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The Digital Business Case

A Development Plan for a Business Case Management tool

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<p>The purpose of this thesis was to create a working tool for Digital Business Case application development. The thesis provides a general look on the case and there is no case company, product or specific industry that affects the work. It is impossible to build a proposal that fits all requirements; therefore, it is vital for this work not to include too many detailed specifications but keep the platform open for further development. The present thesis is the first milestone in a long process of actual application building and further improvements.</p> <p>The process included analysing the current status of business planning and business case creation, finding the weaknesses in today's practicalities and creating an easy and a practical way to support building different scenarios for future technology, product and service development.</p> <p>In addition, the investor's role and requirements were considered in this work. Every development project needs funding and for small businesses and first-time technology, product or service developers, such as start-up's, it is likely that funding is coming from external sources and therefore the output information should be in a format that can be used for example by venture capitalists.</p> <p>In addition to the theoretical approach, three professionals with business case creation experience were interviewed for thesis in order to gain practical knowledge on current state. Interviewees did not want their companies, titles or names to be published and therefore appendixes are only visible in the original, instructor's version. Terminology definitions are published, but an actual Excel tool that turns data input into dashboard report is not included in the public version. This is due to possible future intellectual property protection.</p> <p>Results of this thesis were encouraging and the conclusions will help to develop better business case templates in the future.</p>	
Keywords	Business Case, New Product Development, Technology Development, NPI, Start-Up & Mobile Application.

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1 Introduction

Investment to new technologies, products or services is a key strategic, operational and business decision for companies in all sizes & calibre. Having trustworthy and reliable calculations and analysing methods behind these vital decisions can be a major success factor and should improve competitiveness in today's digitalized planning environment. Purpose of this Thesis is to clarify current state of business case creation in general and to build a development plan for a Business Case Management tool, which can later on be used in all Research & Development (R&D) environments to support business planning and decision making process.

A scope for this Thesis is a development plan of a tool and a first MS Excel version that can be used primarily by Start-up's and small businesses when they are planning to develop new technologies, build new products or create new services. It has only the minimum data entry requirements complemented with a Dashboard view that supports investment decision making process. Targeted users of this planning tool will be employees who are responsible for planning in small businesses, start-up owners who are looking for first seed funding partners and on the other side and venture capitalists who are looking for promising new investment opportunities. This plan (Thesis) and a first version of a management planning tool will hopefully be the first furlong in a long race towards a full development planning platform.

Key drivers behind this Thesis are both experience from working life in financial management and desire to build something that would benefit people involved in business planning and business case preparation. Timing for this kind of development plan should be reasonably good as there are no similar competing tools, such as mobile applications, available in any of the mobile application stores (Jul 2016), and the infrastructure for worldwide distribution already exist. Most importantly, demand for this kind of tool exist, but there's no supply at all.

1.1 A Key Concept

Innovation is vital for all companies' success and being able to build scenarios easily and with reliable outcomes will help management to improve their product and technology improvements. I will concentrate on a version that supports small businesses and start-up's in their planning process, meanwhile keeping in mind that same functionalities may apply to bigger, existing companies and therefore a Digital Business Case (DBC) platform should be transformable when scaling up in the future.

The key concept, this pioneering tool Development Plan is targeted towards disruptive technology developers rather than one's that are concentrating to sustaining their offerings to customers. Part of the concept is to increase transparency in the planning process and at the same time to encourage inventors to increase their planning capacity and ensure investors that the information they're receiving is trustworthy and comparable with other similar plans. This ideology can also be called as a Value Network, where each firm's competitive strategy determines its perceptions of the economic value of a new technology. These perceptions shape the rewards different firms expect to obtain through pursuit of sustaining and disruptive innovations (Christensen, 2006).

1.2 Case Background

As this Thesis is not company specific, a development plan itself is based on overall understanding of the current state (CSA) and solution will be publicly available in Theseus for anyone interested in improving business case creation process. There's a general requirement for business case related improvement especially from companies involved in R&D and for those business owners that don't currently have any supporting tools available for an effective business planning. Therefore, all available support to make product and technology planning process easier will be highly appreciated by those, who wish to ease the administrative burden and focus into actual development instead.

