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Financial simulation tool for Kunnan Taitoa Oy: the role of the financial management student

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<p>This Bachelor's thesis presents a simulation tool project, commissioned by Kunnan Taitoa Oy, a municipal financial service provider in Finland. The main goal of this thesis report is to introduce the reader to the simulation tool created during the project and to familiarize the reader with the tasks of the financial management student in the project.</p> <p>The goal of the project was to produce a fully functional web-based simulation tool for financial planning. The purpose of the product was to provide a new service for the company to offer to its customers and to improve the financial planning of municipalities. The potential users of the simulation tool are the heads of municipalities and financial directors working in municipalities.</p> <p>This thesis is divided in to three parts: a theoretical framework, project planning and project implementation. The theoretical framework of this thesis will revolve around business intelligence and project management. The part on project planning explains the reader how this project was planned and what the objectives at the beginning of the project were. The project implementation part explains the reader the work that was carried out by financial management students during the project and the different phases of the project. At the end of the thesis, the result of the project is introduced. The conclusions also include recommendations for the further development of the simulation tool.</p> <p>The approach of this thesis is practice-based. The project of the thesis was conducted in a ten person team during the spring (April –June) and fall (August- October) of 2015. The team included two financial management students and eight business technology students. The project followed the SCRUM model. This thesis concentrates on the financial management student's role in the project.</p> <p>The outcome of the project simulation tool is called Talouspeli. It is a simulation tool meant for planning municipal finances. The simulation tool is easy to use, it is informative and visually pleasant. The client will add it as a feature to their future product called Portaali.</p>	
Keywords	
Project management, Data model, Municipality, Business intelligence	

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1 Introduction

This thesis was made for project conducted to Kunnan Taitoa Oy (later Taitoa). Taitoa is a company that offers financial services and products to Finnish municipalities.

The purpose of the project was to create web based financial planning simulation tool. The project was conducted in ten-person team containing two financial management students and eight business technology students. Project was conducted during spring and fall of 2015 in three sprints.

This thesis was made in perspective of a financial management student in an IT project. Thesis concentrates on the financial management student's tasks in the project and the knowledge and skills needed in order to create financial simulation tool.

1.1 Background

In the field of finance the need of real-time and current analysis is increasing. The need to react and meet the markets demands is more important than ever in the global world. There are more data available than ever before. The use and relationship between aspects of business and finances are crucial part of business decisions. (Perficiant 2015.)

Business intelligence solutions are not new tools to be used in the business decision making. These solutions and tools have been around since the computers were first brought to the business life. However, the extent and the possibilities of business intelligence have grown rapidly. Business intelligence solutions are available for all areas of business for example finance, logistics and marketing. The possibilities to combine information from all business areas are the new challenges of business intelligence. (Brijs 2013, 4-7.)

1.2 Project objectives and project scope

The objective of the project was to create a financial planning simulation tool for the company. In the future Taitoa will offer this simulation tool as part of their new web based product. The purpose of the tool is to help Taitoa's customers plan their finances and to simulate different financial scenarios easily.

As a financial management student I had four tasks in this project:

1. Data modeling the simulation tool
2. Testing the simulation tool
3. Translating the documents
4. Presenting the simulation tool at Kuntamarkkinat fair to potential users

As financial management students our tasks were to make the financial frame and designing helpful features for the simulation tool. This was done by making three data models for the project. Our important tasks in the project were also to test the tool and to give the financial specialists opinion during the project. As the project team was international, with two international students and eight Finnish students, all the documents needed to be in English and in Finnish. One of my tasks was to translate the data models in to English so it would be usable for all the members of the development team. The project was divided into three phases during which these tasks were carried out several times. We also presented the simulation tool at Kuntamarkkinat fair to the potential future users of the tool. Presenting also included recording the test users thoughts and feedbacks of the simulation tool.

The financial frame of the simulation tool follows publicly available financial planning Excel tool by Ministry of Finance. In addition to information on the publicly available planning frame, the client had their own additional criteria for the tool. The simulation tool is made for the use of finance director or head of municipality to help their financial planning and decision-making.

This project had two financial management students and there are two separate thesis works made from financial management student's work on this project. This is why the theoretical frame has been divided in to municipal finance and to business intelligence and project management. This thesis will concentrate on financial management student's role in the IT project and therefore the theoretical framework will concentrate on business intelligence and project management. Municipal finance aspects will only be mentioned in this thesis briefly in parts it is necessary. Financial aspects of project management will not be taken inconsideration in the theoretical framework, as it is not necessary for this project.

1.3 Case company

Kunnan Taitoa Oy (Taitoa) is a company that offers financial services and products to Finnish municipalities. It is one of the biggest nationwide municipal finance and human resource management service provider. Their services are used by over 100 municipal organizations. Taitoa is solely owned by municipalities and other municipal organizations. They have offices in seven different cities around Finland. Taitoa employs over 500 experts and their revenue in 2014 was 33 million euros. (Kunnan Taitoa 2015.)

Their values are summarized in three to be open, to influence and to success. They implement these values by listening to their customers' wants and needs. They believe that sharing the best-noticed processes with all of their customers and keeping their customers informed is important for the open organization. Taitoa is interested of improving their procedures and products and being involved with newest products and processes. They take part in in several projects which are involved in improvements of finance and financial management. (Kunnan Taitoa 2015.)

Between 2014 and 2015 Taitoa took part in Taloushallinnon runkoverkko (TARU) project. Aim of TARU-project was to produce new digital financial management solutions and to automatize financial management processes. TARU-project was funded by Tekes and four companies Administer Oy, Kunnan Taitoa Oy, Tieto Oyj and Tikon Oy organized it. The project was conducted with the help of higher education institutes including Haaga-Helia and public organizations such as Federation of Finnish Financial Services (FFI). (TARU 2015.)

Municipalities can easily outsource all of their financial management operations to Taitoa as they offer a wide selection of these services. They provide everything from accounting and financial statements to accounts ledger services and debt collection. They have also range of human resource management services. However these services are more involved in payroll processes, they also offer help in other issues such as recruitment. (Kunnan Taitoa 2015.)

1.4 International aspect

The project is conducted in ten-person team from whom two are international students. For this reason, the project language is English. However, the final simulation tool will be in Finnish as the client is a Finnish company. This is why the team needs to have all the documents both in Finnish and in English. As mentioned above the translation of the doc-

uments made by the financial management team is one of the tasks of this thesis work. Working in the international team will be the international aspect of this thesis and all the translated documents are given to the client for future use.

This thesis concentrates on the project in an aspect of the financial management student. This meets the criteria of the financial management specialization track.

1.5 Anticipated benefits

The stakeholders in the project are the client Taitoa, students working on the project and Haaga-Helia.

The project was beneficial for all the stakeholders. As a result of this project, the client has a product, which it will be able to offer their own customers. In addition, their customers the municipalities will be able to find weak points in their finances and improve their financial planning.

This project was also be beneficial for all the students working on the project since they gained real life experience of working on and creating business intelligence tool. The tool will be used by real municipalities and financial professionals in the future, which added challenge and value to the project. The financial management students also had a chance to familiarizes themselves with municipal finance and see the differences it has between regular private businesses.

Other stakeholder for this project is Haaga-Helia as the project was commissioned from it. Haaga-Helia will benefit for the successful project by group of their students completing their thesis and getting possible future commissions from Taitoa.

1.6 Key concepts

Municipality

Finland is divided in to autonomic municipalities. Municipality's mission is to govern and to provide services to its residents. Municipalities are governed by council elected by the municipals residents. (Local Government Act 365/1995.)

Municipal finance

Municipalities are financed mainly by tax revenues which covers roughly half of the income. Other half is covered by sales revenue for the services and government subsidiaries. (Association of Finnish Local and Regional Authorities, 2015.)

Financial planning

Financial planning is important part of business operations. Its purpose is to forecast organizations future funds and distribution of funds as well to support decision-making. The outcome of the financial planning is a set of budget and action plan for the forecast period. (Business case Studies 2015.)

Data model

Data Model is a tool used in information system engineering process. Data Model explains the use, location and relation between the data to be used in the process. (Ambysoft 2013.)

Project management

Project management is a method of using skills, knowledge, tools and techniques to achieve project objectives. Project management is carried out in five process groups: initiating, planning, executing, monitoring and controlling and closing. (PMI 2013, 5.)

2 Business intelligence

Understanding business is important when making decisions for it. The most important tool to understand the business is the data that business creates. Company's data can reveal its strengths and weaknesses when analyzed correctly. Data is often gathered from various sources and it might be impossible for a person to analyze all the data. This is why business intelligence solutions were created. (Space Time Research 2014.)

Business intelligence is a category of solutions and technologies to provide information to make better business decisions. This is done by gathering, storing, analyzing and providing access to data. These solutions can be used for certain operations of the company or even organization widely. Business intelligence solutions are not only the decision support systems but also forecasting, data mining, reporting, statistical analysis solutions. (Brijs 2012, 6.)

A wide definition of business intelligence is that it is a managerial philosophy. As these solutions were not created to solve new problems but to help managers with problems they have always battled with. How to make the best possible decision by analyzing the business environment? Business intelligence solutions provide an answer to this quickly, in a simple manner and by using wide range of company data. These solutions have become in today's fast moving business environment crucial tools of management. (Hočevar & Jaklič 2010, 89, 91.)

2.1 Use of business intelligence

Business intelligence solutions are used in all parts of the business. These are the most evident in the financial field as the need of accurate and current knowledge of organizations finances is important. In most cases, the use of business intelligence in the companies starts in the finance department and is then implemented in other parts as well. (Brijs 2012, 11, 14-16.)

According to Mulcahy (2007), restaurant chains in the USA are active users of business intelligence solutions. He states in his article that restaurant chains utilize business intelligence so well that they get more real value from solutions than businesses in other industries. Restaurants use these solutions for example to determine what kind of new products should be launched or which products should be discontinued. These solutions in restaurants are also used to negotiate deals with suppliers and to improve internal processes.

In financial management the analyzing and improving business performance have become more important tasks than collecting information or reporting. With the help of business intelligence financial professionals can easily collect information from all parts of the business to define how the company could for example reduce costs and improve profitability. (TDWI 2010, 6.)

With the help of business intelligence finance departments can be transformed from traditional providers of accounting services and reporting into a department which can provide important strategy advising. Financial analyses created with business intelligence solutions can be used not only to provide information from the past but also make forecasts for the future to help to make strategic decisions. (TDWI 2010, 5.)

Business intelligence solutions traditionally used in financial management are for example accounting information systems (AIS). AIS systems create accounting reports and analyses according to standards. Its main purpose is to provide necessary financial information by using data gathered from company's accounting program precisely, easily and quickly. (Srinivas & Gopiseti 2012, 2.)

2.2 Benefits of business intelligence

It is difficult to determine what kind of benefits applying business intelligence solutions have to the company. The benefits may vary from simple benefits noticed by employees such as finding information easier to wider benefits noticed by the customers or other stakeholders for example improved response time. These benefits are usually caused by faster information management, which is difficult to measure. (Hočevár & Jaklič 2010, 90.)

In many cases, it is seen that business intelligence cases intangible benefits for example improving decisions-making process and time saving. These benefits may in the long run cause tangible benefits such as financial savings. Effects and benefits of the business intelligence should be measured by examining the big picture and in a longer period of time. Has the company's market share increased in a five years after the business intelligence was taken in use or has the revenue increased in the same period of time? These are of course not directly cause by the use of business intelligence but these might be caused due to the knowledge gained from business intelligence solution. (Pirittimäki, Lönnqvist & Karjaluo 2006, 85, 88.)

2.3 Business intelligence projects

Business intelligence projects are always unique and it depends on the company's needs how complex it is. These projects are also quite expensive and the investment in such project should be carefully planned and well justified. Before starting the project company needs to determine the benefits it wants to receive by investing in business intelligence project. To justify such a big investment four components of justification should be used:

1. Business factors
2. Requirements of business analyses
3. Cost and benefit analysis
4. Risk assessment

The first component, which is business factors, determines the reasons to implement the business intelligence, strategic goals to be achieved with the project and how to achieve these goals. Second component defines the information used in the business intelligence to produce needed analyses. Cost and benefit analysis component assesses the costs of implementing the project and evaluation of future costs. It includes the anticipated benefits the investment should bring to the company. Last component determines the risks of the solution, the project, the usage and the integration of the business intelligence solution for example. (Hočevar & Jaklič 2010, 93.)

Implementing business intelligence solutions in the company is more than just taking software in use. When company implements business intelligence solutions they also are committed to improve their organizations performance and way their organization works. (Brijs 2012, 11, 14-16.)

When implementing a business intelligence project, company should not expect immediate savings as there might be a need for of new technologies, additional employees or changes in current employee's roles and responsibilities during the project. Moreover, with all the inputs put in the project it could still fail. Over half of the business intelligence projects are unsuccessful and lead to failure or abandonment of the solution. Reasons for this are insufficient planning, poor project management, poor quality or the solution not meeting the business requirements. (Moss & Atre 2003, 31)

3 Project management

Efficient project management leads to effective use of project resources. Project management is especially important in a project where project work is unfamiliar to its participants. (Dalcher & Brodie 2007, 5.)

3.1 What is a project?

Project is a temporary work which purpose is to create a product, a service or results. Project has a defined timescale. Project starts with defined objectives and ends when these objectives are met. Project can also end due to termination of the project. This can be caused by various reasons such as its objectives cannot be met or the client wishes to terminate the project. Length of the project can vary between days and years. (PMI 2013, 3.)

No two projects are alike. Project characteristics are what make each project unique. The main project characteristics are stakeholder value and resource utilization. The value project has to its stakeholders might be tangible or intangible. The outcome of the project might be a product that will be sold in a future or it might be a strategy report conducted to create future strategy outlines. The value can also vary in between the project if there are several stakeholders involved. The main resources used in projects are time, money and personnel. The use and availability of each of these resources define the size of the project. (Dalcher & Brodie 2007, 3-4; PMI 2013, 3.)

3.2 Project life cycle

Generic life cycle of a project consists of four periods: beginning the project, organizing and preparing, executing the project work and ending the project. Depending on the project these periods might be broken into several more detailed phases. (PMI 2013, 38-39.)

The nature of the project determines how many project phases are needed. Project phase is a set of a project tasks that relate to each other. Each phase of the project usually requires specific skillset to be completed. By completing the phase in a project one objective or sub objective of a project is usually met. Project phases make the project management, controlling and planning easier. (PMI 2013, 41.)

