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Pacific Dunlop China (A): Beijing

太平洋鄧祿普(亞洲)紡織集團

What Was Said	Ideal Translation	Actually Translated As
Littley: Madam Li, could you tell us what engineering has done about making the list of equipment for the container that's waiting in Australia. They can't send it half-empty.	**Littley:** 工程部門能否把在大利亞要裝箱的設犈列個清單出來？	**Littley:** Madam Li, where is the list of equipment from engi-neering? People are waiting for you in Australia because you haven't done it. They can't send it half empty you know.
Li: 我可不能肯定這是工程部門的事情。	**Li:** Well, I'm not sure that that is really an engineering pro-blem.	**Li:** That's not my job!
Littley: What do you mean not your job! I don't want everyone to think the engineers just spend their days sitting smoking cigarettes!	**Littley:** 但那是你工作的一部份。	**Littley:** But everyone knows your engineers do nothing but sit around smoking cigarettes!
Li: 甚麼？你怎麼能這樣説呢，我們都要忙死了。	**Li:** What! How can you say that. We've been working like crazy!	**Li:** I don't understand what you mean. We work hard!
Littley: Ok! - it was a joke!	**Littley:** 我只是開個玩笑而已。	**Littley:** Joke! Joke!
Li: 你的玩笑一點兒也不好笑。	**Li:** Your joke was too serious!	**Li:** You are too serious!

Patience, especially in China it seemed, was a virtue. Steve Littley had discovered this in his 14 months as divisional manager of Beijing Pacific Dunlop Textiles Ltd. in the Shi Jing Shan district of

This case was written by Professor David Upton and Research Associate Richard Seet as a basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Some facts have been disguised.

Beijing. It was November 11, 1994 at 5:18pm, and Littley did not have *time* to gaze thoughtfully out of the window musing over abstract business problems. He had a plant to run.

It was a frustrating meeting. The heated exchange was just one of many between Littley and Madame Li, the Chinese manager of the engineering department. Littley had organized these weekly caucuses to gather information essential for running Pacific Dunlop's Beijing sock and underwear factory, such as the status of late orders, the progress on maintenance problems and equipment requirements. But as usual, even such simple tasks were proving extraordinarily difficult. What in Australia would normally have been a 20-minute exercise dragged into two hours.

Other Agendas

Littley had had an ancillary agenda for the meetings: to take his Chinese managers, by example, through the step-by-step process of analysis, diagnosis, and solution of the everyday problems that would face any textile factory. His responsibilities had shifted from overseeing three plants in Australia to micro-managing department managers in their duties in China. What he had taken for granted back home independent problem solving—seemed rare to him in China, or at least—in Beijing. The obvious solution was to provide even more training in plant management. But the problem seemed to be one of attitude as much as skill. Dispositions towards work were deeply ingrained in Beijing. The Maoist old guard, raised at a time when pronouncements flowed only from the top down, could not seem to learn any other way of working fast enough. While there *were* young people willing to accept responsibility for getting a job done, their prime advantage, their youth, which had prevented them from being steeped in Maoist doctrine—and the hangover left throughout China from the Cultural Revolution—was also their Achilles' heel. To promote the young based on their merit was still unacceptable in a society where rankings were slated by age. He had tried once and the older workers revolted—making management impossible for their underaged overlings.

The difficulties of delegation meant that Littley was permanently occupied with the minutiæ of running a plant. Seven days a week. Twenty-four hours a day. Littley's apartment was situated in the plant, and it was quite common for him to be woken at four in the morning with problems in the plant. Vacations, it now seemed, were not a good solution to the continual stress. Every time Littley left, he returned only to find another crisis which people had procrastinated in solving—no one wanting to take the initiative without his oversight. It seemed like there was never enough time to get everything done. No time to reflect, no time to train, no time to breathe. No time.

Computers and Production Control

Exacerbating the organizational problem was the lack of an automated system for production management. Information on stock levels and production plans were generated and maintained by hand, because of the plethora of problems associated with running computers in China. This, in concert with the already tenuous managerial structure had made running the plant unusually challenging to say the least.

Attacking the problems

Despite the tremendous time pressure, and life pressure, Littley remained upbeat—but realistic. The plant had come a long way since he had taken over but he knew that there were two critical things to do to make the plant manageable in the long term: First, he had to find or build managers to whom he could delegate. This would relieve him of tasks like making sure that the maintenance man had checked that the water supply had sufficient pressure for the toilets to flush, or haranguing an operator to put oil in a noisy machine.

Second, he needed to build systems that would provide the information that Western plant managers took for granted. While a good production management system would not be a panacæa, it would make the factory controllable and allow him to concentrate on readying it for the forthcoming capacity expansion.

Pacific Dunlop and Clothing and Textiles

Pacific Dunlop Limited (PD), founded in 1893, was a firm built upon its stated philosophical lynch-pins of "people, ideas, and technology. " PD's strength had grown from its combination of "innovative products, creative marketing, and cost competitive sourcing," and in nurturing "world-class technology. " An international marketing company with sales to more than 80 countries, as well as global procurement and distribution capabilities, PD was an Australian-based conglomerate with 1994 sales of A$7. 0 billion and A$6. 8 billion in world-wide assets (see **Exhibit 1**)). Employing more than 49,000 employees world-wide, Pacific Dunlop had over 12,000 employees, 38 factories and over A$700 million invested in Asia (see **Exhibit 2**). PD comprised five core business groups: consumer products; healthcare; automotive products; building and construction; and distribution. The consumer products group, with revenues of A$1. 8 billion marketed and manufactured clothing, footwear, sporting goods and packaged food products (see **Exhibit 3**). Pacific Brands, the clothing and textiles, footwear, and sporting goods division of the consumer products group, generated 1994 revenues of A$874 million (see **Exhibit 4**), of which clothing and textiles contributed 55%.

By November, 1994, four joint venture plants were manufacturing clothing and textiles both for export and for the Chinese domestic market:

- Beijing Pacific Dunlop Textiles Ltd. produced socks and ladies underwear;
- Shanghai Holeproof Garments Ltd. produced underwear and Ping Hu Ausbrands Knitting Co. Ltd. made socks. Both were in Shanghai.
- Taiping Pacific Dunlop Garments Ltd. in Guangdong produced underwear, babywear, polo shirts, and bras.

