



OPERATIONAL CASE STUDY May 2018 EXAM ANSWERS

Variant 2

The May 2018 exam can be viewed at

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SECTION 1 -Explanation of the tables

The tables show monthly contribution from the entire Mansako range for differing combinations of demand and supply.

The first table demonstrates the contribution gained from the different combinations. The numbers range from L\$10.8m contribution per month to L\$16.2m per month. If demand exceeds supply, we under-supply and are limited by the amount we supply. If supply exceeds demand, we over-supply and are limited by demand. The lowest contribution is when we sell just 12,000 units per month – this is achieved when we supply 12,000 units irrespective of the demand as we can only sell units that are available. The highest contribution is achieved when we sell (and supply) 18,000 units per month.

The second table demonstrates the holding cost of excess inventory when we over-supply; the more we over-supply, the higher the cost. These numbers range from zero when we under-supply to L\$1.2m per month when we over-supply 6,000 units in a month. These costs are zero when we under-supply.

The third table demonstrates the overall net gain after deducting the holding costs of excess inventory. The lowest gain of L\$9.6m per month is when we over-supply with demand at 12,000 units a month but we supply 18,000 units; whilst we gain L\$10.8m per month from selling 12,000 units, we have excess inventory holding costs from over-supply of L\$1.2m each month by having an extra 6,000 units available. The highest monthly net gain is L\$16.2m per month when we supply correctly 18,000 units.

The fourth table demonstrates the size of the regret when the wrong amount is supplied; this is the opportunity loss of making the wrong decision. This is zero when the correct amount is supplied.

Explanation of decision criteria

A maximax approach would lead us to the alternative that maximises the maximum pay-off. This is an optimistic approach – we would supply 18,000 units per month with a possible pay-off of L\$16.2m per month as this gives us the opportunity of earning the most should demand equal supply at 18,000 units.

A maximin approach would lead us to the alternative that maximises the minimum pay-off. This is a pessimistic approach which would lead us to supply 12,000 units per month with a worst-case position of L\$10.8m payoff per month as this gives the highest minimum result of all the options.

A minimax regret approach would lead us to the alternative that minimises the size of the regret when a wrong decision is made. If we want to avoid a bad decision, we would minimise the regret. Supplying 18,000 units per month would minimise the maximum regret at L\$1.2m per month.

Lean manufacturing

The Operations Director is keen to link recent Mansako sales with production schedules. This could be achieved through lean synchronisation which aims to produce products that the customer wants at the right quantity and in the right location, thereby eliminating waste. This is not the case currently at Mansako as there are items such as Edge products in high demand that are not in stock and other items such as Classic products which are not in demand and may still be in production.

It makes sense to use up to date sales data to shape production according to sales, essentially a demand led approach to managing production. This could affect the mix of what is produced, when it is produced and how much is produced. A lean approach would demand that we are flexible and so would manufacture large batches for popular lines such as the Edge range and small batches for more niche or older products such as the classic range. This would allow for a much quicker response to an upward trend in demand and reduce any lost sales.

Economies of scope are another feature of lean management. This could lead to lower unit costs for Mansako in the supply chain and the manufacturing process for more than one type of product through organising and combining production and movement of product lines more efficiently. This is unlike economies of scale where savings are made on one product.

There are several sources of waste here which would be reduced by a lean approach. Primarily, excess inventory would be reduced, saving on inventory costs by, for example, less Classic inventory. Over-production is reduced by better scheduling based on demand levels. We could thus have reduced our production of the Classic range if we had recognised that sales were not what we might have hoped and quickly shifted our production capability to the Edge range. Lean production would also reduce waiting time or delays, getting product into the stores much quicker. This could translate into increased sales if we are able to supply in time to meet current trends.

Quality circles

Quality circles involve a range of employees, drawn from all levels and parts of the organisation, who meet to discuss issues. These circles can be very useful as they motivate and develop staff through exposing the team to a wide range of problems. This involvement increases their commitment to the organisation and is likely to improve the team's understanding of all parts of the organisation resulting in better quality and better productivity. Furthermore, it fosters continuous improvement and broadens the perspective of the staff involved. There are also potential problems however including a lack of support or co-operation from management plus workers may also be unwilling to get involved. The circle will also be less effective if they are not well led and some members dominate the discussions. Overall usefulness is dependent then on a range of factors but will also depend on sufficient training and good communication.

