

DISTRIBUTOR GAME



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1. INTRODUCTION

This document is an excerpt of www.gscg.org and is meant as a handout for preparing students and managers for playing a game focusing on supply chain management. This document contains the information relevant for the game (DISTRIBUTOR GAME) and the case (Local vs. Global) you will play. Furthermore, the game flow as well as an introduction to the player application are described. Additional information, such as information about other games, extended background information etc. can be found on www.gscg.org.

2. DISTRIBUTOR GAME

The DISTRIBUTOR GAME is a game designed around the supply chain trend of globalization. Players take the role of a distributor and have to manage a global network of suppliers and customers, each with their own characteristics. Players have to manage products with a high depreciation, such as consumer electronics. Management of inventory and interpreting developments of the market are key for players. In this chapter we will introduce the case, key decisions, background information, and some information with relation to global regions parts of the game.

2.1 *Case: Local vs Global*

In this case, you are operating as a computer distributor on one of three markets: the USA market, the European market, or the Asian market. The continental markets are each divided further into a number of smaller local, regional markets (examples are the North-West US market in the USA, the Scandinavian market in Europe, and the Japanese market in Asia). In each regional market, one or more distributors are located, and you have competition from each of the other distributors in your continental market. Your customers know that you and your competitors are trustworthy, but are generally quite slow given the current speed of businesses in the Internet area. You start to suffer from competition from direct deliveries from manufacturers, and profit margins have dropped from 20-30% which could be reached a few years ago to around 10% right now. Given the gradual loss of business, a profit margin of less than 10% is not enough to sustain your business. As a result, you have been sourcing globally for quite a while to get your purchases for the lowest prices. The downside of global sourcing is longer delivery times or higher transportation costs. You need a new strategy for your business to survive in the next couple of years. Recently, one of the options that came up was to react on spot buy requests from larger global companies, and try global sales in addition to global sourcing. In the scenario, there is a growing number of international requests for quotes, for which distributors can bid world-wide. Another option might be to focus more on your local market and conquer that instead of aiming for the global market. A third option might be prod-

uct specialization; instead of keeping a limited number of different products in your warehouse, you might keep more products of one or two types on stock, thereby being able to react more swiftly on local and/or global requests. Many other options are possible as well. What is most important is that you develop a strategy and make the strategy work. Please remember that your local and global competitors in the game (the other players) find themselves in the same situation, and will also choose a strategy.

2.1.1 Goal of the game

The goal of the game is to show you the trade-offs of global sourcing versus local sourcing in a complex market with products that quickly lose their value. You have to take many decisions, both for purchases and for sales. The behavior of your close competitors makes it even more difficult to choose a good strategy. Both on the local and on the global markets, you are facing the same competitors with similar problems. The game allows you to experience the effects of your decisions very quickly; in a short period of time, you see whether your company is able to improve its position based on the strategy that you have chosen. Even more, during the debriefing of the game, you can immediately compare the results of your strategy with the results that others were able to reach with theirs, and compare the results with expectations derived from theory.

2.1.2 Key Performance Indicators

The results of your company will be evaluated based on several key performance indicators (KPIs). A financially healthy position is of course the major KPI. The market share per product in your region and for the globally sources products is another indicator, but this of course depends on your strategy. These indicators can help you to judge how successful your strategy has been. A number of additional indicators (e.g. monthly financial breakdown, monthly success rate of your quotes, average inventory per product, number of fines you had to pay) will be provided in addition.

2.1.3 Stimulating good behavior of the actors

The game has several incentives for correct behavior built in. This holds both for the suppliers and for you as one of the distributors. The following fines are built into the game for incorrect behavior. When a shipment for an order is delivered after the promised delivery date, the supplier has to pay a fine. The fine is based

on an interest rate of 20% per year for the value of the shipment. When you have not delivered after 30 days, you pay 50% of the agreed price for the order. When you do not pay on time, you also pay a fine of 20% interest rate per year. When you have not paid after 14 days, the bill will be charged to your bank account, even if you did not take action, or if you have a negative balance. By the way, the game is symmetric in the sense that you also get the benefits of a fine for suppliers that do not deliver on time or markets that do not pay on time.

2.1.4 *Transportation*

The computers lose their value rapidly. Therefore, shipping is done by plane. The shipping costs depend on the region of the supplier or market you're dealing with. For inter-regional transport, e.g. between a supplier located in the USA and a customer in the European region, the costs are \$250.- per shipment for handling and taxes, plus \$0.0007 per kilometer per kilogram of weight. For intra-regional transport the costs are \$200.- per shipment for handling and taxes, plus \$0.0007 per kilometer per kilogram of weight. Furthermore, depending on the weight of a shipment, a discount may be obtained. For a shipment with a weight ≥ 100 kg, a 10% discount on the total transportation costs is given. For a shipment with a weight ≥ 1000 kg, an additional 10% discount is given. The weight of a laptop is 6.5 kg, the weight of the other three types of computers is 15 kg. The time it takes to transport a shipment is two days for shipping the goods to and from the airport and to handle the shipment, and for the rest a shipping time based on a speed of 800 km/hr is added to the transportation time. This means that you can get your goods to any place of the world within 4 days. Be aware of the costs for transporting to or from a remote location, however!

2.1.5 *Finances*

For the distributors, there are several costs you make during the course of the game. One of the types of costs is fines, which has been explained above. You can avoid fines by delivering and paying on time. The second type is the depreciation of your inventory. As this amounts to 2% per week, make sure you don't keep the computers too long in your inventory. The third type are the fixed costs for personnel, buildings, equipment, etc. This amounts to \$500.- per day. This sounds like a small amount, but it has been calculated as a percentage of the total operational costs or the distributor, for that part of the distributor organization that deals with these four products. The final type of costs (or benefits) are the interest rates for your bank account. When you have a positive balance, you receive 3% interest per year, but

for a negative balance, you pay 8% per year.

2.1.6 Initial product prices

The initial average market prices of the products in stock, at the manufacturer, before shipping, are as follows:

- DESKTOP: \$650.-
- LAPTOP: \$1000.-
- LINUX: \$850.-
- MMEDIA: \$1200.-

The starting value of your initial stock is as follows:

- DESKTOP value: \$40500.0 unit price: \$900.-
- LAPTOP value: \$48000.0 unit price: \$1500.-
- LINUX value: \$55200.0 unit price: \$1200.-
- MMEDIA value: \$20400.0 unit price: \$1700.-

Thus, the total value of your initial stock is: \$164.100.-. During the game, product prices change as a result of economic or other developments. After a change, your suppliers will offer computers for different prices, and your customers expect other prices as well. By the way, you can make offers above market price, but be aware that your customer will base its choice on price, distance, and promised delivery date. How the customer weighs these three aspects is unknown to you.

2.1.7 Additional information about prices and finance

See figure 2.1 for an explanation how transportation costs are part of prices and are dealt with when you buy and sell products.

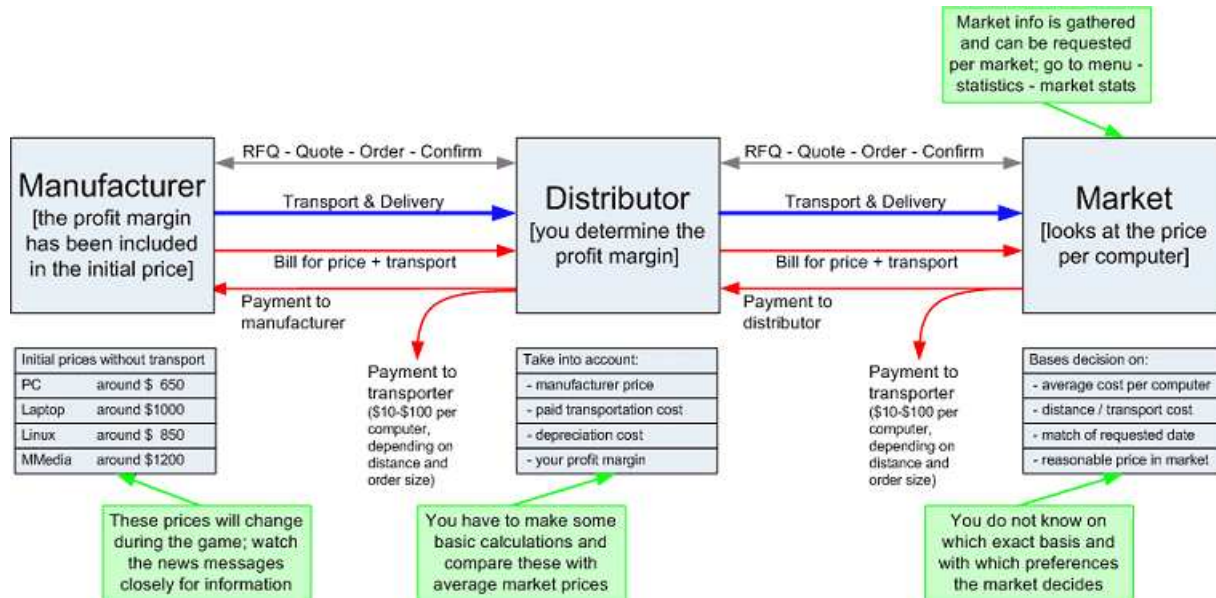


Fig. 2.1: Handling of transportation costs

2.1.8 Ranking

From a generally accepted accounting perspective, inventory is treated as an asset. Thus, the team rankings which ranks each team by its Equity Position is based on the following equation:

$$Equity = assets - liabilities$$

Which we define as:

- *assets*: the value of on-hand cash + the value of actual stock on hand + the value of incoming payments (if the accompanying shipment is either in transit or has been delivered, i.e. if the products are no longer part of your actual stock on hand)
- *liabilities*: outgoing payments (if the accompanying shipment has been received, i.e. the products are part of your actual stock on hand)

2.2 Key decisions

By Sandor Boyson and Tom Corsi, R.H. Smith School of Business, UMD.

<i>Distributor Business / Financial Strategy</i>	<i>Distributor Sourcing of Product from Suppliers</i>	<i>Distributor Inventory Management Strategies & Issues</i>	<i>Distributor Sales to Market Customers</i>
Geographic Scope	Assume conditions of consistently available supply; There will be a response to your RFQs from suppliers.	Demand Pull • Distributor wins bids from customer • Source needed inventory from suppliers to meet bid requirements	Assume that customer evaluations of distributor bids will be based on distributor meeting requested delivery date; and price.
Regional Focus for Sourcing and Customer Sales • Customer service orientation/ Quick response orientation • Transportation Cost Minimization	Supplier Response to Distributor Request For Quotes includes the following: • Base Price. • Transportation Cost. • Total Cost. • Transit Time. • Promised Delivery date by Supplier to Distributor (the actual Delivery date to Distributor varies based on reliability of supplier).	Inventory Push • Accumulate Inventory • Sell off Inventory on-hand to market customers	Customer Request For Quotes to Distributors specify types and quantities of product required and customer need by date. Distributor response to customer(market) RFQ includes: • Total Order Price, including transportation which is automatically added to the base price quoted by Distributor. • Promised Delivery Date, the Actual Delivery Date depends on inventory availability and transit times; transit times are defined in the game: 24-36 hours for intra-continental delivery; and 48-56 hours for inter-continental delivery.
National Focus for Sourcing and Customer Sales • Expanded Customer base • Expanded Supplier Base • Higher Transportation Cost / Longer Transit Time • Economies of Scale in Purchasing		Mixed-Strategy • For fast moving products, you accumulate inventory. • For slow moving products, you win bid first then accumulate inventory to meet sales requirements.	
Global Sourcing and Regional Sales • Lower Purchase Costs Lower Purchase Costs • Higher Transportation Costs/Longer Transit Time • Greater Risks of Late Deliveries		Other Inventory Considerations Inventory depreciation is rapid: 2% a week across the Games four product categories. All shipments from supplier to distributor and distributor to supplier are air shipments. Transportation time & costs have a fixed and variable component. The fixed component is higher for inter-continental shipping and includes time and costs of customs clearance.	

Regional Sourcing and Global Sales • Expanded Market • Sufficient Availability of Low Cost Suppliers • Higher Transportation costs • Customer Service Risks • Different characteristics of global spot buy markets vs local regular markets		The variable component is related to shipping distance e.g. greater the distance of shipment, higher the transport costs. There is a discount for larger shipment sizes: discounts are given for shipments above 100 pounds and above 1000 pounds. To get these discounts, Distributors should look for opportunities to respond to larger size customer orders; and to send out RFQs of larger size to suppliers.	
Global Sourcing and Global Sales • Maximum Flexibility			
Product Scope All Inclusive • Average Supplier Price to Distributor (exclusive of Transportation Charges and Time) • Individual suppliers deviate from average price based on their operating performance and location • Desktop(\$650), Laptop(\$1000), Linux(\$850) and Multi-Media(\$1200)			
Product Specialization • Focus on sub-set of available products • Could focus on high-end/higher margin products			

Tab. 2.1: [Key Dimensions of Game Decision Making]Key Dimensions of Game Decision Making

2.3 Background Information

Computers and Peripherals Wholesale Distributors: Industry Snapshot and Competitive Dynamics Dr. Sandy Boyson, September 7, 2005

The Role of Computer and Peripheral Wholesale Distributors in The Value Chain

- Alleviates need for suppliers/manufacturers to maintain extensive inventories and helps them avoid risk positions.
- Helps suppliers/ manufacturers save on the costs of establishing sales forces.
- Provides One Stop Shopping to customers.
- Provides extended credit terms to customers.
- Enables customers to avoid inventory buildup.

Snapshot Of The U.S. Industry

- Total Industry Revenue 2003-2004: \$273.6 billion
- # of Enterprises: 10,026
- # of Employees: 330,637

Types Of Computer & Peripherals Wholesale Distributors

- Source & sell globally a full spectrum of finished systems, components and software: Arrow, Ingram
- Specialize in sourcing from Asia & selling in U.S.: Global Sources
- Buy and sell used or refurbished equipment and peripherals: Network Liquidators

Types Of Distributors

- Specialize in reselling specific brands such as IBM PCs: Synnex
- Specialize by customer segments such as VARS and System Integrators: Atomic Park.
- Specialize in custom configurations of systems: Computer & Control Systems
- Act as aggregators of multiple other distributors and serve as an inter-enterprise hub: CNET

Major Industry Trends: Concentration Trend

- In 1970, top 5 electronics distributors accounted for 25% of industry revenue
- In 1990, top 5 accounted for 60% of revenue
- In 2000, top 5 accounted for 75% of revenue

Major Industry Trends: Dominant Companies

- Ingram Micro \$25.4 billion revenues; 13,600 employees
- Arrow Electronics \$10 billion revenues; 12,450 employees

Major Industry Trends: Downward Trend In Profit Margins

- Ingram had \$2.92 billion in North American sales in 2004, 4% growth versus year ago
- But gross margins were only 5.37%, 8 basis points lower than year ago quarter.
- The company attributed the reduction in margin to "increased competitive environment in North America" (Annual Report 2004)

Operation Challenges: Order Surges

- Batches of orders arrive late in day, right before FEDEX/UPS pickups.
- Due to order surges, Arrow dropped from 94% same day ship rates to 75% in its four North American warehouses over a two year period.
- This leads to customer complaints about missed shipments.
- It also leads to increased freight costs from using premium services to compensate for missed schedules.
- As a result of surges, Ingram has to hold \$1.88 billion in inventory or 27 days of on hand inventory.