Using less expensive Chinese labor, the production facilities served primarily as export manufacturing centers for the Australian market. All of the joint ventures operated under the Chinese 70/30 rule: a minimum of 70% of manufactured product was to be exported in order to receive tax relief under Chinese law.

Clothing and Textiles: looking to the future

The free market reforms introduced by Deng Xiaoping had helped stimulate China's economy to grow at an average of 9. 5% real GDP annually from 1978 to 1994. In this environment, China saw the beginnings of a new middle class. This new tier was, however, not evenly distributed throughout China. Industrial development was concentrated along China's eastern seaboard. The new middle class was gathered in an area less than one-third of the Chinese geographical land mass and was concentrated in three epicenters: Guangzhou, Shanghai, and Beijing. It was estimated that by the year 2010, China would become the largest economy in the world, with rising affluence among the 375 million urban residents of the coastal cities. Market analyses projected that by the year 2000, 45 million Chinese would have the purchasing power of the average Singaporean of 1994.

A Strategy for China

PD's Clothing and Textiles group was well positioned to take advantage of this new source of growth. With joint ventures already operating in China's three largest consumer markets, Robert Hershan, Managing Director of Pacific Brands, Alan Goodfellow, Group Director, Clothing and Textiles and David Lau, Group Director of PD's Clothing and Textiles operations in China, had devised and begun the execution of an aggressive strategy to capture the evolving Chinese market, while maintaining enough productive capacity to supply the comparatively stagnant Australian home market.

The cities of Beijing, Shanghai, and Guangzhou would serve as production and distribution centers to feed the market on the eastern seaboard. Products would be shipped among the three cities to supply a complete range of Chinese manufactured PD goods (each plant was focussed on different products and brands). Stocked with a full range, each of the three cities would serve as distribution capitals within their municipalities and for developing second cities close to them. Thus, Shanghai would serve as the distribution center to supply garments within its city limits and into Hangzhou, and Beijing would supply the capital city and Shenyang. Freight shipments among the various market cities would be performed by local carriers within their "areas of influence" (it was not uncommon for freight to be lost or hijacked if a freighter without influence was contracted).

This Asian strategy required an aggressive ramp-up of production in the Chinese plants to build a visible presence in the growing local market. The projections suggested that unit capacity would have to be grown by 190% between 1995 and 2001. This expansion would initially be fueled by investments in the latest high-speed production equipment along with complementary manufacturing information management systems within the next two years.

Preparing for Growth

"We know it's aggressive," said Lau, *"but we've learned a lot from being here for longer than most people. We believe its the right strategy—and we're pretty sure we can do it"*. PD's history in textiles in China passed through three distinct phases. Ten years previously, the company had begun to build a manufacturing base to supply the home market, shipping old machines made too expensive by Australian labor costs from Melbourne, and at the same time, investing in new equipment in Australia. Initial manufacturing problems of poor delivery and quality slowly began to be solved. Next, PD began to develop international markets for its Chinese products, such as Canada and Switzerland. Having cut its teeth on these challenging markets, the company again began to look for opportunities for growth. The solution quickly became clear: China itself. Lau described the experience of building the Chinese operations:

> *I've learned so much since we began. The first thing I learned was not to underestimate how much managerial time doing business in China consumes. You can't take anything for granted. We were saddled with a horrible managerial structure at first [in 1987]. I was running the Melbourne operation and running China part time. It nearly killed Alan Goodfellow and me!*
>
> *Second, we now know how important it is to assess your joint venture partner's powerbase effectively. If they don't have enough pull, they won't be able to grow the business with you later. They won't give up equity, but they'll be unable to raise any capital. Influence and connections mean a lot in China. On the subject of joint ventures, I can't emphasize enough how important it is to ensure that the articles of association are really specific and not left vague. The Chinese language is very ambiguous at the best of times—and if you leave things vague, you can be sure it'll hurt later.*

Third, if I had to do it again, I would start building local managers earlier. Ex-pats bring a fresh mind and don't accept local standards—but they wear out really quickly, even the tough ones. They have to learn a lot of new skills. They kind of go through stages: in the first six months, they learn not to shout! Things in China are done gently, by gradual persuasion. Over the next 18 months, they start to become productive. After this, the environment can start to really wear them down. It can be very destructive of families. We have to remember, that wives and husbands in China are part of the business. Without them being able to deal with it, you are lost. China is a much more hostile environment than people think! I would use ex-pats as consultants if I did it all again.

Finally, you need to plan a future for the manager you bring in—you can't just say 'Here's a great opportunity - but when your spouse has had enough and wants to come home, we won't tell you what's going to happen to you.'

Lau's upbeat outlook had been a great advantage in building PD's manufacturing base. But now he had to consider how he would make the new growth plan happen. Like many manufacturing people, he knew that most operations plans failed in execution rather than conception and that this new plan was critically dependent on the growth in capabilities and capacity of the existing manufacturing plants. Each plant and area of the country had its own problems, and new challenges appeared with each stage of the growth.

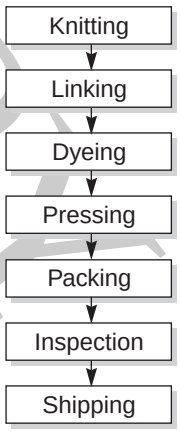
The Beijing plant provided a prime example of how processes, people and systems were constantly being challenged by the environment and by the continued expansion. While Lau faced challenges at the network level, very different challenges were being handled by people managing the plants.

The Beijing Plant

The Beijing plant was on the outskirts of the city, 45 minutes by car from the center. The plant was close to an old steel mill, and the skies rained ash and sulphur dioxide occasionally. While the plant was amongst the best textile plants in Beijing, the working environment was not comparable to what one might see in Australia or the US. The more relaxed local standards made housekeeping extraordinarily difficult.

