Business Board Game

Final report

Supervisor: Mikael Ehrs
Gohar Karapetjan
Maria del Mar Torelló Massana
Victor Gallard
Sam Meulemans
Michał Stępień
Simon Thys

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Final report about group achievements after EPS semester
Abstract

Create an entertaining, engaging game which allows students to gain basic knowledge about principal rules of economics and give a feeling that doing business can be fun. A clear task, but one that demands a lot of creative input. Firstly, the project is started by trying to make a clear picture of who the team is and what we can do. All the general methods for project management are applied: a work breakdown structure, an in-depth project planning, preparing for any and all contingencies...

Secondly as much information as possible is gathered. Existing online business games and economic simulating games are extensively tested. Looking at them allowed us to learn from the mistakes of others. Another source of information were interviews with students who played educational business games before. An expert in board game who has developed board games himself before was also consulted. We also researched how and how effective people learn when they learn by playing.

What follows is an inquisition to which parts are needed in this game and possible options on how to implement these. The resulting game is in not a traditional board game as one would know. Players run a company in a team, they assemble or order bicycles and try to sell them all over the world. A close to reality stock market is generated by a computer program with which the teams can trade. Apart from that they also interact with each other, learning negotiating skills and general tactical decision making. This makes that playing this game is not just sitting around a table but walking around trying to gather resources and information. On 24 of May a preliminary version of the game was tested with a group of 14 students. This showed that the basic concept of the game works and gave all the necessary information to make further improvements.

At the last stage the layout and design of all the game boards were finalised and send off to be professionally printed. Pawns, coins, hourglasses and other pieces were searched for and ordered on-line where possible. The others will be either printed on a 3D-printer or custom-made with another process. A manual for the game is written to guide the students while playing.

In the end our whole teams feels is proud of the result of all our hard work and hope this game will teach future student something. There were many lessons learned on a professional as well as on a personal level.
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1. Introduction

¡Yes! team is an exchange student group who are working within the confines of European Project Semester. According to Hansen (2015), EPS cover a wide range of topics i.a. project planning, management, language, communication, marketing. Project of the team is about Business Board Game appropriate for educational purposes.

1.1. Problem Statement and Problem Definition

The project is to create an entertaining, engaging game which allows players to gain some basic knowledge about principal rules of economics and give a feeling that doing business can be fun. This will require tests of existing games, creating new one, testing the created game and taking surveys about our game. Information which we will gain from surveys will allow us to make improved version of Business Board Game.

Working on the project gives many possible benefits to students, teachers and team members. First of all, when board game is finished, it will give a lot of fun to players and will teach basics of economics. Therefore, it will benefit not only the school but also the students. It is worthy to mention that board games have socializing aspect which is very important nowadays. For the Novia UAS it may be interesting project for advertising the University itself. As for team members it is a possibility to learn about other cultures because the team consists of people from five different countries.

1.2. Approach and Limitations

Firstly, the project started with team member's own knowledge and experience in board games and in business. Therefore, the team had to do research in literature and what is of more importance - play existing online business games, simulators and board games. In already existing games the team can find attributes which makes a game attractive, engaging and business features which can be implemented in the board game. ¡Yes! team also needs people's opinions and wishes about a new game. Afterwards, the team has to do several brainstorm sessions to think about concept of Business Board Game, rules and board layout. Next, the first version of the game is created. The key goal is to create a board business game and to success in it team members need to learn basics of economics. The team members are allowed to use facilities of Novia UAS, Vaasa University, Tritonia etc.

The team has some limitations in the project. A very important issue is that the team has to create something on its own and must not steal someone’s ideas. The game itself must be realistic, with some basic principles of economics. However, it cannot be too realistic, because it is supposed to be a game, not a business simulator. The team isimitated by time and money, also. The game must be done till the end of the semester.
2. Management
The ¡Yes! team consists of six members from five different countries. It is difficult to manage such a team, since each team member has different work habits and comes from a different culture. It is a great challenge for all of the team members to organise work in such a way to minimize possibility of misunderstandings. In the other hand, the team multiculturalism is an advantage, because each team member put his share to the project. Team members has to communicate and express themselves in English. Because each team member has a different view on a project, the team is able to came up with a great amount of different ideas. The differences between team members makes challenges but also opportunities to become stronger, to take responsibilities and to create strong social links.

2.1. Team Name and Team Logo
When one hear business, one immediately think about making money. One of possible associations is a very rich person with the dollars in his eyes. That was also the teams idea. ¡Yes! team want to represent this idea in the team name. While brainstorming about a name someone wrote several currency symbols on the blackboard. The immediate idea was to use them in to create team name. A little bit later someone shouted the word ‘yes’. The team connected symbols of euro, dollar and the yen to this word. Therefore, the name of the team refers to currencies symbols.

At the very beginning there was several ideas about the shape of the logo, like cards, card colours, dice. Finally, the team decided on a dice. There are two reasons for the dice in the logo. For the first, dice is one of the most popular game accessory. Dice is an obvious association with board game. Secondly, in three visible sides of the dice the team name made of currency symbols is presented. In the fig.1 the first version and final version of the team logo is presented.

2.2. Team members
The team consists of six members from five different countries. Team members are presented in table 1., below.

<table>
<thead>
<tr>
<th>Name: Gohar Karapaetjan</th>
<th>Nationality: German</th>
</tr>
</thead>
<tbody>
<tr>
<td>University: University of Applied Sciences Kiel</td>
<td>Degree Program: International Marketing and Purchasing in Engineering</td>
</tr>
<tr>
<td>Belbin team role: Coordinator, implementer</td>
<td></td>
</tr>
</tbody>
</table>
Before start working on a team project, it is important to know which role define each of the group member. Therefore team members did the Belbin test, which scores people on how strongly they express behavioural traits from nine different team roles.

In the results obtained it is shown that all of team members are plants, and that is really good in this project because it means that members are creative and generators of ideas.

In the team there is an implementer, a shaper and a coordinator. Furthermore, majority of team members are quite resource investigator. Although it seems that everyone can be one of the nine different team roles, no one in the team is a finisher. Therefore, it is a great challenge in this project to balance the lack of a finisher with collective effort to finish the tasks.
2.3. Group organization and Responsibilities

Within the team there are a few roles divided to make meetings more efficient and to organise work in a proper way. This are the general roles within the team after the midterm.

Team roles:

Michał – project manager
Sam – project secretary
Michał, Sam, Maria – editors

Before the midterm team roles were as follows:

Gohar - project manager
Maria - project secretary
Michał - editor

Besides, there are responsibilities set for each task that has to be done. These responsibilities are shown in the responsibility matrix. This matrix is made to prevent that work is not finished at the right time due to communication issues. It contains the tasks from the work breakdown structure (see chapter 3.5. Work Breakdown Structure). Every task has a responsible person and a support person. In the first case has the task to be finished by the responsible person, but when a task is too large or too difficult it can be finished together with the support.

There are a few tasks which every team member is responsible for. Those are tasks that cannot be finished by one or two people. For instance, taking decisions about rules, products, etc. For these topics is it important that everybody agree with it.

2.4. Cooperation and Communication

In order to organise the work, fix the rules and communication standards, a team contract was created. The team agreed to certain set rules about meeting norms and cooperation. It was decided that each member will inform the others about his/her individual activity, all the information will be shared by the Internet. Conflicts will be resolved by voting or trying to find a different solution, depending on situation. It was also decided that fifteen minute late is acceptable. The team will distribute the tasks equally. Team members will be assigned to different tasks by team consensus. Each team member has a right to work by his own working habits on the condition that team member will not miss the deadline. Full team contract can be found in the appendix.

2.5. Schedule

To help us in the planning of the project and making of the Gantt chart we first made a work breakdown structure (WBS). The project is broken down into several tasks, these tasks are in turn divided in tasks. The result is a list of task that should be easier to overview and to make an estimate about the required time. Making an elaborate WBS should prevent the occurrence of unexpected tasks later on in the project. Below you can find our work breakdown structure.

A Gantt chart is a tool of project management for schedule representation. It illustrates the temporal successions of activities graphically in form of bars on a time axis.

The team took an excel chart for the project. The various tasks, to achieve a successful end of the project in planed time, are listed in the first column of the chart and the time axis is plotted on the
row. The tasks are subdivided into individual activities. Afterwards, the tasks and the activities are visualized in the respective rows with a bar. The length of the bars indicates then the duration of the task or activity. Overlapping activities are represented by overlapping bars. The Gantt chart can be found as an appendix.

Duration of 100 days of the project was divided into chronological tasks and their related activities. At the end of each done activity there is a milestone to show the important achievements. The team has to put a lot of effort in order to stick to the set plan. It is very important to make changes permanently, in case of exceeding set duration, to be up to date about the remaining time.

3. Project specification
Every project should be specified in terms of input, tools, output, basic elements and many other different tools. It is important to specify the project because those tools are helps to manage the project.

3.1. Input, Tools and Output
The project can be divided in terms of input, tools and output. In case of ¡Yes! team input consists of Work Breakdown Structure, Gantt chart, Midterm and Final Report, existing games, students and teachers reviews on existing board game. WBS helps to define different stages and elements of the project. In Midterm and Final Report the team will includes results of its work. Tools used to in the project are interviews with students and teacher, questionnaires, game tests and brainstorm. Interviews and questionnaires will help the team to establish what students consider as good and entertaining in business board games, and what teachers think about learning outcome from business board games. Team can find inspiration and standard solutions (e.g. accounting) in existing games. Brainstorms is a tool thanks to which the group can think about, invent and create different features of the new game, layout of the board, etc.
3.2. Basic elements

Project process consists of four main steps. Firstly, making ideas. The team has to think about and decide which features to include in the game and how to do it. Secondly, creating the first version. After creating the first version one or more testing sessions will be organised, to check which solutions are working and which are not, what should be added or removed. Afterwards, making adjustments. After each play test the team has to improve the game, invent new solutions if necessary, etc. At the end, creating the final version of the Business Board Game. Creating Business Board Game which will allow students learn basics of economics in an entertaining way is a task of the team.

Another basic element is interested parties. In case of Yes! team interested parties are students, professors, EPS coordinator and supervisor, Novia University of Applied Science CEO and the team itself. Students and professors because the game will be designed to be used by teachers during business courses, to organise classes in unusual way and convey the knowledge in an entertaining way. The team will put maximum effort to make the game engaging and attractive. Therefore, such Business Board Game may be great tool to advertise EPS programme in Novia UAS.

Environment of Yes team consist of students and professor with whom the team made interviews, supervisor who helps the team. Another element of the environment is Novia UAS building, Technobotnia, Tritonia Library and other facilities thanks to which the team can work.
Resources used by the team are the Internet where much information about different games can be found, library and existing board games.

3.3. Risk Management

Every project has its potential risks by which it is threatened. Each possible risk has its value i.e. how dangerous it is. The risk value is evaluated by multiplying two factors: probability that certain issue will occur (1-10) and impact on the project (1-10). In case of Yes! team project possible risks were divided into three main categories:

- personal issues,
- issues with the game,
- external issues.

Personal issues might happen due to some personal problems of any of the team members. One of the most dangerous personal issues is tense atmosphere among team members. Probability of occurrence is relatively high and impact on the project is severe. It might happen due to several reasons, e.g. misunderstandings due to cultural differences or different working habits. To avoid this, the team decided to make clear work rules (Team Contract) and divide tasks equally. Next risk is disagreement between team members on important issue. The team consists of six persons. Therefore, it is probable that different team members may have different view on certain problems. The team avoid this risk by solving disagreements by a consensus or, if a consensus cannot be reached, by asking for external advice.

The project is threatened also by issues with the board game. The most dangerous ones are the ones connected with manual. The team may have a difficulty to create a manual due to game complexity. If the team is not able to create the manual, then the team can ask for external help. Next risk is creating unclear manual, which is not helpful to players to understand the game rules.

There are also external issues. One of the most dangerous risks linked with external factors is lack of time to finish the project. The team is limited by period of time, and to finish the project on time, the team decided to create a proper Gantt chart and to follow it.

Only the most dangerous risks are described above. Full risk management can be found in the Appendix.
3.4. Quality assurance

Quality assurance is an important in any company or project, just as it is in this one. To make the outcome of the project of high quality, it is much about tools and techniques. But at the heart of quality is passion for your work. This is something the team has got.

Firstly, the factors that defines the project had been found and later the team looked how important these things are and how they can be measured.

3.4.1. Define the things to measure

To establish and control the quality of a project one should first define the things by which this is defined. To be able to adjust them, if necessary, these things should be measurable. The quality of our project is defined by the following aspects:

- educational value,
- amusement value,
- design,
- resemblance to reality,
- how well it fits with team members fields of study,
- appropriate difficulty.

3.4.2. Plan project quality

It is predefined how we are going to measure these factors and how important they are. In other words we set a benchmark for what the different factors should minimally be, as well as what we would like them to be. We divide the benchmark on a scale of low, medium or high.

Table 2. Plan of project quality

<table>
<thead>
<tr>
<th></th>
<th>How to measure</th>
<th>Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>need</td>
</tr>
<tr>
<td>Educational value</td>
<td>Feedback from business teachers</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td>Reaction of test players</td>
<td></td>
</tr>
<tr>
<td>amusement value</td>
<td>Reaction of test players</td>
<td>medium</td>
</tr>
<tr>
<td>design</td>
<td>Ask experts</td>
<td>medium</td>
</tr>
<tr>
<td></td>
<td>Feedback from general public</td>
<td></td>
</tr>
<tr>
<td>resemblance to reality</td>
<td>Result of test playing with student and/or experts</td>
<td>medium</td>
</tr>
<tr>
<td>How well it fits the</td>
<td>Compare what is learned from the game to the curriculum</td>
<td>low</td>
</tr>
<tr>
<td>curriculum</td>
<td></td>
<td></td>
</tr>
<tr>
<td>appropriate difficulty</td>
<td>- set desired difficulty with coordinator</td>
<td>low</td>
</tr>
<tr>
<td></td>
<td>- time to explain</td>
<td></td>
</tr>
</tbody>
</table>
The appropriate difficulty level does not mean that the game has to be as difficult as possible. The game should be complicated enough to engage the players but it should not be so complicated that it is nearly impossible to understand or explain. The desired difficulty was set with the help of the teachers and coordinators. The team will measure the difficulty by seeing how long does it take to explain and understand and by the complexity of the manual.

3.5. Work Breakdown Structure

Work breakdown structure is a fundamental tool used in project management to define and organize all things that have to be done. It is a decomposition of the project into all the tasks needed to complete the whole project. It is very useful to predict the amount of work to do in order to create an accurate planning. It is important to make it complex and to divide the project into small tasks. Thanks to this it is easier to organise work i.e. plan and distribute tasks among team members. Also it helps to structure the project, to make a Gant Chart and to know how the time has to be managed.

