Short Shelf Life Products
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* The article was slightly modified to enable easy comprehension for readers who are not familiar with the Theory of Constraints.

When an industry is already operating in line with a TOC solution, do we still have anything of significance to offer?

Last week I made an audit visit to a relatively large company that manufactures flour and maize. This Company sells these ingredients in bulk to other manufacturers, in packages of half-a-kilo to 2.5 kilos to retailers, and its highest margin product is bread, produced in 8 large bakeries and representing about 30% of the total sales. Increasing sales of a significant, high-margin product has much more of an impact than increasing sales of a low-margin product. No wonder that when I first met them, 2 years ago, my inclination was to focus on the bread.

Since bread is a consumer goods product the relevant TOC solution is the Distribution Solution which is based on increasing the frequency of order and/or delivery. We are used to environments where frequencies of once a week or even once a month are common. From our experience in regular products, we have learned that a delivery frequency of once-a-day is enough to ensure no shortages; increasing the frequency to higher than once a day does not increase availability and/or sales. But bread is already delivered to each shop every morning.

Considering the current high frequency of bread delivery, do we still have anything of significance to offer? Before we give up and restrict our attention to the Company’s other products, the lower margin products that have conventional frequency of order and/or delivery, maybe we should continue to ask: Why is bread delivered once a day? It is because bread has a short shelf life.

What typifies a short-shelf-life product is that freshness is a major issue. From my days in the army, I remember that when we asked the cook, “Can we have fresh bread?” He would reply, “You want bread that was baked today? Come back tomorrow.” Yes, there is a big difference if the bread was baked today or yesterday. There is also a difference between warm bread that was baked half-an-hour ago and a loaf of bread that was baked 2 hours ago. But, is there a difference between loaves baked 2 hours ago or 8 hours ago? Not really. Therefore, it looks like unless the Company finds a way to offer bread directly from the oven, from the point of view of the consumer, delivery once-a-day is the right frequency.
Before we conclude that delivery once-a-day is optimal for our Company, let’s review the impact a short-shelf-life product has on the retailer. Suppose that whatever is not sold today cannot be sold tomorrow; surpluses turn into obsolescence. Or, suppose the less extreme scenario, that whatever is not sold today has a lesser chance of being sold tomorrow and keeping it on the shelves for an extra day causes a bad impression on the consumers.

The bread produced by this Company is sliced and wrapped in plastic; the product life is estimated to be 4 days. The expiration date is “by law” printed prominently on the plastic bag. Since the shelf life is more than a day and since customers are sensitive to expiration dates, the second, less extreme scenario is applicable to this Company’s situation.

Even though the retailer wants to have the product available, he must consider the impact that leftovers (products older than 1-day) have on the business. One can expect that when the daily demand is not precisely known, the retailer will tend to be on the conservative side and as a result, towards the end of the day, the product might not always be available in the shop. Therefore, moving from once-a-day to a higher frequency of delivery may result in an increase in sales.

How big of an increase?

Well, it is a function of the level of conservatism of the retailer. Being aware that one cannot be sure to enter a shop towards the end of the day and find a decent looking loaf of bread, I estimated that increasing the delivery to twice-per-day might result in a non-negligible increase in sales. Since I did expect shortages to be mainly in the afternoon and since most of the demand is in the morning, my highest hopes did not exceed a 30% increase, and I was not going to be overly surprised if the increase would be less than 10%.

But this change in frequency of delivery also has an effect on cost. The gross margin of these products is around 40 to 50% of sales and distribution costs are only a few (3-5) percent of sales. Therefore, as long as the increase in sales will be more than 10%, even if the Company has to double its distribution costs, it will still positively impact its net profit.*

* Bread is unique in the sense that the shops mandate that it must be available in the morning. As a result, the bakeries of the Company are strategically located all over this large country and all shipments are done within a few hours span. Most of the day, the transportation fleet is standing idle. It is likely that a second delivery a day will not require any increase to the fleet.

As for production, splitting the demand to two times a day has mainly positive effects.
So it all depends on how much sales will increase due to changing the mode of operation to two deliveries a day. If it is more than 10%, it is good. If it is close to 30%, it is very good.

