考試科目	經濟學	所別	科管所學士後甲組 491	考試時間	4月20日(上)下午第一節 星期日

國立政治大學圖書館

一、 選擇題 (70%)

1. 下列何者不計入台灣GDP？

(A) 本國人在國內外資公司工作的薪資
(B) 國內公司的外籍員工的薪資
(C) 公務員的薪水
(D) 老人年金
(E) 間接稅
(F) 以上皆非

2. 規模經濟和規模報酬遞減，可以解釋:

(A) 報酬遞減法則
(B) 短期成本曲線為U形
(C) 長期成本曲線為U形
(D) 固定成本保持不變
(E) 平均成本及變動成本曲線正斜率部分
(F) 以上皆非

3. 假設x物品的需求量Qx由其本身價格Px，消費者所得Y及y物品價格Py決定，

$$Qx = 150 - 3Px - 0.002Y + 8Py$$

下列何者為真？

(A) x是正常財
(B) x及y在生產上是替代品
(C) x及y在消費上是替代品
(D) x及y在消費上是互補品
(E) 以上皆非

4.近來由於SARS疫情的升溫，口罩的價格調漲，下列敘述何者為真：(複選)

甲、 疫區民眾對疾病的恐慌造成口罩需求量的上升。
乙、 口罩的生產廠商，大舉出貨造成供給的右移。
丙、 香港的口罩價格上漲幅度比台灣高，需求右移的幅度較大是可能的原因之一。
丁、 口罩的供不應求，是因為價格沒有充分的調整。

(A) 甲乙
(B) 甲丙
(C) 丙丁
(D) 乙丁
(E) 以上皆非

5.若經濟體系的失業率恰等於「自然失業率」，則下列敘述何者為非？

(A) 失業為經濟體系的摩擦性失業
(B) 長期菲律普曲線（Phillips Curve）為垂直線
(C) 經濟體系的預期通貨膨脹率，高於實際的通貨膨脹率
(D) 失業率為長期穩定的失業率
(E) 以上皆非

6. 總體經濟資料如下：

GDP成長率為8%，資本存量成長率為4%，勞動成長率為2%，資本邊際生產力為50，資本平均生產力為100，勞動邊際生產力40，勞動平均生產力為80，而總體經濟生產函數為Y=T(t)F(K,L)，T(t)為技術進步率；則根據上的資料，計算技術進步率為多少？

(A) 4%
(B) 5%
(C) 6%
(D) 7%
(E) 以上皆非

備考	試題隨卷繳交

命題委員： —204— (簽章) 年 4 月 7 日

考試科目	經濟學	所別	科管所 甲組 491	考試時間	4月20日(上)午第一節 星期日 下

國立政治大學圖書館

7. 下列何者為「差別取價-price discrimination」的應用實例？（複選）
   甲、 HP與Epson噴墨印表機必須使用自身品牌之墨水。
   乙、 快譯通的舊機可折價換購新機的活動。
   丙、 商品的「外銷」價格通常低於「內銷」價格。
   丁、 麥當勞的折價券（coupon）。
   戊、 微軟將office區分為專業版及家用版。

   (A) 甲乙丙
   (B) 乙丁
   (C) 甲丙丁戊
   (D) 以上皆是
   (E) 以上皆非

8. 若100人同住在一個小島上，他們願意支付$50建造額外的路燈。又若路燈的建造成本為$C(X)=3X^2+200X+10$，X表路燈數量。則符合經濟效率的路燈數量為多少？

   (A) 910
   (B) 1130
   (C) 765
   (D) 800。
   (E) 以上皆非

9. 下列敘述，何者正確？（複選）
   甲、 我國郵匯局的存簿儲金被計入$M1_B$中
   乙、 本位貨幣具有「無限法償」的能力
   丙、 若活期存款有10,000元，法定存款準備率為20%，則可創造40,000元的存款貨幣。
   丁、 民眾預期明年物價將因波灣戰爭的延續而上漲，則會增加現金餘額持有量。
   戊、 若實質國民生產毛額為1,000元，貨幣供給為500元，在物價水準為2.0之下，則貨幣流通速度為4。

   (A) 乙丁
   (B) 甲戊
   (C) 甲丙丁
   (D) 乙丙戊
   (E) 以上皆非

10 下列有關IS-LM曲線的敘述，何者為「非」？（複選）
   甲、 LM曲線是一條垂直線時，隱含貨幣需求的利率彈性為零。
   乙、 LM曲線的水平部分反映的是流動性偏好。
   丙、 若政府以發行公債融通公共投資，則IS曲線右移，LM曲線左移。
   丁、 物價水準上升時，實質貨幣數量減少，LM曲線左移。
   戊、 投資的利率彈性越小，IS曲線越平緩。
   己、 政府的支出增加，一定會產生排擠效果。

   (A) 甲丁
   (B) 乙己
   (C) 丁戊己
   (D) 甲乙戊
   (E) 以上皆非

二、 問答題（30%）

(15%) 1. 日前台北市政府提出有意針對機車路邊停車進行收費。假設台北市民對機車路邊停車位的需求為$Q^d=140-P$，而台北市政府對機車路邊停車的訂價為$P=20$，機車停車位的供給量為$Q^s=40$，求在所有潛在需求者皆有相同機率獲得停車位之假定下，車位可提供之消費者剩餘是多少呢？

(15%) 2、下列有兩條貨幣需求函數：

、 $(A)\ln\frac{M^d}{P}=0.5+0.98\ln Y-0.13r+e$

$(B)\ln\frac{M^d}{P}=0.4+0.95\ln Y-0.04r+u$

$\frac{M^d}{P}$ 實質貨幣需求

Y：所得，R：利率，e及u為殘差項。請問當貨幣需求函數為A或B時，採用貨幣政策比財政政策更有利？

考試科目	微積分（科管所甲組 92）	別	科管所 491	考試時間	4月20日上午第一節 星期 日 ⑦

國立政治大學圖書館

注意事項：1、請將算式以及推導過程臚列清楚。

2、每題 10 分，注意時間的分配。

一、 某產品的總成本函數是 $y = f(x)$，

如果邊際成本函數是 $f'(x) = dy/dx = 2 + 60x - 5x^2$，固定成本是 70 。

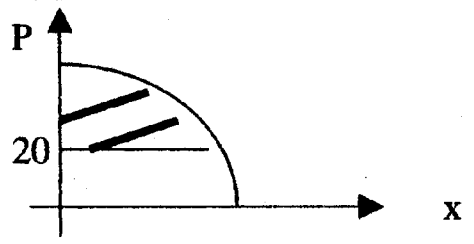
請問總成本函數及平均成本函數分別爲何？

二、 請求出 x, y, z 的最佳解：

$$MinZ = 5x^2 + 6y^2 - xy$$
$$s.t. \quad x + 2y \geq 24$$

三、 請微分：$\ln(2x^3 + \sin x)$

四、 求斜線部份的面積： $P = 35 - 2x - x^2$



五、 定義 彈性 $e = -\dfrac{dQ/Q}{dP/P}$，試求 $P = Q^{-3}$ 的彈性爲何？

六、 若 $\dfrac{xz^2}{x+y} + y^2 = 0$，試求 $\dfrac{\partial z}{\partial x} = ?$

七、 已知 $f(x,y) = xy - \ln(xy)$，試求 $\dfrac{\partial^2 f}{\partial y \partial x} = ?$