To create the WBS of the Business Board Game, Yes! team firstly named the six main points that define the project:

1. Prepare the project
2. Gathering ideas
3. Create the first version
4. Making adjustments
5. Making the final Project
6. Papers

Afterwards, those point were developed. Full WBS includes all the tasks which may be related with each point such as things to do, to discuss, to research, to think about, to brainstorm, etc.
creating a business board game

Make adjustments

First test with people

Test playing it ourselves

Test with the group and people

Identify things that can be changed
Identify possible improvements
Make changes

Create a document where we can write our notes
Extract the notes
Make changes if needed

Create a document people can write their notes

Discussion and final improvement

Problems with rules
Problems with accessories
Check if something is missing

Check if something is missing

Check if something is missing

Check if something is missing

Check if something is missing

Check if something is missing
Fig. 4. Work Breakdown Structure
4. State of the art

The one of the first tasks was to find papers and articles on what are the learning outcomes from business board games. Another task was to find existing business board games as well as online business games and simulations and test them. Thanks to that the team was able to define what makes a good business game. The last task was to do interviews.

4.1. Learning Outcomes from Board Games.

The frenetic pace of today’s world is challenging educators and business professionals to find the best ways of learning and how to use them correctly.

This project defends the idea of learning by playing, especially by playing board games and the team has realized that most people does not believe neither support this method. Games are still seen as a fun pastime for children and although board games have gained traction, most of them are created only for children. The point is that there is a lack of knowledge about how people learn.

It is known that hands-on and heads-on learning works best. And it is true that properly designed board games are one of the most effective ways to provide this combination. But most professional educators and business professionals do not value the importance of heads and hands-on learning and the true value of board games designed for learning are unrecognized by most people. The first thing that everybody ask is whether games really help people learn and how they do it. Yes! team wants to demonstrate the importance of the recent researches about the power of board games to facilitate rapid learning and retention, about how we can really learn by playing and show some examples of business universities that use this method.

As it is said in the paper *Why Games Work and the Science of Learning* (Curtiss Murphy, 2010), to prove this power, first it is needed to demonstrate why learning games work. And the answer is in the laws of learning that are the basic tenets that are known to improve learning outcomes. There is a strong connection between that tenets and the basic assumptions of game design. The things that are known to improve learning are almost exactly the reasons why games work. So one can say that games work because of the laws of learning.

Edward Thorndike developed in the early part of the twentieth century the three basic laws of learning that are readiness, exercise, and effect. Then five additional laws have been added to the list: primacy, intensity, recency, freedom and requirement. Those rules help us to understand how people learn and which conditions help them to learn better.

Laws of learning:\(^1\):

1. **Law of readiness:** States that people are much more ready to learn when they are mentally, physically and emotionally prepared. They need to have strong purposes, clear objectives and especially motivation to make more progresses.

2. **Law of exercise:** States that to learn something, practice and repetition is needed. It has been proven that students learn best and retain information longer when they have been practicing and repeating. The mind cannot retain neither learn new concepts in a single

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\(^1\) *Why Games Work and the Science of Learning* (Curtiss Murphy, 2010)
People learn by applying what they have been told and shown. Every time practice occurs, learning continues.

3. **Law of effect**: States that learning is better when associated with positive emotions. It is based on the emotional reaction of the student.

4. **Law of primacy**: States that the first thing one learn creates a strong impression that then is difficult to erase.

5. **Law of intensity**: States that the more intense things are the more likely they will be retained. This law shows why exiting experiences teaches more than simple lectures or a book.

6. **Law of recency**: States that things we learned most recently are the once we remember the most. It is easier to remember the things we learned most recently.

7. **Law of freedom**: States that things freely learned are the best learned. That students must have freedom. If not they will lose their interest in learning.

8. **Law of requirement**: States that we need the material needed to reach our goal. We must have something to do or obtain something.

Elizabeth N. Treher (*Play for performance. Learning with Board games*, 2011) affirm that learning via Board Games is an important tool to provide hands-on and heads-on skill and knowledge development for people of all ages on all subjects. That Board Games create engaging atmospheres, competitive environments and reinforce and apply learning. Through the mistakes people can know what they need to learn. The board and all the physical elements are vehicles for learning. The situations to consider and the problems to solve when one is playing allow players to think through and apply what they learn.

In team-based board games all the members learn together and it helps to build communication and relationship skills.

The same happens with video games that, as it is said in the paper of the MIT, *Moving learning games forward* (Eric Klopfer, Scot Osterweil, and Katie Salen, 2009), games player’s exhibit persistence, risk-taking, attention to detail and problem solving skills. Game environments enable players to construct understanding actively, and to advance on different paths at different rates in response to each player’s interests and abilities, while also fostering collaboration and just-in-time learning.

James Paul Gee’s ² sets out in his last text, “*What Video Games Have to Teach Us About Learning and Literacy*” (December, 2007) that video games, when they are successful, are very good at challenging players. They motivate players to persevere and simultaneously teach players how to play.

Gee’s work is focused on the learning principles in video games and how these learning principles can be applied to the K-12 classroom.³ Gee suggests that if students in formal educational environments had the ability to build their own knowledge, as players in a game do when they beat a level, more

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² James Paul Gee (April 1948) is a researcher who has worked in psycholinguistics, discourse analysis, sociolinguistics, bilingual education, and literacy. Gee is currently the Mary Lou Fulton Presidential Professor of Literacy Studies at Arizona State University. Gee is a faculty affiliate of the Games, Learning, and Society group at the University of Wisconsin–Madison and is a member of the National Academy of Education.

³ K-12 classroom is a term used in education and educational technology in the United States, Canada, and possibly other countries. Is a short form for the publicly-supported school grades prior to college. These grades are kindergarten (K) and the 1st through the 12th grade.
progressive learning would follow rather than the frustration that is often felt by students in academic settings.

- Identity development
- Interactive approaches
- Student production
- Risk-taking
- Individual customization
- Personal agency
- Well-ordered problems
- Challenges and consolidation
- Active exploration
- Rethinking goals
- Using smart tools and distributed knowledge
- Engaging in cross-functional teams
- Encouraging performance before competence
- “Just-in-time” and "on demand"

Some of the learning principles that good games incorporate include:

BUSSINES UNIVERSITIES USING GAMES

Even though sometimes in the world of education it is believed that most games are created only for young children, an ever richer assortment of educational games is providing to students the chance to learn while having fun and in a more interactive way. Video games and also board games are increasingly becoming an educational tool of training business people, among others. Here are some examples of schools paving the way in using gaming in business graduate education

1. University of Pennsylvania, Wharton School of Business: In the Wharton’s Alfred West Jr. Learning Lab of this University more than 30 games have been developed to use them as a tool for the business education courses. That games are based on economics, finance, management, marketing, and on real-life scenarios that in a near future the students will have to deal with. The goal of this games is to challenge the students to improve the skills needed in a business world while they are having fun.

2. MIT: Arcade Education is a consortium of researchers, faculty and students that works on the development of games for learning. It is known that the MIT have one of the best academic research and development on educational games of the U.S, but they also use that games with the students. For example the Platform Wars that is a game where the students have to play the role of a senior manager to learn about how to manage competition and develop strong technology strategies.

3. European Institute of Business Administration: The online virtual world Second Life is being used as a learning tool in some business education Universities like Paris, Singapore or Abu Dhabi. It is a virtual camp that offer lectures and where you can meet other MBA students from all the world. It is made to create different experiences for the students to learn and improve their abilities in an unreal world while having fun.

4. University of Washington: University of Washington started using business simulation games since 1957. The Foster School of Business at UW in collaboration with Novel, developed in 2011 new fun enterprise simulation game with lessons from companies such as Starbucks, Nike and Alaska Airlines. The game asks students to use their skills at collaboration and
management to be successful players. It is really interesting to improve this skills since they are needed in the real business world.

4.2. Online Games
To create a board game, the team needed experience and competences in this field. The first step was to get experience by playing and testing all kind of games about business. In the Internet there are not only those flash games which one can play for ten minutes but also contain some really complicated and realistic simulations about business. Testing games was a really important step in the project, because thanks to that team members gained knowledge and experience about games. In this chapter some of games that team members have played are described. Firstly, one can find general summary of the games played. Then, there is more in-depth review of some of the games.

4.2.1. Games played
During the first weeks of the project a lot of time was invested in playing existing games. This helped to understand what the possibilities were and what ways of approach there are. The team gathered an enormous amount of ideas from these play tests. It turned out to be very useful during the brainstorm later on in the project.

Next is a summary of some of the games team members played. The games were evaluated on several aspects:

- Learning outcome - the learning outcome which comes from the game, or how much one can learn about business
- Entertainment - how fun was it
- Graphic design - how nice does it look
- Rules - how complicated rules are

Based on these four aspects an overall score out of ten is given. If more than one person played a game they gave individual scores and the average is shown in the table. The following list shows some of the games played. Full games matrix can be found in the appendix.
Table 3. On-line games played by Yes! team

<table>
<thead>
<tr>
<th>Game</th>
<th>Learning outcome</th>
<th>Entertainment</th>
<th>Graphic design</th>
<th>Rate</th>
<th>type of game</th>
<th>played by</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtonomics</td>
<td>9</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6.00</td>
<td>On-line game</td>
<td>Victor, Michał, Simon, Gohar</td>
</tr>
<tr>
<td>Adventure capitalist</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>4.67</td>
<td>Flash game</td>
<td>Victor, Michał, Simon</td>
</tr>
<tr>
<td>game corp</td>
<td>3</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>5.25</td>
<td>Flash game</td>
<td>Sam, Simon, Michał</td>
</tr>
<tr>
<td>Tycoon Online USA</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>10</td>
<td>7.75</td>
<td>On-line business</td>
<td>Michał, Simon, Gohar</td>
</tr>
<tr>
<td>3rd world farmer</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4.25</td>
<td>Flash game</td>
<td>Sam, Simon, Gohar</td>
</tr>
<tr>
<td>Theme hotel</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>5.75</td>
<td>Flash game</td>
<td>Victor, Simon</td>
</tr>
<tr>
<td>gazillionaire</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>5.38</td>
<td>Flash game</td>
<td>Sam, Simon</td>
</tr>
<tr>
<td>Simunomics</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>5.75</td>
<td>Flash game</td>
<td>Simon</td>
</tr>
<tr>
<td>Small business game</td>
<td>7</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>5.00</td>
<td>Flash game</td>
<td>Simon</td>
</tr>
<tr>
<td>Frontier</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>3</td>
<td>4.75</td>
<td>Flash game</td>
<td>Simon</td>
</tr>
<tr>
<td>Industy Player</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>5.00</td>
<td>Flash game</td>
<td>Gohar</td>
</tr>
<tr>
<td>Kapiland</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>6.00</td>
<td>Flash game</td>
<td>Gohar</td>
</tr>
<tr>
<td>Capitalism II (demo)</td>
<td>7</td>
<td>5</td>
<td>5</td>
<td>3</td>
<td>5.00</td>
<td>Flash game</td>
<td>Gohar</td>
</tr>
<tr>
<td>Rising Cities</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>4</td>
<td>4.75</td>
<td>Flash game</td>
<td>Gohar</td>
</tr>
<tr>
<td>Marty Raygun’s fistful of dollars</td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>4.25</td>
<td>Flash game</td>
<td>Gohar</td>
</tr>
<tr>
<td>Theme Park World</td>
<td>6</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>8.25</td>
<td>PC/PlayStation Game</td>
<td>Michal</td>
</tr>
<tr>
<td>Airline Tycoon</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>7</td>
<td>7.50</td>
<td>Downloaded game</td>
<td>Victor</td>
</tr>
<tr>
<td>TransEdu</td>
<td>5</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>3.25</td>
<td>Business simulator</td>
<td>Michal</td>
</tr>
<tr>
<td>GoVenture</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>8</td>
<td>8.00</td>
<td>Business simulator</td>
<td>Gohar</td>
</tr>
<tr>
<td>SimCEO</td>
<td>7</td>
<td>6</td>
<td>8</td>
<td>6</td>
<td>6.75</td>
<td>Business simulator</td>
<td>Gohar</td>
</tr>
<tr>
<td>INOV8</td>
<td>5</td>
<td>3</td>
<td>4</td>
<td>4</td>
<td>5.00</td>
<td>educational</td>
<td>Sam</td>
</tr>
<tr>
<td>Fishbanks</td>
<td>5</td>
<td>4</td>
<td>7</td>
<td>5</td>
<td>6.00</td>
<td>educational</td>
<td>Sam</td>
</tr>
<tr>
<td>7 Wonders</td>
<td>8</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>6.40</td>
<td>Board Game</td>
<td>Victor</td>
</tr>
<tr>
<td>La bonne paye</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>8</td>
<td>6.00</td>
<td>Board Game</td>
<td>Victor</td>
</tr>
<tr>
<td>Illuminati</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>5.25</td>
<td>Board Game</td>
<td>Victor</td>
</tr>
<tr>
<td>Ticket to Ride</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>7</td>
<td>6.75</td>
<td>(Online) Board Game</td>
<td>Victor, Simon</td>
</tr>
</tbody>
</table>
In the later phase of game testing team members looked more into various business simulators and educational games. Next the team looked at some of the played games more in-depth.

4.2.2. Vitronomics

Goal
Create your own business by building and exploiting stores, factories, laboratories, offices, warehouses etc.

How
Game starts with a gift from a rich uncle (10.000.000$). Player also gets a factory, a laboratory, an office and a store. Depending on first choices, player may get an extra store, a restaurant or a mil.

Player cannot buy, sell or produce goods with an office. However, it is necessary to coordinate the subdivisions of a company. It is possible to change the size of an office depending on the size of a company, improve equipment (e.g. computers) in order to improve the efficiency of a company, or spend money for advertisements.

Factories produce goods that can be sold to company owned by a player or to other company in the game. But firstly, player needs raw materials. Those can be bought from any company that provides these goods or player can provide himself by building other subdivisions. Price and quality of materials vary depending on different suppliers. Player have an ability to choose between several suppliers depending on his preferences.

At the end player can sell products to the stores or deliver them to his own store.

The same is with an office. Player have a possibility to improve the efficiency and the size of his office by upgrading the equipment and employees.

The next subdivision is store chain. One has to set a contract with suppliers and sell the goods for a profit making price. Player can change the size, location and employees in his shops.

At any time player can build new subdivisions, e.g. a new office, a new store, a restaurant, a mill, an animal farm, a factory, a laboratory, a warehouse or a mine.

Experiences
It took a long time to figure out the different futures. However, after several hours of playing the game become entertaining. Moreover, Virtonomics has clear lay-out.

Especially, the interaction with other players is good. Player has to adapt his prices and your products to compete with other players. When one’s goods are too expensive, one cannot sell them. Otherwise player has to cover your production- and transport costs. Also, the variety of the different choices within the company is an advantage of this game.

A disadvantage of this game is the duration of the updates. Every 24 hours (50 minutes in-game time) player gets the balances. Only then one can estimate if one’s company is running well.
Another note is about the player-competition. It is difficult to make enough profit to get the company started. There are a lot of competitors, and of course, every competitor choose the cheapest supplier. That means player has to sell goods of bad quality or under the production price.

Fig. 5. Virtonomics - list of subdivisions

Fig. 6. Virtonomics - data about a factory
4.2.3. Simunomics

Goal
Create and manage your company by building and managing several subdivision, i.e. farms, factories, laboratories, stores and warehouses.

How
The main principles are the same as in Virtonomics. The only differences are in small details such as other kind of stores, mines or materials.

Experiences
Concerning the game design, it is not attractive. In the background there is an ugly picture of the current subdivision the player is looking at. In the submenus it is possible to check production and activity of the subdivisions. In boxes player can find calculations and data about different factors. Not every calculation is clear or make sense. It is not clear at all and difficult do understand.