IT projects are often divided into six phases which are: justification, planning, business analysis, design, construction and deployment. Justification means assessing the busi-

ness needs for the new project this is usually the first step before the project starts and objectives of the project are usually set in this phase. In planning phase, strategic and practical plans are made to lay out how the objectives of the project will be met. Business analysis is made to gain understanding of the business problem and the requirements, which should be included in the product. This analysis should also disclose the business opportunities the product will bring to the stakeholders. During the design phase, a design of the product is made. This design should follow the business analysis. Construction phase is the development phase during which the product designed is developed. Deployment is the final phase of the IT projects during which the implementation of the final product is made. During the final phase the product should also be evaluated. (Moss & Atre 2003, 33)

3.3 Project life cycle models in IT projects

Project life cycle models define how the work and the phases during the project are organized. Dalcher and Brodie (2007) define seven most common project life cycle models used in IT projects. These models are:

- Waterfall model
- Incremental phased delivery
- Evo model
- Spiral model
- Dynamic system development method
- Extreme programming

Waterfall model is the most traditional project life cycle model. It has been used since 1970's in the IT projects. Waterfall model is sequential model, which means all project work is completed during one phase. Each of the project tasks such as testing are completed only once during the project. Tasks are completed one after another; this is what gives the name waterfall to the life cycle model. It is suggested that this model should be used in project where the requirements are unlikely to change during the project. (Dalcher & Brodie 2007, 11-12.)

Incremental phased delivery is a variation of the waterfall model. Incremental means that the project is divided into several phases. Each phase is in a way a smaller project, which follow waterfall model. After each phase is complete, the product is delivered to the customer. Issues seen in the incremental phased delivery is the set of specified requirements.

As it is seen difficult to set specific requirements at the beginning of the project and customer may want to add requirements after seeing the work carried out during the incremental. (Dalcher & Brodie 2007, 11, 13.)

Evo model follows evolutionary project life cycle approach where the product is allowed to evolve over time. There are no set requirements at the beginning of the project, the requirements are created based on the customer feedback during the development. The project is made in a several smaller cycles. In the Evo model the new product is created on top of an existing product. Each of this model's project cycles represent tasks which are carried out during the cycle. Additional smaller tasks might be added to the cycle. The requirements, which are seen as the most important to the customer, are created during the first cycles. The aim is to create high value to the customer in the beginning of the project. (Dalcher & Brodie 2007, 11, 14-15.)

Spiral model is risk driven approach for project life cycle. Its idea is that there are four sections, determining the objectives, identifying and resolving risks, development and verifying and planning the next phase. These sections are followed one after another continually during the project in a cycles starting from objective and ending in planning the next phase. After finishing one cycle a phase of the project ends, phases are for example graphics and design or requirements of the project. (Dalcher & Brodie 2007, 16.)

In dynamic system development method the project is divided into timeboxes. Timebox is a preset amount of time in which part of the project work is executed. Timeboxes are usually between two to six weeks long in which a prototype is made. The aim of this model is to create prototypes or parts of the systems from which then evolves the final system. Dynamic system development method usually involves several timeboxes during the project. During a timebox following seven phases are executed:

1. Pre-project phase
2. Feasibility study
3. Business study
4. Functional model iteration

5. Design and build iteration
6. Implementation
7. Post-project phase.

Phases follow the order given above. Feasibility and business study are only fulfilled in the first timebox and pre-project and post project phases before and after the start of the timeboxes. Phases 4 to 6 are fulfilled in all the timeboxes or these could be divided into separate timeboxes. This model allows the client to be involved in the project actively and changes can be made or reversed during the project. (Dalcher & Brodie 2007, 17-18.)

Extreme programming is a progressive project life cycle method in which the program is released frequently in small parts. Parts and functionalities that provide highest business value are developed in the beginning of the project. Customer or customer representative is usually fulltime member of the project team. (Dalcher & Brodie 2007, 21.)

3.4 Project plan

Planning is the first phase of any project and it is an important tool for the project manager. In the project plan the schedule of the project and all of its steps are defined. Project plan tells the project manager what phases are needed to complete the project, by when phases need to be completed and in what order. With the information on the project plan the project manager is able to see how many people are needed for the project and what kind of expertise is needed to carry out the project. (Dalcher & Brodie 2007, 134.)

3.5 Project team

Project team is a group of individuals who work together to meet the project objectives. Project team usually consists of project manager who is in charge of leading the project and project group who delivers the work for the project. Project group may include roles such as project staff and supporting specialists. Project staff is the member of the project who does the concrete work to meet the objectives. Project staff usually works on the project full time. Supporting specialists perform tasks which need specific field's expertise such as knowledge based tasks or skill based tasks. Supporting specialists may work on the project full time alongside the project staff or during the phase of the project when specific expertise is required. (PMI 2013, 35-36.)

3.5.1 Project manager's role

Project manager's role is to be the leader, the supporter, the communicator and the motivator of the project team. Project manager should have good communication, leadership,

team building and motivational skills in order to create good and efficient working environment in the project. Project manager is usually responsible of the communication between the stakeholders of the project such as the customer, the management and the project team. Project manager is in an important role delivering the strategy from the customer to the project team and delivering the work and suggestions from the project team to the customer. (PMI 2013, 16-18.)

3.5.2 Supporting specialist's role

As mentioned above supporting specialist is an expert of their field and their role is to give the project team additional information. Driving Strategy Delivering More (DSDM) has divided the traditional supporting specialist's tasks amongst three different roles to define the specialist's role and involvement in the project. These roles are business ambassador, business analyst and business advisor. (DSDM 2015.)

Business ambassador is a member of the project team and works closely with and alongside the team. Business ambassador is a professional of field the project solution is meant for. In best case business ambassador works in a position similar than the intended user of the solution. Business ambassador's role is to provide information about the needs of the project solution and how this should be defined and implemented. The ambassador keeps the project teams mind in the intended user and provides inputs and ideas on a perspective of the user. (DSDM 2015.)

Business analyst is a common role especially in IT projects. The analyst, as well as the ambassador, is a member of the project team and works closely with and alongside the team. Business analyst has knowledge in both the field of the project solution is meant for as well as in the project development. Analyst's role is to be the mediator between the project team and the other supporting specialists and to ensure and to support the communication between them. Business analyst makes sure that the information given by the ambassador to the project team is correct and usable. (DSDM 2015.)

Business advisor is a temporary member of the project team. The advisor is a professional of a specific field and is called upon when specific specialist's information and input is needed. Business advisor can be intended user, someone who benefits from the project work or specialist of some other field. Business advisor may for example be a lawyer who provides legal guidance. (DSDM 2015.)

3.6 Risk management

Project risk is something unexpected or expected that might happen during a project. The risk might have negative or positive impact on the project. Risks can never be totally eliminated which is why resources preventing risks should be used cautiously. Best way is to minimize the impact of the risks is to define and to analyze the expected risks. Definition and the analysis of the risks should be done during the project-planning period and it should be done to all tasks and phases of the project. When the risks management plan is done in the beginning of the project risks also need to be assessed throughout the whole project. This is because when the project evolves new risks may occur. (Dalcher & Brodie 2007, 263-269; PMI 2013, 310-314.)

Risk management should be started by identifying the risks. Risk identification could be done by just the project manager or with the help of the team and/or stakeholders. More participants are involved in defining the risks the more risks are likely to be identified. In risk identification risk events and risk symptoms are defined. Risk events are incidents that are possible to happen during the project and influence the project negatively. Such risk events could be performance failure of the IT software. Risk symptoms are signs that point to the risk events. For example, performance failure of the IT software's symptoms could be errors in the calculation formulas. (Dalcher & Brodie 2007, 272; PMI 2013, 319-321.)

4 Plan of the project

The approach of this thesis is practice-based. This is because the project does not include collecting information for the client. The product is created based on the material given by the client. The initial project plan and the project design were made by Haaga-Helia and agreed with the client. The project was conducted using SCRUM- method. This means a project management process where the project is divided into parts based on their complexity to build the product (SCRUM 2015).

This project was planned to be implemented in three parts called sprints. In each sprint the team created a perfectly functional proto version of the simulation tool. After each sprint the current proto version was planned to be presented to the client and the feedback was planned to be collected from them. At the beginning of the project each sprint was given three weeks including two weeks before the start of the first sprint to establish working models and work spaces. It was planned that there would be total of 11 working weeks for the project.

Before the sprint 1 officially started the whole team got together to make a task division and agree on used project management tools and software requirements. The financial management students had two weeks to plan and implement the first data model and the translation. After data model was finished it was accepted by the supervising teachers and the client.

The beginning of the project it was planned that the product would have six different simulation variables which the user can change to simulate their financial planning. In the first sprint these two variables were set to be tax percentage and the change in the amount of loan. The proto version of the simulation tool created in sprint 1 was planned to be improved in the sprint 2 based on the customers feedback and by adding two new simulation variables. The same process was planned to be follow in sprint three.

For each sprint it was planned to have separate data model which would include two additional variables and other possible features. These data models were planned to be completed and translated before the start of each sprint.

During sprint 1 financial management students started to make a testing plan. Testing plan explains how the simulations tool should be tested. The testing plan can be found from appendix 2 in Finnish as this was done for the financial management students' personal use there was no need to translate it. During each sprint individual plan for each

sprint was added to the testing plan. This was done due to different features planned for each sprint. The testing was planned to be done during sprints so the development team could fix the possible errors before the presentation to the client.

The outcome of the project was planned to be fully functional simulation tool with six different variables in a game like setting. The design of the project and the links between project tasks of this thesis is illustrated in the figure 1.

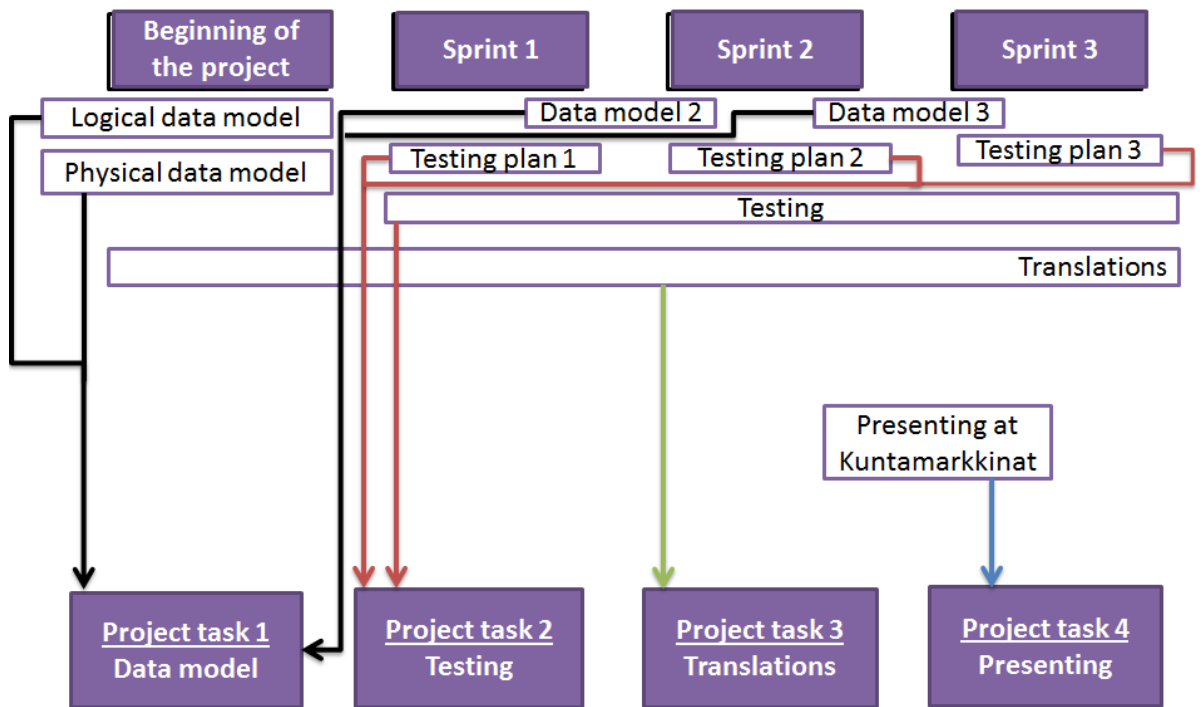


Figure 1. Project design

5 Project implementation

This project was implemented in three phases called sprints. Our tasks as financial specialists in the project was to create a data model for each sprint, to test the simulation tool in each sprint and on the two last sprints to present the product to the client at the end of each sprint.

5.1 Starting the project

Before the official start of the project and the first meeting with the client, the finance team met to familiarize ourselves with Haaga-Helia's offer and the Ministry of Finance's Municipal finance planning framework which would be the core of the simulation tool. The tool was first quite complex and without any knowledge about the municipal finance, it took some time to understand all of its functions.

Project started officially with the customer meeting in April. In the meeting, there were one client representative present and three client representatives present via videoconference called Lync. Present were also three coordinating teachers, project manager and four project team members. In the meeting Haaga-Helia's offer for the project was gone through. The timetable for the project was also set with the customer. Client shared their ideas about what they wanted for the tool and what aspects they thought were important. Client wished for game like simulation tool for the use of head of municipalities and municipal's finance directors. As the client needed more time to set the specific requirements for the tool requirements were received after the meeting.

The first meeting was fruitful in a way that it opened up some of the questions we had about the scope of the project and the material we would be working with. However the meeting also confused us even more as client had a lot of ideas about the simulation tool and what they wanted for it to be in the future but not a clear picture. Client wished it to be game-like but left that for the project team to determine what would be game like enough. This is why when making the first data model we had problems with visualizing the simulation tool. As finance professional tools that you work with are not game like. The tools are functional, easy to use and provide all the needed information this is also what we visualized the simulation tool to be like.

Second official project Kick-start meeting was among the whole project team. In this meeting everyone presented themselves and shared about their background and why they were taking part of the project. During the meeting everyone's tasks during the project were decided and it was confirmed that official project language would be English. The

meeting started of quite slow and there were no specific agenda for it. As someone who has been part of several student organization's boards, I found the meeting chaotic and felt like not all the necessary things were covered during this kick off meeting.

5.2 Sprint 1

During sprint 1 our tasks were to create and translate data model and to test the simulation tool. Data model was given two weeks to work on before the official beginning of the sprint 1. Objectives of the sprint 1 were to create the base of the simulation tool and to have two variables tax percentage and amount of loan.

5.2.1 Data model

The first data model was quite tricky and extensive as it included the calculation and forecasting formulas for all the items. It was important that the data model would be detailed enough and to have all the possible information for the development team.

The base of the data model came from the Ministry of Finance's Municipal finance planning framework Excel. This Excel framework is publicly available on Ministry of Finance's website. The framework included two years financial statement information from all municipalities of Finland as well and formulas for the forecasting. During the first sprint the 2014 version was used with 2012 and 2013 as base years (years with financial statement completed) and years 2014-2023 as forecast years. The framework is divided in two parts income statement and combination of cash flow statement and balance sheet. The framework starts with the population information and tax rate of the municipality and is then followed by income statement information, accumulated surplus/deficit, combination of cash flow statement and balance sheet, income statement growth rate table, cash flow statement variables and ends with two diagrams.

