

CGMAX OPERATIONAL CASE STUDY
February 2020
Variant 4

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Section 1

Costing of the digital app

Difficulties of establishing a cost per app for the S-Pencil

The S-Pencil app is a digital product without physical form. There are significant indirect costs associated with developing the app (including FirstApps contractual development fee of G\$250,000), but once developed, the app can be reproduced without incurring additional direct production cost because there are no raw materials and negligible labour is involved. Each time we sell an S-Pencil (with the app included for free), we will incur a royalty fee, but this is the only direct cost that can be associated with the app.

To establish a cost per app we will need to firstly establish any direct costs, which in this case will simply be the royalty fee per app. We then need to establish how much of the indirect costs associated with the app, which include development and future support costs (see below), relates to a single app. To do this we will need to determine the total indirect cost associated with the app and divide this by the number of S-Pencils that we expect to sell over the app's lifetime. However, there are two main issues with this.

- Firstly, the indirect costs associated with the app can be spread over a number of periods and hence it can be difficult to establish up-front what these costs are. The cost associated with design and development is G\$250,000, but other costs such as testing and operating the app will be spread into the future. Given that this is the first time that we have operated an app, these will be especially difficult to estimate.
- Secondly, it is difficult to determine the lifespan of our app. If the S-Pencil is not successful or other products come onto the market which supersede it, then the app may have a short-life. On the other hand, it could operate for years. Alternatively, it might need to be redeveloped if different types of technology emerge in the future.

Types of cost still to be incurred

Infrastructure services: The infrastructure required for operating our app will include the platform and servers which support the hosting of the app, data storage and data delivery. In addition, our app will include the facility to make payments for additional content. The more complicated the platform and what we want the app to do, the higher the cost will be.

IT support services: Operating our app will require ongoing technical IT support services. Firstly, in the form of testing the app and dealing with any bugs that are present (which is what FirstApps is about to do). After launch, there will be on-going IT support required regarding the maintenance and monitoring of servers, data storage and image data.

Administrative services: Our app is designed so that users can purchase additional drawing and colouring tools. This content will need to be managed through an administrative dashboard, which will also manage functionality, app updates and user profiles.

Royalties: For every app that is actioned by S-Pencil users, FirstApps will charge a small royalty fee which as noted above will be a direct cost.

Time series information

The trend

The regression trend line represents the trend in the sales volumes for HB Graphite and HB Pexeco pencils over the past three years. The trend is the average position over time with seasonal variations smoothed out.

The first number in each equation represents the number of each type of pencil sold in the first quarter of 2017: 30 million HB Graphite pencils were sold and 5 million HB Pexeco pencils. The second part of each equation represents the trend in sales units since this starting point. For HB Graphite pencils that means that for each successive quarter the trend is for the volume sold to fall by 168,000: a fall because this is taken away from the starting position. For HB Pexeco pencils the other hand the trend is for the volume sold to increase by 210,000 in each successive quarter.

The trend lines show that based on the last three years of data, there is a downward trend in sales of Graphite pencils and an upward trend in the corresponding time periods for the Pexeco pencil. This is to be expected given that our Pexeco pencil carries out exactly the same function as our graphite pencil and that they are substitutes for each other. The fact that the decrease in volumes for Graphite is more than compensated for by the increase in volumes for Pexeco indicates that certainly for the HB pencil we are not losing market share in what is a relatively stable market.

Seasonality

The second part of the analysis looks at how seasonality affects the trend. For example, looking at HB Graphite pencils we can see that in the period April to June sales were on average 20% lower than the trend, but in the following month were 15% higher than the trend.

Both types of pencils have similar seasonality profiles. Many of our customers are organisations such as local authorities and large businesses which are likely to buy in bulk once or twice a year, quite often when budgets have been released: this could be affecting

seasonality. In addition, our large stationary retail customers cater to students and school children and therefore are likely to stock up before school and college years start.

Usefulness of this information for predicting S-Pencil sales volumes

The S-Pencil is a different type of product to our normal HB pencils because it is a stylus to be used on a screen rather than on paper. There are some similarities with the products in that the S-Pencil will feel like a Pexeco pencil and will have the same look and branding as our Graphite pencils.

However, the market for stylus type pencils is likely to be quite different to normal writing pencils in that a stylus will be a relatively expensive one-off purchase, whilst normal writing pencils are not. In addition, stylus pencils are a relatively new innovation compared to the normal writing pencil. There will also possibly be a greater seasonal affect for stylus type pencils, given that that this type of product would make a good gift at Christmas. Taking all of these factors into account, this time series analysis is not really that useful for forecasting S-Pencil sales volumes.