Different roles in organizations can be highly specified and this can lead into situation where clear ownership of business case creation and validation is fragmented and there's no structured way of consolidating data and information from several sources. This may result as challenges in controlling future technologies and new products or services development. There's a clear need for improved transparency in planning process and this development plan should be able to support in role definition and task distribution. Building roadmaps and product portfolios may suffer unnecessarily due to fact that people are struggling with duties outside their own comfort zone, i.e. engineers preparing financial information or financial professionals planning sales forecasts.

“While the need for system-of-record reporting to run businesses remains, there is a significant change in how companies are satisfying these and new business-user-driven requirements. They are increasingly shifting from using the installed base, traditional, IT-centric platforms that are the enterprise standard, to more decentralized data discovery deployments that are now spreading across the enterprise” (Sallam, Hostmann, Schlegel, Tapadinhas, Parenteau, Oestreich, 2015).

Part of the solution is to build a tool that can create more comfortable environment for all participants via automatization, clarification and improved user experience. This should also help organizations to allocate resources more effectively as people are concentrating on tasks they have the knowledge for and tool itself is looking after version control, approval process and ideally also for asking the right questions from right people at the right time.

By using existing platforms, such as cloud data storages and application stores, improvements in security should be realistic with secure data handling and less vulnerable payment methods for actual application development in the future. This only applies to Thesis work if the end result will ever be turned into an application, however it's beneficial to keep in mind what are the opportunities afterwards.

1.3 A Business Problem

Current problems are that available resources are used ineffectively and both time and money is spent on obsolete tasks and some of the required work is duplicated somewhere in the organization. Employees, small business owners and start-up founders need to use significant portion of their valuable time in tasks that should be automated and require only the information that is needed for future business decisions. In addition, companies involved in R&D also need flexibility in planning and faster scenario building models in order to fight competitors and develop new disrupting products.

Relevant questions at the moment are:

- Can a draft business case be created shortly?
- Can these plans include several scenarios?
- Is data input easy and understandable?
- Is most up to date version being used?
- How to optimize approval process?
- How to access business cases remotely?
- Is data visualization clear in dashboards?

Most of companies need business cases for effective planning and they all do it differently, waste time and create confusion among participants. Businesses also need improvements in the way they measure and analyse disruptive technologies and future products impact into their current and future performance. This may not apply to start-up's who are developing their first product or service but we must keep it in mind that when building a platform for future digital business case development.

The fear of cannibalizing sales of existing products is often cited as a reason why established firms delay the introduction of new technologies (Christensen, 2006). This is the reason why sales and margin calculations in this Thesis include cannibalization as default and investments are valued on incremental numbers.

Once the business case platform is ready, it's worthwhile to connect the data and information in a format that can be used in annual short and long term planning budgeting. In a tool for Thesis, this is done by converting data from different gates into fiscal year summaries on cost element level. A budget is merely a plan relating to a period of time, expressed in quantitative terms. In the business world, a budget is the formal expression of the expected incomes and expenditure for a definite future period (Arora, 2010).

Current challenge is that individual business plans are created when ever applicable; without simultaneously linking them into next planning round. This creates significant amount of frustration in both development and management levels as a lot of time is used to connect the dots in shot time during the budgeting process. If we can create future planning data and information ongoing basis, all the planning is easier to digest for comprehensive long term planning. I think all of the problems above are worth solving and companies in all sizes would benefit the outcome of this Thesis.

1.4 Research Objectives & Scope

Setting up objectives was a quite straight forward process as there's a lot of half-prepared knowledge available for current state analysis, literature review and in a form of existing experience, therefore the end result requirements for business planning improvements are relatively easy to define. Scoping caused some additional trouble as in ideal world this Thesis would resolve all business case creation problems, but in order to keep the start-up and small business focus, research includes mainly elements that are required right now. Any further development, such as an actual, fully working mobile application will take place later on if correct partners and funding are available.

Another thing that constraints this Thesis work slightly is intellectual property risk related to a public documentation. I need to be able to fulfil minimum requirements for profit & loss calculations, discounted cash flow, general project inform including payback time and financial KPI information, but everything that may be

patented in the future must be excluded from the Thesis. On the other hand, this makes Thesis work more focused and scope is easier to handle.