2.4 Region Information: Asia

2.4.1 Market description

The market parties place orders with the distributors (you) for different types of products at irregular intervals. There might be market fluctuations you have to watch. The Asian market is divided into several geographic regions:

- *Indian Market* The Indian market is very large; the country has over one billion inhabitants. The economy has posted an excellent average growth rate of 6% since 1990 [CIA World Factbook]. India is capitalizing on its large numbers of well-educated people skilled in the English language to become a major exporter of software services and software workers. Southeast
- *Asian Market* The Southeast Asian market is growing as well, for instance due to the US-Vietnam Bilateral Trade Agreement, excellent facilities in Malaysia and Singapore, and a reasonable stable political situation.



Fig. 2.2: Region information: Asia

- *Chinese Market* One of the fastest growing markets around the world. This is an interesting region to operate in, because of the growing demand from the market as well as the growing number of good and cheap computer suppliers.
- *Indonesian market* Indonesia is a difficult country to operate in as a foreign company. Corruption, the lack of reliable legal recourse in contract disputes, weaknesses in the banking system, and a generally poor climate for foreign investment make trading difficult. On the other hand, the almost 250 million inhabitants provide both a cheap labor force, and a potentially interesting market.
- *Japanese Market* Japan is a very challenging and demanding market to operate in. Government-industry cooperation, a strong work ethic, mastery of

high technology, and a comparatively small defense allocation (1% of GDP) helped Japan advance with extraordinary rapidity to the rank of second most technologically powerful economy in the world after the US and third-largest economy after the US and China [CIA World Factbook]. Both for production and consumption of new and innovative electronics and computer technology, Japan is the leading market.

- *South Korean Market* The South Korean market is viewed as a separate market, as it is geographically disconnected from the rest of Asia. As a result, all shipments come in and go out by boat or by plane, increasing the transportation costs.

Each of the distributors has a local market, but of course it is allowed to compete on the other markets as well, or even internationally!

2.4.2 Short characterization of the distributors

There is one distribution company in each of the Asian markets. As you are managing the distributor in the game, not much can be said about the performance or competitiveness of the distributors.

<i>Market</i>	<i>Company</i>	<i>Location</i>
India	Sitaram	Madras, India
Southeast Asia	Tanikalang	Davao, Philippines
China	Wuxi	Hong Kong, China
Indonesia	Sendang	Jakarta, Indonesia
Japan	Mitsuya	Osaka, Japan
South Korea	Woo	Seoul, South Korea

Tab. 2.2: Short characterization of the distributors in the Asian region

2.4.3 Short characterization of the suppliers

India: Vishnu, Agra, India

Vishnu is a good computer manufacturer that has the full range of products, but the company mainly focuses on standard desktops and laptops, as these are most wanted in the local region that Vishnu is operating in. As a result, they can offer sharp prices for their line of desktops and laptops. Since two years, Vishnu also expanded their

activities to the global market. They make heavy use of web portaling technologies to stay in contact with their customers, and use a very good workflow engine.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Good	Cheap
Laptop	Good	Good	Cheap
Linux	Average	Good	Pricey
Multimedia	Average	Good	Pricey

Tab. 2.3: Short characterization of supplier Vishnu in the Asian region

India: Manaskriti, Nagpur, India

Nagpur city is, as they coin it themselves, the "complete computer literate city". It is also famous as one of the biggest marketplace for computer peripherals as well as IT products. It has many computer institutes that are serving the citizens and external customers since many years. Manaskriti clearly benefits from this environment, and offers high-end computers (Linux and Multimedia) for a good price. Their customer service is reasonable.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Linux	Excellent	Average	Cheap
Multimedia	Excellent	Average	Cheap

Tab. 2.4: Short characterization of supplier Manaskriti in the Asian region

Talam, Kuala Lumpur, Malaysia

Talam is one of the companies involved in the the Multimedia Super Corridor (MSC) project (www.msc.com.my). MSC is Malaysias most exciting initiative for the global information and communication technology industry. The MSC is a dedicated 15 x 50 km Corridor, stretching from the Petronas Twin Towers in the north to the Kuala Lumpur International Airport in the south; and encompasses Cyberjaya (the Technology Core) and Putrajaya (the new administrative capital of Malaysia). Implementation of the MSC is divided into three phases from 1996-2020. Hosting more than 900 internationals, it creates a tremendous demand for multimedia computers. This is exactly what Talam focuses on.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Multimedia	Excellent	Good	Cheap

Tab. 2.5: Short characterization of supplier Talam in the Asian region

Southeast Asia: Dinhvu: Hanoi, Vietnam

Dinhvu is a new company in Vietnam that only recently started to profit from the more open market structure and uplift of the economy in Vietnam to access the global market. Due to low labor prices, their computers are quite cheap, for a reasonable quality. Their customer service process is, however, not yet up international standards. They offer all computers, except for Linux servers.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Average	Cheap
Laptop	Good	Average	Cheap
Multimedia	Good	Average	Pricey

Tab. 2.6: Short characterization of supplier Dinhvu in the Asian region

China region: Hongda, Shenyang, China

Shen-yang, formerly Mukden, is a city in northeastern China on the Hun River. The city is and has always been a major industrial center. Manufactures include tools, processed copper, machinery, steel, and electrical equipment. Shenyang is both one of Chinese megalopolises (4,5 mln. inhabitants) and an important industrial base, and the center of economy, culture, science and technology, trade, finance and transportation. Hongda company is rooted in this industrial tradition, and offers a full range of heavy duty computers. Hongda has excellent logistical qualities as well.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Good	Pricey
Laptop	Good	Good	Pricey
Linux	Good	Good	Pricey
Multimedia	Good	Good	Pricey

Tab. 2.7: Short characterization of supplier Hongda in the Asian region

China region: Cheemay, Chengdu, China

Cheemay's founders are all educated in Chinese Universities and in North American Universities. The founders worked in Chinese hi-tech enterprises as well as in North American and European enterprises, including some of the best-known hardware and software companies around the world. The company has a broad vision on computer developments. Their motto is: "Being the promoter of the globalization strategy." Their focus is 100% on desktops, for which they offer a unique and very competitive line of products.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Excellent	Good	Very cheap

Tab. 2.8: Short characterization of supplier Cheemay in the Asian region

China region: Xinlian, Wuhan, China

Wuhan is one of the six biggest cities in China. It is an important industrial, financial, commercial, educational and scientific research center for the central part of China. Transportation facilities are excellent, with railway, waterway and highway facilities. Pricing is a little expensive, but their workflow is excellent. Xinlian offers a full range of computers for a reasonable price.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Good	Pricey
Laptop	Good	Good	Pricey
Linux	Good	Good	Pricey
Multimedia	Good	Good	Pricey

Tab. 2.9: Short characterization of supplier Xinlian in the Asian region

China region: Haqiang, Changsa, China

Haqiang just had a big fire in their main production facility. In spite of a lot of hard work, they are having big trouble to get their operation up and running for a competitive market again. The price of their desktops and laptop computers suffers from the restructuring costs. Because the entire client administration was lost in the fire, workflow quality is also a problem. The desktop and laptop computers that they offer are, however, of a good quality.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Problematic	Expensive
Laptop	Good	Problematic	Expensive

Tab. 2.10: Short characterization of supplier Haqiang in the Asian region

Indonesia: Aryajati, Padang, Indonesia

This company is a family owned business on Sumatra that only does the final parts of the assembly before shipping out the computers. Parts and computer modules are bought on the world market, for laptops, they buy the entire laptop and only build in the hard disk and memory. All other types of computers are bought as complete as possible, giving Aryajati sometimes more the characteristics of a distributor than of a supplier.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Fair	Fair	Cheap
Laptop	Good	Fair	Average
Linux	Good	Fair	Average
Multimedia	Fair	Fair	Cheap

Tab. 2.11: Short characterization of supplier Aryajati in the Asian region

Japan: Kanetsumo, Saporro, Japan

Kanetsumo is a sound company that delivers high-end desktops and Linux servers. Having an excellent sales support staff and good relations to local shippers, they are able to dispatch their shipments fast.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Excellent	Average
Linux	Good	Excellent	Average

Tab. 2.12: Short characterization of supplier Kanetsumo in the Asian region

South Korean market: Hanwha, Pusan, South Korea

Hanwha is a well established company, that has consistently offered a full range

of computers for a reasonable to good price to the South Korean market. Their workflow could be handled better, but on average, the company is doing well. Transportation from Pusang is excellent, as it is the largest port city in Korea and the marine transportation center of the south coastal area of the Korean peninsula.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Fair	Fair	Cheap
Laptop	Good	Fair	Average
Linux	Good	Fair	Average
Multimedia	Fair	Fair	Cheap

Tab. 2.13: Short characterization of supplier Hanwha in the Asian region

2.5 Region Information: Europe

2.5.1 Market description

The market parties place orders with the distributors (you) for different types of products at irregular intervals. There might be market fluctuations you have to watch.

The European market is divided into several geographic regions:

- *UK/Irish Market* The UK/Irish market is viewed as a separate market, as it is geographically disconnected from mainland Europe. Organizations from the UK and Ireland place orders in this market, which has also several local suppliers. The Irish suppliers benefit from the favorable tax situation and establishment grants.
- *Scandinavian market* Scandinavia has one of the highest percentages of computer use in the world, with a lot of focus on mobile and wireless equipment.
- *Mediterranean market* This is a large market with France, Italy, Spain, and Portugal. Distances are quite large, and the region includes several industrial centers with a high demand for computers.
- *German / Benelux market* This market includes Brussels with the seat of the European Union, the industrial Ruhr area in Germany, and former East Germany where many investments in IT are still being made. With many ports



Fig. 2.3: Region information: Europe

such as Hamburg, Rotterdam, and Antwerp, this market is one of the easiest ones to reach from other places in the world.

- *Eastern European market* One of the fastest growing markets in Europe. With the new EU member states Czech Republic, Estonia, Latvia, Lithuania, Poland, and Slovakia, this is an interesting region to operate in.
- *Southeast European Market* This market includes Greece, the former Yugoslav

republics, and the new EU member states Hungary and Slovenia. IT use is growing tremendously in this region, so the market offers many possibilities for a distributor.

Each of the distributors has a local market, but of course it is allowed to compete on the other European markets as well, or even on the international market!

2.5.2 Short characterization of the distributors

See table 2.14 for a characterization of the distributors for the European region.

<i>Market</i>	<i>Company</i>	<i>Location</i>
UK	Waltons	Manchester, UK
Scandinavian	Storstrom	Copenhagen, Denmark
Mediterranean	Satolas	Lyon, France
German / Benelux	Scheffer	Enschede, The Netherlands
Eastern Europe	Gdynia	Warsaw, Poland
Southeast Europe	Najdenovski	Skopje, Macedonia

Tab. 2.14: Short characterization of the distributors in the European region

2.5.3 Short characterization of the suppliers

UK: Fanagans, Galway, Ireland

Fanagans is a fast growing business that profits from the Irish government tax regime and establishment grants. Based in the large industrial zone in Galway, they have all the relations to shippers and subcontractors that they need. Fanagans offers all types of computers for a reasonable price. Their workflow quality is excellent. Their only problem is the shipping time of their products to mainland Europe. This tends to make their products slightly more expensive than the products of their competitors.

UK: Hytec, Edinburgh, Scotland

Hytec has been on the market for many years. Originating in the heavy industry, and later moving into control systems, they have a lot of experience with getting components from all over the world. They specialize in desktop computers and Linux servers. Their sales staff is a little sloppy, so answering of customer demands is not always done quickly. The price of their desktops is good, but their Linux servers are

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Excellent	Good	Average
Laptop	Excellent	Good	Average
Linux	Excellent	Good	Average
Multimedia	Excellent	Good	Average

Tab. 2.15: Short characterization of supplier Fanagans in the European region

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Excellent	Below average	Good
Linux	Excellent	Below average	Pricey

Tab. 2.16: Short characterization of supplier Hytec in the European region

too expensive.

