SJStudio

**Sample Only**

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Reference Guide

Revision 2

1. **How the calculation works**

SJStudio is a model that calculates net income and profit margin for each of three product categories of merchandise (prints, stationary, patterns) created and sold by Sarah Jane Studios. These two output streams are calculated from a number of inputs. The inputs fall into four categories: revenue, material expense, labor expense, and services expense.

The revenue inputs are sales forecasts and sales prices, one stream for each product category. The sales forecast input is intended to hold values that represent the hypothetical number of sales of each of the products. The named ranges for these inputs are:

* PrintsForecast
* StationaryForecast
* PatternsForecast

The sales price input is intended to hold values that represent the planned sales price for each product, including planned changes to the price during the timeframe of the model. The named ranges for these inputs are:

* PrintSalesPrice
* StationarySalesPrice
* PatternsSalesPrice

The material inputs describe the various material costs associated with the creation of the products and the operation of the business (ink, paper, patterns, shipping materials, and stationary purchases). The named ranges for these inputs are:

* InkCostPerSet
* Paper8x10CostPerBox
* Paper11x17CostPerBox
* PatternsCostPerItem
* ShippingMaterialsExpPerMonth
* Paper8x10BoxesPerMonth
* Paper11x17BoxesPerMonth
* StationaryExpPerMonth
* InkSetsPerMonth

The labor inputs describe the labor costs inccurred by Sarah Jane Studios. These include wages paid to the illustrator, printing and shipping assistants, marketing agent, and business manager. The named ranges for these inputs are:

* IllustratorExpPerMonth
* PrintingAsstExpPerPrintItem
* PrintingAsstExpPerStationaryItem
* ShippingAsstExpPerItem
* MarketingExpPerMonth
* BusMgrExpPerMonth

The services inputs show costs associated with the following services: Etsy, PayPal, shipping machine rental, internet, and advertising. The named ranges for these inputs are:

* EtsyExpPerItem
* PaypalExpPerItem
* ShippingMachineExpPerMonth
* InternetExpPerMonth
* AdvertisingExpPerMonth

Inputs whose values Sarah Jane Studios can control are designed as a stream of inputs so that the company can analyze any planned future changes to their business. Inputs whose values are beyond the control of the company are designed as single values (e.g., ink and paper costs, most service costs).

From these inputs, intermediate values are calculated for each of the three product categories and for overhead. Revenue for each product is calculated by multiplying the forecasted sales by the sales price for each month. For Prints, the formula is: =Inputs!PrintsForecast\*Inputs!PrintsSalesPrice.

Expenses are also calculated. Costs that can be attributed directly to a product category are included in the expense calculation for that product. Costs that cannot be attributed to a specific product are calculated as overhead. For each product category, expenses are subtotaled first by expense type (Materials, Labor, Services). Direct expenses will be discussed first, followed by an explanation of overhead calculations.

Print materials expenses include paper costs and materials overhead. Paper costs are calculated by multiplying the cost per box of paper by the number of boxes needed for each month. For 8x10 paper, the formula is: =Inputs!Paper8x10CostPerBox\*Inputs!Paper8x10BoxesPerMonth.

Print labor expenses include printing and shipping assistant costs and labor overhead. Assistant costs are calculated by multiplying the rate per sale by the number of forecasted sales. For the Printing Assistant, the formula is: =Inputs!PrintingAsstExpPerPrintItem\*Inputs!PrintsForecast.

Print services expenses include Etsy and PayPal expenses and services overhead. Etsy and PayPal costs are calculated by multiplying the rate by the amount of the transaction, which in this case equals revenue. The formula for Etsy expenses is: =Inputs!EtsyExpPerItem\*Prints!Revenue.

Stationary materials expenses include the cost of stationary (on which designs are printed) and materials overhead. Stationary costs are inputted directly on the Inputs worksheet.

Stationary labor expenses include printing and shipping assistant costs and labor overhead. Assistant costs are calculated by multiplying the rate per sale by the number of forecasted sales. For the Printing Assistant, the formula is: =Inputs!PrintingAsstExpPerStationaryItem\*Inputs!StationaryForecast.

Stationary services expenses include Etsy and PayPal expenses and services overhead. Etsy and PayPal costs are calculated by multiplying the rate by the amount of the transaction, which in this case equals revenue. The formula for Etsy expenses is: =Inputs!EtsyExpPerItem\*Stationary!Revenue.

Patterns materials expenses include pattern prints and materials overhead. Pattern prints costs are calculated by multiplying the cost per pattern print by the number of forecasted sales. For pattern prints, the formula is: =Inputs!PatternsForecast\*Inputs!PatternsCostPerItem.

Patterns labor expenses include shipping assistant costs and labor overhead. Shipping assistant costs are calculated by multiplying the rate per sale by the number of forecasted sales. For the Shipping Assistant, the formula is: =Inputs!ShippingAsstExpPerItem\*Inputs!PatternsForecast.

Patterns services expenses include Etsy and PayPal expenses and services overhead. Etsy and PayPal costs are calculated by multiplying the rate by the amount of the transaction, which in this case equals revenue. The formula for Etsy expenses is: =Inputs!EtsyExpPerItem\*Patterns!Revenue.