The reason for choosing this area as a Research and Thesis topic comes mostly from my own experience in different financial and management accounting roles in research & development and manufacturing environments. There is an organic need for a tangible and user friendly solution, that can support planning process on different levels of an organization. First step towards a new solution is to study current state of this area with interviews and literature review, followed by adding my own working experience into analysis and then creating an actual proposal for a new model. Target of this process is to have a well investigated and a trustworthy documentation that can be used as a guidance for an actual tool development in the future.

In short, the scope at for Thesis is following:

- CSA including Interviews, research & existing knowledge
- A plan for building a tool, such as a mobile application and web client
- Data input cells created in Excel
- Calculations defined in Excel
- Dashboard and other outputs built in Excel
- Result is a platform design for digital business case application which supports creation and of technology and product development plan.

Thesis scope will stop here but the actual product development continues possibly after the development plan is created and hopefully a full application is up and running by the end of year 2017. If concept is proved to be working and a critical mass of at least ten thousand users is achieved with the first version that is going to be a free of charge for start-up's small business owners, a full business case roadmapping and budgeting model will be built in the future. All this obviously depends on available funding and activity of possible business partners. I have reserved a web domain where future development can be reviewed (<http://www.digitalbusinesscase.com/>).

This Thesis also excludes all technical proposals for an actual mobile application development as my Business Informatics syllabus stream at Metropolia Master's degree studies is Business Admin, not Engineering. Another reason to leave this part out of research is the fact that application development tool libraries, cloud service platforms and all other related elements vary so much that it would be virtually impossible to select right fit without the support from actual developer. This is also an area which is changing rapidly, today's application development methods may be obsolete when the development plan is reviewed by someone who know more about creating working and successful applications.

2 A Thesis Method

2.1 Research Approach

The fieldwork is based on current state analysis, which includes interviews with relevant stakeholders, existing knowledge from literature review and my own experience on business case creation. After business problem was fully understood, data was collected from these three elements and consolidated into proposal which includes required data inputs, calculations to turn numerical data into relevant information and then the outputs in a form of dashboards.

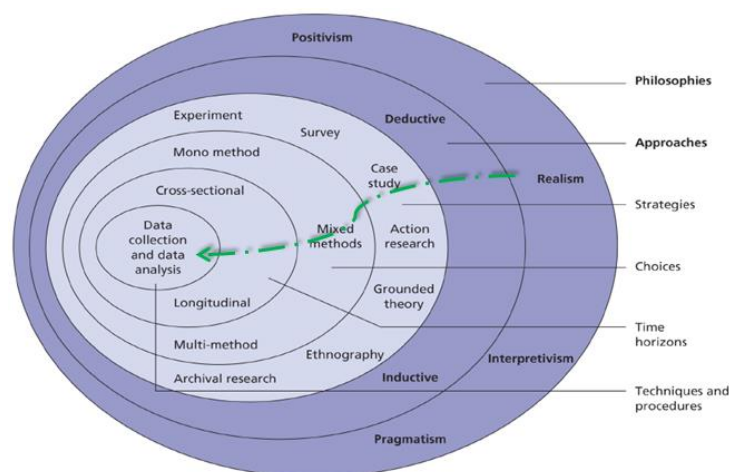


Figure 1 - DBC research "onion" – Saunders, Lewis and Thornhill 2008

Approach is somewhere in the middle of the road when it comes to following research “onion” path (Saunders, Lewis and Thornhill, 2008). Action research is not used as a corner stone for this research approach as a solution itself is not about change management and therefore and there’s no requirement for sequence of events. Data collection again is rather a part of ongoing process.

2.2 Research Design & Process

After Thesis objective was set up, research process followed fairly straight forward path with CSA, literature review and experience into actual business case tool proposal. Workload was distributed between interviews, literature and writing down existing knowledge while taking notes on possible tool features and dashboard outcome requirements. Turning input data into key figures and graphs required significant amount of work in order to make Excel tool fully functional and ready for possible further development. Calculation methods and formulas are not opened in this process as it’s probably going to be a vital part of intellectual property at some stage after Thesis is published.



