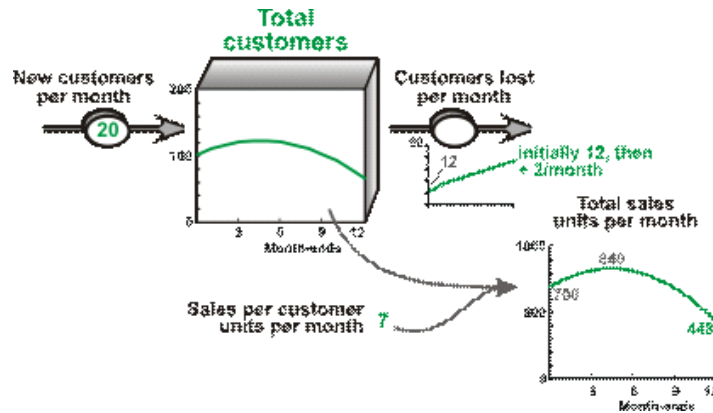


INSTRUCTIONS FOR USING THE SIMULATION MODELS SUPPORTING THE BOOK

Contents:

Requirements	2
Introduction to using mystrategy	2
Using exercises to learn from the model	7
Solutions to sample exercises	13

To help understand strategy dynamics principles, most chapters in Strategic Management Dynamics include simulation models that use the **mystrategy**^{®1} software. These are linked to specific examples and figures. The following instructions takes you through a small example - figure 3.6 from chapter 3 – which shows how a company’s customer numbers change if they are won and lost at differing rates. The model allows you to change those



items and see the effect on the pattern of customers and sales over 12-months.

A small simulation model allows you to experiment with the framework above. You can enter your own values for three items – new customers per month, customers lost per month, and sales per customer per month – and see how the resulting performance changes.

Note: This is a very small model – some others are much more extensive, illustrating the more complex issues to be found in many types of organization.

¹ 'mystrategy' is a registered trademark of Global Strategy Dynamics Ltd

REQUIREMENTS:

For each exercise that accompanies the book you will need some items in addition to the PDF instruction. If you are not familiar with the mystrategy software you are recommended to work through this document to provide a grounding in using it. For this you will need the following items:

The mystrategy™ software:

- Download the mystrategy software from www.strategydynamics.com/msi
- Install the software [this installs the 'reader' version]

The free 'reader' version allows models to be run and changed, but not saved. Changes can only be saved with the licensed version of the software. Free licenses are available for academic institutions, and students can obtain a low-cost license. See links on the SMD resources webpage for more information, or under the Help menu in the Reader.

The model:

- download the zip-file containing the model – Exercise3a.zip
- unzip the file and save the model, named 'customer_flows_and_sales.msfl' - We recommend that you create a folder in "My Documents" for your downloads.

The book [or at least the chapter relating to the model you are working with]

In general you will be working on an exercise that illustrates a key point in the book. We have chosen a simple one for this section which does not require you to have read the book.

INTRODUCTION TO USING MYSTRATEGY:

1. OPENING THE MODEL

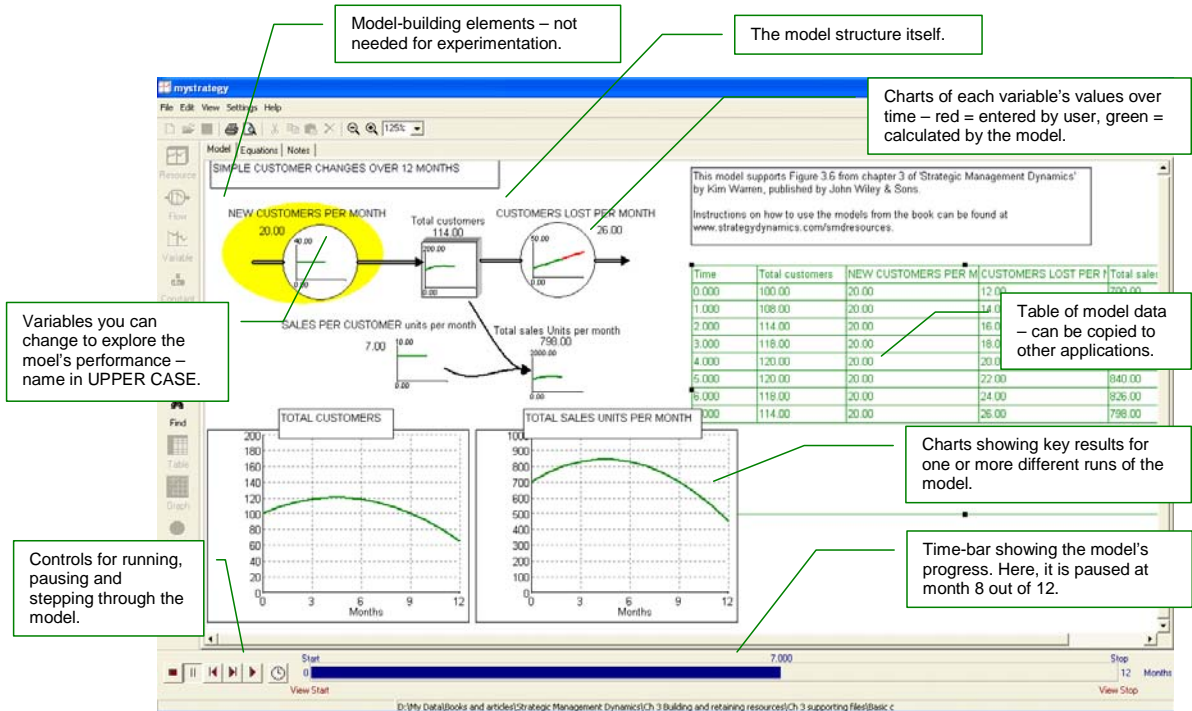
In mystrategy open the file - 'customer_flows_and_sales.msfl'. Note this is provided as Read Only format so if you have the full version of the software, you will need to save any changes with a new filename. This ensures you can return to the original version.

