



The Beer Game on Steroids (BGOS)

**A Freeware Tool for Teaching Supply Chain
Dynamics**

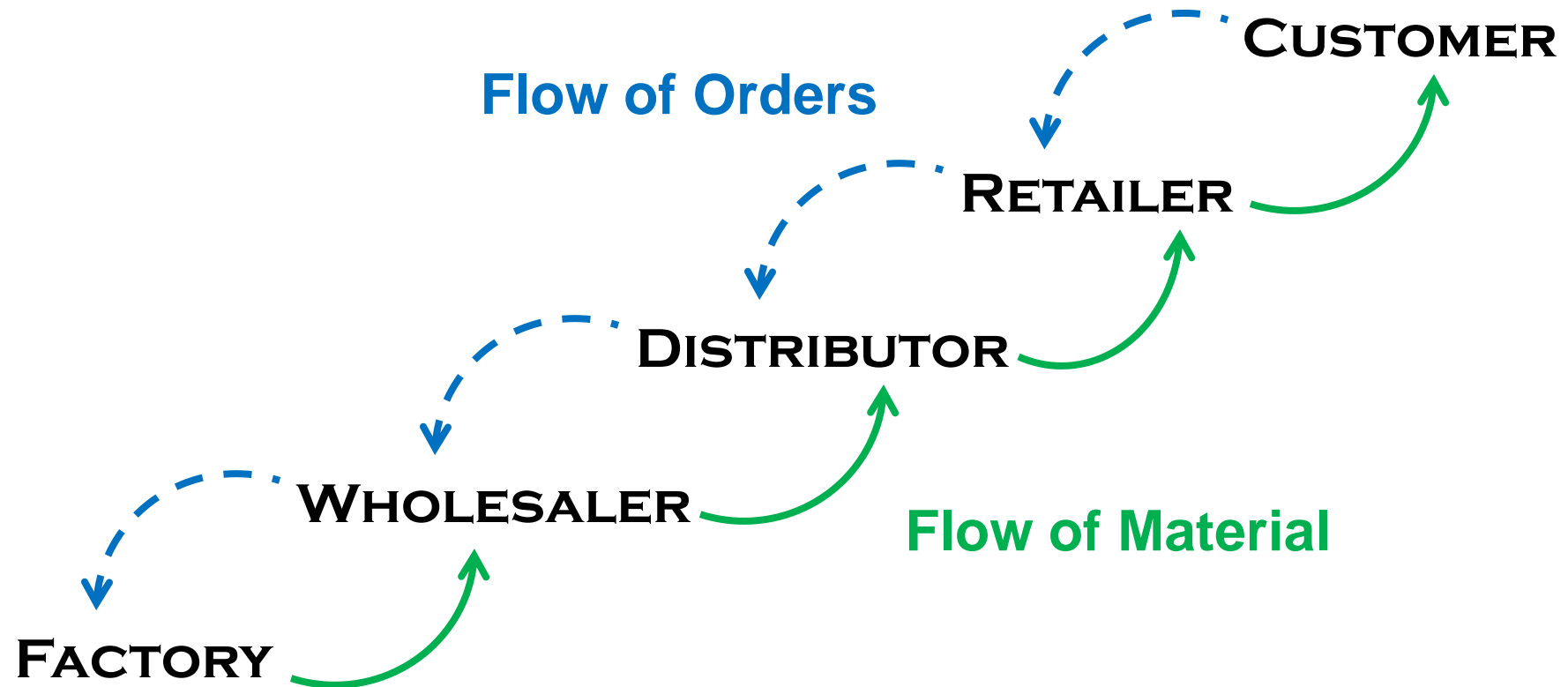
Overview and Purpose

- **What is BGOS?**
 - **Freeware supply chain simulation tool based on Dr. John Sterman's "widget" model in his book *Business Dynamics* (2000).**
 - **User-friendly tool in which the user drags, drops, and connects multiple entities in a supply chain or network of any size.**
 - **Customizable tool that allows the user to change the individual parameters for each entity in the supply chain to alter the way it behaves in the model.**
- **What is the purpose of BGOS?**
 - **Expands on the simple 4-entity model of the original Beer Game to allow the creation of more complex models.**
 - **Teaches students about how supply chains operate, perform, and behave under a variety of conditions.**
 - **Increases a student's intuition of supply chain "physics."**

