A Look at the Problems of the Front-End Operation in Supermarkets with the Automatic Checkout

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Last month our clothes dryer became a total loss and we replaced it with a new one with many more dials and settings than the old dryer. There was one problem--no operating instructions. After much trial and error I managed, with my daughters help, to master the operation of the dryer.

Are we in the retail food industry facing a similar problem with the introduction of the automatic checkout? The suppliers have developed a new concept in check-out with excellent programming support and the possibility of considerable savings in other areas of store operations. All segments of the retail food industry have cooperated in the development of the U-P-C code, and its introduction is ahead of schedule.

However, if I were the executive of a retail food chain responsible for the installation of the automatic checkout in my firm, it would be invaluable to have the "operating instructions". I would want to be able to incorporate the automatic checkout in a counter that would provide the most efficient use of the system. I would want shopping carts that complement the counter and the ACO. I would want to have the best information possible on the operation of the front end. Should there be a remote change station or should the cashier make change? Who unloads the cart? The customer or the checker? And finally, what is the proper crew size for each of these options?

My objective today is not to present results of ACO installations--that will be privileged information until testing is completed--but rather to present for your consideration some of the unresolved problems of the front-end operation with the ACO.

In 1925 my family purchased a Chrysler. Its hydraulic brakes and high compression engine were dramatic innovations in technology. Detroit has made changes in car design during the past 50 years, but typically they were building block changes--each year some improvement--but nothing as dramatic as the 2 changes in the '25 Chrysler. It is important that we do not follow the pattern of adaptation and gradual change so often practiced by Detroit.

An example of a giant, yet risky, step forward in technology in the food industry was the IBM move from the 1400 series computers to the 360. This created many problems in the food chains since all programs had to be revised--yet it greatly increased the value of the computer to the firm.

I believe it is important that such a leap forward be made with the automatic checkout--that we don't attempt to adapt the automatic checkout to present counter, carts and front-end operating methods, but rather that all equipment suppliers, industrial engineers, computer specialists and store operations executives cooperate to develop a new front-end operation that will optimize the efficiency of the total checkout operation. We must not have great expectations for the ACO and have them dissipated by lack of cooperation of all involved.

We have an example of such high expectations in the introduction of the ECR registers. Some of the reported savings were rather sensational. We compared the ECR with the Class V under controlled conditions in a 3-phase study. The same crews were first studied on the Class V, then on the ECR after 6 weeks 5 months experience with the new register the studies were adjusted for the same order size and frequency of occurances of key elements.

Table 1. Class V and ECR Compared

	(orders per hour) Class V	ECR	% Increase Over Class V
Cashier Along	12.9	13.9	8%
Cashier & Sacker	22.1	22.6	2%

The greatest savings were for the cashier working alone--8%. When a full-time sacker was added, the labor savings were only 2%. It is interesting to note where the ECR savings occurred.

Table 2. Where ECR Savings Occurred

	Cashier Alone Class V	ECR	Cashier & Sacker Class V	ECR
	(minutes/order)		(minutes/order)	
Ring-up	1.13	1.16	1.17	1.22
Make Change	.65	.51	.65	.53
Bag Order	1.66	1.53	.13	.15
Other	.51	.53	.42	.42
Total	3.95	3.73	2.37	2.32

1. There was no improvement in the ringup operation.

2. The most significant savings were in change making, half of which was due to a change in the check cashing procedure.

3. We have no explanation for the decreased time for bagging when the cashier worked alone.

The automatic checkout presents an opportunity to reduce the ring-up function and increase customer thru-put.

I have listed the most likely operating options but will confine my comments to the cashier making change.

Table 3. ACO Operating Options

Cashier make change
- Customer unload:
  - checker alone
  - checker & sacker
- Checker unload:
  - checker alone
  - checker & sacker
  - 2 checker-sackers

Remote change station
- Customer unload:
  - checker alone
  - checker & sacker
- Checker unload:
  - checker alone
  - checker & sacker
  - 2 checker-sackers

This in no way indicates I have ruled out a central change station because it would increase thru-put and may well be used during peak sales periods.

When the cashier makes change the critical decision is who unloads the shopping cart--the customer or the checker? This will have a significant impact on productivity and on counter design.

When the cashier works alone, customer unload is the most efficient method because she can combine scan and bag. I do visualize a problem of operator fatigue with the design of the counter for one of the ACO suppliers.

The checkers maximum reach, without bending her body, extends only to the slip off. She is literally forced to bag items in the sequence they are placed on the counter unless she bends forward to select the proper item for bagging, it will be difficult to:

1. Build a good base.
2. Have fragile items on top.
3. Have self filled bags--hence higher supply cost.

The other problem when the checker works alone is decreased thru-put--hence more equipment.

The addition of a sacker--with custimer unload--will increase thru-put and there could be a good crew balance. Thru-put is at 59 orders per hour for a 22 item order.

Table 5. Crew Balance for Cashier and Sacker

Element	Customer Unload (22 items per order) min./order	Delay for Customer Unload (estimated)
	- Cashier -	
Obtain cart	.04	.04
Ring-up	.33	.55
Make change	.51	.51
Other	.14	.14
Total	1.02	1.24
	- Sacker -	
Obtain bag (2)	.14	.14
Bag order	.59	.59
Bag to cart (2)	.12	.12
Delays & Misc.	.17	.39
Total	1.02	1.24
Thru-put in orders/hour	59	48

This all looks good on our projection, but there could be delays for customer unloading. This really is the key factor in productivity with the 2-man team. We noted this problem in the ECR studies--items were not always available on the counter for ring-up.