2. FINDING YOUR WAY AROUND

The picture opposite shows a screen-shot of the mystrategy model of the figure shown on page 1, and the elements needed to explore its behaviour. The model has been run for 8 months of its 12-month time-scale.

This limited model largely fits in a single screen. With some of the larger models, you may need to use the scroll-bars to move around. Note also:

- the zoom buttons on the top menu bar enlarge and shrink the diagram
- hitting the 'Home' key returns you to top-left of the model



The model structure at upper-left includes small time-charts showing how the values of each variable are changing over time. Red time-lines show values for the variable that have been entered manually. As the model runs, it calculates new time-lines displayed in green, which may or may not track the same path as the manual values.

The larger time-charts at lower-left display the values of selected variables on a larger scale, usually key performance outcomes [here, customer numbers and monthly sales value]. These charts add a new line each time the model is run, so you can compare the results of running the model with different values. See below for how to clear these charts.

The table at lower right displays the values of selected variables for each time period. See below for how to extract this data for other applications.

The run buttons at bottom-left are used to run, pause, and step forwards or backwards through the model's time-scale.

- ⇒ The right-most button '▶' runs the model from start to end without pausing.
- ⇒ '▶|' steps the model through one month at a time. First press of this button initialises the model's values at time-zero. Use the '|◀' button to step back one period - useful for studying exactly how numerical values are changing from period to period.
- ⇒ '||' pauses the model at any point during a continuous run, after which you can resume with the '▶' or '▶|' buttons once more.
- ⇒ '■' stops the model at any point. The large time-charts only store results for the current run if the model is stopped at the end.

Ignore the clock symbol, which changes the time-scale over which the model runs.

You can usually change the values of decision values [which are named in UPPER CASE] whenever the model is paused. This enables the model to be used as a 'game' by changing decision values as time passes.

3. CHANGING VARIABLES' VALUES

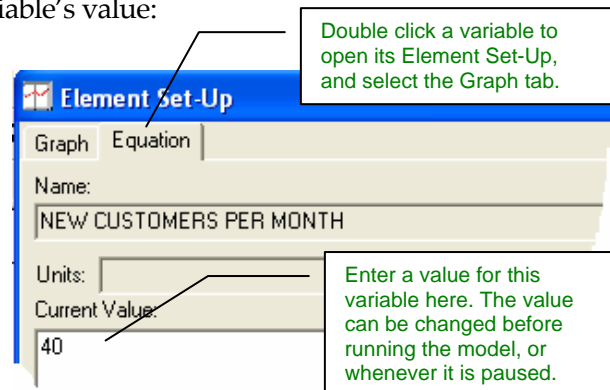
You are advised to change only the values of variables whose names appear in UPPER CASE. When you have done so, use the '▶' or '▶|' buttons to run the model with your chosen values.

- Double-click on the variable to open its 'Element Set-Up' window.

There are then three ways to change the variable's value:

Enter a single value. Adding a value before the model is started allows that value to be used over the entire time-scale of the model.

- Select the Equation tab in the Element Set-Up window and type a value in the 'Current Value' box.