八、 已知 $w = \ln(x^2 + y^2 + 2z)$, $x = t + s, y = t - s, z = 2ts$，試求

$\dfrac{\partial w}{\partial t} = ?$

九、 請運用泰勒(Taylor)展開式求 ln(1.04) 的近似值至小點後第五位。

十、 何謂「微積分基本定理」？這定理的重要性何在？

備考	試題隨卷繳交

命題委員：　　-206-　　（簽章）　92 年 4 月 3 日

考試科目	經濟學(乙)	所別	科管所 492 (學士後乙組)	考試時間	月 日 星期 上下午 第 節

國立政治大學圖書館

經濟學（乙）92

1、 請儘量輔以圖表或方程式來說明需求函數與供給函數是如何導出來的。（20%）

2、

（1） 請解釋以下名詞：（18%）
進入障礙，套牢，轉換成本，網路外部性，規模經濟，搭售

（2） 微軟一再投入重金以更新並擴充 WINDOW 系統軟體的功能，甚至要把 IE 瀏覽器也納入系統軟體的一部份。請用以上名詞解釋微軟採取這種策略行爲的原因。（12%）

3、 規模經濟與學習曲線是相關或獨立的現象？規模報酬遞減就不會有規模經濟的現象嗎？（10%）

4、 沒有鑽石不會怎麼樣，沒有水我們卻活不下去。但是，爲什麼鑽石卻比水來得貴呢？（10%）

5、 在經濟學中，如何定義「技術」？如果有全自動紡紗機，半自動紡紗機及手動紡紗機等三種生產的方法可供選擇，廠商該如何選擇最有經濟效率的生產方法呢？（10%）

6、 政府介入科技發展的理由是什麼？方式有哪些？（20%）

備考	試題隨卷繳交

命題委員： -207- （簽章） 92年 4月 3日

考試科目	企業管理個案	所別	科管所博士後乙組 492	考試時間	4月20日 星期日 上午(下)午 第 1:20-3:00 節

試題包括四個個案，請分別就各個案後的問題來作答。也請把握時間

國立政治大學圖書館

個案一 (40 分)

從台南地區一家沒沒無聞的小型代工企業，發展到自創品牌行銷到國內外，盜成爲第一家在大陸股票上市的台資企業；除設定公元 2003 年時營業目標爲六億美元，病例至於公元 2006 年躋身世界前五大家電廠商，燦坤集團的成功經營策略足堪國人借鏡，而其未來的發展策略如何？亦受是人矚目。

在創業之始，吳燦坤先生便設定要走精緻設計的高級小家電產品路線，因爲他認爲一般小家電單價低、利潤薄，而廠商的相對汰換速度也快。例如十年前做吹風機的廠商有數十家之多，如今只剩幾家，且仍走廉價的路線。此外，在創業初期應集中資源及努力於少樣主力產品，以提高專業能力，並開發熟悉領域內的獨特產品。燦坤的產品便是結合工業、商業設計，把傳統的產業加上藝術化與新科技重新推出，贏得國際推崇爲除日本廠商外的最優秀專業小家電設計製造公司。

雖然接受國外家電大廠的委託代爲製造〈OEM〉的訂單很大，利潤也有，但那畢竟是創業初期迅速打開國際市場，達到規模量產的捷徑。燦坤並不甘於被定位在「台灣最好的小家電代工廠」，因而努力研發設計，不但賣產品，更賣設計，而且從不斷創新所賺來的錢會更多且持續。因此，燦坤在早期即利用當時台灣充沛的製造能力，大量運用協力廠，而企業重心則放在工業設計和研究，迄今其每年的研發費用均保持在營業額的 5%水準。於是，其企業形象很快地從 OEM 改爲委託設計製造〈ODM〉。隨著企業體質的壯大，吳燦坤先生自創品牌的夢想就越來越易實現，而且也唯有生產自己的產品〈OBM〉，並在自己能掌握的通路上銷售，才是企業真正大格局的出現。當然，策略上還是得按步就班地去實現。目前燦坤在台灣及大陸市場的自創品牌以「燦坤 EUPA」爲主，在歐洲市場則大部份以 ODM 爲主，賺取設計利潤，少部分爲「EUPA」品牌，另外還有一小部份產品以「SUP」爲名。至於美國市場，則自 1994 年起成功地以「SWIFT」品牌進入最大的零售通路 WAL-MART，這是燦坤集團在美國自創品牌的重要里程碑。

在產品策略方面，爲了提高市場佔有率與智慧佔有率，燦坤規劃生產兩極化的產品，一是以低價取勝的大眾化產品，另一是以創意、設計及功能取勝的高附加價值產品〈亦即提高智慧佔有率〉。燦坤每年均保持開發數十件新產品，每件產品平均壽命十個月。往往在產品開發出來後，第一年在台灣生產，第三、四年移大陸生產，第五年以後把權利賣給印度、巴基斯坦。一般而言，其產品在市場上規劃爲：10%的開發性產品，50%的收益性產品，另外 40%則屬於攻擊性產品。此外，在品質方面，採用 MILD-105D 抽樣計劃。從進料→製程→產品→出貨檢驗，均依開發工程部所制定的部品承認書、作業指導書、規格書，進行檢驗步驟。

備考	試題隨卷繳交

命題委員：-208- (簽章) 92年4月7日

考試科目	企業管理個案	所別	科管所學士後乙組	考試時間	4月20日上午第一節 星期日

並且爲了提昇品質，燦坤除了積極引進 ISO-9000 的認證系統外，目前最具體的成果便是成立新實驗工廠。此舉除了加強產品功能、安全規格、和符合各國規定的查驗外，對於部分開模、外來顧問實例的指導上，也可提供一個條件較優的設備場所。至於品質認證方面，燦坤的產品獲得 VDE、TUV 等諸多國際標準，在國際上享有極高聲譽，且在燦坤實業通過 ISO9001、廈門燦坤通過 ISO9002 認證後，燦坤集團已成爲家電業者中，少數擁有兩個 ISO 認證的家電集團。