Typical Instruction Approach

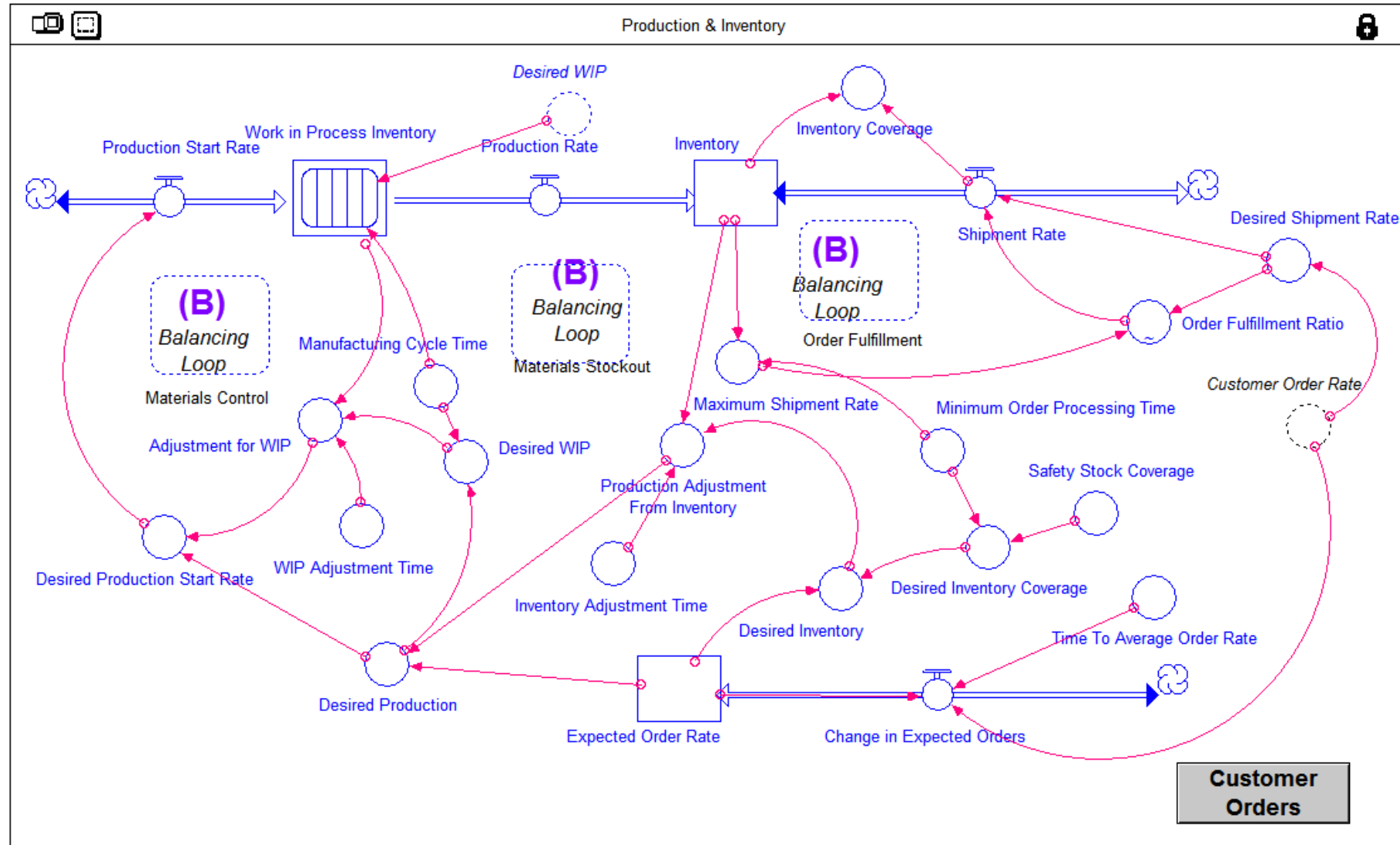
- **Students participate in the original role-playing version of the Beer Game.**
- **Students build the original Beer Game in BGOS and replicate the behavior seen in the in-person game.**
- **Students run additional scenarios on the original Beer Game to observe more dynamics.**
 - **Ex: Impose additional demand patterns (20% increase, 30% increase, 10% increase followed by a 20% decrease).**
 - **Ex: Slow down or speed up the processing times at each entity in the chain.**
- **Students expand on the original Beer Game to add several entities to observe more dynamics.**
 - **Ex: Add an additional distribution center in the chain.**
 - **Ex: Add a second factory in the chain with its own distributors.**
- **Students write a report of their findings and what they learned.**