Income statements purpose is to report the profit and losses of the accounting period by indicating the revenues and expenses (Weetman 2006, 171). In the framework income statement (Image 1) was divided into 22 items. These 22 items were divided into eight head items (bolded in Figure 2) and 14 sub items (which are used to formulate the head items). For the base year the figures were gathered from base data included in the Excel or calculated by adding up sub items. For the forecast years the sub items were forecasted by using different formulas based on the item. The variables which the user can change are presented in blue.

KOKO MAA	TP 2012	TP 2013	2014	2015
TULOSLASKELMA				
Asukasluku 31.12.	5 398 173	5 422 604	5 478 556	5 504 314
Veroprosentti	19,26	19,40	19,75	19,75
vero-% yksikön tuotto	869 907	0	918 953	940 089
→ noston vaikutus			0	0
Toimintatuotot	9 056 776	9 099 866	9 300 063	9 458 164
Toimintakulut	35 283 938	36 154 397	37 347 492	38 169 137
Kotikuntakorv.+elätustuen pal., netto			-145 632	-145 632
Toimintakate	-26 227 162	-27 054 531	-28 193 061	-28 856 605
Kunnallisverot	16 754 413	17 881 106	18 149 323	18 566 757
Yhteisöverot	1 205 379	1 308 621	1 333 485	1 386 824
Kiinteistöverot	1 268 178	1 360 351	1 507 269	1 591 676
Verotulot	19 228 651	20 550 650	20 990 076	21 545 257
Valtionosuudet	8 031 581	8 252 562	8 200 923	7 692 465
valtionos. pl. hark.var.	8 011 581	8 232 562		PPO>
Korkotuotot	220 142	205 086	205 086	205 086
Korkokulut	235 608	200 399	275 737	300 760
Muut rahoitustuotot	367 685	349 625	349 625	349 625
Muut rahoituskulut	44 476	40 257	40 257	40 257
VUOSIKATE	1 340 812	2 062 736	1 236 655	594 812
€/asukas	248	380	226	108
Poistot ja arvonalent.	1 891 826	2 058 535	2 239 935	2 437 319
Satunnaiset tuotot	271 406	384 160	384 160	384 160
Satunnaiset kulut	29 081	18 131	18 131	18 131
Tilikauden tulos	-308 688	370 230	-637 251	-1 476 478
Poistoeron lisäys(-) tai väh.(+)	20 056	-19 191	-19 191	-19 191
Varausten lisäys(-) tai väh.(+)	-6 257	-6 649	-6 649	-6 649
Rahastojen lisäys(-) tai väh.(+)	10 973	49 155	49 155	49 155
Tilikauden yli-/alijäämä	-283 917	393 545	-613 936	-1 453 163
TASEESTA				
Kertynyt yli-/alijäämä	6 571 755	6 961 486	6 347 550	4 894 387
€/asukas	1 217	1 284	1 159	889

Image 1. Income statement in Municipal finance planning framework, Ministry of Finance

Cash flows purpose is to show how the cash in the organization is generated and to give information about the solvency and liquidity of the organization. Balance sheets purpose on the other hand is to show the financial position of the organization. (Weetman 2006, 28,173.) The Municipal finance planning framework combines information from municipalities' cash flow statements and balance sheet into one (Image 2). As most of the information on this part is based on the cash flow statement this part in the simulation tool is called just cash flow statement as well as in this thesis. Cash flow statement is divided into 17 items. These items included 7 head items (bolded in Image 2) and 10 sub items. The formulas for these items follow similar manner as explained in previous paragraph.

KOKO MAA				
	TP 2012	TP 2013	2014	2015
RAHOITUSLASKELMAN JA TASEEN TIE TOJA (sisältäen rah				
Vuosikate	1 340 812	2 062 736	1 236 655	594 812
Tulorahoituksen korjauserät		-611 896	-611 896	-611 896
Satunnaiset erät, netto	242 325	366 029	366 029	366 029
= 1. Tulorahoitus, netto		1 816 869	990 788	348 945
Investointimenot		-3 815 428	-3 815 428	-3 815 428
Rahoitusosuudet investointeihin		210 416	210 416	210 416
Inv.hyödykkeiden luovutustulot		896 983	896 983	896 983
= 2. Nettoinvestoinnit	2 719 195	-2 708 029	-2 708 029	-2 708 029
€/asukas	504	-499	-494	-492
= 3. Rahoitusjäämä (1. Tulorahoitus + 2. Nettoinv.)		-891 160	-1 717 241	-2 359 084
4. Bruttorahoitustarve (= Rahoitusjäämä + antolainasaam. muutokset + lainanlyh.)			-3 305 001	-4 103 237
Antolainasaamisten muutokset		-135 596	-135 596	-135 596
Lainamäärän muutos; Lainanlyhennykset Lainanlisäystarve		1 574 396	1 251 145	1 813 165
			1 723 355	1 879 748
			2 974 500	3 692 913
Lainakanta	12 212 446	13 786 842	15 037 987	16 851 152
€/asukas	2 262	2 542	2 745	3 061
Rahavarat	3 339 979	4 323 597	3 993 097	3 582 773
€/asukas	619	797	729	651
Nettovelka (rahat-lainat)	-8 872 467	-9 463 245	-11 044 890	-13 268 379
€/asukas	-1 644	-1 745	-2 016	-2 411

Image 2. Cash flow statement and balance sheet combination in Municipal finance planning framework, Ministry of Finance

Planning tool also included growth rate table for six different income statement items and three variables for cash flow items (Image 3). Growth rates could be set for operating income and expenses, municipal tax, corporate tax, property tax and for government subsidies. User could also determine with the variables the loan shortening period, Interest rate for interest expenses and the rate from cash flow to be used to cover the gross financing need.

TULOSLASKELMAN ERIEN KASVUPROSENTIT:													
Muutos ed. vuodesta, %:	11/12	SYÖTÄ HALUAMASI KASVUPROSENTIT!						oletuksena samat arvot kuin v. 2017 >				Syötä muutos-	
Toimintatulot	0,5	2,2	1,7	2,9	2,8	2,9	2,9	2,9	2,9	2,9	2,9	2,9	prosentit
Toimintakulut	2,5	3,3	2,2	2,4	2,8	2,7	2,7	2,7	2,7	2,7	2,7	2,7	Vuosien 2013 - 2017
Kunnallisverot	6,7	1,5	2,3	3,3	3,6	3,9	3,9	3,9	3,9	3,9	3,9	3,9	ohjelma PPO:n 13/2013
Yhteisöverot	8,6	1,9	4,0	-9,6	6,1	4,4	4,4	4,4	4,4	4,4	4,4	4,4	arvioluvut koko maan
Kiinteistöverot	7,3	10,8	5,6	1,9	1,8	2,1	2,1	2,1	2,1	2,1	2,1	2,1	kehityksestä
Valtionosuudet (pl. hark.var.)	2,8	-0,6	-6,2	1,7	2,0	1,9	1,9	1,9	1,9	1,9	1,9	1,9	V. 2013 lopulliset vossit.
2014 vossit sisältävät kust.jaon tarkistuksen													
TAUSTAMUUTTUJAT:													
VALITSE KESKIMÄÄR. LAINANLYHENNYSAIKA (VUODET):							8,0	Esim. lainanlyhenntäisaika 8 vuotta, jolloin vuosilyhenntä = 1/8 eli 12,5 % * lainamäärä					
VALITSE KESKIMÄÄR. KOROKKANTA (KORKOPROSENTTI):							2,00	Vaikutus korkomenoihin, ei korkotuloihin					
MONITAKO % RAHAVAROISTA KÄYTETÄÄN (4.) BRUTTORAHOITUSTARPEEN KATTAMISEEN ?							10 %	Syötä prosenttiosuus, joka käytetään rahavaroista.					

Image 3. Income statement growth rates table and cash flow statement variables in Municipal finance planning framework, Ministry of Finance

Our first task was to familiarize ourselves with the framework and to break down all the formulas in to understandable form. As this was done it was sent to one of the coordinating teachers for a check. After the approval from the coordinating teacher we divided the work on the data model in half to income statement and to cash flow statement. We then

wrote a detailed data model for each formula for the base years and for the forecast years with cell references to the original Excel framework. Variables for the first sprint were determined to be tax percentage and change in the loan amount. On the client's requirements there was one item listed which was not presented in the municipal finance planning framework. However because all the information needed to calculate this item was available in the planning tool this item was also added in the data model. Some of the items such as different tax revenues and loan also had separate growth rates or variables which were determined and informed in the data model in detail. As an example "KOKO MAA"'s numbers were used throughout the data model. In the data model there were also a rough sketch of the simulation tool what it could be like and features it should have.

Data model was then sent to the client to be approved. While waiting for the client's approval the data model was presented to the development team and the coordinating teachers. As the project manager hadn't specifically asked or told us that we should present it we were not prepared. However we presented the data model as we were able to do it and answered any of the development team's questions. The development team had rarely any questions or comment about our work. This made making the data model also in the future sprints bit tricky as it was hard to improve your own work without feedback. The coordinating teachers were very happy with our work and told us that the data model was very professional. Client did not either have any comment about the data model.

After the client's approval I started working on the translation of the data model. I first went through all of the items in the Municipal finance planning framework and made a list of translations for each in the introduction of the data model. In the data model itself I did not translate the items names as the simulation tool would be in Finnish and there for I saw it to be more beneficial. The translation was then sent to the development team. International development team members gave me good feedback about the translations and told it was very helpful and understandable.

5.2.2 Testing

While the development team was working on the simulation tool we started planning our next task which was testing. We made a testing plan where we determined what would be tested and how. In the same testing plan we combined testing plans for all three sprints. Testing plan can be found in appendix 2 in Finnish.

During the first sprint we tried to be in contact with the project manager to discuss the possible testing times. However he did not respond to us until very late in the first sprint.

This caused the testing during the first sprint to be very limited. We were able to test the simulation tool only once for one hour during the sprint.

During this testing we took a look at what the development team had made so far. By then they had built up the layout for the simulation tool and finished the income statement. We then tested each of the formulas for "KOKO MAA" as its numbers were also used as an example in the data model. We organized the testing so that we had the Municipal finance planning framework open and we checked that all the values were same as in the simulation tool and when changing the values change would be same in both. This testing worked out quite smoothly we made few notes for example about the formulas, which did not work, and the use of dot instead of comma for separating the decimals. As we were testing in the same class room where the development team was working on at the same time they asked us to give the notes to them orally. Some of these notes were also added to sprint 2 data model.

5.2.3 Presenting

The Sprint 1 ended with customer presentation. The first presentation was done by the project manager and one of the Finnish members of the development team. We were present to answer any questions the client might have had about our part in the simulation tool. After the meeting the project team was given a week to come up with the objectives to the sprint 2. During this meeting client also confirmed that project team could come to Kuntamarkkinat fair to present the simulation tool as we suggested in the beginning of the project.

5.2.4 The outcome of the sprint 1

During the first sprint only income statement part from the data model was finished. However the development team noticed during the programming that making the items changeable was quite easy. This made it possible to make the same items changeable in the income statement as it was in the original framework. It was also made possible during the sprint 1 to change the income statement growth rates. Development team also added one of the diagrams presented in the original planning tool.

After the client meeting the project team had a meeting where we went through what went good in the first sprint and what could be improved. Team also discussed the ideas for the future sprints and ideas to be our next objectives. As the previous data model was still

unfinished it was decided that during the sprint 2 Cash flow statements would be finished and additional diagrams would be added.

5.3 Sprint 2

Objectives for the sprint 2 were to finish the data model created for the first sprint, to update the base data and to create two more diagrams. The unfinished data model included the whole cash flow statement. During sprint 2 our tasks were to make the second data model, test the simulation tool during the sprint, to present the simulation tool to the client and to prepare for the presentation for Kuntamarkkinat fair.

5.3.1 Data model

Second data model was not as extensive as the first data model; this was of course due to the fact that half of the first data model was unfinished. It turned out that programming variables was quite quick thing to do. This is why it was decided that all same variables as in the Municipal finance planning framework would be added when programming the cash flow statement. In the second data model we concentrated on how to make already made income statement and upcoming cash flow statement usable as well as the new features agreed with the client.

Between sprint 1 and 2 Ministry of Finance published new updated version of the Municipal finance planning framework with updated data as well. As the client had hoped for more updated base data in the second sprint it was added as one of the tasks of the sprint. It was also specified that it would be good to have more than just two base years and if possible the 2012's financial statement information should be kept in the simulation tool.

In the second data model improvement ideas for the lay out and structure of the simulation tool were given. In the first version of the simulation tool the existing parts were all stacked one after another so it was difficult to see where municipal's general information ended and where the income statement started. We felt that it was important that all three parts of the simulation tool's framework would be separated clearly. It was also suggested that heading on the left of the framework and the years on top of the framework would be pinned so that the user would see these when scrolling the framework in different directions. In the data model we also specified the need of the signs in front of each sub item in head item open menus.

Second data model also specified possible miscalculations, missing numbers from the income statement and errors noticed when testing the simulation tool in between sprints 1 and 2. This included possible writing errors and suggestions to make all the text in the simulation tool to be consistent. It was also suggested that the color and font scheme should follow Taitoa's new updated public image. Examples of this such as screen shorts were added to the data model.

New feature, which was suggested to be added to the simulation tool during sprint 2, was diagrams. Client liked the idea of a more visual presentation of the "dull" numbers. In the data model it was suggested that we would have the two same diagrams as in the Municipal finance planning framework and one additional which would be user's own diagram. Data model specified how the diagrams in the planning tools used the data and how it should be calculated as in the planning tool the information was expressed in euros per resident. The additional diagram was suggested to have all the head items and make it function so that the user could choose which items would be shown in the diagram. It was suggested in the data model that these diagrams would be presented on separate tab on the webpage. Data model also included three examples of the user's own diagram.

After the data model was finished it was once again approved by coordinating teacher and the client. Data model was then translated and presented to the developing team. The project manager was unsure if the team would be able to get everything ready by the end of the second sprint. This was resolved by making a priority list. The priority list specified which were the most important tasks to be completed during the sprint 2 and the priority order of all the tasks. Finishing the cash flow statement and updating the base data were set as the most important tasks of the sprint 2. As the cash flow statement had been one of the tasks of sprint 1 it should be completed first. Client had also wished for the updated data which is why it was also high priority. Diagrams had the lowest priority as these were new features and it would be more important to make the base features working.

5.3.2 Testing

As the sprint 1's testing had not gone very well we decided to set testing dates a head of time with the development team. New communication tool called Slack was also taken in use in between sprints 1 and 2 which made the communication with the team easier. Before starting the data model we tested the simulation tool and made correction suggestions in the data model as mentioned above. This was quite a general testing as we had already tested the formulas. Before the first official testing during sprint 2 we made again a testing plan similar to the sprint 1's testing plan.