Section 2

Multi-product break-even

Line A

Line A shows the combinations of profit and revenue based on the original budget that will be generated if we sell our pencils in the order of their c/s margin. For the original budget this will be Pexeco, then artist coloured, followed by graphite and finally regular coloured. The line starts on the y axis at negative G\$6 million which represents the originally budgeted fixed costs for the month. The line ends at the total amount of revenue and profit as originally budgeted for the month: revenue of approximately G\$12.5 million and profit of approximately G\$2.2 million.

Based on the original budget the breakeven position based on the assumption of selling in the order of c/s ratio is approximately G\$8.8 million. The margin of safety is reasonably high as revenue would need to fall from around G\$12.5 million to the breakeven of G\$8.8 million before a loss was made. Line A also indicates that in our original budget sales revenue from graphite pencils equates to probably more than half of total revenue (because it's share of the line is probably longer than the other shares combined).

How the revised budget changes the analysis

Line B represents the combinations of revenue and profit based on the revised budget, selling our pencils in the following order: S-Pencil, Pexeco, artist coloured, graphite and regular coloured. The order hasn't changed from the original budget other than the addition of the S-Pencil, as the most profitable product, being sold first.

The c/s ratios have changed as a result of the revision to the budget (although the order of profitability hasn't). Compared to the original budget, the c/s margins of graphite and regular coloured have fallen, indicating that the selling prices for these pencil types have been reduced (given that variable costs have not been changed in the revised budget). The Pexeco and artist coloured c/s margins have increased, showing an increase in selling price. These

changes in c/s ratio are reflected in different slopes on the line. For example, graphite for line A has a steeper gradient than line B indicating that the c/s margin has fallen.

This has clearly had a knock-on effect on volumes and the mix of pencil sales. Revenue from graphite pencils appears to be a lesser proportion of sales than the original budget because this product's share of the line is smaller than Line A. This will be partly due to the price reduction but might also indicate lower volumes. Similarly, Pexeco's share of overall revenue has increased (because the length of its portion of the line is longer). This will be the result of the price rise but could also be due to increased volumes.

Line B also shows that fixed costs are approximately G\$6.8 million in the revised budget and that total budgeted revenue is greater than originally budgeted. The breakeven position for the revised budget has increased to nearly G\$10 million. This increase in breakeven position is because the level of fixed costs has increased: more contribution is needed to make a profit. The changes to the c/s margins will also affect the breakeven, although from the chart it is difficult to establish this effect. The margin of safety is now from approximately G\$13.8 million to G\$9.9 million (which is a slightly higher differential than the original budget indicating a slight increase in margin of safety).

Expenditure on new baking equipment

Initial measurement

The baking equipment will be recognised as a tangible non-current asset in accordance with IAS 16: Property, plant and equipment, because it is probable that future economic benefit will flow into our business and because the asset can be reliably measured. The amount that the asset is initially recorded at will be its purchase price (G\$160,000) plus any expenditure which is directly attributable to getting the asset ready for its intended use. The directly attributable costs are the costs of installation and testing of G\$5,000 because both of these are required to get the asset ready for its intended use. The G\$2,000 spent on additional ventilation will also be included in the cost of the asset because this expenditure is required to ensure that the site of the baking equipment is safe. Presumably the equipment cannot be used without this ventilation and therefore this expenditure is also directly attributable to getting the baking machinery ready for its intended use.

Depreciation

The asset will need to be depreciated from the date that the baking equipment is available for use (even if it isn't being used from that date) over its useful economic life. Where an asset has elements to it which have different useful economic lives, IAS 16 states that the initial carrying amount of the asset should be split into its separate elements and depreciated separately. In this instance the baking equipment itself has a useful economic life of 15 years, however the lining only has a useful life of three years (because it then needs to be replaced). Therefore, we need to establish how much of the total cost of the baking equipment relates to the lining and treat this as separate asset depreciated over three years. The remaining cost will be depreciated over 15 years.

Disposal of warehouse property

Impact on our tax charge

The sale of our warehouse property will give rise to a capital gain which will be chargeable to tax at the corporate tax rate of 30%. The amount of the capital gain will be the proceeds of sale (G\$600,000) less the property's original cost of G\$350,000 less the indexation allowance available for the period from the date of purchase of the property until the date of sale of 31 May 2020. This indexation allowance will be calculated as the indexation percentage relevant to the time period multiplied by G\$350,000.