Making Socks

The plant's budgeted capacity was 580,000 dozen pairs of socks per annum, though in November 1994, it was making socks at a rate of 620,000. The plant also made 260,000 units of women's underwear. The materials for the plant's products were cotton, Spandex, nylon and Elastane (a rubber material for the welt of the sock). Cotton purchasing had originally been carried out at group level and sourced through Beijing or Shanghai, but as local relationships strengthened, cotton was being sourced locally from the state-run Beijing Mill #1 and Mill #2. Spandex, Nylon, and Elastane had all been originally sourced outside China, but lately good quality indigenous sources had been found, by knowing someone, who knew someone else, who knew someone else…



Finding good quality indigenous material sources was important because they could then be paid for in local currency rather than Australian dollars. In 1994, the *renminbi* (RMB) remained a troublesome currency to convert.

Sock manufacturing could be broken into five process steps:

Knitting

The first process step was knitting the sock. The four yarns were placed on the wide variety of knitting machines in the operation. The plant used 45 brand-new electronic Lonati machines, alongside 27 30-year old German Esta machines retired from the Australian operation. The remaining 255 were English Komet machines which were between 40-50 years old.

Linking

The next step was to close the toe of the sock. Three different technologies were used for this operation, which was carried out in the next shop. The slowest, and highest quality, was hand-linking, which demanded high dexterity and entailed considerable labor content. The Merrow overlocking machines provided automated closing, but produced at a lower quality than the three Rossi machines, which incorporated state-of-the-art closing technology.

Dyeing

Socks were then batched into a 40-45 kilo batch for a dyed color or a 60 kilo batch for bleached white or black. 40-45 kilo production went into the three P&L dyeing machines. A dye batch would normally take 4-5 hours for cotton. Older technology was used for the 60 kilo batches (the Smith drum), which used hydrogen peroxide for the bleaching process. Each of the P&Ls had a built in spinning program which extracted the excess water.

Pressing

The socks were then tumbled in a dryer to a set moisture level, then were set to shape on one of two shaping machines. Each was run by a crew of four people, one loading, one straightening, one unloading and one examining. This was a 24-hour operation, with 6 teams.

Examining, Pairing and Packing

The socks were then put into cartons of 240 pairs which went into rack stock. Packaging and presentation variety was then produced by drawing from this inventory, making multiple consumer-packaged SKUs from common manufacturing numbers. Thirty people worked in the packing area, working on one shift.

Capacity

Total production was between 2400 and 2500 dozen pairs per day. The new 44-hour working week had recently been mandated by the Government, and an announcement had just been made that there would be a further reduction in the maximum working week, possibly to 40 hours a week by January, 1996.

The process was characterized by a very diverse set of production technologies, qualities, and output rates, even for similar operations. This diversity brought with it its own set of problems, though it reflected the overall PD operations strategy: to start with older machines from Australian plants, then upgrade to the latest technology over time.

The plant rated an average of 60 to 80 defects per 1000 items, which was similar to what was achieved in Australia. Young women aged mostly between 17 to 21 staffed the labor intensive knitting, dyeing processes, pressing, and sorting activities of the plant. The women were recruited from the local district and most had not completed their secondary school education. The Chinese government's methods of allocating labor occasionally suggested a view that "labor" was more or less a fungible commodity. It was not uncommon, for example, for a state run factory to be closed, and the employees sent off to work in a department store at very short notice. Of the 350 employees, indirect workers numbered 75 of the total. If supervisors were counted in the indirect pool, the total reached 84 resulting in an almost one to three indirect to direct employee ratio: unusually high for such an operation. In Australia the ratio was closer to one indirect for every eight direct employees.

Managing the Beijing Plant

The plant's organization chart is shown in **Exhibit 6.** Littley described his experience as he started to manage the plant 14 months previously:

> *The first three months when I arrived—I didn't know what had hit me. You feel like you're Robinson Crusoe with 350 Man Fridays. And like Robinson Crusoe, you have to find a way of communicating. I was running around trying to work out why things happened a certain way and why I couldn't change them. I didn't understand them, they didn't understand me. They find it very hard to come to grips with the change. Anyone who's coming to China really has to make a commitment to come for longer than two years. Two years is too short. It's too long from the Westerner's point of view, but its too short from the business point of view. I'm going through the learning curve even now. I wish I had learned more about China before I had come.*

Managing managers

One of the primary problems, Littley found, was the lack of qualified and independently-acting middle managers. This meant important changes in the way he had traditionally worked. Because information had traditionally only travelled down the organization, any information received upwards could be highly suspect. Managers would often just say yes—that they understood a problem—when they did not. They would then procrastinate on it, until it was too late to solve.

More importantly was the lack of the checks and balances on his own decisions. Like most good managers, Littley had relied strongly in the past on people prepared to tell him that he was wrong, and that there might be another way of doing things. This never happened in the Beijing plant.

> *You have to tell them how to do everything at first, but then you're very quickly in a position where you are relied on for everything. People would <u>never</u> come to me and say they think I'm making a mistake. My style had become quite autocratic in some ways. But I need to be autocratic to get things done, but then that stifles responsibility. It's a Catch-22.*

Meetings

To counter the problems, Littley held meetings every week with every department, from basic design to services, to engineering. While the meetings generated action plans, and a commitment from people to execute their plans, the following meeting generally showed that the tasks were not complete, for one reason or another. Meetings were characterized by long periods waiting for translation, which meant that both Littley and his managers spent much of the meeting

waiting. In addition, there were inevitably untranslated side-discussions, in one language or the other, leaving at least someone isolated from the group. Mistranslation was common, even if only in tone, and much time was spent clearing up such misunderstandings.

Reports

Littley asked for daily reports from every department. Each manager was required to fill out a report detailing what progress had been made, along with specific information that Littley had asked for from each group. Every day, by every machine in the company, he received a report of everything that had been produced, what seconds had been made and what the problems were—to ensure that corrective action had been taken, though it rarely had. Then, by machine group, output was compared against what would normally be expected and reasons for discrepancies identified; then by style level—why deliveries weren't being met, what would be done about overtime, whether work would be subcontracted, whether machines might be sped up or whether alternative materials had been considered.