Before our first testing during sprint 2 we informed the development team couple days ahead about our testing time. Testing was done in same area and time as the development team was working on the simulation tool. We organized the testing similarly as we did in the sprint 1 testing by having the Municipal planning framework and our simulation tool side by side. During this testing we noticed that there were two major errors in one of sub items formula and in one of the head item's formula. These errors caused errors in many other items in income statement and cash flow statement as well. We made a figure to show the relation of all the errors in the simulation tool. There were also some smaller errors in the base year's values which were not caused by the calculation formulas. All the errors and notes during the testing were written down and sent to the development team by email.

Second testing of the sprint 2 was also done alongside the development team. By this testing, the team had fixed the errors noted in previous testing. This time there was a problem with income statements growth rates tables. When changing the rate in table the items multiplied by ten and the value was incorrect. Another big problem we noticed in the second testing was slowness of the simulation tool. When changing the values it took a lot of time from the simulation tool to calculate the new values. These errors and problems were once again written down and sent to the development team.

5.3.3 Presenting

The sprint ended with meeting with the client and presentation of the simulation tool. This time we were responsible of the presentation and this was told us luckily a head of time. There was one client representative present in the meeting and three participated via Lync. There were also one of the coordinating teachers, project manager, one of the members of the development team and us the finance team.

We presented the simulation tool by showing its features and functions. We went through each part of the simulation tool and showed graphic ideas the development team had for the tool. These graphics were intended to have in use by the time of Kuntamarkkinat. Client representatives liked the graphic ideas but some of them were not so pleased by the lack of game like features. During this meeting some client representatives expressed that they had hoped for some kind of more interactive tool which would guide the user to make financial choices. As we discussed this matter further it was clear to everyone that as this tool was originally meant for the use of professionals the way the tool was shaping up was suitable for this purpose. The slowness of the tool was also a concerned and it

was decided that development team would try to fix it by the time of Kuntamarkkinat, which was less than a week away by the time of the presentation.

5.3.4 Kuntamarkkinat

Client mentioned in the first meeting that they were taking part of municipal professionals fair called Kuntamarkkinat in September, which would affect the timing of the sprints. We then suggested if we could come and present the tool during the fair. After the sprint 1 it was confirmed that we would be able to participate during both days of the fair. The fair took place in 9th and 10th of September Taitoa had reserved two hours on the first day and an hour on the second day for our presentation.

We prepared for the fair by going through the fair with client representative and making promotional material for them. This included short summary of what the simulation tool was to be added in their promo video playing during the fair. The same summary was also added to the front page of the simulation tool. It was also decided that we would collect feedback from the visitors. We made a small questionnaire with three open questions, which the users could fill in after trying out the simulation tool. The development team took care of the having computer at the fair and getting the simulation tool working on it.

During the fair we had 26 testers. These testers included Taitoa's employees as well as municipals' workers and representatives of municipal councils. While having the first tester we noticed that the questionnaire would not work and we could not gather enough feedback. We then decided that one of us would be presenting the tool to the testers and another one would write down feedback and comments at the same time. We switched roles from time to time. This turned out to be a very good method and Taitoa also liked it. On the first day we were present for 2.5 hours instead of the intended two hours and on the second day 1.5 hours instead of one hour.

The feedback from the fair was quite good. Many testers liked the graphics of the tool and how easy it was to use. They also liked that it showed the impact of changes and thought it was good visual way to show the representatives in municipal councils the municipal finance. The testers also gave as valuable improvement ideas. They hoped that there would be visual way of showing the changes made in the tool have compared to the original data. The testers also hoped more detailed information on the tool as the operating expenses and income are not broken down in the tool and these are important factors when considering the municipal finances. They wished that the tool would be a bit more instructive on the use of it and that the items would have definitions.

All the feedback collected were collected in one file and sent to the client with our suggestion to be our last sprint objectives. These objectives were based on the task still uncompleted during previous sprints and functions the testers had hoped to be in the simulation tool. We also had a Lync meeting with the client and the development team to discuss the feedback and to the suggested objectives for the last sprint.

5.3.5 Outcome of sprint 2

The simulation tool after the sprint 2 was pleasant to use, it was fast and had all the prioritized functions on it. The cash flow statement was finished and the lay out was nice. However it was noticed during the programming that the change in amount of loan could not be made as a variable item due to the complex formula. This was discussed with the client and they were okay with it. It had also turned out to be quite a big job for the development team to have three base years in the simulation tool, which is why after sprint 2 only years 2013 and 2014 were base years. Diagrams were also not finished during the sprint 2.

5.4 Sprint 3

Sprint 3 was the last sprint before handing the simulation tool for the client. The objectives of this sprint were to make all the functions specified in previous data models to operate and to add some features suggested by the testers during Kuntamarkkinat. The features that would be added during the last sprint were user guiding and definitions on each of the items.

5.4.1 Data model

Before the start of the sprint 3 we compiled a list of all the tasks of the functions we suggested for the last sprint. This list was then sent to the development team so they could define which of these could be done in the last sprint and how much it would take their time. We then prioritized the tasks and send it to the client to be approved. There were three priority classes in the list:

- 1 – Must be made during the sprint
- 2 – Made if there is enough time during the sprint
- 3 – Too time consuming will be filed to the development recommendations

There were 18 tasks with priority 1, four tasks with priority 2 and two tasks with priority 3 in the task list. Client approved our list and we started working on the data model.

Data model was made by following the task list sent to the client. It had detailed information on each of the tasks and ideas how it should operate. This data model also had definitions for each of the head items. These definitions were approved by the client before sending them to the development team. In the data model 3 it was emphasized that this was the last sprint and great attention to the detail should be made during the development.

5.4.2 Testing

In the sprint 3 we had organized three testing sessions. We informed about these testing times to the development team again ahead of time. Unfortunately, this time we were unable to have two of the testing sessions with the development team present. Before the testing started we again made a testing plan for this sprint's testing in a similar manner we made the testing plans for other sprints.

The first testing was organized by going through the task list one item at a time. To our surprise by the time of the first testing development team had added most of the functions mentioned in the data model. As we had noticed during the fair that there were some errors on some municipal's pages we divided the municipals between us and went them through. There were no errors found as the development team had already fixed these errors. During the first testing we did not send out separate notes for the development team.

Before the second testing we had team meeting with the development team and the project manager. We were then familiarized with what had been done by them so far. During the testing we went through all the functions with the task list. We noticed that there were some functions missing and some did not work as we planned them to work in the data models. During the second testing we wrote down alternative ideas on how to make these functions work. For example in the data model 2 we had hoped for the years and items on the simulation tool's framework to be pinned so it would make the simulation easier when scrolling to different directions. As this was something that could not be made due to the lay out of the simulation tool we suggested that each of the frameworks could have the years on top. We also wrote done tasks which were not completed. This was then sent to the development team.

The last testing was done couple of days before the final presentation and hand over of the simulation tool. This time we concentrated on little details such as wordings for the user guiding and company information on the pages. We were nitpicking on smallest de-

tails as there were lots of small things which we had asked the development team to fix since the very first testings.

5.4.3 Presenting

The sprint ended with meeting with the client and presentation of the simulation tool. We had prepared to be the responsible of this presentation as well despite of project manager not asking us to do it. This time there were 2 client representatives present in the meeting and one participated via Lync. There were also one of the coordinating teachers, project manager, two of the members of the development team and us the finance team present.

We presented the simulation tool in a similar manner as we did after sprint 2 by showing its features and functions. We went through each task on our task list and we were happy to tell the client that we were able to complete them all even the ones with priority 3. Client was very pleased with the final simulation tool. They were excited to be able to add it in their new product called Portaali and to start to develop it further on.

During the presentation Taitoa wanted us to give them feedback about the project. We went through what we had learned during the project and which things we thought could be done better next time. Client was very happy about the idea we had to come to present the tool at the fair and we also agreed that the feedback collected there brought additional value to the simulation tool.

5.4.4 Outcome of sprint 3

All the functions and tasks which were in the data model 3 were completed with two additional functions. These additional functions were listed in the task list sent to the client with priority 3. This meant that these tasks would be too extensive and would not be possible to be completed during the last sprint. These were adding third base year (2012) and showing the affect simulation has compared to the original data.

5.5 Risks and risk management of the project

Benefit for the project was that the financial frame of the product is based on the previously used Excel tool. However since the finance team added additional information and broke the information in smaller pieces there was room for error. Finance team needed to be careful when making the data models and the formulas. Testing and checking the for-

mulas while making the data model and testing the product was an important task to prevent errors.

It was important that the data model was done in such format and way that the development team would understand it and were able to use it in their work. This is why good communication between financial management students and the members of the development team was crucial.

As all the documents were needed in two languages it was important that the translations of the terms were defined at the beginning of the project. It was important that the whole team used the same terminology throughout the project. As there might be several different translations for specific financial terms. To make sure there are no misunderstandings same translations for terms should be used throughout the project in all the translations.

The schedule for the project was tight. As the financial management students we were in an important part at the beginning of the project and before each sprint started making the data models in an agreed schedule was important. If this part of the project was delayed it would delay the whole project. To make sure the schedule was followed we divided the tasks between the two of us and we had our own internal timetable for each task to make sure all of the work was done according to the schedule.

Risks included that the project would not meet the client's expectations or there would have been misunderstandings in their requirements. This risk was eliminated by the process of the project. The project was done in three sprints, after each sprint the customer saw the product and gave feedback. This process was beneficial because the team knew what kind of expectations the client had and what objectives to take on the next sprint.

5.6 Product description

Final outcome is called Talouspeli (finance game in Finnish). It is a simulation tool meant for planning municipality's finances. The simulation tool is easy to use, informative and visually pleasant. The simulation tool has 14 different items which can be changed for simulation as well as income statement growth rate table and cash flow variables table as presented in the Municipal finance planning framework.

5.6.1 The layout

When the webpage of the simulation tool is opened the user sees a short summary of what is the simulation tool. Below the text user can choose the short cut “Ava Kehikko” (open the framework in Finnish) which takes the user to the simulation tool. The simulation tool can also be accessed by choosing “Kehikko” from bar above the summary. There is also “Info” tab where there is wider explanation of the simulation tool and its future development plans. The information on this tab was created by the client. (Image 4)



Image 4 Front page of Talousspelin

User starts the simulation by choosing the wanted municipality. (Image 5) All of Finland’s municipalities are available to the user in addition to this user can also choose “KOKO MAA” which is the whole Finland calculated together.

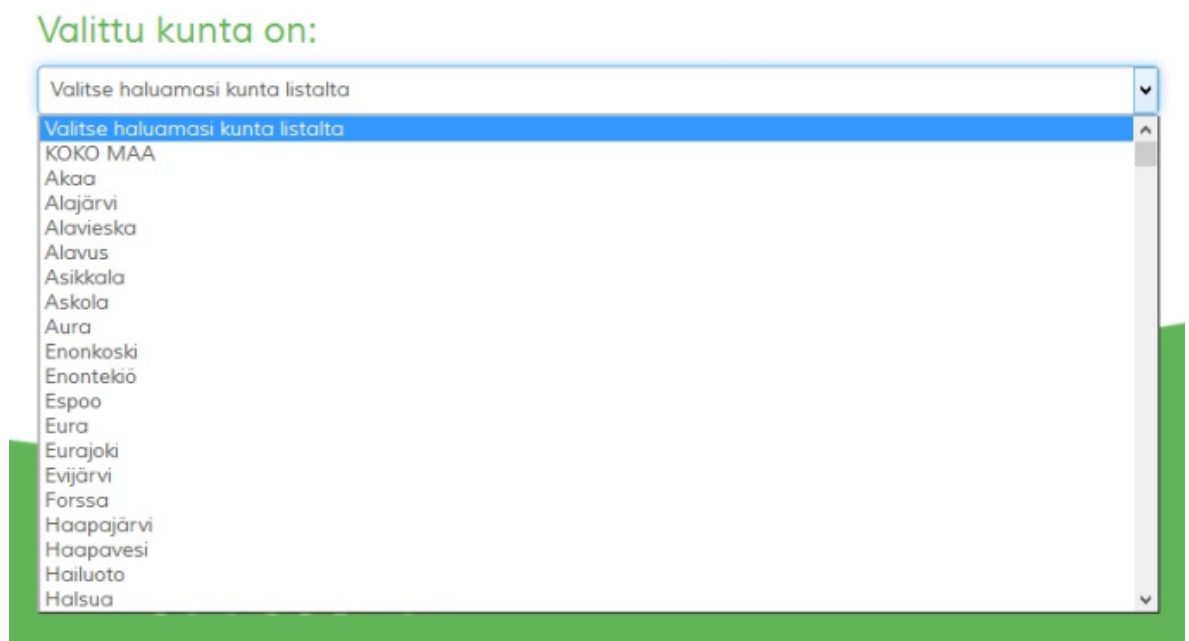


Image 5 List of available municipalities

After choosing the municipality the simulation tool opens to the user. Below the list of municipalities user can choose the number of base years and forecast years presented in the simulation tool's frameworks. User can choose between two or three base years. User can also change the number of forecast years available from four up to seven. There are also four functions tools. First function tool (plus sign) is used to enlarge the framework in to whole screen look. Second function tool (arrow) is used to open or close all the head items. Third function tool (clock) is used to delete all the simulations and bring back the original data. Fourth function tool (question mark) is a user guide tour. Below the functions tools starts the framework. On the right hands side of the screen the diagrams are presented. Below the diagrams there is the income statement growth rates table and below that the cash flow statement variables table. User has the option to hide the diagrams, growth rate table or variables table by choosing the heading before each with the arrow sign. Base years are presented with darker background than the forecast years. The negative values are also presented in different color than the positive value. (Image 6)



Image 6. The outlook of the simulation tool

Simulation tool is divided into three frameworks municipal information, income statement and cash flow statement. On each of the frameworks only head items are shown and sub items hidden. All together there are 17 head items. Head items, which are calculated by

using the sub items have an arrow sign signifying that the item can be opened up to see how it is calculated (Image 7). In front each of the sub items there is sign telling the user how the calculation is made. This was done to educate the users about the financial statements. On top of each of the frameworks the years are presented so it would be easier to use the frameworks when all the head items are opened.

