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MAKE OR BUY:
COMPUTER PROFESSIONALS IN A DEMAND DRIVEN ENVIRONMENT

By

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WP 1342-82 September 1982

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Make or Buy: Computer Professionals in a Demand Driven Environment

By

Thomas A. Barocci*
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The manager of the Information Systems Department was feeling a genuine dilemma. Three of this top 13 people had resigned to take positions with competitors. His frustration and somewhat accusatory tone elicited from the personnel director: "All of your people are outliers, 'red circles'; we may have to redo the entire point system." "Redo it then; we are an exceptional group and it is your job to keep our people here. All of the leavers are getting 20-30 percent raises when they leave," responded the manager of Information Systems. "But what about the IS people we have placed, at your request, I might add, in the functional areas? Their colleagues will soon know that their salaries are higher; this action is going to require a complete overhaul of the point system." And so the story goes. Companies react to shortages and turnover with money incentives which often work to keep people, but only in the short term.

The manager was upset not only because he had to replace the "Senior Software Engineer," but also because he had to worry about finding, cajoling and training new people and persuading the personnel department that their

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rules on pay scales had, once again, to bend to the needs of IS. Personnel passed the buck to the budgeting authority, who "needed convincing."

The turnover problem in American firms is not new, but it is exaggerated in IS departments. The exaggeration is predictable, since the skills needed to run a modern and responsive IS department are in short supply. Moreover, computer professionals have tended to be more attached to their occupations than to their companies. Over the last 10 years great strides have been made in developing career paths for non-managerial positions in IS, but few organizations have addressed the career path issues for supervisory and managerial positions (Idema, 1981). The problem is becoming even more acute as functional specialties within the organization become more closely linked with the IS department (Keen, 1980).

Two issues come to the fore. First, there is a great need for IS personnel to be knowledgeable in at least the basics of the functional areas. Moreover, the users/demanders of IS products must also be aware of the capabilities of IS departments. Secondly, if the flow of information and expertise is to be continuous and increasingly productive, the personnel involved must establish a good working relationship. This requires time and a great deal of firm-specific knowledge on the part of the major assets of corporate IS production -- human resources.

Firms have access to the same technology. Differences in performance turn on the people involved. As demand for IS production increases, so does the money-enticed turnover among the company's most able employees. The situation can only get worse. Data collected at MIT's Center for Information Systems Research show that the demand for computing power is increasing at a rate of 40 percent per year, there is an average of two to five years' backlog of development projects, and the mix of products from IS departments is changing from primarily transaction processing and routine reports to inquiry

and analysis capability (Alloway & Quillard, 1982). Moreover, the CISR survey showed huge "latent or hidden demand," where users didn't even ask for systems because they knew they could not be supplied. The bottleneck is primarily in software, where the traditional development tools are unsuited to ad hoc applications; often 70-80 percent of DP staffs are involved in maintenance work on old systems (Wegner, 1979), and there is a shortage of people available to do the work. In addition, most IS personnel would prefer to work on new systems development, rather than maintaining or supporting a system which tends to become routine, and therefore less challenging. Of course there are individuals who chose to remain support Cobol programmers; however, the more exciting work is generally believed to be in systems design.

Other problems have emerged, such as increases in recruitment time, salary compressions resulting from many new hires, internal referral head hunting fees which create multiple exits when one employee leaves and entices his ex-coworkers to come along, and so on (McLaughlin, 1975).

We submit that the costs and the related lost productivity are symptoms of organizational difficulties; no place are they better exemplified than in turnover within a given organization. Here, it is possible to show quantitatively that the price of not maintaining constant attention to personnel is high in the short run and astronomical in the medium and long run. Recently, the previously mentioned IS department manager in a large electronics manufacturing company asked one of the authors, somewhat rhetorically, "What can I do to convince my Chief Financial Officer in this company that I need a budgetary increase to allow for increased salaries, increased education, increased amenities and increased equipment purchases, as well as the hiring of a human resource professional? Often, the IS group sits within the Finance area, but this close proximity does not appear to facilitate easy resolution of the problem. He continued, "turnover was 35

percent last year and 25 percent at the top, and it's killing me." The response was quite simple; it centered on showing how much it costs in the short run NOT to do anything about it.

