

所別：管理技術研究所
學程別：企業管理學程

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下面文章引自 The Economist (September 28th, 1996), 請做為回答第 1, 2 和 3 題之依據。

TECHNOLOGY BRIEF

Being digital is not enough

The dustbin of history is full of technological ideas that looked good at the time, but which nobody wanted to buy. What does it take for a new gizmo to catch on? The first in a series of articles seeks lessons from attempts to replace the compact disc and the tape cassette

EVERYONE who is anyone in the consumer-electronics business has a dream: to do to the compact disc what the CD did to the vinyl record. Many have tried. All, so far, have failed.

Technologies may miss their mark for several reasons. They may not fill a market need. They may not deliver what they promised. And they may be too expensive to manufacture. But none of these reasons for failure applies to the various gadgets that have been put forward as successors to the CD. The market for recorded music is clearly huge. The new technologies worked. And they were not ludicrously costly to make. But they failed because they were not sufficiently better than the established alternatives.

Since the success of CDs, venture capitalists have introduced a rule of thumb, known as the 10x rule, to help them decide which ventures to back. They ask themselves the question, "Is this thing ten times better than what it is replacing?" Or, perhaps more accurately, "Will consumers perceive it to be sufficiently better to think it worth the upheaval of changing?" So far, since the CD, it seems that no consumer audio technology has passed this test.

In 1982, when Philips and Sony introduced the CD, the perception of a massive leap was certainly created. CDs were, in-

deed, better than LPs. Encased in protective lacquer, and read by lasers instead of having sapphires dragged across their surfaces, they did not wear out. They needed to be neither flipped nor rewound. They took up less storage space. And some people even thought that the recording quality was superior. But what really helped the CD was timing.

Sales of recorded music went flat in the late 1970s. In 1980 they actually began to fall. The moment for a new technology was psychologically right. And CD was the better mousetrap people were looking for. In 1982, being digital was an excitingly modern concept. The perceived benefits were enormous. So sales grew by leaps and bounds (see chart).

Flushed with success, the same two companies introduced digital audio tape (DAT) in 1987. DAT has advantages over both CDs and tape cassettes (which survived the CD onslaught at least in part because another Sony technology, the Walkman, allowed them to do things that CDs could not). Digital tape beats CDs because it can record music instead of just playing it. And it beats cassettes because its sound quality is better. Unlike CDs, though, DAT bombed.

The received wisdom is that it was killed by the record companies, who were afraid it might be used to make pirate copies,

and thus wreck their sales. But other technologies (including CDs themselves) have been resisted by record companies and still succeeded. The real reason, therefore, seems to be that it simply did not pass the 10x rule.

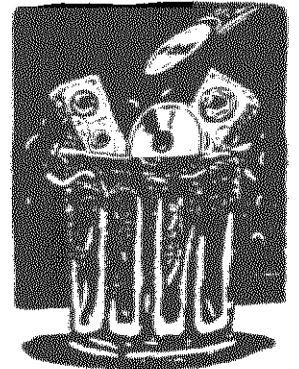
Today, DAT lingers on in a few minor applications. It is the professional musician's favourite way to exchange demo tapes. And followers of bands such as the Grateful Dead and Phish (who permit audiences to record shows) use DAT in droves. But these are niche markets for specialists. They are not the places where billions are made.

Undaunted, the two companies tried once again in 1992, this time independently. Once again, they ran up against the 10x rule. Philips introduced the digital compact cassette (DCC). This, at least, had the advantage that the machines designed to play it could (unlike DAT machines) also play ordinary cassettes. Sony replied with the mini disc which, unlike the CD, allows a user to make his own recordings.

This time the record companies could not be blamed for any failure. Unlike DAT, the DCC had the support of most of them. And the mini disc naturally had Sony Music (previously CBS Records) behind it. It was billed as the biggest, bloodiest fight-of-the-formats since the video-cassette recorder duel between Betamax and VHS. But it wasn't. The two did not lay a glove on each other. Instead, both were floored by existing technologies.

The DCC was a total failure. Though superior to ordinary cassettes, it was not even as high-fidelity as DAT. This was because Philips made the tape heads of DCC players simple and cheap. That, in turn, meant that the music had to be simplified and compressed. Philips did this mainly by "throwing away" inaudible sounds. But even so, aficionados claimed to be able to hear imperfections in pieces with a wide range of treble and bass. And when aficionados fail to rave, consumers are unlikely to buy.

The mini disc did not fail completely—it still has a following in Japan. But it did not storm the rest of the world. A mini disc looks like a small CD, but it works rather differently. A CD's surface is covered with pits, which encode the information it carries. A mini disc is a magnetic recording (though, like a CD, it is read by a laser). This means that,



like a cassette, it can be sold blank and used as a recording medium. And the mini disc not only trumps the cassette on sound quality, it is also able to leap from song to song instantly. Even so, these advantages do not seem to add up to the jump prescribed by the 10x test—at least, not in the West.

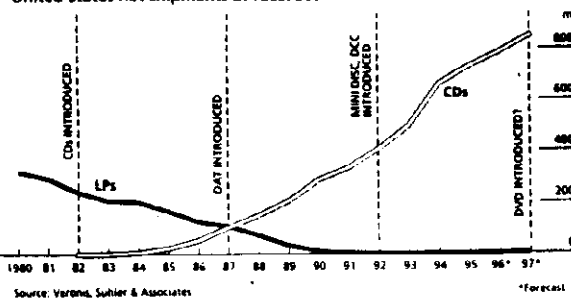
The latest attempt, though, does pass the test, at least formally. The DVD (variously claimed to stand for "digital video disc" and "digital versatile disc") has narrower tracks and tinier pits than a CD. Each of its recording layers can hold about seven times as much information as a CD. This is enough to store a boxed set of music albums (or a feature film, or 4.7 gigabytes of computer memory; the DVD truly is versatile). Since the discs will feature at least two, and possibly four such recording layers (the laser can be refocused to read below the surface), they will beat the 10x rule hands down in the area of storage capacity.

