, 1978-1995. ***Strategic Management Journal***, 21(10-11): 1061-1081.

Kostova, T., & Zaheer, S. 1999. Organizational legitimacy under conditions of complexity:

The case of the multinational enterprise. ***The Academy of Management Review***, 24(1): 64-81.

Kumar, N., & Puranam, P. 2012. Frugal engineering: An energing innovation paradigm. ***Ivey Business Journal***, 76(2): 14-16.

Larsson, R., & Finkelstein, S. 1999. Integrating Strategic, Organizational, and Human Resource Perspectives on Mergers and Acquisitions: A Case Survey of Synergy Realization. ***Organization Science***, 10(1): 1-26.

Levi-Strauss, C. 1968. ***The Savage Mind***. Chicago: University of Chicago Press.

Lounsbury, M., & Glynn, M. A. 2001. Cultural entrepreneurship: Stories, legitimacy, and the acquisition of resources. ***Strategic Management Journal***, 22(6/7): 545.

Mahnke, V., Venzin, M., & Zahra, S. A. 2007. Governing entrepreneurial opportunity recognition in MNEs: Aligning interests and cognition under uncertainty. ***Journal of Management Studies***, 44(7): 1278-1298.

Markides, C., & Charitou, C. D. 2004. Competing with Dual Business Models: A Contingency Approach. ***Academy of Management Executive***, 18(3): 22-36.

Markides, C., & Sosa, L. 2013. Pioneering and First Mover Advantages: The Importance of Business Models. ***Long Range Planning***, 46(4/5): 325-334.

Martens, M. L., Jennings, J. E., & Jennings, P. D. 2007. Do the stories they tell get them the money they need? The role of entrepreneurial narratives in resource acquisition. ***Academy of Management Journal***, 50(5): 1107-1132.

Miles, B., & Huberman, M. 1994. ***An Expanded Sourcebook Qualitative Data Analysis***. London: Sage.

Oliver, C. 1991. Strategic responses to institutional processes. ***Academy of Management Review***, 16(1): 145.

Orlikowski, W. J. 2002. Knowing in practice: Enacting a collective capability in distributed organizing. ***Organization Science***, 13(3): 249-273.

Penrose, E. T. 1959. The Theory of the Growth of the Firm. Oxford: Basil Blackwell.

Pfeffer, J. 1992. ***Managing with Power: Politics and Influence in Organizations***. Boston,

MA: Harvard Business School Press.

Pfeffer, J., & Fong, C. 2005. Building organization theory from first principles: The self-enhancement motive and understanding power and influence. ***Organization Science***, 16(4): 372.

Pfeffer, J., & Salancik, G. R. 1978. ***The External Control of Organizations: A Resource Dependence Perspective***. New York, NY: Harper and Row.

Phillips, N., & Tracey, P. 2007. Opportunity recognition, entrepreneurial capabilities and bricolage: Connecting institutional theory and entrepreneurship in strategic organization. ***Strategic Organization***, 5(3): 313-320.

Powell, W. 1985. Hybrid Organizational Arrangements: New Form or Transitional Development. ***California Management Review***, 30(1): 67-87.

Reason, P. 1988. ***Human inquiry in action: Developments in new paradigm research***. London: Sage Publications.

Sabatier, V., Mangematin, V., & Rousselle, T. 2010. From Recipe to Dinner: Business Model Portfolios in the European Biopharmaceutical Industry. ***Long Range Planning***, 43(2–3): 431-447.

Sarkar, M. B., Echambadi, R., & Harrison, J. S. 2001. Alliance entreprenuership and firm market performance. ***Strategic Management Journal***, 22(6/7): 701-711.

Schön, D. A., & Rein, M. 1994. ***Frame Reflection: Toward the Resolution of Intractable Policy Controversies***. New York:: Basic Books.

Shane, S. 2000. Prior knowledge and the discovery of entrepreneurial opportunities. ***Organization Science***, 11(4): 448-469.

Sharma, S., Sugumaran, V., & Rajagopalan, B. 2002. A Framework for Creating Hybrid Open Source Software Communities. ***Information Systems Journal***, 12(1): 7-25.

Sherer, P. D., & Lee, K. 2002. Institutional change in large law firms: A resource dependency and institutional perspective. ***Academy of Management Journal***, 45(1): 102.

Sinfield, J. V., Calder, E., McConnell, B., & Colson, S. 2012. How to Identify New Business Models. ***Sloan Management Review***, 53(2): 85-90.

Steensma, H. K., Marino, L., Weaver, K. M., & Dickson, P. H. 2000. The influence of national culture on the formation of technology alliances by entrepreneurial firms. ***Academy of Management Journal***, 43(5): 951-973.

Svejenova, S., Planellas, M., & Vives, L. 2010. An Individual Business Model in the Making: a Chef's Quest for Creative Freedom. ***Long Range Planning***, 43(2/3): 408-430.

Teece, D. J. 2010. Business Models, Business Strategy and Innovation. ***Long Range Planning***, 43(2–3): 172-194.

Vaara, E., & Whittington, R. 2012. Strategy-as-Practice: Taking Social Practices Seriously. ***Academy of Management Annals***, 6(1): 285-336.

Vaghely, I. P., & Julien, P.-A. 2010. Are opportunities recognized or constructed?: An information perspective on entrepreneurial opportunity identification. ***Journal of Business Venturing***, 25(1): 73-86.

Van de Ven, A. H., Sapienza, H. J., & Villanueva, J. 2007. Entrepreneurial pursuits of self- and collective interests. ***Strategic Entrepreneurship Journal***, 1(3-4): 353-370.

Wernerfelt, B. 1984. A Resource-based View of the Firm. ***Strategic Management Journal***, 5(2): 171-180.

Wernerfelt, B. 1995. The resource-based view of the firm: Ten years after. ***Strategic Management Journal***, 16: 171-174.

Wirtz, B. W., Schilke, O., & Ullrich, S. 2010. Strategic Development of Business Models: Implications of the Web 2.0 for Creating Value on the Internet. ***Long Range Planning***, 43(2–3): 272-290.

Yin, R. K. 1994. ***Case Study Research: Design and Methods***. Thousand Oaks, CA: Sage.

Zott, C., & Amit, R. 2007. Business Model Design and the Performance of Entrepreneurial Firms. ***Organization Science***, 18(2): 181-199.

附件一：少力設計

Less for More: Resource Reconstruction in Entrepreneurial Bricolage

Ruey-Lin Hsiao
National Cheng-Chi University
Room 81013, 64, Chih-Nan Rd., Sec. 2, Wenshan,
College of Commerce, Taipei, 116, Taiwan
Tel: +886 (0)229393091 ext 81013
Email: rueylin.nccutim@gmail.com

Chi-Hsu Liao
National Cheng-Chi University
Room 80911, 64, Chih-Nan Rd., Sec. 2, Wenshan,
College of Commerce, Taipei, 116, Taiwan
Tel:+886(0)229393091 ext 89511
Email: raffael.liao@gmail.com

Submitted to 30th EGOS Colloquium, Rotterdam, the Netherlands, July 3–5, 2014

Sub-theme 05: (SWG) Strategizing Practices and Resources: Unpacking the Micro-Foundations and Dynamics of Resource Allocation, Deployment, Development and Perception

January 10, 2014

Acknowledgement: This research is financially supported by National Science Council (Taiwan), under NSC-99-2410-H-004-013-MY3.

Abstract

Corporate growth requires constant investment of resources. However, entrepreneurial firms situated in a disadvantaged environment, or in confrontation with high-power opponents, may have great difficulties to acquire necessary resources to sustain growth. These firms need to become entrepreneurial and employ inadequate resources to over constraints while achieving innovations. By taking a bricolage (making-do with resources at hand) perspective, our study investigates how entrepreneurial firms may acquire and deploy relatively limited resources to create solutions and design viable business models. This case study examines the innovative practices employed by a leading cable-television company in the entertainment businesses in Asia. By means of artists' contract design, drama development and channel portfolio, our study describes how resources could be reconstructed to create solutions to overcome constraints. This paper reports three patterns of resource construction in its entrepreneurial bricolage. These patterns explain the practices of hybridizing resource, reserving resource and syndicating resource in responding to frugal conditions. Theoretically, this research adds to the theory of bricolage, in the strategy-making context, and explains why analyses of resource construction could complement to the prior literature. By examining strategists' moves and motives, this case study elaborates the complexity of resource deployment and describes a bricolage approach to strategizing. Practically, the patterns of resource construction provide useful 'less-for-more' designs to firms to implement strategies under disadvantage circumstances. For every thing, there is a season. Although entrepreneurial firms may not have ample resources to create new products or services, they could always create something from the 'minimal everything', if they would come to grip with the tactics of resource reconstruction suggested by this study.

Keywords: bricolage, resource construction, hybridizing resource, reserving resource, syndicating resource, creative industry

Objectives of the Research

This research aims to explore practices of entrepreneurial bricolage and investigate how resources may be reconstructed by firms at a disadvantage (Baker & Nelson, 2005). To sustain firms' growth, managers need to acquire, allocate or deploy resources to resolve challenges from the competitors or constraints imposed by the environment (Penrose, 1959). Nonetheless, how may firms deploy resources to deal with the survival issues, or innovate products and services, under constraints?

The resource-based view suggested that firms should to establish valuable, rare, inimitable and non-substitutable resources in order to gain competitive advantage (Barney, 2001; Conner & Prahalad, 1996; Wernerfelt, 1984). This literature stresses that firms must integrate resources internally, as well as acquire, allocate and exchange resources externally, so as to develop capabilities strong enough to grow in the market. However, the resource-based view seems to assume that acquisition of resource is a relatively smooth process. In reality, firms often face resource-constraints.

Penrose (1959) reminded us that the growth process is constantly constrained with the allocation of resources. For instance, the capacity of human resources is tied to individual firms. If a firm would allocate its employees to work on marketing activities, it would have less resource to engage in research and development tasks. Any expansion requires new recruit of more resources, and needs to recruit more human resources; thereby demands more monetary investments. Moreover, new recruits may not work effectively without a period of on-job training. As such, most firms tinker with insufficient resources when they embark on various growth activities, such as pursuing more sales, inventing new products, venturing into new markets, or fending off rivals (Baker, Miner, & Eesley, 2003a).

Therefore, how may we deal with resource constraints during firm growth? Current literature suggests three possible resolutions. First, firms could recombine or integrate two seemingly useless resources into a useful one (Galunic & Rodan, 1998). By identifying the synergy of resources, firm could resolve constraints (Larsson & Finkelstein, 1999). Alternatively, finding collective effects among complementary resources is also a key to tackle constraint problems (Collis & Montgomery, 1995; Karim & Mitchell, 2000).

Secondly, firms could leverage on their prior knowledge. Through accumulated

experience, firms could maximize resources effectively to achieve desired results. Firms could take advantage of their prior knowledge to employ the same technology (three dimensional sculpturing systems) in various professional scenarios (Shane, 2000).

Thirdly, firms could create something from nothing. Some resources are less visible than others. Entrepreneurs could identify seemingly useless resources by reconstruct their values. This would involve three improvised practices of bricolage (or tinkering), as suggested in Baker's serial studies (Baker, 2007; Baker et al., 2003a; Baker & Nelson, 2005). Firms could making-do of resources at hand and seek ways to alternate its value. For instance, a deserted bus could be transformed into mobile library to serve low-income families. A farmer's land was filled with intoxicated gas; they could take a second-hand generator and turned the gas into electricity. This requires an elaborate assessment of inhibiting factors so as to turn liabilities into credibility. As Baker's studies suggested, some resources appeal to be useless; but if we take a different standpoint, firms could turn crude resources into gem. The shortage of resources in a sense is a blessing in disguise as it inspires entrepreneurs to conceive impossible solutions when resources are affluent (Garud & Karnøe, 2003).

The theory of bricolage recognizes the importance of improved practices for innovation in terms of making-do, tinkering with resources at hand, and creative recombining resources. Additionally, shifting people's occupational roles or changing existing work routines could also bring about bricolage (Bechky & Okhuysen, 2011). For instance, if an art director replaces a film director's role, or if a design engineer brings his expertise to the production line, certain kinds of improvised innovation may occur. This type of cross-boundary making-do would also stimulate bricolage.

However, current studies seems to be more interested in various practices of bricolage and pay less attention to the micro-level of resource deployment. In exercising bricolage, under resource-constraints, how may people (i.e. managers) tinker with resources? This issue has not yet fully addressed in previous research. We need to elaborate how resources are tinkered before reuse. After all, as Penrose (1959) remarks, the growth of firms is often connected with the attempts of a particular group of 'people' to do something, and not 'firms'. Our study calls for an attempt to move ahead, from the issue of how people acquire, allocate and deploy resources, to the subject of how do people rejuvenate, effectuate and reconstruct resources (Baker & Nelson, 2005; Bechky & Okhuysen, 2011; Duymedjian & Rüling, 2010). This attempt is to take a closer look at how bricoleurs reconstruct resources for alternative uses when situations put them at a disadvantage.

This theoretical lacuna motivates us to examine the issue of 'resource reconstruction' in bricolage, which connotes two investigative issues. First, in the face of resource constraints, managers must exercise creative response to the competitors or the environment. In this study, we will refer to these managers or strategists, as bricoleurs, who needs to exercise bricolage strategically in order to achieve certain innovation, or perform their tasks differently, to resolve constraints, such as lack of funding, brain drain or sharking markets. In other words, our study suggests that exercising bricolage under constrained situations is a form of 'strategizing' (Johnson, Melin, & Whittington, 2003). Our goal is to examine how the strategists (i.e. the collective party consisting of various strategy implementation teams, which may include more than the top executives) could respond to constraints creatively, with only handful of resources.

Secondly, in light of resource constraints, strategists must create new ways of using resources at hand. But they face added challenges. They may need to identify resources that are less visible to them; swap resources with high-power partners, transform the value of their finite amount of resources at hand, or even collaborate with strong competitors to obtain necessary resources. Nonetheless, how may strategists recognize such opportunities and identify something useful within their scant resources? Why would high-power partners or competitors swap valuable resources with the low-power strategists? Furthermore, in what ways strategists may transform the value of resources at hand, especially when their choices are not readily available.

In considering the two issues, our aim is to address the 'reconstruction' of resources in situations where competitions are heightened and supports are restricted (Baker & Nelson, 2005; Cleaver, 2002; Dutton et al., 2010). We will investigate how strategists remake the same resources for multiple purposes and generate a wide range of innovation. The next section explains how this research is operationalized.

Research Methods

This research employs qualitative case study method, with a focus on how strategists deploy resources (Denzin & Lincoln, 1994). This method is useful in surfacing the dynamics of social actors' strategic moves in responding to survival situation, leading to patterns of organizing resource (Johnson, Langley, Mein, & Whittington, 2007). By examining strategists' responses, our goal is to identify their actions and motives behind.

