Decision-making guide
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Chapter 1. About Cesim

1.1. General

Cesim provides corporations, universities, and other educational institutions easy-to-use and cost-effective business simulations that can be integrated in various business courses. Headquartered in Finland since 1996, we operate globally through our own offices and partner network.

1.2. Cesim products

Cesim offers four types of simulations to educational institutions:

- **Cesim Global Challenge®**
  
  An on-line simulation designed for strategy and international business studies. It develops students' understanding of the complexity of global business operations in a dynamic, competitive environment.

- **SimBrand**
  
  An on-line marketing management simulation that develops students' understanding of the marketing decision-making process as a whole, with particular emphasis on profitability.

- **OnService**
  
  An on-line services management simulation that helps students to practice and learn service business success factors in a Small to Medium sized Enterprise (SME) environment.

- **Hospitality**
  
  An on-line hospitality simulation that helps students to practice and learn about small scale hotel and restaurant operations.

- **SimFirm**
  
  An entry level on-line simulation designed to develop understanding on how decisions in different functions of a company attribute to overall success in a competitive, international business environment.

Simulations can be conducted in a few days or over an entire semester. The number of simulation rounds, schedules, and team structures can be adjusted even after the course has started.

1.3. Contact Cesim

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v1.165
Chapter 2. Simulation Platform Introduction

2.1. General User-Interface Options

1. My Info – Through this page, you can personalize your Cesim player account by adding personal data about yourself, as well as a picture, which will then be shown in various part of the user interface. You can also change your password here, or even your email. On the bottom of the page, there are two checkboxes for determining when you wish to receive automated email notifications.

It is highly recommended that all students use valid emails here, as otherwise they could miss important information during the game. Also, the "Forgot my password" feature works through email, making password recovery impossible through an invalid email address.

2. Support – This is your best way to reach the Cesim Support team, should you run into problems or issues relating to the game functionality. Please note that for any content related questions, you should primarily contact your instructor.

3. Change Language – You will find a list of supported languages for the game here. You can change the user interface language at any point of the game.
2.2. Home Page

1. Player Information

2. Email function – Use this to easily reach your team members and instructor through emails. An easy to use checkbox allows you to choose which team members you want to reach.

3. This panel shows all the important on-going data of the course. On the top you see the main indicators of the last round. Below it, you will find information about round deadlines, forums messages and quizzes.

4. Team Decision Log – This feature allows you to see the decision making actions done by the team members. Please note the "Show all rounds" and "More" buttons below the panel. By default, you only see the current round latest decision saving action. Using the additional buttons, you can expand the panel to show all rounds, and every decision saving action made during any of the rounds. Also note that decisions made while in the team decision column (more on this in the Decision Checklist part of the guide) will not be recorded in detail, only as "The team’s decisions were modified by…”.

2.3. Decision Checklist

Cesim simulations offer the user an innovative decision making area, through which the team members have a high level of control over the decision making process. The "Decision Checklist" is split into two general sections: The individual "Student Decision Areas", and the "Team Decision Area". Please note, that once the round deadline has passed, the round results will be calculated only based on the Team Decision
Area. During each round of the game, you can easily identify changes already made by the highlighted cells on the checklist.

The Decision Checklist offers several tools to manage the decision making process, which are explained below.

1. Round drop-menu: Use the indicated drop-down menu to select the desired round. You may select previous rounds in order to review the decisions made during the rounds, however modifications will be disabled.

2. The “Go” button allows a player to move to another team member’s decision making area, or the join team decision making area. Use caution, as any modifications will be automatically recorded on their respective area. Any modifications made directly in the team decision area will be used as final decisions when the round ends, if no further actions are taken.

3. The “Copy” button copies a player’s decisions from the student area to the team area. Once copied, the previous set of decisions cannot be recovered. Decisions can be copied from Student Area to Team Area as many times as needed, before the round deadline. Please note that if decisions are made directly into the team decision column, then no additional steps need to be taken, as they will be automatically used for result calculation when the round ends.

4. The “Import” button, found on top of every decision area, transfers the decisions from the Team- or Student Area to the importing players own Student Area. Once imported, the original decisions of the
importing player cannot be recovered. The decisions on the player that are being imported from will not be changed in any way.

5. The budget for the round shows the estimated profits based on the current decisions, as well as the "change in sales %" comparable to the previous comparable round.

2.4. Decision Areas

The Decision Area is split into several theme based sub-categories (e.g. Demand, Production, etc.). Please refer to your decision making manual to determine where the decision making process should begin, and what the suggested order of the process is. Some areas should be filled out first, as the effect of those areas may influence some calculations and estimates elsewhere.

The actual decisions are entered into dedicated fields within their respective areas. There are three general types of decision making fields:

1. In the white cells you enter your decisions.
2. In the highlighted cells, you enter estimates of your sales, personnel turnover and so on. These estimates act as a basis for the budgets shown in the system.
3. Drop-down menus are used in certain decisions where there are some specific options to choose from.