Five telephone calls and four hours of person-to-person interviews produced a scenario that convinced the Chief Financial Officer. The most viable and obvious place to begin was with an analysis of turnover and its costs. We addressed the Personnel Department first. They offered a list of the recruitment, advertising, moving, interviewing and other costs associated with filling the vacant positions. These can be high, often amounting to almost 40 percent of the person's starting salary. This, however, is only the tip of the iceberg. Indirect costs can dwarf these costs (Hall, 1981).

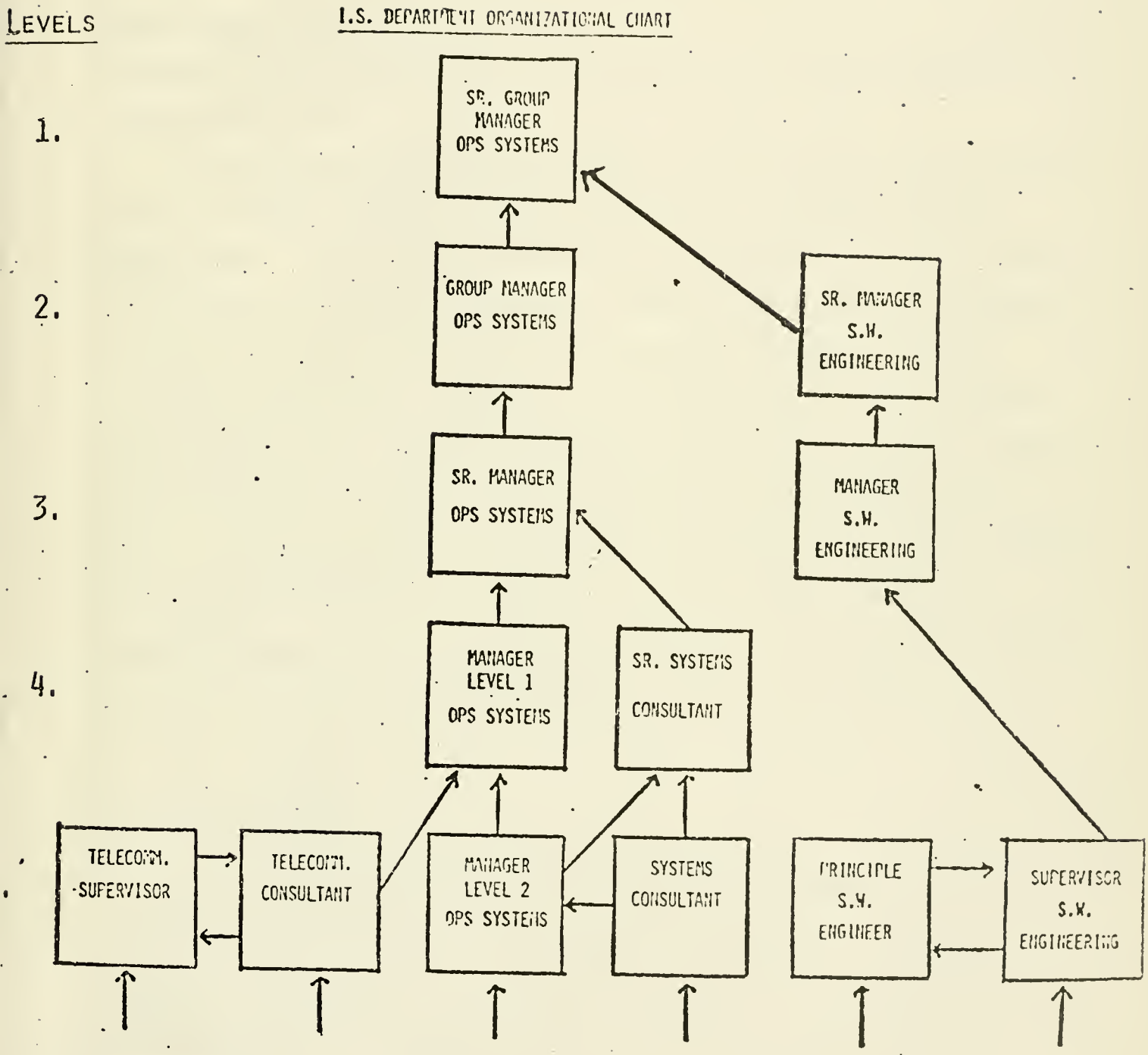
The method of estimating the costs of turnover within an organization can be illustrated by using the following real example. Figure 1 shows the organizational chart of the IS department of the firm mentioned above. For the purposes of simplicity, only the top of the structure is utilized; the principles are the same as one moves down the organization. In fact, one study that researched the turnover costs of low level computer professionals found the recruitment cost of one systems project leader was $10,339, while the training costs were estimated to be $15,735. This amounted to 87 percent of the project leader's average annual salary of $30,000 (D. Tessier, 1982).