Fig. 7. Simunomics layout
4.2.4. Tycoon online

Goal
Similarly to the most business simulation games, the goal of the game is to build and maintain a profitable company.

How
Player can make money by building factories, shops or transport goods. When player builds a shop or a factory, he needs a piece of land to build it. At the beginning of the game player has a choice in which area he wants to develop a company.

If player builds a factory or a shop, he needs a piece of land in the appropriate area, e.g. Downtown or in the countryside, in the forests, near the road or near the sea. This makes it more expensive than building a subdivision.

One can also buy a truck, a trailer, a train or an airplane. To use this then, a driver and fuel are necessary. It automatically loads goods and chooses destinations.

When player has to build a company, he needs employees to produce materials. The only way to hire workers is to post a job advertisement for $250 (valid only for one profession). Player can hire up to three workers, $50 each. A brief description of each worker is available.

The workers in an online game have also feelings like humans. Player has to satisfy and pay them at the right moments, otherwise they become sick or go on a holiday. Player cannot dismiss sick or absent workers.

Another way to make or lose money us to purchase shares of other players. 10% of all revenue for a company goes to dividends, which are paid to shareholders every Sunday at 06:00.

In the game there is also the option for buying and selling goods at the market. Player gets a daily update of the prices to see if they increase or not. This is an other way to make money, or to know wher to invest money.

Experiences
The lay-out of the game is basic but clear. There is not too much details or graphic interfaces. One can easily find different options and there is also a brief description available at the different submenus. It is easy to start the game thanks to all the hints.

The stock exchange and the market is a helpful tool to know what and where to invest.
Fig. 8. Main screen in Tycoon Online

Fig. 9. Left - information about factory, Right - data about transport
4.2.5. Short market game

Fig. 10. Short market game - game preview

Goal
The goal is to maximize company's profits.

How
The game is played in monthly rounds. It is focused on betting on the future prices. Player compete with other students who can ruin player's score. One can also see the previous prevision and who sold what and in what quantity. Player really has to adapt to the others and to the market, to make the best benefit. Player can choose a market to enter.

Experience
The layout is very attractive and clear, which is very important. The rules are clear but the game is sometimes difficult because of competition with other players. After many rounds, prices are very low and player cannot earn money anymore.
4.2.7. Industrial organization

Goal
In this game, the goal is to become the best seller among students.

How
The game is played in monthly rounds. Player sells products, shares the market with other students. If he sells at a low price, he will sell a lot of product but for less money and in the end player has to adjust to the market and to the other students. There is no many options but it is well guided.

Experience
This game is a bit similar to the previous game but here there is more competition between the students and it is easier to see what will happen. The layout is well organized and player can check the strategy of the four best sellers. One can lose money which is an interesting part in this game.
Goal
The goal is to improve the existing factory, replacing the steps in the production, marketing, etc.

How
Firstly, player has to change the way of working of the factory, e.g. add quality control after each modification of a product.
Then, one has to test every solution by balancing the budget between the option and see what is happening and what are the impacts on the environment, client satisfaction, etc.

Experience
It may be difficult in the beginning because player do not know anything about the company and he has to modify everything. However, the idea is interesting because everything in the company can be modified. Then, player has a budget and several projects and he has to choose which one to finance. The impacts are a really good method to measure if decisions are right. Nevertheless, this solution is easy on the computer, not in a board game.
4.2.8. Salt seller

Goal
Player is the sales manager of a company who sell salt. He has to set the selling price.

How
The main idea is quite easy. The several competitors have to set a price at which they want to sell their salt. Player has to keep in mind that he should not set the price too low. Otherwise, player is going to lose a lot of profit to become the market leader. There are also the direct and indirect costs depending on the sales volume.

Once all the competitors made their bid, player gets the competitors prices, the percentage of market share and an income.

Experience
It is an easy game but also instructive. Player has to consider selling price every year, but be aware of losing money if the price is set too low. It is possible to see the choices of other players, so player can try to predict other players moves. Sometimes you succeed, sometimes you lose.

Fig. 13. Salt seller - game preview

4.2.9. Clean start

Goal
Player has to impersonate CEO of a company that produces technology for improving the energy efficiency of buildings. Player raised $1,000,000 in funds from friends and family. Now he has to start up his company with this funds.

How
There are also other competitors on the market. Firstly, player has to try to win costumers. The production of a product costs $60,000 and the maintenance fee is 5% of the sale price per year. The production costs can be reduced when player has more experience and knowledge. One has to set selling price each year.
Product must be more attractive than the one produced by opponents. Players employees, engineers and sales workers have to work for it. It is necessary to hire them, but also be aware of their costs. Hiring too much staff without selling products can end in lost.

**Experience**

It is difficult to make a profitable company. If player wants to save money by keeping price too high, he has no customers even after a few years, which means no income. Other strategy which can be applied is to start selling product at half of the production price. Once player gets customer confidence, he can start raising the price.

![CleanStart: Simulating a Clean Energy Startup](image)

*Fig. 14. ClearStart - game preview*

### 4.2.10. GameCorp

**Goal**

In this flash-game one is managing the company developing PC games. Player starts with a small studio and $30 000. The goal is to manage the company in such a way, to become a biggest company on the market.
How
Player has to hire workers (programmers, graphic designers, writers) and train them. Player has also to care about food and drinks for employees, facilities to increase creativity. One of the main tasks is to choose the type of the project (micro, small, medium or big), type of the game (shooter, RPG, racing, etc.) and divide work among the workers. Player has to choose a type of marketing - advertisements in TV, Internet and press. After the game is done, a few game magazines review and rate it. Game is complex as for a flash game but easy to understand because of the tutorial at the beginning. The big drawback of this game is lack of possibility to take a loan or to dismiss an employee.

Experience
Learning outcome from this game is not as big as from business simulator. However, game is simple, has a nice design, it is easy to find different options. Tutorial and the beginning is very helpful. The game gives a view about basic issues connected with managing a company. As a manager, one has to care about employees to keep them motivated and efficient. It gives opportunity to learn something about HR management. Proper distribution of work among the workers is also very important. One has also to make decisions about type of marketing.

4.2.11. Conclusions
On the one hand, the results indicated that playing on a screen can be really entertaining. The layout can move and grab the attention of the player and there is always something to do. It also gives a lot of possibilities for the creation of the accessories even if they are not real. On the other hand, it is difficult to balance the educational part and the entertaining part.
4.3. Interviews
As it was mentioned before, the team performed interviews firstly with students of Novia UAS and afterwards, with a board game designer - Anders Olin. It brought a great amount of knowledge about students feeling and expectations about the game. Also and technical knowledge about game mechanisms was gained. What is more, Anders Olin expressed his opinion about inventions and solutions created by the team, which was very valuable for the team.

4.3.1. Interviews with students
To be able to create a really educational game which students enjoy to play, the !Yes! team has set itself the task of interviewing students who already played a business board game created at Novia UAS. The old business board game is considered to be educational.

Following conclusion gave the team a plenty of information:

- the game “Produce forest machinery” is about production,
- game starts in 3\textsuperscript{rd} year of the company,
- 4 various kinds of machines can be produced,
- opportunity of improvement or purchasing of new production machines,
- selling of machines,
- opportunity to explore other markets and expand the company to other countries,
- accounting at the end of each year.

The Game is very educational. It provides a view what you need to look after as a Product Manager with realistic data and resources. Although it might be better to start from very beginning to face the problems of establishing a company or a factory.

Playing three days, or if necessary longer is fine, because there are some new outputs in each turn. It improves and facilitates the understanding the way, production really works. The possibility to get up from the board is thoughtful. Since it makes easier to stay focused on the game, it feels good to handle and count with coins. Moreover playing in a team and the amount of the players in each team is appropriate. The accounting felt realistic, but making a mistake in the first year pervades through the entire game. Nevertheless, it links the game with the theory of a real company. It might be a challenge for the teams and at the same time a good educational strategy to make them think about short term as well as a long term planning. A little variety in the game brings an order intake from Brazil, thereby originates an interaction with other companies. After an amount of random events the company has to deal with some problems to survive in the market.

On the other hand it is hard to get used to the new position of the CEO, production manager and economist after switching the responsibilities every 5 years. Also it is complicated to figure out the correct way to act and play. There need to be more clear rules from the beginning to understand the process and it needs more guidelines in case of forgetting a step or braking the rules. In addition the steps become routine after a while. Unfortunately, it feels ridiculous when the game master makes meetings of the CEOs to create new rules after a strike or another random event in the game. Preferable would be an intercompany business and a solution of fixing the accessories on the board. Adding some taxes would feel more realistic.
4.3.2. Interview with Game Designer

The team thanks to help of EPS coordinator, Roger Nylund, organised a meeting with Anders Olin who has a great experience in creating board games. The first thing told by Mr. Olin was that the team need to make a prototype as soon as possible, because process of creating a board game mostly consists of testing. It is important to test the game and check if economic engine, rules and all of solutions work.

According to Mr. Olin each board game should have a clear goal, e.g. collect the biggest amount of money. Furthermore, it is crucial to find an appropriate balance between realism and entertainment. The team must remember that the game will be used during business courses. Therefore, it must be realistic and provides some learning outcome. However, as a board game it must be entertaining and engaging. The team should be careful about implementing random events, price fluctuations, etc., not to make players angry and irritated. Students are supposed to learn by playing and having fun, not by struggling with severe random events. As Mr Olin said, in a good board game there should be about 10% to 20% of randomness. Another issue is that players should be rewarded for taking a risk an appropriately for the level of risk (higher risk - higher award).

To make the start easier player should start with, for example, five workers, as a part of a budget. Next issue is to how to find a balance between investment and profit. One of possible solution is to test different scenarios, i.e. to spend as much money as possible with obtain as less as possible, then try exactly opposite scenario. Another problem which the team have not thought about before, is what will happen if player become more and more rich. In such case there are a few solution, e.g. rise of the prices and taxes.

Mr Olin said that the team idea about system of distribution (described in further chapter) is a very good one. Also, it is good idea to implement cards with statistics and forecasts in the game. Despite a plenty of good ideas that the team came up with, there was still many things to improve. One of them was turn based system. Problem with a turn-based system is if everyone has to go at the same time to the market to sell their products, it is very probable that players will have to wait for the slowest one. The turns may be arranged in the different way, for example to give more opportunities to earn money. Also, it was suggested that maybe it is a good idea to change the play system to something different than turn-based system. One of possible solutions is time-limited play system, where players are limited by time to do certain tasks. Time limitation is represented by an hourglass. Another issue was to decide if teams should be small or big. Either small or big teams have its pros and cons. In case of small teams, learning outcome is bigger since one player has more tasks to do. However, it may be overwhelming for player to be responsible for too many tasks. During the meeting with Mr Olin prices of raw materials, etc. were not fixed, which is crucial for business board game. Since the team want to create a board designed as a city, it is possible to create different prizing zones. For instance, facilities near roads are more expensive than the one which are far from roads.
Meeting and interview with Mr Ander Olin gave the team much knowledge about creating games. His opinion about solutions invented by the team was very helpful and gave the team possibility to improve the existing ideas and game features. To sum up, interview with Mr. Olin can be may be summarized as following list of tasks to do:

- make a prototype and organise test play,
- define a clear goal in the game,
- find a balance between realism and fun,
- think of reward for taking a risk,
- find a balance between investment and a profit
- think about random events,
- change turn-based system to some other system

4.3.3. Conclusions
Different interviews which were made firstly with students, then with a game designer, pointed out some difficult parts in the game and its creation. First of all the testing part was underestimated but the team will now focus on this. It also brought to light the difficulty of making decisions and switching roles during the game. On the other hand, it confirmed team’s view of teaching and brought new ideas to develop such as intercompany business or reward the risks taken by teams.

4.4. Conclusions
First there was the research about games and the educational value of it. The few sources that were used were pointing in the same direction: board games are the best way to educate people in an entertaining way. Today it is still increasing to use board games as an educational tool. A few universities are mentioned in the text.

In order to discover what business is about - specifically - what is a business game as the first part of the project was playing games. A lot of time has been spend on flash games, but at the end it turned out to be a waste of time instead of an interesting experience. The more complex online games, e.g. Virtonomics, were much more interesting. They teach more about business than a lot of the flash games do. But also they require more time to learn the rules.

A few people were interviewed to learn more about board games and their experiences with business board games. Firstly, a few students were interviewed about the previous board game that used to be played at Novia UAS. A brief summary of what students like and dislike in the game are: it is better to start the game from scratch instead of jumping in an already running company, player has to survive instead of making a lot of money. Moreover, taxes would make the game more realistic when player starts to earn more money.

The last main part of the research was the interview with a professional game designer, Anders Olin. He had some few tips about what to do and what the team should avoid. The main points were about: finding the balance between realism and entertainment. It has to educate students, so it has to be realistic, but on the other hand it also has to be entertaining. The game should not consists of too much randomness. Players do not like more than around 20% of randomness. Another remark is that risk has to be rewarded with the right amount of money. People are not likely to take a risk if it is not rewarded. And a last topic was about finding the balance between investment and profit. The difference between the profits cannot be very high to keep it fair to the other players.
5. Possible Solutions
To create a game the team had to decide which business features to include. After the team had made a choice about features, it was needed to find a way how to include them into the game. In order to invent solutions, Yes! team did brainstorm sessions. During those sessions team members came up with great amount of ideas. The best one are described in this chapter.

5.1. Loans

5.1.1. First idea
This is a three option loan. Player can choose if he wants to return the money in 1, 5 or 10 years. Depending on this, player pays more or less each year.

Fig. 16. Loan board - first idea

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DRAWBACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• One have three different options to choose</td>
<td>• There is no reason to take the expensive one if one can take the 1 year loan.</td>
</tr>
<tr>
<td>• Player can take that one every year.</td>
<td>• Player can take that one every year.</td>
</tr>
</tbody>
</table>

5.1.2. Second idea
Depending on which loan player takes he will pay a different amount of money each turn. This amount of money is written in the board.

Fig. 17. Loan board - second idea

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DRAWBACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Player can predict how much you will have to pay</td>
<td>• There is no strategy</td>
</tr>
<tr>
<td>• Player do not have to pay every turn</td>
<td></td>
</tr>
</tbody>
</table>
5.1.3. Third idea

Get 10 coins

Player has X years (5, 10, 15...) to pay the loan plus the interests. He can choose when and how much to pay each year.

Pay 10 coins + interests

Fig. 18. Loan board - third idea

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DRAWBACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Player can create his strategy</td>
<td>• There is no reason to pay for it every year if player can pay all at the end.</td>
</tr>
<tr>
<td>• Player can control his money</td>
<td>•</td>
</tr>
</tbody>
</table>

5.1.4. Fourth idea

This idea works exactly like the second one that you can chose from three types of loan, but this time the layout is presented as a circle. The number one means that you have to pay 1/10 of the loan that turn. And the number 10 means that is the last turn so you have to return the whole loan (that is 10 million).

