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Letters

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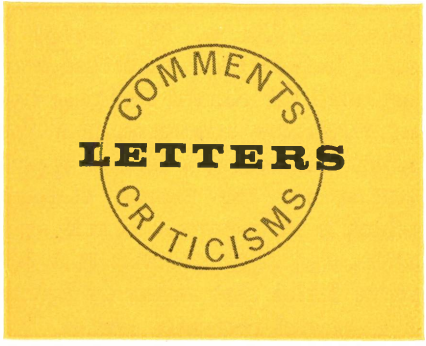

Still some confusion

I have read with interest the paper written by Mr. Charrin ["A Lease-or-Purchase Decision Model for the XYZ Corporation" by Jack R. Charrin, M/S September-October '69, p. 19] as well as the comments in the January-February [1970] issue [pp. 1-5]. In my opinion, there are still some misunderstanding and confusion in Mr. Charrin's analysis despite all the corrective remarks. The following comments are concerned with two points: treatment of the residual value of the purchased asset and cost analysis in conjunction with demands on working capital.

First, the salvage value of the asset, if purchased, after six years as stated in Table VI [September-October '69, p. 24] is $105,000, yet Mr. Charrin turns in the cost analysis (p. 26) to inform us that the residual value is estimated at $140,000. . . . [Either] Mr. Charrin did not record that the XYZ company expects [a] gain of $35,000 from the salvage sale or he did not remember precisely the salvage value of the asset according to his previous calculations.

In both cases, however, the larger problem lies in Mr. Charrin's assertion that the $140,000 is fully taxable at [a] 50 per cent rate (p. 5). This is incorrect; income taxes are collected on the *gain (above the book value) resulting from selling the asset rather than the sales value* as such. Thus, if the asset is sold at an estimated gain of $35,000, income taxes will be $17,500, and if it is sold at its book value ($105,000), there will be no income taxes. In the [ensuing paragraphs] I will take the more conservative [position of assuming that] 85 per cent of the asset's value [is depreciated] over six years and that [it will be sold at] book value.[1]

Second, the second paragraph on page 26, even after its correction, is oversimplified [and its calculations are] confused. The comparison between cost savings and the opportunity cost of earnings on working capital differences fails to recognize the fact that both the after-tax cumulative cash outflow (demand on working capital) and the after-tax cost of each of leasing and purchasing are only *two facets of the same thing.*

Indeed, it is impossible for leasing to score savings in total cash outflow (after taxes), and in the meantime it is found more expensive in terms of after-tax cost analysis. In other words, the total savings in cost (undiscounted) in this problem must be equivalent to the amount of cumulative savings in cash outflow (undiscounted). To prove this point, [I have worked out] two statements . . . comparing after-tax outflow requirements and after-tax cost for each of purchasing and leasing over the six-year period. These statements are shown in Tables I and II [page 3 of this issue].

Both Tables I and II show that the after-tax cash outflow equals the after-tax total cost in each of purchasing and leasing and that purchasing has net savings in both cost and working capital analysis estimated at $73,242 ($387,072—$313,830).[2] At this point, the validity of Mr. Charrin's argument, even after correction, needs to be overhauled with a deeper view.

One may observe that, despite the fact that purchasing has gross after-tax savings of $73,242, it does require much more cash outlay (or demand on working capital) in the first three years. And so, Mr. Charrin points out correctly, these temporary savings in working capi-

[1] This view is, indeed, supported by the fact that Mr. Charrin mentions in the article that the equipment is rather specialized, with limited market value.

[2] The reader may note that the $2 difference is due to approximating depreciation.

tal due to leasing should [be] applied to work [to] earn money by the corporation.

These earnings realized by leasing must be compared with the cost savings realized by purchasing in their respective years, and finally the net savings must be discounted for the present at [a] 5 per cent rate. Table III [on page 3 of this issue] shows the cumulative freed working capital, earnings realized on this capital, the cost savings due to purchasing, the net savings (earnings on freed working capital minus cost savings of purchasing), and finally the present value of these net savings.

It is noteworthy that Table III shows a present value of net savings in favor of purchasing estimated at $2,910. These savings, however, should not be the final and decisive factor in the decision. Indeed, other factors, such as the certainty of the salvage value and the availability of borrowed funds, should be considered. The more uncertain the estimated sale value of the asset the more favored leasing should be over purchasing, and vice versa.