Of the 13 top positions in the IS department, three required replacements during the previous 12 months: Senior Manager of Software Engineering, Manager of Software Engineering, and Systems Consultant. Their combined salaries ($105K + $75K + $60K) equalled $240K, or about 25 percent of the total top management salary budget of $985K. The turnover rate was 3 of 13 or 23 percent -- actually lower than the averages we have found in other field work.

Figure 2 shows the calculation of the direct costs involved in replacing the three people who left, adding advertising, agency and finder fees is the first step. We must add to this the actual expenses of bringing personnel into the area and the firm for the interviews. For final selection everyone offered a job was allowed to bring his or her spouse to the area for a visit. The relocation expenses are also included, as is the allocation of 20 pecent of the time of a senior person on the personnel staff of the organization. This figure was estimated by the personnel department; it includes the time spent shuffling the pay point scheme to "allow" for the "red circle" rates necessary to offer the new hires the 20 percent (average) salary increase required to lure them away from their old jobs. Total direct costs equalled $197,000. This is a conservative estimate; it does not include bridge loans and mortgage subsidies. Obvious, but noteworthy, is the fact that no output to the firm is directly related to this expenditure.

In addition to direct costs, it is necessary to add indirect costs, which include an estimate of existing management time spent interviewing, and convincing the candidates that this was the right place to work. Interviews aimed at getting the management to estimate the hours spent in this activity showed approximately two percent of the total yearly hours. The same interviews tried to obtain educated estimates of the time it takes new personnel to arrive at a 90 percent productivity level. Figure 3 shows the results of these estimates. During the first seven weeks the productivity of the new hires was only 20 percent; during the next seven weeks the figure was 32 percent, and during the last seven weeks their productivity was at 86 percent. In total, the learning curve productivity losses cost the company an additional $62K.

FIGURE 1


LEVELS
I.S. DEPARTMENT ORGANIZATIONAL CHART
1.
2.
3.
4.
SR. GROUP MANAGER OPS SYSTEMS
GROUP MANAGER OPS SYSTEMS
SR. MANAGER S.W. ENGINEERING
SR. MANAGER OPS SYSTEMS
MANAGER S.W. ENGINEERING
MANAGER LEVEL 1 OPS SYSTEMS
SR. SYSTEMS CONSULTANT
TELECOMM. SUPERVISOR
TELECOMM. CONSULTANT
MANAGER LEVEL 2 OPS SYSTEMS
SYSTEMS CONSULTANT
PRINCIPLE S.W. ENGINEER
SUPERVISOR S.W. ENGINEERING

Thus, by adding the direct and indirect estimates of the costs, we arrive at a total of $279K. It should be mentioned that this is also a conservative estimate, since it does not take into account any of the time management had to spend "training" the new hires on the job over the period of their learning curve.