The system automatically updates the budgets and calculations as you make decisions.

It is important to note that there are two decision making areas. The first one is the Student Decision Making Area. Each team member has their own personal decision making area, where they can freely input any
figures they want to see the effects they have on the projected results. The students always start on their own student area by default, when logging into the game. After satisfactory decisions have been made on the student area, they can easily be copied over to the second area type, the Team Decision Making Area, through use of the "Copy" button. Once copied, the decision set will be used to calculate the rounds results.

Alternatively, decisions can be made directly into the team area. To do this, a team member can move to the Team Area through use of the "Go" button. Any changes here are automatically recorded, and will be used to calculate the round results, if no other decisions are copied over. It is important to note that if a team member’s decisions are copied over the decision set made directly to the Team Area, there is no way to restore the originals, unless a player has "Imported" the set into their own Student Area.

Once the round deadline is passed, the game will automatically calculate results based on the final decisions found in the Team Decision Area. Again, be sure to have copied over the decision sets from the student areas before the deadline, if decisions are not made directly into the team area.

2.5. Results

As mentioned before, the round results are calculated immediately after the deadline passes based on the decision set on the Team Area. The games also allow you to review the results from previous rounds, including possible practice rounds, at any given time during the course of the simulation by using the Results page drop-down menu. You may also utilize some special features, such as downloadable excel versions of the round results and slideshows of main indicators.
1. The universe drop-down menu lets you choose any universe in the on-going course.

2. Use the Round drop-down menu to choose the desired round results.

3. Use the "Download" button to download an excel file of the chosen round results.

4. Use the "Slides" button to view a slideshow of the key indicators of the round.

5. Use the "Printable" button to print the round results.

### 2.6. Schedule

In the schedule section, you can see a list of the amount of rounds that have been set for the course, as well as the deadlines for each round. In cases where the user’s computer time is different from the system time, this page will show the deadlines in both user time and the system time set for the course.

The simulation games are often started with practice rounds. Please note that practice round results have no effect on the results of the real rounds, and are simply used to learn game mechanics and practice forecasting results. Once the practice round(s) are over, the game will reset to the initial market situation.
2.7. Teams area

The Teams area allows you to see details about players across all teams in all universes of the course. You may also edit team information, like team name, slogan and team description.

Team members may also move freely between teams until the deletion of empty teams has occurred, and the game has officially begun. Click the "Join Team" button to move to a different team. Once empty teams have been deleted and the game has begun, it is only possible for the instructor to move students between teams.

2.8. Materials

This section contains all the documentation that is needed to understand and enjoy the game. The generic reading materials will include the decision making guide and the case description. Instructors can also upload custom case specific materials here.
The decision making guide shows you the basics of the simulation, such as user-interface functionality, how to make the decisions, what should be considered when making decisions, and the general order which you should begin with each round.

The case description gives information regarding the business case that is being played during the course. It gives a general understanding of the industry situation, trends in the industry, future challenges. Certain case specific parameters may also be given in the case description.

In this section, you can also find a video tutorial of the game, if available.

2.9. Forums

The forums are a great way for the players to contact their instructors or co-players, and vice versa, when face-to-face contact is not possible. The benefit of forum usage compared to private emails is that it is easy for everyone with the rights to view the forum to contribute to the discussion.

The forums are split into a Team Forum, and a Course Forum. As the names suggest, in the Team Forum, only your team members can see the posts and reply to them. The Course Forum on the other hand is available for everyone on the course to participate in, regardless of team and universe.

Instructors are able to view and reply to forum posts in both sections. As such, the course forum is a good place to ask questions that everyone on the course can benefit from, while the team forum is the ideal place to discuss sensitive team related issues.

Unless disabled in the "My Info" section, players will get notified by email whenever something is posted on their team forum area.
Chapter 3. Decisions

3.1. Main Objective and Winning Criterion

The goal of the simulation is to maximize the total cumulative shareholder return, which includes the change in the value of shares, dividends paid out to shareholders by the company, and the interest that the dividends generate for the shareholder. Cumulative shareholder return is given as an annualized percent. It is important to note that dividends paid out early mean you have less own capital to make profit and increase the share price with, but they will have a longer time to accumulate interest.

3.2. Decision-making flow

These instructions will help you as you go through the decision making tool for the first time. In the beginning, you may want to follow the decision making flow that is presented here. Later, when you are more familiar with the model, you can make decisions as you prefer.

It is useful to print these instructions before you start working on your decisions.