Case selection: This study selected Sanlih Entertainment Television (in short, SET; see

www.iset.com.tw) in Taipei (Taiwan, Republic of China) as the target of investigation. SET is a representative case for theoretical sampling (Eisenhardt, 1989), because it indicates three suitable factors. First, the firm faced severe challenges from the market environment. The rapid growth of entertainment industry in Mainland China (People Republic of China) had caused 'brain drain' in Taiwan. The established actors of television dramas at SET would quickly be recruited by talent agencies from Mainland China. The entry-level remuneration for fresh leading artists is around NT$50000 (circa USD17000) per episode in Taiwan. China's talent agencies, however, would offer RMB¥50000 (circa USD8500) to attract these actors. This 'same amount, different currency' approach had significantly affected SET. The constant lack of leading actors and actresses delayed SET's production schedule of idol drama.

In addition to the brain drain of artists, the shortage of scriptwriters is another problem hampers the production of idol dramas. Generally, each drama requires 15-20 episodes, which requires around five scriptwriters of different skill sets to accomplish the tasks. Not only the domestic television companies compete for the talented scriptwriters, but also the production teams from China that engage the first-rate scriptwriters through attractive offers (five times repayment than that of the domestic offer had become a norm in the martket). For instance, the scriptwriting teams, which create the box-office favorite drama 'King of Lang-Lin' in China, were recruited from Taipei.

The third challenge for SET is the constraint from market size. There were more than 200 cable television channels and eight wireless television channels in Taiwan, as a result of deregulation policy in the telecommunications industry. For a resident population of 20 millions, Taiwan has too many television channels oversupplying dramas to a relatively small market. According to government statistics, there were only 4,979,700 subscribers for cable television and the estimated numbers of total television subscribers were about 8,200,000. This number was not conducive for sustaining advertising incomes, as they are calculated by CPRP (Cost Per Rating Point). Each CPRP was worth of USD250. The cost of each episode (in 90 minutes) is around USD84,000. This meant that active CPRP must reach 4.6 to recover the production cost. However, due to the overcrowded market, each episode on average often scored less than 3 points. This demotivated television companies to invest more resources on drama productions and affect their quality.

In spite of the constraints abovementioned, SET managed to produce 4000 hours of dramas annually. In comparison to the domestic competitors, who created only 500 hours per

year, SET produced eight times more than its counterparts. In 2006, SET maintained the highest rating and topped the advertising incomes in the domestic market. By 2012, SET reached USD19 millions in revenue. Although this revenue was not considered attractive enough in China, it established SET's leading position in Taiwan. Taking into account these factors, SET is a suitable case for bricolage analysis. How SET may reconstruct its available resources to deal with these constraints? Why would SET respond to brain drain of artists, shortage of scriptwriters, and restricted advertising revenues? This case offers useful evidence to understand the process of resource reconstruction within bricolage.

Data collection: Our data gathering spread around 16 months (2012/9~2013/12). Table 1 summarises the fieldwork arrangement. Our fieldwork consisted of two main steps. First, we gathered data concerning the constraints facing the firm and SET's practices in response to the constraints. The purpose is to understand SET's unique ways of organizing under conditional restrictions, so as to suggest evidence on bricolage (Dutton, Worline, Frost, & Lilius, 2006; Hansen, 2008; Orlikowski, 2002). As a result, we focused on SET's three core modes of organizing: artists' (including both actors and actresses) contracting, scriptwriters nurturing programmes, and portfolio planning for channels. In addition to personal interviewed with SET's core execution team, including executives and R&D (Research and Development) Department's staff at Story Lab, we also sent a research assistant to the Story Lab for continuous data collection for two months (July to September 2013). Our purpose was to gain a fuller understanding of SET's community-building initiatives with film directors, artists and scriptwriters, among other experts.

[INSERT TABLE 1 HERE]

Secondly, to gain a deeper look of these organizing practices, we visited SET's film production sites and participated in various award ceremonies (see Table 1). These events helped us get in touch with industry experts and familiarize with various rituals in the entertainment circle. This type of field observation facilitated our understanding of the intricate relationships among different professional communities. Through these events, we were able to talk to officers from Ministry of Culture and understand various policies employed to promote the inland audio-visual industry.

The data analysis included three core procedures. First, we examined SET's three strategic responses in terms of artists' contracting, screenwriting's nurturing and channel portfolio planning. At this stage, we mainly described what the strategists at SET performed

in dealing with their survival concerns (see Table 2). Second, we analysed the organizing patterns behind these practices by means of how resources were deployed (see Table 3). Hence, from artists' contracting practices, we identified the principle of 'resource hybridizing'. From scriptwriters' nurturing practices, we identified the principle of 'resource reserving'. From SET's arrangement of channels for advertisers, we identified the principle of 'resource syndicating'. Third, we examined these organizing practices to identify how core resources were reconstructed (see Table 3). In so doing, we recognized the conventional ways of resource deployment and investigated why such approaches were not used by SET. Subsequently, we examined how SET reconstructed such resources (i.e. their actions) and the underlying motives.

Our overarching purpose is to surface purposive actions of resource reconstruction within these organizing practices. By tracing the strategists' moves and motives, we aim not only to illustrate what the strategists performed but also their subtle ways of tinkering with resources. Especially, in this case study, the analysis of 'tinkering' is mainly concerned with resource reconstruction. Our hope is to generalize the findings beyond the entertainment context. I believe that SET's approaches to resource reconstruction could offer useful lessons to firms employing bricolage in other business contexts.

Research Findings

Our full paper will articulate the three modes of organizing practices. This extended abstract highlights the case study in two main parts. The first part explains SET's strategic responses (i.e. their strategic practices) to disentangle the constraints, illustrating how the firm exercised bricolage. The second part examines the process of resource reconstruction and elaborates three modes of organizing.

Part 1 examines SET's entrepreneurial bricolage, which was exercised through three strategic responses to cope with constraints. These practices include flexible manoeuvring of artist contracts, long-term nurturing of scriptwriters, and portfolio planning of television channels. Each practice is summarized below (see Table 2).

[INSERT TABLE 2 HERE]

1. Flexible manoeuvring of artist contracts: SET could not recruit enough contracted artists; it therefore split artists' contract management into three categories in order to extend sourcing methods. First, the comprehensive performance contract aimed to develop the

artists' multi-talent potentials; secondly, the artisan contract blended professional craftsmanship into variety shows (e.g. food & catering programmes); and thirdly, the volume-performing contracts were used to align with fashion model agencies and sourced suitable artists for idol dramas.

2. Nurturing communities-of-practice: SET picked up key themes from its existing drama production and designed scriptwriting exercises for open competition. SET collaborated with YouTube for this open competition campaign and attracted thousands of submitters; most of them were Internet novel writers. SET selected 200 of these submitters and offered extensive free courses (140 hours) to train these scriptwriters in order to familiarize with the firm's production specifications. Furthermore, through this series of course, SET incubated communities of practices and established a platform for forming mission-oriented taskforce. In addition to scriptwriters, a drama production team also requires film directors, production managers, marketing specialists, props makers, animation designers, lighting engineers and makeup artists. The course brought them together and SET offered intern projects to allow scriptwriting in teamwork. In this way, SET blended scriptwriting course into pilot drama production.

3. Portfolio planning of television channels: Instead of staying with a single channel, the firm acquired five additional 'smaller' (or greener channel, in terms of rating) channels. The firm repositioned these channels and consolidated them into a 'portfolio family'. This portfolio approach served for two purposes: first, to expand broadcasting capacities for various genres of dramas, so as to maintain artist visibilities and production volume; second, the portfolio solutions accommodate more advertisements and maximize profits. Moreover, SET employed a wireless-self-cable 'sandwich' approach to absorb production costs. In this approach, selected dramas' premieres were broadcasted in wireless channels (i.e. selling the premieres rights to rivals). In alternative weeks, the selected dramas would be shown in SET channels. After a few months, other cable channels (secondary rivals) could purchase the third-round broadcasting rights. Using this sandwich model, SET could demonstrate favourable ratings in each drama and increase bargaining power for overseas licensing. Additionally, by showing favourable ratings, the artists would receive commercial performance invitations (such as enterprises' year-end parties) and increase incomes from artist brokerage for SET.

Part 2 represents second-order analysis and explains the process of resource reconstruction. The goal is to demonstrate an alternative way of tinkering with resources.

This examines not only how strategists integrate and recombine resources but also how available resources are reconstructed and reapplied. We elaborate three modes of reconstruction. Table 3 compares the conventional method of managing resources to that of SET's approaches. By showing the before-after contrast, we could gain a better idea of how resource reconstruction occurs.

1. Creating a hybrid mode of talent sourcing: Typically, television firms and talent agencies would incubate a dedicated group of artists and incorporate division to manage these artists' performance contracts. The challenge is that artists might not want to sign a comprehensive contract with television companies because they could miss out opportunities offered by other television firms. SET signed comprehensive contracts with selected artists and sourced alternative talent pools. In this hybrid mode, SET developed its exclusive artists with versatile talents. For instance, an artist could begin with idol drama performance and extend to pop-music singing, or vice versa. Moreover, the artisan contract incorporated renowned chefs, bakery champions, and food program hosts into various parts of drama production, while extending their career to celebrity endorsement. The volume-performing contract sourced lead actors/actresses from model agencies to reduce search costs. Behind this practice is a principle of resource hybridizing.

2. Preserving inside while maintaining outside: Keep an in-house department to maintain scriptwriters to ensure consistent drama outputs. However, domesticated scriptwriters often suffered from inspiration dried up. Nonetheless, if a television firm outsourced tasks to external scriptwriters, the output constantly mismatched with the firm's required production specification and theatrical styles. SET targeted at Internet novel writers and offered a 140-hour free course to nurture the selected scriptwriters. This pool of trained freelancers understood the firm's required specifications and story-telling styles, and could work in team to create drama scripts that are readily to be adapted by the firm's production teams. This year-round course incubated a community of drama production experts. The course served as a platform to maintain talent reservoir in which SET could readily draft specialists according to different drama needs and production schedules. Behind this practice is a principle of resource reserving.

3. *Syndicating titles through sundry channels*: Most television firms only run single channel and thus suffer from the lack of capacity. They thereby could not accommodate enough advertisers to sustain income revenues. SET syndicated drama productions in its drama channels while placing advertisements in a portfolio of sundry channels. The sandwich

method broadcasted a title through three time sequences. Collectively, this syndicate model accumulated favourable ratings for promoting overseas licensing. This enabled an alternative business model by selling SET's intellectual properties. Behind this practice is a principle of resource syndicating.

Implication and Conclusion

Corporate growth is sustained by regular resource investment; however, most corporates are either in shortage of resources or unable to obtain resources required (Penrose, 1959). A core obstacle for corporate growth could be resource constraints. Against such background, most firms would need to maximize whatever is available at hand to overcome resource constraints. The theory of bricolage suggests ways to deploy frugal resources, yet it is still not entirely clear how may strategists tinker with resources (Baker & Nelson, 2005; Bechky & Okhuysen, 2011; Dutton et al., 2010). Theoretical contribution of this research is thus of twofold: on one hand, this study investigates how strategists engaged in 'resource reconstruction' (as a form of bricolage) and their strategic moves in developing innovative solutions for overcoming constraints; on the other hand, this research aims to distil the organizing patterns of such bricolage. In this regards, we suggest that this form of bricolage could become an alternative mode of organizing in entrepreneurial firms.

Furthermore, our study speaks to the movement of 'Strategy-as-Practice' (Jarzabkowski & Whittington, 2008; Vaara & Whittington, 2012). In line with this movement, we pay more analytical emphasis on strategists' practices and their cognition. In this research, we propose that the 'Strategist-as-Bricoleur' angle may enrich Strategy-as-Practice literature, when strategists behold only parsimonious resources. In such frugal business contexts, strategists require a set of new skills to manage resources. They need to learn to rejuvenate, effectuate and reconstruct resources. By exercising skills of bricolage, future strategists would need to mobilise inactive resources seeking multiple applications of a resource, and redefine the meaning of a given resource. Our study illustrates three distinct practices of resource reconstruction, and makes the reconstruction process more visible to executives. In this way, the 'Strategist-as-Bricoleur' approach stipulates a form of 'strategizing' under constrained situations and suggests how the collective strategists could respond to constraints creatively.

Practically, this study suggests new mode d'emploi for managing entrepreneurial bricolage. It calls attention to recognize the new role of strategists and their ability to respond to constraints at a disadvantage. This study shows that apart from creating something from

nothing, it is also important strategists to recreate something from everything. The future strategists, be them in small or large enterprises, would inevitably face dearth of resources. Our study offers a useful guide for strategists in manoeuvring their finite amount of resources into viable innovations in order to outperform their competitors under difficult situations.

The three organizing patterns, resource hybridising, resource reserving, and resource syndicating, indicate valuable lessons not only for executives in audio-visual or creative/cultural industries, but also offer strategists who need to innovate within thrifty business contexts. The three practices of bricolage would commence an exploratory journey to search for more versatile approaches to resource reconstruction. By understanding how strategists making-do with resources, we begin to appreciate the wisdom of ‘less is more’, whilst our study further reveals the ‘less for more’ possibilities to enable the miracle of Midas touch.

References

Baker, T. 2007. Resources in play: Bricolage in the toy store(y). ***Journal of Business Venturing***, 22(5): 694-711.

Baker, T., Miner, A. S., & Eesley, D. T. 2003. Improvising Firms: Bricolage, Account Giving and Improvisational Competencies in the Founding Process. ***Research Policy***, 32(2): 255-276.

Baker, T., & Nelson, R. E. 2005. Creating Something from Nothing: Resource Construction through Entrepreneurial Bricolage. ***Administrative Science Quarterly***, 50(3): 329-366.

Barney, J. B. 2001. Is the Resource-Based 'View' a Useful Perspective for Strategic Management Research? Yes. ***Academy of Management Review***, 26(1): 41.

Bechky, B. A., & Okhuysen, G. A. 2011. Expecting the Unexpected? How SWAT Officers and Film Crews Handles Surprises. ***Academy of Management Journal***, 54(2): 239-261.

Cleaver, F. 2002. Reinventing Institutions: Bricolage and the Social Embeddedness of Natural Resource Management. ***European Journal of Development Research***, 14(2): 11.

Collis, D. J., & Montgomery, C. A. 1995. Competing on Resources: Strategy in the 1990s. ***Harvard Business Review***(July-August): 118-128.

Conner, K. R., & Prahalad, C. K. 1996. A Resource-based Theory of the Firm: Knowledge versus Opportunism. ***Organization Science***, 7(5): 477-501.

Denzin, N. K., & Lincoln, Y. S. (Eds.). 1994. ***Handbook of Qualitative Research***. London: Sage.

Dutton, J. E., Roberts, L. M., & Bednar, J. 2010. Pathways for Positive Identity Construction at Work: Four Types of Positive Identity and the Building of Social Resources. ***Academy of Management Review***, 35(2): 265-293.

Dutton, J. E., Worline, M. C., Frost, P. J., & Lilius, J. 2006. Explaining Compassion Organizing. ***Administrative Science Quarterly***, 51: 59–96.

Duymedjian, R., & Rüling, C.-C. 2010. Towards a Foundation of Bricolage in Organization and Management Theory. ***Organization Studies***, 31(2): 133-151.