The Basic Beer Game



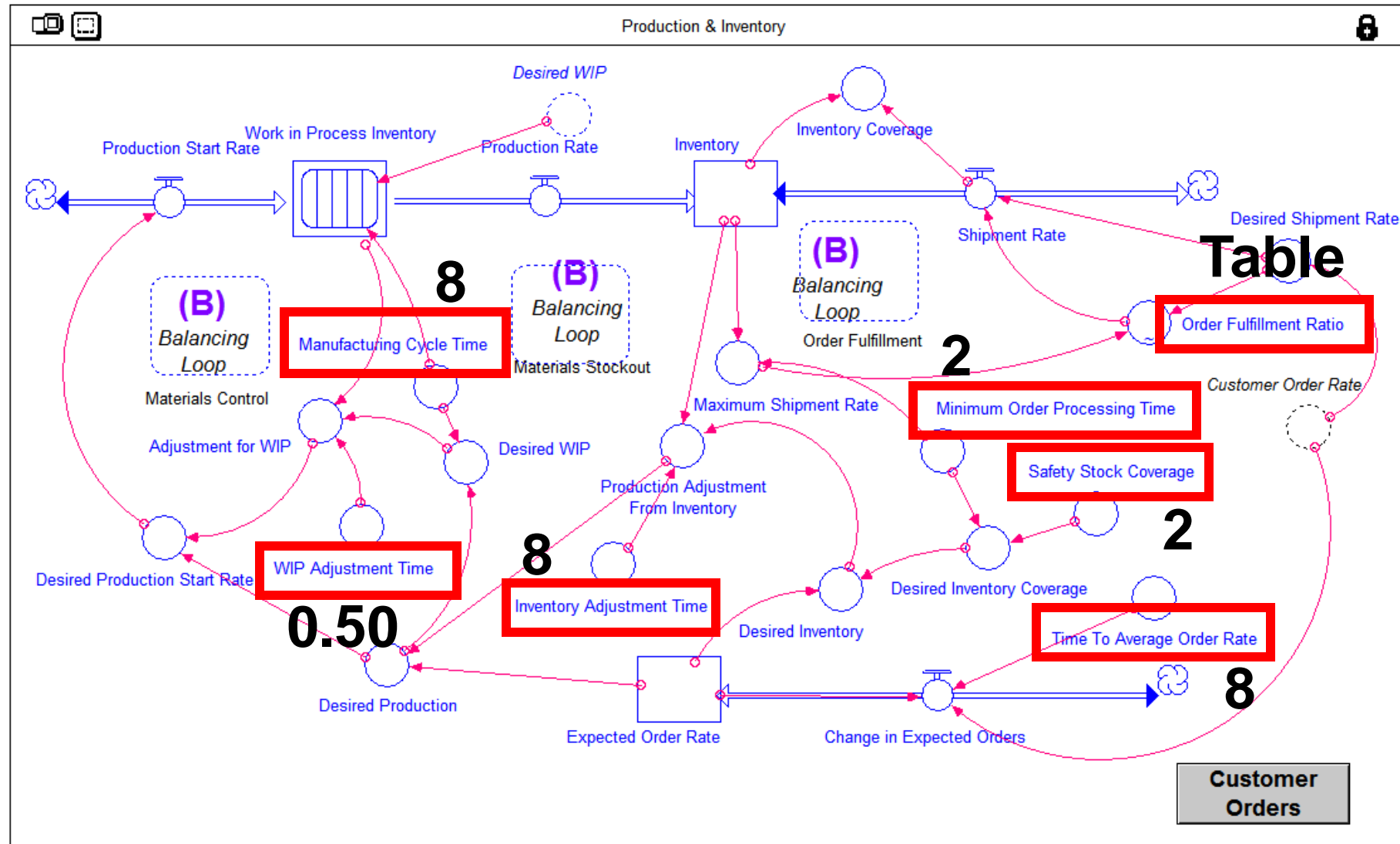
“Widget” Model

(Ref: Sterman, J.D., *Business Dynamics*, 2000, Ch. 18, used w/permission)



“Widget” Model – Default Values

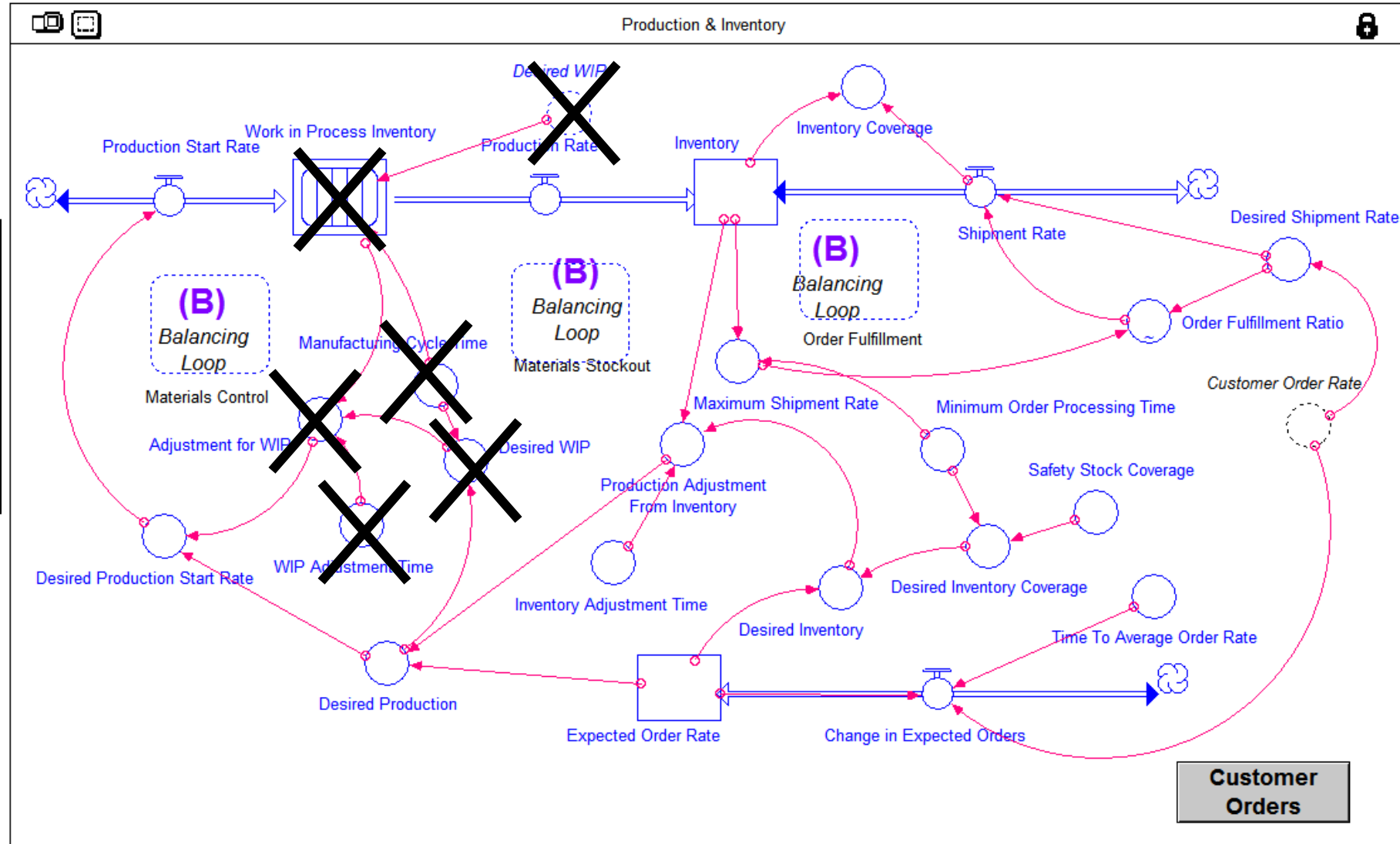
(Ref: Sterman, J.D., *Business Dynamics*, 2000, Ch. 18, used w/permission)