3.3. Successful decision making flow:

- Market conditions
  - Read the market outlook
- Demand
  - Total market demand
  - Predicted market growth
  - Product selection
  - Market shares
- Production
  - Production capacity
  - Capacity allocation
  - Outsourcing
  - Inventories (optional)
- Investments
  - Estimations of future demand
  - Investment in new production plants
- Finances and Budgets
  - Treasury management
  - Dividend policy
  - Capital structure
  - Short and long term debt
  - Financial indicators
  - Budgets
- Logistics
  - Delivery priorities
  - Transfer prices
- Marketing
  - For each product and market
  - Product feature decisions
  - Pricing decisions
  - Promotion investments
- R&D
  - Development of technology
  - Development of new features
  - Purchasing of licenses for technology and features
- HR (optional)
  - Recruiting, layoffs, remuneration

3.4. Team-work best practices

Here we have collected some best practices about team-work for your benefit. This becomes especially important if you are working in virtual teams.

- For each round, appoint a “CEO” who is ultimately responsible for coordinating the team-effort and submitting the final decisions. Circulate the CEO role from one round to another.

- Pay special attention to timing. Each team-member can work independently, but in order to utilise the synergies you must find a way to coordinate the efforts.
• Use the Forum under the "Communications" tab to exchange ideas about your strategy and decisions. This Forum will store your correspondence so that you can also check later what has been agreed on and how implementation should occur.

• Agree on an internal deadline for each round by which each team member will make his/her own decisions and suggestions. This deadline should leave sufficient time to compile the decisions before the actual deadline. If you work in different time zones, you can use "system time" to coordinate the schedules.

• Use the "Decision Checklist" to compile final decisions. Here you can see all team members' decisions side by side and you can also access each team-member's decision-making area. You can use one of the team-member's decision-sets as a starting point for the team decisions and make the necessary adjustments. You can also edit the team-decisions directly in the team decision-making area.

• Finally, when you are satisfied with the decisions press "Copy". This will save the decisions to the database and the round is completed. You can still change and re-copy the decisions until the deadline. Notice that it does not matter whose account is used to save the team decisions. Also, only one set of decisions per team per round is taken into account. After the deadline for the round has passed, only team decisions will be used in the database for processing results.
Chapter 4. Market conditions

1. It is very useful to read the market outlook before you start to make decisions. Outlooks contain important information on possible future developments and will help you in anticipating market movements.

2. At the bottom of the page you’ll find a dedicated tab for parameters. These parameters (costs, exchange rates, tax rates, etc.) are presented for the current and the previous round. Together with the ones that are not shown here, these parameters define your business case and you can take advantage of this information for example when planning for taxes, logistics or investments.

**Note**

Quantitative parameters, such as tax rates, are forecasts for the period and they tend to be rather accurate. Market development, on the other hand, can be different from the market outlook due to the fact that the markets are influenced by competing companies' actions in the markets. Therefore, market growth may not actualize exactly as predicted.
4.1. Demand

1. It is good to start decision-making by estimating total market growth for each market area. The information on the Market Conditions page is useful for making these estimates.

2. After estimating market growth you can choose which technology products you sell in each area. The maximum number of products in each area is two. In the beginning, your company does not have all of the technologies for production and sales. Later in the game it’s possible to research and manufacture more sophisticated technologies in order to have them available. (See chapter Research and Development about new product development.)

3. Now that you have chosen which technologies to sell, you estimate market shares for each of these products in all of the markets. These forecasts are used when the model calculates your company's pro-forma statements and budgeted production figures. Last round column, on the left side of your market share estimation, shows the market shares that the company actually had during the previous round. Total market shares for this and last round can be seen on the far right side for all three regions.

4. When you have estimated total market growth and your market share, you can see the expected demand in each area here. Keep in mind that these are only your estimations; the final figures will depend on how well you succeed in your decisions relative to the competitors. (See chapter Demand, total market and market share.)

5. These graphs give projections on planned infrastructure (Network coverage) improvements of all four technologies. The higher the coverage level, the more demand that tech potentially has.
4.2. Demand, total market and market share

Demand for a team is determined in three steps.

1. Total market size for each market area is calculated. Market outlooks provide a good forecast of what is going to happen in the future.

2. The total market demand is divided into different technologies.

3. The market shares for each company are determined. The factors affecting the market shares are: the number of offered features, average selling price, promotion, previous round market share, and the attractiveness of the technology in the market.

At the bottom of the Demand page there are graphs showing the development of the different technologies. The infrastructure for a technology is a prerequisite for demand, i.e., there are no sales for a technology unless infrastructure is in place. Graphs present the progress of each infrastructure. For example, a figure of 50% on the U.S. graph would indicate that 50% of the geographical area in the US is covered with this technology.