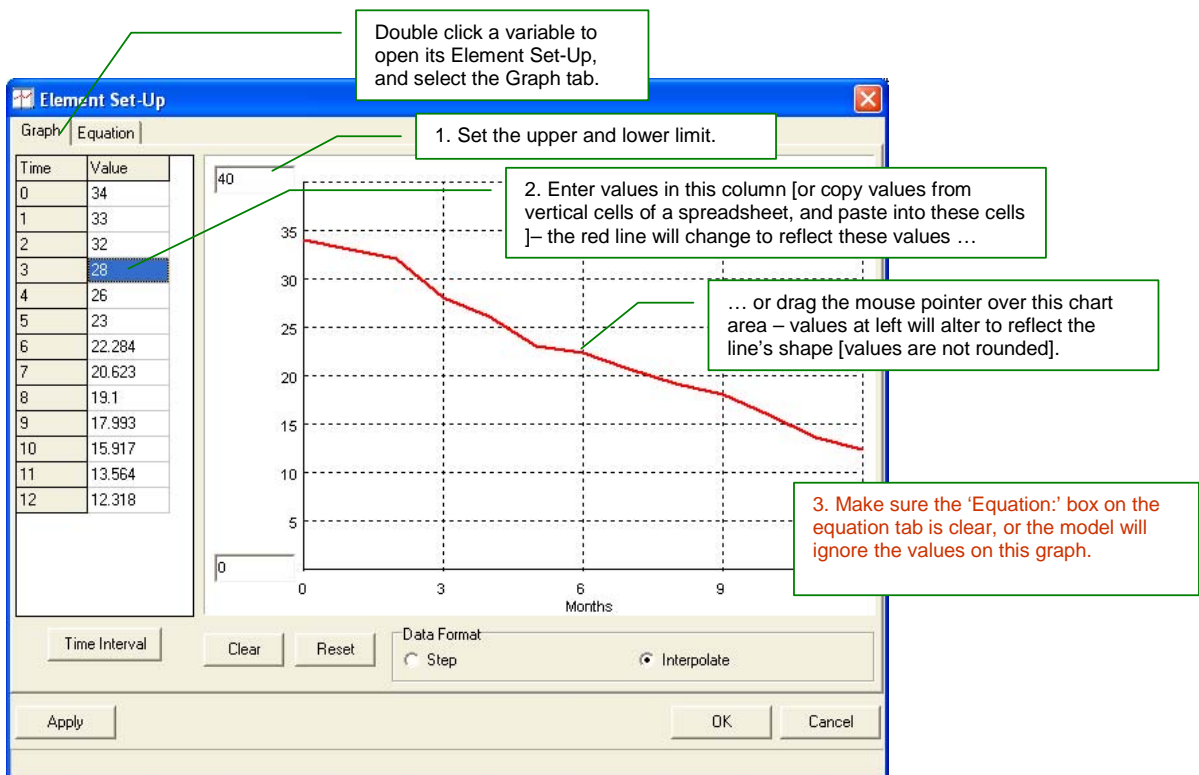
The value in this box can also be changed whenever the model is paused. You could start this model with a value of 20 for NEW

CUSTOMERS PER MONTH and step through to time=8 with the '▶|' button, by which time total customers will be falling. Then open NEW CUSTOMER PER MONTH and enter a higher value, say 30, to see if this is enough to sustain total customers until month 12.

Enter a simple equation. In this case typing in ' $20 + \text{TIME} * 5$ ' will give values starting at 20 and increasing by 5 each month. Typing in ' $\text{IF} (\text{TIME} < 7, 20, 40)$ ' will use a value of 20 up to time=6, then change the value to 40. These two forms of equation should be adequate for most exercises you may wish to carry out [see the **mystrategy** Help for further information on equations].

Sketch a time-series. Values can also be set for a variable for each period of the simulation.

Select the Graph tab at the top of the Element Set-Up window to open a time-chart for the variable's values. Follow the instructions in the following figure.



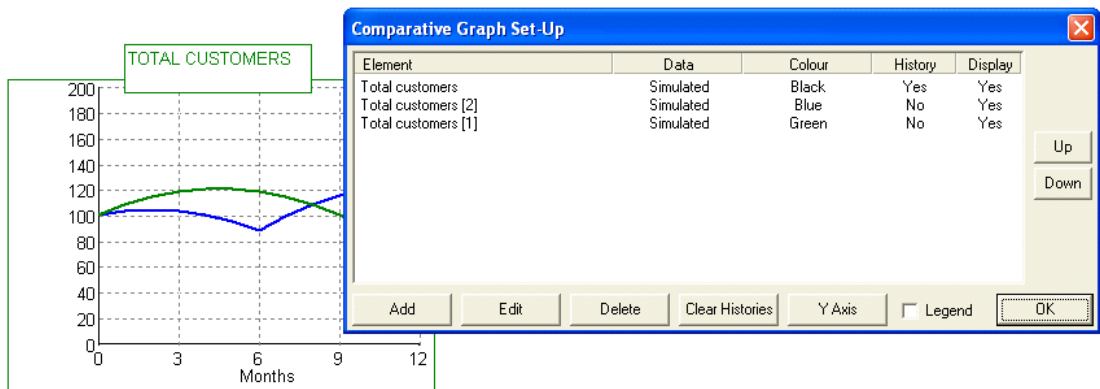
4. RESCALING AND CLEARING THE LARGE TIME-CHARTS

You can change the vertical scale of the large time-charts (lower left of the screen) when the model is either paused or stopped.