Tuloslaskelma

Vuosi	2013	2014	2015	2016
Toimintakate 	-27 054 531	-27 303 162	-28 295 323	-29 190 343
+ Toiminnantuotot	9 099 866	9 117 151	9 317 728	9 476 130
- Toiminnankulut	36 154 397	36 420 313	37 622 183	38 675 604
+ Kotikuntakorvaus	0	9 132	9 132	<input type="text" value="9132"/>
Verotulot 	20 550 650	21 063 658	21 551 623	21 942 236
+ Kunnallisvero	17 881 106	18 099 037	18 518 110	19 036 617
+ Yhteisövero	1 308 621	1 508 244	1 453 947	1 307 099
+ Kiinteistövero	1 360 351	1 455 821	1 579 566	1 598 521
Valtionosuudet	8 252 562	8 153 386	8 116 138	8 424 551

Image 7. Head and sub items in the simulation tool

5.6.2 Diagrams

To add a game like feeling and to make the simulation tool more visual there are three diagrams. Two of the diagrams were also presented in Municipal finance planning framework and one extra diagram made for the purpose of the simulation tool. The extra diagram is called user's own diagram. In this diagram user can choose between all the head items what kind of diagram they need. The items can be chosen from the list below the diagram. This function is also available in two diagrams based on the Municipal finance planning framework. In the diagrams all the values are presented per resident. As a default all of the items are chosen. Items chosen to the diagram are presented with black text and colored box. When the user takes their cursor on top of the simulation tool they can see the exact values. (Image 8)

Kuvaajat

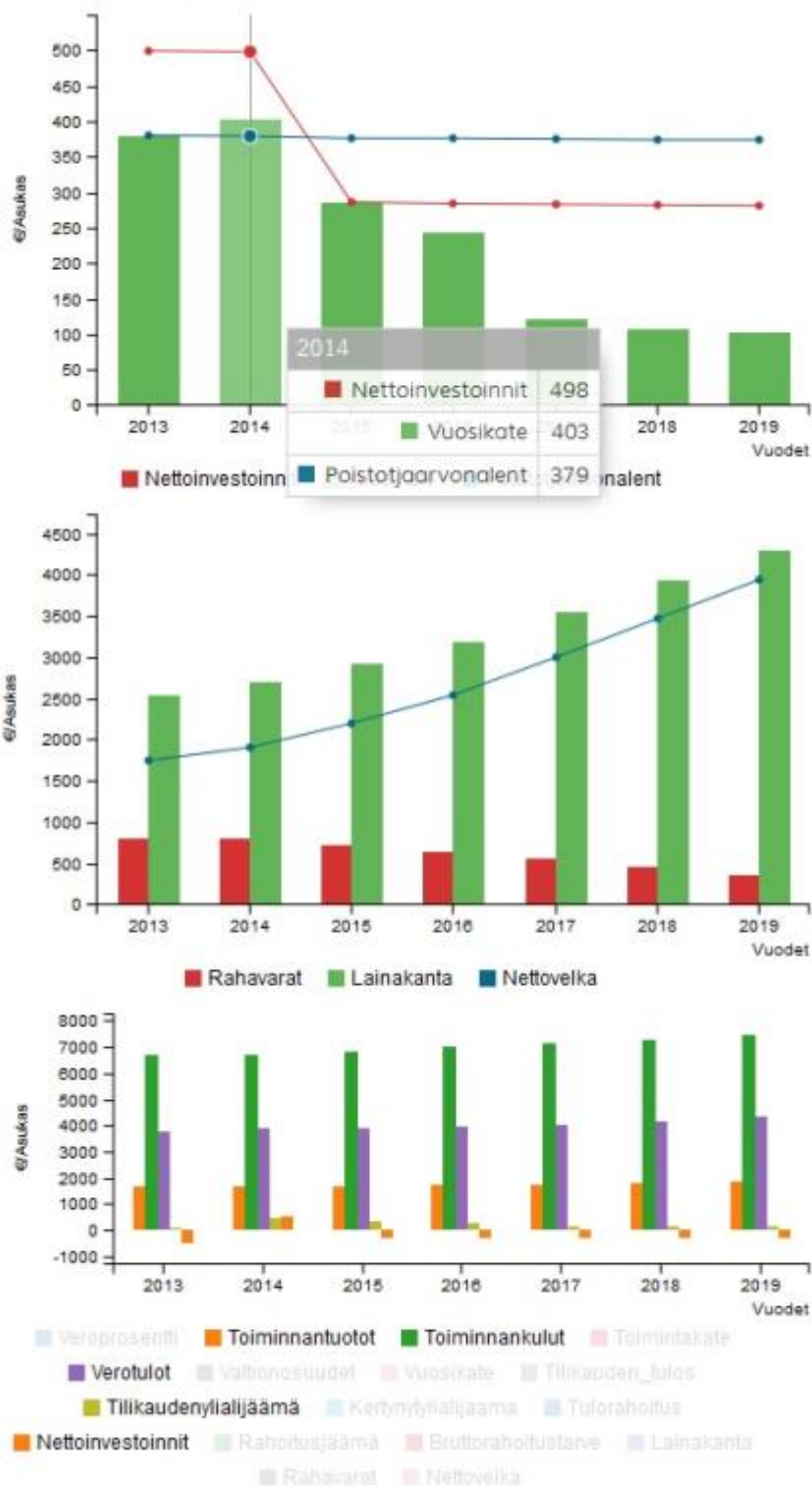


Image 8. Diagrams of the simulation tool

When changes are made in the simulation tool the effect of the change is presented in the diagrams. This is done by having the original bar or curve side by side with the forecast bar or curve. For the forecast bars and curves additional items are added to the list below

the diagram. Like in the original diagrams also in the changed diagrams user can choose which of these items are presented. The user can tell the forecast items from the original items from each other because at the end of forecast items there is word "uusi". (Image 9)

Kuvaajat

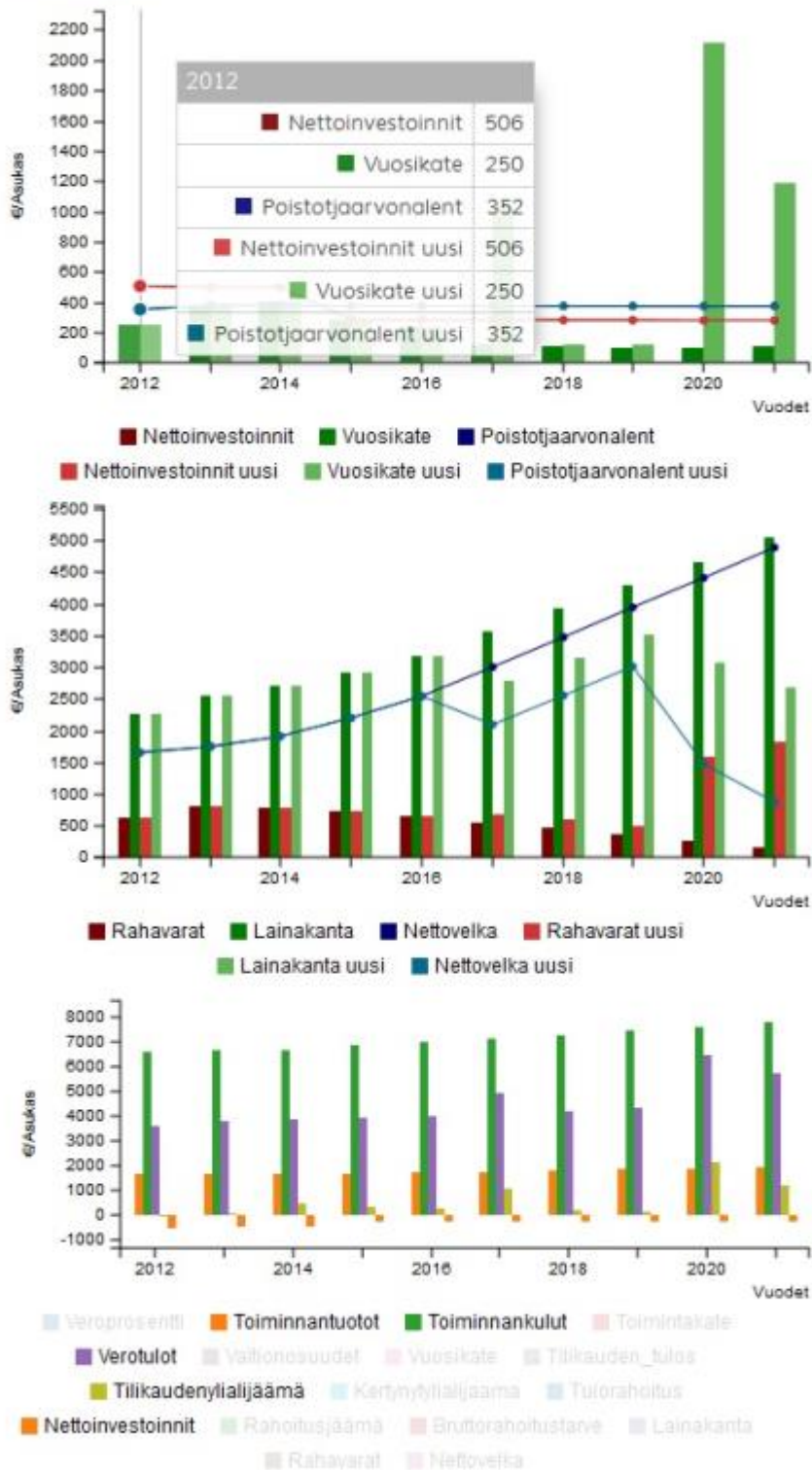


Image 9. Diagrams presenting the effect of simulation

5.6.3 User guiding

The simulation tool is quite easy to use. To prevent the need of creating a user manual user guide tour function was added. By choosing the tour user is informed about the important functions of the simulation tool and where to find everything (Image 10). The tour has 13 steps. These steps are the following:

1. What is the simulation tool for?
2. What is presented in the table?
3. How to make simulations?
4. What are the diagrams for?
5. Where to see how the head item is formulated?
6. Where to change the amount of base year and forecast years presented in the framework and in the diagrams?
7. How to make the framework bigger?
8. How to close up or open all the head items?
9. How to return the original values?
10. Where to find the tour again?
11. What are the income statements growth rates for?
12. What are the cash flow statements variables for?
13. Where to change the chosen municipality?



Image 10. User guide tour

To educate the users about the financial issues a definition of each of the head items was added. When the user takes the cursor on top of the head item the definition of the item appears (Image 11). The same function was also added to the function bar so when the

user takes the cursor on top of one of the functions the use of the function appears in black box. This added a lot of value to the simulation tool in educational manner as well as user friendliness.



The screenshot shows a table with a dark blue header and light blue rows. The header row is labeled 'Vuosi' and '2013'. The first row is 'Toimintakate' with a value of -27 054 531. A tooltip is displayed over this row, containing the text: 'Osoittaa, kuinka suuri osuus kunnan toimintakuluista tulee vero kattaa verotuloilla ja valtionosuuksilla.' Below this, the value 20 550 650 is visible. A second row is partially visible at the bottom with the value 9 259 569.

Vuosi	2013
Toimintakate	-27 054 531
	20 550 650
	9 259 569

Image 11. Items definitions

6 Project conclusion

The objectives of the project at the beginning of the project were to make a game-like simulation tool for the use of the head of the municipalities and municipal's finance directors. The simulation tool would be based on Ministry of Finance's Municipal finance planning framework and it would have six different variables that could be changed by the user. This would be done in three phases called sprints. Each sprint would take three weeks and between the sprints the simulation tool would be presented to the customer. During each sprint two new variables would be added to the simulation tool. These variables would be determined by the client. The first two variables were set to be the tax rate and the change in loan amount. Each sprint would have its own data model in which the formulas, functions and features would be specified.

Every project evolves during the project and this one was not an exception. During this project not everything went according to initial plan and there were delays like finishing the cash flow statement. This limited what we could be done in the following sprint's data model and new features which could be added. There was also success like the possibility to make variables while programming. This made it possible for us to think about features which would bring value to the user and be innovative like the diagrams and user guiding for example.

Data models were the most important task in the project. It was also the most time consuming task at the beginning of the project. Data models were the backbone of the project. It determined where the data used in the simulation tool is gathered and how it is used. Each sprint had its own data model which gave guidelines to the development team. As described in previous chapter all three data models were very different. Throughout the project we evaluated our own work and tried to assess what kind of data model would be most useful for the development team.

Testing was important part of the project as well. This task included planning how the tool would be tested and implementing the testing plan. Testing was done in a perspective of a financial professional and results were shared with the development team and added to the following data models if needed. Testing was conducted several times during the project. During the sprint 1 testing was conducted only once and was not constructive enough as it was quite a short testing. Learning from this, we took initiative with it and made sure to improve testing during the following two sprints.

The project team was an international team with two international students, thus the project language was English. The client however is a Finnish organization and the final product is in Finnish. This is why all the project documents were in both languages, Finnish and English. As an international financial management student, one of my tasks was to translate all three data models made by the finance team and client's requirements from Finnish to English. The final product was made in Finnish which is why the names of items and words/phrases used in the simulation tool were not translated. The translation of the first data model included a list of all the names of the items and words/phrases used in the simulation tool and translations. This was done to introduce the international students with the concept they were working with.

The simulation tool was presented to the client in a meeting at the end of each sprint. These presentations included introducing current sprint's version of the simulation tool and its features. The features were presented by doing simulations with the tool. The financial management students conducted presentations for sprint 2 and three. Between sprints 2 and 3 the simulation tool was also presented to the potential future users at Kuntamarkkinat fair by the financial management students. During the presentations feedback was collected from client and the potential future users. We evaluated our own work during and after each sprint. Through these evaluations some aspects and our working methods evolved during the project.

6.1 Recommendations for future development

The simulation tool has multiply development possibilities. In my opinion the most important ones would be the possibility to save user's own simulations, possibility to import user's own financial statements and more detailed items. These would bring more value to the user and give more detailed information of the municipal's financial state.

In the future development, saving user's simulations could be the first thing to do. The simulation tool has quite a few items user can simulate it can be hard to remember what was done. Of course, user could print the screen but to be ecological and to bring more value to the user saving option would be necessary.

Option to import user's own financial statement to the system could be another development that could be done in the next phase of the development. This would allow simulation that is more correct and there would not be a need to have base data. As not all of the municipalities, which are currently available, are Taitoa's customers having extensive base data is not necessary. This would also bring more value from the simulation to the user.

Currently the operating expenses and incomes are not detailed in the simulation tool. As mentioned previously these items can only be changed through income statement growth rates. Operating expenses especially are quite important when thinking about future savings. For example employment expenses are important part of the municipal finance and financing. When this item is not more detailed, simulation does not allow proper answers to the user of possible saving or investment options. Detailing operating expenses and incomes will make the simulation more correct and give the user real picture of the municipal's financial state.

6.2 Project evaluation

Overall project was successful and the client was happy about the outcome of the tool. However there were a lot of things which could have been done differently during the project. The main things that should have worked better in the project were project management and project manager's role in the project. As mentioned in chapter 3.4.2 Project Management Institute (PMI) (2013, 16-18.) describes project manager as a leader, a supporter, a communicator and a motivator of the project team. Many of these were missing from our project.