Widget Warehouse Model

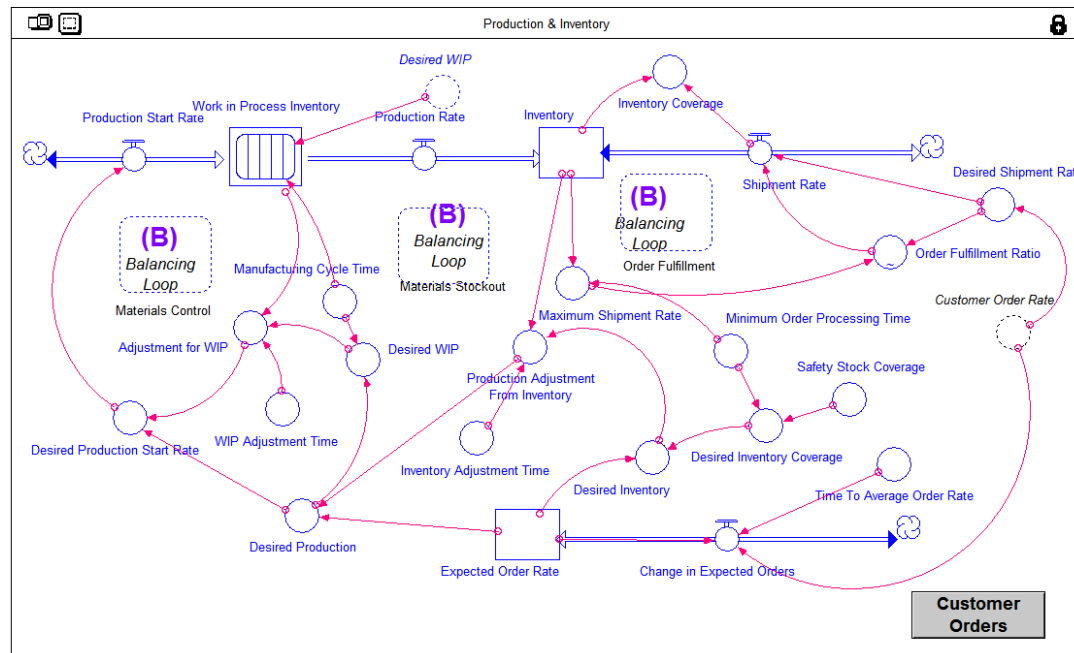
(Ref: Sterman, J.D., *Business Dynamics*, 2000, Ch. 18, used w/permission)

For a warehouse, these parts of the model related to production are removed.



BGOS Methodology

Simulation “agent” model



BGOS “icon”



Factory

BGOS Interface

SimBLOX Studio Model Creator - [* Beer Game 2]

Home View Layout Templates Analysis

Alignment Zoom Comments

Brix Palettes

BeerBRIX

Factory

Warehouse

Customer

Root

Factory

Wholesaler

Distributor

Retailer

Customer

Properties

Filter:None

Definition

Inventory Adjustment Time	8 Weeks
Manufacturing Cycle Time	8 Weeks
Minimum Order Processing Time	2 Weeks
Order Distributions	(Edit value...)
Order Fulfillment Ratio	(Edit value...)
Safety Stock Coverage	2 Weeks
Time to Average Order Rate	8 Weeks
WIP Adjustment Time	0.5

Display

Image System.Drawing.Bitmap

Identity

name	Factory
------	---------

Simulation Controller

Document: Beer Game 2

Component Property Message

start

Microsoft Office O...

Desktop

SimBLOX Studio Mode...

Microsoft PowerPoint ...