Network coverage is an important factor in determining the demand for the devices in new technologies. Inhabitants outside the network coverage of any given technology do not purchase devices of that technology. The attractiveness of each technology may vary a lot depending on the market area. New technologies tend to be more attractive than old ones and thus generate more demand. However, sometimes a new technology may turn out to be a flop on some of the market areas, but a huge success in another. The market outlooks may give more insight on the expected attractiveness of new technologies. Sometimes the success or failure of a technology can come as a complete surprise, learned only by experience. The division of demand between technologies is also strongly affected by:

- Price level (a new technology is normally priced higher than the old)
- The number of companies offering products in that technology
- Marketing efforts

For example, pricing the new technology twice as high as the old reduces the attractiveness of that technology by at least 50% (that is, if the price elasticity of demand would be -1).

4.2.1. Total Market & Company Market Share

1. Factors affecting the total market size:

   - Economic conditions
• Average price level
• Average promotion budget
• Technological evolution

2. Factors affecting technology’s share of the market:
• Technology price level
• Technology promotion
• Number of companies offering each technology
• Network coverage
• Technology attractiveness

3. Factors affecting the market share of one company for the technology:
• Price
• Promotion
• Number of offered features
• Previous round market share
• Number of companies offering the technology

4.2.2. Market shares

In the beginning everyone has the same market share, but as soon as you start making decisions, the market shares start changing. The picture below illustrates an imaginary situation with four different teams.

1. Team Yellow 30%
2. Team Purple 15%
3. Team Blue 22%
4. Team Green 33%
5. Team Orange 25%
6. Team Red 8%
4. Team Green 33%

(Team Green's market share is further split into two technologies)

5. Team Green's Tech 1 has a 25% share of the total market

6. Team Green's Tech 2 has an 8% share of the total market

By combining the market shares of these two techs we get a market share for the whole company: 33% of the total market. Remember, when estimating demand percentages for products, that your percentage estimate is a percentage of the total market for all devices. Not a percentage share of the demand for that specific technology.
Chapter 5. Production

Global allocation of production is an important success factor in this simulation. You have two production areas (USA, Asia) that you can use to supply to the three market areas. Global Challenge can be used with or without finished goods inventories. In case the inventories are not enabled and you overestimate your demand and make too high production decisions, the production will be reduced automatically to match the demand. There is an additional cost if production needs to be adjusted during the round. Note that your production will not be increased if your demand turns to be higher than estimated. In that situation you will have lost sales. There is more information about inventories in Chapter 5.2.

1. Here you choose which technologies to produce in each production line and how much of the production line capacity you allocate to each product. With two areas and two production lines in each area you can do any combination of four technologies. In this example, production lines 1 and 2 are in use both in USA and Asia.

2. The simulation automatically calculates the unit cost (see chapter production costs). The scrap% depends on the maturity of each technology in production. Scrap% is taken into account in the unit cost.

3. Here you can decide how much production is allocated to contract manufacturers. Only technologies chosen for production at your own production lines can be allocated. There is a limit how much you
can choose to contract manufacture during each round. The cost of contract manufacturing is also given here and it varies according to the manufacturing amount. In this example, production is allocated to contract manufacturers in USA but not in Asia.

**Food for thought**

When you are deciding whether you should put a buffer in your capacity allocation in order not to lose sales or whether you should go without any excess capacity you need to compare the opportunity cost of lost sales with the cost of extra capacity. Opportunity cost for lost sales is equal to the lost sales margin for each product that you do not sell and the cost of extra capacity equals to the cost of having to cut the production during the round. In addition, if you overestimate the demand your logistics will not be completely optimized because each production site attempts to maximize their production and the excess capacity will be automatically divided between the areas.

Naturally, if your course has inventories enabled, then the cost of extra capacity consists of inventory management costs, cost of capital tied into the inventory, possibly needlessly high production costs and the risks associated with having excess inventory of old products.

### 5.1. Production costs

**The factors affecting the production costs are the following.**

- Basic cost level in the production area
- Production cost function (U-shaped curve)
- Learning curve effect
- If finished goods inventories are not in use there is a penalty for having a too high production target. This happens if you have over-estimated your demand since your production needs to be reduced during the period. This penalty represents roughly 5% of your production cost.

The U-shaped production cost function can be seen below. Cost multiplier is used to multiply the basic cost level.
1. Cost multiplier

2. Capacity utilisation

The Basic cost level indicates the cost for producing the first unit of the new technology. For example, if the initial employee skills/efficiency would be lower in Asia, the basic cost would logically be higher in Asia than in the US. The learning curve effect is a significant factor affecting the production costs. The X-axis represents the cumulative GLOBAL production of certain technology. In our example, you could first produce products in USA and then start producing in Asia when the learning curve reaches a certain level. The example below illustrates the logic.
1. Unit cost USD

2. Global cumulative production per technology
5.2. **Inventory**

If your Global Challenge course has inventories enabled, you will find detailed information on the inventory page under the production tab and additional cost information by clicking the parameters tab at the bottom of the page. The beginning and ending inventory figures are also presented on the production planning page. Inventory management does not require any active input from the participant.