- Double-click the time-chart to open the Comparative Graph Set-Up window.
- Click the 'Y Axis' button and enter new values for Min and Max.

These charts may become cluttered with lines recording the results of several different runs of the model. To clear these lines:

- With the model stopped, double-click the time-chart you wish to clear to open the Comparative Graph Set-Up window.
- To delete a single run's result, select the desired element and hit Delete.
- To remove all previous results, select the top element and hit Clear Histories.



5. COPYING DATA FROM THE MODEL¹

You can copy data from the table:

- Run the model, and *do not* hit '■' to stop the model.
- Double-click the table to open the Results Table window
- Right-click anywhere in the table and click the Copy Grid command that appears.
- Switch to the other application and paste in the table data.

Time (Months)	Total customers	NEW CUSTOMERS PER	CUSTO
0.000	100.00	20.00	12.00
1.000	108.00	20.00	14.00
2.000	114.00	20.00	16.00
3.000	118.00	20.00	18.00
4.000	120.00	20.00	20.00
5.000	120.00	20.00	22.00
6.000	118.00	20.00	24.00
7.000	114.00	20.00	26.00

¹NOTE: these models report values at instants in time, so time 0 is the start of the first period, and time 1 is the end of the first period. See 'Strategic Management Dynamics', Chapter 2 for a full explanation of this issue.

With the full version of **mystrategy** only, screen images can be copied, e.g. parts of the diagram, or the large time-charts.

- Run the model, and *do not* use the stop button.
- Select the items to copy.
- Right click on any of the selected objects and choose Copy Image
- Switch to the other application and paste in the image. [If an option is offered such as Edit, Paste Special, Metafile, the pasted image will be editable, e.g. to remove unwanted elements, change fonts and line styles, etc.]

USING EXERCISES TO LEARN FROM THE MODEL

The easiest way to illustrate the types of exercise provided to develop your understanding is to use a real example. This is from Chapter 3 and is a typical example showing objective, variables to change and suggested exercises..

Learning objective

- specifically, to understand how gains and losses of customers work together to affect how a company's customer base changes over time under different circumstances.
- more generally, to understand how the quantity of a resource rises or falls over time as in-flows and out-flows change

Management has no direct control on the number of customers because decisions and actions, such as marketing or price can only affect the win- and loss-rates. It is not intuitively obvious what effect a change in one or both of these rates will have on the development of customer numbers over time.

Decision variables to change

The main items to change are:

NEW CUSTOMERS PER MONTH
CUSTOMERS LOST PER MONTH

Additionally, you can explore scenarios in which a third item varies:

SALES PER CUSTOMER

A first exercise.

The company starts with 100 customers, wins 20 new customers per month, and loses 10 per month, with average sales of 7 units per customer per month. In month 4, it raises prices with the result that only 12 new customers are won and 15 are lost each month, and average sales fall to 6 units per customer per month. How many customers will the company have by month 12, and by how much will total sales per month be higher or lower than at the start?

1. First, sketch on a piece of paper the two main time-charts for total customers and total sales, and try to draw on those charts the path of these values over the 12 months. Be sure to write the scale on the vertical axis of each, so the line you draw quantifies your estimates.
2. Next, try calculating the values from month to month, and draw the results on the same piece of paper. How close were your 'guessed' lines to the actual result?
3. Finally, run the model with the values explained in the short scenario above:
 - ⇒ Enter the values for each of the three variables that will apply up to month 4
 - ⇒ Hit '▶|' to step the model through to month 4 [you will actually need to click the button five times, since the first one only initialises the model]
 - ⇒ Without stopping the model, change the value of each variable to the number that will apply for the last 8 months.
 - ⇒ Hit '▶'|' or '▶|'|' to run or step the model through to month 12

Did you estimate and calculate the path of these lines correctly?

FURTHER EXERCISES

Here are some more exercises to try. As with the first example, try sketching on paper what you expect to happen, then try working out the results numerically, and finally run the model to see how well you did with your estimates and calculations.

Turn round falling customers and sales.

Starting with 100 customers, the company is at first losing 5 customers per month, and winning none. Customers buy an average of 5 units per month. In month 4, it starts a new marketing effort, which wins 12 new customers each month, although it continues to lose 5 each month. The marketing effort also increases the average sales to each customer to 8 units per month. What will be the company's lowest rate of monthly sales? How many

customers will the company have by month 12, and what will be its sales rate?

A new competitor takes customers and sales.