Scandinavia: Aursunden, Trondheim, Norway

Aursunden is an average computer supplier. They offer all products for a reasonable price, and can respond in a reasonable time. Six years ago, they won an innovation award, but since that time management has changed twice, and the innovative character of the company is gone.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Fair	Average
Laptop	Good	Fair	Average
Linux	Good	Fair	Average
Multimedia	Good	Fair	Average

Tab. 2.17: Short characterization of supplier Aursunden in the European region

Scandinavia: Vanavesi, Tampere, Finland

Finland is one of the most mobile countries around the world, with a high density of telecommunications networks and wireless access points. Vanavesi is aiming at the mobile market by offering laptop computers. They can usually offer a sharp price in a reasonable time. The quality of their laptops is good.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Laptop	Good	Excellent	Cheap

Tab. 2.18: Short characterization of supplier Vanavesi in the European region

Mediterranean: Desarrollo, Barcelona, Spain

Desarrollo is part of a European chain of computer suppliers. They source around the world, and offer an averagely priced set of computers. The size of the company has also resulted in a slow handling of the orders. Desarrollo tries to keep the local inventory small, as they can source from other members of the chain when they do not have enough stock available in Barcelona. Therefore, customers sometimes have to wait long for their promised orders. Desarrollo offers all types of available computers, and can handle special requests as well because of the size of the chain.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Below average	Average
Laptop	Good	Below average	Average
Linux	Good	Below average	Average
Multimedia	Good	Below average	Average

Tab. 2.19: Short characterization of supplier Desarrollo in the European region

Mediterranean: Sistemi, Genoa, Italy

Sistemi offers good desktops, linux and multimedia computers for a low price. The company has a no-nonsense attitude, and it is working with the most modern order tracking software to satisfy their customers.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Excellent	Cheap
Linux	Good	Excellent	Cheap
Multimedia	Good	Excellent	Cheap

Tab. 2.20: Short characterization of supplier Sistemi in the European region

Mediterranean: Debeaux, Mulhouse, France

Debeaux is currently going through a merger with Subrenat, which caused quite a

stir with the employees from Debeaux, as they had always seen Subrenat as one of their main competitors. The CEO of Debeaux, Mr. Gauthier, indicated that it was necessary to save on support staff in order to be competitive again. Some of the support staff are looking for another job in the region, as they expect to be fired when the merger gets through. The technical support staff is quite good. Debeaux does not sell Linux computers.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Problematic	Average
Laptop	Good	Problematic	Average
Multimedia	Good	Problematic	Average

Tab. 2.21: Short characterization of supplier Debeaux in the European region

Germany/Benelux: Eisenstein, Koblenz, Germany

Eisenstein is part of a big European telecommunication chain. It does the final parts of the assembly before shipping out the computers. Parts and computer modules are bought on the world market, for laptops, they tend to just build in the hard disk and memory, which makes their laptops slightly boring. Their Linux servers tend to be technically behind the products of some of their competitors. Eisenstein always tries to sell complete solutions to their bigger customers, including all the telecommunications equipment and networking. Their sales and support staff is working fine.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Average	Average
Laptop	Good but not innovative	Average	Pricey
Linux	Not innovative	Average	Average
Multimedia	Good	Average	Average

Tab. 2.22: Short characterization of supplier Eisenstein in the European region

Germany/Benelux: Kapsch, Linz, Austria

The Kapsch company is special in the sense that they assemble the computers to customer's orders. The company has highly trained personnel and is very flexible; the downside is that ordering can take long, due to the peaked demand that the company faces. At this moment, Kapsch does not sell laptops.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Excellent	High quality but slow	Expensive
Linux	Excellent	High quality but slow	Expensive
Multimedia	Good	High quality but slow	Expensive

Tab. 2.23: Short characterization of supplier Kapsch in the European region

Eastern Europe: Pulaski, Poznan, Poland

Pulaski wants to get out products as fast as they can, and they usually succeed in that, but their handling is sloppy. Last year, the company faced a number of law-suits from companies who did not get their products on time, and could not cancel their orders. Their laptops are of very low quality, and actually too expensive, given the low quality. Pulaski never cared about customer care, and their free helpline is usually unmanned.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Fair	Terrible	Cheap
Laptop	Bad	Terrible	Pricey
Linux	Fair	Terrible	Cheap
Multimedia	Fair	Terrible	Cheap

Tab. 2.24: Short characterization of supplier Pulaski in the European region

Eastern Europe: Danubis, Cluj-Napoca, Romania

Danubis is selling computers assembled from parts from various Chinese factories. The quality of their computers is reasonable, and their multimedia computers have an excellent performance. Their workflow is average, but also here the multimedia department performs better than the other departments. The prices are average for all types of computers, although their Linux computers tend to be pricey.

Southeast Europe: Tvornica, Croatia

Tvornica really profits from its strategic transportation location in Split, Croatia. They import high quality electronics, hard disks, and processors from different European and Asian suppliers for a good price. All their computers are offered in a reasonable time. Tvornica outsourced their customer handling services to the international company Global Service Handling Inc., and was able to negotiate an

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Fair	Average
Laptop	Good	Fair	Average
Laptop	Good	Fair	Pricey
Multimedia	Excellent	Excellent	Average

Tab. 2.25: Short characterization of supplier Danubis in the European region

excellent Service Level Agreement (SLA).

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Good	Inexpensive
Laptop	Good	Good	Inexpensive
Linux	Good	Good	Inexpensive
Multimedia	Good	Good	Inexpensive

Tab. 2.26: Short characterization of supplier Tvornica in the European region

2.6 Region Information: US

2.6.1 Market description

The market parties place orders with the distributors (you) for different types of products at irregular intervals. There might be market fluctuations you have to watch. The US market is divided into the "traditional" geographic regions: Northwest, North central, Northeast, Southwest, South central, and Southwest. Each of the distributors has a local market, but of course it is allowed to compete on the other US markets as well, or even on the international market!

2.6.2 Short characterization of the distributors

There is one distribution company in each of the US markets. As you are managing the distributor in the game, not much can be said about the performance or competitiveness of the distributors. The competing distributors in the USA are illustrated in table 2.27.

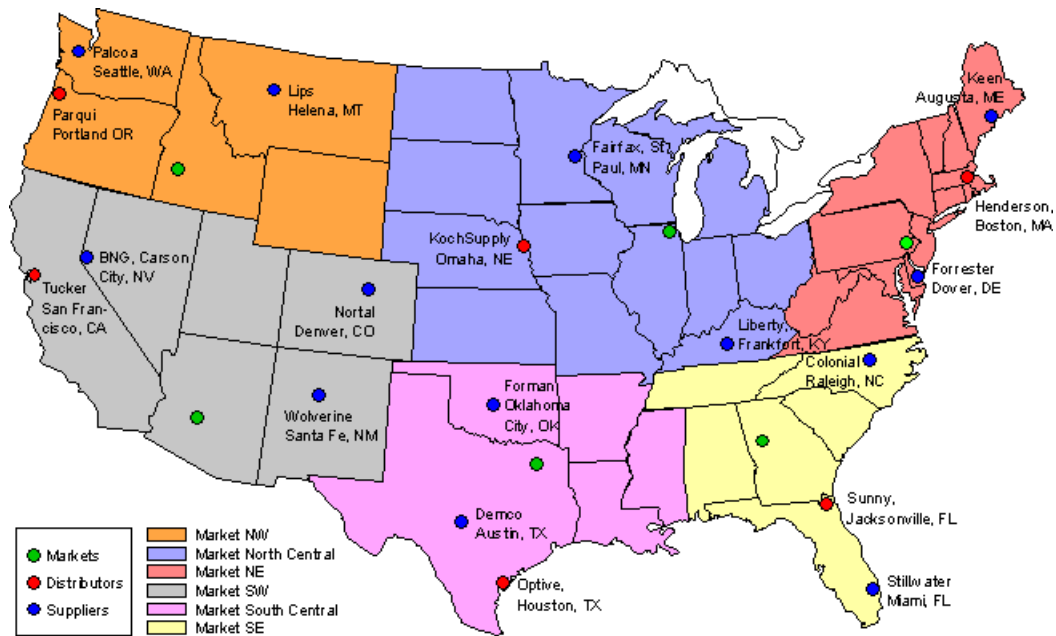


Fig. 2.4: Region information: US

<i>Market</i>	<i>Company</i>	<i>Location</i>
Northwest	Parqui	Portland, OR
North central	Kochsupply	Omaha, NE
Northeast	Henderson	Boston, MA
Southwest	Tucker	San Francisco, CA
South central	Optive	Houston, TX
Southeast	Sunny	Jacksonville, FL

Tab. 2.27: Short characterization of the distributors in the US region

2.6.3 Short characterization of the suppliers

Northwest: Palcoa, Seattle, WA

Palcoa is a relatively new computer supplier on the market, specialized in multimedia computers. The founders of Palcoa especially aim at business from and via Microsoft, and their company is close to Microsoft's headquarters.

Northwest: Lips, Helena, MT

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Multimedia	Good	Fair	Average

Tab. 2.28: Short characterization of supplier Palcoa in the US region

Lips has been on the market for many years. Originating in the electronics business, they have a lot of experience with getting good components from all over the world. They specialize in desktop computers and servers, but they offer a complete range of computers.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Excellent	Good	Average
Laptop	Excellent	Good	Expensive
Linux	Excellent	Fair	Average
Multimedia	Excellent	Fair	Average

Tab. 2.29: Short characterization of supplier Lips in the US region

North central: Fairfax, St. Paul, MN

Fairfax has been started four years ago by a number of alumni of the University of Minnesota. With an early involvement of engineers, financial experts, and business experts, Fairfax has been able to supply a good product, and provide excellent services to their customers. The products are good over the entire range.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Excellent	Average
Laptop	Good	Excellent	Average
Linux	Good	Excellent	Average
Multimedia	Good	Excellent	Average

Tab. 2.30: Short characterization of supplier Fairfax in the US region

North central: Liberty, Frankfort, KY

Liberty is part of a worldwide chain of computer suppliers. They source around the world, and offer a cheap set of computers. The size of the company has, however,

not resulted in a fast handling of the orders. Liberty tries to keep the local inventory small, as they can call upon other members of the chain when they do not have enough stock in Frankfort. Therefore, customers sometimes have to wait long for their promised orders. Liberty offers a full range of computers.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Sometimes slow	Average
Laptop	Good	Sometimes slow	Average
Linux	Good	Sometimes slow	Average
Multimedia	Good	Sometimes slow	Average

Tab. 2.31: Short characterization of supplier Liberty in the US region

Northeast: Forrester, Dover, DE

Being close to the Washington DC area, Forrester has done business with government agencies and ministries for many years. The public character of the customers has led to prices that are a little higher than the USA average, but the prices are certainly reasonable. Forrester's customers normally take their time to order, and as a result, Forrester's handling tends to be on the slow side as well. Forrester does not offer multimedia computers, and for the past year, they have also offered a product line of Linux servers.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Slow	On the pricey side
Laptop	Good	Fair	On the pricey side
Linux	Good	Slow	On the pricey side

Tab. 2.32: Short characterization of supplier Forrester in the US region

Northeast: Keen, Augusta, ME

The Augusta, Maine based Keen company has as its motto: "Be keen on quality". All products offered by Keen are A brands. Keen heavily invested in workflow management and inventory management, so the contacts with customers are fast and efficient. Quality has a price, so Keen is one of the more expensive companies around.

Southwest: BNG, Carson City, NV

BNG (Bolden-Nash-Gold) is the result of a merger of three small computer suppliers

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Excellent	Excellent	Expensive
Laptop	Excellent	Excellent	Expensive
Linux	Excellent	Excellent	Expensive
Multimedia	Excellent	Excellent	Expensive

Tab. 2.33: Short characterization of supplier Keen in the US region

in the Carson City area. BNG offers a wide range of services in addition to supplying computers, and their customers often make heavy use of these services as well. With the rapid growth of the company in other fields than computers, the staff's attention for their main product is wavering a bit. Last month, the CEO decided to cut back on the types of computers for large customers, and mainly focus on desktops.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Fair	Average

Tab. 2.34: Short characterization of supplier BNG in the US region

Southwest: Nortal, Denver, CO

Nortal is a Unix / Solaris / Linux server company. Traditionally, the company has had good relations with the Sun Microsystems' Colorado research campus in Broomfield, CO. By closely following the developments of one of the market leaders, Nortal has been able to offer very advanced technology for a good price. Their sales and support staff is well trained, customer friendly, and fast. Since 1996, when Sun expanded into Colorado, Nortal has experienced a steep growth in sales every year.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Linux	Excellent	Excellent	Good value for money

Tab. 2.35: Short characterization of supplier Nortal in the US region

Southwest: Wolverine, Santa Fe, NM

Wolverine is your average computer supplier. They offer all products for a reasonable price, and can respond in a reasonable time.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Fair	Average
Laptop	Good	Fair	Average
Linux	Good	Fair	Average
Multimedia	Good	Fair	Average

Tab. 2.36: Short characterization of supplier Wolverine in the US region

South central: Demco, Austin, TX

Demco has served the State of Texas with computers for many years, and it has grown enormously. Last year, Demco attempted to apply for a stock market notation, but failed. The company responded by diversifying its prices; the prices of commodity computers like laptops and desktops have been lowered; multimedia computers and Linux computers are now more expensive. Demco has recently not been very fortunate with choosing their desktop supplier; quality and prices are not in line with average prices in the USA. Demco has a reasonable support staff.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Below average	Fair	Slightly expensive
Laptop	Good	Fair	Average
Linux	Fair	Fair	Average
Multimedia	Good	Fair	Average

Tab. 2.37: Short characterization of supplier Demco in the US region

South central: Forman, Oklahoma City, OK

Forman offers good desktops for a low price. The company has a no-nonsense attitude, and has invested heavily in optimizing their supply chain, and teams with other suppliers to experiment with supply chain management software.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Good	Cheap

Tab. 2.38: Short characterization of supplier Forman in the US region

Southeast: Colonial, Raleigh, NC

Colonial recently got the order for delivering all the computers for the new downtown convention center in Raleigh, NC. The company has been able to expand, and invest some budget into training of their sales staff. The focus of Colonial is on desktops, although they are also able to sell laptops. With their imports from Japan, they offer good quality equipment.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Good	Good	Average
Laptop	Good	Good	Pricey

Tab. 2.39: Short characterization of supplier Colonial in the US region

Southeast: Stillwater, Miami, FL

After the death of the CEO last year, Stillwater has replaced its management already two times. Many dedicated employees have left, and the sales department is a shambles. Often, customers are not called back and sometimes orders are not delivered... Reaction times are terribly slow. The product quality is not something to be proud of either. This is typically a company to avoid! The company, by the way, does not sell Linux computers.

<i>Product type</i>	<i>Product quality</i>	<i>Workflow quality</i>	<i>Pricing</i>
Desktop	Bad	Terrible	Too expensive
Laptop	Bad	Terrible	Too expensive
Multimedia	Bad	Terrible	Too expensive

Tab. 2.40: Short characterization of supplier Stillwater in the US region

3. GAME FLOW

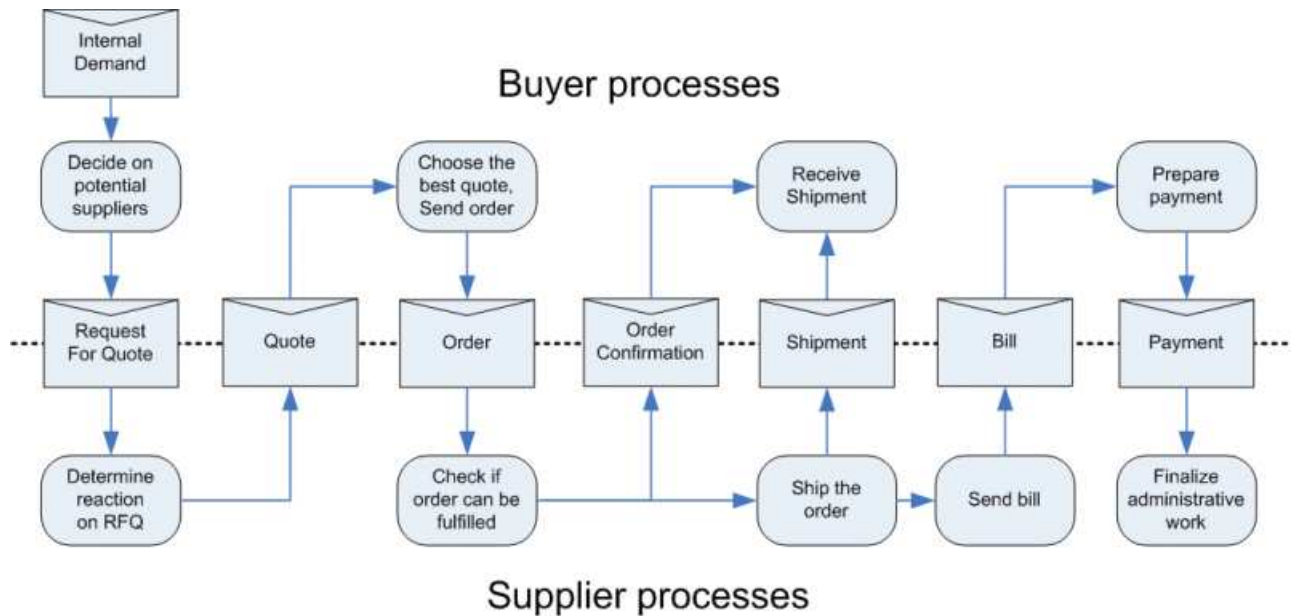


Fig. 3.1: Game flow

The flow of the game is illustrated in the figure above. It starts when a customer sends a request for quote to one or multiple distributors. The description below shows the flow of actions, which takes place when a customer places an order with you. When you place an order with one of your suppliers, the flow is completely similar, only you play the role of the customer in that case.