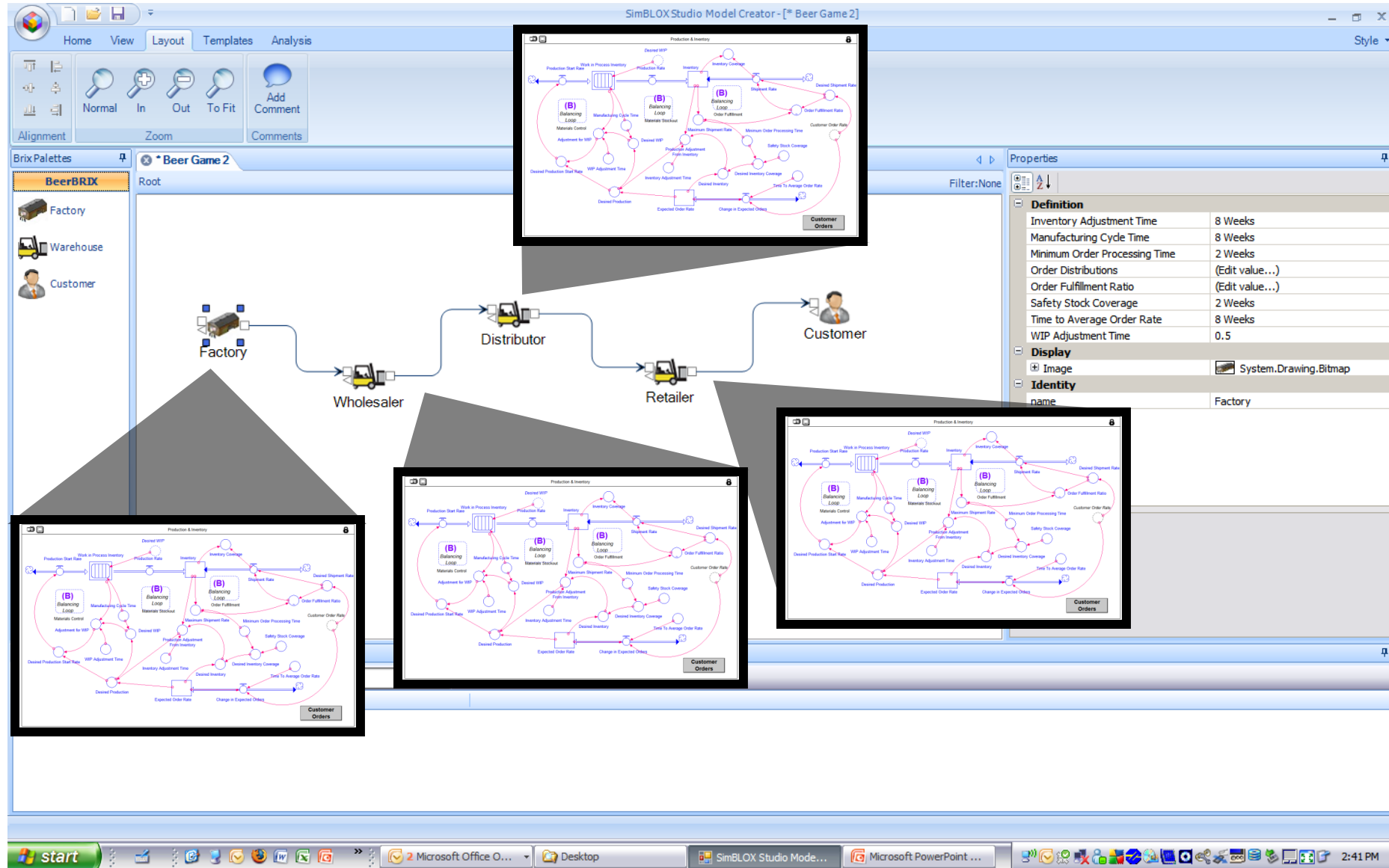
2:41 PM

Icons

Drag-and-drop icons to build larger model

Input parameters for selected icon

BGOS Interface



Demo of the Beer Game

Beer Game Inputs

The screenshot displays the SimBLOX Studio Model Creator interface for a model named "Beer Game 2". The main workspace shows a flow diagram with a "Factory" component connected to a "Wholesaler" component. A dialog box titled "Edit Order Distributions" is open, showing a table with the following data:

Supplier	% of Orders
Wholesaler	100

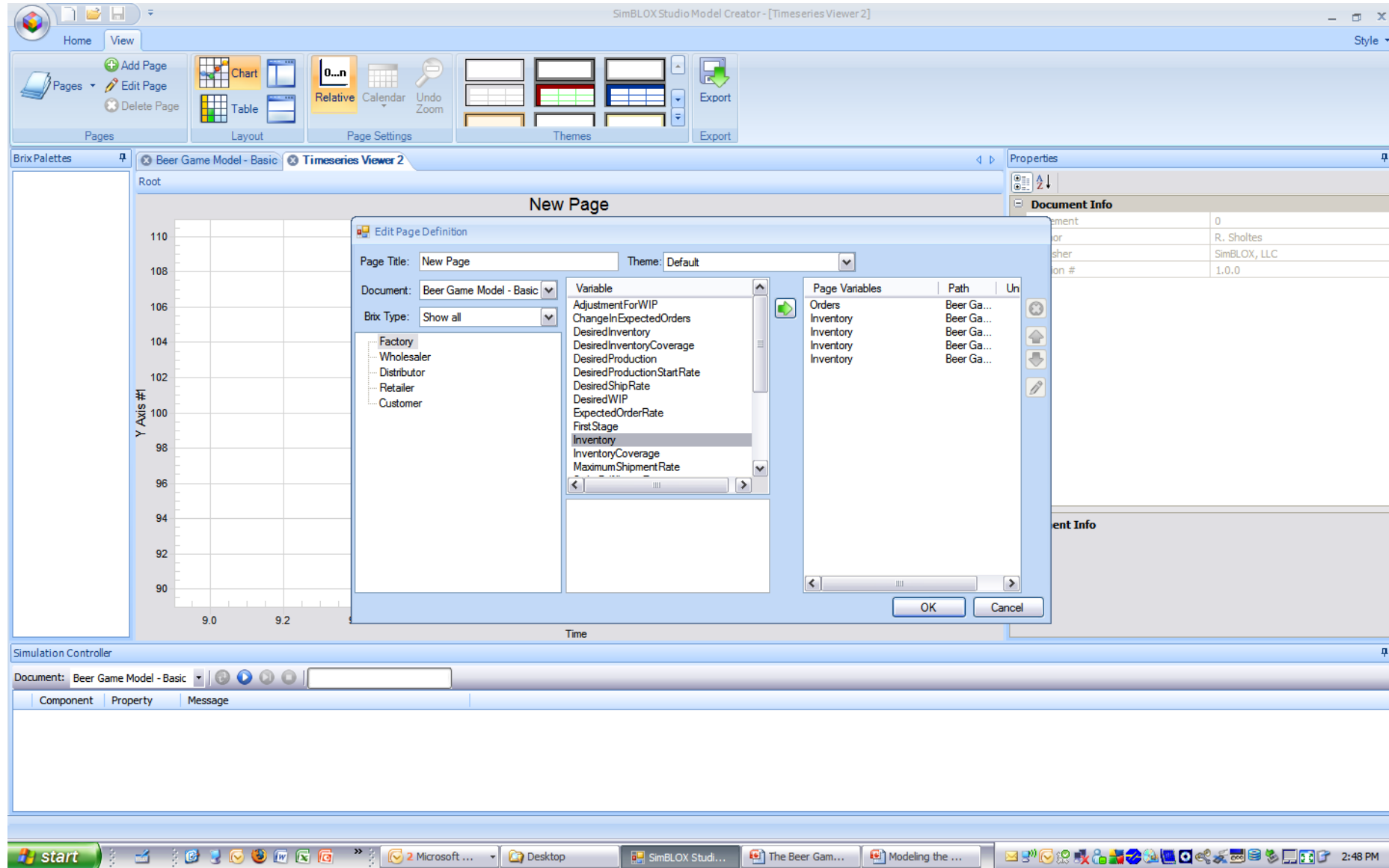
The dialog also includes a "Definition" section with the following parameters:

Parameter	Value
Inventory Adjustment Time	8 Weeks
Minimum Order Processing Time	2 Weeks
Order Distributions	(Edit value...)
Order Fulfillment Ratio	(Edit value...)
Safety Stock Coverage	2 Weeks
Time to Average Order Rate	8 Weeks

The "Display" section shows an image of a system drawing. The "Identity" section shows the name "Distributor". The "Order Distributions" section specifies how orders to suppliers are distributed on a per-material basis.