Eisenhardt, K. M. 1989. Building Theories from Case Study Research, ***Academy of Management Review***, Vol. 14: 532-550: Academy of Management.

Galunic, D. C., & Rodan, S. 1998. Resouces Recombination in the Firm: Knowledge Structure and the Potential for Schumpeterian Innovation. ***Startegic Management Journal***, 19(12): 1193-1201.

Garud, R., & Karnøe, P. 2003. Bricolage versus Breakthrough: Distributed and Embedded Agency in Technology Entrepreneurship. ***Research Policy***, 32(2): 277.

Hansen, H. 2008. A grammar of organizing. ***Organization Studies***, 29(12): 1591.

Jarzabkowski, P., & Whittington, R. 2008. A Strategy-as-Practice Approach to Strategy Research and Education. ***Journal of Management Inquiry***, 17(4): 282-286.

Johnson, G., Langley, A., Mein, L., & Whittington, R. 2007. ***Strategy as practice: Research, Directions, and Resources***. Cambridge: Cambrige University Press.

Johnson, G., Melin, L., & Whittington, R. 2003. Micro Strategy and Strategizing: Towards an Activity-based View. ***Journal of Management Studies***, 40(1): 3-22.

Karim, S., & Mitchell, W. 2000. Path-dependent and Path-breaking Change: Reconfiguring Business Resources Following Acquisitions in the US Medical Sector, 1978-1995. ***Strategic Management Journal***, 21(10-11): 1061-1081.

Larsson, R., & Finkelstein, S. 1999. Integrating Strategic, Organizational, and Human Resource Perspectives on Mergers and Acquisitions: A Case Survey of Synergy Realization. ***Organization Science***, 10(1): 1-26.

Orlikowski, W. J. 2002. Knowing in practice: Enacting a collective capability in distributed organizing. ***Organization Science***, 13(3): 249-273.

Penrose, E. T. 1959. The Theory of the Growth of the Firm. Oxford: Basil Blackwell.

Shane, S. 2000. Prior Knowledge and the Discovery of Entrepreneurial Opportunities. ***Organization Science***, 11(4): 448-469.

Vaara, E., & Whittington, R. 2012. Strategy-as-Practice: Taking Social Practices Seriously. ***Academy of Management Annals***, 6(1): 285-336.

Wernerfelt, B. 1984. A Resource-based View of the Firm. ***Strategic Management Journal***, 5(2): 171-180.

Table 1: Fieldwork Arrangement Overview

Methods	Informants	Period	Times	Hours
Personal Interviews	Executives at SET	2012/09/11	2	4
	Story Lab R&D Staff at SET (four employees)	2013/7~9	36	36
	Teaching Faculty Members in Story Lab's Courses (six key lecturers)	2013/7~9	6	6
	Partner of SET (Cable Television Co.), Vice President	2013/05/24	1	2
	Partner of SET, Film Producer	2013/3/14 2013/5/22	2	4
	Partner of SET (Wireless Television Co.), Planning Division Manager	2013/3/25	1	3
	Partner of SET (Wireless Television Co.), Deputy General Manager	2013/05/01	1	2
	Officers in Ministry of Culture	2013/6	2	4
Site Audit	Onsite visit to drama production	2013/05	1	4
Non-participatory Observation	Participating in the Story Lab Course (for Script Writers)	2013/7~9	60	120
	Focus Group with Industry Experts	2013/12/15	1	6
	Golden-Horse (Film) Award Ceremony	2012/11/24 2013/11/23	2	16
	Taiwan Pop-Music Award Ceremony	2012/6/23	1	8
Total Immersion in the Field			116	335

Table 2: The Case Firm's Strategic Response to Constraints

External Constraints	Core Resources	Strategic Responses
Brain drain: the leading artists were allured to more affluent markets.	Artists	Flexible manoeuvring of artist contracts: 1. Comprehensive performance contract: Incubating dedicated artists for internal drama production. 2. Artisan contract: Creating a new genre of artist through variety shows. 3. Volume-performing contract: Sourcing suitable lead actors for idol dramas by setting up strategic alliances with fashion model agencies.
Production backlog: Shortage of scriptwriters severely delayed drama production schedules.	Scriptwriters	Nurturing communities of practice: 1. Organizing scriptwriting competition to attract Internet novel writers; 2. Offering extensive free courses (140 hours) to train scriptwriters to familiarize with the firm's production specifications. 3. Incubating communities of practice so as to establish a platform for forming mission-oriented taskforce.
Shrinking market: The domestic market size was relatively small; too many competitors contested for limited advertisers.	Cable TV Channels	Portfolio planning of television channels: 1. SET acquired five additional greener channels so as to provide portfolio services to advertisers. 2. SET employed a 'sandwich' approach to reduce production costs while broadening broadcasting periods. The firm could leverage on favourable ratings to negotiate higher overseas licensing fees and obtain invitations for commercial performance.

Table 3: How Resources were Reconstructed

Core Resources	Conventional Approach	After Reconstruction	Organizing Patterns
Artists	Incubate dedicated artists and incorporate a talent agency division to manage performance contracts. However, if artists sign contracts with cable television firms, they might let other performance opportunities slip through their fingers. Most television firms encountered the problems of sourcing leading artists.	*Creating a hybrid mode of talent sourcing*: SET kept minimal comprehensive-contracts with selective artists and leveraged outside talent pools. SET employed artisan contracts and volume-performing contracts to introduce semi-artists (artisans in various occupations) and transient artists (debutant fashion models who only work for SET within three-year periods).	Resource Hybridizing: Incorporate three different contract models and allow them to support each other. To reconstruct resources by hybridization, resources from multiple sources are converged to support a core task.
Scriptwriters:	Keep an in-house department to maintain scriptwriters to ensure consistent drama outputs. However, domesticated scriptwriters often suffered from inspiration dried up. Nonetheless, if a television firm outsourced tasks to external scriptwriters, the output constantly mismatched with the firm's required production specification and theatrical styles.	*Preserving inside while maintaining outside*: SET offered a 140-hour course to nurture the selected scriptwriters. These trained freelancers understood the firm's required specifications and story-telling styles, and could work in team to create drama scripts to the firm's specification. This course also built a drama eco-system that includes a community of experts. SET could readily draft taskforce to support drama production.	Resource Reserving: This is similar to the concept of reserve army officers. By keeping scriptwriters outside, the talents may maintain creativities and SET could mobilize such resources in ad hoc fashion.
Cable Television Channels	Most television firms only run single channel and thus suffer from the lack of capacity. They thereby could not accommodate enough advertisers to sustain income revenues.	*Syndicating titles through sundry channels*: SET syndicated drama productions in its drama channels while placing advertisements in a portfolio of sundry channels. The sandwich method broadcasted a title through three time sequences. Collectively, this syndicate model accumulated favourable ratings for promoting overseas licensing. This enabled an alternative business model by selling SET's intellectual properties.	Resource Syndicating: SET employed two syndication approaches. First, it placed advertisements in a syndicate of channels. Second, it sold a series of drama programs to various television stations through temporal differences. This 'wireless-self-cable' sandwich method syndicated SET's titles and maximized incomes.

附件二：資源流研究

Navigating Resource Flow: Becoming Hybrid Business Models in News Media

Ruey-Lin Hsiao
National Cheng-Chi University
Room 81013, 64, Chih-Nan Rd., Sec. 2, Wenshan, College of Commerce, Taipei, 116, Taiwan
Tel: +886 (0)229393091 ext 81013
Email: rueylin@nccu.edu.tw

Su-Hwa Ou
Soochow University
56, Kueiyang St., Sec. 1, Taipei, 10048, Taiwan
Tel: +886 (0)23111531 ext 3697
Email:suhua.scu@gmail.com

Chun-Fang Young
National Cheng-Chi University
Room 80911, 64, Chih-Nan Rd., Sec. 2, Wenshan, College of Commerce, Taipei, 116, Taiwan
Tel: +886 (0)229393091 ext 81013
Email: ashira0408@gmail.com

Chia-I Cheng
National Cheng-Chi University
Room 80911, 64, Chih-Nan Rd., Sec. 2, Wenshan, College of Commerce, Taipei, 116, Taiwan
Tel: +886 (0)229393091 ext 81013
Email: twinkle9998@gmail.com

Submitted to 30th EGOS Colloquium, Rotterdam, the Netherlands, July 3–5, 2014

Sub-theme 27: Business Model and Strategies: Organizations and Alternatives Forms of Organizing

January 13, 2014

Acknowledgement: This research is financially supported by National Science Council (Taiwan), under NSC-99-2410-H-004-013-MY3.

Navigating Resource Flow:
Becoming a Hybrid Business Model in News Media

Abstract

This article examines how a hybrid business model is emerged from a newspaper firm's transformation process. Our study highlights 'resource flow' as an alternative way of shaping business model innovation. The core thesis is to trace the flow of resource and investigate how firms may integrate both the internal and external resources in order to create new sources of revenues and renovate the nature of their business. Through a qualitative case study, we investigate a newspaper firm's organizational transformation and explore how creative navigation of resource flow could result in a hybrid business model. Specifically, this findings describes three patterns of navigating resource flow: (1) resource effectuating, which explains how one resource could be put into multiple applications; (2) resource crossing-over, which illustrates how cross-boundary collaboration may create new resources; and (3) resource recycling, which converts the value of a seemingly less useful resource. Theoretically, this study added to open innovation theories and business model literature by showing the link between resource flow and hybrid business models. Practically, this paper examines how enterprises may achieve resources synergy to bring about business model innovations.

Keywords: case study, hybrid business model, open innovation, resource flow, resource effectuating, resource crossing-over, resource recycling

Objectives of the Research

As an insight of his serial research, Chesbrough suggests that the value created by a splendid technology added by an ordinary business model is significantly less useful than an ordinary technology supported by a brilliant business model (Chesbrough, 2003, 2006, 2010). The importance of business model innovation becomes apparent. Although firms continue to invest in new technologies, products and services, they could not neglect opportunities rendered by alternating their business models (Teece, 2010). The design of business model provides executives a window to conceptualize their alternatives in ever-changing environments.

The first task of a business model is to articulates a firm's value propositions in a given business context (Amit & Zott, 2012). Such propositions assist firms to identify target users, recognize market segmentations, deliver products/services, and specify sources of revenue (Chatterjee, 2013; Chesbrough & Rosenbloom, 2002). Current studies suggest useful ways to innovate business models, such as incorporating organizational competency (Sinfield, Calder, McConnell, & Colson, 2012), experimenting with cross-boundary knowledge (Svejenova, Planellas, & Vives, 2010; Zott & Amit, 2007), interacting with users through network technology (Haefliger, Jäger, & von Krogh, 2010; Hienerth, Keinz, & Lettl, 2011; Wirtz, Schilke, & Ullrich, 2010), balancing the use of resources (Achtenhagen, Melin, & Naldi, 2013), maintaining culture-structure consistency (Bock, Opsahl, George, & Gann, 2012), planning a portfolio model to maximize value (Sabatier, Mangematin, & Rousselle, 2010), and aligning with proactive strategic actions (Markides & Sosa, 2013).

Theories of open innovation further extend the scope of business model innovation to external partners. Firms could reinvent their business models by collaborating with their supply chain partners (Dahan, Doh, Oetzel, & Yaziji, 2010), their users or customers (Baldwin, Hienerth, & von Hippel, 2006), and even their rivals (Bouquet & Birkinshaw, 2008). For example, IBM shared 500 units of software to its competitors to create intellectual commons for product compatibility, while forming research alliances with Toshiba and Chartered to reduce development cost (Chesbrough, 2003).

However, in current studies, two significant themes seem to receive sufficient attention. First, in the ongoing design of business models, firms begin to evolve from a single business model to that of multiple business models. A signature restaurant could co-exist with catering

services and a branded publisher (Svejenova et al., 2010). An automotive firm could also develop a business in vehicle-leasing services (Chesbrough, 2011b). Although we know more about these diversified business models, we understand less about hybrid forms of business model (Bonaccorsi et al., 2006). Especially, more studies are needed to elaborate the process of how hybrid business models come into shape. In what ways could firms benefit from such a hybrid form of business model? Particularly, in hybrid forms, business models may need to complement to each other. How may firms create such complementary effect?

Secondly, in a hybrid business model, and to understand how complementary effect occurs, we need to understand how resources are acquired, managed and deployed. Surprisingly, the issue of resource is undervalued in the literature of business model and the theory of open innovation. As Chesbrough (2006) suggested, "Open innovation is the use of purposive *inflows* and *outflows* of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively. [This paradigm] assumes that firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as they look to advance their technology." The key point, in our view, is the flow of 'knowledge', or more generally 'resources' (Chesbrough et al., 2006).

From this standpoint, we may raise two issues. The first is to understand the inventory of resources, and the second is to trace the 'inflow' and 'outflow' of resources. A series of questions could be asked. In developing a new business model, what internal resources does a firm have and what external resources may be of available? How may a firm purposively navigate the inflow of resources from both the internal units and the external partners? Similarly, how may a firm guide the outflow of its resources to both the internal units and the external partners? Fundamentally, in the perspective of open innovation, firms need to engage in resource exchange constantly in the shaping of its business model. Therefore, how does the firm integrate resources in order to accelerate innovation or create a variety of new business opportunities?

The issue of resource flow is not fully addressed in prior research. Although the resource-based view literature largely investigates resource acquisition for obtaining competitive advantage (Barney, 2001), it has not yet examined the flow of resources at the micro-level. This 'flow' issue is a theoretical lacuna that motivates our research. Our study examines a leading newspaper firm, United Daily News Group, in Taiwan. We traced how this firm has come to grow into a hybrid business model, extending its boundary from journalism to information services, art curation and e-commerce, among others. Our research

aims to disentangle the sophisticated flow of resources, internally and externally. More importantly, our analysis addresses how a navigation of resource flow may create a hybrid business model for a firm's survival growth.

Research Methods

This study belongs to a long-term research project which investigates business model innovation designed to cope with resource constraints. The goal is to understand how firms at a disadvantage could overcome unfavourable situations and still grow their organizations. Because this research aims to understand the flow of resources, qualitative case study is a more suitable method to be employed (Miles & Huberman, 1994; Yin, 1994).

We selected the case of United Daily News (hereafter UDN) Group for our investigation because this firm demonstrated an evolving hybrid business model. Commencing by 2000, the newspaper firm was impacted severely by Internet. As a global trend, the newspaper's conventional business model was under threat when news became free online. In a period of 12 years, UDN Group has strived to innovate almost everything, from contents (the production of journalism) to media (various devices) and to business models (anything outside newspapers).

To make our case study manageable, we narrowed our scope of investigation in five sub-cases: udn.com (online news services), Golden Media (art exhibition units), udn.shopping, *Upaper* (free metro newspaper) and udn.app. These cases are selected for three reasons. First, these cases illustrate how UDN ventured into new business models. These five business units explain how UDN align journalism to other opportunities, leading to a hybrid form of business model. Secondly, these business units highlight idiosyncratic resources. Their extensive interactions over 12-year period suggest evidence of resource flow, and illustrate how different units exchange resources to achieve certain solutions. We could trace retrospectively to identify the emergent business models.