Impact on our financial statements

In terms of accounting treatment, we will depreciate the property up until the date of disposal and calculate a profit on disposal of G\$600,000 less G\$140,000 (which is the property's carrying amount at the disposal date). The asset will be derecognised in the statement of financial position and the profit on disposal will be recognised in the statement of profit or loss. In addition, the statement of cash flow will show the G\$600,000 as proceeds from the sale of property, plant and equipment.

Section 3

Sales variances

Sales price variances

For large retailer customers there is no variance, which means that actual and budgeted sales prices were the same. Given that there are only three customers that have remained the same throughout the period, this is not surprising: prices will have been negotiated and agreed with these customers up front. There are however adverse variances for small retailers (which represents 100 customers at the end of the period) and for website customers, meaning that average selling prices for these groups were lower than we expected. The variance for website customers can be directly linked to the decision by Ben Thakar to authorise a special promotion during the period. The variance for small retailers will be due to the sales teams negotiating with new customers and offering discounts.

Sales mix variances

This variance is adverse for the large retailers and means that for our total sales, a lower proportion was to large retailers than we had expected. For both small retailer and website customers the opposite is true: the favourable variances mean that we sold proportionately more to these customers than expected. Overall the variance is favourable which means that we sold proportionately more to the customers with the higher profit margins (website and small retailer customers) and proportionately less to the customers with the lower profit margin (large retailers). There are two main reasons why the mix of sales to customers has changed. Firstly, there was a specific sales promotion targeted at website customers, which will have boosted sales volumes for this type of customer. Secondly, the sales teams have been more successful than we anticipated securing small retailer customers, although there has been no change in the number of large retail customers.

Sales quantity variances

This variance is best considered in total and indicates that gross profit is increased by G\$245,625 for the three-month period as a result of selling more S-Pencils in standard mix than we expected to. One reason for this is that we have increased the customer base for small retailers and the website as a result of the specific promotion and the sales teams' efforts as already explained above.

Overall impact

Overall, Ben's authorised price promotion and the activities of the sales teams will have increased actual profit for the three months compared to that budgeted. The reduction in profit from sales price discounts given is more than compensated for by both the increase in volumes sold and the change in the mix towards customers that generate a higher gross profit per pencil. This increase in sales volume, however, is not universal for all customer types: there is an adverse volume variance for large retailers (because the adverse mix variance is bigger than the favourable quantity variance) and indicates that sales volumes were lower to these customers. Given that there has been no change to the individual large retailer customers in the period, this reduction in volume is slightly concerning. It would be interesting to look at an analysis by customer to see if this relates to just one customer or all three.

Receivables management

Profile of the aged receivables report

There are two main changes to the profile of aged receivables. Firstly, whilst the number of large retailer customers has remained the same, the number of small retailer customers has increased considerably during the period. This is because the sales teams successfully secured new customers. Small retailers are often family owned, independent businesses and this means typically that they are more at risk of ceasing to trade than a large retailer business.

Secondly, the proportion of receivables that are overdue has increased considerably over the three-month period. New small retailer customers have been given extended credit terms, although this will not have affected the profile because aged receivables are reported by amounts overdue. However, it would appear that customers are taking longer to pay us which could indicate that our receivables management is not as efficient as it should be (especially as the three large retailer customers also have a greater proportion of the receivables overdue). It could also be that some of the new customers taken on are not as reliable as we would like them to be (perhaps stringent creditworthiness checks were not carried out in order to boost sales).

The potential implications of these changes in profile are:

- Our cash flow could be adversely affected because money from our customers is received later than it should. This increases our investment in working capital and reduces our cash balance.
- The risk for receivables being irrecoverable is increased. Ultimately this could have the effect of reducing profit if receivable balances end up being written off.

Two suggestions of how to manage the implication

We could factor our S-Pencil receivable balances. Factoring involves a factor advancing us say 75% of the value of invoices as they are raised which means that we would receive a significant proportion of the monies due to us earlier than normal: this would help in managing cash-flow. A factor would also take over responsibility for managing the receivables ledger and because they are experts in credit control this means that it is likely they would recover more of the monies owed to us. We could even take out a 'without recourse' arrangement which would mean that the factor has responsibility for irrecoverable debts: this would eliminate our risk to irrecoverable debts. However, factoring is expensive, and we would need to consider the cost of this against the benefits to cash flow and reduced risk.

