Cigar Box
Improvement System

GLOBAL
facts

MANUAL FOR USING THE CIGAR BOX®

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Chapter 4 CB 2 Portfolio Analysis

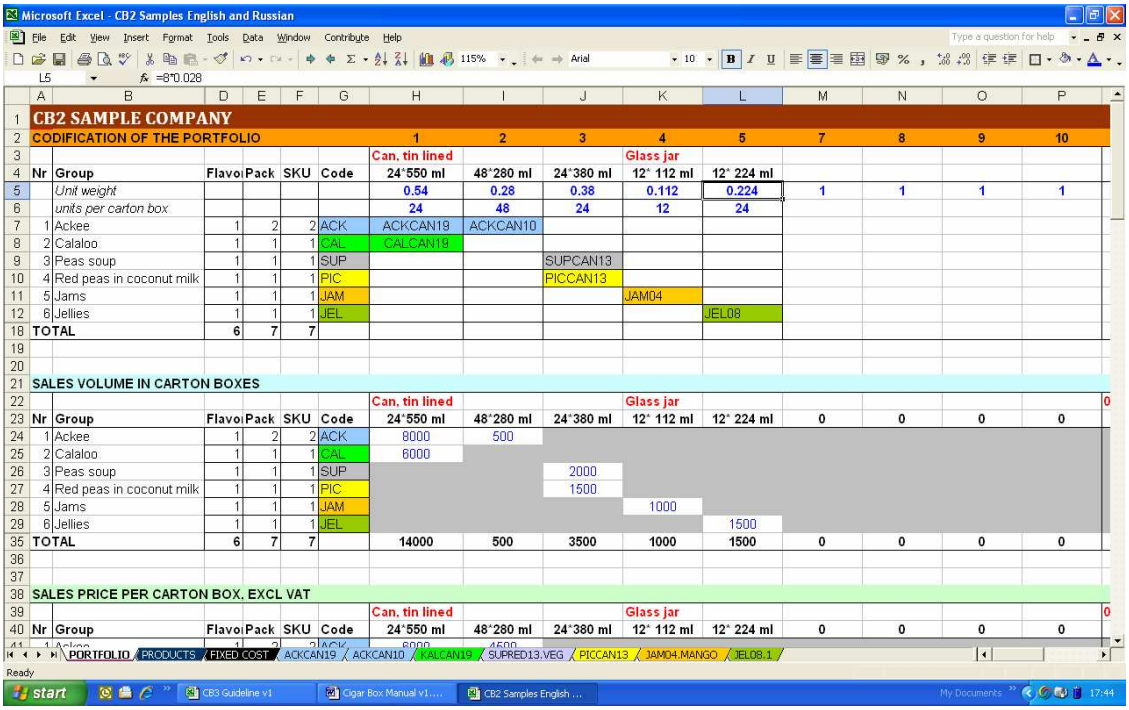
4.1 CB2 is a Planning Tool.

CB1 is an instrument of calculation; CB2 is a planning tool. It helps management to expand or shrink their portfolio of products. It contains multiple CB1 sheets: one sheet for each SKU.

CB2 provides information to conduct the following types of analysis at SKU level:

- Gross margins analysis: analyze risk of price fluctuations on the margins; margins must usually be over 30% in agro-processing industries.
- Contribution analysis: analyze which products are the most important ones for the company; usually the 80-20 rule (Pareto) applies.
- Sensitivity analysis: calculate the effect of changes in the essential cost parameters on the profitability of the enterprise (similar to gross margin analysis)
- Break-even analysis: calculate which volume must be produced (and sold!) to have sufficient contribution to pay for all fixed costs; is the volume where no profit and no loss is made.
- Profitability analysis: analyze if the portfolio brings sufficient profit to compensate owners risks.

Figure 3 - Screenshot of CB2 - Portfolio sheet



Cigar Box® 2 Portfolio Analysis can be applied to current or past operations, planning future operations and even for overall business planning for several years. It allows receiving sufficient information to take decisions in the following areas:

- Supply and stock management
- Sales and marketing
- Product portfolio adjustment
- Cash flow planning (CB2 Plus)
- Investment planning (CB4)

SHORT OVERVIEW OF THE STEPS TO IMPLEMENT

- **STEP 1: Determine all SKUs and codify the portfolio**
  - Identify all product categories
  - Define a code and color label for each product or product category
  - Identify all types of packaging used in each category
  - Define a code for each package type/volume
  - Make a coding system for SKU's
  - Codify all SKUs in provided table (one SKU=one Code)