Finding People

One larger plant management problem loomed on the horizon. Young Chinese graduates were becoming increasingly reluctant to work on the floor where they could gain the experience vital to be a manager:

> *One person came back to me and said 'I didn't get a university education to go on the factory floor!' They are often just looking for a springboard—to get you on their resume, even though they are paid 30-50% higher than base [500 RMB per month on the shop floor]. Of 18 graduates we had come in here, there are only 3 left.*

This difficulty in retaining educated university graduates forced Pacific Dunlop to focus hard on training from within for day-to-day plant management:

> *What this means then is that you cannot attract the type of people you want—those out of the university. You now have to hire middle school graduates and train them as if they'd never had a job before. But that takes time and money. You need to take them through the ranks. And when you are trying to grow the business like we are, then it becomes hard to achieve that and get the management training as well.*

Custom and Practice: China & Australia

A willingness and ability to solve minor, tactical problems seemed to be almost completely absent in the plant at first - this again meant huge demands on Littley's time. Even the most minor problem would be deferred up the chain of command, and very often, just "sat on". While Littley had worked to try to cultivate some self-reliance, by holding weekend training sessions, so far, his attempts had not really borne much fruit. An acceptance of the need for autonomous action was simply not common practice in state-run industries.

In addition, even when problems were solved independently, there was a wide disparity in Australian and Chinese views of what constituted a "good" solution to a problem. An example was the loading of the dyeing machines. These machines comprised axially-horizontal, rotating drums, rather like a big spin-dryer and indeed, this was part of their function, to spin-dry after the dyeing operation. However, the drums were split into three compartments. Each compartment should have been loaded with 15kg of material. To try to be more "efficient," the operators frequently loaded one drum with 15kg, one with 17kg and another with 20kg. Despite being told many times not to do this, operators continued with the practice, which meant that the loaded assembly was dynamically

unbalanced, and led to the bearings in one of the new machines burning out (bearings are rarely good at handling an oscillating load).

Chinese Solutions on Western Equipment

To fix the problem, the shop-floor people, for once, acted independently, and ordered bearings from a supplier, which they could only get in the wrong size. The engineering department therefore bought a smaller diameter and used metal shims to jam the bearing into its housing. While few Western technicians would have even considered such a makeshift solution, in China—it seemed like the right thing to do, even though this new bearing wore out much more quickly than the first, and probably damaged the rear bearing as well.

This example was just one of the myriad of problems in the plant, which would not arise in the West but which, in their multiplicity, were an incessant drain on time. The inevitable therefore happened—some things just had to be allowed to slide.

Building Guanxi

The Chinese concept of *guanxi* (roughly translated as "connections or "relationships") was an important aspect of managing a plant in China, and one which was usually dismissed as trivial by plant managers when they arrived, then emphasized by them incessantly after their "burning-in" period. While in Western plants, authority and prestige tended to be carried much more by the formal position, in China, such formal authority meant very little. Much more important, as Littley quickly found out, was a person's *guanxi*. While the plant in Beijing had three Western managers, each took his *guanxi* with him when he left, leaving the new manager to start over.

> *This is much more important than I ever, ever thought it would be, especially when dealing with people outside the firm. If you don't have the right relationship with people, it doesn't mean anything that you are prepared to pay a lot to buy something. The customer is not King in China—the supplier is. They will often refuse to sell to you at any price. Most often, they will smile and nod. Then nothing will happen.*

Like many Western managers Littley was originally frustrated by these tiny things that seemed so inconsequential. Since he had realized that running a plant in China *was* dependent on such things as who one meets, and how one meets them—even what one eats, he had put many precious hours into building *guanxi* with the critical suppliers and government officials.

> *I realized, it was kind of like a test. We would go out to dinner, and I would have a few drinks with them, and eat a couple of things from the dishes they set in front of me. Hardly anything to do with business seemed to get done at these meetings. Then I realized—business was being done—I was under test. The first few times we went out, they would bring an army of people, each of whom would drink a toast to me—I would end up plastered! Then they'd talk business. I realized what was happening. Now, I always take a load of my key guys, and insist that they each take a turn to be toasted.*
>
> *The food is another thing. This is also a series of tests—to see how tough you are and how serious you are about doing business and working with the Chinese. Now, I eat just about anything—and I do mean anything. Of course, you can try any excuse you like to avoid doing this stuff—religion, vegetarianism, health. It doesn't matter. If you do, they'll think you're not willing to adapt. You won't get the supplies or permits your plant needs to keep running. The deal just won't happen without doing this kind of thing—or if it does, you'll be compromised as a short-term hit, rather than seen as worthy of a long-term relationship.*

Living on Site

Littley lived in a one bedroom apartment above his office. It was his place to eat, sleep, and think. He had tried commuting to work and living away from the office, but the time and, more importantly, the constant attention required by the factory forced him to live at work.

Living on site, all you do is work and you do not get away from it. You are here everyday, you hear the shift changes. They come and knock on your door and you end up working 24 hours a day.

Such demands took a toll on his personal life, as it did on many Western plant managers in Beijing. Littley knew of several other ex-patriate Australians within the vicinity but had not found time to meet with them. Moreover, his health had begun to suffer, partly as a result of the high level of pollution. He was battling a cold that had lasted two weeks and only recently he had suffered what he thought was a heart attack:

It was a real scare. I went down with some excruciating chest pains. I have never felt anything like it in my life. It was too late to go to the embassy hospital so I had to see one of the local chinese doctors, a witch doctor really. He gave me some heart massages and declared everything clear. I went for a full medical for two days at the Chinese hospital specially for Westerners. They gave me all kinds of tests and declared me okay, except for the stress.

Beijing's Performance

While the plant had improved dramatically in the previous 14 months, Littley knew there was still a long way to go. The poor management system and discipline problems meant that 25% of orders were still running late. There was also a variance in lateness of six weeks across the outstanding jobs. One person, it seemed, could only do so much. In stasis, such problems might gradually have been solved—but the strategy of aggressive growth in China meant that soon, new challenges would face the plant and its creaking systems. Something had to be done to ready the operation for the explosive growth and new manufacturing technology to come. And it had to be done now.

Building a Production Management System

The information systems needed to run the plant were sorely lacking. There had been a rudimentary production control system, brought up by the previous manager from Australia. For one reason or another, Littley found, on his arrival, that the hard disk on the PC running the planning software had been erased. Even if the disk had been saved—it would have helped very little, since no one else understood it. And despite its existence, the plant had had much poorer delivery performance at the time it was used. Few people questioned the output of the computer, so errors would snowball as a result of poorly entered information, sometimes with fairly dramatic results. For the previous 18 months, the plant had run on a manual or semi-manual system.