從 1982 年產品過於集中歐洲市場而得到慘痛的教訓後，燦坤改以「分散市場」爲主要策略，並且就各國不同的文化背景，分別開發適合的產品，以增加市場吸引力。1985 年燦坤成立台灣優柏〈EUPA〉公司，將已風行國際的小家電轉進國內市場。目前，產品行銷遍及全球，計劃未來內、外銷比例將達：內銷 20%；外銷 80%。其中外銷市場分配爲美洲 30%、歐洲 30%、日本 30%，其他地區 10%。這對因應廣大環境變動而得以靈活轉移市場，以及防止外銷過度集中而致業務暴起暴落，均有相當大的助益。另外，鑑於媒體使用成本過高，燦坤藉著參加國際性商展和國際性產品設計比賽的機會，來增加直接與國外經銷商接觸的機會，此舉除了可減少廣告費用，並可快速建立該品牌的國際性聲譽。還有，由於國際行銷網路的建立不易，燦坤在歐美市場，以積極併購的方式，買下當地公司既有的品牌和通路，如 Novatrend，更名爲美國燦坤公司；又如燦坤產品以「SWIFT」品牌，進入美國最大 WAL-MART 零售網，可避免因建立自己通路必須花費的大筆費用與風險。至於日本市場，更是因爲難以打入，燦坤只得藉與日本英弘的合作，而成功地將產品深入對方的 250 家連鎖店體系中。而燦坤本身亦因符合我國投審會「平行輸出入」的規定，得以免除由日進口家電產品的關稅。

在人力資源的培育運用策略方面，燦坤堅持幹部五年輪調制度，以避免跨國企業的本位主義弊端。除爲員工規劃未來生涯，並鼓勵他們內部創業。此外，還分別在台南新化及廈門設立員工教育訓練中心和燦坤學院，自行培育人才。而公司研發人員，更是計劃性地向世界各地招募，並不惜成本送到各地吸收新觀念或進一步深造，使公司內充滿重視人力資源的企業文化。

燦坤於 1994 年於上海成立中國銷售總部，以及上海燦坤公司正式生產後，其國際化的發展便更明確地以「大亞洲計劃」爲目標。由於燦坤過去的海外市場多集中在以麵包爲主食的歐美市場，故產品以煎烤器、咖啡壺爲大宗，若想要進軍新興的亞洲市場，則必須要有不同的產品策略。因此，大亞洲計劃除了在地理區域上要涵蓋台灣、香港、大陸、日本、韓國、越南等地區外，更應在產品結構上調整爲以米食文化爲主的產品，如電子鍋、微波爐及食品處理機等。其做法是在日本大阪的辦事處聘用多位日本設計師，負責開發人性化家電產品，並透過日本據點蒐集先進的市場情報及設計概念，再由台灣的研發中心加以商品化。規劃中、台灣廠供應日本和台灣的市場，上海廠供應大陸和香港的市場，廈門廠則仍以外銷爲主。至於將來的越南廠，則可以搶攻東南亞市場。

燦坤發展至今儼然已形成國際性佈局，在其設計、製造、行銷的三個環節中，台灣成爲商品化的設計中心，大陸成爲主要的生產基地，美國的芝加哥、日本的

國立政治大學圖書館

備考	試題隨卷繳交

命題委員：　　-209-　　（簽章）　　年　　月　　日

考試科目	企業管理個案	所別	科管所學士後乙組	考試時間	4月20日上午第一節 星期日(下)

國立政治大學圖書館

大阪和德國的科隆則成爲行銷據點和市場情報站。此外，爲因應集團的全球化發展，並推動現代化管理革新，該集團總部計劃構建企業體資訊高速公路，其中，台灣、香港和廈門間的網路，已於 1995 年初完成啓用。

【上述個案摘錄並修改至劉長勇（民 87）台灣本土企業個案集－系列五，杜富燕撰寫之「燦坤集團」個案】

個案一**問題**：

1. (1)台灣很多公司的主要經營型態是 OEM，請問此類經營型態通常有哪些特性？(2)有哪些好處與壞處？(3)在燦坤的情形爲何呢？(4)就你（妳）的瞭解，台灣資訊電子業（以 OEM, ODM 爲主）的主要競爭優勢/Strengths 爲何？
2. (1)請用施振榮先生的”微笑曲線”來說明燦坤公司的發展情形。(2)從燦坤發展的情形來看，一般人常以單一企業功能優勢（如生產製造,行銷或研發）的角度來思考經營管理，請問此想法可能有何盲點？
3. (1)燦坤在全球化的經營管理上，有哪些特色？(2)時下流行的”台灣研發，大陸生產”的手法，你（妳）覺得可能有哪些盲點/不足之處？可以有何進一步的考量與作法？
4. 請問：台灣的企業<u>未來</u>是否有機會立足於國際？主要的機會點與競爭優勢來源將可能爲何？

個案二 (20 分)

A home is the most complex purchase most consumers will ever make. The decision spans the entire spectrum of behavioral influences, from the legal and practical to the social and emotional. From traditional and cozy to sleek and futuristic, practical to extravagant, homes reflect their owners' sense of style, activities, and personal values. Because of this deep connection with self-image and lifestyle, many buyers want their homes to be unique, to have special touches that meet their personal needs and distinguish them from all other houses in the neighborhood.

Unfortunately, this desire to create unique houses collides with the cold realities of homebuilding economics. Customized houses cost more money, and the more custom a house is, the more it's likely to cost. The reasons range from the need to hire an architect to draw up the plans to the builder's cost of buying specialized materials in small quantities. For the vast majority of new-home buyers, creating a one-of-a-kind master-piece is simply too expensive. In the typical suburban planned neighborhood, one or more homebuilders offer a few different models quickly and cost-effectively, but the result is often cookie-cutter houses that look nearly identical. Consumers who'd love to have a unique house built to satisfy their dreams and demands can look

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up and down the streets and find other people with practically the same house. It's a little like showing up for a party in some splendid new outfit, only to find a dozen other people wearing the same thing-except that you're stuck with your house for years, not just for an evening.

In this buyer frustration, homebuilder Donald Horton saw opportunity. He realized that it doesn't take much to give most buyers a sense of uniqueness. It could be a marble entryway to impress guests, an enlarged kitchen window to let parents keep a better eye on their children playing in the yard, or a whirlpool bathtub in the master bedroom. Horton offer perhaps 10 basic home models in each of his developments; then he lets people make choices to customize from those standardized starting points. Horton still gets much of the cost-effective of mass production, and buyers get to feel a little mores special about their new homes. Many cost-conscious builders, in contrast, calculate their costs for each model down to the penny and refuse to budge when buyers ask for change.