Fig. 19. Loan board - final idea

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DRAWBACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Player do not have to pay every turn</td>
<td>•</td>
</tr>
<tr>
<td>• Player can chose between 3 loans</td>
<td>•</td>
</tr>
</tbody>
</table>
5.2. Distribution
In a company, the distribution represents a part of the logistic: the flow management for the goods which arrive in the factory then those which are sent outside of the factory. This is an important step but it was not included in some of tested games.

Below is an example of distribution. These are cities but it also can be countries or continents.

Fig. 20. Scheme of distribution in the game

There are different cities but in the beginning of the game only one is available – the city where the company is situated. Later in the game, teams can pay for marketing in those cities and see what kind of product is needed there or how it will move in several months. In that way player can check the market, choose the most appropriate one and then send his products.

The main idea was to create different kind of transportation e.g. trains, boats or trucks. To materialize this distribution, the teams could take different ways in lengths and prices to make compromises.

The cities have their own market. This means, e.g. that selling product A in the city B is good deal but only during a determined period. Companies have to develop their marketing through the distribution to get better benefits. To increase the difficulty, market in the first city can get worse and the demand can suddenly go down for example, to enforce the companies to develop abroad.

This approach is also good for random events like an accident on one road delays the distribution. One of possible solutions is that in the beginning, only few cities are available. Then, when the game master wants to, he can create new events and advertising for new towns.
This board can be one distinct for each company or a main board where everybody can see their competitors. Each turn, or after certain period of time if it is a continuous game, teams have to move their pawn or products one step forward. They can only sell their products when they reach the destination. This idea can also be linked to the warehousing in each city.

5.3. Production

The production is an important part in a company. It represents the place where raw materials are turned into finished goods. In the game, the team wanted it to be clear and not as complicated as in certain games. Different ideas and solutions were invented.

First of all, the team agreed on having different types of machines. They can be for creating different parts of the product or for different qualities and speed of production. We found a lot of ideas such as:

The first idea was to put one machine for each type of product but with several steps on the same machine. This is simple for the students and to create but this is sometimes not realistic.

![Fig. 21. Scheme of machine with several steps](image1)

Another idea team came up with was in relation with the products similar to the water turbines: shaping then finishing and coating. This way we can have different machines for different shapes of blades but one machine in common for the coating. Student will have to manage the production for actions which needs a lot of time, and with busy machines.

![Fig. 22. Machines based on production of water turbines](image2)

If bikes will be used as a main product, the process could be shaping first, then assembling the parts. Painting machine may be added in the end. This way is not totally realistic, because factories which produces bikes do not create them from scratch.

Team also thought about machines creating different qualities of products with different demanding customers. This idea is interesting but nobody wants to create bad quality product even if product is of bad quality. This idea was dismissed.
To visualize the production going on, the team thought about building the product in different steps like one do while playing with Lego®. Students will take the needed raw materials and create the product then. This solution brings entertainment to the game, but it will be really annoying for the game master to destroy the finish good to get back the small pieces. Then the team thought about a small container which has to be flipped to get back the pieces.

As we were going through the project, we started thinking about continuous playing. Turns may be a bit boring whereas if there is always something to do you may carry away with your emotions. However, we always need to count time for the production. Consequently, the idea of using cooking timers for each machine solved the problem. We could use a “magic box” or the working principle of a salt container to open the machine only when the operation is finished. This brings a lot of interaction and a visual progress of the production but it can be noisy, we cannot stop the game and we need to buy a lot of stuff. Moreover, electronic part need to be changed years after years. To replace it, we came up with hourglasses. It solve most of the problems but is less attractive. The sand can be in different colours to match with the machine. For example a red hourglass goes together with the red machine.

There is also possibility to not include production part in the game and focus more on parts as the accountancy. Nevertheless, these decisions are closely associated to the product which will be chosen.

5.4. Human Resource Management
The first idea was such that player has to pay for an announcement in the newspaper. Then, player throws a dice which determines the quality of a worker. The quality is defined in six stacks of cards which are divided in the outcome of the dice. It may affect the production (slower, more expensive, etc.).
Every year there is a defined number of new workers on the market. Player has to pay to go there and then he can see the quality of the workers and choose if he wants to hire them. Player may replace another worker.

Main points:

- number of workers needed in the factory/machine,
- Different types of workers (engineer, office, workers)
- just make it simpler and add the HR in the accounting

Nevertheless, this solution makes the game very complex. Therefore, the team decided to implement Human Resource Management in a different way. On every card representing a certain machine, there is an information about how many workers of different type it requires. If player owns machines, he has to pay certain amount of money at the end of the turn/year for employees’ salary.

5.5. Market research

Market research is the very first step that a company has to take before entering a market or a sector. It is the systematic exploration of supply and demand, including the collection of the needs of customers and other interested parties. The results of the market research form the basis for the prognosis of product development.

There are many paths of market research. To implement it in the game, we chose the following:

1. Sell of cards by game master,
2. Show the steadily market conduct on a digital screen

Which includes

- **Surveys**: By buying researches about the shopping behaviour of the consumer the former years, the company is able to make decisions about the kind and amount of products. The more the company invests the more accurate and better is the information. This can be supplemented through...

- **Statistics**: They will give information about turnover figures for every individual types of each product, produced by competitors. Thereby you can decide if the product will pay off.

- **Forecasts**: By investing in forecasts, the company will get the most important information about the present and future behaviour of the market. They take into consideration for example the government (new fiscal reform, new legislation), the environment or simply new trends.
5.6. Selling
Products that you produce should be sold, this is your main source of income. There should be a real sense of competition here. The market prices vary somewhat predictable in the long run but there will always be small fluctuations that are unpredictable. These should be included as well. We came up with several possible solutions, two of them are briefly explained. It would even be possible to make a combination of them.

5.6.1. Customer base
The selling department is a constant struggle for customers and a market share. You could go for strong branding, in the form of quality, the lowest price or the best cost/quality.

There are a certain amount of customers that will always go for the cheapest provider. A smaller group will always buy the highest quality.

Investing in 'branding' will assure that you have number of loyal customers. If you whoever, fail to serve their needs, they will go to your competitors next time.

On the physical board the customers could be represented by figures. They stay on the 'customer part' of the board. If they are close to your company, meaning they like your brand. It’s likely they will buy from you. Unless you can’t meet the demand off course.

5.6.2. Spinning wheel
You spin a wheel to choose what kind of customers we have this round. Are they more interested in product A or B… You have a general idea of the customers that will be available each round.

To promote a feeling of competition between the teams we hold these auctions at predetermined times. If the team wants to participate they should make sure they have products to sell and be there at the right time.

A player would have to set a price for which he wants to sell his product, this cannot be chanced ones the auction has begun. The wheel is spun to see what the demand of the market is. The differences between where the spinner ends up are not that great, it merely represents the small fluctuations of a market which are impossible to forecast.

On the wheel there is a number for each product, this represents the consumer market. Each turn there is a demand for a certain amount of product A, b and C. The number is how much of each product there can maximally be sold. These amounts should be set just right, the demand should always be slightly smaller than the total number of produced goods of each type.

Fig. 25. Selling - customer based
The team who has set the lowest price for their product will sell first, then comes the team with the second lowest price and so until the demand is met. The players with the highest price will most likely not sell their products.

If, however, due to circumstances you would know that the demand for a product will be higher than the number of goods that have been produced you could set your price very high. To parry this there will always be a maximum price a customer is willing to pay. These maximums vary in time according to the market and the product.

By doing marketing you can influence which cards are on the board. You can replace the pie pieces by stuff that is better for you. The several options for marketing will be looked at in chapter (chapter 5.11. Marketing).

5.7. Warehousing

Warehousing is a part of running a factory, closely connected with logistics and buying. There are two different parts in the warehousing: the first one is for the raw materials which are just coming into the factory. The company has to stock them and to ask for other. There is a limit of capacity and the players have to take it into account. The second part is for the finished goods the company is producing. Player needs to stock them in a warehouse before selling them. This part can be implemented on each market the company has.

In fig. below an example of a warehouse which may implemented is presented. The goods take the place in red and the white squares represent the free space. It is visible and quite easy. Different size of warehouses may be defined.
5.8. Board
In the board games world there is a lot of easy solutions to create a board. But the game our team is designing needs more than a simple board. As the game is highly complicated it is needed to add a lot of information on it. Our idea is to create a main board for the general information and a personal board for each team to control how the game is going for them. Below we will explain all the ideas we have created.

5.8.1. First idea
Octagonal board gives the possibility to split it in an amount of portions that represents each step of the game. In each portion there is space to write all the information about the step it represents. The circle created in the centre represents the bank.

![Octagonal board](image)

ADVANTAGES | DRAWBACKS
--- | ---
- Represents clearly all the steps | - Too small. Not everybody can see it well
- Players can see all the information in one board | - Difficult to read in all directions
- | - Small portions. The information can’t fit in it.

5.8.2. Second idea
This board represents all the steps that have to be played in the game.

![Board representing the steps](image)
### ADVANTAGES | DRAWBACKS
---|---
- Simple | - Difficult to read in all directions
- Clear | - Uncreative

5.8.3. Third idea

3D board. The same idea that the first one but this time is in 3D and may spin. The players can chose which part of the board they want to see.

![3D board](image)

**Fig. 30. 3D board**

### ADVANTAGES | DRAWBACKS
---|---
- Everybody can see every part of the board | - Could become chaotic if everybody wants to spin it
- Creative, new, different, innovative | - It is not big enough for all the information
5.8.4. Fourth idea

In this idea the main board will be situated on the walls of a classroom.

Fig. 31. Posters on the classroom walls

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DRAWBACKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Provides interaction and movement while playing</td>
<td>• A lot of space is needed</td>
</tr>
<tr>
<td>• A lot of space can be used and everybody can see all the things perfectly.</td>
<td>• It can interrupt the game and create distractions</td>
</tr>
</tbody>
</table>

5.9. Raw materials - purchasing

Purchasing of the materials the company needs is a step just after a thorough market research. To purchase the best quality in combination with the price, it is necessary to make a supplier analysis. Once a company found a trusted supplier, it should make contracts to keep the price stable. However it is not always possible, because of the gambling on the stock market. With increasing demand the price increases and vice versa. Therefore, the companies have to make strategically important decisions.

For the production of two types of bicycles the company mainly needs aluminium and steel.

It can be implemented in the game in following ways:

- The stock market of these materials is displayed on a screen and controlled by the game master. In case of random events in the market he can immediately change the price and display it on the screen.
- Each table, which contains 3 or 4 teams, has one stock market in the middle of the table. The price is constantly updated when new material are added to the stock. The prices of the various tables are not directly related. If they disperse too much the game master can intervene and transfer some of the raw materials from one table to another, or add more material to the stock.

5.10. Building a factory

There is one central board that represents the city where the factories are located. Preliminary design of central board is presented in fig. below. In the city there are huge, small, cheap and
expensive pieces of land that can be bought. The larger parts are more expensive than the smaller parts. But the larger parts can contain more machines, warehouses and other kind of buildings.

Once someone buys a ground, he gets a cardboard with an amount of squares. This is the area of a company. The larger the ground, the more squares it contains. Every machine or building has to be placed on these squares. There will be a choice between several machines. Every machine has its own dimensions. Players get the option to buy new pieces of land when there is no more space available on the personal cardboard to extend their factory.

Raw materials have to be stocked in the warehouse of the factory. There are different sizes of warehouses, as the same for the machines. These warehouses has to be placed on the same cardboard together with the machines and possible other buildings, for instance an office.

Buying the machine player gets an information about the costs of the staff and energy consumption included in the production costs. There is still the possibility to play with visible workers. This means a machine can only produce products while it is equipped with workers. This includes the risk that workers quit, are sick or do not want to work and the unequipped machines cannot produce anything.

When more complexity is acceptable there is an option to work with an energy consumption meter. It is a scale how much kilowatts-hours a machine consumes. Every year player gets an energy bill to be paid, but the energy price fluctuates each year so the energy cost will differ every year. This is still an undeveloped idea, with less entertaining value.
5.11. Marketing
Doing marketing will enhance chances for selling. There are different types and ways to do marketing. Player can make advertisements in TV, Radio, social media, by sponsoring, etc. The different types of marketing give different results.

The market is represented by a spinning wheel (see chapter 5.6. Selling). When someone invests in marketing, he/she gets a piece of pie chart that can be placed on top of the spinning wheel. Depending on the budget of the marketing the player gets more pie chart pieces or pie chart pieces with a larger possible amount of products on it. This pie chart contains the amount of products on the original wheel with an added number of products which the player advertised for. The spinning wheel can be a totally different spinning wheel after the advertisements.

However, the players can only add pieces to the market or spinning wheel, so there is still a chance that their advertisement fails when the final outcome is not the pie chart of their advertisement.

Besides, there is a small remark that not every product can be matched with this idea. It makes no sense to make advertisements in TV or social media for products that only can be sold to a specific costumer. For instance water turbines or high technical machine components.
5.12. Accounting
To be more educational and realistic the game needs an accounting part. It represents the balance sheet companies have to fill every year. It was decided to implement one balance sheet per year but an easy one. To help the students to complete this step, a simple board with instructions written on it will be created. After every transaction, the student responsible for the accounting has to put a coin or a put a cross in a box. In this way, at the end of the year, players can fill the balance sheet properly and understanding every number.

Below there is presented an example of board (in blue) where the balance sheet can be put on with comments in the blues parts.

![Balance Sheet Example](https://www.sampletemplates.org)

Fig. 35. Balance sheet on board with instructions. Image from: www.sampletemplates.org

5.13. Product
Which product or products we use in the game dictates for a part the look and general atmosphere of the game. The product should have the following characteristics and possibilities:

- Interesting
- not be outdated too fast
- realistic in the game
- Should be possible to have cheap more simple types as well as more expensive types
- possibly have something to do with Finland or Vaasa

The product also influences how the game is played. Some products are more transportation based, others are more about product development while others are very production intensive. The choice for some products makes some facets of the game unrealistic, you would for example not do an advertising campaign on social media to sell train locomotives. A lot of the other parts of the game depends on the product:
Another important thing to take into consideration is whether you produce first and try to sell later or get a contract for the production first. For general consumer products you produce the product and try to sell them afterwards, there is a steady flow of products. But most product are only produced after there is an order placed. For example when a retailing store orders a large number of bikes. In other fields of the industry it is common to put out a request for tenders (RFT) or request for proposal (RfP). This is a document that an organization posts to elicit bids from potential vendors for a desired solution (techtarget, 2015). This is the case in construction and other fields (Kengen, 2011).

Furthermore there is the option between bulk goods and individual products. Is each product you produce represented by one piece on the board? This also depends on the time it takes to produce the product in real life. If we would decide on a bulk products they can still be represented on the board, this would then be as a batch. For example instead of producing one water turbine you could make 1000 bicycles, represented in the same way on the board.

With these things in mind we had a brainstorm session on 20.03.2015 to get possible solutions.