While 90% of output was destined for Australia, Littley was also responsible for selling spare capacity onto the market, often in Switzerland, Canada, Denmark or Bulgaria, which required careful planning to ensure that capacity was available to fill the current orders.

I have a good young guy in the planning department. If I had another 300 of him, I'd be happy, I can tell you! Brad Zhou is the youngest manager we have and he controls the planning and purchasing for the whole factory. Before he took it on we had only 40% of our deliveries on time, with some jobs over a year late, and average lateness running at 3 months.

Now we're up to 75% on time, with an average lateness of about 6 weeks on the rest. He's done a great job, but its taken a lot of training and a lot of sitting down on Sundays after work. I got him to do it manually at first, then adapt it to simple programs on the computer.

Planning Production

Production planning was carried out by three mechanisms:

For each machine in the plant, by month, Brad Zhou produced a simple Lotus 1-2-3 spreadsheet, showing the number of days available and the specification of output, thus providing a rudimentary capacity analysis. This provided the ability to know what could be sold. Second, on the same spreadsheet, the orders, by customer, were blocked in. The value of each order was also recorded. This enabled Zhou to ensure the plant was on target for sales value as well as unit volume. Third, was an exception report which showed up the "holes". Littley would then go out and find business to fill the holes.

This was the full extent of the production control system. There was no system, for example, to explode production projections into bills of materials. This had to be done manually—a clerk would sit down with the specification and calculate through.

Shop-floor Control

But generating schedules was only part of the problem. Operators would often ignore the schedule entirely, and produce the orders-on-hand in the sequence in which they had arrived at the plant (First-Come-First-Served), in keeping with the way lines were serviced in shops and markets. Littley was convinced this was causing an excessive number of late deliveries and was making poor use of the available capacity. The inability to work around scheduled downtime, for example, could often mean setting up a machine two or three times for the same order (see **Exhibit 8** for an example of Zhou's spreadsheets).

In addition, production controllers would frequently order far more material than the plans advised, to provide safety stock for the plant. Inventory levels were becoming excessive. The warehouse contained piles of boxes full of unneeded labels, for example.

Preparing for Growth

The 50% growth in sales and 25% growth in volume projected for the plant over the next year would mean a severe test for the already creaking production control system. Something had to be done to control the way things were currently done, but care had to be taken.

The last system that was used had been a failure in terms of delivery performance because no one was able to maintain the integrity of the data it held or the hardware on which it ran.

There was an existing base of six unconnected Personal Computers in the plant: Janet Mok used one to keep track of financial data, and Zhou used one to generate the Lotus production control spreadsheets described above. At the end of the month, Mok and Zhou would get together to resolve discrepancies between their machines. They never agreed.

Australian Plants' Manufacturing Information System

In Australia, Littley had had a system which produced the kind of reports he needed for running the plant, including:(1) Sales from the previous day and sales from month to date; (2) orders

outstanding for the month and the month before; (3) orders on hand; (4) production plans; (5) delivery schedules; and (6) inventory levels and allocation; all of which were available with the stroke of a key.

Viruses

Littley was cautious about the introduction of such a system in Beijing. Over-reliance on computer systems was dangerous in part because of an endemic problem that would be relatively easily cured in the west: computer viruses. Only a few months previously, a virus attacked the system used by Mok for financial accounting and crippled it. The problem took so long to correct that Mok was forced to resort to pen and paper to maintain the financial system.

> *We were dead for a week. The virus went through the plant like wildfire. Everyone says this is a big problem in China and it is. Another one of those things that sounds completely trivial when you're at home, but here it stops the operation dead. Western virus protection does not work against Chinese viruses and they are everywhere, on every disk it seems. Even the CAD systems controlling the knitting machines were affected, meaning we couldn't produce anything. We managed to get some IBM people out here, but it took them almost a week to clean the plant. The machines aren't even on a network! and they were dying left, right and centre. It was unbelievable!*

The virus problem was widespread throughout China for two reasons. First, virus transmission was facilitated by the relatively liberal interpretation of copyright law in China concerning the duplication of software (see **Exhibit 7**). While all software used in the plant was legal, people would bring disks into work to try out 'borrowed' software, and use advance copies of newly released versions. The disks inevitably contained viruses. Even repeated proscription by Littley had not stopped the practice. Second, The viruses that existed were 'Chinese' strains, mostly invented by hackers with a lot of time and inventiveness on their hands. Many Chinese viruses were unknown in the West and were often immune to Western virus-killing programs.

Building a System

The Electronic Data Processing (EDP) group in Melbourne had looked at three options for automating production control at the Beijing plant:

The first option was to install a mainframe computer in Beijing. While mainframe computing was past its heyday in the West, it did provide some advantages over a distributed system. It would be straightforward to protect as a whole entity and would run software that was well-tested and not dependent on a continuously effective network. The drawback though was the maintenance and operation of such a computer. It was hard to think of anyone who could run it. Second, a mainframe or even a minicomputer would be 'overkill' for a plant the size of PD Beijing.

The second possibility was to install a PC network with ready built software. Backup and recovery routines could be built into the network architecture. However, if a PC network was installed, the plant would have to wait at least six months (and probably a year) for the development of appropriate software. On the other, hand, it might be able to use the system which had been developed in the Taiping plant (which made bras and polo shirts) though this catered to a very different type of production. Bras and polo shirts exhibited much more variety, and were manufactured by a very different process—with much more focus on assembly than primary processing.

The third possibility was to rent a land-line from Beijing to Hong Kong (which could then connect with an AS-400 minicomputer in Melbourne). A variation on this was to use a satellite link to

connect the plant with Australia. While such a method would be very expensive, it would solve the problem but realistically, would probably be very inflexible to any changes needed in the system.

Something had to be decided soon. While it had worked as a stop-gap solution, the existing way of coordinating production needed to be improved if the plant was to continue to prosper as the market grew.

Building Improvement

The challenges were clear and urgent. While the production management system was a thorn in the side, the dilemma eating into Littley's already minimal sleep time persisted: what should be done to build a culture of self-reliance in such a reluctant environment? And how could such self-reliance be vindicated in peoples' eyes when even their best guess provided what would have been considered in the West a 'wrong' solution, potentially damaging to both the plant's performance and its equipment? With so little time for training (even if it were available), it seemed inevitable that Littley would have to continue to intervene, especially as the technology became more sophisticated.