I know you all have been in a checkout line and observed some women (and men) unload the cart.

1. The cart is deep and low and many women are short.

2. They often have a purse in one hand, so only one hand is available for unloading or the purse is on the shoulder and keeps slipping down.

3. There is a baby or child to tend.

4. The customer attempts to group the multi-items priced units.

So you wait and so does the checker, and the customer rarely is able to observe the ring-up.

We selected 3 of the better checkers in the ECR study and plotted their average ring-up time.

Operator A would stop when items were not available for ring-up and push the items previously recorded to the rear of the counter.

Operator B would occasionally push items to the rear.

Operator C adjusted her speed to the availability of items on the belt. The key to this is Operator C since this reflects the time for customer unload on this type counter. A counter with a larger accumulation area on the belt might reduce the delay for customer unload.

Customer unload created a problem on the ECR where the items were manually recorded. It could create a bigger problem on the ACO where the recording is much faster.

A final point on customer unload. Consider the number of times she handles the items of her order.

1. Into the cart.
2. Onto the counter.
3. Load in car.
4. Out of the car and to the house.
5. Put away.

Perhaps we should place more emphasis on customer service. I believe the cart unloading is the area she would be most appreciative of more service.

I will only briefly explore the concept of checker unload. This poses a greater problem to the industry because of present counter and shopping cart design.

When the checker works alone I anticipate:

1. It will be possible to scan in the sequence required for good packing.

2. Minimum labor savings when compared to checker unload with the ECR because with checker unload on the ECR the checker often combines the ring-up with the unloading.

3. Increased fatigue for the checker.

4. Very low thru-put hence checker alone should only be used in slack periods--or equipment costs will be prohibitive.

When a sacker assists the checker I anticipate:

1. A fairly good crew balance--the unload and scan (plus change making) should balance the sackers time.

2. Increased fatigue for the checker.

3. The sackers time will control productivity. If the sackers time is longer than the checkers--what do we accomplish by speeding up the checker?

I would like to propose an alternative to the checker unload option--the use of 2 checker-sackers. Each checker-sacker would unload, scan and bag. This counter could be:

> Used with one or two operators depending on the level of business. Each checker-sacker removes items from the cart (preferably a shallow one), scans and places it in a bag. While one operator makes change the other operator places the filled bags in the cart and obtains empty bag for the next order.

What are the advantages of this counter?

1. Good crew balance

2. No delay for customer unload.

3. Can easily convert from one to a two-man operation.

4. No change in checker unload service where this is the normal procedure.

5. High utilization of equipment.

I have only briefly discussed the operating options relating to checker change making. A remote change station may well alter the entire picture.

I strongly urge that you who are involved in retail food research assist equipment suppliers and the food chains in providing the operating instruction that will provide optimum utilization of equipment and people with the automatic checkout. This can be accomplished by constructing cost models for each operati option. The model should recognize such factors as order size, produce weighing at checkout, check cashing, coupon handling. A cooperative effort by all of us will pave the way for increased productivity in the food industry.

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SATISFIED? CONSUMERS RATE THE FOOD INDUSTRY

by
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Are consumers satisfied with food products purchased for their households? To a surprisingly high degree, the answer is yes. In a nationwide survey, consumers generally expressed a very high level of satisfaction with food products and food stores. Furthermore, this high level of satisfaction was fairly evenly distributed across all regions of the country although there were significant differences between some demographic groups. When asked, "All in all, how satisfied are you with the food products you buy for your household?", two-thirds of the respondents said they were either always satisfied or almost always satisfied. And when asked, "On the whole, how satisfied are you with the food stores where you do most of your shopping?", 70% said they were always or almost always satisfied.

In view of much evidence of widespread consumer unrest, this finding is indeed surprising. But probing beneath this deceptively tranquil surface, several areas of frustration and dissatisfaction became apparent. Consumers evidently separate specific sources of dissatisfaction from their general attitudes or feelings toward food products and the food industry. Price, of course, is the most obvious source of dissatisfaction, but even here, there are significant differences in satisfaction across products. Consumers also were quite dissatisfied with the availability and reliability of product and shopping information. Further, there were significant differences in satisfaction across demographic groups.

To gain a more accurate reading of the level of consumer satisfaction with food products, stores, and marketing services, a national survey of persons primarily responsible for buying food for the household was completed in March 1974. Questionnaires were completed by 1,831 households, or 72% of the eligible number. Probability methods were used at each stage of sample selection. Interviewers had no choice in the selection of households for the survey. Since the respondent was the primary food purchaser for the household, 87% were female.

Satisfaction was recorded on a five-point scale ranging from: (A) always satisfied; (B) almost always satisfied; (C) sometimes satisfied; (D) rarely satisfied; to (E) never satisfied. Respondents were asked how satisfied they were with: the food products they buy, the food stores where they most often shop, various forms of product or shopping information, seven product groups, and with 31 individual food products including up to seven product attributes. This report presents only a brief