The bottom of the interface shows the "Simulation Controller" with a "Document: Beer Game 2" dropdown and a "Component" tab. The Windows taskbar at the bottom shows the Start button and several open applications, including "viaSim email - Micro...", "SD Conference - Albu...", "SimBLOX Studio Mode...", and "Microsoft PowerPoint ...". The system clock indicates the time is 2:27 PM.

Time Series Viewer to Display Results



Customer Orders

SimBLOX Studio Model Creator - [* Beer Game Model - Basic]

Home View Layout Templates Analysis

Alignment Zoom Comments

Brix Palettes

BeerBRIX

Factory

Warehouse

Customer

Root

Filter:None

Factory

Wholesaler

Distributor

Edit Orders

Weeks	Units Ordered
Init	100.00
10	110.00

OK Cancel

Properties

Definition

Order Distributions (Edit value...)

Orders (Edit value...)

Display

Image System.Drawing.Bitmap

Identity

name Customer

Orders

Defines the orderbook profile (in units per week).

Simulation Controller

Document: Beer Game Model - Basic

Component Property Message

Validating Beer Game Model - Basic..

Creating simulation world from Beer Game Model - Basic

The analysis completed in 17.132 seconds.

start

Microsoft Office ...

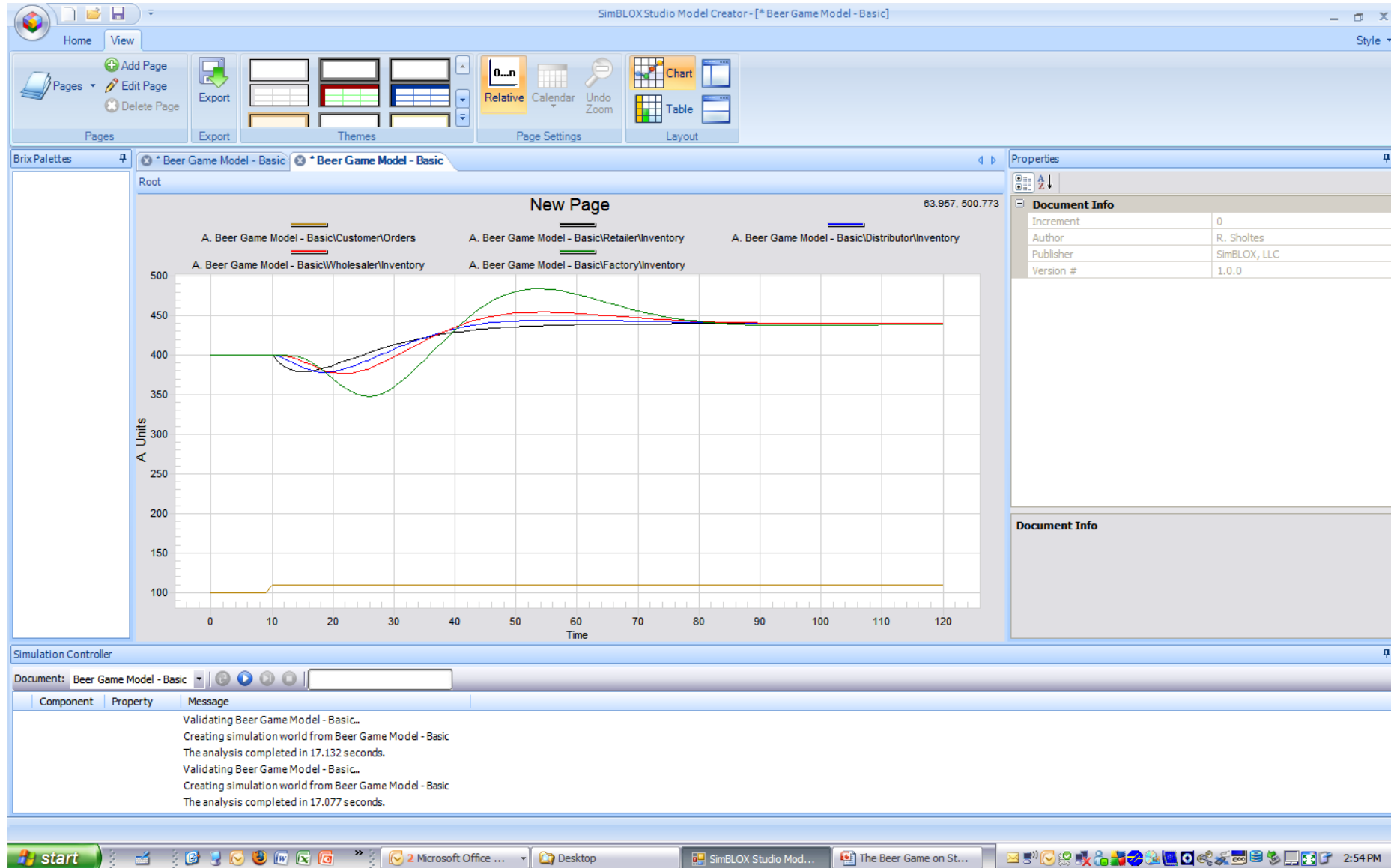
Desktop

SimBLOX Studio Mod...