Your customers have a limited budget, and therefore they want to be able to compare a number of offers before they decide where to buy their products. To get an indication of the offers and the prices, they place a so-called Request for Quote or RFQ with a number of suppliers. The RFQ contains the type of product and number of products that the customer wants, with a time interval in which they would like to have the products delivered. When you receive an RFQ, you can look whether it is interesting for you (Where is the customer located? Do I have the products on

hand? Who is my competition?, etc.). When you find the request interesting, you respond with a Quote. In the quote, you state your proposed price and proposed delivery date. You could deviate from the requested amount and from the indicated time window, but be aware that the customer will select the most interesting offer. In some cases, you can make your offer more interesting by providing extra services, such as warranty, local support, or on-site installation. Be aware, however, that extra features cost you extra money. When submitting a quote, you also have to watch your stock at-hand, and already committed stock, as well as the confirmed orders for the coming period. When you cannot fulfill the order later on time, your customer might blacklist you or impose a fine, which is worse than not submitting a quote at all. Another point to take into consideration is that the customer does not want to wait too long with ordering – remember that the market is volatile. When you do not promptly submit your quotes, one of your competitors will have already have gotten the order.

Suppose that the customer selected your offer as the most interesting one. It will do so by sending you an Order. The order contains the information of your quote, and might be amended with changes. Usually, however, the order from the most interesting supplier is consistent with the quote that it submitted. Please note that if a customer does not pick your quote, he or she will simply not respond to you. They will not notify you directly that they have not picked your quote.

When you receive an order, there is one more step to take: you have to send an Order Confirmation to the customer. This is the last time you can still cancel the order – for a price. After sending the order confirmation, you put the order into your schedule on the shipment date. The customer will put the order in its schedule, on the promised delivery date.

When the shipment date arrives, the products are taken from your inventory (if they are available) and shipped. Between shipment and arrival, the products are in transit. When the customer receives the products, you will be notified that the products have arrived. Usually, you will send a Bill to the customer at the same time that you ship the products. A bill will have a payment period. Hopefully, the customer will pay the bill by sending you a Payment on time. After receiving the payment, the ordering process is over: the customer received the goods, and the goods have been paid.

As a distributor, you also order products from the suppliers. This process is 100% similar to the above process; you only act as the customer in the above work flow sketch. This means that when you want a product, you send out an RFQ to a number of suppliers, and wait for one or more quotes to come in. After a while, you compare the quotes and select the best one by placing an order with the supplier. After that,

you will (hopefully) receive an order confirmation, the products, and a bill that you have to pay. When you receive the products, they will immediately be placed in your inventory. A more detailed description of the messages is available in the sections below.

3.1 Request For Quote

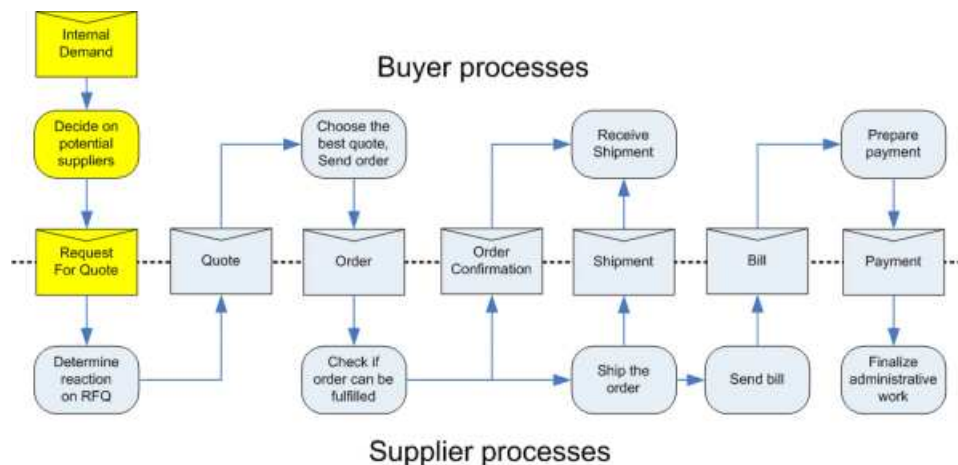


Fig. 3.2: Game flow: request for quote

The ordering workflow starts when a customer (your client to you, or you to a supplier) sends a request for quote to one or multiple distributors or suppliers (see figure 3.2). Your customers have a limited budget, and therefore they want to be able to compare a number of offers before they decide where and when to buy their products. To get an indication of the offers and the prices, they place a so-called Request for Quote or RFQ with a number of suppliers. The RFQ contains the type of product and number of products that the customer wants, with a time interval in which they would like to have the products delivered.

RFQ properties

The RFQ has the following properties to be entered:

- *Product name.* The product to order.

- *Quantity*. The number of products to order.
- *Cutoff date*. In many cases, the RFQ process takes a limited time, and will be broken off after a certain cutoff date. In the game, this date is often indicated with the label 'Respond before'.
- *Earliest delivery date*. The earliest date of delivery that the client accepts.
- *Latest delivery date*. The last possible date of delivery.
- *Suppliers*. Selected suppliers to send the RFQ to.

3.2 Quote

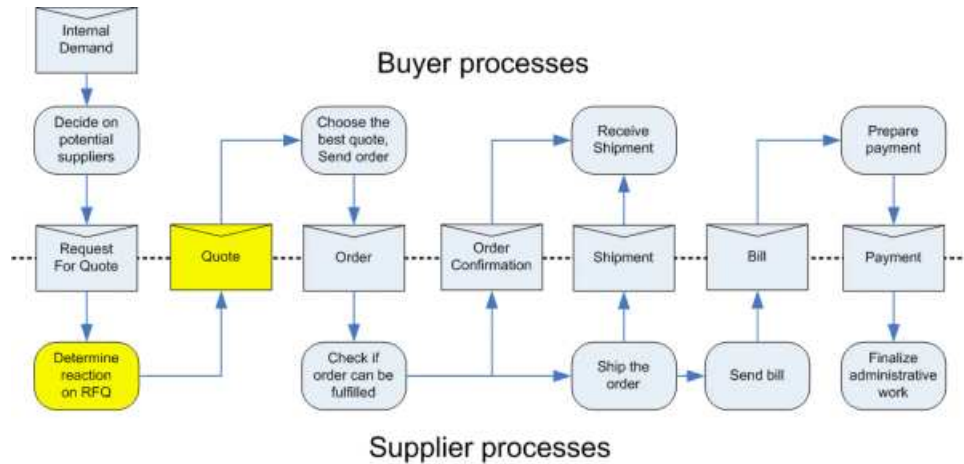


Fig. 3.3: Game flow: quote

When you receive an RFQ, you can look whether it is interesting for you. This process is called the quoting process (see figure 3.3). Questions you answer are for instance: Where is the customer located? Do I have the products on hand? Who are my competitors? When you find the request interesting, you respond with a Quote. In the quote, you state your proposed price and proposed delivery date. You could deviate from the requested amount and from the indicated time window, but be aware that the customer will select the most interesting offer. In some cases, you can make your offer more interesting by providing extra services, such as warranty,

local support, or on-site installation (the availability of these services depends on the particular game you are playing). Be aware, however, that extra features cost you extra money. When submitting a quote, you also have to watch your stock at-hand, and already committed stock, as well as the confirmed orders for the coming period. When you cannot fulfill the order later on time, your customer might blacklist you or impose a fine, which might be worse than not submitting a quote at all. Another point to take into consideration is that the customer does not want to wait too long with ordering – remember that the market is volatile. When you do not promptly submit your quotes, you might have violated the cutoff date of the RFQ and consequently not get the order.

Quote properties

The Quote has the following properties:

- *RFQ*. The RFQ to which the quote belongs (not changeable).
- *Proposed amount*. The number of products that are actually promised.
- *Promised delivery date*. The promised date of delivery.
- *Base Price*. The price per product unit that the supplier is asking for the proposed amount of products.
- *Price*. The total price that the supplier is asking for the overall order.

You have to take into account the transportation time and transportation mode when promising products on a certain date. An estimate of the transportation time is usually given in the game.

3.3 Order

Suppose that the buyer has selected one of the Quotes as the most interesting one. It will do so by sending the particular supplier an Order (see figure 3.4). The order contains the information of the quote, and in rare circumstances it might be amended with changes. Usually, however, the order from the most interesting supplier is consistent with the quote that it submitted. Please note that if a customer does not pick a certain quote, he or she will simply not respond to you. They will not notify you directly that they have not picked your quote. This is why the cutoff date (see RFQ) is so important: as a supplier you know that when you did not hear from the

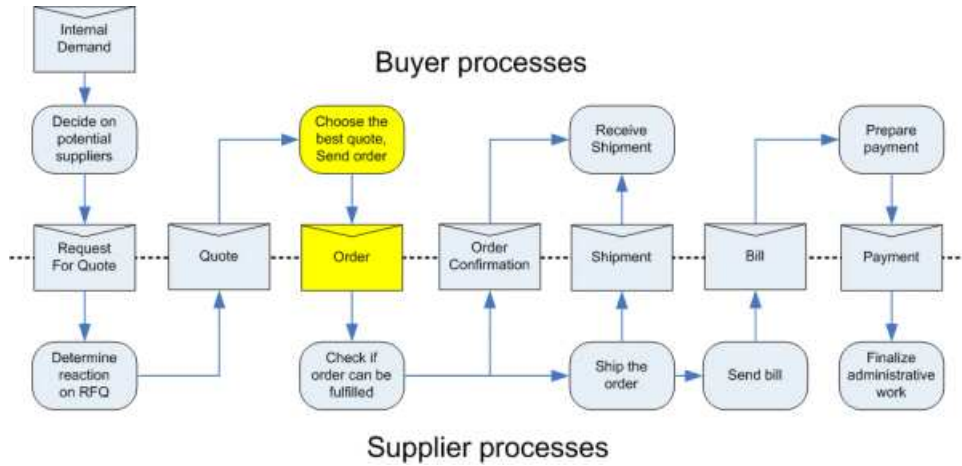


Fig. 3.4: Game flow: order

buyer a day or so after the cutoff date, the order will not have been granted. In the user interface for a player, the quote will be removed from the screen, and be counted as an unsuccessful quote.

Order properties

The Order has the following properties:

- *Quote and RFQ.* The Quote and underlying RFQ to which the order belongs (not changeable).
- *Proposed amount.* The number of products that are actually promised (not changeable).
- *Promised delivery date.* The promised date of delivery (not changeable).
- *Price.* The total price that the supplier is asking for the overall order (not changeable).
- *Confirmation.* Yes or No, confirm or reject the quote. If yes, an order will be sent out.

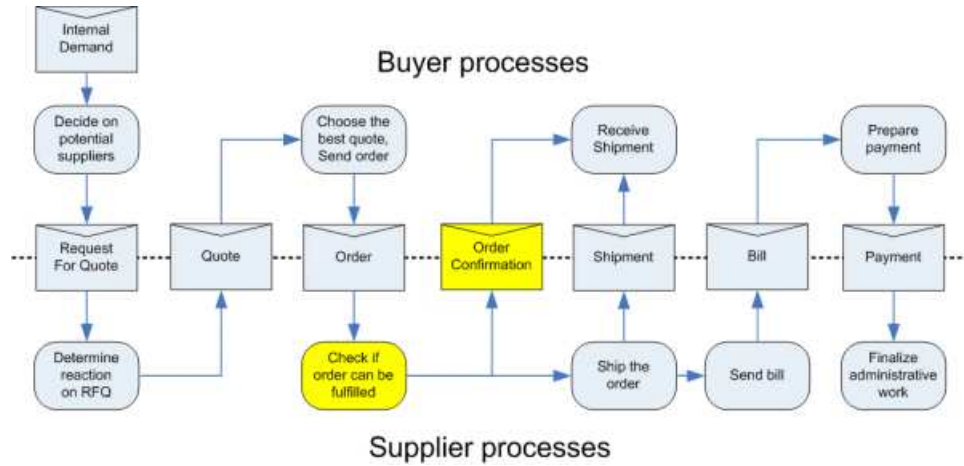


Fig. 3.5: Game flow: order confirmation

3.4 Order Confirmation

When an order is received, there is one more step to take: sending an Order Confirmation to the supplier (see figure 3.5). This is the last time an order could still be cancelled – for a price. After sending the order confirmation, the supplier will put the order into its schedule on the shipment date. The customer will put the order in its schedule on the promised delivery date.

Order Confirmation properties

The Order Confirmation has the following properties:

- *Order.* The underlying Order to which the confirmation belongs (not changeable).
- *Proposed amount.* The number of products that are actually promised (not changeable).
- *Promised delivery date.* The promised date of delivery (not changeable).
- *Price.* The total price that the supplier is asking for the overall order (not changeable).
- *Confirmation.* Yes or No, confirm or reject the quote. If yes, an order will be sent out (not changeable).

The Order Confirmation is a feedback that does not contain any changeable properties. The confirmation is used to enter the order into the plan of the buyer.