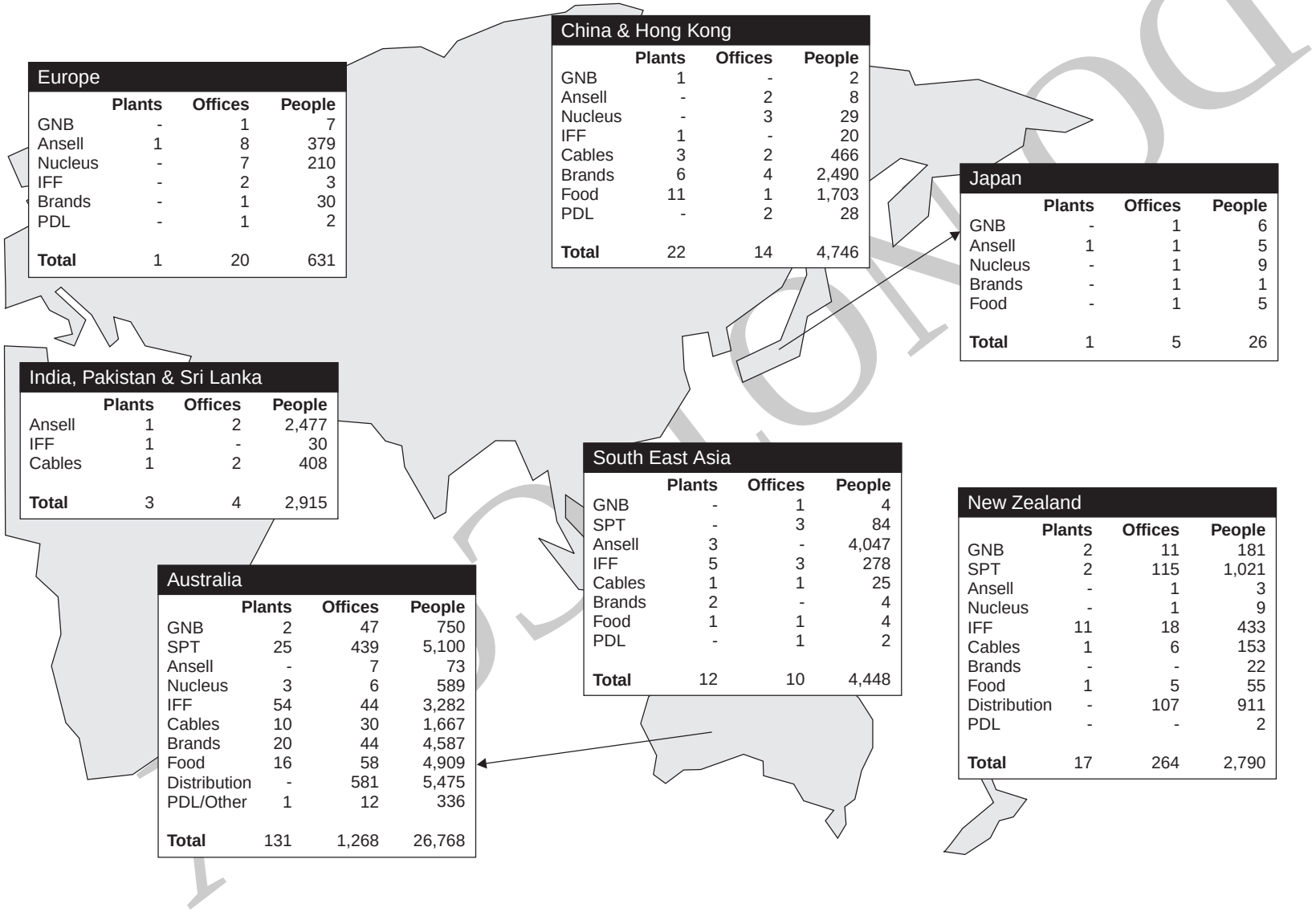
The problems danced around in Littley's head as he tried to sleep amidst the clatter of the machinery.

It was going to be a short night.

Exhibit 1 1994 Pacific Dunlop Operating Results and Balance Sheet

	1994	1993	1992	1991	1990
Operating Profit			**(in A$m)**		
Group Sales	6. 967	6,305	5,806	4,922	5,048
Earnings before Interest and Tax	546	493	448	449	501
Operating Profit after tax	312	266	220	244	306
Dividends	240	213	190	154	142
Cash Flow from Operating Activities	484	446	474	310	488
Assets					
Cash	1,012	1,207	1,003	965	793
Receivables	1,125	1,040	1,036	756	778
Inventories	1,253	1,156	1,066	890	859
Property, Plant and Equipment	1,571	1,497	1,349	1,062	1,008
Investments	207	174	289	156	152
Prepayments and future income tax benefits	424	408	363	241	196
Intangibles	1,153	968	878	575	465
Total Assets	6,745	6,450	5,984	4,645	4,251
Liabilities					
Borrowings	1,872	1,947	1,712	1,535	1,386
Creditors	1,821	1,620	1,527	1,214	1,017
Provisions	670	646	604	386	429
Other liabilities	13	46	89	125	141
Total Liabilities	4,376	4,259	3,932	3,260	2,973
Net Assets	2,369	2,191	2,052	1,385	1,278
Less outside interests	31	31	27	20	19
Shareholders Equity	2,338	2,160	2,025	1,365	1,259

Exhibit 2 Pacific Dunlop locations in Asia



Europe

	Plants	Offices	People
GNB	-	1	7
Ansell	1	8	379
Nucleus	-	7	210
IFF	-	2	3
Brands	-	1	30
PDL	-	1	2
Total	1	20	631

China & Hong Kong

	Plants	Offices	People
GNB	1	-	2
Ansell	-	2	8
Nucleus	-	3	29
IFF	1	-	20
Cables	3	2	466
Brands	6	4	2,490
Food	11	1	1,703
PDL	-	2	28
Total	22	14	4,746

Japan

	Plants	Offices	People
GNB	-	1	6
Ansell	1	1	5
Nucleus	-	1	9
Brands	-	1	1
Food	-	1	5
Total	1	5	26