- **STEP 2: Find and fill in all relevant data**
  - Fill in Fixed Costs sheet with relevant data
  - Create one CB1 sheet for each SKU
  - Label each CB1 sheet with appropriate SKU code and color
  - Fill in all necessary data for each SKU CB1

- **STEP 3: Data processing**
  - Calculate gross margin for each SKU (see CB1)
  - Estimate the annual sales volume for each SKU
  - Calculate the annual contribution
  - Rank SKU's according to importance in contribution
  - Distribute Fixed Costs among SKUs using one of available methods
  - Calculate Break Even points
  - Estimate profitability

- **STEP 4: Analyze data and make conclusions**
  - Gross margins analysis
  - Contribution analysis
  - Sensitivity analysis
  - Pareto analysis
  - Break-even analysis
  - Profitability analysis

4.2 Step 1: Determine all SKUs and Codify the Portfolio

Codification is a necessary step to systematize the work processes in the factory. Codification of all finished products (SKUs) should be done in a systematic manner using the following parameters:

- Product category
- Product

- Type of packaging
- Volume of packaging

SKU is abbreviation for a Stock Keeping Unit – individual product, with certain product and packaging characteristics, produced at the plant.

Example of SKUs at dairy and F&V processing plants:

Dairy plant

	Type of packaging		
Product	250 ml.	500 ml.	1000 ml.
Milk		+	+
Kefir	+	+	
Smetana		+	

Total number of SKUs is five (5).

F&V processing plant

	Type of packaging		
Product	1l. jar	2l. jar	200 kg. AB
Tomato paste	+	+	+
Apricot juice		+	
Strawberry jam	+	+	

Total number of SKUs is six (6)

Information about all SKUs should be provided in PORTFOLIO sheet of the Cigar Box 2:

- Identify all product categories and individual products
- Invent a code for each product category
- Identify all types of packaging used in each category (packaging material, cap type, volume, etc.)
- Invent a code for each package type/volume
- Make a coding system for SKU's (which is a combination of a product code and a packaging code, which makes it individual)
- Codify all SKUs in provided table (one SKU=one Code)

Figure 4 - Portfolio codification table of the CB2

CB2 SAMPLE COMPANY											
CODIFICATION OF THE PORTFOLIO						1	2	3	4	5	
						Can, tin lined			Glass jar		
Nr	Group	Flavo	Pack	SKU	Code	24*550 ml	48*280 ml	24*380 ml	12* 112 ml	12* 224 ml	
	Unit weight					0.54	0.28	0.38	0.112	0.224	
	units per carton box					24	48	24	12	24	
1	Ackee	1	2	2	ACK	ACKCAN19	ACKCAN10				
2	Calaloo	1	1	1	CAL	CALCAN19					
3	Peas soup	1	1	1	SUP			SUPCAN13			
4	Red peas in coconut milk	1	1	1	PIC			PICCAN13			
5	Jams	1	1	1	JAM				JAM04		
6	Jellies	1	1	1	JEL					JEL08	
TOTAL		6	7	7							

Remarks to the picture:

1. *Include all products, produced at the plant*
2. *Include all packaging used at the plant*
3. *Indicate weight of each unit (in kg.)*
4. *Indicate number of units per wholesale packaging (carton box, crate, shrink wrap, etc.)*
5. *Indicate number of flavors, types of packaging and SKUs per each product*
6. *Don't forget to give each group an individual color*

In addition to codifying the goods sold, all raw materials, ingredients, packaging items and chemicals, disposables etc. used the factory should be coded. A company may have well over 100 code items and a systematic approach is needed. This falls outside the scope of this Chapter.

4.3 Step 2: Find and Fill all Relevant Data

CB2 contains several forms, which has to be filled with relevant data to enable a thorough and efficient data analysis. As it has been mentioned above, the CB2 tool can be used both for current situation analysis and planning purposes. Based on it, either current of expected data should be filled into CB2.