Figure 2 - DBC research design (on top) and research process (on bottom)

There are two separate **Data Collection** points in this process and in addition, there’s a strong element of ongoing data gathering as simultaneous tool development creates valuable data in smaller portions. First set was collected via Interviews and second after literature review along with existing experience analy-

sis. Data from the Interviews is both quantitate (Scoring) and qualified (Comments from open-ended questions) while data from Literature Review and Experience is mainly qualified (guidelines, recommendations and references). It's important to keep in mind that the analysis of quantitative data is judged on how it contributes to the overall research question and its integration with other data sets that make up the research strategy (Farquhar, 2012).

3 Current State Analysis (CSA)

3.1 Introduction

The next step after recognizing a business problem and coming up with a research design was to investigate and understand how processes work at the moment and where are the strengths & weaknesses within the existing practices regarding to Business Case creation and maintenance. This was done by conducting a Current State Analysis (CSA) and the aim was to move from current state to desired state by learning the conditions and opportunities for sustainable change (Coghlan and Brannick 2014).

Analysis can be performed via interviews, literature research, by using existing knowledge or combining several different elements and create a hybrid intake and outcome. Time invested into a proper CSA pays dividends later on in Thesis work and adds value and credibility into research as whole. Interviews were structured, semi-structured or unstructured and a reports are established as a result of a respectable interview.

Outcome of the CSA is the in-depth analysis of the strengths & weaknesses and only an analysis of the current state, not the suggestions to improve (Collins, 2016). A systematic approach included interviews of relevant people in several organizations and industries, existing knowledge, aiming to find reasons behind current strengths and weaknesses. Information from CSA was extracted and used as a basis for conceptual framework.

3.2 CSA for Digital Business Case

CSA for Digital Business Case (DBC) thesis includes two major ingredients. First part is based on interviews including questionnaires and open-ended questions with three professionals having years of experience in business modelling, portfolio roadmapping and business case creation. Second part includes existing knowledge from magnitude of resource spending related to business case creation to quantitate information that is available regarding to support opportunities within research and development companies.

First part of CSA interviews was a two-page questionnaire to find out how important different areas of business case creation and preparations are and in what kind of state these specific areas are currently in their own organization. It's also vital to understand whether this kind of development (DBC) is needed at all. There's always a chance that idea, which is based on one person's hunch and experience only, is 100% obsolete and focus on Thesis work could have been directed somewhere else.

First questionnaire was used for gaining understanding if interviewees valued the same elements as planned to be included in DBC, and to find out how important these separate details are for business case planning process. Questions varied from security to version control and data visualization among some other related questions. Purpose of second set of questionnaire was to find out where these companies are at the moment and how interviewees value their current state, from poor to excellent. Finding the gap between current and desired state validates the need for action and therefore can be used as a validation basis for actual research. Turning this information into useful recommendations and proposals when defining DBC design and data input & output was vital for success of Thesis as whole.

Latter part of interviews regards to business case preparation and requires interviewees to express their own views on different parts of process with open ending

questions, aiming to dig in more than yes or no answers. This is part where experts in their own areas described strengths and weaknesses in their current process and also openly comment about time usage, sequence of business case creation and related risks. The basic purpose of the standardized open-ended interview is to minimize interviewer effect by asking the same question of each respondent (Patton, 2002). Different roles in business case preparation and risks or opportunities are explained in this part as well, this is a channel for bringing up concerns in current methods and how to get rid of unnecessary workload that relates to business case creation.

As Digital Business Case Thesis is not about one organization but rather an overall development process, CSA was also always going to be done by analyzing current processes in several companies and by interviewing relevant persons in different roles from Fly Nano, Microsoft and Oxford Instruments. Interviewees hold key roles in research & development, operations and finance. They were briefed over the phone or e-mail prior to sending any material and they're told what this Thesis is for, why it's done and what's the desired outcome of this exercise. All interviews were performed during Feb / Mar 2016, fitting into interviewee's own schedules. Defining conceptual framework and building towards further research started right after all interview material was collected, scoring calculated and answers analyzed.

All interview material was delivered to participants via e-mail prior to meeting them face to face. This gave interviewees a chance to think about questions on their own time and without any direction given by interviewer. Open ending questions were partly or fully answered prior to actual meetings and questionnaires were done without further clarifications. Most of the answers were provided before meetings, actual interviews were more like an open conversation over the topics and therefore notes include more relevant ideas and comments than was originally planned.