One more consideration should be noted. This cost was not only incurred by the firm under study here; equal costs fell upon those firms who hired these people. And the same expensive ball rolls through all levels of IS and DP departments throughout the economy; it will not stop rolling until serious attention is focused on the effective and equitable management of human resources. Preventing all turnover is unrealistic and probably undesirable. When a person leaves a firm it sometimes shows that he/she did not fit in and wanted something different. It is a waste of time to try to prevent this. But to prevent the turnover of valued people who have embodied a great deal of firm-specific skills can be the single largest productivity enhancement program available. Of course, turnover prevention requires the institution of a systematic program explicitly considering the make-buy decision.

The Make-Buy Choice

The scarcity of computer-related personnel, and the corresponding increase in wages, generally results in an increase in turnover. To alleviate a firm's shortage of computer professionals, an organization has three options. These include: (1) training existing employees in data processing, and providing a way of upgrading skills in nonuse, (2) hiring unskilled personnel and runnning training development programs, or (3) recruiting personnel with the requisite skills from the outside. The decision about which option or combination to use is the basic dilemma each firm must face.

FIGURE 2

CORPORATE I.S. DEPT: TOP MANAGEMENT - 13 POSITIONS
ESTIMATION OF YEARLY TURNOVER COSTS

(TOTAL COMPENSATION - 13 POSITIONS = $985,000/YR.)

SALARIES:

TURNOVER	-	3 JOBS	-	1 YEAR = 23%
JOB A		LEVEL 5	-	60K/YR.
JOB B.		LEVEL 3	-	75K/YR.
JOB C.		LEVEL 2	-	105K/YR.

ESTIMATION CALCULATION:

DIRECT

1.	EMPLOYMENT ADVERTISING	$ 6,000
2.	AGENCY AND FINDER FEES (30% OF A,B,C)+20%	86,000
3.	APPLICANT EXPENSES WITH SPOUSE ($2,000 x 3)	6,000
4.	RELOCATION EXPENSES ($13,000 x 3)	39,000
5.	EMPLOYMENT STAFF COMPENSATION(20% x 60K)	12,000
6.	SALARY INCREASES (20% OF 240K)	48,000
	DIRECT HIRING COSTS (SUM OF 1 - 5)	$197,000

FIGURE 2 (continued)

CORPORATE I.S. DEPT: TOP MANAGEMENT - 13 POSITIONS (CONTINUED)

INDIRECT (ESTIMATED)

6. COST OF EXISTING MANGEMENT TIME - INTERVIEWING, ETC. (2% OF TOTAL YEARLY "BILLABLE" HOURS) $20,000
7. LEARNING CURVE PRODUCTIVITY LOSSES

AVERAGE WEEKLY PAY (3 PEOPLE)	WEEKS LEARNING TO 90% PRODUCTIVITY	% EFFECTIVE DURING LEARNING CURVE		
		FIRST 1/3	SECOND 1/3	THIRD 1/3
$4,600	21	20%	32%	86%

A. FIRST THIRD LOSS ($5,500 x .80 x 7 WKS.) $ 30,800
B. SECOND THIRD LOSS ($5,500 x .68 x 7 WKS.) 26,180
C. THIRD THIRD LOSS ($5,500 x .14 x 7 WKS.) 5,340

TOTAL LEARNING CURVE PRODUCTIVITY LOSSES $62,320

TOTAL INDIRECT ($20,000 + $53,000)

GRAND TOTAL

DIRECT + INDIRECT ($82,370 = $197,000) $279,370

*NOT INCLUDING EXISTING MANAGEMENT O.J.T.

The short run approach is to maximize profits by minimizing the cost of training or of paying recruitment fees and salary premiums for external personnel with the requisite skills. Of course this approach is short-sighted, and does not solve the critical long run issue of turnover. The long run strategy would be to determine if turnover is lower for personnel that have been brought in at average or below average salaries as trainees, trained and/or developed, and promoted within the organization's internal career ladders--a "make" decision. In the "buy" decision, personnel are recruited at higher salaries from outside the organization, receive little training, and experience little or no career mobility. One might argue that by "making" computer professionals, the employees would then feel a sense of loyalty to the firm providing the training, and they may benefit from a higher salary through having increased their firm-specific skill level. As a result, one would expect turnover to decrease. The opposite argument would be that once an employee has undergone training, he/she becomes more attractive to competing firms, who then bid him/her away. This assumes, of course, that their training can be utilized by competing firms. In this case, an organization's decision to "make" personnel by providing training would actually cause turnover to increase. On the other hand, the "buy" decision, might be the most likely approach taken by an organization in a labor shortage situation. In particular, the Information Systems (IS) function, which has by necessity reacted to crisis situations by using the "quick and dirty" approach, would be expected to utilize the "buy" decision. Beside the expense associated with the "buy" response, there is the associated fact that once a computer professional is "bought", chances are he/she has no inhibition about being "bought" again; therefore, the propensity to change jobs is higher.