**Table 4. Possible products in the game**

<table>
<thead>
<tr>
<th>Products</th>
<th>Advantage</th>
<th>Disadvantage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bike</strong></td>
<td>Bulk</td>
<td>Easy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lot of possibilities</td>
</tr>
<tr>
<td>Water turbine</td>
<td>Individual</td>
<td>Interesting?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Fits the game</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Production planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Worldwide market</td>
</tr>
<tr>
<td>Happiness</td>
<td>Abstract</td>
<td>Fun</td>
</tr>
<tr>
<td>(widgets)</td>
<td></td>
<td>surrealistic</td>
</tr>
<tr>
<td>Medicine</td>
<td>Bulk</td>
<td>Product development</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Product testing</td>
</tr>
<tr>
<td>Product</td>
<td>Type</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>High-tech electronic devise</td>
<td>Individual</td>
<td>Fits the game</td>
</tr>
<tr>
<td>Spaceship</td>
<td>Individual</td>
<td>A lot of raw materials</td>
</tr>
<tr>
<td>Passenger drones</td>
<td>Individual</td>
<td>Expensive and cheap parts</td>
</tr>
<tr>
<td>Train locomotive's</td>
<td>Individual</td>
<td>Produce one at a time, Different types, Easy to visualize, Expensive and cheap parts</td>
</tr>
<tr>
<td>Solar panels</td>
<td>Bulk</td>
<td>High tech, Expensive parts</td>
</tr>
<tr>
<td>freezers</td>
<td>Bulk</td>
<td>Basic, Marketing, Huge market, Cool</td>
</tr>
<tr>
<td>Cars (high-end cars)</td>
<td>Bulk (individual)</td>
<td>Car industry is big and interesting, And used a</td>
</tr>
</tbody>
</table>

All have their advantages and disadvantages. Some of them could be characterized as the same, for example bicycles and freezers could have the exact same game mechanics but with a different name for the product. None of the products fits perfectly in all of the game parts we have come up with so far (21.3.2015). Deciding which product we shall use is therefore a priority before we can specify some of the other parts of the game. We now look at some of the products in more detail.

### 5.13.1. Widget

One could say that the product you produce is not that important, the general way of running a business stays the same. Therefore it is an option to produce an abstract nonexistent product or a "widget". Economists often use the term widget to refer to an abstract unit of production (Econmodel, 2015).

Several of the games we tested used widget or more abstract products as well:
• Gazillionair you buy and sell made-up products
• Corporation inc. you run a "push-button" company
• INNOV8 no specific product is mentioned
• Clean start produce a high tech product worth 60 million

Using an abstract product would mitigate the problem that with every different product at least some game parts become unrealistic. If the game play would improve by focusing more on a particular part, with a widget it would never become unrealistic.

A futuristic product, such as spaceships, drones for passenger transportation or similar products, is also an option. These would however suffer the same problems and in addition may seem childish.

**Conclusion**

However the lack of 'feeling' with the product could distance players from it. Thereby making it look more like a game and less like a real-world simulator. It is easier to visualize the production and distribution process if you are building a product you know. Several of the students we interviewed as well as our supervisor conformed this. Therefore the choice is made to use a product that actually exists.

**5.13.2. Medicine**

With medicine the production is relatively simple: you have a machine that makes pills. Putting in different ingredients creates different pills. Generally one machine can make all kinds of pills. There can still be machines that produce pills faster than others, these are more expensive. The cost of the actual production of a drug is almost negligible compared to the research, trail testing, postproduction testing,....

**Product development**

The product development could be way more complicated than with other options. In a realistic scenario a new drug takes 8 -12 years to get from discovery to the market. Even after a drug is invented it still has to go through a long path to get approved. Where each step of either the invention or the testing and approval you have to decide if it's worth it to go through with this product. If you think there is already a better alternative on the market it's useless to develop it further. You would always need to seek to develop pharmaceuticals that are best in a certain field. Either creating a treatment where none existed and/or improving on existing treatments. Only 1 in 4000 compounds synthesized and 1 in 5 tested on humans ever reaches the market (Sadare, 2009).

Even if we greatly simplify this process it would still dictate the whole game.

![Timeline for Drug Evaluation](image)

(Kernsters, 2013)
The fallout of products that do not make the market it in the end is very high and so the cost per product that gets approved is enormous. Making a realistic representation of the costs involved in the drug industry would be tricky. There is a difference between the cost of research and development (R&D) and the others. The average drug developed by a major pharmaceutical company costs at least $4 billion, and it can be as much as $11 billion (Forbes, 2012). For example:

<table>
<thead>
<tr>
<th>Number of drugs approved (1997-2011)</th>
<th>R&amp;D Spending Per Drug ($Mil)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pfizer Inc.</td>
<td>14</td>
</tr>
<tr>
<td>Johnson &amp; Johnson</td>
<td>15</td>
</tr>
</tbody>
</table>

One could say that the big numbers could work attractive and feel like you are indeed running vast companies. But this industry is probably something none of the student will ever get in to close contact with.

Each new medicine could have mostly random stats that could be possibly be altered. This way you would learn more about the product each step and based on that decide if it is worth developing. This would be easier to implement in an online game rather than a board game.

There is great potential for random events that require quick thinking and alternating a solution to fit the problem. Pandemics could break out, a cheap vaccine could make your medicine no longer useful.

**Conclusion**

Although a lot of the other parts we have thought of would be hard to implement with this product: warehousing, transport, production, ... Too make this a realistic representation of the real pharmaceutical industry we would need to gather enough information about this. Focusing on R&D could be interesting but in the end it would make a very different game. The feel and flow of it might not be as interesting, therefore we decide not to use this.

**5.13.3. Water turbines**

One of our other ideas for a product was the water turbines. It is the kind of product destined to be sold one by one, this means a production in small amounts. This type of product is not new but it is still relevant, mainly in renewable energies, consequently interesting for some students. The different products can be characterized by the most frequently used types of turbines (Wikipedia, 2015):

- Francis turbine
- Propeller turbine
- Pelton turbine
- Kaplan turbine
As well as needing different materials of which they are made of (iron, chrome, nickel...). The production could be divided in three steps: molding, machining and coating.

**Production to order**

![Fig. 36. Water turbine](image)

However, this product is not a normal one. Indeed, only few company need it and the way of selling is very different: the customers sign a contract with a precise bill and time. A system of request for proposal (RfP). You would never produce a turbine without an order. The companies have to respect the contract and manage their time and money accordingly. On the one hand, this can be interesting working on projects instead of on a product where you still have to find a buyer for. It is a lot more visual then selling a bulk amount of products. This way of purchasing is increasing nowadays. On the other hand, it is not really close to reality that nine companies start in this business at the same time and sell a lot of water turbines. This market can be influenced not only by the government which promotes green actions but also by new big events like the construction of the three gorges dam in china in 2009 which needed thirty two water turbines (*Wikipedia, 2015*).

This way we can enforce the students playing with competition sometimes, then with cooperation when they have to work together on big projects. You would operate on a global market.

Your machines you use to produce the turbines could be limited in the size and/or type they can produce. For example a cheaper machine is able to produce a turbine with max Ø of 3m while the more expensive can make 5m turbines. If the customer demands in his RfP a certain size of turbine you might not be able to enter because you cannot produce it.

**Production planning**

A further step which this product enables to implement in the game is production planning. This is a unique feature, planning ahead too optimally use your machines.
If you notice your production is limited by your moulding machine it seems wise to invest in a second machine. These could even have a different type or maximum size of turbine they can handle. If you were not to be able to meet the deadline specified on the contract you committed to, you would find. As is the case in the real life situations, this would also be included on the contract in advance.

If we use the system of selling by contract a complicated distribution and logistics system would be unnecessary. You already know your costumer so having to have to go through a number of steps to get it to the costumer would only add complexity without an added value.

**Conclusion**

Water turbines are a durable product for renewable energy, it is a big and high tech product. Although it might be subject to being pushed aside by other means of energy production in the future, industrial water turbines will probably be relevant the upcoming years. It might even give the student an opportunity to learn something more about this subject.

Choosing this product would mean that we would need to change some of the other parts of the game. If you get an order for your product before producing a complicated distribution system or logistic system would no longer add anything. However, a part about production planning would be interesting and add another learning opportunity.

**5.13.4. Bicycles**

Bicycles are typical product associated with students. They can commonly be seen throughout Vaasa. Almost everyone owns one or has used it before. The production process is easy to understand, it needs standard materials to produce. Bikes have existed relatively unchanged for more than 150 years, so it is most likely to be a stable product in the upcoming future as well. Bikes can be related with the technical studies of the participating students. One could produce different types of bicycles: city bikes, mountain bike, race bikes, electric bikes, etc.

One could notice that some people have an opinion about bikes in general, whether its positive or negative. Therefore, it could distract from what the game is really about; learning something. Picking a less mundane product could be more interesting.
This product would be an example of a bulk product. Instead of producing one bike there would be batches of 100 bicycles moving around the board for example. Raw materials for different types of bicycles could be: iron, aluminium and carbon, ranging from cheap to expensive respectively. This could feel very simplistic and uninteresting.

The ideas of producing to order versus producing first and trying to sell afterwards can be unified here. While most of time you produce without being entirely sure of a costumer, sometimes you could get a certain contract so you know you can sell a certain amount.

By choosing this product we could also implement a part about production planning, there are at least two clear steps: making a frame and adding all the parts. In that case raw materials would be either, aluminium, steel or carbon for the frames and afterwards you would need to add the other parts to the frame. These parts are generally bought finished and just need to be installed. There are cheap parts and more expensive parts. The quality of these parts, and their price, depends on the overall quality of the bike. Either it is a high-end product or more of a 'price-buster'. When you would choose the parts to put a bike together you would take parts of the same price class. The price of the final product is thereby greatly decided by the quality of the parts and the frame, not by the type of bicycle.

However, we can say that we all produce the same quality bike with the same quality of parts. Then the price would vary because the demand for a certain type is higher at that point in time. For example, a city bike is the cheapest at first but gets more expensive than the rest in the end because people use it instead of buying a car and are therefore willing to spend more money on it. There could still be one type that is generally always cheaper than the other ones. This could be the type you are forced to produce in the beginning.

6. Game - first approach
In order to organise first test play within bigger group, it was required to prepare preliminary versions of boards. First board designs were very rough, not attractive, but clear and easy to understand. The main goal of creating those boards was to check if the rules and game engine works, therefore the team did not focus on nice looking design.

6.1. Main rules
Since the game is designed and made to be played at school during courses, it is supposed to teach business skills i.e. planning, negotiating, managing with limited resources, etc. In this chapter general rules of games are explained, to give general overview of the game.

Two Game Masters are required during playing the game. Their role is to control the distribution, loans buying/selling screen and generate random events. The game is time-based, meaning that there is no turns during which all players have to do certain steps. Instead of turns, real time is divided into periods which corresponds with time in the game. Players can do the market research, produce, buy and sell at any time they want to. However, prices of raw materials and ready products vary in time. Therefore, players have to be careful and think about possible trends to buy cheap and sell at the high price.
The beginning of the game is the same for all the teams. Every team will have a certain amount of money, raw materials, one frame stock, one assembly station, one bike stock and one loan. It was decided to start the game in this way, because after several test plays and discussion within the team, idea of starting the game with nothing was abandoned. If players had to start from scratch, there would be a queue to the game master at the very beginning of the game. It does not bring any learning outcome, neither makes the game more attractive.

Players can choose between producing by themselves, owning a factory and care about buying raw materials and producing, or they can outsource the production. Outsourcing can be done in several ways. Ready bikes or only frames can be bought either from game master or from other teams, at any time. If players choose to buy from game master - the price is determined by the excel engine. If they decide to buy from other teams, they have to negotiate. Players can buy not only bikes or frames, but also elements of infrastructure, assembly stations, etc. If player outsources the production to other country, he still have to stock bikes in Europe.

It is possible to sell products at any time to the Game Master or to other teams. Selling to other teams is an opportunity to sell products by higher price than to Game Master. Concerning the transportation, one can choose between two options. Or to pay every time and wait for a boat/truck and then for money, or to contract with transportation company, ship at any time. In second case player also have to wait to get the money or certain materials.

Random events are divided into good and bad events. Also, they concern only one company (team) or everyone. If random event concern one of teams, a dice throw determines the company. Good random event is for instance a free transportation, subsidy, a contract for certain amount of bikes, etc. Bad events make the game more difficult, e.g. problems with transportation, theft of raw materials or products. Thanks to bad random events players are exposed to difficulties which may occur in real life. It teach students skills how to solve problems.

The role of one of the Game Masters is to control the excel file for buying and selling, buying and selling materials, frame, parts and bikes. Another one is responsible for moving boats/trucks on transportation map, for loans, buying/selling company infrastructure (machines and warehouses) and random events. Prices at Game Master are always rounded up. If the Game Master makes a mistake it is a bad luck for players. Players cannot argue with the Game Master.

6.2. Boards

There are three types of boards in the game. Each team has its own board representing company (Fig. 38. Company board). On this board player can put game accessories (Fig. 40. Game accessories - machines and warehouses i.e. machines and warehouses. Prices of buying new machines and warehouses are on the top of board. There are different types of machines and warehouses. Machines can be divided into slower and faster one. I takes five minutes to produce one unit of bikes for the slower one, and three minutes for faster one. Warehouses are divided into those with six and with four places. There is one board for transportation for all the teams, as well as board for loans (Fig. 39. Loan (left) and transportation (right) board. One of Game Masters is responsible for moving pawns on those boards. Boards with game accessories can are presented in Fig. 41. Boards on one table Design of first boards was very rough and not nice looking. However, it was clear. First boards were designed to test if the game engine is working. Therefore, the team did not make an effort to create good looking boards.
### Fig. 38. Company board

<table>
<thead>
<tr>
<th>Raw Material Stock</th>
<th>Frame Building</th>
<th>Frame + Parts Stock</th>
<th>Assembly</th>
<th>Bike Stock</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 pieces: € 400.000</td>
<td>1 min: € 1 500.000</td>
<td>6 pieces: € 2 000.000</td>
<td>5 min: € 1 200.000</td>
<td>4 pieces: € 1 100.000</td>
</tr>
<tr>
<td>12 pieces: € 1 200.000</td>
<td>3 min: € 2 000.000</td>
<td>10 pieces: € 1 200.000</td>
<td>2 min: € 1 200.000</td>
<td>8 pieces: € 1 900.000</td>
</tr>
</tbody>
</table>

### Fig. 39. Loan (left) and transportation (right) board
Fig. 40. Game accessories - machines and warehouses

Fig. 41. Boards on one table
6.3. Buying and selling engine
For the first test play, a basic version of the buying and selling engine has been created to simulate the stock market. Time and different macros have been written then implemented in the software. The main goal of those macros is to help the game master, but it also permits to create a dynamic and interactive environment for teams.

6.4. First play test
After weeks of creating and testing the game by themselves, the Yes! team had the first general test with students. For the test the team invited its supervisor Mr. Mikael Ehrs, the game designer Mr. Anders Olin and several students from different fields of study. They formed seven random groups with two members per group. After taking their places at the tables the game started with the introduction. Afterwards the game started.

Students needed a short time to understand the mechanics and rules of the game. Subsequently, when students figured out the way the game works they started to think about strategy, make and sell bikes, etc. The Yes! team stopped the game after one and a half hours. The group with the greatest company value was the winner.

Although there are some features to change and improve, overall impression of players was positive. The students had fun playing and learned about business.

6.5. Play test feedback
After playing the game each students commented on the game and told about their impressions as well as Mr. Ehrs and Mr. Olin. Also they completed a survey and evaluated the game on several aspects. Below there is a graph with average student evaluation of different game aspects. Mr. Ehrs and Mr. Olin gave more detailed evaluation with comments during a meeting and via an e-mail.