Starting with 100 customers, the company starts well, winning 10 new customers per month, with average sales of 10 units each. In month 6, a competitor with a new product immediately takes 20 customers, stops us winning customers at all, and continues to take 5 each month. They also cut our average sales to 8 units per customer per month. When will sales fall to the same rate as month-0? What will be the number of customers and total monthly sales by month-12?

Increasing success with a new product.

Starting with 100 customers, the company is losing 15 per month and winning 4, with average sales of 5 units per customer per month. However, it has just introduced a new product, so each month wins 2 more customers than it did in the previous month [though it continues to lose 15 per month]. Also, the new product is raising the average monthly sales per customer by 1 unit per month, each month. How do the company’s customer base and its sales rate develop over the 12 months? What is the lowest number of customers during the year, and the number at the end of the year? What is the final sales rate in month-12?

The decision values for these exercises are summarised in this table:

Description	1. Turn round falling customers and sales		2. A new competitor takes customers and sales		3. Increasing success with a new product
initial customers	100		100		100
time-periods	Month 0 to 4	Month 4 to 12	Month 0 to 6	Month 6 to 12	Month 0 to 12
new customers per month	0	12	10	0	4, plus 2 each month
customers lost per month	5	5	0	20 in month-6, then 5	15
sales per customer	5	8	10	8	5, plus 1 each month

AIMING TO ACHIEVE SPECIFIED OBJECTIVES

It is also instructive with these models to work out what is needed to hit certain objectives. For example:

- In exercise 1, what would the company have to do from month 4 in order to end the year with 150 customers and sales of 1500 units per month, assuming it continues losing 5 customers each month?
- In exercise 2, what target would its sales force have to hit for new customers each month, after losing 20 in month 6 and continuing to lose 5 per month, in order to get back to the same number of customers it had in month 6
- In exercise 3, a competitor responds by launching a new product in month 4. What is the maximum rate of customer loss the company can tolerate if it is to hit a year-end sales rate of 1000 units per month, assuming its win-rate and average sales rate increase as before?

You can look up the solutions to the three exercises above, and to these additional challenges, on the screen-shots given at the end of this document.

DEVELOP YOUR OWN EXERCISES.

You can make up further exercises of your own by completing the following table. It is important to pose a question to be answered, in order to test your ability to anticipate the answer correctly.

Description		
initial customers		
first and second periods	Month 0 to __	Month __ to 12
new customers per month		
customers lost per month		
sales per customer		
Add a question:		

Exercise 1 above is an example where the customer win- and loss-rates remain constant over long periods of time. As examples 2 and 3 show, you can also try other patterns, such as:

- a 'pulse' of customer gains or losses in a particular month
- a continually rising or falling win-rate for customers, or changing average rate of sales

Note for instructors. It is useful learning to make up exercises of these kinds for class participants. However, be sure to work out the answer for yourself first before setting them as challenges for others!

DEBRIEF

Each exercise will usually include a summary of what you should have learned by carrying out the suggested activities. In the case of the exercise on customer flows and sales, you should have learned that:

- customers 'accumulate' over time, with the customer-base filling up as customers are won, and draining away as they are lost, rather like water in a bath-tub. Other resources, such as capacity, staff and cash, behave in the same way.
- you have no direct control of customer numbers, only on the rates at which they are won or lost. In practice, even this control is only indirect, through decisions regarding marketing, price etc
- it is not intuitively easy to estimate what will happen to resource levels (here the customer base) when in- and out-flows vary. Nor is it easy to work out how much has to be done to hit target performance outcomes when there is not a simple linear relationship back to the items you actually control

RELATED ITEMS

Exercises may relate to others referred to in the book, whether simpler exercises on which they build, more complex models that take the principles further, or exercises that illustrate similar principles but in other settings. This exercise on customer flows and sales is intentionally simplistic, in order to clarify important underlying mechanisms. Other items build on and extend this simple exercise. See for example:

- Demonstration: factors affecting gains and losses of airline passengers – chapter 4, figures 4.1 to 4.6.
- Game: how advertising and word-of-mouth win potential customers [the ‘Bass diffusion model’] – chapter 4, figure 4.10
- Game: the customer choice pipeline, in which potential customers are first made aware, then interested in a product, before becoming active purchasers and ultimately loyal – chapter 6, figure 6.7.