This, then, will truly test the rule. By the time DVDs are released (which was due to happen this autumn, but looks as though it will slip to next year), CDs will be a technology that is a decade and a half old. Their sales are still on the up, but they no longer carry the aura of modernity. The time may be ripe for a change, and the technological leap may be big enough for this to be the change that works.

But perhaps not. Though DVDs will surely do well in computer and video applications, where the extra capacity will be welcome, having more than 25 times as much music on a disc may not turn out to be what people want after all. And if it isn't, there is still plenty of room in the dustbin.

Disco dancing

United States net shipments of recorded music



國立台灣工業技術學院
八十六學年度碩士班招生考試試題

(命題用紙)
第 2 頁共 3 頁

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1. Philips 和 Sony 在 1982 年發明 CD, 為何唱片的市場漸漸消失而 tape cassettes 卻未被 CD 取代?(10%)
2. 1987 年 Philips 和 Sony 又引進 DAT,但是這次新產品卻未取代 CD, 請問理由為何? (5%)
3. 是否 DVD 會在未來取代 CD, LD 和錄影帶?理由為何?(10%)
4. 管理學界常喜歡創立一些新鮮名詞,例如:企業再造(reengineering), 企業減肥(downsizing)等,但是企業再造無非是指生產(增加價值)活動的分工或整合之最適調配. Michael Hammer 和 James Champy 過度強調整合的好處而忽視整合的壞處.例如在其 Reengineering the Corporation 的著作中,提及公司在改造流程後,將產品工程設計和籌劃印製行銷手冊的工作全交由同一工程師執行,如此就可享受兩種工作整合的好處.請問工作整合的壞處是什麼?生產活動的分工或整合應如何調適才能達到最適境界?(15%)
5. 王永慶先生經營企業的看法本領是:追求效率,降低成本,以求利潤最大. 某位美國名醫學院的華人教授回台考察幾家國內大醫院後,批評王永慶唯利是圖,將長庚醫院變企業,將病人當商品.請問你的看法為何?(10%)

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6、在公司招募新進員工時，經常會考慮應徵者的學歷或在校成績作為招募甄選的重要依據，雖然學歷與在校成績不見得與日後員工的工作績效有直接相關，然而，一般公司仍採用這些條件作為招募甄選新進員工的標準，試敘述其理由。(12分)

7、A 公司為一生產主機板的公司，成立歷史有 10 年，資本額約為 12 億，員工人數約有 200 人，與其同業相較之下，此公司規模較小、歷史較短、成長快而且獲利能力較高。此公司乃是由 7 個原先同在一家大電腦公司工作的工程師脫離原公司所創辦的。A 公司剛開始的資本額只有 3 千萬，在十年內的資本額擴展十分快速。由於其產品市場的高度成長、經營者的卓越管理及工程師團隊的先進技術能力，近幾年來，公司的經營績效十分卓越，每股稅後盈餘由剛成立的前五年(民國 77-81 年)的平均 4 元，提高到民國 82 年到 83 年的平均 12 元，近兩年(民國 84-85 年)的平均更高達 33 元。A 公司的股票於 85 年上市以來，股價漲幅達 300%，每股的交易市價已達 700 元，A 公司的總市值於短時間內上漲數倍。

- (1) A 公司因 85 年經營績效卓著，董事會於該年度終了時，決定提撥盈餘給 200 名員工作為年終獎金，但尚未決定以何種方式來發放盈餘。若全部以現金發放，則每名員工平均約可得三十萬元，若全部折算為股票來發放，則每名員工約可得市值近千萬元的股票。請評估以上兩種不同盈餘分配方式對公司可能造成的利弊得失。(8 分)
- (2) 由於 A 公司的成功多半憑藉的是工程師團隊的技術及合作能力，因此如何繼續維持工程師團隊的合作與穩定性為公司持續成長的關鍵。如果你是 A 公司的高階主管，針對工程師團隊，擬定你的領導方式，並說明理由。(8 分)
- (3) 由於工程師的研發需要透過團隊合作，衡量個人績效有其困難，然而就實際需要考量，A 公司的高階主管認為仍有必要針對個別工程師的績效予以評估，作為升遷與加薪的依據。如果你是人力資源主管，擬定一套適用於工程師的績效考核方法。(8 分)

8、X 電腦公司為某企業集團的所屬公司之一。為因應新的經營策略，及擴大經營規模，X 電腦公司將組織重整為六大事業群：光學影像、多媒體週邊、軟體、電腦系統、個人軟體及通訊新產品，此六個事業群的營運比重分別約佔公司總營運的 30%、5%、5%、50%、5%及 5%。該公司的黃董事長指出，重組後的六大事業群，將以營運利潤中心的新體制運作。黃董事長並強調各事業群之間將共用某些資源，並將與其集團內各家公司強化合作關係與分享資源。何謂利潤中心制？若你是 X 電腦公司的總經理，你將預期此種利潤中心制度可能會碰到甚麼問題？將如何解決？(14 分)