Offering a prompt payment discount might encourage at least some of our customers to pay earlier than they would normally which means that cash comes into the business more quickly, however not all customers will take advantage of it. It might also mean that some customers end up paying before they run into difficulties and the debt becomes irrecoverable, although this is likely to apply in only a small number of cases. As with factoring we would need to consider the benefits to be gained against the cost of giving away the discount (which at a potential 1% or 2% of invoice value could amount to a significant amount).

Section 4

IT app administration supplier decision

How to make the decision and the decision under different risk attitudes

When making a decision such as this there are three approaches that we could adopt: risk neutral, risk seeking and risk averse.

If we have a risk neutral attitude to this decision, we could consider all possible outcomes and choose the provider that would give us the best expected value. We would ignore risk and the coefficient of variation and would choose Provider C which has the lowest expected value of the cost of supply at G\$1,624,000.

If we have a risk seeking attitude to this decision, we would choose the option which would give us the best outcome no matter how small the likelihood of it occurring. We would choose the provider which gives us the lowest overall cost, which is also Provider C (when there are 900,000 users). This provider has the highest coefficient of variation therefore is the riskiest option, which is consistent with it having the largest spread of outcomes: a risk seeking decision maker would ignore this.

If we have a risk averse attitude to this decision, we would choose the provider which given the same level of cost has the lowest level of risk. We would use the coefficient of variation and choose the option with the lowest measure because this represents the amount of risk for each G\$1 of additional cost that we would incur. We would therefore choose Provider A.

Limitations of the analysis

The decisions identified above are based on assumptions about the number of app users and probability of occurrence. These are all internal estimates based on information that we have available now. However, twelve months in the life of a new product is a relatively long time and therefore it's possible that these estimates are wrong.

There are also issues of using expected value and coefficient of variation approaches to make the decision. Expected value gives no indication of the range of possible outcomes, it is not the most likely result, but the long run average outcome if the same event was to be repeated over and over: therefore, it is of limited use when making a one-off decision. Coefficient of variation assumes a linear relationship between risk and return and that decision makers will be willing to risk more when the return is higher: this is not necessarily practical.

Finally, this analysis ignores other non-financial factors, such as the quality of the service that each provider will supply. We should consider issues such as reliability and the speed of dealing with queries. We might also want to consider credit terms offered as well.

KPIs

Number of user complaints: The IT app administration service provider will be managing the administration of the app that allows the S-Pencil to function. If app updates are not managed properly or the functionality of the app fails, the users of our S-Pencil will not be happy and complain. The level of complaints is therefore a good indicator of how well the provider is administering the app.

Percentage of user complaints dealt with within a target time: Where there are complaints it is important that they are dealt with quickly and efficiently. A target can be set about how quickly we expect queries to be dealt with and the provider's performance measured against this. The higher this percentage is greater our confidence that the provider is appropriately dealing with our customers.

Percentage of users that make in-app purchases: Part of the administration of the app will include promoting in-app purchases. Clearly the greater the number of in-app purchases the greater our revenue. We would want as many of our users to make in-app purchases as possible and therefore this measure would indicate how successful the provider was in achieving this.

What is beyond budgeting and how might we apply it

Currently we take a traditional approach to budgeting in that we set our standards on an annual basis and create the budget using a top-down approach from these standards. We report variations against budget in the form of variance reporting which means that our control system is very backward looking rather than forward looking.

Beyond budgeting is an approach to budgeting which seeks to address some of the limitations of traditional budgeting such as it being backward looking and rigid. Under such an approach, rolling forecasts on a monthly or quarterly basis, are used as an alternative to the annual budget. These rolling budgets will use the latest information each time (for example, latest prices for graphite, cedar and all other inputs as well as latest sales and production forecasts). This means that our budgets will be more up-to-date and should result in better resource allocation and allow us to adapt to changes more quickly. Also, the budgets are more forward looking.

Additionally, under a beyond budgeting approach, instead of just evaluating performance against budget targets (through variance reporting) the focus is on a wide range of performance measures or key performance indicators (KPIs), such as customer returns and production times. We already do this to a limited extent and using this approach would expand this throughout the business. We should look at external targets set by our competitors when setting these targets. For example, if our main competitor promised next day delivery then we should be setting similar targets.

Beyond budgeting also involves participation across the business. At the moment we take a central approach to budgeting where the annual budget is set by the directors and the Finance Department each year, with little input from the rest of the business. Under a beyond budgeting approach this would change as the people within the business with the detailed knowledge would be involved in creating the rolling budgets.