Options such as whirlpool baths and fancy windows have a strong emotional pull for buyers, who often don't think twice about the additional cost, a smart salesperson can remind them that over the life of the typical 30-years mortgage, a few indulgences barely create a financial blip. Adding a US$1,000 whirlpool bath to a US$200,000 house with a 10-percent, 30-year mortgage, for instance, works out to less than US$0.30 a day. For $5 a day, you could add about US$17,000 worth of custom goodies-enough to add a lot of personal touches to a standard-issue structure.

Being flexible enough to let consumers add all these options pays off handsomely for Horton. First the profit margin on options is often higher than on the basic structure of the house, so the more options people buy, the higher Horton's profit margin. Second, letting people choose the personal details often leads to fasters sales. The faster he can sell homes, the less money he has tied up in inventory.

Having the flexibility to respond to customers' unique requests looks like good business to Horton. His company's profit margin is more than twice that of his nearest competitors, and sales continue to grow. He'd be the first to tell you that listening to customers is just basic good business.

個案二**問題**：

1. How does Donald Horton apply the marketing concept?
2. Because of his willingness to customize the details, would Horton be able to attract all homebuyers, regardless of price category? Why or why not?
3. How does Horton's flexibility relate to the definition of quality?
4. Identify at least three other consumer purchase choices that like houses, reflect the buyer's self-image and lifestyle.

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個案三 （20分）

Eastman Kodak is a US$20 billion Rochester, New York, company. Comprised of several business product lines-film and cameras, chemicals, and pharmaceuticals -Kodak's profit in 1992 was well over $1 billion per year. Kodak has been a strong market contender for decades in the film industry, having some 70 percent of the market. With all this going for a company, you'd think there'd be a little to be concerned about. Wrong!

Kodak is having difficulty keeping its managers. Take, for instance, Christopher Steffen. Steffen was considered one of the best finance minds in the business. Because of a need for change to keep pace with the ever-changing world, Kodak was looking for someone of Steffen's caliber. And did it ever pay off! Within weeks of being hired, Steffen began his analysis of what the company needed. He looked for inefficiencies in its operations. He advocated cutting costs and restructuring the company, which included selling the pharmaceuticals division-a part of the company the president had nurtured. His efforts were quickly rewarded as Kodak's stock skyrocketed because of what he was doing.

Then, suddenly, eleven weeks into the job, Steffen quit. His resignation sent all involved with Kodak searching for answers. Had Steffen made a bad decision in coming to Kodak? Did he have a too ambitious plan for the recommended change? Was he up against the culture of the organization? Did he perceive living in a small, isolated town created a barrier to his desire to continue his career growth? We may never know. The point, however, was here was an individual who had all the qualities of an effective manager. He planned his course of action, looked at how the company was organized to best meet its plans, and took a leadership role to correct gaps in where the organization was versus where it could be. Yet in spite of his management ability, Christopher Steffen and his job at Kodak were not a good match.

個案三問題：

1. What role does organization culture play in creating a proper match between employees and their jobs?
2. How can restructuring the organization affect its culture?
3. If you were Steffen's boss at Kodak, and were pleased with his work, what actions would you take to attempt to keep Steffen from resigning?

Source: Carol J. Loomis, " The Battle to Shape-Up Kodak," Fortune, May 31, 1993, pp. 62-63.

備考	試題隨卷繳交

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國立政治大學圖書館

個案四 (20 分)

Sue Reynolds is twenty-two years old and will be receiving her bachelor's degree in human resource management from the University of California at the end of the semester. She has spent the past two summers working for California Mutual (CM), filling in on a permanent basis upon graduation.

California Mutual is a large insurance company. In the headquarters office alone, where Sue will work, 5,000 employees are employed. The company believes strongly in the personal development of its employees. This translates into a philosophy, emanating from the top executive offices, of trust and respect for all CM employees.

The job Sue will be assuming requires her to direct the activities of twenty-five clerks. Their jobs require little training and are highly routine. A clerk's responsibility is to ensure that renewal notices are sent on current policies, to tabulate any changes in premiums from a standardized table, and to advise of result of non-response to renewal notices.

Sue's group is composed of all females, ranging from nineteen to sixty-two years of age, with a median age of twenty-five. For the most part they are high school graduates with little prior working experience. The salary range for policy renewal clerks is US$1,720 to US$2,370 per month. Sue will be replacing a long-time CM employees, Mabel Fincher. Mabel is retiring after thirty-seven years with CM, the last fourteen spent as a policy renewal supervisor. Because Sue Spent a few weeks in Mabel's group last summer, she is familiar with Mable's style and knows most of the group members. She anticipates no problems from any of her soon-to-be employees, except possibly for Lillian Lantz. Lillian is well into her fifties, has been a policy renewal clerk for over a dozen years, and-as the "grand old lady"-carries a lot of weight with group members. Sue has concluded that her job could prove very difficult without Lantz's support.

Sue is determined to get her career off on the right foot. As a result, sne has been doing a lot of thinking about the qualities of an effective leader.

個案四問題：

1. What critical factors will influence Sue's success as a leader? Would these factors be the same if success were defined as group satisfaction rather than as group productivity?
2. Do you think that Sue can choose a leadership style? If so, describe the style you think would be most effective for her. If not, why?
3. What suggestions might you make to Sue to help her win over or control Lillian Lantz?

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一、The Lab that Ran Away from Xerox　30%

1. 全錄的PARC對全錄有何貢獻？PARC對個人電腦產業有什麼貢獻？
2. 為何全錄無法從PARC的研發成果中獲得更大的利益？

二、微利陷阱的突圍　30%

1. 為何微利是個陷阱？台灣是否有機會從微利中突圍？
2. 大陸為何是個「黑洞」？你的看法如何？

三、厚植文化之根，才能走向國際　20%

1. 從雲門看文化的根與國際化的關係。
2. 雲門的創意在哪裡？台灣還有什麼其他足以傲世的創新？

四、商品化　20%

1. 以你自己的經驗說明商品化中「驗證」與「取捨」的重要性？
2. 請詮釋創新的創字中有「創傷」的意義。

備考	試題隨卷繳交

命題委員：

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The Lab that Ran Away from Xerox

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On a golden hillside in sight of Stanford University nestles Xerox's Palo Alto Research Center, a mecca for talented researchers—and an embarrassment. For the $150 million it has lavished on PARC in 14 years, Xerox has reaped far less than it expected. Yet upstart companies have turned the ideas born there into a crop of promising products. Confides George Pake, Xerox's scholarly research vice president: "My friends tease me by calling PARC a national resource."