Other resources, such as staff, capacity or cash, also accumulate in the same way as customers. See for example:

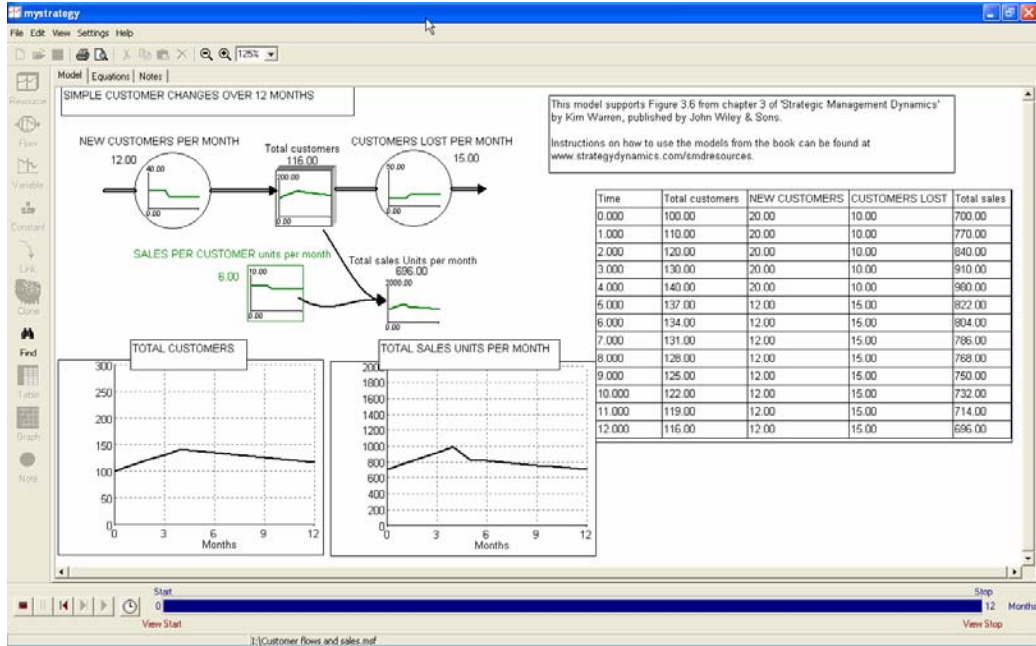
- Exercise: law firm staff flows – chapter 3, Figure 3.9.
 - Exercise: airline routes opened and closed – chapter 3, Figure 3.13.
-

BACKGROUND TO THESE MODELS

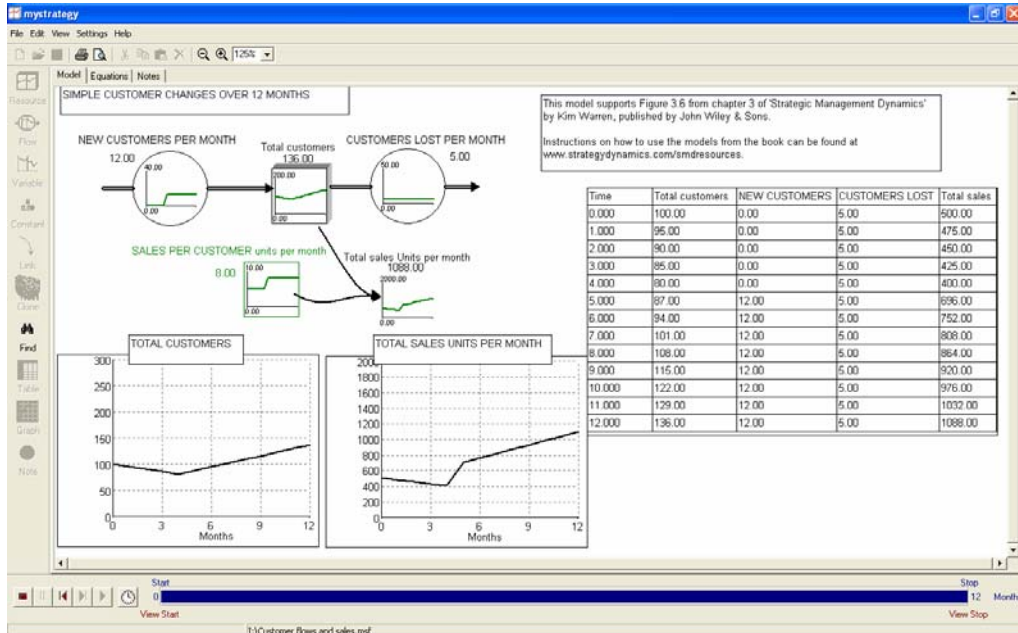
Strategy Dynamics helps build an integrated picture of how an organization is performing over time, as the basis for setting strategy and estimating how that performance may develop into the future. The approach requires a process to be followed that lays out the causal relationships connecting performance outcomes back to the organization’s underlying resources. This process is fully explained in the book *Strategic Management Dynamics*.

The **mystrategy** software was developed in order to create quantitative models of an organization’s strategy and performance, but can also be used to demonstrate smaller dynamic frameworks that operate in specific parts of an organization, such as its customer base, its staff resources, or its product range.