Planned inventory is the same as previous round ending inventory. Beginning inventory consists of the products that were not sold on the previous rounds and remain in the inventory available for selling on all subsequent rounds. Ending inventory highlights the amount of products that would remain in the inventory after the current round if the same estimates end up being accurate. Unsatisfied demand is equal to estimated or actual market demand in excess of estimated or actual sales. Inventory management costs are out of the pocket costs and they are based on average inventory balances from previous and current round. Capital costs on the other hand are implied costs; holding inventory on the asset side of the balance sheet requires some form of financing on the liabilities side, which incurs costs for the company.

USA and Asia production facilities have their own inventories and products are never shipped between the areas unless there is market demand. The inventory values fluctuate as a result of production decisions and sales outcomes, but careful production planning and sales estimation is still important as inventories incur management costs and possibly needlessly tie up capital. All products in inventory are carried at their original production cost, oldest products are sold first (FIFO principle) and there is no depreciation of inventory.
5.3. Investments

1. Here you estimate global demand for the next two rounds. This year's demand is based on the estimates made on the Demand page. Future projections are important because it can take up to two periods to complete new production facilities (depending on the case setting of your course). You can check when the capacity will be available from the capacity planning-graph.

2. Based on your future growth expectations you can decide to invest into new production facilities in USA and/or Asia. They will be available for production one or two periods from now (depending on the case applied to your course) and you will always have to pay for them one period from now (middle of the investment cycle).

   Depending on your course settings, it is possible to divest existing production plants from both areas. Divestment decision is made by inserting a negative value to the decision field. The divestment and resulting cash flows follow the same schedule as investments.

3. This graph contains information on how your demand and capacity are projected to develop. The graph is a good tool in visualizing the relationship between your estimated demand and capacity.

   **Food for thought**

   When you make a plant investment you are committing a substantial amount of money into a long-term investment. You need to make sure that you can pay for the investment with the revenue that you are making from it. We can try this calculation: price of the plant is 160 mUSD and plant capacity is 550 thousand units. You can sell your products
in the future at about the same price as you are doing currently in the US, about 200 USD. Also, your average operating profit before depreciation (all operating costs except plant depreciation are deducted from the sales revenue) is about 35%. When you multiply the annual plant production capacity (We assume that you can use the plant at an average 90% utilization rate) by the expected margin per product you get about 35 mUSD (550 tUnits x 90% x 200 USD x 35%) operating profit before depreciation. From this money you will need to pay for the depreciation and financing costs of the plant. Here depreciation is calculated as 15% depreciation on declining balance. This gives you a depreciation of 24 mUSD (160 mUSD x 15%) for the first year of operations. (Declining balance emphasizes the first years over the last ones, which is reasonable in this kind of high-technology business environment). After depreciation you have 11 mUSD (35 mUSD -24 mUSD) left to cover for financing and investor risk.

Return on investment (ROI) in this example is 6.9%. That is calculated by dividing Operating profit (EBIT) by the cost of the investment (11 mUSD/160 mUSD).

5.4. **Procurement**

If your Global Challenge course has the social responsibility module enabled, you will find detailed information on the procurement page under the production tab. In the procurement page you get to decide which component suppliers you want to subcontract and the option to order a study on any of the suppliers.

You have two types of decision to make in the procurement section:

1. Decide which suppliers to contract. Minimum number of suppliers needed is shown at the bottom of the screen.

2. Option to order a study on conditions at single or multiple suppliers’ facilities. Conducting an objective study reveals the direction that social responsibility standards and unit costs are expected to progress in the near future. This is especially beneficial in case you are planning to change suppliers, as there is a cost associated to opening a new supplier line. Results of the study are available one round after it has been ordered, and the results reveal information concerning the two rounds after that.
To assist you with your decisions there is some information available for each supplier:

- Social responsibility values are shown in stars for each component supplier. The ethics value corresponds to how well suppliers treat their employees and the sustainability value indicates their environmental responsibility. Using socially responsible suppliers is part of your company’s social responsibility and will affect your public image and demand for your products.

- Each supplier has a unique unit cost that you have to pay for every product manufactured. As the component procurement is outsourced, your production efficiency will not affect the unit cost. If you are using multiple suppliers it is assumed that the component orders are split evenly between selected suppliers i.e. you will be paying an average unit cost of selected suppliers.

- The results of a study are presented in arrows. Arrow up indicates an increase in value, arrow down a decrease in value and arrow right points to no change in value.
If you fail to select the required amount of suppliers there will be additional costs, as you won’t have a sufficient amount of components ordered and therefore have to make last minute arrangements to satisfy production demand for components.