Not that the center has been utterly barren of benefits for Xerox. The company's prowess in designing custom chips, to be used in future copiers, comes largely from PARC. So do its promising capabilities in computer-aided design and artificial intelligence. PARC did most of the research for Xerox's laser printers, now a $250-million-a-year business growing at 45 percent annually and expected to turn a profit in 1984.

But Xerox hasn't cashed in on PARC's exciting research on computerized office systems, which was the center's original reason for being. According to Stanford J. Garrett, a security analyst who follows Xerox for Paine Webber, the company's office systems business lost a horrific $120 million last year and will probably drop $80 million in 1983. "Xerox has got a lot out of PARC," says Garrett, "but not nearly as much as it could have or should have."

Why has Xerox had trouble translating first-rate research into money-making products? Partly because the process takes time at any large company—often close to a decade. Sheer size slows decision making, and the need to concentrate on existing businesses impairs management's ability to move deftly into small, fast-changing markets. This is a special problem for Xerox, still overwhelmingly a one-product company whose copiers accounted for three-quarters of last year's $8.5 billion in revenues and almost all the $1.2 billion in operating profits.

Serious organizational flaws, acknowledged by high Xerox executives, have also proved a handicap. PARC had weak ties to the rest of Xerox, and the rest of Xerox had no channel for marketing products based on the researchers' efforts. The company has revamped office equipment marketing five times in the last six years. "Xerox has creaked, twisted, and groaned trying to find out how to use PARC's work," says an insider. While Xerox has groaned, disgruntled researchers have left in frustration. These Xeroids, as they call themselves, have showered PARC's concepts—for designing personal computers, office equipment, and other products—on competing companies.

PARC's influence outside the walls of Xerox is an ironic tribute to the ambitious vision of the man who founded the center in 1969. C. Peter McColough, then Xerox's president, charged PARC with providing the technology Xerox needed to become "an architect of information" in the office. The new center, in a mutedly elegant three-story building whose rock-garden atria foster meditation, quickly lured many of the nation's leading computer scientists, offering what an alumnus calls "a blank check and 10 years without corporate interference."

Roughly half of PARC's money went for research in computer science and half for research in the physical sciences. Most of the glamour radiated from the computer crew. Members were notorious for long hair and beards and for working at all hours—sometimes shoeless and shirtless. They held raucous weekly meetings in the "bean-bag room," where people tossed around blue-sky concepts while reclining on huge pellet-filled hassocks. PARC's hotshots were not just

playing at being geniuses. Before long, computer scientists recognized PARC as the leading source of research on how people interact with computers.

The hands-off policy at Xerox's headquarters in Stamford, Connecticut, proved a double-edged sword. PARC researchers used their freedom to explore concepts for personal computing that have since swept the industry. All sorts of computers, including some from Apple and IBM, now offer "bit mapped" displays, which PARC championed 10 years ago. Such displays link each of the thousands of dots on a video screen to a bit of information stored in computer memory, thus allowing the computer to change each dot and create very fine-grained images. Apple's new, easy-to-use Lisa flaunts a display that can be divided into "windows" for viewing several pieces of work at once, as well as a pointing device, or "mouse," for giving commands. PARC did the lion's share of work on both ideas.

But Xerox's loose management also encouraged PARC to overstep its charter, which was to do research, not nuts-and-bolts product development. By the mid-1970s, the center was hard at work on the Alto, an expensive machine with some of the attributes of a personal computer, which was supposed to serve as a research prototype. Alto and its software became so popular inside Xerox, where PARC installed a couple of thousand of the systems, that some renegade researchers began to see them as commercial products. Out of top management's sight, they slaved like distillers of moonshine whiskey to develop the Alto for the market.

Product development, however, was the turf of another Xerox group, which was championing a rival machine called the Star, later to reach the market as Xerox's 8010 workstation. Unlike a personal computer, which generally relies on its own processing power and memory, the Star worked well only when linked with other Xerox equipment. (See "Xerox Xooms toward the Office of the Future," *Fortune*, May 18, 1981.)

PARC rebels not only took on the development group, but also dominated a Xerox unit set up to test-market research prototypes. This group got over 100 Altos installed in the White House, both houses of Congress, and a few companies and universities. Unwilling to support rival machines, Xerox guillotined the Alto and in 1980 liquidated the whole test-marketing group.

Veterans of that group have been the chief evangelists of PARC technology. John Ellenby, one of the unit's managers, later founded Grid Systems. His Compass computer approximates some prescient PARC concepts first used in the Alto. It's portable, uses a bit-mapped display, and easily hooks up with remote computers. At

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$8,000 to $12,000, the Compass sounds too costly to be popular, but Grid expects revenues of more than $28 million in 1983, its first full year of operations; in August, Grid said it was on the verge of profitability.

Another manager of the test-marketing unit, Ben Wegbreit, had previously been one of PARC's brightest technical talents. Convergent Technologies of Santa Clara, California, founded in 1979 to make workstations, picked off Wegbreit and two colleagues to design software. Convergent's word processing program shows some of its origins in the form of a "piece table," a type of software developed at PARC. It allows computers with fairly small memories to process long documents. It does this by storing only the changes made when editing, along with the original version, instead of the original plus a full-length edited version, as other programs do. Conveniences like that have helped Convergent land contracts that could produce some $450 million in sales to big computer companies that haven't developed their own desktop systems.

Charles Simonyi, who defected from Hungary at 17, styles himself "the messenger RNA of the PARC virus." He worked at the center for seven years, mostly on Bravo, a text-editing software program for the Alto that never reached the market. "We weren't supposed to do programs like that," he confesses, "so Bravo started out as a subterfuge. But when people at Xerox saw it, they wanted to use it inside the company. Bravo was why people used Altos, just as VisiCalc was the reason people bought the Apple II." Simonyi expected some brilliant executive to see his product's market potential. "That wasn't dumb," he says, "but it was naive to assume such a person would come from Xerox." Simonyi found a warmer welcome at Microsoft Corporation, based in Bellevue, Washington, which rang up $50 million in sales of personal-computer software in the year ended last June. A big chunk of this year's sales, which should approach $100 million, will come from Microsoft Word, a streamlined version of Bravo.

Lisa is the unkindest cut of all. In December 1979, Steve Jobs, then Apple's vice chairman, visited PARC with some colleagues to poke around. They saw Smalltalk, a set of programming tools. "Their eyes bugged out," recalls Lawrence Tesler, who helped develop Smalltalk. "They understood its significance better than anyone else who had visited." Seven months later, Jobs hired Tesler, having decided to use many Smalltalk features in the Lisa.