6.5.1. According to Anders Olin
The team should create a balance between the "buy frames + sell bikes" and "create frames + sell frames/bikes" option. It takes about twenty six transactions to have a return on investment in own frame production line.
According to Mr. Olin, it is needed to solve the waiting procedures, because it is still the cost of producing the bike that is interesting not the waiting. He said that the main problem is having and creating money.

The idea of different markets are nice in theory, but for Mr. Anders it felt like waste of time. If the player wants to sell at batch, for instance to Africa, and only earn ten thousand more, it is not enough if he has to wait 5 minutes.

It turned out that two Game Masters are not enough, and it felt a bit messy with people running around giving random event cards. The queuing to get to the Game Master to buy or sell was not a good solution at the moments.

6.5.2. According to players
As it was mentioned before, after play test the team asked players to fill in short survey about the game. Results of this survey are presented in Table 5. Game evaluation according to players As it can be seen in Fig. 43. Graph presenting average student evaluation of different parts of the game.

Table 5. Game evaluation according to players

<table>
<thead>
<tr>
<th>Game aspect</th>
<th>Average score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>4.5</td>
<td>More place in board needed for the materials</td>
</tr>
<tr>
<td>Distribution</td>
<td>4.3</td>
<td>Board on the wall, make it visible for everybody, need a timer</td>
</tr>
<tr>
<td>Buying</td>
<td>4.5</td>
<td>Queue too long, prices rounded up or down maybe not fair, more difference between the prices, the aluminum prices went wrong (buy at least 2 at the same time?)</td>
</tr>
<tr>
<td>Selling</td>
<td>4.5</td>
<td>In general the same as buying</td>
</tr>
<tr>
<td>Prices</td>
<td>4.5</td>
<td>Is ok</td>
</tr>
<tr>
<td>Loans</td>
<td>4</td>
<td>Good pawns, needs a timer, good idea to start with a loan and possibility to get a loan. In general it was confusing</td>
</tr>
<tr>
<td>Random events</td>
<td>4.6</td>
<td>Good: “those who get punished also can get a reward later in the game”, have to happen more often and more impact, makes it more entertaining,</td>
</tr>
<tr>
<td>Timing</td>
<td>4.1</td>
<td>Perfect</td>
</tr>
</tbody>
</table>
6.5.3. Solutions

After the team got feedback from Anders Olin, Mikael Ehrs and students, members had to think about possible solutions for existing problems. Those solutions are described in this chapter.

Balance the game

In order to acquire better balance between producing and buying ready frames the prices for the frame building stations were lowered. Players do not have to wait a long time anymore to get profit from their infrastructure.

Excel engine

The Excel had to be changed after the play test. There were a few issues to be solved. The prices were reset during the game because the aluminum prices raised faster than expected. Since the players always chose the best price, after some time prices did not differ much.

To solve this problem it was decided to introduce the mass price benefits. The more the player sells or buys, the better price he gets. If player sells only one or two bikes, he sells them at lower price per bike than actual market price. It is supposed to encourage cooperation between the teams, what hopefully will solve the long queue.

Different markets

The transportation time was appropriate for team members and for most of players. A counter will be added to the screen that the players can see how long they have to wait. During the play test the game master was going to each team and giving the transported goods. It made one of the game masters very occupied. It was decided to be changed. Good will be available to pick up at the game master. There will be two boards on which game master will put transported goods. One will be waiting 5 minutes for players to pick up their transport, another one will be for game master to start the transportation for the next 5 minutes. After this time game master switches the boards. When players do not pick up their transport after 5 minutes, they lose it.

7. Game - final solution

To test the game was definitely the best way to realize if it was necessary to make changes and also the last step before the final version of the game. With all the received feedbacks from the students, supervisors, game designer and from team members as observers during the test, aspects needed to
be improved were found. Finally team members worked on that improvements and the suitable layout was designed.

7.1. Rules
In this chapter one can find a brief explanation of game rules. Full manual can be found in the appendix.

Production
There are 2 options to produce bikes. First option is buying raw materials from the game master and produce frames and assembly them with parts then. Second one is buying ready frames and assembling the bike.

- Producing:  
  1 frame = 1 steel/aluminum + 1 coin  
  1 bike = 1 steel/aluminum frame + 1 coin  

- Outsourcing:  
  buy bikes or frames from the game master or other players  
  1 bike = 1 steel/aluminum frame + 1 coin  

Infrastructure
Players can buy and sell infrastructure at any time from the game master. The prices are written on the board.

Selling
It is possible to sell bikes at any time to the game master. Prices are displayed on the screen. When the player sells in other continents he gets money when transportation is done. It is also possible to sell everything to other players for a negotiable price.

Distribution
Products from other continents has to be transported. Every 5 minutes a boat/truck arrives and players can pick up their goods. Waiting time is displayed on the screen. The players have 5 minutes to pick up their goods.

Random events
Random events occur at random times. A 10-face dice will decide which team is involved. Some cards are for everyone, some cards are individual. The game master decides when the random events will happen.

Loans
- Starting loan  
  Every player starts with a loan of 20,000 and a pawn in the inner circle. Players can pay back this loan at any time to the game master. Every time when a pawn is on the cell with a number, players have to pay the interests. The money has to be in the pawns before they move to the numbered cells.
- Loans during the game  
  It is possible to take a loan of 10,000 or 20,000. Every time a ‘1’ is written on the board, the players have to pay one coin (for 10,000 loan) or two coins (for 20,000 loan) coins. The cell with ‘11’ means the players have to pay back their loan +1 coin (10,000 loan) or +2 coins
The player can choose between long and short term loans. It is the same idea, only the time to return is different which also includes paying more or less interests.

7.2. Boards
A lot of effort was dedicated to the development of the boards. The first layout of a boards evolved after the first idea of the steps. Afterwards the team had to change the layout, rethink and discard previous ideas. After every single change in various steps the team changed boards. The most difficult part was to find the right way of implementing the ideas on a board with a logical order.

It was also difficult to choose which accessories will be appropriate for the game. Team members had to think whether cards, dices, wheels or something else should be used. The team had ideas starting from a main board for all players to a board with pieces meant to be putted together. At the end the team made the decision of the final design and the colours. The main colour of the board is blue which is associated with business.

For the loans the team create a big round board, which is presented in Fig. 44. Loan Board

![Loan Board](image)

The loan board is placed on a table in the middle of the room, visible for each player. There are different paths for different kinds of loans, and areas where players have to pay. There is a pawn for every loan taken by each group, moving counter clockwise. In middle of the board there is a space for an hourglass, which counts ten minutes. After every ten minutes players one of the Game Master moves the pawns and the player has to pay if his pawn is in area with a number.

The personal board (Fig. 45. Personal board is designed in blue as well. It represents the company infrastructure.
On the left side the players can have a look on the brief explanation of the game. The rows are for the amount of production lines. The columns are used to demonstrate the several steps of the production, listed on the top.

Every step of the production has its own area on the board. To produce bikes or frames, the players need to put the appropriate machine and warehouse card in right area for the step listed on the top.

The players have the possibility to purchase

- 8 and 12 places for raw materials in the warehouse,
- 3 and 5 minutes frame building station,
- 6 and 10 places for frame and parts in the warehouse,
- 3 and 5 minutes assembly machine
- 4 and 8 places for bike warehouse

which are represented by cards presented in Fig. 46. Machine and warehouse cards
For a distribution the team choose two separate boards. One with a world map, to visualize where and when ships and tracks are, and second for transported goods. The map consist only of following continents: North America, Africa, Europe and Asia.

The colours of the continents in the board are the same as in buying and selling engine displayed with a beamer. Every five minutes boat or truck leaves from Europe and go to other continents.
Distribution board for goods is presented in Fig. 48. Those boards are used by the game masters only.

![Fig. 48. Distribution board for goods](image)

On the top of the board there are numbers appropriate to each group. On the left side are continents where the players can purchase or sell their goods. The game master puts a remark on the appropriate area of the board, every time a player buys or sells. Every five minutes, when the transportation takes place, the game master places the board, containing all goods or the money from sales, available for the players to collect.

For random events the team have chosen cards and a dice. The cards content good and bad events and will be mixed by the game master. Number on the dice refers to numbers of companies (teams). To choose a company for an event randomly, the game master need to throw the dice. Some events concerns a single team and some events concerns all companies. Exemplary random event cards is presented in
7.3. Buying and selling engine

An essential part of the game is the supporting excel-file ‘BBG buying and selling engine’. This file gives the prices the players have to pay and allows us to make these prices flexible. The stock market is represented in this game by a big screen with a lot of data and numbers like in the real stock exchange. This has to be dynamic and related to time to create fluctuations, benefits or crisis. It also has to be related to the team’s purchasing and selling to adapt or to increase these effects. Different macros have been created, these solve a lot of problems such as representation of time. They are also made to help the game master with the management of the market.

We choose to make this in excel and not in another program because the team members did not have experience in any other common programming languages. Utilizing the VBA’s in excel also made everything we wanted to implement possible. Visually it does not look like an ordinary excel sheet anymore. This way the students also notice what is possible within excel.

The visuals do not work perfect if the file is run on an older version than excel 2013.
7.3.1. Timer
First of all, a timer has been implemented in an excel file. It is linked to a delay: this timer will change after a set amount of seconds, which is the delay. When you press “START”, the timer starts counting and will only stop when you will press “STOP”. To start again from this point you just have to press “START” again.

![Fig. 51. Time representation in the top of the screen](image)

During the game the delay is set to 60 seconds. In that way the market will change every minute. While checking whether the prices progress as they are supposed to, it is possible to set this delay to one second. One second is the lowest delay time that can be set. We made it impossible to set the delay smaller than one second. Previously when you would set the delay to low, especially to zero, the program would make infinite calculations and crash.

![Fig. 52. Parameters on the bottom of screen](image)

When you press “Start” while the program is already running it would go twice as fast. Likewise for when you press “Stop” when it is not running, there is an error notice. We added a cell which marks whether the program is running or not. When the timer is started a cell is marked in green with the text “Running”, and red with the text “Paused” when you stop the timer. This cell turns to red when the timer is stopped.

In the top part of the big screen you can find a calendar that shows which month and year you are in inside the game. One month takes 5 minutes and 1 year takes an hour. The days change with an increment of 6 days: 1, 7, 13, 19 and 25. You can set in which year you want the calendar to start.

The start and stop buttons are each linked to a macro.
Each time the timer gets updated, which is after ‘delay’ amount of seconds, the sub (i.e. function or subroutine) “updateprevprice” and “updategraph” are run. More about this later.

The code in the macro is not optimized. It does some calculation and actions which do not have to happen every time. This slows down the program, you can notice this when the program is running. Every time it updates the prices and graphs it takes about one second, depending on the computer its run on. This is not a big problem because than the players can visually notice that the prices are updated.

7.3.2. Prices on screen

On the top half of the screen one can see the price at that time for any product at the four locations. These prices are updated every time the timer changes. Next to the price of each product one can find how the price has changed in comparison to the previous one. This is calculated by the sub “updateprevprice”. Every time this sub runs, which is every minute during normal game, the prices that are on the screen will be saved in the ‘calculation’ sheet. Only then will the prices be updated. The increase/decrease is then calculated and shown.

\[
\text{Increase/decrease} = \frac{\text{Current price} - \text{previous price}}{\text{current price}}
\]

Next to this there is also a coloured point to make the trend more visible. If the colour is green, it seems that it is better than before for buying raw materials and selling bikes. Due to the time it takes for excel to run the sub there is a small amount of time that these arrows says the prices are equal to
the previous ones. This almost looks like a wave of updates on the screen, this was unintentional but not a bad thing.

![Fig. 53. How the prices in Europe looks on screen](image)

### 7.3.3. Buying raw materials

To start their business and their factory, teams will buy a lot of material and maybe some finished goods. The game master will be charged of making the transactions. On the bottom part of the screen you can find the order and selling part. Here the players can see what the game master is filling in and what price they have to pay. It takes the momentary price for each material and makes the sum. This is then adjusted to the percentage you have to pay according to the mass price benefit, this is explained later in the chapter. Since one coin in the game represents 1000 EUR, the total price is rounded off to the nearest 1000. If someone sells bicycles this has to be filled in the Excel as a negative amount. For example if you buy 20 steel frames, 10 parts and sell 4 steel bikes in Europe it would look like this:

![Fig. 54. Ordering the raw materials and selling bikes](image)

There is a small table where the game master can fill the order in the red column, then get the price for this in the yellow column. If players buy, the amount will be positive and the price as well so the game master will receive money. If they sell, the amount will be negative and the price as well: the game master will give money. Teams can buy and sell in the same order. What they cannot do is buy finished bikes in Europe because it will create instant profit. If the team buy a lot in the same time, they will receive a discount. This also works when they sell a lot (mass price benefit).

In the preliminary version of the Excel the prices were on the right and the order and selling on the left side of the screen. During the test play on 24.04 it was noticed that when there are people ordering from or selling products to the game master they block the view of the screen for other
players. For that reason the layout was changed so everyone can see the prices all the time, but the people that are ordering or selling at the game master can still follow that part.

When the order is finished on all the markets, the team have to pay the « Big Total » which is the sum of all the goods bought multiplied buy a factor depending on how much they buy, more about this in later in mass price benefit. The button « BUY ! » updates the amount of material available, this changes the prices a little bit. It also clear the red column for the order. Then a new order can be filled.

![Big Total](image)

**Fig. 55.** The total amount to pay or get paid
Here below is an extract of the macro for buying goods in north America:

```vba
Sub BUY()
    ' Buy
    'update amounts live amounts
    Worksheets("Market research NA"), Range("H6") = Worksheets("Market research NA"), Range("H4") - Range("ML.S.OR")
    Worksheets("Market research NA"), Range("H5") = Worksheets("Market research NA"), Range("HS") - Range("ML.S.F.OG")
    Worksheets("Market research NA"), Range("D6") = Worksheets("Market research NA"), Range("D5") - Range("ML.A.OR")
    Worksheets("Market research NA"), Range("D7") = Worksheets("Market research NA"), Range("D7") - Range("ML.S.F.OG")
    Worksheets("Market research NA"), Range("D9") = Worksheets("Market research NA"), Range("D8") - Range("ML.F.0R")
    Worksheets("Market research NA"), Range("M9") = Worksheets("Market research NA"), Range("M9") - Range("ML.S.B.0R")
    Worksheets("Market research NA"), Range("M10") = Worksheets("Market research NA"), Range("M10") - Range("ML.A.B.0R")

    ' Clear input boxes
    Range("ML.5.OR").ClearContents
    Range("ML.A.OR").ClearContents
    Range("ML.P.OR").ClearContents
    Range("ML.F.0R").ClearContents
    Range("ML.S.F.0R").ClearContents
    Range("ML.AB.0R").ClearContents
```

### 7.3.4. How the prices are determined

The prices of each product is depending on several factors. There is a predetermined trend which the prices will follow but they also change according to how much or how little of them are bought by the teams. The predetermined trend is comprised of two parts: a general long term trend and a shorter term fluctuation. The final price of the product is then calculated depending on these and on what the teams purchase.