The fieldwork included a mixture of personal interviews, non-participant observations, and member-checking seminars (see Table 1). Our interview plan consisted of two parts. First, we talked to executives in the five business units, often more than once, to gather data on organization history and past innovation initiatives. Second, we spoke to groundwork employees within each unit so as to understand the actual occurrence of these initiatives. To smooth the complex investigation scheme, we collaborated with the firm's Media Innovation Xentre (MIX) to obtain assistance for setting up interviews.

Data collection and analysis was conducted in tandem and consisted of four main steps. First, we examined each business unit's innovation initiatives and highlight the historical activities. Second, we identified the core resources deployed in each business unit. Third, we discerned how each business unit integrate its resources for achieving certain forms of innovation. We noted that not every action eventually leads to effective resource integration. In this regards, we examined which unit gives resources to its partners and which unit takes resources from its associates. Fourth, we mapped out the flow of resources (from the give-and-take process) and analyse how the inflow of outflow of resources may constitute a resultant business model. As a result, we identified three patterns of resource flow and examined these patterns in terms of three key constructs: content, carrier and commerce. The construct of *content* referred to the production of journalism, such as how news are produced and displayed. The construct of *carrier* refers to various devices used to accommodate news and diverse methods to broadcast news. The construct of *commerce* refers (narrowly) to how transactions are made and the various sources of revenues created. These constructs were constantly used as communicative devices among the practitioners. Therefore, it seems reasonable to us to take up these constructs to conceptualize how resources may flow to achieve innovations in content, carrier and commerce.

Research Findings

In the full paper, we will present our findings in two main parts. The first part reports the five cases, including udn.com, Golden Media, udn.shopping, Upaper and udn.app. It aims to explain the respective business models and resources in each unit. The second part elaborates the three patterns of resource flow, as our core findings. In each pattern, we analyse three constructs: content, carrier and commerce, so as to illustrate how innovation occurs. Collectively, we will explain the implication of this hybrid business model (see Figure 1). We summarize the key issues in this extended abstract below.

Part 1: Identifying key resources in each business unit

Case 1: udn.com provides online news and retrieval database services. The udn.com was established in March 2000. The unit's mission was to migrate from newspaper to online news. Later, udn.com added an audio-visual department and supplied video chips. The unit produced 800 items of news per day. According to Access Rating Online (ARO), udn.com attracted circa five million non-repeated visitors daily.

Generating access rating was a key source of revenue from online advertising.

udn.com's strategy was to create more segmented readers. By 2000, udn.com kicked off another two online sites: undstar.com (entertainment industry news) and udnmoney.com (investment and banking news) to attract new readers. Moreover, udn.com aligned with *China Post* and initiated an online English learning site for student readers. The full paper will explain how udn.com collaborate with newspapers and conceived ways of versioning strategies to attract segmented readers.

Case 2: Golden Media bring the world into Taiwan. In 2008, UDN merged *Economic Daily* and its event planning division to incorporate Gold Media. This business unit created new revenues from art exhibition, professional forums, and entertainment shows. Gold Media leveraged media influence to promote these events and recruit industry sponsors. These events also become featured stories for journalists in various UDN journalism teams. We will discuss how this synergy is achieved.

Case 3: udn.shopping converts readers into shoppers. The unit of udn.shopping employed data-mining methods to examine its user profiles. The goal of udn.shopping is to build Customer Relationship Management (CRM), which consisted of three strategies. First, udn.shopping directed viewers from udn.com to visit its e-commerce site. By analyzing readers' browsing patterns, udn.shopping could identify their consumption behaviors. The second was the OCOP (One City One Product) strategy. This was a social enterprise initiative to help marginalized farmers to sell their products online and avoid grind-down by middlemen. The third strategy employed media influence to invite celebrity endorsement and charity sales.

Case 4: Upaper brings in metro readers. UDN collaborated with Taipei Metro Rapid Transportation Company and published Upaper for metro travellers. This is a new genre of newspaper. UDN circulated this free newspaper and established a new advertising markets. Upaper targeted at large department stores and vendors nearby 109 metro stations in great Taipei area.

Case 5: udn.app delivers contents to mobile users. In 2009, mobile phone users began to get attached to software application programs, known as APP. UDN incorporated New Media Center, called udn.app, which aims to offer users a new kind of reading experience. How may udn.app be integrated into UDN's digital convergence scheme? This issue will be addressed in the full paper.

Part 2: The flow of resources and the shaping of hybrid business model

Part 2 examines three patterns of resource flow and shows how careful guidance of resources could lead to various synergies. These patterns include resource effectuating, resource crossing, and resource recycling. In each pattern, we will explain how various flows of resource could support innovations in content, carrier and commerce (as shown in Figure 1).

Resource effectuating: The first pattern refers to one source for multiple uses. In journalism, the same news could be re-adopted into different versions for target readers. The newspaper and online news started various versioning methods to maximize the use of news. UDN edited news into different versions, as well as broadcasting to different devices. The versioning strategy is core of our analysis.

Resource crossing: The second pattern examines how resources were employed to span across boundaries. For instance, udn.com work with *China Post* is a crossover from journalism to language education; Gold Media collaborated with international museums is a crossover to art exhibitions; udn.shopping is a crossover to retail e-commerce.

Resource recycling: udn.com digitized outdated newspapers and convert them into knowledge base. This knowledge base became a platform to accommodate other media firms' databases. The transmedia initiative helped UDN to set up a new business called udn.data. This is a form of resource recycling where unused data is reused as knowledge and accessed to a new segment of institutional users.

Implications and Conclusion

Our study examines how navigating of resource flow may enable business model innovation. The contribution of our research is twofold. Theoretically, our study articulates the becoming process of hybrid business model. To understand 'hybrid', we must not limit our investigation in individual business models. If a firm produced cars and computers, both businesses does not constitute a hybrid model. We could only consider it as a car producer diversifies into computer manufacturing. Our research is concerned with hybrid business model, rather than 'dual' business models (Markides & Charitou, 2004). To become hybrid, one business model may support or complement another. Thus far, we know relatively little about how a hybrid model could mean for business (Bonaccorsi et al., 2006; Powell, 1985; Sharma, Sugumaran, & Rajagopalan, 2002). Could hybrid business model help firms resolve resource constraints? How may a firm develop a hybrid business model that may align to its core competences? Issues of hybrid business model require more of our attention in the

future.

To add to open innovation literature, our study highlights the importance of tracing ‘the purposive inflow and outflow of resources’ to depict how a hybrid model functions and what innovation may a hybrid model generates (Chesbrough et al., 2006). The analysis of resource flow could help us gain a better understanding of open business model (Baden-Fuller & Haefliger, 2013; Svejenova et al., 2010; Teece, 2010). Future studies could benefit from our flow analysis to explore how resources may be integrated while establishing various kinds of open innovation.

Practically, the three flow patterns could provide effective ways to innovate new products, technologies or applications (Shane, 2000). By understanding the existing ways of resource integration, executives could identify areas for further improvement. For instance, as shown in Figure 1, we could recognise that UDN seems to ignore the great opportunities of linking United Daily News, Gold Media (which controls *Economic Daily*), Upaper, udn.com and etc., among other media in the group. Building a ‘transmedia’ solution for UDN could aggregate its influences and perhaps establish a new ways of social advertising. Similarly, if UDN could direct resources from udn.app (for mobile device) to e-commerce, it could create yet another business model that guides mobile readers into a niche shopping segment. If executives of UDN could look at resource flow collectively, it is possible that more business models could be conceived.

In our view, executives could become more like designers of business models (as that of architect), rather than merely serving administrative tasks and managerial functions. Their duty covers not just about how to develop stream of products or services, but also more about channel the flow of resources through a firm’s eco-systems. To play the role of designers, executives may benefit from a new genre of skill: navigating the flow of resources into building numerous forms of hybrid business model.

References

Achtenhagen, L., Melin, L., & Naldi, L. 2013. Dynamics of Business Models – Strategizing, Critical Capabilities and Activities for Sustained Value Creation. ***Long Range Planning***, 46(6): 427-442.

Amit, R., & Zott, C. 2012. Creating Value Through Business Model Innovation. ***Sloan Management Review***, 53(3): 41-49.

Baden-Fuller, C., & Haefliger, S. 2013. Business Models and Technological Innovation. ***Long Range Planning***, 46(6): 419-426.

Baldwin, C., Hienerth, C., & von Hippel, E. 2006. How User Innovations Become Commercial Products: a Theoretical Investigation and Case Study. ***Research Policy***, 35(9): 1291-1313.

Barney, J. B. 2001. Is the Resource-Based 'View' a Useful Perspective for Strategic Management Research? Yes. ***Academy of Management Review***, 26(1): 41.

Bock, A. J., Opsahl, T., George, G., & Gann, D. M. 2012. The Effects of Culture and Structure on Strategic Flexibility during Business Model Innovation. ***Journal of Management Studies***, 49(2): 279-305.

Bonaccorsi, A., Giannangeli, S., & Rossi, C. 2006. Entry Strategies Under Competing Standards: Hybrid Business Models in the Open Source Software Industry. ***Management Science***, 52(7): 1085-1098.

Bouquet, C., & Birkinshaw, J. 2008. Managing Power in the Multinational Corporation: How Low-power Actors Gain Influence. ***Journal of Management***, 34(3): 477-508.

Chatterjee, S. 2013. Simple Rules for Designing Business Models. ***California Management Review***, 55(2): 97-124.

Chesbrough, H. W. 2003. ***Open Innovation: The New Imperative for Creating and Profiting from Technology***. Boston, Mass.: Harvard Business School Press.

Chesbrough, H. W. 2006. ***Open Business Models: How to Thrive in the New Innovation Landscape***. Boston, Mass.: Harvard Business School Press.

Chesbrough, H. W. 2010. Business Model Innovation: Opportunities and Barriers. ***Long Range Planning***, 43(2–3): 354-363.

Chesbrough, H. W. 2011. ***Open Services Innovation: Rethinking Your Business to Grow and Compete in a New Era***. New York: Jossey-Bass.

Chesbrough, H. W., & Rosenbloom, R. 2002. The Role of the Business Model in Capturing Value from Innovation: Evidence from Xerox Corporation’s Technology Spinoff Companies. ***Industrial and Corporate Change***, 11(3): 529-555.

Chesbrough, H. W., Vanhaverbeke, W., & West, J. 2006. ***Open Innovation: Researching a New Paradigm***. Oxford: Oxford University Press.

Dahan, N. M., Doh, J. P., Oetzel, J., & Yaziji, M. 2010. Corporate-NGO Collaboration: Co-creating New Business Models for Developing Markets. ***Long Range Planning***, 43(2–3): 326-342.

Haefliger, S., Jäger, P., & von Krogh, G. 2010. Under the Radar: Industry Entry by User Entrepreneurs. ***Research Policy***, 39(9): 1198-1213.

Hienerth, C., Keinz, P., & Lettl, C. 2011. Exploring the Nature and Implementation Process of User-Centric Business Models. ***Long Range Planning***, 44(5–6): 344-374.

Markides, C., & Charitou, C. D. 2004. Competing with Dual Business Models: A Contingency Approach. ***Academy of Management Executive***, 18(3): 22-36.

Markides, C., & Sosa, L. 2013. Pioneering and First Mover Advantages: The Importance of Business Models. ***Long Range Planning***, 46(4/5): 325-334.

Miles, B., & Huberman, M. 1994. ***An Expanded Sourcebook Qualitative Data Analysis***. London: Sage.

Powell, W. 1985. Hybrid Organizational Arrangements: New Form or Transitional Development. ***California Management Review***, 30(1): 67-87.

Sabatier, V., Mangematin, V., & Rousselle, T. 2010. From Recipe to Dinner: Business Model Portfolios in the European Biopharmaceutical Industry. ***Long Range Planning***, 43(2–3): 431-447.

Shane, S. 2000. Prior Knowledge and the Discovery of Entrepreneurial Opportunities. ***Organization Science***, 11(4): 448-469.

Sharma, S., Sugumaran, V., & Rajagopalan, B. 2002. A Framework for Creating Hybrid Open Source Software Communities. ***Information Systems Journal***, 12(1): 7-25.

Sinfield, J. V., Calder, E., McConnell, B., & Colson, S. 2012. How to Identify New Business Models. ***Sloan Management Review***, 53(2): 85-90.

Svejenova, S., Planellas, M., & Vives, L. 2010. An Individual Business Model in the Making: a Chef's Quest for Creative Freedom. ***Long Range Planning***, 43(2/3): 408-430.

Teece, D. J. 2010. Business Models, Business Strategy and Innovation. ***Long Range Planning***, 43(2–3): 172-194.

Wirtz, B. W., Schilke, O., & Ullrich, S. 2010. Strategic Development of Business Models: Implications of the Web 2.0 for Creating Value on the Internet. ***Long Range Planning***, 43(2–3): 272-290.

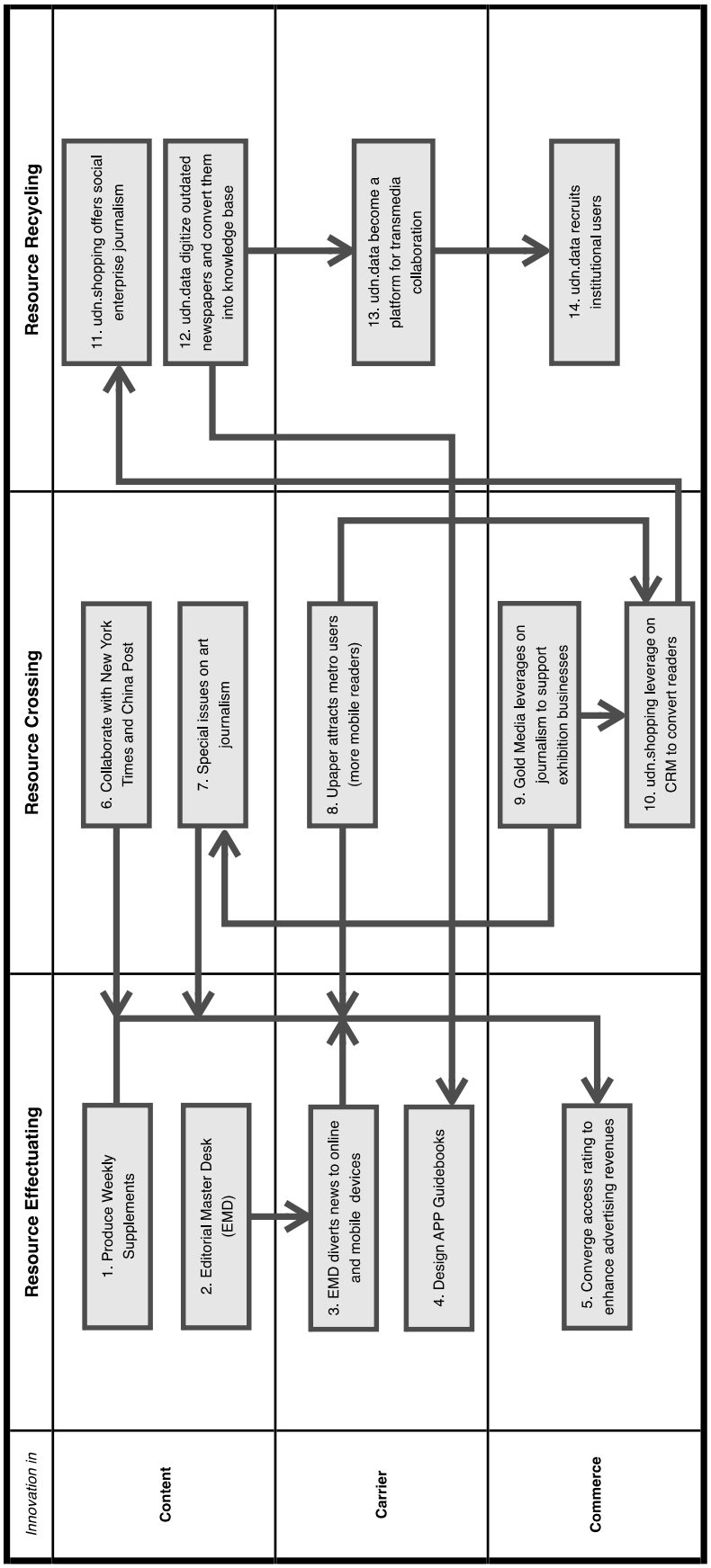
Yin, R. K. 1994. ***Case Study Research: Design and Methods***. Thousand Oaks, CA: Sage.