3.5 Shipment

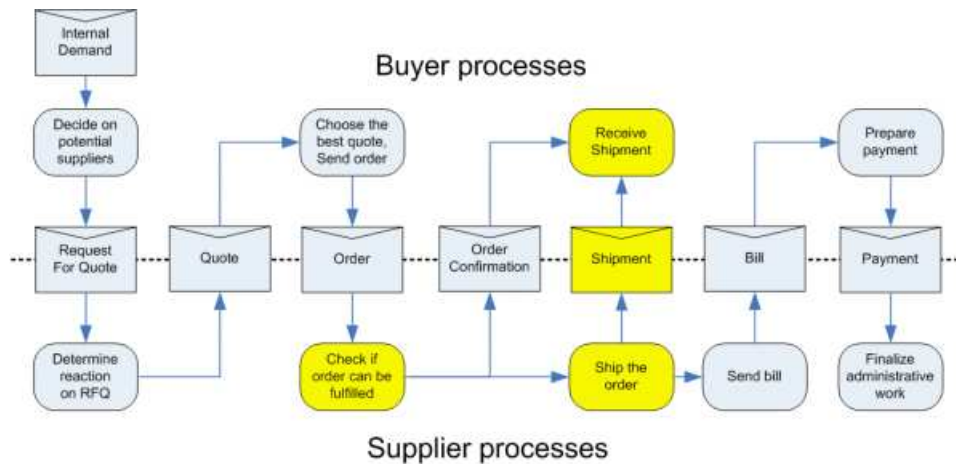


Fig. 3.6: Game flow: shipment

When the shipment (see figure 3.6) date for a confirmed order arrives, the supplier takes the products are taken from its inventory (if they are available) and are shipped. Between shipment and arrival, the products are in transit. When the customer receives the products, both parties will be notified that the products have arrived. When the products are not available with the supplier, the inventory is checked every 24 hours to see if they are already available. As a result, the shipment will arrive too late at the customer, and a fine may be imposed. When the goods have not arrived after a very long time (usually 2 weeks or a month, this depends on the scenario), you might get a bill including a large fine for the order that you have to pay in spite of not yet having delivered the products.

Shipment properties

The Shipment has the following properties:

- *Order*. The underlying Order to which the shipment belongs (not changeable).

- *Delivered amount.* The number of products that are actually delivered (not changeable).
- *Actual delivery date.* The actual date of delivery (not changeable).
- *Price.* The total price that the supplier is asking for the overall order (not changeable).

3.6 Bill

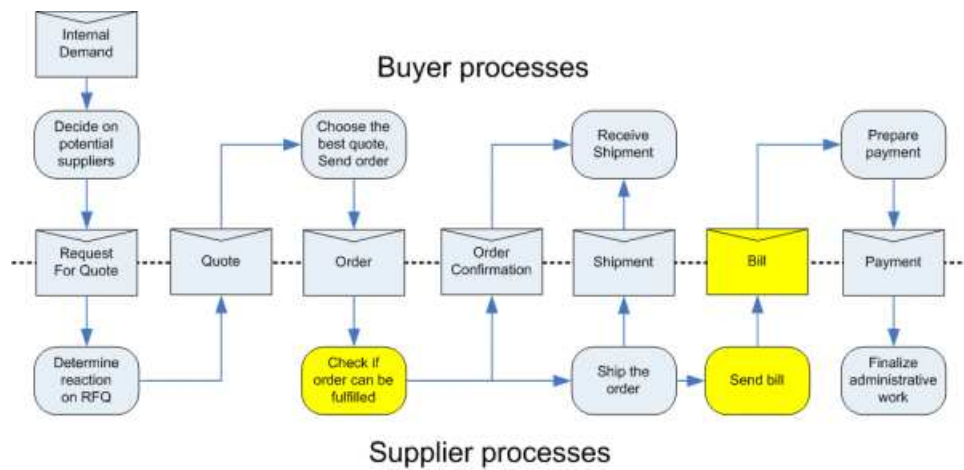


Fig. 3.7: Game flow: bill

Usually, the supplier will send a Bill (see figure 3.7) to the buyer at the same time that the products are being shipped, although that may be different per scenario of the game (in some scenarios payment is asked in advance, in some scenarios payment has to be done at the delivery moment, and in some scenarios a bill might be sent late). A bill will have a payment period. Hopefully, the buyer is able to pay the bill by sending a Payment on time.

Bill properties

The Bill has the following properties:

- *Order.* The underlying Order to which the bill belongs (not changeable).

- *Price*. The total price that the supplier has to pay for the overall order (not changeable).
- *Payment date*. The final date when the payment has to arrive at the supplier (not changeable).

3.7 Payment

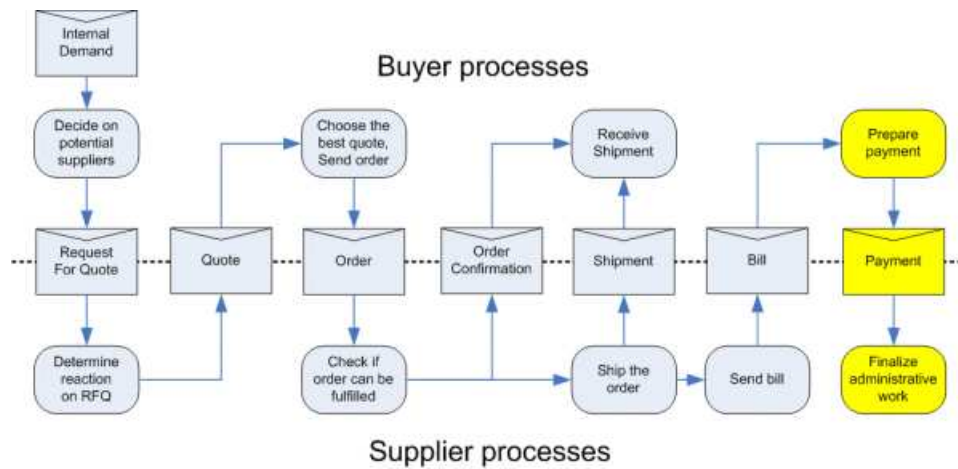


Fig. 3.8: Game flow: payment

The Payment is the final step in the overall ordering process (see figure 3.8): the customer received the goods, and the goods have been paid.

When payment is too late, a fine will be imposed, which will be paid to the supplier. The fine is not invoiced; the fine amount is immediately deducted from your bank account, even if the bank account is negative.

Payment properties

The Payment has the following properties:

- *Order*. The underlying Order to which the bill belongs (not changeable).
- *Price*. The total price that the supplier has to pay for the overall order (not changeable).

- *Requested payment date.* The final date when the payment has to arrive at the supplier (not changeable).
- *Actual payment date.* The date when the payment actually takes place.

3.8 Transportation

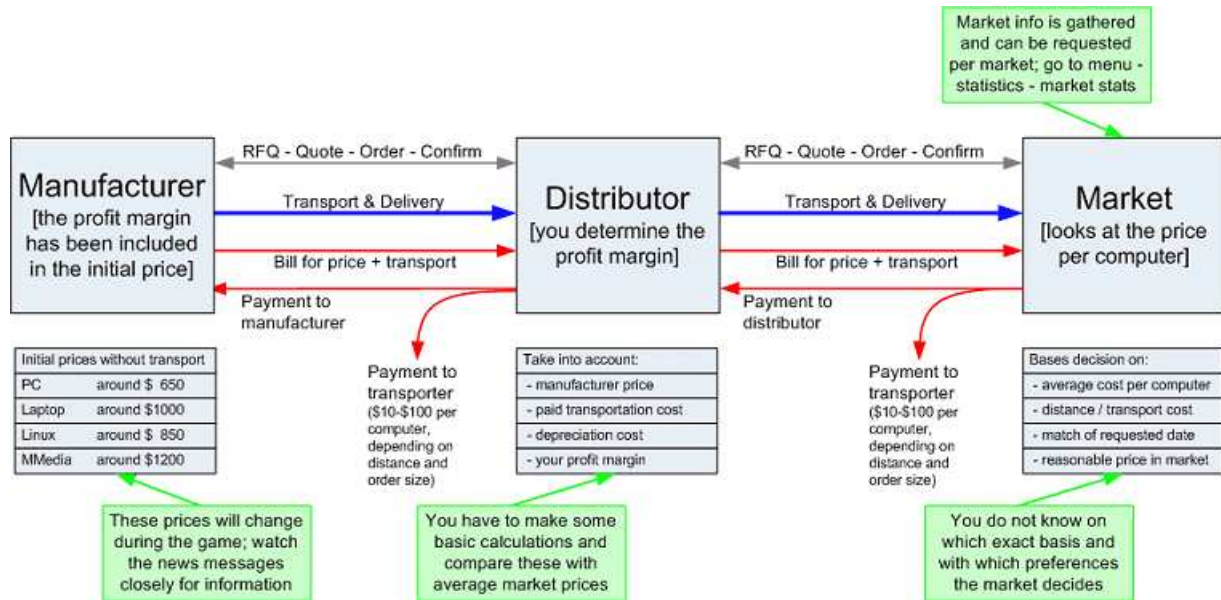


Fig. 3.9: Handling of transportation costs

Transportation (see figure 3.9) is taken care of by a 3rd party transportation company. This company takes care of the transportation between your company, an airfield, additional handling and the transportation from the airfield to your customer. For handling and transportation you pay a price, of course.

When you want to buy a number of products, e.g. 20 Desktops, you'll send a request for quote to one or more suppliers. As a result, you'll receive a number of quotes. In each of these quotes, a part of the proposed price is for transportation. These costs are calculated on the weight of the product, the requested amount and the region and distance to the supplier. When you pay a bill, the costs for transportation are diverted to the 3rd party transportation company.

When you send a quote to one of your markets, the transportation costs are added to your quote automatically. However, you're able to see these costs when you send a quote. When a payment is received from one of your markets, the transportation costs are diverted to the 3rd party transportation company.

As you can see, the transportation company takes care of all the handling and transportation involved with your shipments. For case specific costs used in your game, please check the case description, e.g. Local vs. Global.

4. PLAYER APPLICATION

A player application (see figure 4.1) that can be started from a Web browser, is used to control the decisions for the company that you are managing in the game. Using the application, you can manage all the activities a distributor has to take care of, such as purchasing, sales, inventory management, and financial management. For each of the different parts of the application, a description is provided. Detailed descriptions of the functionality can be obtained using the navigation menu on the left of this web-page. When a player logs on (see also Player login), a player application is initialized with the latest information of the game. During play, a player may log off, and later on login again. The information received during a inactive period is stored and later on presented to a player when he or she logs in again.

4.1 *Main components on the screen*

As can be seen on the screen above, there are several panels on the screen with different information. From top to bottom:

- *Menus.* The menus enable the player to view several types of statistics and to read larger news messages with important information for the player.
- *Game time.* The game time is shown in hours since the game play started, with the date and the time. The top-right bar in the date panel is red when the game is paused for a moment by the game administrator, for a break, for debriefing, or for administrative purposes.
- *Purchase business messages.* These contain a possibility to submit RFQs (click on "Submit and view RFQs" for the right product) and to see the responses from suppliers on your submitted RFQs. The numbers indicate the number of messages for each product.
- *Sales business messages.* Incoming RFQs from customers are shown here, and the player can react to the incoming RFQs. The numbers indicate the number of messages for each product.

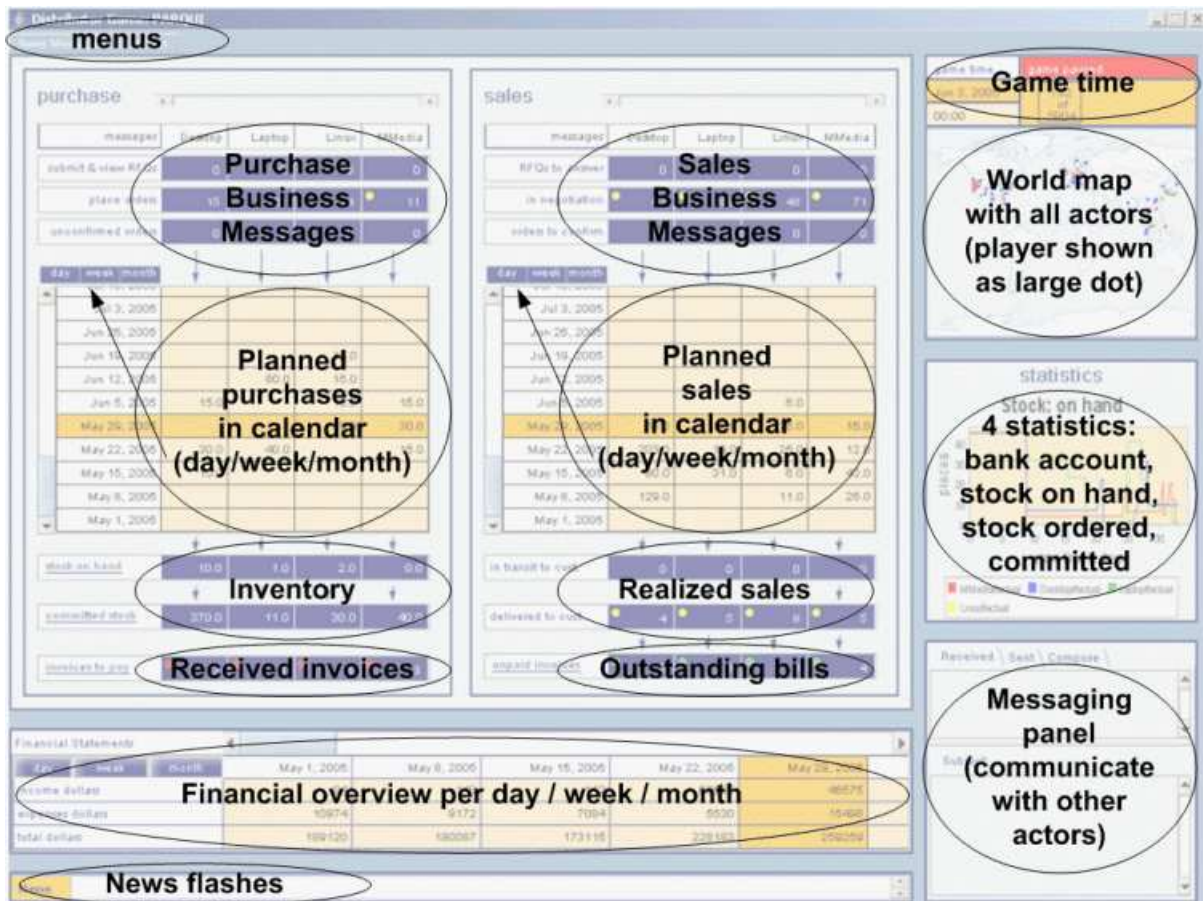


Fig. 4.1: Player mainscreen with explanation

- *World map*. The world map shows all actors per type and displays the player as a larger dot on the map.
- *Planned purchases in calendar*. The planned purchases are given as the amount of confirmed purchases of products per day / week / month (depending on the aggregation level chosen – see the arrow in the picture). The amount is not a guarantee, as some suppliers can not deliver on time. The numbers are inserted

in the calendar based on the delivery date.