At the start the price is 90% dependent on the preset trend and only 10% on what the teams buy. This changes over time to 40% and 60% respectively, this is explained further in ‘importance of trend’.

The trend prices follow different sinus waves which are overall increasing to add difficulty in the end of the game because the period of the sinus is really long. To implement sort of random in this game, it has been decided to add a doubled sinus wave to the trend but with a shorter period. The first idea was to use an actual random generator. This, however, presented difficulties. Different “random” has then been created for each product and each market. This way it can be predictable by teams but there is a lot of information moving in the same time so they will not pay attention to this detail. This kind of random also permit teams to buy really cheap sometimes and buy nothing the next period because prices increased a lot. One educational goal is to teach the fact that there are period of lower prices, when it is convenient to purchase a lot instead of buying only when it is needed.

### 7.3.5. Trend of prices

The general trend of all product is slightly increasing over time as to simulate overall inflation.

The short term fluctuation is generated by multiple comprised sinuses, the average over time of is zero. This results in short periods of slump and boom with a period of about 15 minutes. For the same products these fluctuations are different but still they in general go up and down at the same time. This is realized by changing one of the two sinuses and keeping the other one the same for all the different locations. Each of these sinuses has about three parameters.

The average of these fluctuations is zero but because you can assume the players will generally buy in the good times you can assume they will buy it slightly cheaper than the long term trend. This way
prices can be more accurately set. Below you can see the long term trend superposed with the short term fluctuations of steel in North America.

This is the ‘trend’, this is also what the price will be reset to if you press the ‘reset to trend’ button.

7.3.6. Price depending on available amount

The other part that makes up the actual price of the product depends on how much and how fast the teams buy materials. Whatever the quantity in stock, the total price for one type of good is always the same: if there is a lot of them, prices go down. Whereas when it diminishes, prices increase a lot. Moreover, this quantity follow a trend which is increasing but with a sinusoid. These fluctuations are related to the amount of teams defined by the game master. The price per each is also visible for the game master. All of these parameters have been fixed during the play tests.

<table>
<thead>
<tr>
<th>Material</th>
<th>Random</th>
<th>Trend</th>
<th>Total price</th>
<th>Start amount</th>
<th>Amount live</th>
<th>Add/time/team</th>
<th>Price</th>
<th>REAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>0,3</td>
<td>2,0</td>
<td>840</td>
<td>420,0</td>
<td>420,0</td>
<td>0,060</td>
<td>2,0</td>
<td>2,2</td>
</tr>
<tr>
<td>Steel frame</td>
<td>0,0</td>
<td>4,1</td>
<td>472</td>
<td>120,0</td>
<td>120,0</td>
<td>0,060</td>
<td>3,9</td>
<td>4,1</td>
</tr>
<tr>
<td>Alu</td>
<td>0,0</td>
<td>3,7</td>
<td>1,200</td>
<td>408,0</td>
<td>408,0</td>
<td>0,060</td>
<td>2,9</td>
<td>3,6</td>
</tr>
<tr>
<td>Alu frame</td>
<td>0,4</td>
<td>6,2</td>
<td>600</td>
<td>116,0</td>
<td>116,0</td>
<td>0,090</td>
<td>5,2</td>
<td>5,7</td>
</tr>
<tr>
<td>Parts</td>
<td>-0,0</td>
<td>2,2</td>
<td>688</td>
<td>320,0</td>
<td>320,0</td>
<td>0,300</td>
<td>2,2</td>
<td>2,1</td>
</tr>
<tr>
<td>Steel Bike</td>
<td>0,2</td>
<td>6,9</td>
<td>656</td>
<td>96,0</td>
<td>96,0</td>
<td>0,150</td>
<td>6,8</td>
<td>7,1</td>
</tr>
<tr>
<td>Alu Bike</td>
<td>0,4</td>
<td>8,6</td>
<td>736</td>
<td>96,0</td>
<td>96,0</td>
<td>0,150</td>
<td>7,7</td>
<td>8,9</td>
</tr>
</tbody>
</table>

Each minute there is a certain amount added to the live amount: add/time/team. This is different for every place and every product. This is multiplied by the number of teams playing. As an example: If all the team together would buy on average 0,15 Alu frames per minute in Europe the price would stay the same. If they buy less, the amount will slowly rise and thus make the product cheaper in this market.

The start amount is also dependent on the amount of teams. In the cell for steel you can find: \( \text{Start amount steel EU} = 52,5 \times \text{Number of teams} \). In this example there are 8 teams which gives the 420 you can see in the table. The start amount for complete bicycles is smaller than the others, this means that whenever someone sells or buys something the change in the price is bigger than the products with a larger start amount.

After the start amount is chosen total price was set so that in the beginning the prices are like team members want them to be.
In the beginning of the game the teams only have a single factory. They will produce a lot less bikes than the add/time/team expects and because the start amount is low the price for bicycles will rise fast in the beginning. After a while the price would stabilize but this means that you can make big profits during the first phases of the game and only marginal profits later on. This potential problem is solved by making the add/time/team for alu and steel bikes a variable instead of a fixed number. For steel and alu bikes the first 60 or 80 minutes respectively there will be less added then the table says. For example: for steel bikes in Europe only 0.1 bike will be added/time/team, after 60 minutes this changes to 0.15. This means the first hour there will be 6 bicycles added per team in Europe. This is not as little as you would think since there are 4 markets.

7.3.7. Importance of trend
The game is also not the same in the beginning and after 2 hours of playing. Companies increase and the demand changes. To make it easier in the beginning, we create a difference between importance of the trend and the importance of the purchasing and selling. In the beginning, teams are focused on learning how to play then developing their factory. On the contrary, when a company has many different machines, its economy is really developed and you can easily buy and sell a lot in the same time: this will affect a lot the market. This change has to be slowly effective and done after one hour.

7.3.8. Mass price benefits
During the test play on 24.04 it became obvious that if all players buy 1 or 2 raw materials at a time the game master has to do a lot of transactions. He cannot keep up with all the orders and the players have to stand in line. Although Finnish people like to queue this was one of the main complaints after the play test. If we give the players an advantage when they buy more raw materials at once they will be inclined to make less transactions, and thus relieve the game master. This also stimulates teams to work together. You pay the actual price you see on the screen when you buy or sell 3 or 4 products at once. If you buy less you have to pay more and vice versa.
7.3.9. Reset to trend

There is also another button called ‘reset to trend’ which can be used if there is trouble or if the game has to start over. This button reset the prices and the amount of products available to the preset trend.

If the teams buy or sell an amount of something that differs a lot from what was anticipated the prices can vary far from the trend. This could create a problem. If, for example, there are a lot less bicycles sold than was anticipated their amount will get very low and the price will go up partly exponentially. If the game master sees this happening and the game gets out of hand there is always the ‘reset to trend’ button.

The button is linked to the sub ‘CLEAR’, after a confirmation window the sub is run. It neutralizes all bought and sold goods and afterwards clears the arrow to indicate the trend to zero.

7.3.10. Graphs on screen

On the screen you can see two graphs which show the prices for the different bicycles in the different markets for the past 20 minutes. The colour of the lines show which market it is: Green is Europe, blue is North America, red is Asia and yellow Africa. This way the players can have a sense of what the stock market is doing.

When the timer gets updated the sub “updategraph” is run. This saves the current prices for all the bicycles in the ‘calculation’ sheet then all the prices are moved up one line. The graphs automatically update then.

![Fig. 61. Graphs of bike prices displayed on screen](image)
In the bottom of the screen one can find the button ‘clear graphs’, which is linked to the sub “cleargraphs”. This clears all the stored data about previous prices and graph will be empty. One have to confirm his choose first.

```vba
sub cleargraphs()
    Dim Confi graphs As Variant
    MsgBox("clear the graphs? Information about previous prices will be lost.", vbQuestion + vbYesNo, "Please confirm")
    If Confi graphs = vbNo Then Exit Sub
    reset graphs
    Worksheets("Calculation").Range("C20", "J40").ClearContents
end sub
```

**7.3.11. Reset to start**

The last button that was added is ‘reset to start’ this one is linked to the sub “startvalues” and does exactly what its name implies. After you confirm it resets all the parameters to how you would want them at the beginning of a game. The timer gets reset to 0, the delay to 60 and the same sub as ‘reset to trend’ is run. Finally the graph is reset to a standard start view.

**7.3.12. Conclusion**

A lot of different parameters change how the program interacts with the actions of the players, this makes it kind of unpredictable. There have been buttons implemented so that there is always an option to go back to a ‘standard’ price.

A big disadvantage of the complexity of the price calculation is that is very hard to predict how much you will have to pay before it is filled in the program. This makes that players would just go to the game master and see how much they could get for the money they have available. This is a problem team members were not able to solve.

Making changes to how the trend works or how everything interacts is not as intuitive as it should be. One really has to experiment a lot with it to get it right. Moreover, one can never really simulate how the program will react without actually playing it with all the players it is designed for.

One could argue that using a computer program makes it feel less like a board game but because the players still have to move around a lot of physical pieces. That is also what was concluded after the test play on 24.04.
7.4. Accounting
The accounting is one of the important parts in the business world since all forms of business begin and end with the accounting.

To show the students the results of their negotiations and actions and to educate them the final calculation of their earnings, the team chose a relatively easy way of accounting.

First of all students need to note the amount of their assets and debts in an “Opening Balance sheet”.

<table>
<thead>
<tr>
<th>Assets</th>
<th>Opening balance</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory</td>
<td></td>
<td>Equity</td>
</tr>
<tr>
<td>Warehouse</td>
<td></td>
<td>Loans</td>
</tr>
<tr>
<td>Raw Materials</td>
<td></td>
<td>Unpaid Receivables</td>
</tr>
<tr>
<td>Trade Receivables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Σ

Immediately after filling out, the “opening balance sheet” is divided into its individual subaccounts.

Assets: Raw Materials (warehouse)  Liabilities: Loans

Start

+   -

End

Every action, like inflow or outflow, concerning each subaccount needs to be noted in its own field.

<table>
<thead>
<tr>
<th>Assets</th>
<th>Closing balance</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factory</td>
<td></td>
<td>Loans</td>
</tr>
<tr>
<td>Warehouse</td>
<td></td>
<td>Equity</td>
</tr>
<tr>
<td>Raw Materials</td>
<td></td>
<td>Unpaid Receivables</td>
</tr>
<tr>
<td>Trade Receivables</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Σ

At the end of a period the subaccounts will be closed by a “closing balance sheet”
The subaccount equity needs its own several subaccounts. This is made up from the whole revenue and expenditure.

\[
\begin{align*}
\text{C} & \quad \text{Raw Materials (used)} & \quad \text{D} \\
+ & & + \\
+ & & + \\
\end{align*}
\]

\[
\begin{align*}
\text{C} & \quad \text{Earnings} & \quad \text{D} \\
+ & & + \\
\end{align*}
\]

\[
\begin{align*}
\text{C} & \quad \text{Profit and Loss} & \quad \text{D} \\
+ & & - \\
+ & & - \\
\end{align*}
\]

\[
\begin{align*}
\text{C} & \quad \text{Profit and Loss} & \quad \text{D} \\
+ & & - \\
+ & & - \\
\end{align*}
\]

\[
\begin{align*}
\text{C} & \quad \text{Profits and Loss} & \quad \text{D} \\
+ & & - \\
+ & & - \\
\end{align*}
\]

\[
\begin{align*}
\text{C} & \quad \text{Equity} & \quad \text{D} \\
- & & + \\
\text{End} & & + \\
\end{align*}
\]

7.5. Accessories

Loan pawns

There are three pawns per each team. This means that each team can take maximum three loans at the same time. The player can choose between a loan of 10.000 or 20.000. For a loan of 10.000 the player put the pawn on the board with the side with one slice on top. For the 20.000 loan with the side with 2 slices on top.

The loan pawns are printed by a 3D printer.

![Fig. 62. Loan pawns](image)
Trays
The trays are shaped to fit all the pieces that are needed to produce a bike. When a player produces bikes starting from raw materials the tray contains two coins, a raw material and a ‘parts’ piece. When the player chooses to outsource and buys frames, the tray contains a frame a coin and a ‘parts’ piece. In the last case the frame covers the raw material and a coin to prevent players to put wrong stuff in it.
It is also possible to pile up the trays to save space on the board. They fit on top of each other.

Every tray is also painted with a little bit of rubber at the bottom to provide them for sliding over the board. The trays are printed by a 3D printer.

Raw materials and frames
For the raw materials is chosen for Lego® bricks. This was the best solution to get three different kind of shapes with standard sizes from the same dealer. For the raw materials it are the 2x2 tiles in black and white, for the frames it are the 1x6 tiles in black and white and for the parts it are the 1x2 tiles in yellow.

Money
The money are plastic golden coins. Plastic coins are widely available and cheap to buy. A lot of coins are needed for the game.

Machines and warehouses
The machines and warehouses are printed on foam and plastic composed boards, but a thinner version than for the other boards. These small boards will be painted with a little bit of rubber at the bottom to provide them from sliding.

Random event cards
The random event cards are printed on cardboard cards similar to play cards. These cards are also laminated for a longer lifetime.
Coin stacker
There are coin stackers designed to make it easy to count the coins. One can fit five coins in one slot and coin stacker consists of ten slots. Thanks to this accessory it is easier to count coins and not to waste game master’s time. Each team has at least 2 coin stackers.

The coin stackers are printed with a 3D printer.

7.6. Difficulties during the project
When it comes to team projects, sometimes team work is a real difficulty. In this case working as a group never was a problem. Even though creating a game requires many decisions and sometimes it was hard to agree in all of them. The lack of knowledge about business made things more difficult than expected at the beginning of the project.

As it is a four months project, time was always was to team members’ disadvantage. When it comes to projects about creating and designing, time limitations are difficult to deal with. And sometimes long brainstorming sessions were not as productive as they had to be. It is a project that requires many team meetings and at some points the language barrier was also a difficulty.

Even so, it has been a great team work where all the members gave all their best to take the project forward and to create a good working environment. Promoting synergy has been the key to face all the difficulties the project had presented.
8. Conclusions
After four months being part of the European Project Semester it can be defined as a great and very positive experience. It is not only an educational experience but the best way to learn how to work as a part of an inter-cultural and multidisciplinary team. How to deal with the real problems students will front in their professional lives. It is also a great personal experience that makes you grow up as an independent person offering you the possibility to learn about other cultures and giving you a more mature vision of life.

The main goal was to create a business board game to be played as an educational tool to teach business. And as a result of this project there is a Business Board Game ready to be played at Novia University of Applied Sciences. The team was always focused on the idea of a game where players could feel the excitement, the pressure, the competitiveness and the real attitude of business. Researching through playing lots of business games, working with brainstorming sessions and trying to be a united work team was the key to succeed in the creation of a game from scratch. It has been achieved an educational, fun and definitely intense game. Even though it is known that there is still some things that can be improved and a lot of ideas that can be developed to make the game more professional.
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Kernsters, 15.07.2013, Graph created based on information provided in Scientific American article, "Faster Evaluation of Vital Drugs"

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§1. Communication & Sharing Information
1. Every team member should share his/her ideas. Every idea should be discussed during weekly meetings.
2. A Project Manager is in charge of making opportunity for everyone to share his/her ideas and to discuss issues.
3. Apart from the meetings, we are going to communicate and share information by the Internet, so we may be informed up-to-date about every step we are about to make.
4. The whole team should be informed about individual activity. Supervisor must be informed about results of our work by the e-mail or in other way (by prior arrangement).
5. Agenda should be sent via Internet (Facebook and Dropbox) 24h before the meeting at the latest.
6. Project secretary is responsible to inform persons which were absent during the meetings about agreements, results of the meeting etc.