SECTION 2 – Time-series analysis

Use of time series analysis

We would use time series analysis to help us use our sales history to predict future performance. This would allow us to establish the likely normal level of demand, without the promotion.

We would need to firstly establish any underlying long term trend that would continue into the future. We would need to use moving averages or regression to calculate this trend, which could be level, positive or negative. It is important to remove any unusual factors from the history such as previous advertising campaigns in order to establish an accurate trend. Based on the graph provided, it appears that recent history shows consistent growth in the underlying trend. We could use the centred moving average data provided by Gwen here to project the underlying base sales trend. This is likely to be based on several quarters. In this case, our promotion may just run for one month in the magazine so it would be sensible to observe the moving average over a shorter and more recent period.

We would add any seasonal variation to the trend, which could also be level, positive or negative. Based on the graph, there appears to be a strong seasonal pattern with quarter four consistently the highest quarter in each year followed by quarter two. This reflects higher sales of handbags at a certain time of year such as Christmas, also coinciding with the launch of new ranges twice a year. We should also calculate these seasonal variations and adjust the trend using an additive approach or a multiplicative approach. Seasonal variations are calculated as the difference between the trend and the actual time series.

We would also need to add any cyclical variations such as longer term economic cycles although this is less likely to affect a forecast over a very short time period. It can be important when there are significant changes in the wider economic environment. The total forecast is calculated by combining trend, seasonal variation and cyclical factors; we would project future sales based on the recent trend of underlying growth adjusted for the normal seasonality and with our estimate for the additional sales from the magazine campaign. Total sales may be achieved by multiplying (multiplicative approach) or adding (additive approach) the components. Difference between our predictions and actual sales will sometimes relate to random factors that cannot be predicted, such as issues in recent years when Mansako attempted to move the brand upmarket.

Usefulness of time series analysis

There are advantages to using time series. Our forecast would be based on a clear set of assumptions which can thus be tested. Over time this should improve our ability to forecast and in turn the accuracy of our forecasts. However, we would also need to consider whether the past was a good indicator to the future as we know that trends can change very quickly in this industry illustrated by the success of the Edge range. It may also be that our assumptions are a little too simplistic as seasonal variation, for example, are rarely constant.

Market research methods

The promotion targets the gift sector. This is a new approach and it may be more difficult to estimate the extra future demand from the magazine campaign solely from past promotions as these are unlikely to provide a good guide.

There are various ways to establish the sales potential of the gift market. We could use a market demand approach which looks at the size of the customer group, the length of time involved and also the market environment including factors such as economic growth or wage inflation to help understand how many additional gift items might be sold.

We could also survey a range of possible buyers to check their reactions to the campaign or get the opinion of an independent expert on the number of people that would react to the campaign. Alternatively, it may be possible to trial the campaign in a magazine that operates in a local area to see the impact on a test area initially before a decision is taken to launch in a national magazine.

As we do have access to a market research budget, we can consider options which include involving expert consultants to create and complete questionnaires or run focus groups to get an idea of how much extra volume will be generated.

It may be helpful to look at the current market statistics for the luxury or high ticket price gift market. We could then calculate our market share based on a number of assumptions. There may however be some value in using secondary research, already available and therefore quicker and cheaper to access. This may have details of the size of the gift market by sector but this may be too general or high level to be helpful in our case.

Marketing mix change

We could adjust the marketing mix through changes to the product (for example, packaging), the place (for example, coverage), a promotion (for example, direct mail) or the price (for example, discounts). One idea for a change in the mix which would support the advertising campaign would be to add a gift-wrapping service when an item is purchased for others – essentially changing the product element of the marketing mix.

This service would need to be available for items purchased in-store or through the website. This would complement the magazine campaign by delivering an in-store or on-line service which fits with the gift purchase message in the magazine. In addition, this could be an opportunity to charge for the gift wrapping service in excess of the direct costs thus increasing contribution. A gift wrapping service could be a great benefit to our customer, saving them the time and potentially resulting in a better wrapped item. This is particularly helpful if the item is sent directly to the recipient as there would otherwise be no opportunity to present the purchase as a wrapped gift.