If you run the numbers you should wonder why I claim that an increase in sales of close to 30% is very good. An increase of 30 percent on a product line that is only 30% of the business and when the materials cost is half of the selling price, increases the profit by only \(0.3 \times 0.3 \times 0.5 = 5\%\) of sales. This number is so far from what is needed to reach a quantum jump in performance that I should regard it as just a distraction.

A 30% increase is very good because the key sentence, in the above analysis, is: “One can expect that when the daily demand is not precisely known, the retailer will tend to be on the conservative side.” To realize that this sentence might hold the key for a quantum leap in performance one should examine the prime reasons for uncertainties in the daily demand.

When a particular type of bread is selling 50 loaves a day, one can expect that in a particular day sales might be 60 loaves or 40 loaves but, except for rare days, one will not expect sales of only 20 loaves. In other words, the reasonable variability in the daily demand for such a product is around 20%. But if we examine a product that is selling on average only 5 units per day, the reasonable expectation is that it might sell only 1 or 2 in a particular day. In other words, the variability is much higher; the smaller the number of items sold per day, the higher is the uncertainty in the forecast of the quantity that will be sold today. Therefore, we should expect that the retailer will be much more conservative when ordering the low-running items. Also, it stands to reason, that the less experience the retailer has with the product the higher will be his conservatism.

How does the above relate to our Company’s situation? Bread is one of the few products that we do have a lot of experience with. We all know that there is a huge difference in price between common bread and the more fancy breads – like croissants or raisin bread. We also know that even though the price of fancy bread might be three or four times higher than the price of a common bread, the ingredients are unlikely to be more than twice as expensive. The throughput of the more fancy breads dwarfs the throughput of the common bread (using these estimates, if the throughput of common bread is 50% of the selling price and is equal to 2 units of money the throughput of fancy bread is likely to be 8 units of money).

But the number of items sold of each of the fancy breads is much smaller than the number of items sold of the common bread. Moreover, when the Company offers new fancy bread to the shop, by definition the retailer has less experience with that product. Therefore, it must be that the conservatism of the retailer is severely dampening both the availability of fancy breads on its shelves and the introduction of new types.
If a second delivery in a day will result in an increase in sales as high as 30%, it means that the fact that the company delivers twice-a-day is a very effective way to deal with the conservatism of the retailer. It means that the doors, for a huge increase in sales of the more fancy breads, will be wide open. Considering the hefty throughput of those breads the Company will be able to further reduce the conservatism of the retailer by offering to take back – for full refund – the leftovers. One more fancy loaf sold compensates for two loaves taken back.

Let’s reasonably speculate on the potential impact by following the logical chain we have already constructed. If the increase in sales for the common bread will be 30% then we must conclude that the second delivery effectively removes the conservatism of the retailer. Since for the fancy breads the number of loaves sold per day is much smaller than the corresponding number for common bread, the current impact of the retailer’s conservatism on the sales of fancy bread is much higher than for the common bread. Therefore removing the conservatism factor will cause a much larger increase in sales for the fancy bread. We are talking about a sales increase of the fancy breads which is probably twice as high as the increase for the common bread. Add to it the new ease of introducing a whole spectrum of new fancy breads and the resulting increase is anybody’s guess. Now multiply this increase with the spectacularly better throughput of fancy bread. We are no longer talking about an increase in profit which is equal to 5% of current sales, but much higher percentages.

What was left to do was to check: To run an experiment with shops representing the different market segments; from supermarkets in big towns to mom-and-pop shops in rural areas. But since at that stage, the expected increase in profit from bread was based on a speculation, I did not neglect to deal also with the packaged mill products. Here we are standing on a more solid ground. We know that our distribution solution, moving from the current frequency of delivering once-a-week (and to many stores even once a month) to a frequency of once-a-day, will certainly increase sales while substantially reducing the inventory levels the retail is holding. This provides a solid ground upon which to build new relationships with the retailers, relationships that will enable expansion to many more stores. Increasing the Company’s sales per shop, while increasing the number of shops is, probably, enough to reach the Viable Vision (the desired quantum leap in performance).

Of course, since the existing infrastructure is based on supply to retailer orders, the switch to supply to actual sales to consumers requires major changes in many functions. Production is traditionally used to the mode of operation of produce-to-order, while augmenting the retailer orders with internal stock orders. This mentality, of striving for full activation of the mills’ capacity, must be replaced with the much more demanding mode of operation of produce-to-availability.
Distribution has to go through as big a change, the change from push-pull mode to the replenishment to actual consumption mode; replenishment – rather than pull – from the mills and replenishment – rather than push – to the stores. Not less important, distribution must put the proper systems to ensure that the target level of each SKU is constantly monitored.