Zott, C., & Amit, R. 2007. Business Model Design and the Performance of Entrepreneurial Firms. ***Organization Science***, 18(2): 181-199.

Table 1: Fieldwork Investigation Summary (2012-2013)

Methods	Informants	Responsibilities	No.	Frequency	Hours
Personal Interviews	Executives of Business Units	Managerial roles for udn.com, Upaper, udn shopping, udn.app, Gold Media	6	10	15
	New Media Team	Designers and engineers of udn.app	3	3	5
	Marketing Departmen t	Employees of newspaper managing advertisement revenues	4	4	6
	Journalism Team	Journalists in *United Daily News*, *Upaper* and udn.com	15	15	20
	Chairman	Setting strategies for United Daily News Group	1	2	3
	Curator	Managers of art exhibition	4	5	6
	Specialists	Members of e-commerce	4	6	10
	Users	Online readers	15	15	15
Participant Observation	Participate in Media Innovation Xentre's research activities so as to outreach to different business units.			6	10
Member Checking Seminars	Organize internal meetings to seek feedback from members and executives.			3	10
Total Hours of Field Engagements					100

Figure 1: Shaping a Hybrid Business Model by Three Patterns of Resource Flows



國科會補助專題研究計畫移地研究心得報告

日期：101 年 12 月 30 日

計畫編號	NSC 99－2410－H－004－013－MY3		
計畫名稱	開放式創新的服務脈絡		
出國人員姓名	蕭瑞麟	服務機構及職稱	國立政治大學科技管理研究所 教授兼所長
出國時間	101 年 09 月 21 日至 101 年 09 月 24 日	出國地點	上海市

一、移地研究過程

這次的移地研究在大上海地區，分為兩階段進行。第一階段在上海外郊之啟東市（崇明島附近），第二階段則是在上海市區。本次的研究目標是採訪大陸的高階經理人，探索開放式創新的議題。第一階段在啟東市受邀與三十多位個企業的高階主管探討服務創新議題。透過這個研討會，我試著收集大陸個企業進行開放服務的作法與對導入開放服務的態度。之後，透過該研討會之主席的安排，我去參觀了啟東生態園區的規劃，以及該市一項龐大的造鎮工程，名為威尼斯計畫，將容納十萬居民，未來希望解決上海居民爆炸性成長的問題。

接著，我移往上海市區，分別拜訪兩個單位：震旦行以及 Continuum 設計公司。第一是震旦行，位於上海浦東之江旁，張總經理已經調來上海經營大陸十多年，幾乎已經成為在地人了。他是由美國應聘到震旦行，之後再轉到上海擔任總經理。採訪的重點是了解震旦行在大陸的開放創新作法，以及他個人的管理經驗，希望分析在大陸實施開放創新的狀況。

第二，我拜訪了在永嘉路的Continuum設計公司[1]，這是一家國際型的設計顧問公司，也是IDEO的重要競爭者。本所今年度很幸運有一位研究生被錄取，進入到Continuum實習。這家公司常與大企業合作，開發設計各類新產品，與開放式創新息息相關。我採訪總經理Chris Homer了解他們的於設計思考上的作法。

二、研究成果摘要

[1] http://continuuminnovation.com/location/shanghai/

啟東生態園區：這個園區採取複合式的經營模式，園區之設計是以休閒娛樂為主。園區有五公頃之大，周邊以人工河川圍繞，河中飼養大量的魚，讓遊客垂釣。但是，河中多為污泥，所以不容易看到魚的身影，設備雖新穎但略微粗糙。園中還有漆彈場供遊客組隊對打。這倒是頗為令人不解，這個戰爭遊戲在以靜養休閒為主的園區中有點不搭配。其他散落在各處的有咖啡店等飲食中心。園區中間有一座大型庭園餐廳，裡面以中國古代建築造景，院中還有一個舞台供表演用，餐廳包廂則是以中國亭台樓閣型態建造，命名亦是。餐廳的菜多是給觀光客的大眾菜，又大又有點俗氣。此園區讓人理解到開放創新的精神雖然是混搭，但是不和諧的混搭，所造成的創新效果可是會被大打折扣。

威尼斯計畫：這是一個水岸造鎮計畫。原本這塊地屬於市政府，為了促進啟東市的經濟發展，市府與建商合作共同開發此新市鎮。這項計畫背後有一個策略，就是吸納上海市的中高階白領人口。上海市之房價一直飆漲，對中高階白領來說，必須負擔很貴的錢著很小的房子著實不易令人接受。啟東市鎖定這群客戶，而想出此造鎮計畫。設計師是以威尼斯為想像參考，各地區均以水道隔開，塑造出義大利威尼斯的場景。各家各戶門後都有一個遊艇停靠處，要拜訪該地區的朋友，只要開船過去即可，有可以開出海遊玩，回來時就直接停靠在家門後。接待與社區中心靠海邊，在社區中心可以一邊喝下午茶，一邊欣賞海景，也可以在健身中心跑步享受一望無際的海岸線。

社區中各地區的建築會根據國家別來規劃，有美國式社區、加拿大式社區、歐洲式社區等，是一個強調洋化設計的建案。社區中的橋邊的公共展示也都是仿義大利的歐式雕像，但是仔細看就會發現這些雕像是工廠大量生產的產品，瑕疵具具可見。房子內裝之用材應該不是很好，樣品屋的牆壁材建好已經出現裂縫，油漆也多處剝落，可見該區濕氣應該很重。

上海離啟東約是一個半小時的車程，但是遇到尖峰時間則拿不準。市府計畫要建一條輕軌捷運，讓啟東到上海只要三十分鐘。這項政見如果兌現，倒是可能改變現有生態，讓大量上海居民搬到此啟東來生活，到上海去工作。啟東市政府以頗有遠見，已經預先將大條道路修好，預備容納大量移民。

本案中採用幾項開放創新的做法。第一，配合當地靠海，將水岸設計帶入。這也看準了上海的新富階級有崇拜歐洲的傾向。這個建案有點像建築界的 Zara，全部設計都是抄襲而來，以評價方式推出。只是，房子不比衣服，說丟就丟，若是用不好建材，住幾年後問題將接踵而來。但是，這也許是建商的計謀，每幾年就會有人要修房子，如此可以在維修費上收取可觀的資金吧。

震旦行：該公司已經在上海經營多年，是最早近上海的台商公司之一。震旦行一進到大陸就馬上買了一棟樓，所以現在雖然上海租金上漲，震旦行卻是獲益者。震旦行進入大陸花了很多時間整頓通路，所以每有太多開放式創新的作為。該公司主要的產品是辦公

室家具，屬於傳統產業，近期內也才導入設計到家具中。所以，大多時間張總經理都是在處理整合各地區的業務，少有時間進行創新相關活動。這也讓我思考到開放式創新的局限性。

正面來看，震旦行忙於每日事務，無暇注意任何新的管理資訊，開放式創新這個名詞對該公司的意義也不大。危機可能是，這類苦幹實幹的公司可能會被更創新的企業超過而不知。反面視之，我們也要注意一下開放式創新這類作法是否只是一時的流行，如同過去盛行一時的改造工程（process reengineering）。開放式創新其實不是新的觀念。從有企業營運以來，公司之間的競合早就不斷在上演。一家公司可能會與供應商合一起改善製程、精進服務或建立通路（如豐田汽車）。企業也會跑出去與顧客合作共同改善即有產品，或找到新產品（如 Dell 電腦）。企業更可以大膽地與敵人合作，共同經營一個新興市場，或探索一個新技術，或轉售技術給競爭者而促成新的商業模式。震旦行對於開放式創新的漠視，究竟是務實的作法，還是企業趕不上時代潮流的脈動呢？這一切將有待觀察。沒有任何實施開放式創新對企業會不會有影響呢？這也是本研究未來要注意的理論議題。

Continuum：這家美國之跨國設計公司一直是以設計思維為主打，擅長以跨界創新協助大公司思考未來產品。各大公司運用開放式創新之法，將產品設計外包給 Continuum，然後就奇蹟式的改變企業的命運。對於這樣浪漫的想像，是我很難相信的。設計思維是近年來又一個時尚管理名詞，強調三項重點：以人為本、在地創新、共創價值。

過去的設計多以技術與功能為導向，而忽視了使用者脈絡。不了解使用者痛點，在越來越競爭的市場中，企業的產品將受到消費者唾棄。研究人的行為模式，找出使用者的痛點，是設計思維的第一步。另外，人的行為不是獨立於社會脈絡之外，所以一項痛點必然牽涉到整體的環境因素，也就是在地脈絡。了解一位使用者特定的工作脈絡、生活脈絡、文化脈絡、歷史脈絡、時間脈絡，都將提供非常寶貴的資訊。設計，必須考量脈絡，才能對痛點有深刻的了解。再來，就是與使用者共創價值，共同思索解決方案來消除他們的痛點。如此，不但解決使用者的問題，同時也讓企業找到新的商機。

這種開放式創新的作法比較像是技術中介（technology brokering），也就是混搭的觀念。將兩個看似不相關的東西，以創意拼湊一起，產生全新的產品或技術，這便是中介的核心觀念。這種設計思維的觀念其實也不是很新穎。設計師本來就是一直在了解人的行為，並且配合在地脈絡，與顧客共同創造出作品，室內設計師、建築師、軟體設計師、管理顧問等，都必須進行設計思考。日本一個報導影集「全民住宅改造王」便展現設計師各種巧思，將各種元素帶入建築與室內設計之中，並就地取材以最簡約的方式做出最驚豔的作品。

本次採訪重點是了解該公司的設計思考作法，以及透過幾個案例了解此作法在實務上的

具體實施方式。克里斯總經理約三十五歲，是美國人，背景是設計，他的田野筆記都是以畫畫為主，去整理採訪資料。他分享兩個案例，一個是有關紙尿布，另一個是有關冰淇淋，都是跨國公司委託。當該公司送出團隊時，大多有三到四位成員，一間專案辦公室會被設立，讓工作人員專心於該案。團隊與客戶討論之後，就會出去田野訪查，大多是鎖定目標客戶群，採訪人數約十五人，每件案子約收費 100 萬人民幣，專案為期約三個月。

了解目標使用群後，同樣地他們也會建立人物誌，然後分析如何針對該使用群的需求與痛點來找出產品設計的靈感。我看了他們對使用者的分析，圖表製作甚為精美，文字之搭配也很得當。但是，當我了將近一小時聽完案例後，結論卻令人非常錯愕。紙尿布的設計只是增加摺片數，但是根據田野資料，一大部分時間年輕夫妻的痛點是因為小孩而睡眠不足。解決方案雖有道理，但是卻與田野資料不契合。冰淇淋的設計勢將產品小模組化，也就是把一長塊冰淇淋重新設計變成五小塊冰淇淋，還有包裝也改變了一下。我很難想像，這樣昂貴的調查費用。卻只產出如此簡單的結論，難道案主不會生氣嗎？這樣的設計似乎不需要「設計思考」也可以想的出來，那麼這種設計公司存在的意義又為何？難怪乎，這幾家公司的業績急遽下滑。因為如果這類案子搞砸了一次，大公司之間一定會耳語相傳，名聲也就隨之下滑。

我之前一直不解，為何一堆聰明人會做出不怎樣的分析。他們田野也去了，人也採訪了，圖也畫的很美，可是為何無法產生洞見。我問了一下公司成員的組成，方知道原因之一二。這些顧問都是工業設計或商業設計畢業生，難怪圖畫的哪麼好，概念呈現也很有視覺感。但是，他們之間很少有人具備商學背景，也因此對數字的分析不多。例如，這個市場多大，這些使用者都在哪些地區，吃冰淇淋是在一週的哪些時段，一週吃的次數有幾次，每次吃的時候都與誰在一起（擴散關係圖），不同群的人吃冰淇淋時有哪些不同的原因，又以哪些不為人知的隱性原因，競爭品牌賣的有比較好嗎，相對於競爭對手這家冰淇淋的產品在包裝、口味、份量、通路等因素上有何強弱之處，有哪些人特別討厭這家公司的冰淇淋，原因為何。

以上這些問題是無法靠美美的設計混過去的，是需要硬功夫的分析，需要市場分析、通路分析、流程分析、創新擴散以及服務體驗分析。更為隱憂的是，這家公司幾乎沒有創新的基礎訓練。團隊成員背景同質性太高，缺乏跨域的融合。這也是我看不到開放創新的原因。在他們的專案中，多只是一般工業設計的產出，產品無創意，更未能下功夫去找到可以跨界採用的元素。例如，雖設計的是冰淇淋，但也可能由建築的角度來想冰淇淋的組合包裝方式。總之，借用跨領域的元素，針對特定的行為，找到在地脈絡，重新運用跨域的創意，重新設計原來的產品，也重新設計隨之而來的服務，而且要與使用者或關鍵角色合作創價值，才符合設計思考的精神，也才能創出令人眼睛為之一亮的產品。開放式創新的精華才會展現。

三、建議

對研究上：開放創新似乎可以由企業延伸到城市的階層。許多城市的議題，都可以找到開放創新的元素。開放創新並不是都能成就好的創新，像啟東生態園區就是一個我認為不是很成功的例子。一堆俗氣之物，再如何開放創新，還是俗氣。這是創新者必須警惕之處。之後，我還必須對開放創新文獻多加著墨，特別是地域問題。現在的開放創新文獻多是美國為主的思維。但是，開放創新華人區，或是亞洲區，在華人企業，應該會呈現不同的風貌。華人在思考開放創新時會如何做？中國企業許多都是大型公司，規模是台灣的數百倍，這些公司的開放創新會不會與美國一樣？或是，中國人的思考開放創新模式會與西方不同？這些都是未來研究上必須考量的。