Piore and Doeringer (1971) warn that how a firm reacts to the external labor market (i.e., the "make" or "buy" decision) has various implications for

the industry. Reacting to labor shortages by increasing salaries (a "buy" situation) without accompanying adjustments in other instruments such as training (a "make" situation) may not relieve the labor scarcity, but will increase the inflationary salary spiral.

The development of structured career paths or career advancement opportunities is one aspect of the "make" decision which firms can adjust to provide an incentive for their computer professionals to remain with the firm, and thereby reduce turnover. The Haber and Goldfarb (1978) study using 1970 census Public Use Data noted that very few data processing occupations advanced along a structured career path. In fact, only ten percent of the programmers in 1965 had advanced to the systems analysts position by 1970. Lateral transfers were much more common than vertical promotions. If firms developed structured career paths and provided training to increase the skills necessary to move along a career path, employees could see stable career development, and a future in the organization. This would be one step toward eliminating the computer professional's attitude of being loyal to the profession, rather than to his/her company.

Firms might argue that by providing primarily firm-specific training, employees will not be able to sell these specific skills in the labor market, and therefore the turnover rate will not increase. Specific training only benefits the firm providing the training. An example of firm-specific training would be special purpose, company-specific, higher-level languages. In this case, it makes sense to invest in specific training, as there is a greater likelihood of reaping the rewards, and a lower chance of turnover (Becker, 1975). Providing general training that could be utilized by competitors (i.e., standard data base management systems) may be viewed as a bad investment, since it would render the employee more attractive to competitors; the result is an increased risk of turnover. However, since

turnover has reached epidemic proportions (in excess of 30 percent per annum), implying that over half the employees in the information systems area may not be with their current organization two years from now, the distinction between general and specific training becomes more important. The reason is that organizations will generally only have less than two years to tie a person to the firm with investments in specific training, and to obtain a return on those investments through employee retention.

We must now address another aspect of the "make" or "buy" decision: the establishment of structured internal career paths. While it is not always possible, firms should move in the direction of the "make" decision by bringing their IS personnel in at a limited number of "ports of entry" (i.e., data entry trainee, and programmer trainee), and then promoting workers from within through a structured internal career ladder including the appropriate training.

Once the "make decision is planned and began, it is well worth the company's efforts to build profit sharing and employee stock option plans for the mutual benefit of the employee and the firm. In order further to reduce turnover, large companies can permit flexible intra-organizational transfer policies. IBM has an extensive retraining and relocation program. (Business Week, November 10, 1975) For large firms, such policies will foster a Japanese-style paternalistic attitude toward employees, and presumably lower turnover. McLaughlin (1979) writes:

> "Again and again, shops that reported no problems struck some common chord. They hired from within other departments of their own firm to find employees whose allegance was to the company rather than to the DP profession. They found ways to challenge and to add interest to jobs."

Since the scarcity of IS personnel is not going to diminish in the short run, firms should adopt the long run "make" decision. Essential elements include:

-- emphasis on a structured internal career path;

-- concentration on firm-specific training;

-- promotion of internal transfers across functional areas;

-- avoidence of salary compression;

-- fostering of a secure working environment.

In addition offering flexible transfer policies, innovative profit sharing and stock option plans or even some "California creative" solutions (like the provision of hot tubs or tennis courts) can be valuable. Packaged correctly, all of the above can facilitate a successful "make" decision and reduce the largest IS productivity glich-turnover.

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