

Management summary

Research introduction

The spatial development process is often indicated as a complex and time consuming process. One of the important tasks in this process is to realize the ambition of quality within the defined financial borders. In order to achieve this optimal result, close communication between the designer and financial engineer is important. In practice this means that a spatial development plan is assessed on its financial feasibility and several recommendations are given to improve the plan. Because of the dependency of the input of the other party, this (iterative) process consumes a lot of time.

Brink Groep supports the view that a software tool which improves the interaction between the design and financial engineering activities could create a substantially added value within the spatial development process which could eventually lead to a better end result; an ambitious and feasible plan.

The goal of this research is to analyse which added value could be realized with such a tool and which functionalities it should contain in order to achieve this added value. This leads to the following main question which is answered in this research:

How can a software tool, which combines the designing and financial engineering activities, positively contribute to the spatial development process?

To answer this question a research strategy is formed including several research methodologies. First the design activities and the financial engineering activities within the spatial development process are analysed. With this process analysis and with the help of experts the possible added value of the software tool is determined. This information is used to describe a program of requirements and assess existing solutions based on the most important requirements.

Spatial development process

The spatial development process could be divided in several phases. In each phase relevant information for the project is gathered and research is performed. This information is combined and decisions are made which closes the current phase and if applicable starts a new phase. At the start of the process the project definition and scope is very broad, based on the decisions made during the process the scope will be narrowed down and eventually the project definition is finished and is ready to be realized.

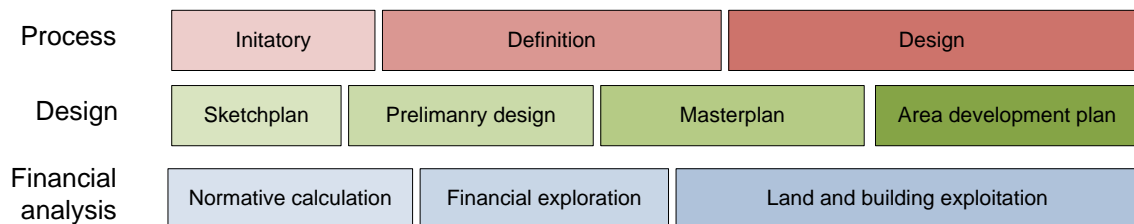


Figure 1: Overview of the spatial development process

This research focuses on two main activities into this process: designing and financial engineering. The process starts with an identification of the possibilities within the project. The possibilities are translated into the first sketch plans which are used to perform normative calculations. The process continues and preliminary designs and the start of the master plan are made. Because these plans contain more detail the financial analysis can be adjusted with this new information.

During the design phase the master plan is worked out and parts of the master plan are presented in more detailed in an area development plan. This level of detail can also be found in the financial analysis which contains a complete estimated exploitation of the project.

There can be stated that during the process the results of the design and financial activities become more detailed, elaborated and profound. The interaction between the design and financial activities are the most intensive during the design phase of the master plan. During this phase the outline for the project is determine. To define this outline interaction between designer and financial engineer is absolutely necessary.

Added value of a software tool

Based on the analyses of the spatial development process and interviews with stakeholders and experts there has been determined that a software tool which combines the designing and financial engineering activities can create an added value within the spatial development process. There is also concluded, based on the interviews, that the tool should be a support tool which will be used by experts only.

The opportunities for the tool to create an added value are the following:

- Create more insight in financial consequences of (design) decisions within the spatial development project;
- Improve the efficiency of the calculation activities in order to determine the financial feasibility;
- Improve the reliability of the financial results;
- Inform external parties more clearly about and involve them into the spatial development issue.

Threads are identified based on the interviews with stakeholders of the spatial development process. The main concerns are regarding the limitations of the tool (which could also limit the freedom of the designer) and an approach from a solely financial point of view

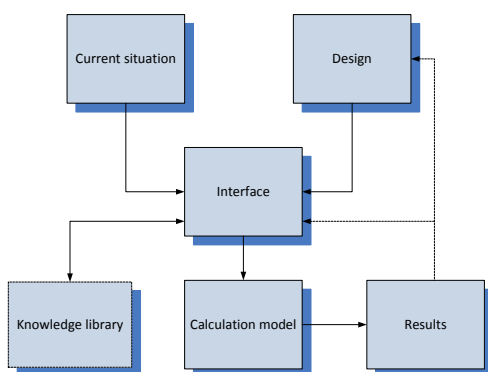
The objective of the tool is formed by the consideration between investment (in time and money) and result. Based on this consideration the first two opportunities (insight and efficiency) apply the most to form the objective of the tool.