India, Pakistan & Sri Lanka

	Plants	Offices	People
Ansell	1	2	2,477
IFF	1	-	30
Cables	1	2	408
Total	3	4	2,915

South East Asia

	Plants	Offices	People
GNB	-	1	4
SPT	-	3	84
Ansell	3	-	4,047
IFF	5	3	278
Cables	1	1	25
Brands	2	-	4
Food	1	1	4
PDL	-	1	2
Total	12	10	4,448

New Zealand

	Plants	Offices	People
GNB	2	11	181
SPT	2	115	1,021
Ansell	-	1	3
Nucleus	-	1	9
IFF	11	18	433
Cables	1	6	153
Brands	-	-	22
Food	1	5	55
Distribution	-	107	911
PDL	-	-	2
Total	17	264	2,790

Australia

	Plants	Offices	People
GNB	2	47	750
SPT	25	439	5,100
Ansell	-	7	73
Nucleus	3	6	589
IFF	54	44	3,282
Cables	10	30	1,667
Brands	20	44	4,587
Food	16	58	4,909
Distribution	-	581	5,475
PDL/Other	1	12	336
Total	131	1,268	26,768

Exhibit 3 Group Organization

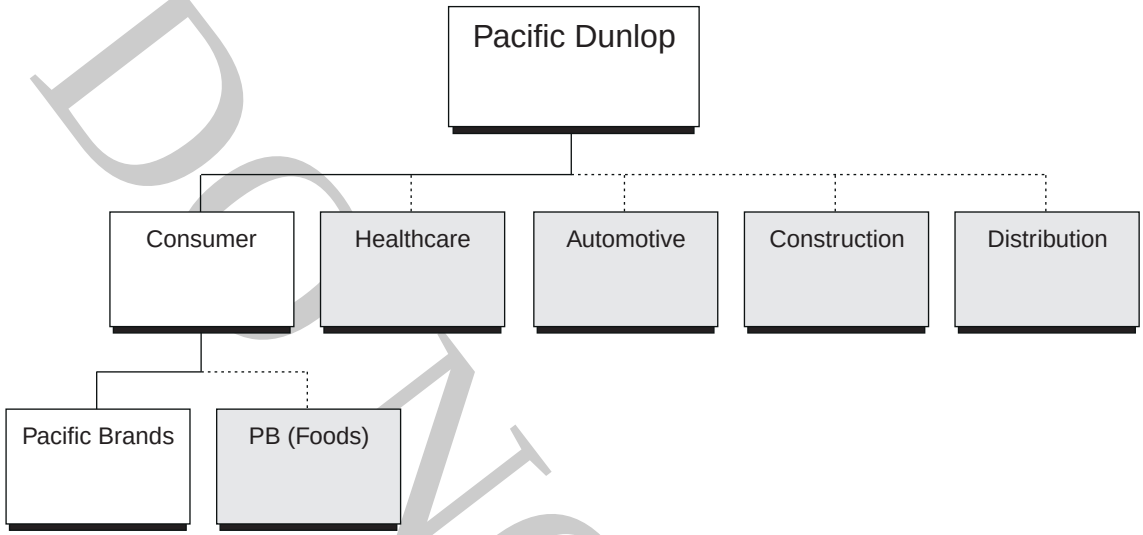


Exhibit 4 Pacific Brands: Financial Summary (A$m)

	1994	1993	1992	1991	1990
Sales (A$m)	874	809	777	759	850
EBIT (A$m)	73	61	72	77	69
% of Sales	8. 4	7. 5	9. 3	10. 1	8. 1
Total Assets (A$m)	525	456	409	409	414
Capital Expenditure (A$m)	19	17	25	14	37
Depreciation (A$m)	15	14	13	14	16
Factories	28	26	29	35	43
Other Establishments	50	44	44	42	60
Employees (000s)	7. 1	7. 6	7. 5	5. 7	6. 6