As to the availability of borrowed funds, one should note that if the company is capable of obtaining the working capital freed by leasing—should it purchase the asset—from some other source, then the after-tax cost of obtaining these funds should replace the 5 per cent return earned on cumulative freed working capital. In other words, the essence of the analysis should be in terms of finding the *opportunity cost* of this freed working capital.

. . . I have found Mr. Charrin's article and [the] comments [on it] interesting and analytical. It has also provided me, and possibly many readers, with the opportunity to gain additional insight into one of the significant problems in managerial finance.

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Tax effect conceded

I found [Mr. Aly's] comments on tax effects in the sale of the asset true. Assuming [that] the sale is at residual or market value and that [the sale price] is more than the book value, taxes are due on the gain only.

I found [his] tables . . . essentially the same as mine with the sale of the asset added in Year Six. Following is a recomputed cost analysis which originally appeared on page 5 of the January-February [1970] issue of MANAGEMENT SERVICES. I have accounted for the tax effects for capital gain on sale over book value:

Sale at residual value	$140,000
Less capital gains tax on sale	17,500
Net	$122,500
Plus after-tax lease cost	37,072
	$159,572
Less after-tax purchase interest charges	49,000
Net after-tax cost difference of lease over purchase	$110,572

This final cost difference should then be compared to the cumulative lease gain of $100,103 (Col. 6, Table II Restated, January-February '70, p. 2), which indicates a $10,469 higher after-tax lease cost over purchase. This is on a non-discounted basis, i.e., on a simple dollar cost difference.

[Mr. Aly's] analysis took in the sale of [the] asset at book value and placed the figure in [his] Table I (cash outflow comparison). I chose not to do this in my analysis due to the uncertainty of this figure. I would suggest instead [looking] at the cost analysis separately [as in the table shown here] to gain perspective on cash outflow differences and cost differences separately. Both are important considerations, which should be examined individually.

[Mr. Aly's] Table III indicates a net saving favoring the purchase of $4,892 (before discount), which compares to my analysis of $10,469 favoring purchase. The difference is due to the use of book value instead of residual value.

Essentially, both approaches are similar (with the tax effects corrected in my cost analysis).

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Case study praised

I was impressed with the Ohio Instrument case study by John Heptonstall in the May-June, 1970, issue of MANAGEMENT SERVICES [p. 46].

Mr. Heptonstall's solution [M/S May-June '70, p. 55] offered a solid, technical approach that even espoused the current real-time terminal/display syndrome. But the solution indicated a lack of appreciation for the human element which is so important in real situations and often becomes that decisive factor that makes or breaks a successful computer system.

The systems-oriented solution, though technically sound, did not sell the installation to the working man. The stores personnel did not feel they participated in the preliminary study because the analyst was too concerned with machine applications to consider their criticism. The situation was aggravated still further at the meeting, when technical aspects and anticipated savings were stressed. The practical approach requires that better service be stressed along with the benefits to accrue to the stores people, such as less time-consuming record keeping that permits them additional time to exercise their expertise in ordering and substituting stock and to conduct more frequent physical stock checks. Without this practical approach, Mr. Heptonstall's next case might well involve stores personnel turnover or union negotiations.

The case study, so popular in higher education, was nevertheless an excellent presentation, and I

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TABLE I

A Comparative Analysis of Cash Outflow Required by Both Leasing and Purchasing Equipment Cost—$700,000

	Purchase		Leasing		Difference	
Year	Net Cash Out	Cumulative Cash Out	Net Cash Out	Cumulative Cash Out	Marginal	Cumulative
1	$191,915	$191,915	$ 64,512	$ 64,512	$127,403	$127,403
2	183,750	375,665	64,512	129,024	119,238	246,641
3	191,917	567,582	64,512	193,536	127,405	374,046
4	(49,584)	517,998	64,512	258,048	(114,096)	259,950
5	(49,584)	468,414	64,512	322,560	(114,096)	145,854
6	(49,584)	418,830	64,512	387,072	(114,096)	31,758
	(105,000)*	313,830			(105,000)	(73,242)
Total	$313,830	$313,830	$387,072	$387,072	$(73,242)	$(73,242)

*This figure represents the estimated sale of the asset after six years at its book value.

Source: Table VI, p. 24, and Table II, p. 21, September-October, 1969, after discarding the cumulative earnings and introducing the sale of the salvage asset after six years.