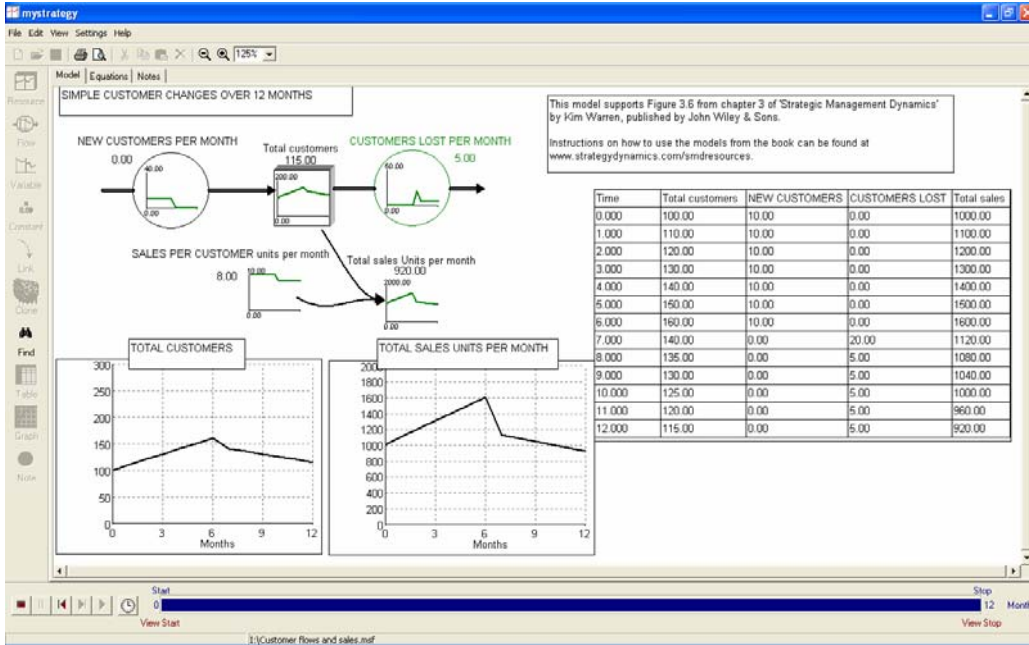
SOLUTION TO THE FIRST EXAMPLE



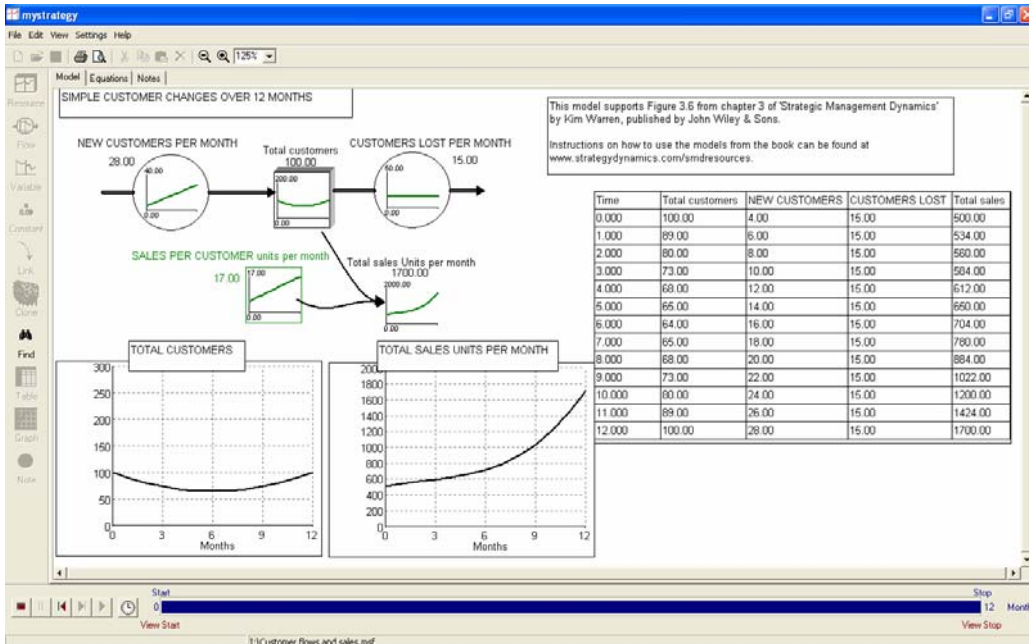
SOLUTION TO EXPERIMENT 1



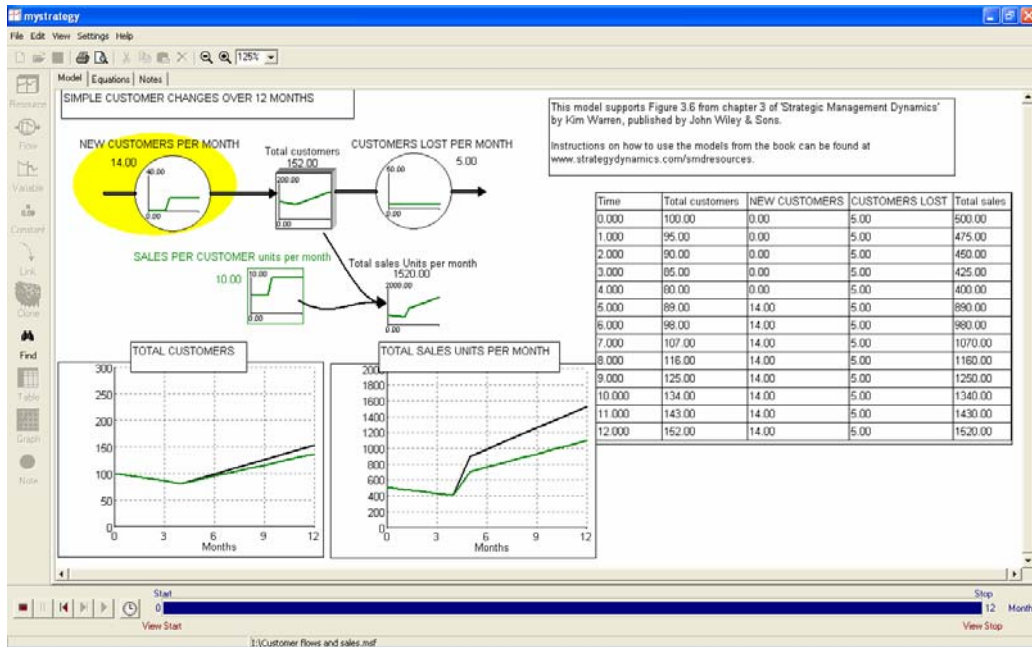
SOLUTION TO EXPERIMENT 2



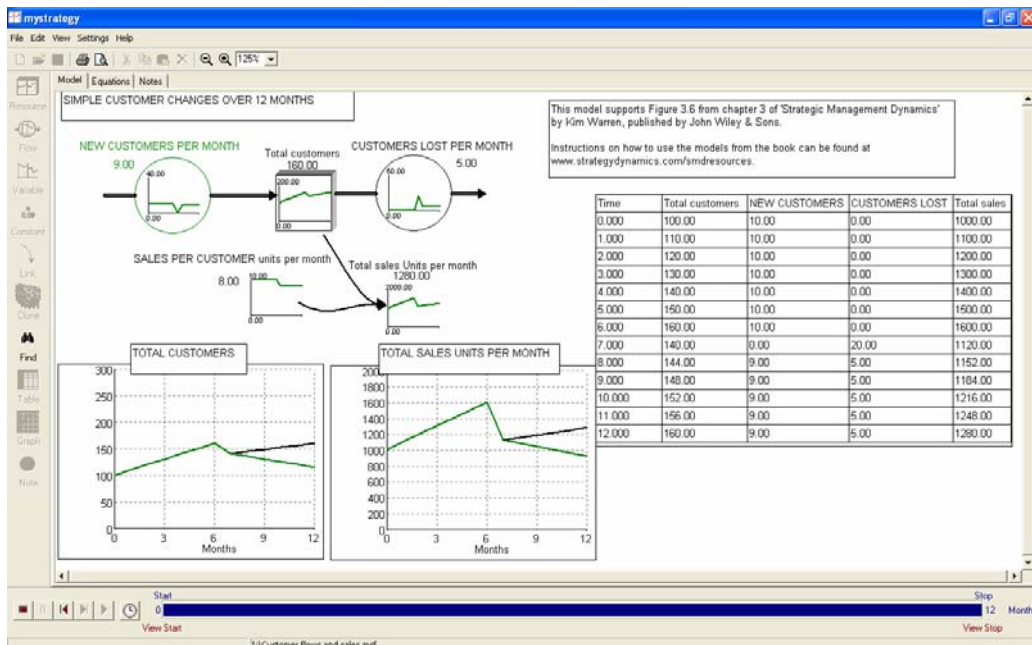
SOLUTION TO EXPERIMENT 3



SOLUTION TO TARGETS BASED ON EXPERIMENT 1 – AIMING FOR AT LEAST 150 CUSTOMERS AND SALES OF 1500 PER MONTH



SOLUTION TO TARGETS BASED ON EXPERIMENT 2 – AIMING TO GET BACK ALL THE LOST CUSTOMERS BY MONTH 12



SOLUTION TO TARGETS BASED ON EXPERIMENT 3 – LIMITING CUSTOMERS IN ORDER TO HIT SALES OF 1000 UNITS PER MONTH BY MONTH-12