**Food for thought**

To effectively handle your social responsibility image to your advantage, you should follow a strategy that best suits your situation. The options are either to invest in cost management and maximize your margins, or to increase your market share at the expense of other teams by thriving to be a leader in social responsibility issues. Additionally, you have to react to changes in the market environment as they affect your suppliers as well as yourself.
Chapter 6.  Marketing

On the marketing page you decide your marketing mix, namely; product, price and promotion. These decisions need to be made for each product and market area. Since you have only one product (based on Tech1) in each market in the beginning, you need to make these decisions for one product only in each area. As soon as you have more than one product, you will make the decisions for both products separately. It is important to keep in mind that the success of your marketing mix will be determined by the markets. Customers are comparing between different alternatives and making their purchase decisions accordingly.

1. First decision you make is to decide the number of features to be offered. More features cover more of the various customer preferences, but also cause more costs.

2. Price and promotion decisions are set here. Pricing decisions are always made in the currency of the area and promotion always in USD.

3. As soon as you have decided about product, pricing, and promotion, you can see your budgeted financial outcome here.

4. Here you can also see where your products are coming from.

Implementing different product features causes feature costs. You can implement 1-10 features to your products and each feature carries additional costs. Features can only be implemented if your company has reached the respective technology competence level either by investing to own R&D or by buying licenses.
from outside. Feature costs can be calculated by multiplying the number of features by the cost per feature (reported in PARAMETERS).

Marketing affects not only the demand for the product, but also the company's image in the particular market area. Thus advertising has a long-term effect.

**Food for thought**

When you make your promotion decision (advertising), you should look at the sales margin that you can generate from that product in the specific market. Usually it is reasonable to over-spend in the beginning when you are launching a new product. However, in the medium-term you must be able to pay for all your advertising of the product with the sales margin that the product brings in. A useful rule of thumb is to allocate the amount that equals to sales margin multiplied by advertising elasticity (e.g. 0.1).
Chapter 7. Logistics

1. Here you can choose in which order you will satisfy your demand in the markets separately for both production areas and for all relevant technologies. For example you may have chosen 1. USA, 2. Asia, 3. Europe for Tech 1 production from the USA, meaning that US made Tech 1 products are first delivered to the USA, then to Asia, and finally to Europe. This decision is only relevant if your global supply is not enough to fully satisfy your global demand. If that should happen, supplies will first be cut from the third market (Europe), then from the second market (Asia) and lastly from USA.

2. In this block you can see where your products are made and where they are expected to be sold. Total cost of transporting products is the actual transportation cost + tariff. Transportation costs and tariffs are reported in PARAMETERS. There is no transportation cost for products that are sold in the same area they are produced in.

Food for thought

When you set the delivery priorities you should attempt to maximize your total margin from the products. This can be achieved by prioritizing those markets where unit margins are the highest. In other words, if you run out of supply, you want to make sure that it happens in the market where your unit margin is the lowest.
Chapter 8. Taxation

With transfer pricing you can adjust your profits between different units and you can make other business units participate in R&D and other fixed costs. Transfer pricing can also be used to benefit from different tax rates between countries. The multipliers must be between 1 and 2.

The chart depicts taxable profits and effective tax rates in all regions and for the company as a whole.

The table at the bottom details how effective income taxes are calculated and divided among the regions and how transfer pricing decisions affect the total amount of income taxes that have to be paid. Taxes are always paid locally. The statutory tax rates are applied to taxable profits, which means that losses from previous rounds, called loss carry forward, reduce the amount of taxes that have to be paid on current round and consequently lead to effective tax rates that are lower than the statutory rates. Moreover, transfer pricing can be used to shift profits between the regions so that more profits are reported in low tax regions which in turn reduces the effective tax rate of the whole company.
Global Challenge can be used with or without human resources decisions. If your course has them enabled, you are able to hire R&D personnel to handle the research and development function in addition to buying technology and design licenses. This will alter the in-house development detailed in the next chapter.

The human resources function consists of three decisions: number of employees this round, monthly salary and monthly training budget. The number of employees is definite and you can always have the amount of workforce you wish provided that your salary level is high enough. You can also lay off all employees if you so choose. You can hire new or lay off current employees by changing the “Personnel this round” decision from its prior value. Employee turnover is taken into account automatically. The amount of employees effectively given the notice is reduced by the amount of employees leaving the company on their own.

Costs from human resources include salary, other associated employment costs, training, recruitment, lay-off and other R&D costs. All of these items are included in research and development costs on the income statement. You can find more information about costs by clicking the parameters tab at the bottom of the page.

Key issues to consider in human resources include employee turnover and efficiency. Employee turnover refers to employees leaving the company on their own without being given a notice. Salary, training, success of the company and good use of employees’ time all affect the employee turnover rate while higher salary through ability to attract talent, cumulative training expenditures and low turnover all support higher level of employee efficiency. Efficiency in turn makes it easier to develop more advanced technologies and product features. Efficiency is measured as an efficiency multiplier; a value of 1.2 means that your R&D personnel is 20 per cent more efficient in in-house research and development compared to a team that has all the contributing factors at a standard level.
Chapter 10. Research and Development

There are two ways of improving your company's technological capabilities: own R&D and license purchases. Own R&D has a one period delay before the technologies and features become available for production. License purchases are available immediately. They are both substitutable and complementary ways of building competence, which means that you can first invest to your own R&D then decide to buy a license and then improve the technology further by your own R&D again. You can use any combination of the two to reach the desired level of technologies and features.