SECTION 3 – Variances and cost control / management

Reasons for the variances and cost control / management

We can use the Distribution Centre Manager's notes to help understand where changes in the costs of activities have created our three variances. Many costs in the distribution centre will change in response to volume; higher when activity increases, for example higher sales, and lower when activity reduces. The three areas to review are storage equipment hire, staff picking cost and packaging cost.

Hiring of storage racks will affect receiving and storage cost centres and is required to increase capacity. The cost of this hire is determined by the number of racks required and the price (rate) paid per storage bay. We could set a standard for both of these in order to understand whether there is rate variance or a volume variance; the latter resulting from an increase in the need for storage. It does appear that the reason for the variance is that the storage requirement has increased as our inventory levels are high. This storage requirement is driven by the range of products and the numbers of bays per product. The number of bays per product is driven by the product size and the inventory days. The costs can thus be managed by adjusting some of these drivers such as reducing the amount of inventory cover held, thus reducing inventory days. The number of bays may also be reduced by ensuring that a particular product uses the minimal number of bays by combining for example part full storage bays. It may not be sensible to change some of the volume drivers, for example the bag size and range size as these have other consequences.

Staff cost in the picking cost centre is running above budget. The picking cost is determined by the time needed for each operation (pick), the hourly rate of staff and the volume of activity. It would be useful to have a standard for the time needed for each operation (pick) and the hourly rate of staff to establish whether the variance is due to changes in the hourly rate, the time per operation (pick) or the volume of activity. The time per pick is driven by the average distance between the storage hub and the packing hub. The reason for the variance may be that the picking effort has increased but it is not clear without comparing to standard (budgeted) times whether the variance is due to more volume (and therefore picks) or due to longer times per pick. The cost can be managed by reducing the average time per pick by reducing the average distance travelled, for example by storing the most popular lines closest to the packing hub. It may be that the popularity of the ranges changes regularly and we have to shift the layout to reflect this on an ongoing basis.

Packaging material cost is also running above budget. The cost of packaging material is determined by the average box size, the average box cost and the volume of boxes used. Analysis would be improved by the use of a standard for the average box size and the average box cost. We could then establish whether the variance was due to volume, the average box size used or the average box cost. The reason for the variance may be that staff have used larger boxes, and therefore also more tissue or the variance may be due to high box prices. The cost could be controlled by ensuring the correct, smallest box option is chosen which would lower the average cost of packaging, and may also lower the amount of time used. There does also appear to be scope to review the average cost of the packaging products themselves as the supplier has not been changed for many years – the current supplier may be competitive. The extent to which we could make savings in the short term will depend on packaging inventory; we will use our current packaging before changing to a more competitive supplier.

Use of the economic order quantity model

The Economic order quantity (EOQ) model is useful in principle because it can help us determine an order quantity that minimises the total of holding and ordering costs. As holding costs are assumed to be variable, the cost increases as the order size increases. Ordering costs however are deemed to be fixed per order and thus decrease per item as the order size grows. This produces a total cost pattern which has a minimum point

At Mansako, we would use EOQ to compare the variable costs of holding inventory against the fixed costs of ordering. Here at Mansako the ordering costs could be fixed, for example if ordering cost comprised the cost of transport for a container from our raw material supplier irrespective of the number of items in the container. This ordering cost would then reduce per item as volumes increase. It is possible also that Mansako has some variable costs in holding items, including for example additional temporary storage and along with financing and obsolescence which would rise as volumes rise. Many holding costs would however be fixed. EOQ would allow us to minimise the overall costs by optimising the amount we order and the re-order level.

In order to use EOQ we would also need to understand the lead-times for orders and also the pattern of volume discounts. These volume discounts do make a difference at Mansako but it is possible to build these into the calculation by checking whether orders over the discount threshold would change the decision. We would also need to establish any buffer inventory should demand exceed our estimates, thus allowing for error in our volume estimates.