Conceptual design

With the objective in mind, six main requirements for the tool are defined. These requirements are an outcome of an expert meeting with employees of Brink Groep. With these requirements an outline is given for the answer of the main question of this research.

The following requirements are identified:

1. Geographical information of the current situation can be imported (preferably digital) and stored
2. Area development plans of the future situation can be imported and stored.
3. Financial data (costs and revenues estimations, planning and financial parameters) can be added to the geographical information.
4. Financial feasibility can be determined and knowledge of costs can be stored in a digital library
5. To improve the interaction between designing and financial engineering it should be possible to interactively adjust the development plans and experience the (financial) consequences.
6. The results (both financial and design) could be visualised (in 3D) and be exported into reports.



Based on these requirements there can be concluded that a Geographical Information System (GIS) offers the most functionalities for implementation of the tool. A basis design is created (figure 2) which follows the structure of a GIS. This results in two input models (current situation and design), an interface module and three data processing & storage modules (knowledge library, calculation model and results).

Figure 2: Basic design of the software tool

Each of the modules is worked out in detail including the required functionalities. Some of these functionalities are also assessed on its practical feasibility and a description is given of the implementation possibilities of these particular functionalities. This has resulted into a program of requirements which is assessed on technical feasibility by a GIS expert. Based on this assessment there can be concluded that there aren't any technical limitations in order to implement the proposed tool.

Existing solutions

A quick scan has identified six already developed products with similar functionalities or objectives. These products are described based on demonstrations or product specifications. The main requirements which are stated in this research are used to assess each of the already existing solutions. This fit and gap analysis gives a clear view to which degree the current products meet the defined requirements. In Figure 3 is a representation given of this fit and gap analysis.

Based on this analysis there can be concluded that all of the products lack some functionalities. However there are some product which with some adaptations could become promising. These promising tools are Gebiedsontwikkelaar (Strategis), OGAGIS (Vicrea) and Tekenen en Rekenen (ADECS).

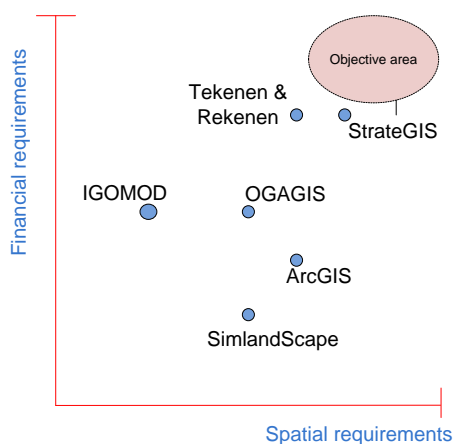


Figure 3: Graph indicating the degree to which already existing solutions meet the defined requirements (divided in financial and spatial)

Conclusion & Recommendation

In this research the interaction between designing and financial engineering in the spatial development process has been described and the opportunities and threads for a support tool has been identified. There can be concluded that the two most important opportunities for such a tool are creating insight and improving the efficiency within the spatial development process.

The possibilities to implement the described tool are not limited by any technical developments. The real challenge can be found in changing the common way of working within the spatial development process. A integration of the designing and financial engineering tasks into one tool requires a major change in the way of working. This is why in this research there has been recommended to develop an expert tool for the financial engineer which has the full financial functionalities and only the necessary design functionalities.

Based on the interviews with stakeholders and developers of similar products there can be concluded that combining designing and financial engineering with the use of a support tool can, if executed and implemented properly, create benefits for Brink Groep. Already existing technologies and products can give Brink Groep a kick start into the implementation process.

This summary is part of the report: Tekenen en rekenen bij gebiedsontwikkeling written by Jeroen van den Burg. For more information or a copy of the complete report (in Dutch) you can contact me at [j.p.vandenburg\(at\)student.tudelft.nl](mailto:j.p.vandenburg(at)student.tudelft.nl)