The Lisa had to be priced at $10,000, two to four times Jobs' earlier estimates. But it seems to be taking off. Apple claims to have shipped as many Lisas in July, the first month they were available, as Xerox has shipped Stars, or 8010s, in 19 months of availability. The Star, which embodies many concepts used in the Lisa, has been ill-starred. The influential *Seybold Report on Professional Computing* calls it "a jack-of-all-trades which does none really well." Sales suffered initially because some of the Star's software was late in coming to market.

Office equipment analysts have started referring to PARC-style systems as "Lisalike," not "Starlike." Apple's next computer, Macintosh, scheduled to ripen into a commercial product by the end of this year, could further identify Apple with PARC's ideas. The engineering manager for Macintosh came from PARC, where his last big project was a personal computer.

From this, Xerox might appear to have muffed the chance to make it big in personal computers with PARC's creations. Some Xeroids are sure the company could have been an early winner if only it had launched a less expensive Alto in the late 1970s. Unlike the Star, the Alto was an "open" computer, easy for outsiders to program. Independently written software has helped touch off the personal computer explosion, so the dissidents have a point. Because the Star is "closed," outsiders can't write programs for it.

To mourn the Alto, though, is to blame unfairly those who killed it. Xerox was out to produce office equipment, and no office equipment supplier, including IBM, foresaw that personal computers would compete with their wares. It was inconceivable that the cost of computer memory would decline 31 percent a year, as it has for the last five years, or that today's microcomputers would be as powerful as yesterday's mainframe computers. Xerox and its ilk concentrated not on freestanding personal computers but on clusters of workstations that share the use of computer hardware. That way, customers could spread high hardware costs across many workers. And suppliers could defray the costs of their prized sales forces with big-ticket orders.

Besides, Xerox had, and still has, ulterior motives in the office. Competition in the copier market keeps growing, and the company's chief aim has been to protect copier installations by strengthening its control of large, lucrative accounts. Companies that can sell complete office systems—workstations with reliable software, printers, and data-storage devices, all linked into a network—have a stronger lock on their customers

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than do suppliers of stand-alone equipment. Thus, the Star, which works well only when hooked up with other Xerox gear, seemed to fit the company's strategy better than free-standing little computers would.

The complete-system approach, moreover, was more compatible with Xerox's expansive ways of thinking than the alternative of making piecemeal improvements on an individual machine like the Alto. Big companies often can't make the modest efforts needed to probe emerging markets. "It's a problem when you're getting your feet wet in a new business," says Jack Goldman, formerly Xerox's research chief. "In a large company, every product must be a home run to justify the costs of marketing and development."

That has been especially true at Xerox, which owes its existence to xerography, one of the longest homers on record. Top management "followed the big-bank strategy," says one veteran. "They wanted to build absolutely the best office system instead of taking things bit by bit." At PARC, the company's urge to build the best at the expense of the merely better, like an Alto, had its own name: biggerism.

Biggerism could pay off in some ways, to be sure. Xerox has big hopes for Ethernet, a PARC-invented network that uses a cable and translating devices to connect different types of office equipment. By souping up the performance of PARC's original version of Ethernet, Xerox drastically raised the cost of hooking up, to as much as $5,000 per connection. That move discouraged sales and deterred other equipment makers from adapting their machines to talk through Ethernet. But now, improved chip technology has sliced the cost of connecting by about two-thirds. Over 70 office equipment makers are using Ethernet or plan to, including Apple. The temporary setback helped keep Ethernet from becoming *the* industry standard, but it is *a* standard. (The only other company likely to set a standard is IBM.)

Xerox still thinks PARC's work can produce some big hits. No one is more convinced than John Shoch, a remarkably hard-boiled former PARC researcher who became the company's office systems chief last October. His first priority is to expand the number of Xerox products that will communicate over Ethernet (20 do now, including laser printers and facsimile machines). Making a winner out of the Star will take more effort. Because the technology is old and the system tries to do so many things, the workstation seems expensive and inept in many functions, especially compared to Lisa.

Shoch wants to bring out a less costly version of the $15,000 Star, which he sees as one claw of a pincer's movement to narrow the Lisa's potential market share. The other claw, in his view, will be IBM's personal computer armed with a Lisa-like set of programs written by VisiCorp. Priced at some $7,000, that system won't compete directly with the Star but will be far cheaper than the Lisa. It will also tap into Ethernet—thanks to a helping hand from Xerox. Says Shoch: "There's going to be a squeeze between the lower priced Star and commodity-type computers that run better software. It'll be a tough place to compete."

The company's support of PARC has never wavered. This year's budget of $35 million or so will set a record. But changes have taken place. Last March, Xerox appointed a new director of PARC, William Spencer. A veteran of two decades at Bell Labs, Spencer admires AT&T's ability to transfer technology out of the lab by attaching satellite labs to major manufacturing plants. "PARC's main shortcoming," he feels, "has been a lack of management attention. We started things that didn't match what was going on in other parts of Xerox."

Spencer is trying to produce a better fit by meeting a couple of times a year at PARC with Xerox's division managers, some of whom haven't visited for years. Every three weeks or so he breakfasts with Shoch, and they've started a joint hiring program: some new researchers will spend their first year or so at PARC, then join the office systems group.

Time is on Spencer's side. Having taken its lumps in the office systems business, Xerox has a better fix on what kinds of products make sense. While Shoch's division still struggles to discover a successful way of selling office systems, PARC, having created much of the technology McColough sought, is stepping up its work on a new frontier: very-large-scale integrated circuits used for everything from diagnosing copier breakdowns to connecting personal computers with mainframes. "The foundation for our future will be the next generation of chips," says Spencer, who originally came to PARC to set up a line for making them. "Office systems is a smaller part of our work now."

When a company wants to make it big in a new business, a solid base of technology is necessary. But it's hardly sufficient. Without a clear understanding of corporate strategy and pressure from a hungry marketing group, even the best technologists can get out of hand. The tricky part is to strike a balance between encouraging creativity and getting your money's worth.