Here is the list of forms/tables, which should be filled:

Form name	Location in CB2	Description	Reference
Sales volume	PORTFOLIO sheet	Actual sales in a certain time period or expected sales for each SKU should be filled.	-
Sales price	PORTFOLIO sheet	Actual or expected sales prices of each SKU should be filled	-
Fixed costs	FIXED COST sheet	All Fixed Costs – FC1, FC2, FC3 – should be calculated and filled	See Cigar Box 1
Cigar Box 1	Individual sheets for each SKU	All CB1 relevant information should be filled for each SKU	See Cigar Box 1

Figure 5 - Example of 'Sales volume' form

SALES VOLUME IN CARTON BOXES

						Can, tin lined		Glass jar		
Nr	Group	Flavo	Pack	SKU	Code	24*550 ml	48*280 ml	24*380 ml	12* 112 ml	12* 224 ml
1	Ackee	1	2	2	ACK	8000	500			
2	Calaloo	1	1	1	CAL	6000				
3	Peas soup	1	1	1	SUP			2000		
4	Red peas in coconut milk	1	1	1	PIC			1500		
5	Jams	1	1	1	JAM				1000	
6	Jellies	1	1	1	JEL					1500
TOTAL		6	7	7		14000	500	3500	1000	1500

Remarks to the picture:

1. *In order to ensure that only proper cells are filled, the Excel sheet is programmed in such a way that you have to fill only white cells (they become white as soon as you introduce a new SKU code in the portfolio codification table above)*
2. *Indicate sales volumes in wholesale units (if applicable) per each SKU*
3. *Wholesale unit = final wholesale packaging (which usually contains several individual units – tins, jars, etc.), such as carton boxes, several jars in shrink wrap, crates, etc.*

Figure 6 - Example of 'Sales price' form

SALES PRICE PER CARTON BOX, EXCL VAT

Nr	Group	Flavo	Pack	SKU	Code	Can, tin lined 24*550 ml	48*280 ml	Glass jar 24*380 ml	12* 112 ml	12* 224 ml
1	Ackee	1	2	2	ACK	6000	4500			
2	Calaloo	1	1	1	CAL	2000				
3	Peas soup	1	1	1	SUP			2500		
4	Red peas in coconut milk	1	1	1	PIC			2500		
5	Jams	1	1	1	JAM				900	
6	Jellies	1	1	1	JEL					2000

Remarks to the picture:

1. *In order to ensure that only proper cells are filled, the Excel sheet is programmed in such a way that you have to fill only white cells (they become white as soon as you introduce a new SKU code in the portfolio codification table above)*
2. *Indicate sales prices per each wholesale unit (if applicable)*
3. *Prices can be indicated either including or excluding VAT*

Fixed Costs and individual CB1 forms (for each SKU) should be filled following instructions provided in 'Cigar Box 1' section of the manual. It should just be mentioned that Fixed Costs are filled only one time – they are automatically distributed among all CB1 sheets.

Again, don't forget that only blue numbers are assumptions and can be changed. Black numbers are formulas and are calculated automatically. There is also one pink link, which is calculated based on contribution of each SKU in the company. It should also not be changed.

4.4 Step 3: Data Processing

In addition to the calculations in Cigar Box 1, some additional data for analysis is introduced:

1. Contribution
2. Contribution %
3. Fixed cost attribution %

1. Contribution

The contribution indicates how much money an SKU contributes to cover the fixed cost and the profit of the company. Contribution is the multiplication of gross margin by volume: GM * q. The general rule is that products sold in a large volume have lower margins, e.g. tomato paste. Products which are sold in small volumes fetch higher margins: consumer products like organic strawberry preserve.

2. Contribution %

The contribution % is the contribution of a single SKU as percentage of the Total Contribution of all SKU's. In most companies a Pareto Analysis shows that 80% of the contribution is generated by 20% of the SKU's. It is very important to decide if it is indeed economically viable to produce all SKU's or rather to specialize in the SKU's which contribute most.

3. Fixed cost attribution %

The Cigar Box uses the Contribution % to distribute the fixed costs over the SKU's in the portfolio. This is the principle of: *"the strongest shoulders must carry the heaviest weights".*

Figure 7 - Example of Final CB2 data table

CB2 SAMPLE COMPANY												
1	2	3	4	5	6	7	8	9	10	11	12	13
Nbr	Sheet	Sales in USD	Sales %	Margin per ton	Margin %	Volume BE	Volume	Vol. %	Contribution	Contrib %	FC attrib.	Profit
1	ACKCAN19	53,600	21.7%	244	37%	47	82	2.1%	19,980	29.9%	11,448	8,532
2	ACKCAN10	17,224	7.0%	469	51%	11	19	0.5%	8,860	13.3%	5,076	3,783
3	CALCAN19	50,933	20.6%	3	6%	688	1,200	31%	3,149	4.7%	1,804	1,345
4	SUPCAN13	38,400	15.6%	12	25%	458	800	21%	9,709	14.6%	5,563	4,146
5	PICCAN13	24,000	9.7%	30	62%	286	500	13%	14,947	22.4%	8,564	6,383
6	JAM04.MANGO	42,093	17.0%	6	12%	470	820	21%	4,939	7.4%	2,830	2,109
7	JEL08.1	20,640	8.4%	12	25%	246	430	11%	5,139	7.7%	2,944	2,195
		246,890	100%	**17.3**	**27.0%**	**2,206**	**3,851**	100%	**66,724**	100%	**38,230**	**28,493**
												11.5%