- *Planned sales in calendar.* The planned sales are given as the amount of confirmed deliveries of products per day / week / month (depending on the aggregation level chosen – see the arrow in the picture). The amount is not a guarantee, as you might not have enough stock to deliver on time. The numbers are inserted in the calendar based on the shipment date.
- *Four statistics.* Four different types of statistics are displayed in a cycle to show you the most important statistical information for the distributor company: evolution of the bank account, the stock on-hand per product, the ordered stock per product, and the committed stock per product. The graphs are displayed for the time between the start of game play and the current moment.
- *Inventory.* The total stock on-hand and the total committed stock per product is displayed here. The committed stock is based on the confirmed sales per product.
- *Realized sales.* All sales that have taken place are stored here for review.
- *Received invoices.* The number of invoices that you have to pay is displayed; you have to actually carry out the payment by clicking on the numbers.
- *Outstanding bills.* The number of invoices that have to be paid to you is displayed; you do not have to take any action; bills will be paid, and if the customer pays late, you additionally receive a fine from the customer. When the bills have been paid to you, they disappear from this part of the screen.
- *Messaging panel.* The messaging panel enables you to exchange messages with other players or with the game leader. Especially in a distributed setting, this is the most efficient way to communicate with other actors or the game administrator.
- *Financial overview.* A simple income and expense statement per day / week / month is displayed here to give you an overview of your cash flow. By clicking on the day / week / month tabs you can change the aggregation level.
- *News flashes.* Brief one-line news messages are displayed at the bottom of the screen. Larger news messages can be viewed with the "News" menu item

An example of a screen with actual data is shown in figure 4.2.

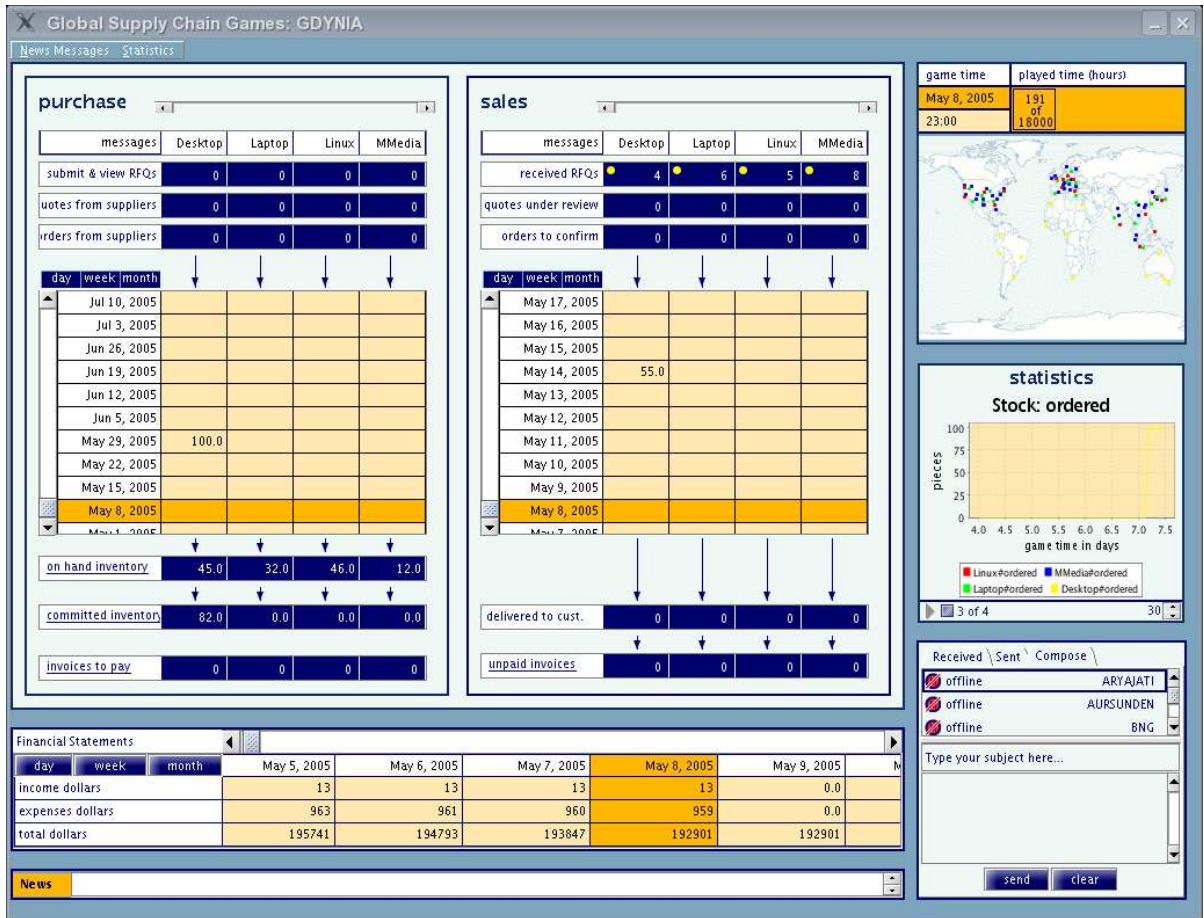


Fig. 4.2: Player mainscreen with data

4.2 Business processes and corresponding business messages

We describe the business processes which are used in a game to communicate with other actors. Based on the game flow the following processes are described:

Purchasing:

- submitting a Request for Quote (RFQ) to selected potential suppliers.
- choosing the best quote from the provided quotes and placing an order with a supplier.
- receiving a shipment.
- paying for the delivered order.

Selling:

- reacting on an RFQ with a quote.
- confirming an order if your quote has been answered with an order.
- preparing and transporting a shipment to your customer.
- sending a bill to your customer.

In all these business processes, business messages are used. All messages (except order confirmations, bills and payments) have a lifetime. This means that after a certain period of time during which these messages are not processed, they are removed automatically. This happens for example when the cutoff date of a request for quote has expired, and it has not been processed (i.e. deleted or answered with a quote).

4.2.1 Purchase



The Purchase part (see figure 4.3) of a player application is used to buy products from suppliers.

You are able to submit new RFQs, to place orders based on received quotes, and to view unconfirmed orders. As soon as an order is confirmed by a manufacturer, its promised date of delivery is made visible on the calendar.

You are able to view the orders which will be received on a daily, weekly, and monthly

basis. Below the calendar, there are two rows visible which show the stock on hand and the committed stock. The last one is the amount per product which you have already promised to its customers. The lowest part of the panel enables you to view bills, and, at the moment you want to, send a payment.

purchase				
messages	Server	MMedia	Linux	Des
submit & view RFQs	0	0	0	
place orders	0	0	0	
unconfirmed orders	0	0	0	
day	week	month		
Jun 22, 2005				
Jun 21, 2005				
Jun 20, 2005				
Jun 19, 2005				
Jun 18, 2005				
Jun 17, 2005		30.0		
Jun 16, 2005				
Jun 15, 2005	20.0			
Jun 14, 2005				
Jun 13, 2005				
Jun 12, 2005				
stock on hand	33.0	12.0	13.0	
committed stock	0.0	0.0	0.0	
invoices to pay	1	0	0	

Fig. 4.3: Player application purchase

Placing a Request For Quote

As explained, the process in a game starts with a request for quote (RFQ) sent to a customer. In a request for quote (see figure 4.4), one has to specify the earliest delivery date, the latest delivery date, the preferred amount or number of products, and the suppliers to send the RFQ to. By default, the suppliers are sorted on distance with the closest supplier on top. For each supplier, a small description of the transportation characteristics is given. "TIME[h]:24" refers to the hours needed for shipping the products to you, "COSTS=200+COSTS/UNIT=3" indicates that the fixed costs for a shipment to you are 200.0 plus an additional fee of 3 per unit you order. In

case you order 100 products, your transportation costs will be $200 + (100 * 3) = 500$.

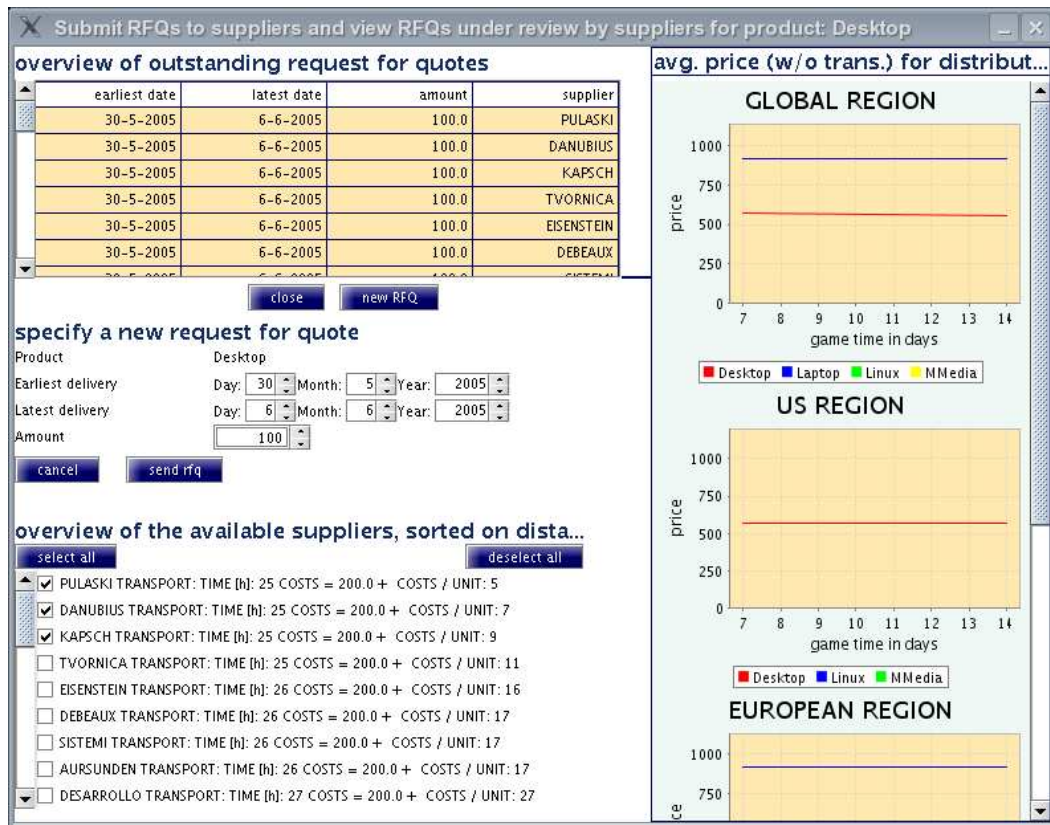


Fig. 4.4: Submit a request for quote

When a player has specified all the required data, pressing the button "send RFQ" is all it takes to send the RFQ to the selected suppliers. After pressing this button, the screen is automatically cleared. Requests for quote which are sent, but for which no quotes have been received yet, will appear at the top of the panel. It is possible, but unlikely, that no quotes will be received for an RFQ. If this happens, an actor has to reconsider the specifications for that quote.

The product is selected by clicking in the correct cell of the overview screen. The product name is visible in the blue top bar of the RFQ submission screen. The earliest and latest delivery dates can be changed with the 'spinners' next to the day, month and year fields. The amount or number of products can be changed with the spinner or by typing in the amount. The suppliers are sorted by distance; you will

find the closest suppliers at the top of the list. Every supplier is indicated with its name, location, transportation time in hours, and average transportation price per product unit, to give you an indication of the transportation cost, when you would source from that particular supplier.

In the top list, you can see the submitted RFQs for which no quote has yet been received yet. The moment a quote comes in, the entry is moved to the next row as a 'submitted quote'.

On the right you see the average unit price, without transportation costs, for the distributors for all the products in the game. For each region, these prices are collected and published on a weekly basis. They give an indication of the price you may want to pay for your products.

Review quotes and place order

Based on the quotes a player has received, a choice must be made which supplier to give the order to. In figure 4.5 we illustrate that based on a previously sent RFQ, a number of quotes per RFQ have been received.

First you select the RFQ for which you would like to review the quotes (top table on the left side of the screen). If you click on one of the rows, the received quotes for that RFQ will be shown. By selecting one of the quotes in the middle table on the screen, its content are shown. Now you are able to make a choice and to place an order. Pressing the "place order" button at the bottom of the screen, sends the order to the supplier mentioned in the quote, and removes the quotes from the other potential suppliers from the list.

You have to watch the offers closely, as some of the suppliers promise to deliver after your latest delivery date. Depending on your financial and inventory situation, you might choose the fastest, or the cheapest quote. The quotes for the selected RFQ are sorted on price.

On the right of the screen, you see the average unit prices of the products, without transportation costs, for the distributors for all the products in the game. For each region, these prices are collected and published in the graphs on a weekly basis. They give an indication of the price you may want to pay for your products.

Receiving the shipment

At a certain point in time, goods are received from the supplier. If the supplier can deliver on time, this will be on or around the promised delivery date as agreed upon in the ordering process, and as indicated in the calendar of planned purchases.