對教育上：我發現大陸的發展實在太快了，而我們在國內企管與科管學程對大陸企業的了解不是過時，就是以偏概全。我們需要更深入的分析大陸企業的案例，不只是在研究上，更是在教學上。國內缺乏，有趣的是大陸也缺乏。國內推動案例研究多年，但是所做個案卻都未能深入，是本所未來需要檢討的地方。未來需要企劃針對大陸企業的案例，像是這次採訪中遇到的博鰲董事長正在企劃另一個造鎮計畫，約一千公頃、廣州老人銀髮族公寓、上海的新浪電子商務都應該可為開放創新借鏡。大陸企業在思考開放創新時到底會與歐美企業或是台灣企業有何不同，應該是一個值得探索的主題。

對政策上：近來，台灣正在推動「研發中心」計畫，而特別注重服務創新。這類創新活動聚焦於將既有的技術或產品應用到服務上，是將流程創新融入產品創新。開放創新正是此一重點。但是，國內企業對開放創新到現在還是一知半解，實在令人憂心。我認為應該要設法將不同企業的開放創新作法更加有系統整理，並且將知識擴散到企業，以便思考透過合作、組合、中介等手法使創新實務更加有效。蘋果電腦運用台灣技術做出iPhone，推出使用者介面創新，而台灣廠商卻淪為技術代工，因為缺乏原創力。李安導演做出得獎電影「少年拍的奇妙旅程」，也都是運用台灣的各種技術。我們不禁要反思，這些很棒的科技在台灣刊發出來已經很久了，為何沒有人可以如此運用，提昇產業附加價值，也提昇對社會的貢獻。開放創新著重的是將看起來不相關的技術，組合成令人驚喜的創新。也許，未來的科技政策，更需要付諸多一點注意力在開放創新上。

國科會補助專題研究計畫出席國際學術會議心得報告

日期：101 年 10 月 15 日

計畫編號	NSC 99－2410－H－004－013－MY3		
計畫名稱	開放式創新的服務脈絡		
出國人員 姓名	蕭瑞麟	服務機構 及職稱	國立政治大學科技管理研究所 教授兼所長
會議時間	101 年 08 月 03 日至 101 年 08 月 07 日	會議地點	美國波士頓
會議名稱	(中文) 管理學會 (英文) Academy of Management 2012 (簡稱 AOM 2012)		
發表題目	(中文) (英文) Artificial Science ：How Technology Evolves with Social Forces		

本次前往AOM2012 管理學會年度共有兩項主要任務。 第一是報告一篇入選論文《Artificial Science : How Technology Evolves with Social Forces》，內容討論開放創新的應用，分析一組科學團隊如何透過轉譯社會事件而產生突破性的科研成果。第二則是受邀擔任國際管理學門的博士生研習營輔導員，為學員介紹質性研究的內涵與挑戰。

除了執行這兩項任務外，我也持續參與各學術社群的活動，包含 AMLE(Academy of Management Learning & Education)期刊委員會、OCIS 學門會議與 TIM 學門會議。這些活動都是持續讓政大科管所能在國際社群有能見度。此外，本次活動中，我也觀察到三項值得關注的議題。

首先，華人圈學術版圖正在迅速移動，大陸學者已經取代台灣，成為 AOM 華人學術社群之領導。目前，北大與在美國任教的華人學者已經組成學會，擁有自己刊物，而且每年定期在大陸開辦學術會議，形成關鍵多數的社群。再加上大陸每年到美國就讀之博士生日益增加，也就相對在美國就業人數增加，自然影響力就會增加。相對比較，台灣學者與研究生已漸漸在學術社群邊緣化。雖參與人數有 170 人之眾，排在第十名，但台灣學者的影響力已消失殆盡。如陳明哲、蔡文彬等重量級學者已不復見。

第二，質性社群雖抬頭，但仍是小眾市場。資管、科管、策略與國際管理等學門都漸漸出現重量

級質性研究學者如 Wanda Orlikowski、Sonali Shah、Catherine Welch、Paula Jarzabkowski、Melissa Graebner、Amy Edmondson、Andrew Van de Ven、Mark de Rond、Fiona Moore 等，但這些學者都各在自己學門，未團結在一起發生綜效。

雖然每年的質性研究研討會都爆滿，但是大多人卻只是抱著好奇心來。每年研討會的內容也大都大同小異，只是宣導性高，實質幫助並不大。多數學者面臨升等壓力，還是會放棄質化而做量化研究。

雖管理學門不斷提倡新的研究方法，提倡更多元的方式來探索未知的領域，提出原創性的觀點，產出品質更佳的學術作品，但是機構的制約(盲目地追求更多的 SSCI 產出)卻諷刺地讓學者將學術當做是追求時尚的發表遊戲。這場遊戲中，不論誰發表多，或誰發表少，都是輸家。台灣各大學盲目倣效美國學術界的發表遊戲規則到底是福或是禍，值得深思。

有些問題適合量化的方法來研究，有的題目則適合藉由質化方法來處理。方法之選擇有時可以是個人偏好的取捨，有些則是研究問題與方法之適配問題。選什麼方法並不是那麼重要，研究的品質如何維持，才是更要緊的議題。

第三，美國的管理真的是世界一流的嗎？這是每年來參加 AOM 會反思的一個問題。這可以由兩方面來看，一由學術，二由實務。由學術角度來看，AOM 的確仍可稱之為國際管理學界最具規模的學術會議。全球學者也都以 AOM 馬首是瞻。不論由發表量或影響力來看美國都是當之無愧。但是美國學者提出的管理觀念多在實務面之操作，而非在深層理念上的開拓。反而是英國與歐洲學者比較能在哲學層次上創作，如 Latour 的角色網路理論、Pinch 之科技的社會形塑理論、Boudier 之實務理論、Pettigrew 之脈絡理論。雖不能直接套用到管理實務上，卻引發學術界思想上的革命。由此觀之，美國管理界的學術研究就略嫌粗枝大葉了些。

由實務來看的話，美國的許多公領域或私領域的管理就不一定令人稱道。例如餐廳服務態度粗糙，機場服務流程無效率，海關通關速度緩慢又海關人員無禮傲慢等。這些實務上管理都令人不敢恭維。

美國管理第一？也許在大企業的確有取法之處，但在日常生活上，美國的管理不會比日本或台灣好。

美國的學術發表過於一致性，重量而不重質，台灣未來是否要持續全版抄襲，令人擔心。放眼未來，我將深耕質性研究社群，並持續培養質性研究學者到社群中吸收養分，淬鍊經驗，以優質研究提升政大科管所在國際社群中的能見度。與中國學界的連結也不容忽視，IACMR 社群在未來應會快速茁壯，如何借力使力而不被邊緣化更是當務之急。至於如何借鏡美國而又不被牽制，警惕美國管理學界之衰退與中國之崛起，則是國科會未來須審慎評量的策略議題。

Artificial Science: How Technology Evolves with Social Forces

Submitted to Annual Meeting of Academy of Management 2012

2012/1/10

Abstract

This study explores innovators' working practices in which social actions are translated into scientific discoveries. Based on an ethnographic study, this article examines a leading research group's scientific breakthroughs, consisting of multidisciplinary laboratories. Our study elaborates how innovators translate the social cues/signals into scientific actions in the laboratories. Our analysis details how a biotechnology called 'biolinker' (a particular form of biochemical compound) is evolved into various forms of innovations through a social shaping process. Theoretical implications are discussed with reference to the social shaping of technology and innovation literature. This paper also contributes to scientific teams and innovation management for practical implications.

Keyword: social shaping of technology, ethnographic study, work practices, multidisciplinary laboratories.

INTRODUCTION

How does new technology emerge? Research used to focus on R&D team management (Brown & Eisenhardt, 1995; Cooper & Kleinschmidt, 1987; Gupta & Loulou, 1998), industrial and research coalition (Barry, 2000; Owen-Smith & Powell, 2003; Siegel, Waldman, & Link, 2003), or intellectual property protection (Enkel, Gassmann, & Chesbrough, 2009; Lee & Cole, 2003). However, constructing the research environment is only the fundamental elements for innovations. There is no necessary connection with technology innovation.

How do scientists create technological innovations? Most people would like to believe these innovations are produced through rational analyses, rigorous experiments and robust tests. Nonetheless, such a romantic thought is challenged by the studies on social shaping. Cultural, political and institutional influences exerted by social actors, often shape the course of technological development and determine whether users' adoption decision in an unexpected way (Bijker, 1987; Latour, 1987; Oudshoorn & Pinch, 2003). These studies typically stress two sources of shaping forces: users (as social actors) and their social contexts. They help us understand how key social actors direct the outcome of innovation, and how social context may influence innovators' invention decisions (Heath & Luff, 2000; Latour, 1988; von Hippel, 2005).

However, current studies seem to neglect the brokering role of innovators. How do innovators make sense of emergent social events and how do they translate these social signals into scientific innovations? Although this is an ongoing research agenda for many sociologists, few have an opportunity to elaborate the process dynamics. In such a process, we need to understand what the scientists do and how they come to 'know' how to translate the social cues into materials (scientific invention). To address this issue, we need more detailed analyses of scientists' and engineers' work (Barley, 1996; Knorr-Cetina, 1999; Latour &

Woolgar, 1986).

This issue motivates us to investigate the interacting dynamics of what scientists' actions in the laboratories and how relevant social actions shape their technological innovation endeavors. This article is organized as follows. The next section begins with a review on social shaping literature. The third section briefly explains research design, fieldwork implementation and data analysis. The fourth section reports key findings of three stages of our research. Finally, theoretical and practical implications are discussed.

LITERATURE REVIEW

Social Shaping of Technology: Technological innovations are subject to multiple interpretations. In this sense, technological innovations are not always about scientific theories or sophisticated technical designs. Current studies on social shaping of technology seem to swing between two perspectives. At one end, prior studies are more concerned with users as a major source for shaping technical innovations (MacKenzie & Wajcman, 1984). At the other end, these studies stress how social, cultural, political and institutional forces may shape the production and adoption of technology. For example, the invention of cochlear implants was shaped by social and institutional forces (Garud & Rappa, 1994a), while the adoption of refrigerators was shaped by industrial coalition (Cowan, 1985) and the adoption of DDT is decided by different political institutions(Hardy & Maguire, 2010)

Indeed, technological innovations can be shaped by social forces. Different technologies are subject to various forms of human agencies and their interactions may shape how users make sense of, and attribute meanings to technology artifacts (Orlikowski, 1992). Recent studies have suggested that many product ideas come from lead consumers, such as the invention of extreme sportswear, mountain bikes, kite surfing, and automobiles (Schreier, Oberhauser, & Prugl, 2007). More studies analyze how lead users may freely develop, share,

and diffuse ideas within their communities (Lakhani & von Hippel, 2003).

In different social contexts, cultural, political and institutional forces could also shape the features and utilities of technological innovations (Bijker, 1987; Garud & Rappa, 1994a; Oudshoorn & Pinch, 2003). For example, using the actor network theory, Latour (1987) explained how scientists obtain recognition and influence through participating in scientific communities, gaining support from joint publication with senior editors, and striving for funding from government agencies. Occasionally, scientists have to communicate with the media to obtain public support for a particular research. Innovations are not entirely about science but more also about social actions; and the developmental path of technology is shaped by various social forces, as Latour (1987) concluded.

However, the social shaping studies seem to devote less attention to the nature of innovators' work (whether they are scientists or engineers) and their practices in responding to emergent challenges (e.g. encountering certain technological bottlenecks). Garud & Rappa (Garud & Rappa, 1994b) inspected how scientists enacted their beliefs by creating artifacts and externalized their cognition as evaluation routines. Comparing the single and multi-channel cochlear implants, Garud & Rappa (1994b) exhibited the "fierce fight for constructing technology reality". However, we still do not know exactly how scientists crafted technology while encountering challenges. Also, we know less about the "black box" of tecgnology.

Evolving of technology:The innovation of technology is a complex process of knowledge brokering and recombination (Hargadon, 1998; Sutton & Hargadon, 1996). Scientists may need to cross throgh different scientific disciplines to get complementary knowledge or to resolve technical challenges for sourcing strategic resources. However, we do not learn much about the process of knowledge creation.

Besides, technology may evolve with time. New technology may breed from old ones and have totally different technology paradigms. Research used to focus on the evolving process of existing technology, such as the evolution of shavers under different genders and cultures (Oost, 2003). The evaluation of DDT changed from "evil threat" to "hero", then "necessary evil", as the malaria NGOs fighting with the environmental NGOs to dominate the United Nations conference (Hardy & Maguire, 2010). Another story was the evolution of cochlear implants. The multiple-channel device surpassed the single-channel device by getting the legitimacy of Food and Drug Administration (Garud & Rappa, 1994b).

These researches cared more about the incremental innovation of technology or the social debates of technology effects. However, they do not learn the transformation process of technology. Technology may mutate from time to time. They may evolve by specific scientific theory or social forces. In this sense, the radical innovation of technology may trigger by particular social events. However, we do not know how scientists make sense of specific social events and translate these social signals into scientific breakthroughs. We argue that, social forces maybe the significant sources of technology evolution. In order to understand the transforming process of technology, we suggest to deconstruct the crafting journey of scientific artifacts.

Crafting scientific artifacts: Artifacts are the creation of scientists' beliefs (Garud & Rappa, 1994b), also they present the technological trajectories of innovation path (Giovanni, 1982). By exploring technology artifacts, we can learn how scientific knowledge is created and also how researchers develop specific technological competencies over time (Garud & Rappa, 1994b; Giovanni, 1982). Dosi (1982) argued that, as competencies become specialized, researchers find it increasing difficult to redirect themselves to other paths. Under the path dependence traps, how scientists make breakthroughs from existing technology? This question needs more attention for evolving technology innovation. We try to explore the

answer by tracing the path of artifacts' crafting process.

Significantly, innovators' jobs should not be confined to technical work; they also need to creatively resolve various challenges emerging from social and institutional contexts (Hargadon & Douglas, 2001). Therefore, a pertinent question is: In the process of technological innovation, how may innovators translate social actions into scientific innovation? This inquiry is apparently not so simple, but involves two analytical points.

First, we need to follow scientists in their laboratories, in order to understand how innovators deal with technological inventions and how such a discovery process triggers the need for social signals. Second, we need to follow scientists outside their laboratories, so as to ask: Where do innovators look for social inspiration; how do they make sense of social signals; and how do they translate such social signals into technological inventions? If we could address these two interrelated issues, we are able to understand innovators' working practices in the process of technological innovation, which is the core of our investigation.

RESEARCH METHODS

This ethnographic study examines the evolving process of technology breakthroughs. Our goal is to highlight the social signals/ cues which trigger the evolution of technology. Also, we have to learn the working practices of scientists to know how they translate social signals into scientific innovations. The crafting process of scientific artifact is our main concern for understanding the source of innovation.