It is important to note that investments into in-house R&D do not decrease technology and design licensing costs. For example, if Team Green invests 20 million USD into tech 2 development on round 1 whereas Team Red proceeds without investments on the same round, the licensing cost for the unfinished development on round 2 is the same for both teams. This is true for both HR enabled and non-HR enabled courses.

If your course has human resources decisions enabled, the in-house development deals with man-days instead of cash. The development will work the same way as with cash, but in this case you have to synchronize your product development decisions with your human resources decisions. It also means that the required development effort varies based on your efficiency level and the ultimate costs of development also depend on your salary and other HR decisions.

1. In these cells you make decisions about your own R&D investments into each technology. The model tells you how much you need to invest in order to make a new technology available or a new set of features for an existing technology. You need to keep in mind that all results from your own R&D investments are available with a delay of one period.

2. You can complement own R&D by buying technology and design licenses. Whereas own R&D has a one period delay, license purchases make the technologies and features available immediately. This is a one-time payment that gives the rights for the technologies and features indefinitely.
3. This graph shows the number of features available in each Tech.

**Food for thought**

R&D investments are very strategic in nature and it is difficult to apply any exact investment calculation method on those. Even at best, those calculations include heavy assumptions and uncertainties. However, at least when you consider investments into new technologies, you should think how many devices you must sell in order to recover the money that you spent on the development. Following your competitor may not be the best alternative, since they can go wrong with their investments.
Chapter 11. Finance

Financing decisions are typically the last set of decisions that you are making. All financial market transactions are managed through the parent company (USA). You decide about:

- increases (+) and decreases (-) in long-term loans
- share issues and buy-backs.
- dividend payments
- treasury management (transferring funds between group companies)

Share issues and buybacks are made according to the market valuation at the beginning of the round. The number of shares issued (repurchased) affects the issue (buyback) price.

You can also transfer funds between different countries by internal loans (International Treasury Management). You may want to use internal loans if you have accumulated substantial cash reserves in Asia or Europe that can be repatriated and distributed to the owners, or you need to finance some plant investments in Asia.

Cash at the end of the year cannot be below a minimum requirement (usually 2 million USD, shown as 2000 K USD). The minimum requirement may vary depending on the case settings of your course. If cash falls below this requirement financial department fills that gap automatically by taking short-term debt. Short-term debt is paid automatically when possible and it is usually more expensive than long-term debt. Therefore it is advisable to try to avoid short-term debt. The difference between short- and long-term interest rates (Premium for Short-Term Debt) is reported in PARAMETERS.

It is also good to keep in mind that the idea is not to minimize the cost of debt, but to maximize the return on equity. The winner of the game is determined by the total shareholder return, which measures the return that the team is able to generate for the shareholder during the simulation rounds. It takes into account the changes in the share price and dividend payments.

11.1. Suggestion for capital structure decisions in case you have accumulated excess cash:

After financing the group companies in Asia and Europe check the cash situation in the USA. If you have excess cash, you can consider the following logic:

1. Check the capital structure. As a rule of thumb, you should try to keep the equity ratio (equity divided by total assets) in the range of 40-60%. If it is less than 40%, it is more beneficial to repay debt than to pay a dividend. If it is more than 60%, you are probably not taking full benefit of the tax shield effect (related to Weighted Average Cost of Capital, WACC).

2. Decide what amount of cash is needed as a "safety buffer" for your operations. Remember, that if you don't have enough planned financing to run the operations, the system will automatically take short-term loans to sustain liquidity and the short-term loan premium is high in this case. The more uncertainty you have in your sales estimations and budgets, the higher should be your cash buffer.

3. Pay dividends according to your dividend policy.

4. If you still have too much cash, pay the excess out to the owners. You have two complementary alternatives: a) Share buy-backs. If you buy-back shares, you improve EPS (repurchased shares are cancelled
immediately). However, this should be done over a longer time period since if you attempt to buy large amounts at once, you create demand in the market and the average buy-back price goes up. b) Pay extra dividends. Dividend payment will be taken into account as part of the total shareholder return. (Money is transferred from the company cash-box to the shareholder's cash-box.)

In reality the weight between share buy-backs and extra dividends is mainly driven by taxation. Since we only consider corporate tax in the simulation the recommendation is that you set a dividend policy that is in-line with your long-term profitability and if you are generating excess cash, spend that on share buy-backs. In case you have so much cash that spending that all on share buy-backs will increase the average buy-back price too much, use extra dividend payments to balance it off.