The products of the shipment will immediately be added to the inventory for that

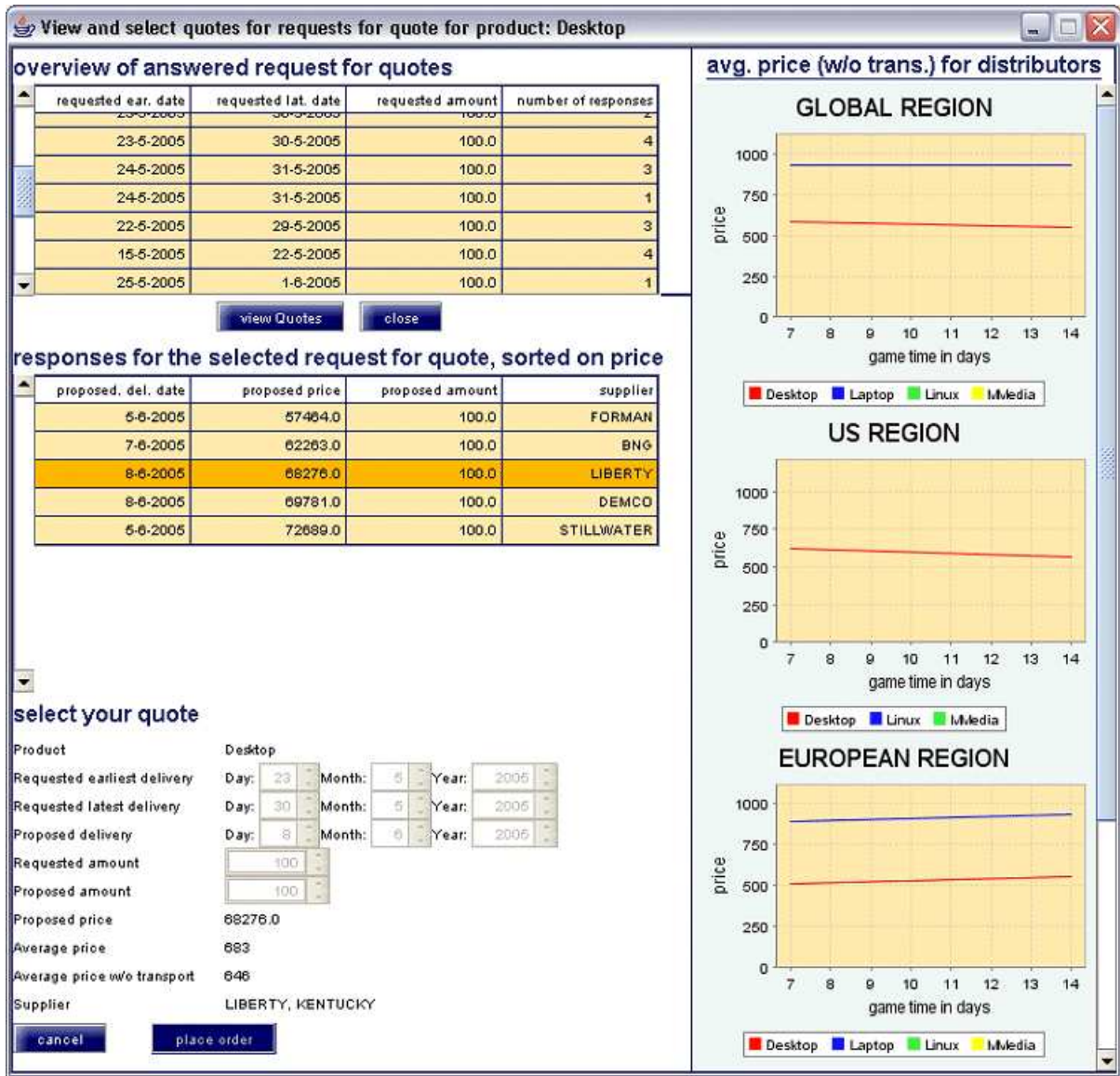


Fig. 4.5: Place order

product, as can be viewed in the 'stock on hand' information on the left side of the main screen.

Paying a bill

View invoices to pay for product: Desktop

overview of invoices that you need to pay

order date	final payment date	price	amount	supplier
28-5-2005	10-6-2005	64188.0	100.0	LIPS
27-5-2005	10-6-2005	66018.0	100.0	LIPS
29-5-2005	10-6-2005	67267.0	100.0	FAIRFAX
29-5-2005	10-6-2005	65080.0	100.0	FAIRFAX

close **view invoice**

detailed overview of the selected invoice awaiting payment by you

Product: Desktop

Delivery date: Day: 28 Month: 5 Year: 2005

Final payment date: Day: 28 Month: 5 Year: 2005

Price: 64188.0

Amount: 100

cancel **pay**

Fig. 4.6: Pay a bill

Around the time you receive your shipment, the supplier will send you an invoice with a certain payment deadline (see figure 4.6). You actually have to indicate that you want to pay the invoice by hand, and you can choose to do so at any date, depending on your financial situation. Don't wait too long, however, as a fine has to be paid for late payment.

Paying a bill is quite simple: select the invoice to pay in the top table, and click the 'Pay' button, which will prepare the payment process between your bank and the bank of the company that invoiced you.

4.2.2 Sales

The Sales part of the player application is used to sell products to customers. For each product, you are able to view the number of RFQs that have been received. By clicking on the cell directly beneath a product type, you are able to view these RFQs and to decide whether to delete them or to send a quote. When you respond to a

quote, the RFQ automatically goes into negotiation by the customer, and appears as an entry in the "in negotiation" box. If the customer accepts your quote, it appears in the "orders to confirm" box. You can then review the order, and decide to finally accept it. If the customer does not accept your quote and selects another supplier, it will eventually disappear from your "in negotiation box". You will not be notified separately about this.



When you confirm an order, the date at which the customer is supposed to receive the products is scheduled on the calendar, as illustrated in figure 4.7. When you do not meet the proposed delivery date, a fine has to be paid to the customer. The "delivered to customers" box provides an insight into the orders that have already been delivered. The bottom line of cells of the panel provides an insight into the invoices that are not yet paid by customers. Payment by your customers will take place automatically – you do not have to take a specific action.

Reacting on a RFQ with a Quote

When an RFQ has been received, quotes are used to respond, to try to make the best offer to the customer and win the order. The panel (see figure 4.8) gives an overview of the number of rfqs which need to be answered. A player may choose to respond to a rfq whenever this is thought to be useful. When a player does not want to respond to a rfq, simply pressing the "delete rfq" button is enough to remove it. When a player does want to respond to a RFQ by sending a quote, an evaluation of the rfq has to take place. Based on the requested delivery dates and amount, a player defines a proposed delivery date. Furthermore a proposed amount is specified, as well as a proposed price. You as a player may respond with a quote event when the proposed amount is not even currently on stock. The only thing you have to do in that case, is to make sure to order enough products on time from your supplier(s). Such a strategy resembles a make-to-order inventory strategy.

To make it easy for players to respond, the information of an RFQ is used to make a default reply possible. The base price of a product is the price you as a player find suitable to use. At the beginning this value is a default one. However, when you

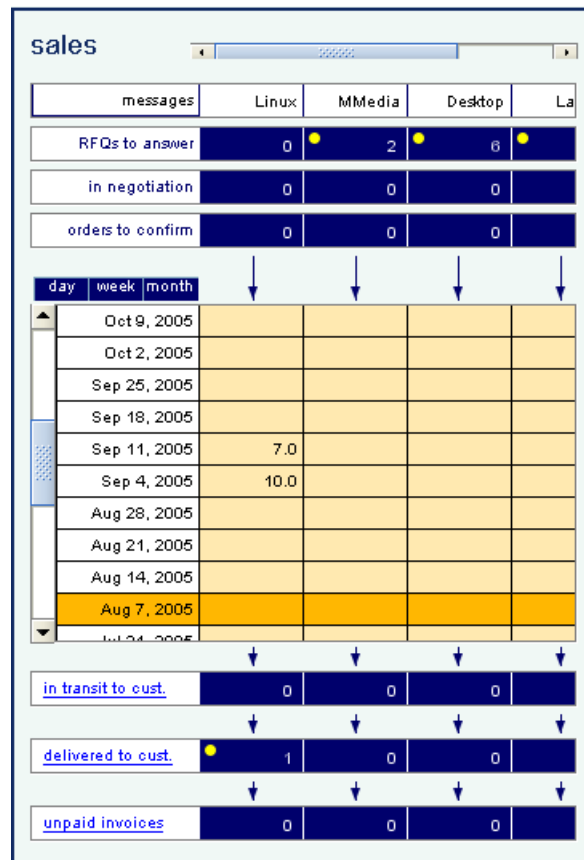


Fig. 4.7: Player application sales

change this value, it will be stored. When you open this frame again in a later moment of time, this last used value will be used. The proposed price consists of the base price multiplied with the proposed amount. You are also able to adjust the proposed price, adapting the shown base price. Based on the distance to the customer, and the weight of the products, the transportation costs are calculated. These costs are added to the proposed price, resulting in the total proposed price. The transportation costs are billed to the customer and transferred to the transportation company. You as a player don't receive the money for these costs. When the frame is updated, for example because a new message arrives, or an old message is removed, the RFQ you were working on keeps selected, as well as the filled in parameter values.

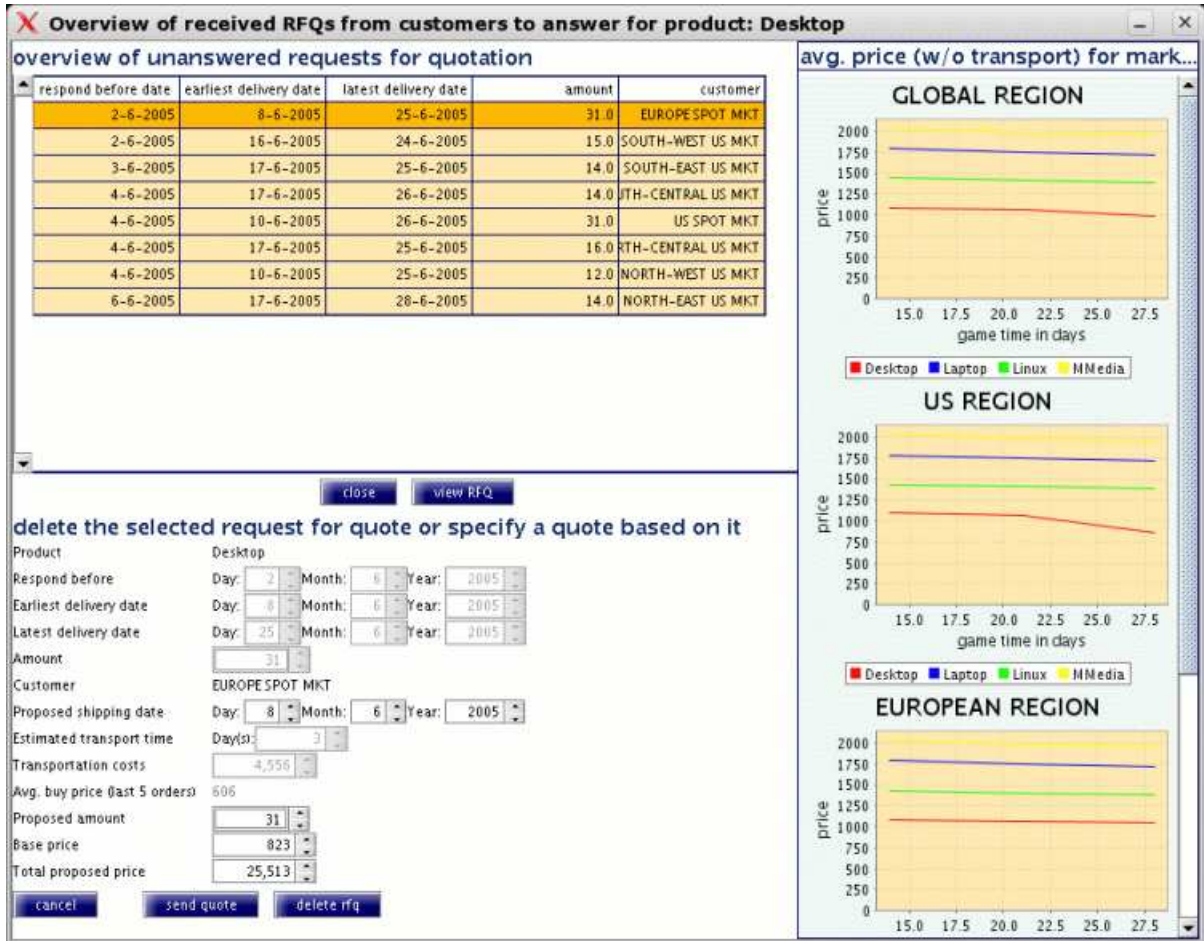


Fig. 4.8: Reacting on a request for quote

Confirm the order

When an order has been received, an actor has to make a choice of either confirming or not confirming it (see figure 4.9). A player has a choice of positive or negative confirmation, of which only 'confirm the order' results in a positive signal to the sender of the order. When you choose to not confirm the order, no shipment will be sent to the customer. In some scenarios of the game, a certain percentage of the

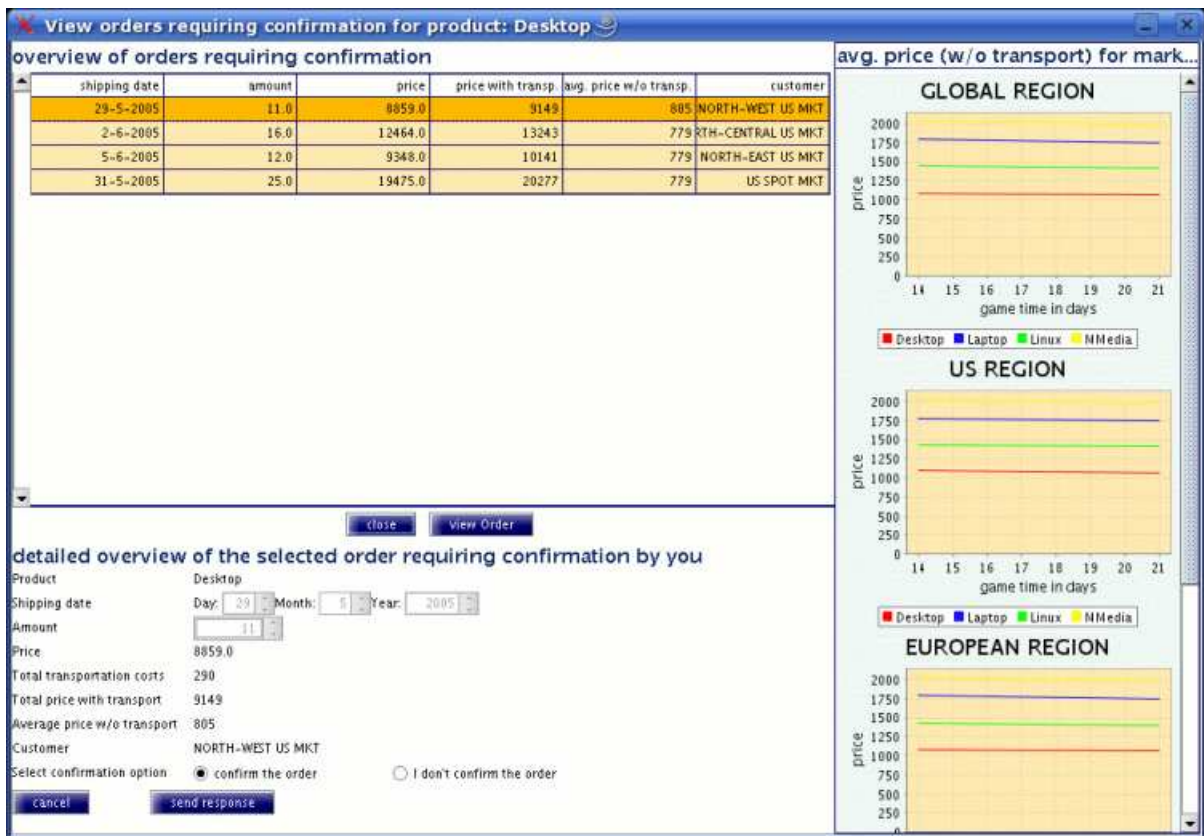


Fig. 4.9: Confirm an order

total order value might be charged to the supplier if the order is canceled at this stage of the transaction process. The latter thus depends on the specific scenario of the game.