Research Site and Case Selection

We selected the case of Nano Research Group (NRG) for this investigation (pseudonym). NGR comprises multidisciplinary research teams from different universities in

Taiwan in such disciplines as nano-science (physics), biotechnology, information technology and network communication. This leading research group was established in 1999, Its initial project, known as WHAM-BioS (Wireless Health Advanced Monitoring Bio-Diagnostic System) detects acute myocardial infarction (associated with heart attacks), has received a series of success.

We selected the case for three reasons. First, this case illustrates a relatively continuous process of innovation. This allows us to examine the evolution of their scientific research. Second, the principal investigators of NRG are prominent scientists in their respective disciplines, based mainly in academic institutions, including 34 professors, 4 medical doctors and 53 graduate students and assistants. This research group has produced a series of significant inventions over time, such as WHAM-BioS (a kind of biological monitor), Anti-SARS (a kind of chemical compound), a flexible paper speaker (which won Wall Street Journal's 2009 Technology Innovation Award), distant healthcare systems, and instant biochips. The group has consistently published in international tier-one science journals, produced groundbreaking innovations, and generated substantial royalties from technology transfer and patent licensing.

During the SARS (a virus which caused an epidemic) crisis in 2003, the research group took only 21 days to produce an innovative anti-SARS mask to protect medical professionals worldwide. To create such groundbreaking innovations, the scientists had to negotiate technological as well as social challenges. Such an approach enables us to examine how the innovators translate social actions into their technological inventions. Third, through university contacts, we were fortunate to gain full access to the research sites, thus providing us with opportunities to interact with the scientists freely. This has significantly increased data authenticity.

Data Collection and Analysis

We conducted regular ethnographic interviews, amounting to 194 field hours, with the group leader, several core principal investigators, senior researchers, project managers, patent managers, doctoral students, and medical doctors who were involved in the innovation process. We also interview the strategic partners, the scientists in the Industrial Technology Research Institute of Taiwan (ITRI) to explore the innovation process, also to triangulate the data we collected.

This paper reports an initial part of our findings. To gain a deeper insight, we participated in their monthly meetings, attended the internal cross-disciplinary training sessions, and observed their laboratory work to learn about the scientists' ways of organization.

In terms of data analysis, we traced the discovery process of the selected innovations over three stages. Each stage was marked by an important research output. This process analysis involves two analytical points for showing the translation from social signals to technological invention (Latour, 1987; Lounsbury, 2006). First, we traced the invention of technology in the laboratories and examined the technical challenges facing the scientists.

Secondly, we analyzed the scientists' social actions, which involved interpreting how scientists made sense of emergent social events and how they translated social signals into scientific inventions. We try to highlight the key scientific knowledge brokering process to specify the artificial crafting process. This analytical framework helped us explicate how scientists domesticated various technologies by exploiting social cues. The data collection is summarized in table 1.

RESEARCH FINDINGS

The findings present three technological inventions for illustration: wireless bio-diagnostic systems, SARS anti-virus methods and the flexible paper speaker.

Stage 1: Biolinker as Wireless Bio-diagnostic Systems (2000~2008)

In 1995, Professor Lee, the group leader, incorporated Micro-Electro Mechanical Systems (MEMS) Laboratories in National Taiwan University. He identified an important trend for cross-boundary research and began to organize scientists across disciplines, such as nano-science, biotechnology, information technology, and network communication. In 2000, Lee received significant funding from the Ministry of Economic Affairs.

However, to deploy this funding, Lee's team was required to present value propositions and specify an appropriate research topic. Within their scope, they surveyed pioneering technologies, such as embedded microchips, a bio-electronic medical recorder and bio-electronic stimulation. But these technologies were in a nascent stage in Taiwan and finding field application was difficult.

Social signals: On one occasion, after experiencing a disastrous typhoon in northern Taiwan, several scientists discussed the possibility of applying a Radio Frequency Identification (RFID) system to detect debris-flow. The current news also attracted a scientist's attention to acute myocardial infarction, dubbed the 'invisible killer' of white-collar workers and listed as one of the top-three deadly illnesses in Taiwan. The scientist suggested employing a similar RFID method and the building of an embedded bio-diagnostic system to predict health conditions inside the human body, and which could detect the onset and progress of acute myocardial infarction in a patient.

However, Lee noted that transferring the debris-flow monitoring system to the bio-diagnostic system would meet several challenges. First, the scientists from the physics

and engineering disciplines had scanty medical knowledge regarding acute myocardial infarction. Second, to apply the bio-diagnostic system into humans, the scientists would require expertise on nano-science in retrieving protein information. A few scientists suggested the use of optoelectronic-based diagnostic tools to replace the biolinkers. Nonetheless, this idea was soon deemed inapplicable because the optoelectronic diagnosis needed to be embedded into the body. The scientists were familiar with engineering formulas; but theories on 'antigen-antibody specificity' and chemical response pathways associated with biolinkers were beyond their scope.

Science in artifacts: To address this challenge, Lee brought the idea to Professor Lin who specializes in medical nanorobotics and DNA mechanics. Lin summarized two research works. First, in order to understand the development of acute myocardial infarction, the team had to understand two key proteins, known as C-Reactive Protein (CRP) and Glucose respectively. Second, to detect these proteins, the team had to 'catch' them and that required an appropriate 'biolinker' structure.

Biolinkers: A biolinker is a form of bio-chemical compound that captures specific proteins. Lee sought the assistance of another scientist, Professor Adam Lee, a chemistry professor and an expert on biolinkers recombination. Adam Lee worked for several months and produced a tailor-made biolinker to seize the CRP and Glucose protein.

> Seizing the nano portein is as difficult as catching an ant on the wall of Taipei 101. You not only have to catch it, but also have to detect the behavior and characteristics of it. It's almost a mission of impossible. All we can think of is using the biolinkers as nano-detectors. By functioning the antigen-antibody specificity, particular structures of biolinkers may link the CRP proteins automatically.

BMW (Bio-Medical-Wieless Sensor): The next task was to place the biolinkers into a sensor (i.e. a micochip). To arrest acute myocardial infarction, medical doctors would advise patients to have health check-ups regularly. But business executives being often too busy

were inclined to ignore medical checkups until it was too late. In the design team, a scientist explained that a biolinker could be used as a ‘nano-policeman’ which would check CRP values constantly (i.e. the protein would signal the risk of heart disease). Therefore, the scientists needed to develop a bio-medical wireless sensor (BMW) that could be inserted in a body. If the sensor could send an alert in time, necessary medical care could be arranged earlier.

RFID: Also, in order to diagnose the signals of acute myocardial infarction and transmit the bio-information in time, Professor Lee invited wireless experts to innovate embedded RFID system which was as small as a coin. The Radio Frequency Identification (RFID) system can store large information and restore all the bio-information easily. It can be reused for several times without taking it out of the body. The scientists also got the access to medical databases to clarify the bio-signals from annoying information. In order to enlarge the bio-signals, scientists put amplifier IC to transmit the bio-information efficiently.

The WHAM-BioS program offered the right value proposition and received government grants in 2003. Thus, NRG was effectively established as a multidisciplinary team. However, there were challenges ahead in the development of this bio-diagnostic system. For instance, if the scientists were to put biolinkers into the biosensor microchip, the biolinkers would die instantly because they would not be able to tolerate high temperatures. However, in semiconductor fabrication, a high temperature is required to process oxidation, diffusion and etching.

Moreover, decoding bio-information from biolinkers was more difficult than the scientists expected. In fact, the biochip was not sufficiently sensitive to translate information from biolinkers into a digital format. The NRG put great endeavors to build the embedded system from 2002-2008. The artifact of this breakthrough technology is as big as a 50 NT dollar coin with a volume of 13.6CC. Although, there are still challenges to pass the animal

experiment and clinical trials, the NRG team got initial success to craft this implant diagnosis technology which claimed as the smallest one in the world in 2008.

Stage 2: Biolinker as Antivirus Solution (in 2003)

Social signals: In 2003, there was an outbreak of SARS (Severe Acute Respiratory Syndrome) in Taiwan leading to a shortage of medical masks. There was an epidemic which affected a hospital in Taipei. Facing great fear of being infected with SARS, people took to purchasing masks in great quantities. However, most of these masks were ineffective; i.e., the SARS virus could easily penetrate the masks and infect the users. At that critical moment, the government called upon the leading research teams to resolve this crisis. Lee who was then a board member of the National Biotechnology Committee began to consider a technological invention to deal with the deadly virus.

Science in artifacts: It was not difficult to reach consensus and focus on the development of antivirus surgical masks. However, the scientists knew little about SARS; they also had little knowledge on how to produce surgical masks. They started from scratch in studying the nature of the SARS virus. A scientist explained that the size of the SARS virus was about 80 nanometers. This virus had many 'crowns' (Note: it is like a very tiny baseball wearing thousands of 'hats'), which can penetrate into human proteins.

AFM (Atomic Force Microscope): Professor Lin decided to take the risk of observing the behavior of the SARS virus under the atomic force microscope (AFM), which can inspect nano-biomaterials. But as the virus was constantly on the move, Lin needed something to 'fix' the virus under the microscope. His hope was to use a biolinker to fix the virus so as to study the biological behavior of SARS. However, to his surprise, when the biolinkers were foisted, the SARS viruses was 'fixed' for an instant and their 'crowns' were dismantled quickly. A scientist explained with excitement:

> This is a great discovery. We never knew that biolinkers could destroy the virus' 'crowns'. Well, in fact, the biolinkers did not destroy the SARS virus. They just changed its natural quality, which is what we refer to as denaturization. In Physics, this is known as the 'Van der Waals Force'. When the SARS virus has lost its crowns, it cannot penetrate human bodies. The virus then becomes nontoxic and harmless!

Biolinkers:HO (CH2)7COOH. The idea was to apply the biolinkers to achieve the 'Van der Waals Force' effect using a natural chemical compound. In 21 days, the scientists formulated a molecular formula: HO (CH2)7COOH. Basically, this formula could be used in a solution that could remove the crowns from the SARS virus. If this solution were spread over surgical masks and the apparel of medical staff, it could serve as a form of antivirus protection.

Electrets materials: Lee sought the assistance of the Industrial Technology Research Institute of Taiwan (ITRI) for the mass production of surgical masks. He learned that ITRI's scientists had examined the N95 Mask produced by 3M. There were three layers of N95: The outer layer was waterproof; the middle layer could capture bacteria; and the third layer circulated air to enable breathing. 3M owned many patents for the N95 Mask and controlled the key components of the middle layer, in which electrets (dielectric materials with quasi-permanent electric charges) were used to capture bacteria. Lee suggested that ITRI combined the magnetic nature of electrets with the antivirus solution.

This suggestion led to an innovation of electrets materials. After blending the electrets in the anti-SARS solution, the static electricity increased to 500 volts (meaning better magnetic attraction to viruses), which was 100 volts higher than that of N95 Mask. This innovation also enabled the team to work around 3M's patent protection and expedited mass-production of antivirus surgical masks at a critical moment.

Stage 3: Biolinker as Flexible Paper Speaker (2003-2010)

Social signals: ITRI had been trying to improve the performance of an electret microphone for several years. The research idea came from an inspiration to make stereo speakers invisible. This meant that the usually large-sized speakers needed to be hidden somewhere. The ITRI scientists planned to design the speakers as papers. Thereby, the speakers could be hidden behind a painting or embedded in the wallpaper, for example. In this way, paper speakers could be used in many artistic performances or home appliances. ITRI initially employed an electret, which is a kind of toxic fluorine. Electret materials charge lower static electricity and are confined to the use of hard speakers.

Science in artifacts*:* In the surgical mask project, the NRG scientists found that biolinkers could enforce the static electricity and soften electret materials. This meant that the paper speaker had a better sound quality.

*Biolinker*s: By blending different biolinkers with an electret material, the scientists learned that paper speakers became bendable and lighter. Adam Lee reconstructed new biolinkers to increase the static electricity. This new combination came out to be "VirusBom" in 2009 which was a big success for denaturing HIN1 virus and different bacteria.

Soften materials: Professor Lee learned that by mixing biolinkers with electret materials, scientists have to soften the plastic materials without high temperature in case the biolinkers may not endure. Scientists use different chemical liquid to soften the plastic materials and worked it out. By blending the liquid plastic with biolinkers, scientists innovated a brand new kind of materials which may make the electrets as thin as possible. Researchers then got the ideas as making thin electret materials by making traditional Chinese pan cake and embarked next milestone.

Carton Paper: But, the NRG faced another problem, the paper speaker cannot be bended and had to be as thin as possible at the same time. For example, for mobile phone speakers, a

thickness of two micro-meters was required. However, thin materials produced low vibrations and sound volume would be compromised. A scientist, returning from a concert, obtained an idea from the orchestra's performance. When he placed multiple mini-speakers into one piece of paper, the problem of low vibration was resolved.

On the other hand, the ITRI also got thin electret papers from carton papers with aluminum on it. This accidential breakthrough made the "printing electricity" become possible. A scientist described:

> At the first beginning, we just paint with a carbon pen on an A4 paper and connect with electricity. We find that it can make sound. This is really exciting! It means that the "paper speaker" is possible. Then, we go to the bookstore to find paper with mental elements to trigger electricity. Then we find the carbon paper with silver and aluminum. Once the paper materials can work, we can realize the "printing electricity". Also, we can put the paper speaker into different shapes and reduce the production cost.

In 2009, the NRG scientists cooperated with ITRI to come out the flexible paper speaker that was as thin as a sheet of A4 paper. It was considered to use as tiny speakers on mobile phones. In early 2010, ITRI got the project of 2010 "Taipei Expo" to blend in flowers exhibition with high-end technologies. ITRI invited artists to design the exhibition and use paper speakers to build a musical forest. Also, they designed the digital photo frames with paper speakers as commodity which made a big success. The value of flexible paper peeked from 0.5~1 US dollars to 35 US dollars. Scientists also enlarged its application for information technology to exhibition and art commodities.

IMPLICATIONS

Theoretical Implications: From the perspective of social shaping, this article explains scientists' work and their knowing process. It aims to re-conceptualize the innovation process

and offer three theoretical implications. First, to understand what scientists know and what they do when they innovate, we must not neglect the social shaping process of technology. Hence, we need to follow scientists not only to their laboratories but also 'elsewhere' (outside their laboratories). We found that scientists also need to bring in social cues to facilitate their technical inventions. Previously, we were given to understand that social forces may shape the construction of technology (Bijker, 1987; Latour, 1987; MacKenzie & Wajcman, 1984). Our findings add that such social shaping is an ongoing process. The evolution of the biolinker in our case illustrates the social shaping and temporal adaptation process (Garud & Rappa, 1994a).