The lack of leadership was evident throughout our project. This caused the very beginning of the project to be quite chaotic. The project was lacking a structure and it was not clear what our role was in the project at the beginning. Lack of leadership also caused our team meetings to be inefficient and sometimes quite useless. Meetings did not have any clear agenda, which it would follow, and starting the meeting was very slow. Many times I had to leave work early to go to the team meetings. When the meetings did not resolve any problems or I was not necessary even needed to be present in the meeting it caused frustration on my behalf. There were also cases when project manager informed us on the same day the video conference meeting with the client was taking place that he would also participate via Lync. I found this very rude behavior on his behalf and it should the lack of commitment to his position in the project.

Due to lack of leadership the communication between the team at the beginning of the project was also lacking. We were in belief that if we wanted to inform the development team about something or if we wanted to know the state of the project we should contact project manager. When we tried this we did not get any response. We were not informed in any way throughout the sprint 1 about the state of the project. There was no specific communication tool used so the whole team could be up to date with the project work.

This caused the testing in the sprint 1 to be minimal. This matter was taken in the discussion in our team meeting and a team communication tool Slack was taken in use with all the team members between sprints 1 and 2. Slack had a very positive effect on the team we were working more closely together and we were up to date with the development all the time. After the first sprint however project manager did not improve his communication with the team or between the client and the team. This was quite disappointing but we did not let it bother us so we took the more active role in the communication with the client as well.

During the project it felt like there was no project manager. Our project manager did not seem interested of the project or our work for that matter and seemed unmotivated. In the very beginning of the project this also caused lack of motivation in all the other team members in my perspective. In the beginning of the project there were eight members in the development team at the end there were only three full time members and one part time member. Many of the team members quit the project after or during the first sprint so early on in the project. Remaining team had to find the source of motivation from somewhere else than from the project manager. Luckily the remaining project team worked well together and the rest of us were motivated to do our best to finish the project.

When we finally got to work with the development team and opened the communication channel with them project work was much easier. I think building the team spirit should have been done in the beginning of the project. Before the actual project work started we should have had some kind of unofficial and relaxed team meeting to get to know each other and to build team spirit.

What I would have hoped more from the project manager and the development team is giving feedback from our work. As mentioned in chapter 5 we rarely got any feedback from our data models from the development team itself. Their feedback would have been very important in order to make the next data models fit to their working style. Project manager gave us couple of times unofficial feedback but did not go the specific on what we could improve. The improvements we made in our own work were based on our own evaluation and experiences in previous sprints.

6.3 Self-learning

During this project I learned a lot about municipal finance and IT projects. I gained valuable experience of what it is like to work for a client. In my own opinion, I did my best in this

project. I also got positive feedback from the client for my work and input during this project.

Before the project, I had not been introduced to municipal finance. It took some time to familiarize it. In the beginning of this project it was a bit hard to understand the municipal finance planning framework we were working with but after familiarizing myself with the municipal finance and the framework itself it did not cause any problems. During the project I have learned a lot about the specialties and needs of the municipal finance has.

Working in an IT project and with IT professionals was also something new for me. I quickly learned that they had a completely different kind of approach to teamwork and projects, which I had used to. In the beginning, this was quite hard and resulted couple of arguments with the project manager. When working on our financial matter with my partner we did not have any problems and we found quickly mutual working methods. As the development team was doing great job and started working with us bit more efficiently, I also decided to relax a bit on my part. This of course helped to adjust to teamwork with them and resulted to great end of the project. I learned that always the way you know how to get things done might not suit for everyone. I also learned that it is important when working in the team with professionals from different fields to adjust the teamwork methods to meet all fields' needs.

Overall, I thought it was lot of fun to work in this project and as mentioned previously a great learning experience. It was great to get to know all the members of our team and it was a bit sad to know that it was ending. Working in this project also raised my interest towards IT solutions used in financial management. This project helped me to understand the work behind these solutions and importance they have. This has also given me understanding, patience, and knowledge with the IT project and changes happening at the company I am working for.

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Appendices

Appendix 1. Customer requirements translation

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Thoughts for the finance game prototype:

Income statement

- Information from Income statement, flow of funds statement and balance sheet should be able to either enter manually or download to simulation tool. Either last year's financial statement or from the Excel-sheet provided. (Later published XBRL-format material).
- Possibility to entering change rates to income statements operating incomes and expenses. Also possibility to enter amounts of changes (€) to incomes and expenses and to different years.
- In able to predict the municipal tax you should be able to enter or download the tax income base. Either based on previous year's financial statement or from the Excel provided. (Later published XBRL-format material). (Could also be calculated as a ratio from municipal tax and tax %).
- Property tax, corporate tax and other taxes and governments subsidiaries should be able to either enter or download the tax income base. Ether based on previous years financial statement or from the Excel provided. (Later published XBRL-format material).
- Possibility to entering change rates to municipal tax income base.
- Possibility to entering change rates to property tax, corporate tax and other taxes and governments subsidiaries. Also possibility to enter amounts of changes (€) to incomes and expenses and to different years.
- Financial yields and costs should be able to either enter manually or download to simulation tool. Either last year's financial statement or from the Excel-sheet provided. (Later published XBRL-format material).
- Possibility to change financial yields and costs to forecasted years. (€)
- Interest incomes or expenses should be able to either enter manually or download to simulation tool. Either last year's financial statement or from the Excel-sheet provided. (Later published XBRL-format material).
- Should be able to enter forecasted years interest rates.
- Should be able to calculate for forecasted years interest incomes from average loans.
- Should calculate subtotals according to income statement.

Flow of Funds Statement

- Annual contribution margin from the income statement (including adjustments to cash flow financing)
- Investments, financial contributions to investments and fixed assets income should be able to either enter manually or download to simulation tool. Either last year's financial statement or from the Excel-sheet provided. (Later published XBRL-format material).
- Adjustments to cash flow financing
- Should be able to enter forecasted years investments, financial contributions to investments and fixed assets income in euros.
- Current assets and current liabilities should be able to either enter manually or download to simulation tool. Either last year's financial statement or from the Excel-sheet provided. (Later published XBRL-format material).
- Should be able to enter forecasted years current assets and current liabilities.
- Net cash flow (calculated from: annual contribution margin, net investments, current assets and changes in debts)
- Loans should be able to either enter manually or download to simulation tool. Either last year's financial statement or from the Excel-sheet provided. (Later published XBRL-format material).

Balance Sheet

- Cash balance...?
- Net assets...?
- Cumulative surplus/deficit
- Loans

Balancing funds

- Changing tax% and/or
- Changing amount of loan

Appendix 2. Testing plan in Finnish



Simulointityökalun testaussuunnitelma

Iris Kivimäki, Marjaana Tiilikainen

Kunnan Taitoa Oy
Testaussuunnitelma
2015



Sisällys

1 Johdanto.....	1
2 Ensimmäisen sprintin testaussuunnitelma.....	2
3 Toisen sprintin testaussuunnitelma.....	3
4 Kolmannen sprintin testaussuunnitelma.....	7
Lähteet.....	8
Litteet.....	9

1 Johdanto

Testaussuunnitelma on asiakirja, jonka avulla hahmotellaan testausta. Testaussuunnitelmaan on määritelty testauksen kohde, tavoitteet, ympäristö, organisointi ja raportointi. Suunnitelman tarkoitus on varmistaa, että tuote vastaa tietomallinnusta ja sen määritellyt ominaisuudet toimivat. (Ghahrai 2008). Tämä testaussuunnitelma on tehty Taitoan talouspelin proton projektia varten, jossa luodaan simulointityökalu kunnan taloussuunnittelun ja päätöksenteon tueksi. Testaus on tarkoitus toteuttaa käyttäjän näkökulmasta. Testauksessa on myös tarkoitus varmentaa tietomallinuksissa määriteltyjen toimintojen toimivuus. Testaussuunnitelma on kirjoitettu testaajia varten onnistuneen testauksen varmistamiseksi.

Varsinainen talouspelin projekti on jaettu kolmeen noin kolmen viikon sprinttiin. Jokaista sprinttiä varten on tehty oma tietomallinnus. Testaukset ovat osa sprinttejä. Testauksissa on tarkoitus testata kuluvan sprintin tietomallinnuksen toteutumista. Jokaiselle testausvaiheelle määritellään erikseen omissa kappaleissaan kyseisen testauksen tavoitteet sekä testausvälineet. Testausvaiheessa myös tarkennetaan testattavat ominaisuudet ja kuinka testauksesta raportoidaan projektiryhmälle. Testauksen suorittavat tietomallinnuksen tekijät.

Tietomallinuksien perustana on käytetty Valtiovarainministeriön kunnan talouden suunnittelukehikkoa, joka on julkinen Excel-tiedosto. Suunnittelukehikosta on saatu myös pohjatiedot simulointityökalulle, joten sitä käytetään apuna testauksessa. Testauksissa esiin tulevat uudet kehitysehdotukset kirjataan ylös ja huomioidaan seuravan vaiheen tavoitteita asettaessa. Kolmannessa sprintissä testauksia tulee suorittaa useampi, jotta voidaan varmistaa pelin valmistuminen aikataulussa. Kolmannen vaiheen kehitysehdotukset kirjataan opinnäytetöiden kehitysehdotukset- kappaleisiin.

2 Ensimmäisen sprintin testaussuunnitelma

Taluspelin ensimmäisessä testauksessa on tarkoitus tarkistaa tietomallinnuksen mukaiset toiminnot toimiviksi. Testauskohteena ovat tulos- ja rahoituslaskelma. Tavoitteena on testata, toimiiko simulointi määriteltyjen muuttujien avulla tietomallinnuksen mukaisesti. Muuttujia ensimmäisessä vaiheessa ovat veroprosentin muutos sekä lainan määrän muutos. Testauksessa tarkastellaan myös pelin yleistä käytettävyyttä ja kirjataan kehitysehdotuksia seuraavia vaiheita varten.

Pelin testaamista varten tarvitaan yhteys Haaga-Helian verkkoon. Testaus suoritetaan Haaga-Helian toimipisteellä, jotta varmistetaan laitteiston ja yhteyksien toimivuus. Lisäksi testaukseen tarvitaan kaksi tietokonetta. Toisella käytetään peliä ja toisella pohjatiedosto. Näin voidaan saman tien mahdolliset poikkeamat ja niiden mahdolliset syyt. Testaus tapahtuu muun projektiryhmän kanssa ennalta sovittuna aikana. Sovittu ajankohta on viisi päivää ennen varsinaista esittelyä asiakkaalle.

Ensimmäisen vaiheen testauksessa testataan kuntavalikon toimivuutta ja tarkistetaan, että ne ovat aakkosjärjestyksessä. Lähtötiedot ja muuttujien simuloinnin toimivuutta testataan KOKO MAA: n tietojen avulla. Lähtötiedot testataan niin, että ensiksi alavetovalikosta valitaan KOKO MAAN: n tiedot. Peli antaa näkyviin mallinnuksen mukaiset pääerät, joita verrataan pohjatiedoston mukaisiin arvoihin. Mikäli pääerän arvot poikkeavat pohjatiedoston arvoista, tehdään tarkempaa tarkastelua eriin, joista pääerä koostuu. Simulaatiota testataan veroprosentilla ja lainan määrän muutoksella. Molemmille muuttujille määritellään kaksi eri vaihtoehtoista arvoa, jonka mukaan muiden muuttujien tulisi muuttua tietomallinnuksen mukaisesti. Työkalusta saatuja arvoja verrataan pohjatiedoston mukaisiin arvoihin kuten pohjatietoja tarkistettaessa. Testauksessa ensiksi tarkistetaan, että molemmat muuttujat toimivat yksittäin. Tämän jälkeen simulointia testataan muuttamalla molempien muuttujien arvoja yhdessä. Ensimmäisessä vaiheessa kiinnitetään huomiota myös ei-toiminnallisten ominaisuuksien testaamiseen ja toimivuuteen kuten visuaaliseen ilmeeseen, käytettävyyteen, yksinkertaisuuteen ja selkeyteen. Tavoitteena on koota jatkoideoita ja – ehdotuksia seuraavia vaiheita varten. Tiedossa on, että ensimmäisessä vaiheessa nämä ominaisuudet eivät tule olemaan vielä kovin hyvällä tasolla, mutta niihin tulisi kiinnittää huomiota alusta saakka parhaan lopputuloksen aikaansaamiseksi. Kuvioon 1 on koottu ensimmäisen sprintin testattavat ominaisuudet. Tämä toimii samalla tarkistuslistana testausta tehdessä.

	OK	Poikkeamat ja muut huomiot
Kuntavalikko		
Toimivuus		
Aakkosjärjestys		
Lähtötiedot		
Perusvuodet		
Ennustevuodet		
Muuttujat		
Veroprosentti		
Lainan määrän muutos		
Muuttujat yhdessä		
Ei-toiminnalliset ominaisuudet		
Yleinen visuaalisuus		
Selkeys		
Käytettävyys		
Yksinkertaisuus		

Kuvio 1. Ensimmäisen sprintin testauksen tarkistuslista

Tulokset raportoidaan projektipäällikölle ja projektiryhmälle ensisijaisesti suullisesti ja tarvittaessa kirjallisesti. Vain poikkeamista raportoidaan, joten mikäli työkalu toimii tarkoituksen mukaisesti, ei tarkempaa analyysiä anneta. Ei-toiminnalliset ehdotukset ja näkemykset raportoidaan projektiryhmälle ensisijaisesti seuraavassa tietomallinnuksessa.

3 Toisen sprintin testaussuunnitelma

Ensimmäisessä vaiheessa saatiin valmiiksi tuloslaskelma, kaikki tuloslaskelman muuttujat sekä tuloslaskelman muutoskertoimet. Tietomallinnuksessa oli määritelty tuloslaskelmalle vain yksi muuttuja veroprosentti, mutta ohjelmoitaessa simulointipeliä huomattiin sen olevan helpompaa ohjelmoida kaikki muuttujat samalla kertaa. Rahoituslaskelmaa ei päästy aloittamaan vielä ensimmäisessä vaiheessa, joten sen testaus siirtyy toiseen vaiheeseen. Projektiryhmä pyrkii myös toisessa vaiheessa toteuttamaan rahoituslaskelman kaikki muuttujat yhdellä kertaa.