And of course, timing itself is a big challenge. The old investor rule "buy low, sell high" applies in corporate equity transactions as well.

1. Here you can make the finance decisions. I.e., increase (+)/decrease (-) long term loans, issue/buy back shares, and pay dividends.

All finance decisions are done at the parent company (US) and while doing those it is useful to observe the parent company's cash flow statement on the right.

2. In this picture you can see the capital structure of the company. It is reasonable to try to keep approximately equal amounts of debt and equity on the balance sheet.
3. Here you can transfer funds between different countries. Blue bars indicate cash reserves and green bars indicate local debt. It is usually recommended to finance Asian and European operations through the parent company in the US.

**Food for thought**

The reason why you should keep approximately equal amount of equity and debt on your balance sheet is that by doing this you minimize your cost of capital. The smaller the cost of capital, the higher is the net present value of all your company's future cash flows, thus higher the market value of your company. Another way to think of the same is that the lower the cost of capital, the more you have investment opportunities that exceed the cost of capital (= more business).
Chapter 12. Budgets

Budgets are located at the bottom of the page and can be quickly accessed from any decision-making page. By clicking any of the budget tabs a corresponding budget will be overlaid on top of the page you were observing. Budgets update continuously as you make decisions. Here you can follow profitability for the group as a whole and for each area separately. Key financial indicators are also presented here.

Notes to the Profit and Loss statement:

In this simulation all R&D and marketing (promotion) costs are expensed on the profit and loss statement during the period the investments are made. As a consequence, profit for the year may fluctuate depending on the intensiveness of R&D and marketing investments.

R&D is considered to take place in the area(s) where you have production plants. I.e., if you have production plants only in the US, your entire R&D expense shows in the USA Profit & Loss statement. When you have production in Asia as well, R&D will be split between the countries relative to the number of production facilities. You can use transfer pricing to roll R&D costs to other areas (Asia, Europe).

Administration costs include the company's overhead costs i.e. the company's fixed costs, which are not allocated to the different products. Part of the administration cost belongs to the service and maintenance of production facilities. Administration costs include basic cost per market area and an extra cost that
depends on the number of plants. The administration cost per one plant decreases when the number of plants in the area increases.

Any losses from previous rounds are carried forward as per the "loss carryforward" principle. Thus even heavy losses may be evened out during later rounds, as future incomes are taxed more sparingly. Deferred taxes in global challenge do not expire, so losses made e.g. during the first round will continue to be deducted from taxes until the losses are covered.

### 12.1. Calculation of key financial ratios:

- **Return on sales (ROS), %**  
  \[ \text{Profit for the round} \]  
  \[ \text{Sales revenue} \]

- **Equity ratio, %**  
  \[ \text{Shareholder's equity} \]  
  \[ \text{Total assets} \]

- **Net debt to equity (gearing), %**  
  \[ \text{Interest-bearing liabilities(short- and long-term)} \]  
  \[ - \text{Cash and cash equivalents} \]  
  \[ \text{Shareholder's equity} \]

- **Return on capital employed (ROCE), %**  
  \[ \text{Operating profit (EBIT)} \]  
  \[ \text{Average shareholders' equity + Average shareholders' equity} \]  
  \[ \text{Interest-bearing liabilities (short- and long-term)} \]  
  \[ 1 \text{ Interest-bearing liabilities (short- and long-term)} \]

- **Return on equity (ROE), %**  
  \[ \text{Profit for the round} \]  
  \[ \text{Average shareholders' equity} \]

- **Earnings per share (EPS), USD**  
  \[ \text{Profit for the round} \]  
  \[ \text{Number of shares at the end of the round} \]

**Following ratios are only available in Results -section after each round.**

- **Dividend yield, %**  
  \[ \text{Dividend per share} \]  
  \[ \text{Share price} \]

- **P/E ratio**  
  \[ \text{Share price} \]  
  \[ \text{Earnings per share} \]

**Cumulative total shareholder return, % (winning criterion)**

\[
100% \times \left( \frac{\text{current share price} + \text{cumulative dividends per share} + \frac{\text{cumulative dividends per share}}{\text{first period share price}} \times (1 / \text{this period})}{\text{first period share price}} \right) - 1
\]

1. "Average" refers to opening and closing balance sheet values
2. Interest bearing liabilities does NOT include accounts payables
Notes to the balance sheet:

Receivables and payables are automatically calculated as a percentage of sales and production costs.

Other restricted equity indicates the difference between share issue/buyback price and the nominal value of the share (10 USD).

Short-term loans are taken automatically if the company does not have enough liquidity to run the operations.

**Food for thought**

Since your goal in the simulation is to maximize the shareholder value, you should aim to run the company with as small a balance sheet as possible without jeopardizing your current profits and your future growth opportunities. If you can generate the same profit with a lighter balance sheet you have utilized your assets more effectively and thus you need less money from investors.