The biggest change is, of course, in sales. It is not a triviality to switch from constantly pushing each store to buy more (especially toward the end of the month and more so toward the end of the quarter) into establishing “partnerships” according to the real needs of the store; striving to increase the return on inventory of the store by agreeing on the right inventory levels and then simply replenishing the actual consumption. In the little over a year since the project started, all the ground work has been successfully implemented. In the bakeries flexibility improved to the extent that the cycle to produce all types of breads has been reduced from 24 hours to about 8 hours while increasing the volume baked (that means that the lead time, from the first loaf exiting the oven until the truck, loaded with all the bread variety needed to service the stores, leaves the shipping dock, has been reduced from almost 24 hours to about 8 hours). This puts the bakeries in an excellent starting point to dramatically expand the number of different types of breads they can provide.

The mills demonstrated that the switch to producing to availability is not only possible, it was achieved while increasing the mill’s effective capacity. The computerized production systems, both in the bakeries and the mills, are not just functioning well, they are fully embraced by the production personnel (not a trivial achievement). All the distribution warehouses are replenished well; the system is humming. Inventory has been reduced, coupled with a substantial reduction in the number of shortages (a small paragraph that describes a big accomplishment).

But, most importantly, the test of the impact of more frequent deliveries on sales has been launched. The results of the test, conducted in fourteen representative shops, have been monitored for the last four months.

As expected, for the mill products (the small packages of flour and maize sold through retail), the sales to the shops went down initially since the excess inventories had to be flushed out. As was also expected, sales then started to pick up nicely and stabilized at a level that is significantly above the starting level of sales. What was less expected was that sales stabilized at a level that is 90% higher than the sales in the corresponding months of last year. This high level of sales was sustained for the last three months. Let me explain why this high increase is somewhat of a surprise. The replenishment solution impacts sales through two different channels.

One channel is the direct channel: proper replenishment almost eliminates shortages and less shortages translates directly to more sales. The second channel of impact –
which we have come to realize is as big as the first – is due to the fact that proper replenishment reduces dramatically the inventories of slow movers. As a result sales increase due to the fact that having fewer slow movers frees up more of the shelf space and also frees up the attention of the sales personnel, allowing more of both to the faster movers. The bigger the number of SKUs a shop is holding the bigger are the two effects. Since there are only 30 SKUs of mill products offered and a shop is holding on average less than 15 SKUs, this impressive 90% increase is more than I expected but it is still within the spread we see in other environments that have switched to the replenishment solution.

A demonstrated 90% increase in sales is ensuring that the replenishment offer will be very attractive to any shop and that distribution cost considerations (being so small relative to the additional throughput) will not stand in the way of a major expansion. If the same level of increased sales will be maintained when this better service is done on a grand scale – and I cannot see any real reason why it should not hold - the Viable Vision target can be achieved much before the target date which is still two and a half years in the future.

What about the bread? What are the results of this field test for the impact of increasing the bread delivery to twice-a-day?

My real delight and astonishment comes from the results recorded at the same shops for the bread. From day one, bread sales increased by... over 100% (the exact average for all 14 shops for the four-month test is 118%).

Delight and astonishment. Let me first expand on the “delight” part. Such an enormous increase clearly indicates that the second delivery a day had wiped out the retailer conservatism. The door is wide open for the really hefty-margin products: the fancy breads. If the numbers reported in the test are real it is clear that in the remaining two and a half years it will be a walk in the park to surpass the (once ambitious) Viable Vision target. But, we better restrain the desire to immediately spread to all the many thousands of shops before we know more precisely the cause and effects governing the sales increase. Now is the time to expand the test to about 100 shops, to introduce a variety of the fancy breads and to monitor which parameters impact the sales and Throughput increases.