Ensimmäisessä vaiheessa ilmeni ongelmia erityisesti aikatauluttamisen sekä sisäisen viestinnän kanssa. Näistä vaikeuksista opittuina, päätettiin toisen vaiheen Sprint-kokouksessa ennalta kaksi testauspäivää jotka sovittiin projektiryhmän kanssa. Ensimmäinen testaus tapahtuu 20.8., tällöin testataan ensimmäisessä vaiheesta pois jäänyt rahoituslaskelma, se muuttujat sekä tarkastetaan päivitetty pohjatiedot. Toinen testaus suoritetaan 31.8., tällöin tarkastellaan pelin ei-toiminnalliset ominaisuudet, jotka perustuvat tietomallinnuksessa esitettyihin kehitysehdotuksiin sekä asiakkaan toiveisiin. Nämä ei-toiminnalliset ominaisuudet ovat muun muassa kirjoitusvirheet, ulkoasu sekä käyttäjäystävällisyys. Simulointipeli esitellään 9-10.9. Kuntamarkkinoilla, jonne Taitoa ja heidän asiakkaansa osallistuvat. Tästä johtuen on tärkeää kiinnittää tässä vaiheessa erityistä huomiota ei-toiminnallisiin ominaisuuksiin. Toisessa tietomallinnuksessa on tehty mallinnukset myös kolmelle kuvaajalle, jotka testataan myös 31.8.

Pelin testaamista varten tarvitaan yhteys Haaga-Helian verkkoon. Testaus suoritetaan Haaga-Helian toimipisteellä, jotta varmistetaan laitteiston ja yhteyksien toimivuus. Lisäksi testaukseen tarvitaan kaksi tietokonetta. Toisella käytetään peliä ja toisella pohjatiedosto. Näin voidaan saman tien mahdolliset poikkeamat ja niiden mahdolliset syyt. Testaus tapahtuu muun projektiryhmän kanssa ennalta sovittuna aikana. Sovittu ajankohta on kymmenen päivää Sprintin aloituksen jälkeen sekä kolme päivää ennen varsinaista esittelyä asiakkaalle.

Toisen sprintin testaus on jaettu kahteen osaan, joista ensimmäisessä tarkistetaan uudet pohjatiedot sekä testataan rahoituslaskelman toimivuutta. Toisessa vaiheessa testataan pelin muu rakenne ja kuvaajat. Toista sprinttiä varten on luotu priorisointilista, joka jakaa tietomallinnuksen kohdat ja tehtävät tärkeysjärjestykseen. Tämän avulla ohjelmointiryh-

män on helpompi priorisoida tehtäviä ja määrittää, mitkä olisivat tärkeimpiä toteuttaa lopputuloksen kannalta. Testauskertojen jako on tehty myös priorisointilistojen perusteella.

Ensimmäisellä testauskerralla testataan uudet pohjatiedot ja rahoituslaskelma. Uudet pohjatiedot tarkistetaan samalla tekniikalla kuin ensimmäisessä sprintissä. Ensiksi alasvetovalikosta valitaan kunnaksi KOKO MAAN ja sen tiedot. Tällöin talouspeli antaa näkyviin mallinnuksen mukaiset pääerät, joita voidaan verrata pohjatiedoston arvoihin. Mikäli poikkeamia havaitaan, tehdään tarkempaa tarkastelua eriin, joista pää-erä koostuu. Rahoituslaskelma tarkistetaan ensimmäisen sprintin mukaisesti. Ensiksi testataan, toimiiko lainan määrän muutoksen simulointi. Tämän jälkeen testataan, syntyykö vaikutus rahoituslaskelmaan toivotulla tavalla, kun veroprosenttia simuloidaan. Lopuksi testataan, toimiiko simulointi, kun molempia muuttujia simuloidaan. Kuviossa 2 on nähtävissä ensimmäisen testauskerran vaiheet.

ENSIMMÄINEN TESTAUS		OK	Poikkeamat ja muut huomiot
Uudet tiedot	Perusvuodet		
	Ennustevuodet		
Rahoituslaskelma	Veroprosentti		
	Lainan määrän muutos		
	Muuttujat yhdessä		

Kuvio 2. Tarkistuslista ensimmäiselle testauskerralle

Toisella testauskerralla testataan kuvaajat ja rakenne sekä muut yleiset huomiot. Kirjoitusvirheet ja mallinnuksen mukainen rakenne tarkistetaan tietomallinnuksen avulla. Tässä kohtaa ei enää tarvita pohjatiedostoa, joten toiselle tietokoneelle voidaan avata toisen sprintin tietomallinnus. Kuvaajat testataan kuvaaja kerrallaan ja laskelmien tapaan vaiheittain. Ensiksi tarkistetaan toimiiko kuvaaja 1, kun veroprosenttia muutetaan ja sitten lainan määrää muuttamalla. Lopuksi kuvajan toimivuus tarkistetaan, kun molempia muuttujia simuloidaan. Vastaavat testaukset suoritetaan kuviolle 2. Kuvaajan 3 testauksessa tulee lisäksi ottaa huomioon käyttäjän mahdollisuus valita halutut muuttujat kuvaajalle. Ensiksi testataan, toimiiko valikko toivotulla tavalla, toiseksi simulointien vaikutus kuvaajaan ja lopuksi kuvaaja toimivuus, mikäli käyttäjä haluaa lisätä tai poistaa erän kuvaajasta. Toisessa sprintissä kerätään yleisesti myös visuaalisuuteen, käytettävyyteen ja yksinkertaisuuteen liittyviä havaintoja. Kuvioon 3 on koottu toisen sprintin toisen testauskerran tarkistuslista.

TOINEN TESTAUS

	OK	Poikkeamat ja muut huomiot
Rakenne	Alaosa	
	Yläosa	
	Pääeräpainikkeet	
	Pääerien etumerkit	
	Vuosilukujen kiinnitys	
	Eränimien kiinnitys	
	Muut	Kotikuntakorvaus
Muut verot		
Poistot ja arvonlukumiset		
Vuosiluvut ja desimaalit		
Kirjoitusasut ja-virheet		
Kuvaajat	Välilehdet kuvaajille	
	Kuvaaja 1	
	Veroprosentti	
	Lainan määrän muutos	
	Muuttujat yhdessä	
	Kuvaaja 2	
	Veroprosentti	
	Lainan määrän muutos	
	Muuttujat yhdessä	
	Kuvaaja 3	
	Valintapainikkeet	
	Veroprosentti	
	Lainan määrän muutos	
	Muuttujat yhdessä	
Valintojen muuttaminen		
Ei-toiminnalliset	Yleinen visuaalisuus	
	Selkeys	
	Käytettävyys	
	Yksinkertaisuus	

Kuvio 3. Toisen testauskerran tarkistuslista

Ensimmäisen testauksen poikkeamat ja huomiot raportoidaan projektiryhmälle ja –päällikölle kirjallisesti sähköpostitse. Toisessa testauskerrassa raportointi tehdään ensisijaisesti suullisesti. Mikäli tämä ei ole mahdollista, raportointi toteutetaan kirjallisesti sähköpostilla. Kehitysehdotukset lisätään seuraavaan sprintin tietomallinnukseen.

4 Kolmannen sprintin testaussuunnitelma

Toisessa vaiheessa saatiin valmiiksi rahoituslaskelman, rahoituslaskelman kaikki muuttajat sekä päivitettiin uudet pohjatiedot. Keskeneräisiksi jäivät kuvaajat joista saatiin valmiiksi vain yksi. Kuvaajat tehdään valmiiksi kolmannessa vaiheessa. 2012 perusvuoden jättäminen simulointityökaluun ei myöskään ollut mahdollista, projektiryhmä tarkastelee vielä kolmannessa vaiheessa jos työkaluun on mahdollista saada kolme perusvuotta. Kolmannen vaiheen tavoitteet on tehdä simulointityökalusta luovutuskuntoinen. Luovutuskuntoisella tarkoitetaan, että kaikki työkalun ominaisuudet toimivat oikein ja ulkoasu on viimeistely. Toisen ja kolmannen vaiheen välissä simulointityökalua käytiin esittämässä Kuntamarkkinoilla tuotteen tuleville potentiaalisille käyttäjille. Esittelyn aikana huomattiin pieni ohjelmointivirhe vuosiluvuissa joillakin kunnilla. Tästä johtuen kolmannen vaiheen testauksessa tarkistetaan myös kuntien näkymät.

Kolmannen sprintin testaus on jaettu kolmeen osaan, joista ensimmäisessä 17.9. tarkistetaan Kuntamarkkinoilla havaitut ohjelmointivirheet. Toisella testauksella 28.9. käydään läpi siihen mennessä valmiiksi saadut ominaisuudet ja lähetetään raportti tekemättömistä tehtävistä projektiryhmälle ja -päällikölle. Kolmannella testauksella 5.10. tehdään yleiskatsaus ja käydään läpi koko työkalun toimivuus luovutusta varten. Testauksen jakaminen kolmeen osaan on erityisen tärkeää projektin viimeisessä vaiheessa, jotta kaikki ominaisuudet toimivat moitteettomasti ja asiakkaalle voidaan luovuttaa toimiva tuote.

Kolmannen vaiheen testauksessa kiinnitetään huomiota työkalun toiminnallisuuksiin eikä enää laskukaavoihin. Kolmatta sprinttiä varten on luotu priorisointilista, joka jakaa tietomallinnuksen kohdat ja tehtävät tärkeysjärjestykseen. (Kuvio 4.) Priorisointi lista on jaettu 24 eri vaiheeseen, jolla on kolme eri priorisointiluokitusta: 1 (toteutetaan), 2 (toteutetaan jos jää aikaa), 3 (kehitysehdotuksiin, liian aikaa vievää). Priorisointilista toteutettiin kehitystiimin palautteen pohjalta, jotta kaikki tarvittavat tehtävät saadaan valmiiksi tämän sprintin aikana. Priorisointilista hyväksyttiin Taitoalla. Tämän avulla ohjelmointiryhmän on helppompaa priorisoida tehtäviä ja määrittää, mitkä olisivat tärkeimpiä toteuttaa lopputuloksen kannalta. Testauksien jako on tehty myös priorisointilistojen perusteella.

nro	Tehtävä	Kesto	Prioriteetti
1	Desimaalien erottaminen pilkulla (Tietomallinnus 2 s.5) (Palaute Kuntamarkkinoilta)	n.15min	1
2	Poistot ja Arvonalennus: näkymä ilman desimaaleja	n.15min	1
3	Tekstien ulkoasun ja kirjoitusvirheiden korjaus (Tietomallinnus 2 s.5-6)	n.15min	1
4	Pääerien avattavien valikkojen etumerkit puuttuvat. (Selventävät huomattavasti näkymää ja ohjeistaa käyttäjää, mistä ja miten erät koostuvat. (Tietomallinnus 2 s. 3-4 kuvio 4.))	n.15min	1
5	2015 vuoden veroprosentin simulointilaatikon poistaminen (ei voi simuloida)	n.15min	1
6	Historiatietojen taustalle väri ja negatiiviset luvut omilla väreillään.	n.15min	1
7	Käyttäjän ohjeistamista (esim "avaa kehikko päästäksesi peliin", "Valitse kuntasi alta", "Voit muuttaa laatikoissa olevia arvoja", "Valitse ennustus ajanjakso") (Lisäisi selkeyttä, palautteena poimittu Kuntamarkkinoilta)	n.15min	1
8	Rakenne: Tuloslaskelma alkaa vasta toimintakatteesta ja päättyy tilikauden yli-/alijäämään. Asukasluku ja vero% erikseen sen yläpuolelle sekä Kertynyt yli-/alijäämä erikseen tuloslaskelmasta alle. (Tietomallinnus 2 s2-3.)	n.15min	1
9	Jokaisen erän kohdalle lyhyt selite mitä tarkoittaa. (Iris ja Marjaana määrittelevät lyhyet selvitykset kolmannessa tietomallinnuksessa. Sovellus Kuntamarkkinoiden palautteesta opastamaan käyttäjää, mitä mikin erä tarkoittaaakaan.)	n.15min	2
10	Sulje alavalikot painike. (Helpottaisi käyttäjää palaamaan ns. lähtötilanteeseen. Melko työläs sulkea kaikki alavalikot erikseen, jos halutaan palata perusnäkykseen, jossa nähdään pääerät)	n.15min	2
11	Asukasluku simuloitavaksi. (Ei vaikuta tässä vaiheessa peliä "kuin" kuvaajien arvoihin vuosikatel/asukas jne. Yksi Kuntamarkkinoilta tullut palaute/toive)	n.15min	2
12	Rahoituslaskelman taustamuuttujat samalle kohdalle rahoituslaskelman kanssa. (Kun avataan tuloslaskelman pääeriä niin taustamuuttujat jää liian kauas rahoituslaskelmasta.)	n.1h	1
13	Vuosilukujen ja otsikoiden kiinnitys. (Tietomallinnus 2 s5)	n.1h	1
14	Kuvaajien tarkkuudet kokonaisluvuissa. (Kun viedään hiiri kuvaajan kohdalle.)	n.1h	1
15	Kuvaajiin oikeat vuosiluvut 0,1,2 (yms) sijan. 2013 ja 2014 vuodet puuttuvat historia tieto voisi tuoda hyvää vertailtavuutta	n.1h	1
16	Palauta alkuperäiset tiedot painike (Helpottaisi käyttäjää palaamaan alkuperäiseen tilanteeseen. Tällä hetkellä tulisi palata pelin alkuun ja valita kaupunki uudelleen.)	n.1h	2
17	Kuvaajat kolme vaihtoehtoa. (Kuvaajat ja laskukaavat: Tietomallinnus 2 s.8-10) Pidetään samalla kohdalla alasveto valikko, josta käyttäjä voi valita mieleisensä kuvaajan kolmesta. (Kuvaajista pidettiin erityisesti Kuntamarkkinoilta saadun palautteen perusteella)	n.1pvä	1
18	Kolmas kuvaaja maksimi kuinka monta pääerää näytetään samalla kuvaajalla (esim 3-4).	n.1pvä	1
19	Koodin refraktorointi.	n.1pvä	1
20	Perus dokumentaatio ympäristön pystyttämiseksi palvelimelle.	n.1pvä	1
21	Turhien vanhentuneiden tiedostojen/koodipätkien poistaminen repositorioista.	n.1pvä	1
22	Bugien korjaus (Esim Tuusniemi ja KOKO MAA, Muut kunnat tarkastetaan 17.9.)	n.1pvä	1
23	Muutoksen vaikutuksen korostaminen (Prosentuaaliset muutokset erin kun muutetaan esim vero% muut) (Mahdollista toteuttaa kuvaajaan tässä kohtaa, mutta kehittäminen vaatii aikaa, jolloin muita tehtäviä/tavoitteita tulee karsia)	n.1vko	3
24	2012 vuoden tilinpäätös historiaksi (Tietomallinnus 2 s.7) (aikaa vievä) (Paljon jatkokehitysehdotuksia on listattu erilliseen tiedostoon, joka luovutetaan asiakkaalle projektin päättyttyä)	n.2-3vko	3

Kuvio 4. Priorisointi lista

Ensimmäisellä testauskerralla käydään läpi kuntien näkymät, mahdollisten ohjelmointivirheiden varalta. Koska kuntia on yli 300 kaikki kuntia ei käydä läpi. Kunnista käydään läpi jokaisen kirjaimen ensimmäinen ja viimeinen kunta. Ensimmäisessä testauksessa voidaan käydä myös läpi mahdolliset uudet ominaisuudet. Valmiit ominaisuudet kirjataan testausmuistiinpanojen lisäksi priorisointilistaan värikoodein (Kuvio 5). Tällöin tiedetään seuraavalla testauskerralla mitkä ominaisuudet olivat jo viime testauksella valmiit ja ne on testattu.