TABLE II

A Comparative Statement of After-Tax Cost of Both Purchasing and Leasing

	Purchase					Leasing			Difference	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(5-8)	
Year	Interest	Depreciation	Investment Credit	Tax Savings	Net After-Tax Cost	Rental	Tax Savings	After-Tax Cost	Marginal	Cumulative
1	$49,000	$ 99,167	$16,334	$ 74,084	$ 57,749	$129,024	$ 64,512	$ 64,512	$ (6,763)	$ (6,763)
2	32,667	99,167	16,333	65,917	49,584	129,024	64,512	64,512	(14,928)	(21,691)
3	16,333	99,167	—	57,750	57,750	129,024	64,512	64,512	(6,762)	(28,453)
4	—	99,167	—	49,584	49,583	129,024	64,512	64,512	(14,928)	(43,381)
5	—	99,167	—	49,584	49,583	129,024	64,512	64,512	(14,928)	(58,309)
6	—	99,167	—	49,584	49,583	129,024	64,512	64,512	(14,928)	(73,237)
Total	$98,000	$575,002	$32,667	$346,503	$313,832	$774,144	$387,072	$387,072	$(73,237)	$(73,237)

TABLE III

Lease-or-Purchase Comparative Analysis of Earnings and Cost Savings

Year	Cumulative FWC	5% Return on FWC	Cost Savings Due to Purchasing	Net Savings Due to Leasing	PV Factor at 5%	Present Value of Net Savings
1	$127,403	$ 6,370	$ 6,763	$ (393)	1.000	$ (393)
2	253,011	12,651	14,928	(2,277)	.952	(2,168)
3	393,067	19,653	6,762	12,891	.907	11,692
4	298,624	14,931	14,928	3	.864	3
5	199,459	9,973	14,928	(4,955)	.823	(4,078)
6	95,336	4,767	14,928	(10,161)	.784	(7,966)
Total	$ 95,336	$68,345	$73,237	$(4,892)		$(2,910)

Source: Table II Restated on p. 2, January-February, 1970, and Table II (above) of this issue. The reader may note that we assume that funds on freed working capital generate in the beginning of the year and that the $105,000 will be received by the end of the sixth year; thus we still have a deficit during the whole sixth year.

(From page 3)

would recommend that consideration be given to including a case study as a regular department in MANAGEMENT SERVICES.

Howard G. Binney
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The human element

I am very happy to know that Mr. Binney was impressed with my "Ohio Instrument" case study and particularly pleased that his interest was aroused to the point of writing [a letter]. But his criticism that the solution "indicated a lack of appreciation for the human element" is a very serious one and merits a reply.

One of the basic points in this case is that the analyst, Mr. Smulkowski, did indeed overlook the human element. The result was a computerized system that performed what the stores clerks were performing in theory—that is, what the operations manual said they were doing. But the clerks, being human beings, had found ways of improving upon the theoretical procedures and were doing more than the operating manual said they were doing. The analyst failed to recognize this fact and therefore produced a proposed system that Mr. Mancini, who knew nothing about computers but did know what his staff were actually doing, was easily able to shoot down. To this extent at least, the case is primarily *about* the human element, so Mr. Binney's comment that I "do not appreciate it" seems a little unjust.

The main thrust of my proposed solution is this: The fact that an operation has a "people content" does not mean that it cannot be converted to a computer, even though some of the people concerned are using their intelligence and making low-level decisions. We often find that what they are doing can be reduced to a set of decision rules, and, if so, [the decisions] can be computed. But the analyst who performs the feasibility analysis had better be aware of the "human element," or he will fail to discover that this decision making is taking place.

Mr. Binney's *specific* recommendations—about "selling the installation to the working man" and so on—are all part of the installation or implementation phase, which the published case did not deal with, so again his comment is less than fair. Certainly, nobody would disagree with the point he makes. Explaining the proposed system to the clerks and showing them how they will benefit makes sense, whether the motive for doing so is lofty idealism or practical management. Mr. Binney's other specific point, that by automating the record keeping function we free the clerks to do more interesting things and make better use of their expertise, is certainly included in my solution; indeed, the last three paragraphs are on this very point. But here I think there is also a basic disagreement between Mr. Binney and myself. His comments suggest that the computer should perform the purely routine work and that the clerks—unaided—should do the jobs that require the use of intelligence. My thesis is that the computer, in addition to performing the routine data processing, can extend the powers of a human being so that man and machine as a team can do things that neither could do independently.

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ROBERT M. SMITH
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