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FRESH POINT 專欄

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微利陷阱的突圍

台灣產業的製造霸業面對對岸大陸的挑戰，不只我們感同身受，日本與韓國對大陸製造「黑洞」的憂懼比之台灣，恐是有過之無不及。

中芯半導體8吋晶圓0.35μ製程現在的報價每片600至650元美金，中芯甚至喊出可預見未來每片500元美金，台積電現在則是1200至1300元美金/片。鑒於中芯現階段相當於大陸在半導體產業政策的指標型企業，北京政府一定會傾全力支持。全球晶圓代工產業，即將因中國大陸的「黑洞」效應，強力往下吸拉價格。

說晶圓代工將近入微利時代也許太誇張，但說晶圓代工產業超高毛利時代將走入歷史，應是持平的看法。

以台積電為例，2001年、2002年營收分別為1662.3億元與1609.6億元，營收差距有限。不過毛利率由2001年的45.7%下滑到2002年的32.3%。營收擴增不易，獲利大幅下滑，全球景氣因素固然是主因，但大陸製造「新霸」的興起，因而對價格下拉的「黑洞」因素也絕對有關。

台灣廠商如何突圍？

筆記型電腦受大陸「黑洞」效應引發的價衰現象大家都已目睹，2003年台灣的NB龍頭大廠主導該公司強大品管和生產實力的靈魂人物資深副總，在過去兩年多往返台灣和上海松江建置的製造中心後，終於在2003年初正式進駐上海製造中心，專責製造和品管業務。這個關鍵人物的遷移，象徵著大陸為NB代工的「新霸」已正式成形；另外TFT-LCD目前除奇美電子外，多數廠家均已跨海在南京、蘇州一帶設立後段模組廠（LCM），有的個案已佔全公司出貨比重四成，估計2003年底將達到七成的比重。

事實上不只台灣的TFT廠如此佈局，韓國三星，日本日立也都已在蘇州設後段模組廠，相關上游材料廠商也相繼進駐。當然後段模組相對較勞力密集，但長期來看，蘇州、南京一帶將成大陸兩大光電重鎮，引發價衰的黑洞效應儼然成形。

如何自微利黑洞中突圍？

關鍵還在獨特技術的掌控。同樣以IC業分析，聯電2002年每股盈餘0.48元，但集團中的聯發科EPS卻高達27元。IC設計是典型的智慧密集「聚智」型行業，這個案例點出：產品創新比起流程創新，每單位產出的利潤是有數量級的差距的。

如果我們問台灣的手機業務未來會不會不落入今天NB壟逢的微利陷阱，有一種說法是不必杞人憂天。這個看法認為手機不像NB有所謂的Wintel產業標準，各牌有相當多的專屬設計。NB的零件表（BOM）中，1000美元的零件/材料，台灣較能掌控的不過200美元，而各項零件的行情又相當透明化，下單客戶的殺價空間就很容易擠壓。手機的零件表則沒有標準化，有人300多項，有人400多項，甚至也有500多項，作業平台也沒有統一。因此，手機的代工業務不像NB那樣容易任下單客戶殺價。

但是所謂產業標準也只是程度性差異，而且也會隨時間演變。當年桌上型PC很開放標準化，NB就較Proprietary（專屬化）。但今天看NB也相當標準化了，難保未來手機產業的演化不會如此。比較有遠見的佈局還是要在基頻晶片、高頻放大器、LCD模組、藍芽晶片等關鍵技術上及早投資（內部建研發能量與成到歐、美投資設關公司）並擁有產權，這樣的「聚智分金」佈局，才是突破微利陷阱的根本作為。

考試科目 管理個案 所別 科管所（碩士在職專班） 考試時間 月 日 星期日 下午第一節

國立政治大學圖書館

中國時報

暴風SARS 2

社論

厚植文化之根，才能走向國際

到莫斯科的旅人，一定不會忘記聽一聽歌劇，看舞台劇，或者芭蕾舞；到維也納的旅人，一定不能錯過音樂表演，不管什麼時候，不管什麼季節，好的音樂在維也納從不缺乏；到布拉格的旅人，一定不會忘記在數百年的音樂演奏廳裡，聆聽史麥塔納的《我的祖國》……。

特別舉這些例子，而不是富裕的百老匯，紐約，巴黎這種城市，原因是想說明：一個國家的文化不是一定來自大資本的積累，也不是一定要在多麼富裕的社會才存在，而是有其他的原因。是什麼原因，讓莫斯科在經歷沙皇，革命，共產黨政權，開放改革的經濟衝擊之後，依然保留著文化的厚度，讓外界非要看到不可？是什麼原因，讓布拉格可以在古老建築之外，保留一種音樂傳統？是什麼原因，讓維也納成為世界音樂愛好者的聖堂？

由文建會所舉辦的「文化創意產業：全球思考，台灣行動」國際研討會，日前邀請林懷民作專題演講。林懷民指出，雲門三十年，只有「慘烈」二字可以形容，政府如欲推動文化創意產業，應先改善表演藝術生態，培基固本，有好藝術家，好團隊，好作品，才能談到延伸性的產業。

說得好極了！沒有「培基固本」，就要談「文化創意產業」，這正如不談內容，而僅僅在「創意」二字上打轉，玩兒一點小小的重新包裝，就能去國際上行銷台灣文化嗎？那未免把「文化」看得太淺薄，太容易了吧！

什麼是「培基固本」？不必去比那些富裕城市如紐約，就說莫斯科吧。在當地的大歌劇院，即使不是觀光旺季，演出歌劇依舊是滿座，且座中以莫斯科本地人居多。如果遇上較通俗的芭蕾舞劇如《胡桃鉗》，《天鵝湖》等，往往是父母帶著孩子，老師帶著學生，全家老少一起來觀賞。用當地的薪水來比較，這些表演的票價並不便宜。莫斯科的平均月薪約一百美元（才台幣三千五百元），但一張票價約要三到十美元。當然，有些演出對學校學生的集體購買有特別優待，但父母帶孩子看藝術表演成為一種生活文化，卻是不爭的事實。而莫斯科有一、二十個這樣的大大小小的表演場地，表演著歌劇，話劇，芭蕾舞，音樂演出等等。這個城市靠著本身的觀眾人口，就足以培養眾多的表演團體。而父母親帶著孩子自小培養的觀看習慣與藝術品味，又會變成未來的觀眾，以及一種藝術鑑賞能力。這才是真正的「培基固本」。

當父母親以自己的品味帶領孩子，形成更廣大的觀眾基礎，表演藝術才能由小眾，變成台灣文化生活的一部份，而這一切是需要從小培養起的。有這樣的社會基礎，表演藝術才不會只是看著政府的補助苦撐生存。當表演藝術與社會形成此種互動，創意就會自然由民間創作中產生。它是一種顯示台灣現存的與傳統的文化的融合所表現的創意，是因應並呈現當代文化特性的創作，而不是被有意突顯，卻顯得扭曲的，小鼻子小眼睛的所謂「創意」。也唯有這種創意，會吸引國際的目光與外來的觀光客。而這一切莫不需要觀眾，創作者，藝術家，與好的表演環境，以長期的互動，形成一種藝術創作的環境。