Secondly, our findings also indicate scientists' working practices (what they do when they innovate), which contain their intelligent brokerage skills (Barley, 1996; Latour & Woolgar, 1986). For instance, in our case, the scientists were able to bridge the idea of RFID (for debris-flow monitoring) to the invention of wireless bio-diagnostic systems, associate the biolinker's health monitoring application to the analysis of the SARS virus, or transfer the electronic lessons learned from the surgical mask project to the invention of flexible paper speakers. This requires a dynamic brokerage of technical expertise and social signals, and such brokering practices assist the scientists in responding strategically to various innovation constraints (Couchman, McLoughlin, & Charles, 2008; Hargadon & Douglas, 2001). In this regard, our study explains the formation of a socio-material ensemble and addresses how innovators design their strategic responses, which are two key issues in the innovation and strategy-as-practice literature.

Thirdly, our findings also speak to the user-led innovation literature. Current studies place emphasis on users as the cornerstone of innovation. However, we seem to neglect that on many occasions, innovators can also be considered as lead users too. Our case illustrates the co-creation of innovators and technology and adds that an ongoing social shaping process

could provide a viable source of innovation.

Significantly, our study highlights scientists' strategizing practices. Scientists conduct experiments and invent new technologies in their laboratories. However, science is not sufficient. Scientists also need to broker social signals to inspire technological breakthroughs. In so doing, scientists develop a better understanding of technological capabilities and are able to resolve emergent constraints. Our research elaborates the socio-material reassemblies of innovators' discovery process and suggests that real scientific invention may be inspired 'elsewhere'.

Practical Implications: Our study offer practical lessons to research teams looking for technology breakthroughs. Organizations often invest great resources, build IP protection walls and provide incentives to inspire innovators (Brown & Eisenhardt, 1995; Cooper & Kleinschmidt, 1987; Gupta & Loulou, 1998). However, they neglect the work practices of scientists and the knowledge brokering process of technology. Scientists not only build their capabilities by accumulating scientific knowledge, but also get inspirations from social signals. Thus, getting the sensitivity for specific social phenomenon and translating it into technological features become essential capability.

On the other hand, scientists also have to source complementary technologies outside the labs to get strategic breakthrough. For example, the NRG scientists cooperate with ITRI to innovate the antivirus masks to get rid of 3M's IP protection in N95. This kind of alliances is not only meaningful for scientific innovation, but also inspires value transformation for technology. Inviting artists to redesign the paper speakers as digital photo frames, the price of commodity is multiplied.

CONCLUSION

Our research analyzed how technology evolved with social forces. By translating specific social signals into technology innovations, scientists took the important opportunity to leap into another new technology trajectory and also build new competence. In this sense, social signals became important transformer for technology. By exploring the crafting process of technology artifacts, we can learn the recombination of technology, but also, social knowledge. Thus, scientific artifacts are not only technically constructed but also socially constructed.

References

Barley, S. R. 1996. Technicians in the workplace: Ethnographic evidence for bringing work into organization studies. ***Administrative Science Quarterly***, 41: 404–441.

Barry, B. 2000. Technology transfer and public policy: A review of research and theory. ***Research Policy***, 29(4): 627-655.

Bijker, W. E. 1987. The social construction of bakelite: Toward a theory of invention. In W. E. Bijker, T. P. Hughes, & T. F. Pinch (Eds.), ***The social construction of technological systems***: 159-187. Cambridge, MA: The MIT Press.

Brown, S. L., & Eisenhardt, K. M. 1995. Product development: Past research, present findings, and future directions, ***Academy of Management Review***, 20: 343-378: Academy of Management.

Cooper, R. G., & Kleinschmidt, E. J. 1987. New Products: What separates winners from losers?, ***Journal of Product Innovation Management***, 4: 169-184.

Couchman, P. K., McLoughlin, I., & Charles, D. R. 2008. Lost in translation? Building science and innovation city strategies in Australia and the UK. ***Innovation: Management, Policy & Practice***, 10(2/3): 211-223.

Cowan, R. S. 1985. How the refrigerator got its hum In D. MacKenzie, & J. Wajcman (Eds.), ***The social shaping of technology: How the refrigerator got its hum***: 202-218. Philadelphia: Open University Press.

Enkel, E., Gassmann, O., & Chesbrough, H. 2009. Open R&D and open innovation: exploring the phenomenon. ***R&D Management***, 39(4): 311-316.

Garud, R., & Rappa, M. A. 1994a. A socio-cognitive model of technology evolution: The case of cochlear implants. ***Organization Science***, 5(3): 344-362.

Garud, R., & Rappa, M. A. 1994b. A socio-cognitive model of technology evolution: The case of cochlear implants, ***Organization Science***, 5: 344-362: INFORMS: Institute for Operations Research.

Giovanni, D. 1982. Technological paradigms and technological trajectories: A suggested interpretation of the determinants and directions of technical change. ***Research Policy***, 11(3): 147-162.

Gupta, S., & Loulou, R. 1998. Process innovation, product differentiation, and channel structure: Strategic incentives in a duopoly. ***Marketing Science***, 17(4): 301-316.

Hardy, C., & Maguire, S. 2010. ***Discourse, field-configuring events, and change in organizations and institutional fields: Narratives of DTT and the Stockholm Convention*** (C. Hardy, & S. Maguire, Trans.): Academy of Management.

Hargadon, A. B. 1998. Firms as knowledge brokers: Lessons in pursuing continuous

innovation, ***California Management Review***, 40: 209-227: California Management Review.

Hargadon, A. B., & Douglas, Y. 2001. When innovations meet institutions: Edison and the design of the electric light. ***Administrative Science Quarterly.***, 46(3): 476-514.

Heath, C., & Luff, P. 2000. ***Technology in action***. Cambridge: : Cambridge University Press.

Knorr-Cetina, K. 1999. ***Epistemic cultures: How the sciences make knowledge***. Cambridge, MA.: Harvard University Press.

Lakhani, K. R., & von Hippel, E. 2003. How open source software works: 'Free' user-to-user assistance. ***Research Policy***, 32(6): 923-943.

Latour, B. 1987. ***Science in action: How to follow scientists and engineers through society***. Cambridge, MA: Harvard University Press.

Latour, B. 1988. ***The pasteurization of France***. Cambridge, Boston: Harvard University Press.

Latour, B., & Woolgar, S. 1986. ***Laboratory life: The construction of scientific facts***. Princeton, New Jersey: Princeton University Press.

Lee, G. K., & Cole, R. E. 2003. From a firm-based to a community-based model of knowledge creation: The case of the Linux Kernel development. ***Organization Science***, 14(6): 633-649.

Lounsbury, M. 2006. Strategy as practice: an Activity-based approach. ***Organization Studies***, 27(6): 906-909.

MacKenzie, D., & Wajcman, J. (Eds.). 1984. ***The social shaping of technology***. Milton Keynes: Open University Press.

Oost, E. V. 2003. How users matter The coconstruction of users and technology. ***MIT Press***: 193-208.

Orlikowski, W. J. 1992. The duality of technology: Rethinking the concept of technology in organizations. ***Organization Science***, 3(3): 398-427.

Oudshoorn, N., & Pinch, T. 2003. ***How users matter: The co-construction of users and technology***. Cambridge, MA: MIT Press.

Owen-Smith, J., & Powell, W. W. 2003. The expanding role of university patenting in the life sciences: assessing the importance of experience and connectivity. ***Research Policy***, 32(9): 1695-1711.

Schreier, M., Oberhauser, S., & Prugl, R. 2007. Lead users and the adoption and diffusion of new products: Insights from two extreme sports communities. ***Marketing Letters***, 18(1/2): 15-30.

Siegel, D. S., Waldman, D., & Link, A. 2003. Assessing the impact of organizational practices on the relative productivity of university technology transfer offices: an exploratory study. ***Research Policy***, 32(1): 27-48.

Sutton, R. I., & Hargadon, A. 1996. Brainstorming groups in context: Effectiveness in a product design firm, ***Administrative Science Quarterly***, Vol. 41: 685-718: Administrative Science Quarterly.

von Hippel, E. 2005. ***Democratizing innovation***. Boston: MIT Press.

TABLE 1: Fieldwork Summary

Categories	Number of Interview	Hours
Nano Class	5	15
In-Depth Interview		
Principal Investigators	19	40
Senior Researchers	8	15
Project Managers	8	16
Doctoral Students	25	38
Medical Doctors	5	10
ITRI Researchers	5	10
Non-Participated Investigation		
Project Meeting	7	14
Animal Experiment	3	30
Clinical Trial	3	6
Total		194

Table 2: The Evolving of Technologies

Technology	Biolinker as Wireless Bio-Diagnostic Systems (2000~2008)	Biolinker as Antivirus Solution (in 2003)	Biolinker as Flexible Paper Speaker (2003~2010)
Social Signal	The "invisible killer" of acute myocardial infarction for white collar listed as top-three illness in Taiwan.	In 2003, an outbreak of SARS in Taiwan led to a shortage of medical masks.	ITRI tried to improve the performance of an electrets microphone for several years.
Science in artifacts	*Biolinkers*: scientists retrieved CRP protein information by particular chemical compound of biolinkers. *BMW(Bio-Medical-Wireless):* scientists designed the biosensor microchip to	*AFM (atomic force microscope)*: scientists used a biolinker to fix SARS to study the biological behaviors under the microscope and found that their "crowns" were dismantled quickly. *Biolinkers :HO(CH2)7COOH.*	*Biolinkers*: NRG scientists found the biolinkers could enforce the static electricity. *Soften materials*: scientists experiment to have liquid plastic

	decode and transmit bio information. *RFID*: scientists transfer the debris-flow monitoring system to the bio-diagnostic system.	Scientists denaturalized SARS by particular biolinkers and Van de Waals Force. *Electrets materials:* ITRI blended the electrets in the anti-SARS solution and increased the static electricity to 500 volts.	materials to blend biolinkers. Carton paper: ITRI scientists found carton paper with aluminum to create paper speaker.

國科會補助計畫衍生研發成果推廣資料表

日期:2014/01/08

國科會補助計畫	計畫名稱: 開放式創新的服務脈絡
	計畫主持人: 蕭瑞麟
	計畫編號: 99-2410-H-004-013-MY3　　學門領域: 科技管理

無研發成果推廣資料

99 年度專題研究計畫研究成果彙整表

計畫主持人：蕭瑞麟	計畫編號：99-2410-H-004-013-MY3
計畫名稱：開放式創新的服務脈絡	

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%		
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	1	0	100%	人次	
		博士生	1	0	100%		
		博士後研究員	2	1	100%		本計畫延攬之博後研究員歐素華博士因受聘為私立東吳大學企管系專任助理教授，研究工作由廖啟旭博士接續，研究期間為102/3/1~102/7/31。
		專任助理	1	1	100%		
國外	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	2	2	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	本計畫於三年之中，在開放創新文獻中發展出初具原創性的學術理論，以資源流、逆強守弱等新觀念，見聞於與國際社群，也延續上一期計畫對「脈絡」的研究成果。這些研究成效尚待發酵。期望這些新發現能夠持續在企業實務中發揚，讓學理更臻完備。放眼未來，本計畫除持續將這些成果發表之外，也會嘗試將研究發現融入課程之中。本研究也將這些案例轉為個案教材，陸續將發表在國際案例平台，包括瑞士 IMD 案例庫（研華科技個案）以及加拿大 Richard Ivey 案例庫（聯合報系）。讓這些知識能夠有效分享給學術界與業界，以期拓展本研究的社會影響力。

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

國科會補助專題研究計畫成果報告自評表

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

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：■已發表 □未發表之文稿 □撰寫中 □無

專利：□已獲得 □申請中 ■無

技轉：□已技轉 □洽談中 ■無

其他：(以 100 字為限)

最後一年度，本計畫總共發表七個核心案例。

案例一、研華科技：這篇論文探討弱勢者如何對抗強勢者德國公司，提出逆強論的回應方式以及資源建構的做法。論文題目是：《逆強論，由強勢者之脆弱點建構資源的作法》。這篇文章預計到搞到策略管理協會 2014 年馬德里國際年會議。

案例二、梵谷策展（聯合報系）：本文探討弱勢者在制約下資源建構的原則，分析各種社會性建構手法。這篇論文已經被《中山管理評論》接受，論文主題是：《劣勢隨創新：梵谷策展中的隨創行為》。

案例三、Intel 亞洲研發中心（台灣）：這篇論文分析弱勢者如何找出資源交換的路徑，並且由角色的改變以及資源互換中分析弱勢者的隨創原則。論文題目是《尋找影響路徑：弱勢者如何以創意回應取得影響力》，目前在修訂重審中。

案例四、三立電視台：這篇論文探討劣勢中弱勢者如何對外開放，並且巧妙組合手邊僅有的資源，完成研發任務（也就是戲劇製作）。這篇論文已經投稿到歐洲組織學會鹿特丹 2014 年國際年會，論文題目為：《少力設計：創業隨創中資源的重新建構》。

案例五、華研音樂：這篇論文探討跨界的開放創新，分析華研音樂的資源效能化做法。這篇論文已經投稿到歐洲組織學會鹿特丹 2014 年國際年會，論文題目為：《文創產業於資源制約下的跨界創新》。

案例六、曜越科技：這篇論文弱勢者如何引進外部資源巧妙融合本身資源，創新出一系列的商業模式以及新產品。這篇論文的題目是：《守弱學：制約下資源的社會建構》，預計將投稿到策略管理學會 2014 年馬德里國際年會。

案例七、聯合報系：本研究已經完成初稿，投到歐洲組織學會（EGOS: European Group of Organization Studies）2014 年於鹿特丹之國際年會，論文題目是：《導航資源流：開放創新下複合式商業模式的形成》。

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

學術成果上，本部分發表七篇案例於國際學術會議（第一級），並且陸續籌備期刊的發表

中。在這兩項目標中，本研究提出一系列的原創性理論，例如資源流、逆強論、守弱學、少力設計、劣勢隨創等觀念與實務。這些構想不僅可以補開放創新文獻的不足，更豐富了劣勢創新的探討。

由實務來看，本計畫也目標達成產學橋接的功能，對企業產生一定的影響，可以分為兩點來探討。第一，透過行動研究合作，聯合報系已經漸漸採用了「資源流」的分析架構來考慮內部與外部的資源整合，探索複合式商業模式的各種可能性。這使得聯合報系研發人員由「串媒體」作法演變成「串資源」的思維。第二，研華科技也採用了本計畫「逆強式」隨創策略，分析各部門每年度的開放創新活動，包含新事業育成、併購、策略聯盟、新產品開發，以提升各事業部的創新策略的規劃品質。

整體而言，本計畫於三年之中，在開放創新文獻中發展出初具原創性的學術理論，以資源流、逆強守弱等新觀念，見聞於與國際社群，也延續上一期計畫對「脈絡」的研究成果。這些研究成效尚待發酵。期望這些新發現能夠持續在企業實務中發揚，讓學理更臻完備。放眼未來，本計畫除持續將這些成果發表之外，也會嘗試將研究發現融入課程之中。本研究也將這些案例轉為個案教材，陸續將發表在國際案例平台，包括瑞士 IMD 案例庫（研華科技個案）以及加拿大 Richard Ivey 案例庫（聯合報系）。讓這些知識能夠有效分享給學術界與業界，以期拓展本研究的社會影響力。