The major value of the CB2 is opportunity to collect data about all SKUs, produced and sold at enterprise in a single, simple, table. Final data table is located at PRODUCTS sheet of the CB2. It is combined here using links from individual SKU cigar boxes' cells.

4.5 Step 4: Analyze Data and Make Conclusions

CB2 provides sufficient information to conduct the following types of analysis:

- Gross margins analysis
- Contribution analysis
- Sensitivity analysis
- Pareto analysis
- Break-even analysis
- Profitability analysis

Cigar Box® 2 Portfolio Analysis can be applied to current or past operations, planning future operations and even for overall business planning for several years. It allows receiving sufficient information to take decisions in the following areas:

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- Cash flow planning
- Investment planning

4.6 Example

The CB2 Sample Company in *Figure* 7 above has six different products, each indicated with a separate color. The blue product (ACKEE) is sold in two sizes of packaging: CAN19 and CAN10. All other products are produced in just one type of packaging. Hence, 7 the SKUs in column 2. Each SKU has its own CB1 sheet. After filling the seven CB1 spreadsheets the table in *Figure* 7 is automatically generated. And the following can be concluded:

Total sales amount to $246,890 (column 3). The sold volume is 3,851 ton (column 8) with an average margin of $17.3 per ton (column 5) and this generates $66,724 in contribution (column 10). Because the fixed cost are only $38,230 (column 12) a profit (before tax) was made of $28,493 or 11.5% of sales. This nice end result hides large differences between SKU's.

ACKEE (a salty fruit popular in Jamaica) has enormous margins: $244 per ton for CAN19 and $469 per ton for CAN10 (column 5). The margins % are also comfortable: 37% and 51%. (column 6). The sales volumes on the other hand are very small (column 8). Ackee accounts for only 2.6% of the sales volume in ton (column 9). It is a typical high value-low volume product. The contribution of the two Ackee products is $28,840 (column 10) or 43.2% of the total portfolio (column 11). After deducting their attributed fixed costs (column 12) ackee generates $12,316 of profit (column 13).

CALALOO is a green vegetable (also grown in Jamaica). CALCAN19 is the largest SKU in volume with 1200 ton per year, or 31% of the total sales volume. The margin is only $3 per ton or 6%: a very risky business. And it only contributes $3,149 per year; less than 5% of the total. The question is: should such a large share of the production (31% of the volume produced) be dedicated to such a risky, low margin product?

As stated in the explanation of CB1, Cigar Box does not answer this question. It just signals what the situation is: 2 red lights; 2 orange lights and 3 green lights. It asks questions!

Note 1. This case is from a real factory in Jamaica. After questioning the owner, an interesting explanation came out: the ackee fruit is a capricious fruit. It is very labor intensive and relatively high skills are needed to process it. He works with mostly female workers from the neighborhood of the factory. But the moments of ackee harvesting (two harvests per year) are unpredictable and the available volumes are small. To complicate matters further, the ripe ackee must be processed within 24 hours otherwise a poisonous toxin will develop making the product useless. Processed ackee generates between $250 and $450 per ton, so he does not want to miss a ton! To mobilize sufficient manpower from the nearby villages takes too much time. Thus, during the season, the owner and his workforce must always be on standby waiting until ' the ackee comes'. He obviously cannot afford to keep his workforce being idle and therefore he lets them process calaloo manually, which is abundantly available. Calaloo cutting can be done 20 times faster (thus cheaper) using a mechanical cutter but he needs his workers to be on standby for the ackee. It is a symbiosis situation: calaloo helps ackee to make a profit.

Note 2. The low margin for mango jam was not expected by the owner. We analyzed his CB1 and compared his recipe and processing ratio with international benchmarks and it turned out that 1. more sugar was added than needed (too high Brix), 2. pectine dosage was wrong making it a jelly like, lower quality, lower priced product and 3. packaging cost were too high. After implementing these improvements, the margin was increased to $14 per ton or 25 and the profit increased from $2,109 to $5,276.