相較於「蘇東波」之後經濟困難的莫斯科，台灣富裕多了。但為什麼台灣的表演藝術團體愈來愈苦哈哈呢？為什麼表演環境愈來愈艱難？連國內外擁有最多觀眾，最多社會支持的雲門都只能說是苦撐，其他就更不用說了。多少揚名國際的表演團體，竟是靠著演出者的藝術熱血，放棄正常的工作與薪水，拚了性命才得以支撐創作與演出；而多少藝術工作者是一開始就抱定了為藝術犧牲的精神，維持著創作的熱力。這一切，其實與台灣的電影一樣，是靠著最少的政府助力，卻最熱情的民間創作力所支撐起來的。然而，這樣的熱血熱力不是永遠存在的。它需要年輕的體力，死命的生命透支才能維持下去。但藝術家是會老的，當他們需要安定，還有誰敢延續這種生活與創作？

我們想問的是：當經濟艱難的莫斯科都可以維持一定的表演與創作，為什麼台灣不能？難道政府不可以用政策加以補助？舉例而言，學生看表演可以由政府補助一部份票價，民間看表演可以抵所得稅，企業支持表演團體的贊助可以抵稅，企業認養表演團體可以得到一定的獎勵等。這些都是不用政府花多少錢，卻立即對表演團體有幫助的事。

再其次，不管是現在的民進黨政府還是未來的任何政府，對表演藝術都應該建立一種尊重。由莫斯科的例子，我們可以看到，政權可以輪替，但文化卻是可以長久的。連堅固如磐石的革命政權都可能一夕消失，但在政治之上，卻存在著文化，那是可以和時間一起存在下去的創作。任何一個政府在面對文化時，都應有一種尊重和謙虛，讓文化的積累得以延續下去，不要輕易的想用意識形態國家機器去干預，或想憑空創造文化神話。

真正的文化藝術要靠時間去慢慢積累，厚植的。它不只需要愛好文化的社會環境，更需要一種尊重藝術的傳統。文化不是工廠，藝術創意更不是錢能夠買到的。台灣要讓藝術走向國際，唯有從厚植文化之根做起。

國立政治大學圖書館

商品化

吳俊瑩 iThome電腦報技術主編

如果要問說從什麼樣的工作可以學到最多，有個階段算是重點：將實驗室的技術推向商品的過程，也就是商品化。這件事情有一個驅動力，就是「壓迫」——從粗略的實驗品修修改改到能夠商品化，像是濃縮的過程，將技術、創新、折衷與毅力壓迫到極限。商品化的過程一點都不有趣，甚至可以說很無聊，很疲憊，需要在很短的時間做很多的嘗試，決定一種折衷的方案來進行；我們不敢隨便斷言說只有經過這個過程的工程師才算「成熟」，但確實這樣的過程能讓工程師學到很多講也講不清的經驗，作為下次成功的基礎。所以說不管你認為自己應該往「廣」的方向前進，或者往「深」的方向前進，都應該要能夠確實走過這個路程，否則自己會覺得有點虛，因為不知道「關鍵」在哪裡。

商品化的關鍵個人認為應該是在「驗證」與「取捨」，前者是把關的工作，後者是代價的決策。當一項技術確定要商品化之後，就不能不考慮穩定性，因為商品的品質關係到後續的銷售，也關係到維修的成本，一項設計上的小瑕疵就有可能造成非常大量的損失。可能各位腦筋裡頭開始浮現Intel當年因為浮點運算器的小瑕疵（事實上大多數人都不會遇到這個問題），商譽與金錢的損失難以估計。當然我們任職的公司可能沒有這麼大，但是「驗證」這件事情真的不能馬虎。工程師本身應該要負責85%以上的bug修正，如果低於這個數字，這應該是工程師沒有用心或者對於自己正在做的東西了解得不夠透徹。剩下的15%的驗證應該由獨立的人員來接手，畢竟工程師有自己驗證的「框框」，不容易跳出來找到莫名其妙的bug。

在臺灣很多公司都感覺不到驗證與測試的重要，一個長達半年的專案中，可能只有一兩個星期來驗證測試，其餘都在趕工或增加新功能。但是從個人的經驗來看，專案本身應該要有60%來開發，40%用在驗證上，這一點必須要讓工程人員與客戶都認同，否則一直加新的功能但是一點都不穩定，就像我的一個學長講的「創新」變成「創傷」，這真的會以悲劇收場。既然要保留驗證的時間確保穩定與品質，那麼取捨就很重要了，什麼都想做就會什麼都做不來，一項完美的產品就有可能會曲高和寡，必須要在時間、穩定、品質與成本之間做取捨。當然客戶都會想多偷渡一兩項功能，我們也會想要多幾項創新增加競爭力，但是真正的競爭力是什麼？應該都是回歸到誰能把基本的事情做到最好吧。所以取捨的重點就是理解技術與產品的本質，不斷地嘗試錯誤認真驗證把基本做好，對於養成一個傑出的工程師非常重要。

我們都比較喜歡「創作」的過程，而不是很甘願地去做「微調」（tune）的工作，畢竟微調的成就感比不上創作的暢快感；但是就長久而言，如果沒有把問題解決，那些問題就會陰魂不散一直冒出來，直到大家都不耐煩為止。我想大家都有私底下抱怨吹毛求疵的主管的經驗吧？可是回想一下是否在這樣的主管底下才真的有紮實地做事呢？確實有要求才有徹底的驗證，有紀律才會有品質，換個角度來說，當有一天你自己做了主管，你會希望有一些常常出狀況的手下，還是願意定下心來把事情做好，驗證到對的部署呢？之前我們談過透過「積極服務」來「Do the right thing」，在這裡我們更需要強調，一再不厭其煩地驗證確實是「Do the things right」的不二法門。身為工程師蠻辛苦的，尤其在專業上一點都不能隨便，我遇到很多過得不快樂的技術人員，他們都一再地因為事前隨便不做驗證，很多事情都以「想當然爾」的方式來處理，結果後來都作繭自縛被自己之前的隨便所反撲，到後來只能換工作丟下爛攤子。

在商品化的階段，花一天的時間驗證，可以省去後面一個月以上的時間代價。體認到這個道理，就能在技術的領域中優遊自在，因為你大部分的時間都在前進，而不是一直踩到或拼命閃躲過去自己埋下的地雷。曾經經過商品化的階段，走過自己埋下的地雷區而存活的工程師，就會真正體認到「驗證」的重要。為了要爭取驗證的時間以及確定驗證的成果，就應該要認真考慮「取捨」這個因素；而且不是你自己考慮而已，也要讓客戶真的了解到，一直塞新的功能企圖「俗又大碗」卻沒有留下足夠的驗證空間，結果就有可能是一場IT災難或是銷售失敗。所以如果現在離專案的「dead line」剩下幾天的時間，你應該再做一次檢查而不是貪心又加一兩個功能下去，新的沒驗證的過的東西不是不好，只是一個不定時炸彈，有些時候爆炸的威力是誰也承受不起的。

備命