Why am I “astonished” by an increase of 100% in bread sales; especially in light of the fact that I’ve already seen such (and higher) numbers in regular products (textile, for example)? Go over the explanation provided for my expectation that the maximum increase will be 30%. Do you find any logical mistake in that prediction? But the prediction was for maximum 30% increase, where did this over 100% increase in sales come from? In all previous cases, when the better replenishment led to an increase in sales, I assumed that the increase was at the expense of a reduction in sales of the competitors. But, in the bread case such an explanation cannot possibly be correct. Our Company is
big, it provides about 30% of the bread sold in the country. It is not present in all shops so it must be that in the shops it is present in, it represents about 50% of the bread sold by these shops. If the increase in sales was mainly at the expense of the competitors, it would mean that the competitors were, for all practical purposes, wiped out from those shops. But that did not happen, so it must be that the increase in sales came from another avenue.

In the morning our Company does not have a real advantage over its competitors, but that is not the case in the afternoon. Maybe the much better availability in the afternoon attracted customers of other shops? If that would be the case we should witness a drop in the Company sales in other nearby shops, shops that were still serviced only once a day. But that did not happen as well, not in any significant amount. So the only explanation I can come up with is that the customers of the test shops are buying more bread; they probably have doubled their bread purchases.

At first I found it difficult to accept such an explanation but after examining my own family’s behavior it started to become more plausible. At least in my home, when anyone in my family is having a choice between old bread and a new purchased loaf, almost always the choice will be to eat the new loaf, even if it means that the old one will eventually end up in the garbage can. Couple it with the fact that more and more people do their grocery shopping after working hours and it is no longer surprising that good availability of fresh bread in the afternoon can lead to such a major increase in purchases of bread.

Actually, after discussing it with several people I started to wonder why it had been so hard for me to accept that the increase in sales in the test shops comes mainly from an actual increase in purchases: from an actual increase in demand. Is it because I accept what I learned in economics as given? Accepting it without trying to check if it meets my life experience?

In economics I’ve learned that there is supply and demand, that prices are the result of the level of supply compared with the level of demand. I’ve learned (maybe the problem is in me and not in my teachers) that supply and demand are independent variables; that if a company increases its sales, it is at the expense of the sales of its competitors. That the cake is finite. That it is a zero-sum game. This certainly has an effect on how we currently analyze a company’s potential. When a company already has a 60% market share, we assume that once the company succeeds to build a decisive competitive edge the maximum increase in sales will be the remaining of the existing market, the other 40%. We always assumed that if the company wants a bigger increase the company will have to expand to new markets or provide new products in the same markets.

Can it be that we should think differently, that we should at least entertain the possibility that the offer that does give the company a decisive competitive edge,
simultaneously also increases the existing market? At least as far as consumer goods are concerned? Can I accept that better supply (of the same product and while maintaining or even increasing the price) is increasing, substantially, the demand? That supply and demand are variables that are strongly dependent? Hmm...
Dr. Eliyahu Goldratt (1947-2011)

Internationally recognized leader in the development of new business management philosophies and systems, Dr. Goldratt’s work is carried out by consultants and educators around the world, and utilized by many of the world’s largest corporations, including IBM, Procter & Gamble, AT&T, NV Philips, ABB and Boeing. Unconventional, stimulating, and “a slayer of sacred cows,” Dr. Goldratt exhorted his audience to examine and reassess their business practices with a fresh, new vision.

THE GOAL, his best-selling business textbook written in novel form, illustrates Dr. Goldratt’s Theory of Constraints (TOC), an overall framework for helping businesses determine: what to change — not everything is broken, what to change to — what are the simple, practical solutions, and how to cause the change — overcoming the inherent resistance to change. Dr. Goldratt wrote numerous books on related topics, including IT'S NOT LUCK and CRITICAL CHAIN. His book, THE CHOICE, rapidly became the #1 bestseller in Japan. Dr. Goldratt was a frequent contributor to scientific journals, magazines and business publications.

Dr. Goldratt was the Founder and Chairman of Goldratt Consulting, which continues to take the Theory of Constraints practices to new heights with VIABLE VISION, a platform to improve business productivity and profitability. Viable Vision provides the strategy and specific tactics that deliver unprecedented performance and bottom-line results in all aspects of a company’s operation.

Goldratt Consulting

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TOC has been implemented in nearly every function in companies from $25 million family operations to top Fortune 500, in product and project manufacturers, and companies with simple and complex distribution networks. TOC is taught in hundreds of colleges and universities, and much has been published on the subject.

Dr. Eli Goldratt founded Goldratt Consulting as part of The Goldratt Group. The company is headquartered in Israel and represented in every continent. Our leadership roster contains the most highly renowned TOC experts in the world.

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