nro	Tehtävä	Kesto	Prioriteetti	Vaihe															
1	Desimaalien erottaminen pilkulla (Tietomallinnus 2 s.5) (Palaute Kuntamarkkinoilta)	n. 15min	1	Valmis															
2	Poistot ja Arvonalennus: näkymä ilman desimaaleja	n. 15min	1	Kesken															
3	Tekstien ulkoasun ja kirjoitusvirheiden korjaus (Tietomallinnus 2 s.5-6)	n. 15min	1	Valmis															
4	Pääerien avattavien valikkojen etumerkit puuttuvat. (Selventävät huomattavasti näkymää ja ohjeistaa käyttäjää, mistä ja miten erät koostuvat. (Tietomallinnus 2 s. 3-4 kuvio 4.))	n. 15min	1	Kesken															
5	2015 vuoden veroprosentin simulointilaatikon poistaminen (ei voi simuloida)	n. 15min	1	Valmis															

Kuvio 5. Priorisointilistan tehtävien vaiheiden värikoodit

Toisella testauskerralla käydään läpi siihen mennessä valmiiksi saadut ominaisuudet ja lähetetään raportti tekemättömistä tehtävistä projektiryhmälle ja -päällikölle. Oletuksena on, että kuvaajia päästään testaamaan vasta toisella testauskerralla. Kuvaajien testaukseen käytetään apuna aikaisempien vaiheiden testauksissa käytettyä Kunnan talouden suunnittelukehikkoa. Samat muutokset tehdään sekä suunnittelukehikkoon, että simulointityökaluun jolloin kuvaajista tulisi tulla samannäköiset. Toisen vaiheen tietomallinnusta varten Excelille luotua ”Käyttäjän omaa kuvaajaa” käytetään myös apuna. Se on toteutettu Kunnan talouden suunnittelukehikon pohjalta, jolloin siinä on samat pohjatiedot kuin simulointityökalussa. Päivitetty priorisointilista vaiheineen lähetetään projektiryhmän ja – päällikön tarkastettavaksi. Toisella testauskerralla tulee olemaan läsnä myös projektiryhmän jäseniä, tällöin sovitaan aikataulu viimeisten ominaisuuksien valmiiksi saamiselle.

Kolmannella testauskerralla tehdään yleiskatsastus ja käydään läpi koko työkalun toimivuus luovutusta varten. Kaikkien ominaisuuksien tulisi toimia kolmanteen testaukseen mennessä. Testauksessa käydään läpi kaikki määritelmät kirjoitusvirheiden varalta sekä käyttäjän ohjeistus. Sekä käydään läpi muut uudet ominaisuudet, joita ei edelliseen testaukseen mennessä ole päästy testaamaan. Viimeisellä testauskerralla kiinnitetään erityisesti huomiota pieniin yksityiskohtiin ja ulkoasuun, jota simulointityökalu voidaan luovuttaa asiakkaalle huippukuntoisena.

Työkalun testaamista varten tarvitaan yhteys Haaga-Helian verkkoon. Testaus suoritetaan Haaga-Helian toimipisteellä, jotta varmistetaan laitteiston ja yhteyksien toimivuus. Lisäksi testaukseen tarvitaan kaksi tietokonetta. Toisella käytetään työkalua ja toisella tehdään testauksen muistiinpanot ja tarkastetaan priorisointilistan tehtävät. Näin mahdolliset poikkeamat ja huomiot saadaan kirjattua ylös. Testaus tapahtuu muun projektiryhmän kanssa ennalta sovittuna aikana. Sovittu ajankohta on neljä päivää Sprintin aloituksen jälkeen, kaksi viikkoa Sprintin aloituksen jälkeen sekä kolme päivää ennen varsinaista esittelyä asiakkaalle.

Kaikkien testauskertojen poikkeamat ja huomiot raportoidaan projektiryhmälle ja –päällikölle kirjallisesti sähköpostitse. Priorisointilista, jossa on päivityt tehtävien vaiheet lähetetään projektitiimille ja –päällikölle toisen testauksen jälkeen. Mahdolliset jatkokehitysehdotukset kirjataan projekteja käsitteleviin opinnäytetöihin.

Lähteet

Ghahrai, A. 2008. Test Strategy and Test Plan. Luettavissa:

<http://www.testingexcellence.com/test-strategy-and-test-plan/>. Luettu 19.08.2015.

Liitteet

Liite 1 Kolmannen vaiheen priorisointilista

nro	Tehtävä	Kesto	Prioriteetti	Vaihe
1	Desimaalien erottaminen pilkulla (Tietomallinnus 2 s.5) (Palaute Kuntamarkkinoilta)	n.15min	1	
2	Poistot ja Arvonalennus: näkymä ilman desimaaleja	n.15min	1	
3	Tekstien ulkoasun ja kirjoitusvirheiden korjaus (Tietomallinnus 2 s.5-6)	n.15min	1	
4	Pääerien avattavien valikkojen etumerkit puuttuvat. (Selventävät huomattavasti näkymää ja ohjeistaa käyttäjää, mistä ja miten erät koostuvat. (Tietomallinnus 2 s. 3-4 kuvio 4.))	n.15min	1	
5	2015 vuoden veroprosentin simulointilaatikon poistaminen (ei voi simuloida)	n.15min	1	
6	Historiatietojen taustalle väri ja negatiiviset luvut omilla väreillään.	n.15min	1	
7	Käyttäjän ohjeistamista (esim "avaa kehikko päästäksesi peliin", "Valitse kuntasi alta", "Voit muuttaa laatikoissa olevia arvoja", "Valitse ennustus ajanjakso") (Lisäisi selkeyttä, palautteena poimittu Kuntamarkkinoilta)	n.15min	1	
8	Rakenne: Tuloslaskelma alkaa vasta toimintakatteesta ja päättyy tilikauden yli-/alijäämään. Asukasluku ja vero% erikseen sen yläpuolelle sekä Kertynyt yli-/alijäämä erikseen tuloslaskelmasta alle. (Tietomallinnus 2 s2-3.)	n.15min	1	
9	Jokaisen erän kohdalle lyhyt selite mitä tarkoittaa. (Iris ja Marjaana määrittelevät lyhyet selvitykset kolmannessa tietomallinnuksessa. Sovellus Kuntamarkkinoiden palautteesta opastamaan käyttäjää, mitä mihin erä tarkoittaa.)	n.15min	2	
10	Sulje alavalikot painike. (Helpottaisi käyttäjää palaamaan ns. lähtötilanteeseen. Melko työläs sulkea kaikki alavalikot erikseen, jos halutaan palata perusnäkyymään, jossa nähdään pääerät)	n.15min	2	
11	Asukasluku simuloitavaksi. (Ei vaikutusta tässä vaiheessa peliä "kuin" kuvaajien arvoihin vuosikate/asukas jne. Yksi Kuntamarkkinoilta tullut palaute/toive)	n.15min	2	
12	Rahoituslaskelman taustamuuttujat samalle kohdalle rahoituslaskelman kanssa. (Kun avataan tuloslaskelman pääeriä niin taustamuuttujat jää liian kauas rahoituslaskelmasta.)	n.1h	1	
13	Vuosilukujen ja otsikoiden kiinnitys. (Tietomallinnus 2 s5)	n.1h	1	
14	Kuvaajien tarkkuudet kokonaisluvuissa. (Kun viedään hiiri kuvaajan kohdalle.)	n.1h	1	
15	Kuvaajiin oikeat vuosiluvut 0,1,2 (yms) sijaan. 2013 ja 2014 vuodet puuttuvat historia tieto voisi tuoda hyvää vertailtavuutta	n.1h	1	
16	Palauta alkuperäiset tiedot painike (Helpottaisi käyttäjää palaamaan alkuperäiseen tilanteeseen. Tällä hetkellä tulisi palata pelin alkuun ja valita kaupunki uudelleen.)	n.1h	2	
17	Kuvaajat kolme vaihtoehtoa. (Kuvaajat ja laskukaavat: Tietomallinnus 2 s.8-10) Pidetään samalla kohdalla alaveto valikko, josta käyttäjä voi valita mieleisensä kuvaajan kolmesta. (Kuvaajista pidettiin erityisesti Kuntamarkkinoilta saadun palautteen perusteella)	n.1pvä	1	
18	Kolmas kuvaaja maksimi kuinka monta pääeriä näytetään samalla kuvaajalla (esim 3-4).	n.1pvä	1	
19	Koodin refraktorointi.	n.1pvä	1	
20	Perus dokumentaatio ympäristön pystyttämiseksi palvelimelle.	n.1pvä	1	
21	Turhien vanhentuneiden tiedostojen/koodipätkien poistaminen repositorioista.	n.1pvä	1	
22	Bugien korjaus (Esim Tuusniemi ja KOKO MAA. Muut kunnat tarkastetaan 17.9.)	n.1pvä	1	
23	Muutoksen vaikutuksen korostaminen (Prosentuaaliset muutokset eriin kun muutetaan esim vero% muut) (Mahdollista toteuttaa kuvaajaan tässä kohtaa, mutta kehittäminen vaatii aikaa, jolloin muita tehtäviä/tavoitteita tulee karsia)	n.1vko	3	
24	2012 vuoden tilinpäätös historiaksi (Tietomallinnus 2 s.7) (aikaa vievä) (Paljon jatkokehitysehdotuksia on listattu erilliseen tiedostoon, joka luovutetaan asiakkaalle projektin päätyttyä)	n.2-3vko	3	

	Kesken
	Valmis
	Projektiryhmän ja -päällikön tehtäväksi tarkastaa
	Ei mahdollista toteuttaa

Appendix 3. Personal project working hours

Date	Objective	(hh:min)	What was done
1.4.2015	First meeting w/ Heli	1:00	Going through the commission.
14.4.2015	First meeting w/ Marjaana	4:00	Going through VM's planning Excel and preparing for the meeting with the customer (coming up questions etc.)
17.4.2015	Project Kick-Off	2:30	Going through the project cycle, participants, time line and customers vision for the simulation tool.
22.4.2015	First meeting with the development team	1:30	Going through results from the kick off meeting, participants of the project and defined everyone's responsibilities in the project. Going through with Heli what our next steps will be.
23.4.2015	Customer requirements	1:00	Translating customer requirements to English
28.4.2015	Data model 1 w/ Marjaana	3:00	Getting to know VM's planning Excel better and writing open all the formulas needed for data model 1.
4.5.2015	Data model 1 w/ Marjaana	3:00	Sketching the data model 1 and dividing the parts
6.5.2015	Data model 1	15:00	Writing the data model 1
13.5.2015	Sprint 1 kickoff	2:30	Presenting the data model 1 for the development team and answering their questions about it. Pivotal tracker was presented to everyone.
14.5.2015	Data model 1	8:00	Translating the finished and approved data model 1
23.5.2015	Skype meeting w/ Marjaana	3:30	Going through all the needed corrections for the data model 1. Sketching the testing plan based on the data model 1 and dividing the parts for all the work.
23.5.2015	Data model 1	1:00	Making asked corrections to my part of the data model (Finnish version, English version already corrected)
26.5.2015	Testing plan 1	1:30	Writing my part from the testing plan
30.5.2015	Sprint 1 testing 1	1:00	Testing the first version of the simulation tool. Testing all the income statements formulas and writing out corrections list to the development team.
3.6.2015	Sprint 1 customer presentation	2:00	Being present at the first presentation and answering questions.
9.6.2015	Sprint 1 retro	1:30	Going through the results of Sprint 1 with the development team. Went through improvement ideas for team work, project and time management. Writing suggestion for Taitoa about Sprint 2's objectives.
28.7.2015	Data model 2 w/ Marjaana	3:30	Writing a sketch for data model 2 based on the objectives and divided the parts.
30.7.2015	Data model 2	7:00	Writing the data model 2
1.8.2015	Translating data model 2	5:00	Translating the finished data model 2
17.8.2015	Testing plan 2 w/ Marjaana	2:00	Writing a sketch for testing plan 2 based on the data model 2. Dividing the parts.

17.8.2015	Testing plan 2	2:00	Writing my part from the testing plan 2
18.8.2015	Lync meeting about Kuntamarkkinat	2:00	Going through with the customer and us what kind of arrangements are needed for Kuntamarkkinat. After the meeting writing the feedback questions.
20.8.2015	Sprint 2 testing 1	3:00	Testing the second version of the simulation tool. Testing all the formulas and writing correction list for the development team.
23.8.2015	Sprint 2 review meeting	2:00	Going through what has been so far during sprint 2 and what still has to be done for Kuntamarkkinat
31.8.2015	Sprint 2 testing 2	3:00	Testing the formula errors noticed on testing 1 and variables. Writing correction list to the development team.
3.9.2015	Sprint 2 customer presentation	2:00	Presenting the results of Sprint 2 to customer present and via Lync, answering questions going through Kuntamarkkinat.
7.9.2015	Sprint 2 retro	1:30	Going through results from Sprint 2 with the development team. Went through if there was anything to improve in the team work and made suggestions list of Sprint 3 objectives (before Kuntamarkkinat) going through Kuntamarkkinat.
9.9.2015	Kuntamarkkinat	3:00	Presenting the simulation tool for potential future users and collection feedback.
10.9.2015	Kuntamarkkinat	2:30	Presenting the simulation tool for potential future users and collection feedback.
10.9.2015	Data model 3 w/ Marjaana	3:00	Sketch for data model 3 and testing plan 3 based on feedback from Kuntamarkkinat. Dividing the parts.
14.9.2015	Kuntamarkkinat feedback	1:30	Going through the feedback from Kuntamarkkinat and our suggested objectives.
15.9.2015	Data model 3	5:00	Writing data model 3
15.9.2015	Testing plan 3	1:30	Writing testing plan 3
16.9.2015	Data model 3	5:00	Translating finished data model 3
17.9.2015	Sprint 3 first testing	3:00	Going through sprint 3 task list testing the new features and going through the errors found during Kuntamarkkinat
28.9.2015	Sprint 3 second testing	1:30	Going through sprint 2 task list and testing the new features
28.9.2015	Sprint 3 review meeting	1:30	Going through what has been so far during sprint 3 and what still needs to be done to finish the tool.
5.10.2015	Sprint 3 third testing	3:00	Going through sprint 3 task list testing the new features and taking a look at the overall outlook of the tool. Making a list of necessary features to fix before the hand over
8.10.2015	Last presentation	3:00	Last look at the simulation tool, preparing for the presentation. Presenting the tool to customer present and via Lync.
Total		118:30	