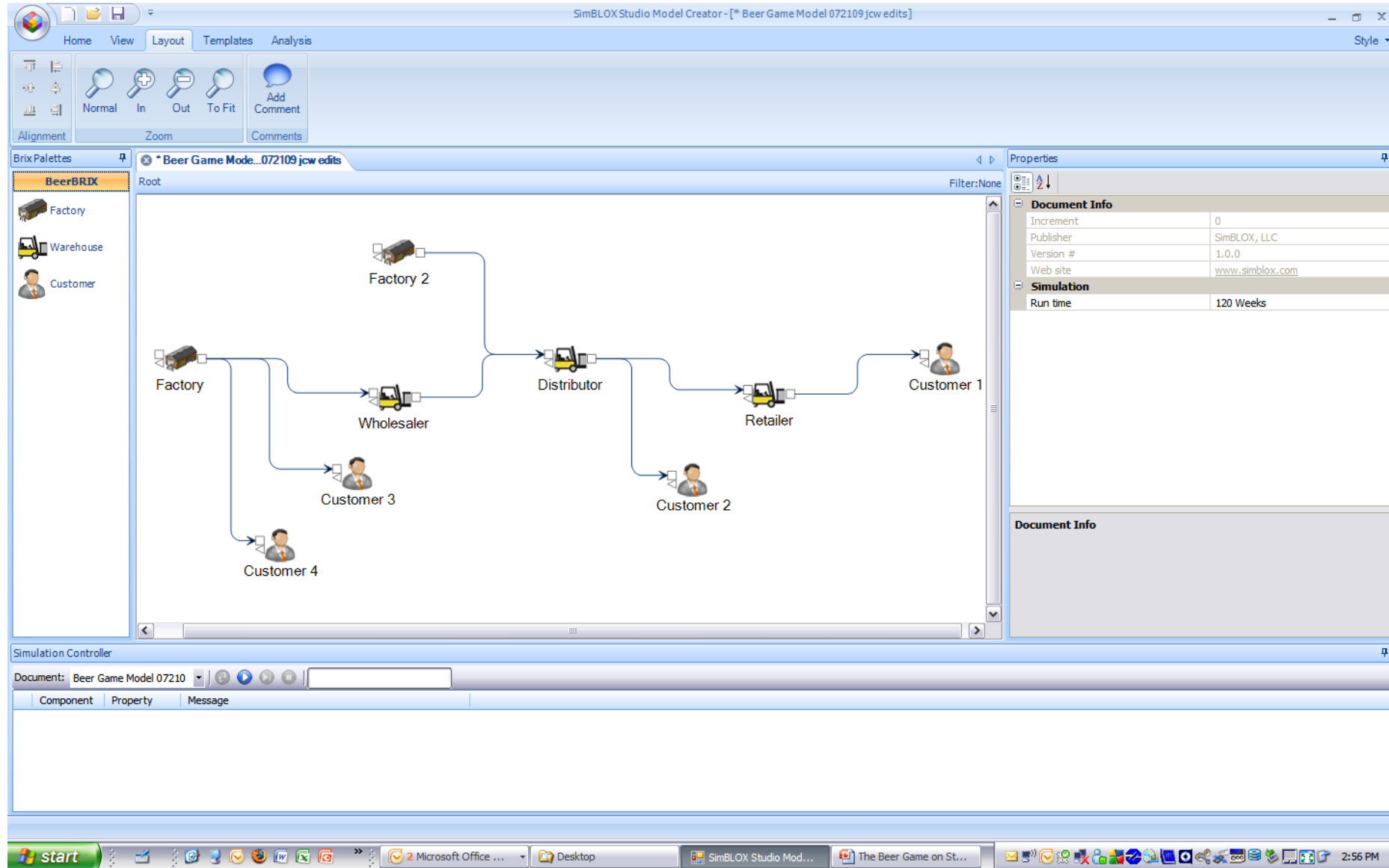
The Beer Game on St...