Exhibit 5 Locations in China

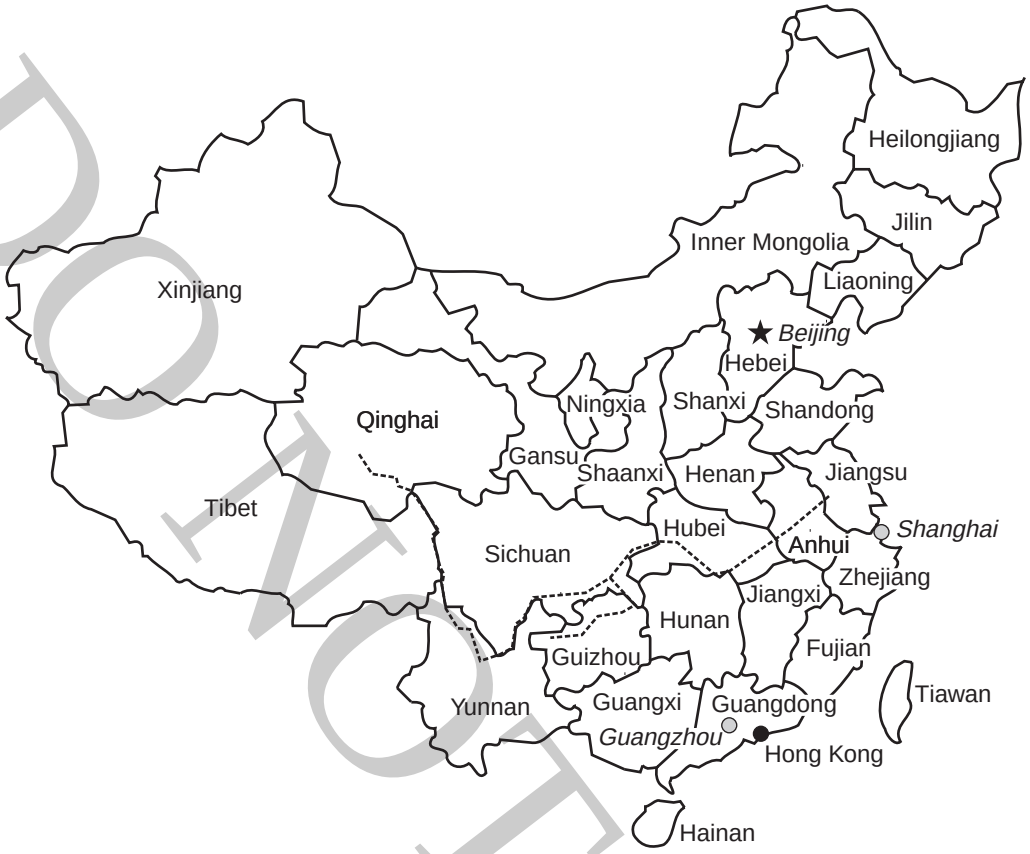


Exhibit 6 Beijing Plant Organization Chart

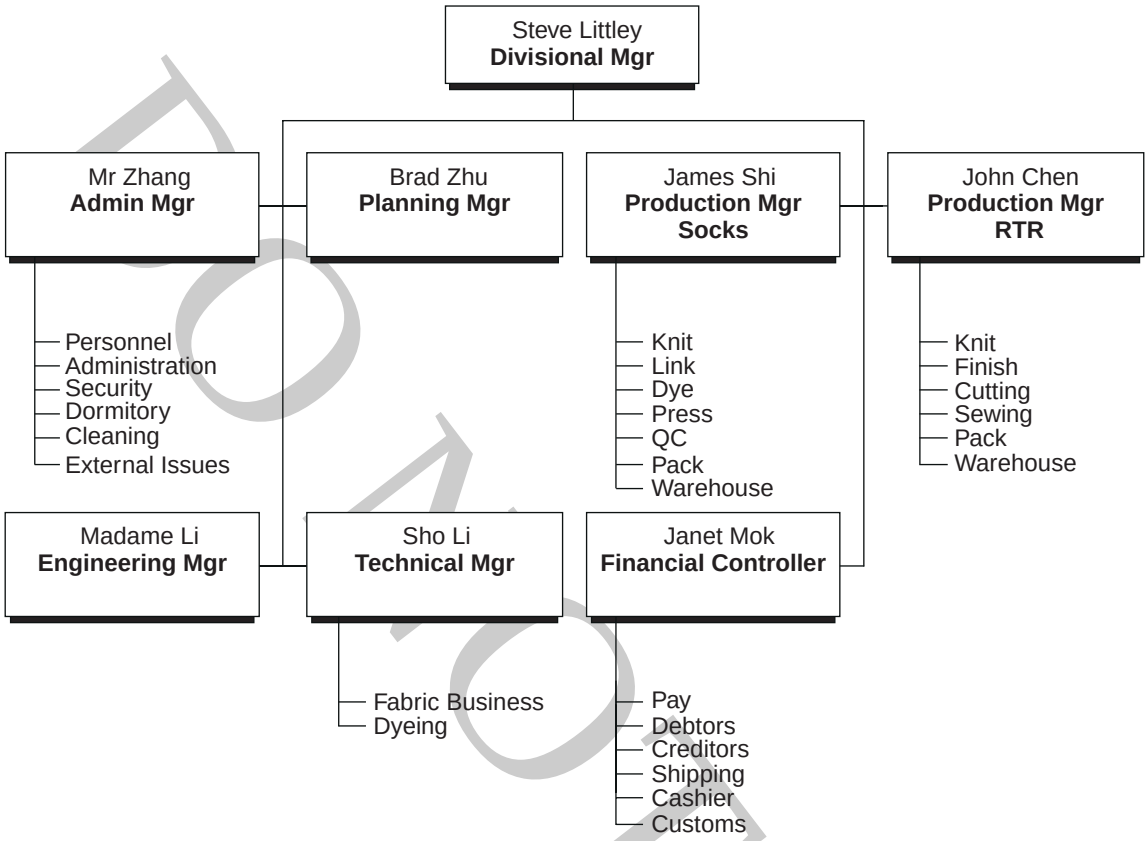


Exhibit 7 Software Copying

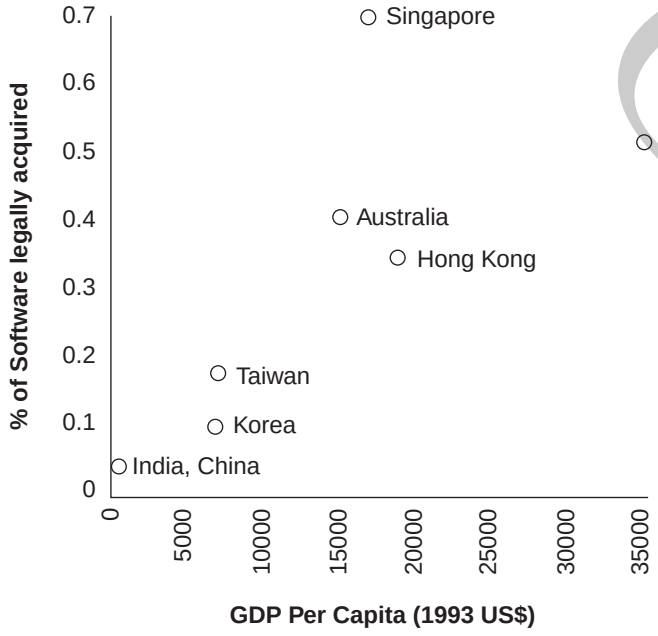


Exhibit 8 Patterning Esta Machines: Capacity Projection—January 1995

Day	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Esta 1	Down until Thurs.																			
Esta 2	Previously Scheduled																			
Esta 3				Refitters from Australia working (machine to be stripped down)																

Exhibit 9 Patterning Esta Machines: Orders on Hand—January 1995

Order (in arrival sequence)	Number of Days Processing Time	Set up Time (days) (additional)*	Finish Date to meet Promise Date	Feasible Machines	Estimated Contribution of Order†
A	**5**	**1**	**7**	**1,2,3**	**$900**
B	**2**	**1**	**10**	**1,2,3**	**$300**
C	**3**	**1**	**13**	**1,2**	**$600**
D	**6**	**1**	**14**	**2,3**	**$900**
E	**8**	**1**	**18**	**1,2,3**	**$1200**
F	**1**	**1**	**19**	**2**	**$300**
G	**2**	**1**	**9**	**1**	**$600**
Total	**27**	**7**			**$4800**

* Jobs could be split between machines, but would then need set up time on both machines

† There was a 50% probability that a late order would not be accepted by the customer (resulting in having to sell the inventory at cost) independent of how late it was.