The named ranges from each product worksheet are:

* Prints!Revenue
* Prints!Expenses
* Prints!MaterialsExp
* Prints!LaborExp
* Prints!ServicesExp
* Stationary!Revenue
* Stationary!Expenses
* Stationary!MaterialsExp
* Stationary!LaborExp
* Stationary!ServicesExp
* Patterns!Revenue
* Patterns!Expenses
* Patterns!MaterialsExp
* Patterns!LaborExp
* Patterns!ServicesExp

Overhead is subtotaled by expense type (materials, labor, and services) and shared across all appropriate product categories as a function of their revenue. The percentage of revenue that a given product generates of the total revenue generated by all three products is multiplied by the total overhead expenses for each expense type to calculate how much overhead to attribute to each product category. The Prints services overhead formula is: =(Prints!Revenue/Outputs!TotalRevenue)\*Overhead!TotalServicesOverhead.

It should be noted that ink is a shared cost only between prints and stationary, not patterns. As such, the percentage of ink overhead that prints and stationary share is proportional to their revenue as a fraction of the total revenue between the two products, as opposed to all three products. The formula for materials overhead for prints is: =(Prints!Revenue/Outputs!TotalRevenue)\*Overhead!ShippingOverhead+(Prints!Revenue/(Prints!Revenue+Stationary!Revenue))\*Overhead!InkOverhead. The named ranges for the overhead outputs are:

* InkOverhead
* ShippingOverhead
* TotalLaborOverhead
* TotalServicesOverhead

From the intermediate calculations made on the product and overhead worksheets are calculated the outputs—net income and profit margin, along with a few additional outputs. Overall net income is calculated by subtracting the total expenses from the total revenue. Net income by product category is also calculated by subtracting the total expenses for each product category from the total revenue for each product category. Total expenses by expense type is also calculated by adding the appropriate expenses from each product category. Lastly, profit margin by product is calculated by dividing the net income for each category by the total revenue for that category. The formulat for Prints profit margin is: =IF((Prints!Revenue=0),0,(PrintsNetIncome/Prints!Revenue)). The IF statement protects against a division by zero. Also calculated for each of these monthly outputs are totals for the twelve month period. The named ranges for the outputs worksheet are:

* TotalExpenses
* TotalRevenue
* PrintsNetIncome
* StationaryNetIncome
* PatternsNetIncome
1. **How to locate inputs, outputs and intermediate results**

The inputs are all located on the worksheet titled “Inputs.” Inputs are grouped together on the worksheet. Inputs dealing with revenue (Sales Forecast and Sales Price) are at the top of the worksheet. The other inputs deal with expenses and are grouped by expense type: materials, labor, and services.

The outputs are all located on the worksheet titled “Outputs.” Total Net Income is found at the top of the worksheet. Profit Margin by Category is found at the bottom of the worksheet. In between are a number of supplemental outputs that may be of use to the user, including Expenses by Category, and Revenue, Expenses and Net Income by Product.

The intermediate results are located on the worksheet specific to their product category (“Prints”, “Stationary”, “Patterns”, or “Overhead”). The intermediate results for each product category are total revenue and total expenses (including totals by expense type) for the given product. The intermediate results for overhead include overhead totals by expense type and overall total overhead.

1. **Guide to visual cues and naming conventions**

The following visual cues are used in the SJStudio model. Cells with yellow background formatting are intended to be used as inputs—cells whose values will be modified by the user. Yellow cells should only exist on the Inputs worksheet. Cells with gray background formatting are intended to contain formulas—calculated values. Gray cells should not exist on the Inputs worksheet.

Named ranges follow the following naming conventions. All names use mixed case, and contain no characters other than numbers and letters. Names should be as descriptive as possible, as opposed to just representational, though not too long.

Abbreviations are as follows:

Bus – Business

Exp – Expense

Mgr – Manager

Asst – Assistant

1. **How to make changes**

This model is built to be easily expandable. There are many ways one may wish to expand this model. Probably the most likely is to add a new product category. To add a new product category to the model, take the following steps:

1. Add input streams and parameters
	1. Add an input stream for the Sales Forecast for the product
	2. Add an input stream for the Sales Price for the product
	3. Add any expenses directly related to the production and sale of the new product to their respective section (Materials, Labor, or Services)
2. Modify the Overhead worksheet
	1. Modify the Overhead worksheet to include any new shared costs or changes to shared costs.
3. Add a worksheet for intermediate results
	1. Add a new worksheet titled with the name of the product
	2. Calculate total forecasted revenue
	3. Calculate expenses by category, including all direct expenses as well as the appropriate share of overhead to be attributed to this product.
	4. Calculate total expenses and net income.
4. Modify the Output worksheet
	1. Change each formula on the Output worksheet that adds totals from the various product worksheets to include totals from the new product worksheet.
	2. Add rows to each output group that subtotals numbers by product to include the new product.
5. Modify other product worksheets to redistribute overhead costs
	1. For each expense type, modify the formula that calculates overhead expenses so that any partially shared overhead costs are accurately adjusted.

Another way to expand the model is to tie the materials streams to the sales forecasts using inventory modelling. This would require a deeper understanding of the business model and whether or not such a relationship between materials expenses and sales forecasts exists or is wanted by the business. Assuming it is desirable, the model could be expanded to calculate materials purchasing schedules and expenses based on foreacsted sales.

Similarly, the way labor is calculated could be adjusted to use a wages-per-hour methodology as opposed to wages-per-month. Further, hours could be calculated based on sales forecasts. Again, these changes would be based on interest by the company, as long as they represented the actual process of the business.