2:53 PM

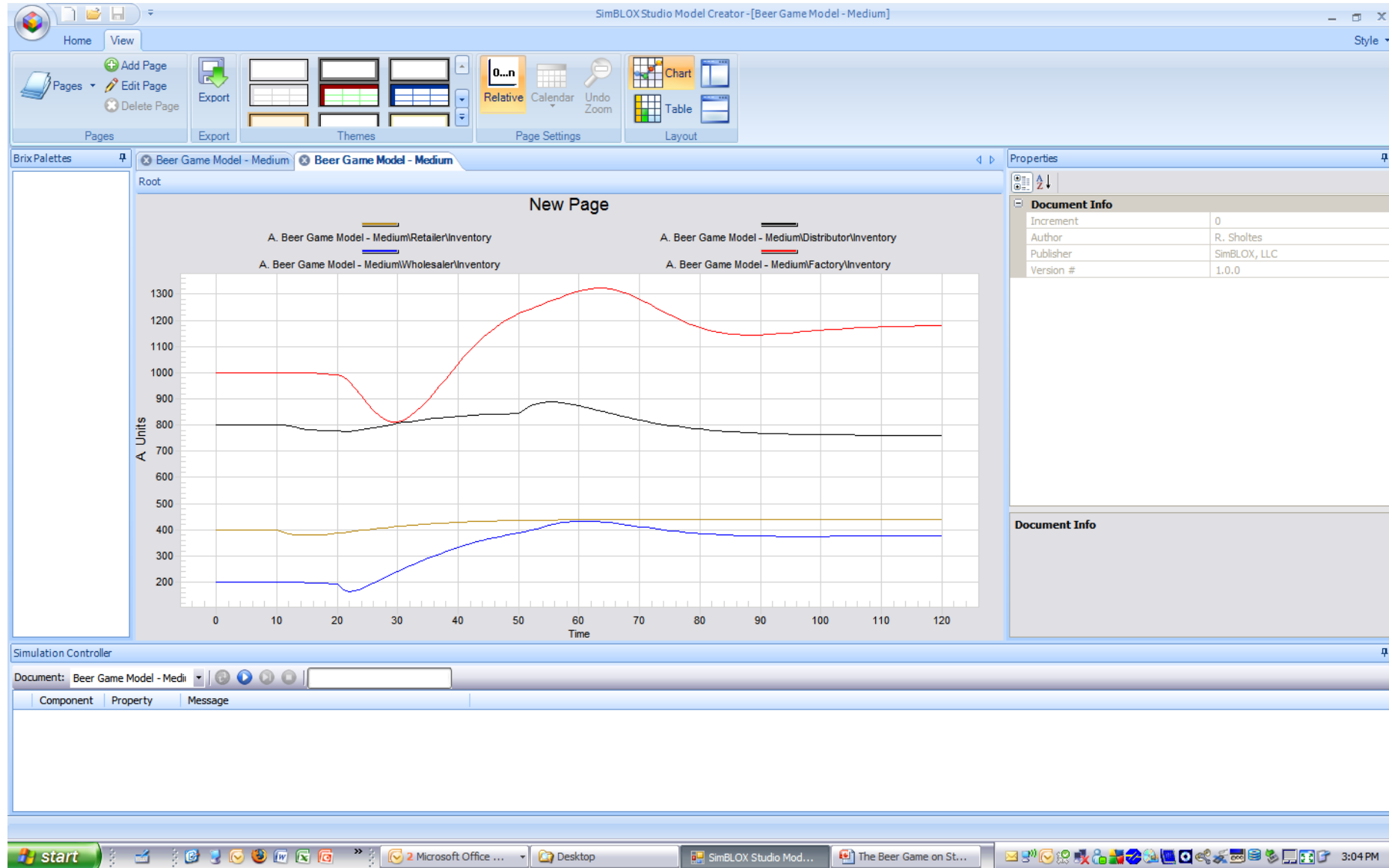
Simulation Results



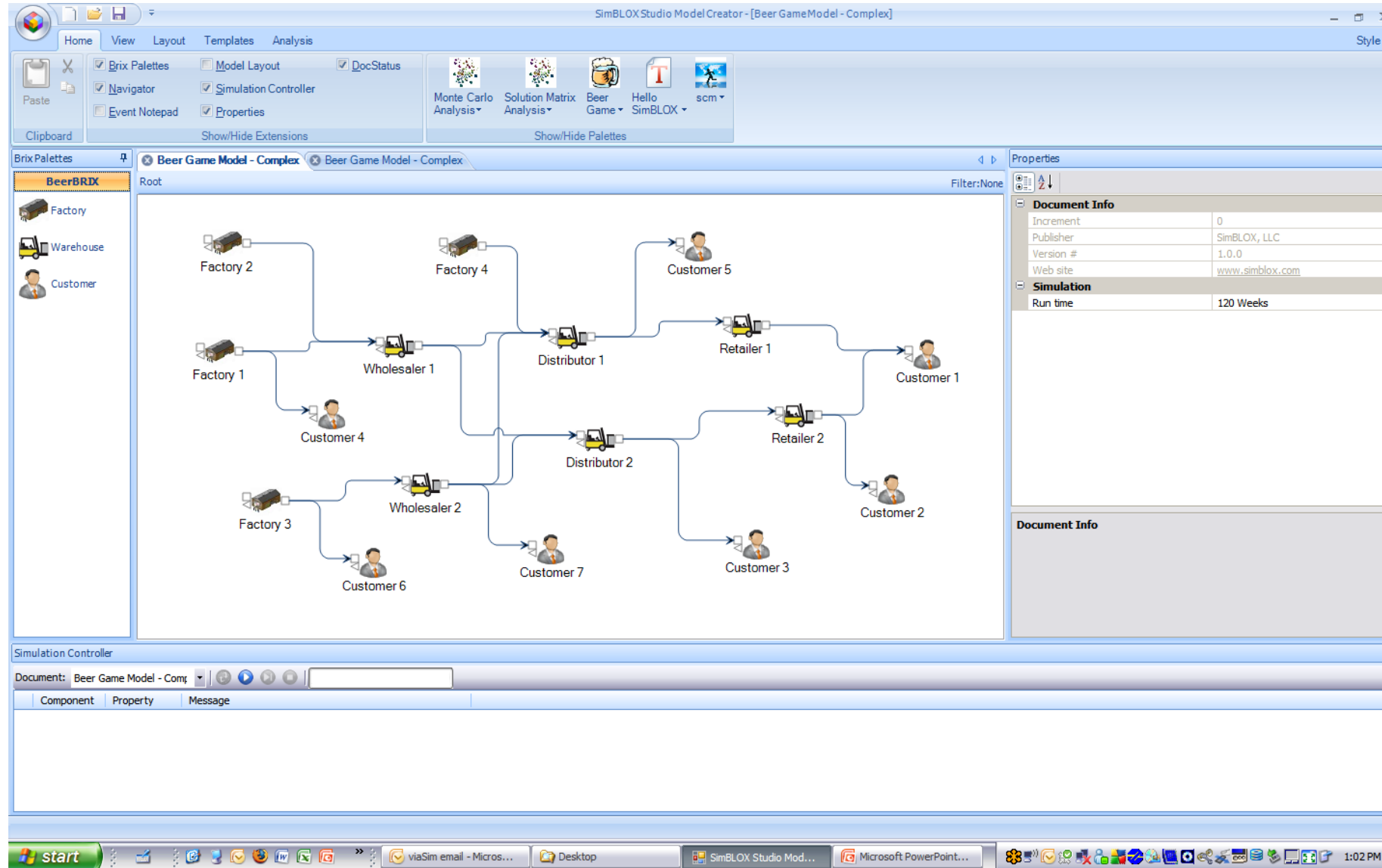
Moderately Complex Supply Chain



Moderate Complexity Supply Chain Results



Highly Complex Supply Chain



Highly Complex Supply Chain Results