§2. Meeting Norms
1. If it is possible, meetings are going to be held in EPS room in Technobotnia at 10:00-14:00 on Tuesdays, Wednesdays and Thursdays. Time and day of the meeting may be exceptionally changed due to some reasons in consent of all.
2. 15 minutes late is acceptable. If team member is late for the meeting, we will try to find out if there are some misunderstandings or dissatisfaction. After that we have to find for a new solution, trying to make everyone satisfied.
3. Additional unscheduled meeting will be arranged if necessary.

§3. Work Norms
1. We will distribute the tasks equally to every team member during weekly meetings. If any of team members do not agree on task distribution he/she should say about it during the meeting. Then the task distribution will be changed after the team approval.
2. Deadlines will be set by our supervisor, cooperators of the project and by ourselves.
3. We will decide about who should do which task by team consensus.
4. We will review everything that was done during the meetings, to make sure that we are doing the right thing. Also the team is going to consult the results of the work with the supervisor.
5. If one or more team members are not doing their share of the work: See §2.2.
6. Every team member have a right to work by his own working habits but any team member must not miss the deadline.

§4. Managing Conflict
1. We will resolve differences by voting.
2. If a team member does not obey the team contract: See §2.2
## 12.2. Risk Management

<table>
<thead>
<tr>
<th>Risk</th>
<th>Probability (/10)</th>
<th>Impact (/10)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>personal issues</strong></td>
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<td></td>
<td></td>
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<tr>
<td>resignation of a team member</td>
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<td>5</td>
<td>15</td>
</tr>
<tr>
<td>tense atmosphere among team members</td>
<td>6</td>
<td>8</td>
<td>48</td>
</tr>
<tr>
<td>disagreements on important issues</td>
<td>6</td>
<td>6</td>
<td>36</td>
</tr>
<tr>
<td>misunderstandings</td>
<td>9</td>
<td>2</td>
<td>18</td>
</tr>
<tr>
<td>struggle for leadership</td>
<td>7</td>
<td>4</td>
<td>28</td>
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<td>absence of team member on a presentation</td>
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<td>6</td>
<td>18</td>
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<tr>
<td>sabotage due to personal issues</td>
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<td>7</td>
<td>14</td>
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<td>unwillingness to work</td>
<td>3</td>
<td>3</td>
<td>9</td>
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<td><strong>issues with the game</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>insufficient quality of report</td>
<td>2</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>failure of company making the board</td>
<td>3</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>similarity of new and old game</td>
<td>2</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>unclear manual</td>
<td>5</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>delayed arrival of final board</td>
<td>3</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>difficulty to create a manual due to game complexity</td>
<td>8</td>
<td>7</td>
<td>56</td>
</tr>
<tr>
<td><strong>external issues</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>lack of English knowledge for writing manual</td>
<td>3</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>loss of all the documents</td>
<td>2</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>inability to create a final version</td>
<td>4</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>lack of time to finish the project</td>
<td>7</td>
<td>8</td>
<td>56</td>
</tr>
<tr>
<td>playtests goes wrong 2 times</td>
<td>4</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>lack of skills for creating an attractive design</td>
<td>4</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>lack of ideas</td>
<td>2</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>not noticing a mistake in the game during playtests</td>
<td>3</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>lack of people to interview</td>
<td>6</td>
<td>2</td>
<td>12</td>
</tr>
<tr>
<td>lack of external people for testing game</td>
<td>3</td>
<td>8</td>
<td>24</td>
</tr>
</tbody>
</table>
## 12.3. Games matrix

<table>
<thead>
<tr>
<th>Game</th>
<th>Learning outcome</th>
<th>Entertainment</th>
<th>Graphic design Rules</th>
<th>Rate</th>
<th>Type of game</th>
<th>Played by</th>
<th>Goal</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Virtonomics</td>
<td>9</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>6.00</td>
<td>Online game</td>
<td>Victor, Michal, Simon, Gohar develop and run a company. Become the most valuable company</td>
<td>See review</td>
</tr>
<tr>
<td>Adventure capitalist</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>4.67</td>
<td>Flash game</td>
<td>Victor, Michal, Simon Make a as large as possible company by investing earned money</td>
<td>A lot to do but gets boring fast</td>
</tr>
<tr>
<td>game corp</td>
<td>3</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>5.25</td>
<td>Flash game</td>
<td>Sam, Simon, Michał develop a software company and try to make and sell the best games</td>
<td>See review</td>
</tr>
<tr>
<td>Tycoon Online USA</td>
<td>8</td>
<td>7</td>
<td>6</td>
<td>10</td>
<td>7.75</td>
<td>On-line business simulator</td>
<td>Michal, Simon, Gohar develop and run a company. Become the most valuable company</td>
<td>See review</td>
</tr>
<tr>
<td>3rd world farmer</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4.25</td>
<td>Flash game</td>
<td>Sam, Simon, Gohar</td>
<td>Too powerfull random events</td>
</tr>
<tr>
<td>Theme hotel</td>
<td>5</td>
<td>7</td>
<td>6</td>
<td>6</td>
<td>5.75</td>
<td>Flash game</td>
<td>Victor, Simon</td>
<td>No clear goal</td>
</tr>
<tr>
<td>gazillionaire</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>5.38</td>
<td>Flash game</td>
<td>Sam, Simon</td>
<td>Simplistic: buy low, sell high</td>
</tr>
<tr>
<td>Simunomics</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>7</td>
<td>5.75</td>
<td>Flash game</td>
<td>Simon</td>
<td>See review</td>
</tr>
<tr>
<td>Small business game</td>
<td>7</td>
<td>7</td>
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<td>(Online) Board Game</td>
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INTRODUCTION
This game is created to be a tool for business teachers to motivate and challenge business students in order to improve and develop their skills.

It was designed for an European project Semester (EPS Spring 2015. Vaasa, Finland) by a group of students. Victor Gallard, Gohar Karapaetjan, Sam Meulemans, Michał Stępień, Simon Thys and Maria del Mar Torelló.

AIM OF THE GAME
The main aim of the game is to be able to run the wealthiest and most successful bike company through producing, buying and selling bikes. Each team has to be capable of creating the right strategy to be the best one and to deal with the competition of the other teams.

THE GAME
The game consist of running a bike company located in Europe where the tasks of the players is to earn money producing, buying and selling bikes. (Check PRODUCTION, SELLING and DISTRIBUTION). It is a time-based game i.e. everything depends on time and money. The process of buying and selling the bikes is based on the stock market simulation where the prices are changing constantly (Check STOCK MARKET chapter). For the production of the bikes there is two options, produce bikes from raw materials or outsourcing.

All these processes require infrastructure as machinery and warehouses. For that, each team will own a personal board to represent the factory of the company.

To play the game is needed a place with space for at least 10 teams of 2 people, a computer connected to a projector, a big screen to display the buying and selling engine (Stock market excel file) and 3 teachers as Game Masters to be in charge of the buying and selling process, loans, distribution and random events.
MATERIALS:
- 10 personal boards
- 1 loans board
- 1 map board
- 2 goods boards
- 1000 coins
- 200 Machines
- 200 Warehouses
- 19 random event cards
- 30 Pawns
- “Coins boxes”
- Trays
- 1 CD

START
Each team will start the game at the same point. They get:
- 40 thousand cash
- Assembly machine (5 min.)
- Bikes Warehouse (4 places)
- 1 Frame warehouse (10 places)
- 3 units of FRAME (steel frames)
- 3 units of PARTS
- 1 Starting loan (20 coins)
HOW TO PLAY

Stock Market

Players can see on the big screen the actual market. On the top of this screen, there is the time line with days, month and year. In the central part, the four different market are represented, where you can chose where and what you want to buy. The red and green dots represent a comparison between this period and the previous one: if it is green it is better than before. On the right part, there are two graphs which represent the evolution of the prices of bikes. Finally in the bottom part, the purchasing and selling is more detailed. You can have additional information and the total price for the transaction.
**Production**

There are two options, producing your own bikes by buying raw materials and parts or by outsourcing.

**Buying raw materials and parts:**

You can buy raw materials and parts from the Game Master or from other players at any time. The prices are displayed on the screen.

**Outsourcing:**

You have also the option for outsourcing. You can buy frames in Europe, North America, Africa and Asia and bikes in North America, Africa and Asia. You cannot buy bikes in Europe. The prices are displayed on the screen.

Bought bikes must be stocked in your warehouse in Europe, this means that you always have to transport your products to your warehouse in Europe. When you want to sell your bikes in other continents you have to transport them again, even when you bought them in the same continent.

**Infrastructure:**

Your factory is located in Europe. It is possible to buy and sell infrastructure to produce bikes from Game Master or other players at any time. The prices of new infrastructure or the value of old ones are written on the board.
The infrastructure has to be placed on the squares in the right column. The description is at the top of the column.

There are:

- Raw material warehouses: here you can stock your raw materials. There are 2 different types, 8 or 12 places. This means it can contain up to maximum of 8 or 12 raw material pieces. When you want more place, you can buy new warehouse boards. There is a maximum of 4 raw material warehouses in your factory.
- Frame building station: here you can build your own frames. To build the frames you have to put a coin and a raw material in the tray and wait for the appropriate time. The time is written on the infrastructure boards. The coin represents the production costs. There are 2 types, 3 minutes and 5 minutes. To control the time, you get a free hour glass belonging to this station.

- Frame & parts warehouse: here you can stock your own frames. This can be self made frames (see frame building station) or bought frames. There are 2 different types, 6 or 10 places. This means it can contain up to maximum of 6 or 10 frames. When you want more place, you can buy new frame & parts warehouse boards. There is a maximum of 4 frame & parts warehouses in your factory.

- Assembly station: here you can build your own bikes. To build bikes you have to put a coin and a parts piece together with a frame and wait for the appropriate time. The time is
written on the infrastructure boards. The coin represents the production costs. There are 2 types, 3 minutes and 5 minutes. To control the time, you get a free hour glass belonging to this station.

- Bike warehouse: here you can stock your own bikes. This can be self made bikes (see assembly station) or bought bikes. There are 2 different types, 4 or 8 places. This means it can contain up to maximum of 4 or 8 bikes. When you want more place, you can buy new bike warehouse boards. There is a maximum of 4 bike warehouses in your factory.
**Trays**

When creating bikes you have to assemble everything in a tray. In the tray is place for all the things you need to produce bikes. A complete tray represents a bulk of bikes. Trays are **free** available by the game master.

- Assembling bikes with raw materials

- Assembling bikes with frames

**Selling**

You can sell everything at any time to the other teams but only bikes and infrastructure to the Game Master. You cannot sell frames, parts and raw materials to the Game Master.

If you want to sell to other teams you have to negotiate the price. If you want to sell bikes to the Game Master the prices are displayed on the screen and for infrastructure the prices are written on the board.
When you sell your bikes in another continent you get your money when the boat or the truck arrives to their destination. (More information in chapter DISTRIBUTION)

The prices for buying or selling are the same.

You get an advantage when you buy or sell more at once. You pay the actual price you see on the screen when you buy or sell 3 or 4 products at once. If you buy less you have to pay more and vice versa. There is the advantage to buy or sell together with other teams to get a cheaper price.

<table>
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<tr>
<th>Amount</th>
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<th>Selling</th>
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<tr>
<td>3</td>
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<td>4</td>
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<td>115%</td>
</tr>
<tr>
<td>10</td>
<td>80%</td>
<td>120%</td>
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</tbody>
</table>

**Distribution**

When you want to buy or sell in other continents you need to transport your goods. There are trucks connecting Europe with Asia and boats connecting Europe with North America and Africa.

There are three routes and every five minutes a boat or a truck crosses the route in both ways. When the goods arrive the Game Master put them on a board for 5 minutes to give players time to pick them up. If you don’t pick them up you will lose your goods.

E.g: You sold 5 bikes to North America and a boat leaves in 3 minutes, you have to wait 3 minutes before you can pick up your money at the Game Master. Your money will be available for 5 more minutes.
Random events

There are cards with random events that provide realism to the game creating new environments or situations. It can be good or bad events in order to help or challenge the players during the game. They will occur randomly and a dice will decide which team will be involved in. The Game Master is in charge of this cards.

Loans

During the game you have the chance to get loans of 10 or 20 coins from the Game Master. There are three different types of loans. Your starting loan (see starting loan), a short term loan and a long term loan. They are represented on a board depending on the time it will take to pay them back. Every time you get a loan a pawn is putted on the board and moved every 10 minutes. When there is a number in the cell it means you have to pay your interest. The money has to be in the pawn before it moves to the numbered cell. Forget to pay is paying twice.

You can have a maximum of 3 loans at the same time. Once you started a loan, you have to finish it. You can only pay back your starting lone at any time.
- **Starting loan**

To start every team get a starting loan to set up their company. This is a loan of 20 coins. A pawn on the inner circle of the loan board represents this loan. Every 10 minutes the pawn is moved by the Game Master to the next cell. The time is measured by an hour glass in the middle off the loan board. When there is a written on the board, you have to pay your interest. This are 2 coins each time.

You can pay back this loan whenever you want. Once you paid back this loan, your pawn will be removed from the board. You do not have to pay interest anymore.

- **Taking additional loans during the game**

There is the possibility to take extra loans during the game. You can choose between a long or a short term loan and the amount (10 or 20 coins). Your pawn always starts in the red cell and goes counter clockwise.

**Short term loan**

When you take a short term loan you have to put a loan pawn on the middle circle. Every time there is a number written on the board, you have to pay.

When you take a **10 coins loan**, you put the pawn with one slice on top. Every time you have to pay, you pay 1 coin as interests. At the final cell you have to pay back your loan with interests. This means your loan of 10 coins + 1 coin interests.

When you take a **20 coins loan**, you put the pawn with two slices on top. Every time you have to pay, you pay 2 coins as interests. Even when there is a ‘1’ written on the board. At the final cell you have to pay back your loan with interests. This means your loan of 20 coins + 2 coins interests. This are 22 coins.
Long term loan

When you take a long term loan you have to put a loan pawn on the outer circle. Every time there is a number written on the board, you have to pay.

When you take a 10 coins loan, you put the pawn with one slice on top. Every time you have to pay, you pay 1 coin as interests. At the final cell you have to pay back your loan with interests. This means your loan of 10 coins + 1 coin interests.

When you take a 20 coins loan, you put the pawn with two slices on top. Every time you have to pay, you pay 2 coins as interests. Even when there is a ‘1’ written on the board. At the final cell you have to pay back your loan with interests. This means your loan of 20 coins + 2 coins interests. This are 22 coins.

Game Master:

♘ Prices at Game Master are always rounded up (Administration costs)
♞ If more than one player goes to the Game Master at the same time you have to queue
♞ The Game Master is always right even when he is wrong.

Extra rules:

- If one team see another team cheating, they can say it to the game master. The game master will give them a deserved punishment.