Usefulness of EOQ model

There are issues that would limit the benefit of using EOQ here. The model assumes that demand is both known and constant which are unlikely to be true: we know from experience that demand can vary quickly and significantly such as seen recently with the Edge range. The model also assumes that we could operate without a buffer inventory. This would be risky as changes in demand would not be met without a delay. The model also ignores shortage costs which are considerable in our case as lost sales are a lost opportunity and will damage our reputation. Finally, it would be difficult to apply the model as we need to hold many different lines of inventory, each with different levels of demand.

Overall the model appears to be too simple to apply to the whole business but there may be scope to lower the order quantities in order to reduce the amount of inventory we hold given that this is a problem at Mansako. We could look at ways to reduce the ordering cost and ensure that we understand whether volume discounts are cost effective.

SECTION 4

Relevant cost of disposal routes

The cost of the product is not relevant to the decision as this is a sunk cost for all options. Our decision will be based on the worth of the best alternative use, the opportunity cost. There are three options for the excess inventory; brand clearance outlet, a price promotion in Mansako stores or dismantle and recycle parts of the product.

Brand Clearance

This option will deliver incremental income of the amount at which we sell to the brand clearance outlet and potentially future customers for the brand. There is an incremental cost however of distributing the products to the store chain and an opportunity cost of the lost income as regular sales may fall. Whether we sell above cost or not is not relevant as the cost of the product is sunk as noted above.

Price Promotion

This option would deliver additional income as we sell additional items in our stores, possibly more income than the brand clearance route. There may be some incremental costs associated with moving products from the distribution centre and promoting the offer. There is also potentially large opportunity cost of lost full price sales as customers decide not to buy a brand that is discounting or they may wait for the next promotion. There is also lost income from customers switching to lower priced items, the latter being the difference between the full price we could have received and the reduced selling price actually achieved.

Recycle

There are benefits in lower future purchases as we will re-use both materials and components and also there is no opportunity cost of lost sales. There is an incremental cost of dismantling these products thus this option may not be a significant net benefit but this could still be a better alternative if the opportunity costs of the other options are very high.

Decision on best option

The decision as to which route is best would be particularly sensitive to the impact on full price sales as a small reduction in sales would have a large impact on contribution. This is likely to be the most significant item and would drive opportunity costs. Similarly, the average selling price achieved on these older lines would be important as this is our income. The cost of the product is however sunk and not relevant.

Further information is needed to make a decision. It is important to prepare a robust evaluation of the predicted net cost or benefit of each option. In order to establish the best option we will need a robust estimate of the impact on demand. It would therefore be useful to research demand for both reduced items and full price sales in both the short term and the longer term. Alternatively, we could use sensitivity analysis to model the possible impact of differing levels of demand and also changes in future sales resulting from damage to the brand caused by discounting.

Inventory adjustments

IAS2 applies to inventory and requires that we hold inventory values at the lower of cost and net realisable value.

If we selected the brand clearance outlet, the Sales and Marketing Director believes that we would sell above cost price but this may be marginal and we would also have bear the cost of delivery to the outlet. Therefore, net realisable value (the estimated selling price less costs to complete and/or sell) is reduced by the cost of distribution which could push this value below cost. In this case, we would be obliged to make an adjustment to lower the carrying value of the inventory, even if it has not already been delivered but it has been agreed. This write down would correspondingly increase the cost of sales thus lowering profits. Cash flow is unaffected by the write down as there have been no cash transactions – this is just a journal entry adjusting valuations.

If we opted for the price reduction in store, we could expect to receive more income than the brand clearance option. This suggests that net realisable value, whilst lower than previously anticipated, would exceed the cost and no adjustment would be required. Cost is unchanged and includes the costs of (material) purchase and the costs of bringing the items to their present location and condition. This may comprise import duties, direct labour and production overheads.

If we decided the best option was to recycle the inventory, then the carrying value would be limited to the materials that could be re-used, inclusive of any conversion cost of dismantling incurred. As these materials were previously finished goods, the net realisable value of the re-usable portion is likely to be well below their previous cost which would create the need for a write-down. The write down would lower profits but as noted before, would not impact cash flow.