Shipping goods and sending bills

In the 'distributor game' the shipping process and the process of sending a bill to your customer is done automatically for you. Shipping can, however, only take place when you actually have the stock on hand for the order. If not, shipment is delayed until the goods to be shipped are available in your inventory (see figure 4.10).

The bill is sent to the customer with a standard payment term that is equal for all the actors in the game.

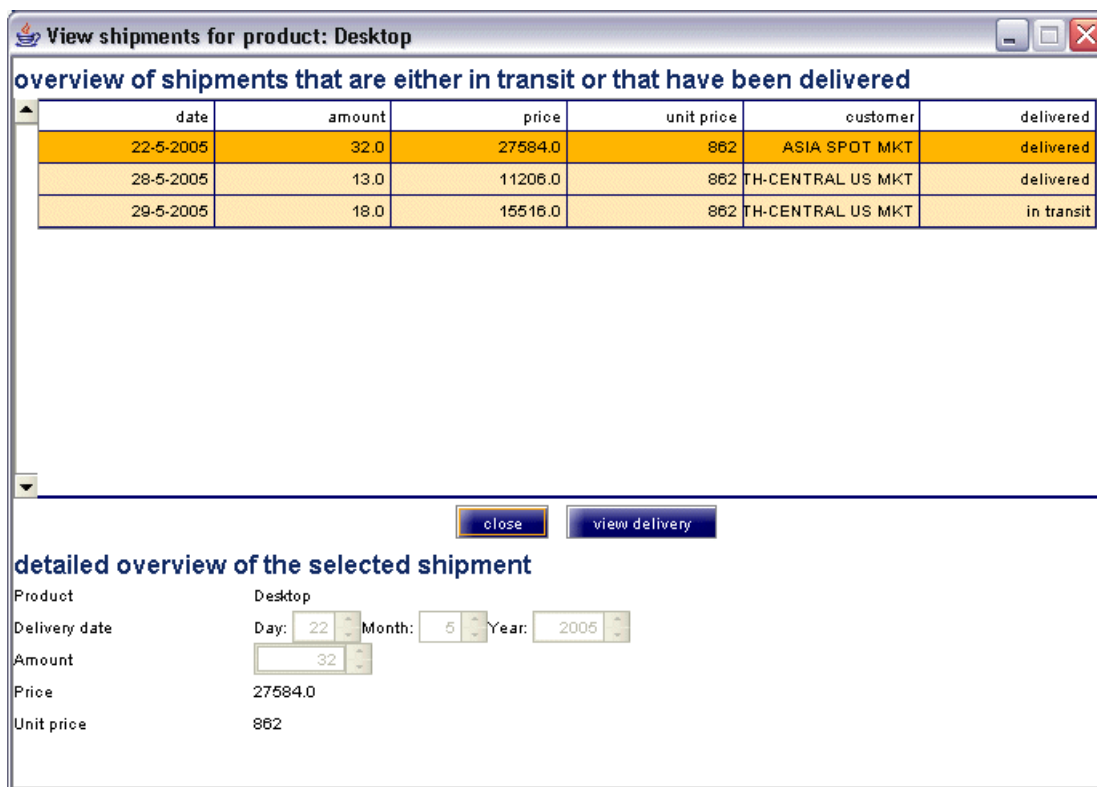


Fig. 4.10: Delivered orders

4.2.3 Finance

The Finance part (see figure 4.11) of the player application shows the financial status of a player. A daily, weekly and monthly resolution for displaying the data can be chosen. The financial overview enables the player to view the financial developments, based on cash transfers, over time.

4.2.4 Communication

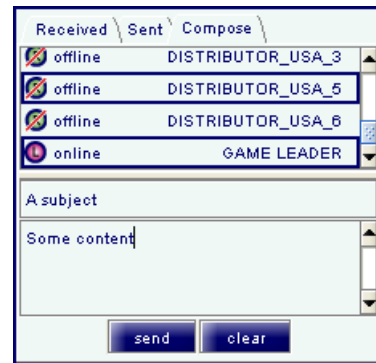
The Social Communication part of a player application is used to send and receive text-based messages. These messages can be sent between human players only. Using the 'Compose' panel, you are able to select one or more receivers. It doesn't matter whether they are on line or not. When a receiver is not on line, the message is stored

Financial Statements						
day	week	month	g 28, 2005	Sep 4, 2005	Sep 11, 2005	Sep 18, 2005
income euros			0.0	12000.0	8400.0	0.0
expenses euros			0.0	0.0	0.0	0.0
total euros			30034.0	42034.0	50434.0	50434.0

Fig. 4.11: Player overview finance



(a) Receiving a message



(b) Composing a message

Fig. 4.12: Social messaging in action

and shown later when this receiver is on line. After selecting the receiver(s), you are able to insert a subject and type the content of the message itself. The maximum size of the content of a message is 10000 characters. The 'Sent' tab shows the messages which you have sent during a game, the 'Received' tab shows, logically, the messages that have been sent to you.

4.2.5 News

The News part of a player application is used to show short news messages. These messages are either preprogrammed for the scenario of the game you are playing, or they are created for you by the game leader.

In contrast with small news messages, large news messages are used to present a



Fig. 4.13: News headlines



Fig. 4.14: News messages

larger amount of information to players (see figure 4.14). These messages typically inform a player about a certain event, for example a growth in economy. Furthermore these messages are used to present market information on a regular basis (e.g. on a quarterly basis). In order to retrieve the screen with the large messages, select the 'News messages' menu item from the top menu.

On the left part of a news message an indication is given on the region of interest, and an image is used to visually support the content of a message. In the middle the actual content of a message is shown. On the right part of the screen a list with received messages is shown, in an descending order.

4.2.6 Game time

The Game time part of the player application shows the current simulation date and time in the game, the played time (in figure 4.2.6 in hours) and the overall progress of the game using a progress bar. Furthermore a small map is used to indicate the

locations of the actors (i.e. players and non-player characters) in a game. Non-player characters are completely controlled by the computer-simulation program part of the simulation game.

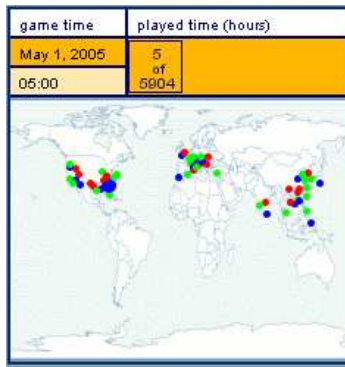


Fig. 4.15: Game time indicator

Four often-used statistics are shown at the mid-right part of the screen. Using the 'Statistics' menu choice at the top of the player application, a player is able to view a wider variety of statistics. These statistics reflect the effects of decisions which were made.

4.2.7 Statistics

In figure 4.16 we illustrate a few of the possible statistics. The top-left graph in the image shows the actual stock of a product (the red line), the committed stock (the green line) and the ordered stock (the blue line). When a shipment is delivered, or received, this information is reflected in the chart as shown in the "Stock: Server" chart. It appears that a shipment of 20 servers has been received on day 37 of the game, therefore the blue line fell back to zero (there was apparently only one shipment which had been scheduled).

In figure 4.17 we illustrate the average size of a committed order to a customer, as well as the minimum and maximum order size as sampled during the game play.

Customizing the graphs

By default, the range of the statistics will show the total time of a game on the x-axis. However, often one wants to have an 'auto range' for a statistic. This means that the range for the x-axis of a statistic is based on the played time of a game, and not on the total game time. As a result, more details will become visible. The range of the x-axis of the statistic then is automatically updated as a game progresses in time. In figure 4.18 we give an overview how 'auto arranging' works. By clicking with the right mouse button when pointing at a statistic, a menu appears (see figure 4.18). You have to select the "Auto Arrange" option, and the type of auto range you would like to use. In this case we selected "Both Axes".

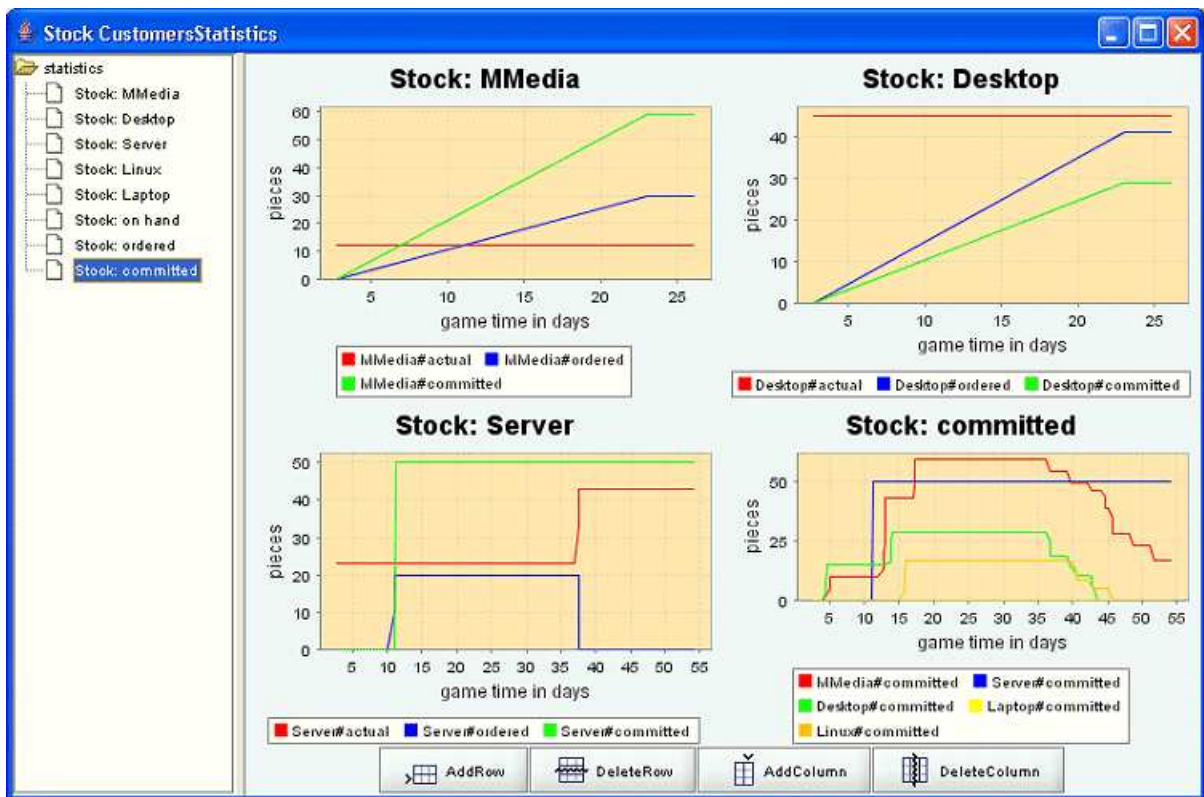


Fig. 4.16: Statistics

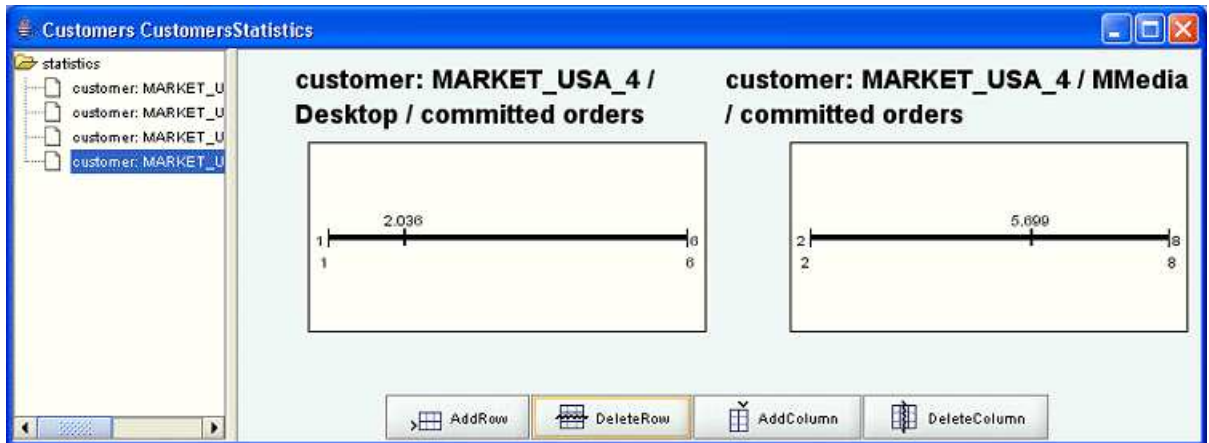
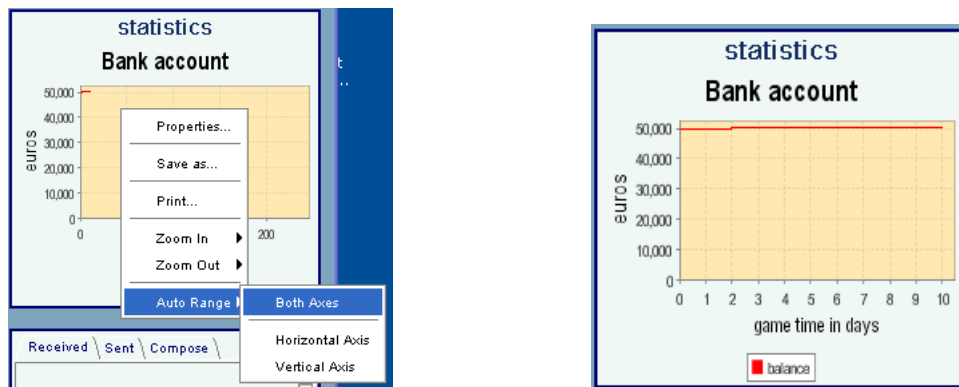


Fig. 4.17: Average order size



(a) Before customization

(b) After customization

Fig. 4.18: Graphs customization

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