In the end interviewees were able to choose if material can be attached into public Thesis document, or if they'd rather like to keep their part private. There was also

an option available if some of the information can be published, for example company's name or interviewee's role in the organization. The least public way is used for final document, i.e. if one wants to keep these interviews fully private, none of the documents will be published. Interviews are not recorded on tape or video, just pen and paper will do.

Overall purpose of using interviews as a part of Current State Analysis was to ask correct people, who really knew day to day how challenging business case creation can be, and let them explain how to improve whole process and minimize resource waste and risks. Value for Thesis comes from understanding these worries and turning this feedback into solid proposals which can be used as a platform for Digital Business Case application creation if work is going to be continued after publication of Thesis.

All interview qualified interview material was consolidated and written in a narrative essay form in Thesis, based on some key learnings and possibly "big ideas". Any relevant points are referred in Thesis text itself, when applicable, and there is a summary of key findings in the end as they will probably change the direction of actual DBC development while putting all information together. Thesis text was sent to interviewees before it's submitted for approval, this is to make sure there's nothing confidential included in text or attachments.

4 Existing Knowledge

4.1 CSA Weaknesses

Approaching issues found in CSA from both sides of the table increases the opportunities for success. After having a score for both "How Important" interviewees consider certain elements in business case planning and a "Current State" analysis, it was fairly easy to extract development areas that needed to be worked on.

Interviewees gave scores from 1 to 5 for each area of a questionnaire, into 22 questions in total. They all indicated that data visualization, having a remote access into toll itself and data entry simplification were among the most desirable features to have in a perfect application. At the same time, they valued that current performance is poorest within these exactly same areas and therefore something needs to be done to improve business case usability.

From Questionnaire		Average	Average	Gap	Priority
How Important?			Current State?		
Data visualization	5,0	Data visualization	2,3	- 2,7	1
Version control	4,3	Version control	1,7	- 2,7	4
Data input flexibility	3,7	Data input flexibility	1,7	- 2,0	
Remote access	4,7	Remote access	2,7	- 2,0	3
Data storage	4,3	Data storage	3,0	- 1,3	
Approval process	4,3	Approval process	2,7	- 1,7	
Consolidation	3,0	Consolidation	2,0	- 1,0	
Data entry simplification	5,0	Data entry simplification	3,0	- 2,0	2
Output / Dashboard	4,3	Output / Dashboard	3,0	- 1,3	
Security	3,7	Security	3,3	- 0,3	
Roles clarification	3,7	Roles clarification	3,3	- 0,3	
	<u>4,2</u>		<u>2,6</u>	- 1,6	
Above 4,5	5,0		Greater than -1	- 3,0	
			Between -1 & 0	- 1,0	
			Above 0	1,0	

Figure 3 - Current State Analysis (CSA) Interview questionnaire analysis

The nine steps open-ended questions highlighted another important topic. Development of a lifecycle measurement capability was something that came obvious when we talked about risks in current process, and the lacking comparability between different cases. Also having an easy way of building different scenarios and how amending one element impacts the others should be built-in, mainly due to uncertainties during the planning process.

Business Cases should ideally be controlled, evaluated and then used for further development in a planning process, i.e. we should be able to learn from past mistakes and to avoid doing them again in the future. This should reduce the risk of having too optimistic or conservative business plans, as people would know

already in the beginning of the planning process that their success rate will be measured. Control is the act of comparing progress to plan so corrective action can be taken when a deviation from planned performance occurs (Heagney, 2011).

From Questions

Risks:	Business Cases are too optimistic. Quality of estimations and understanding of specifications. Inaccurate and misleading information.
Opportunities:	Automatization, cloud, visualization, BI, document sharing and roadmapping. Comparison to actual costs after project completion. Simplicity, accuracy, scenario building and cash flow forecasts.
Strenghts:	Simplicity Light weight. Agile, small crew and possible to edit small details.
Weaknesses:	Consolidation, Business Case life cycle development and comparison. Unrealistic Business Cases. No scenarios available. Excel based, lacking visualization, hard to follow-up and missing process control.

Figure 4 - CSA Interview open-ended questions outcome

While preparing and performing the current state analysis, it was noticeable that the general feeling among interviewees was very positive and they were willing to support with future development as well. There are clearly several issues that need to be fixed, interviewing people was more like a game opener for deeper conversation in the future.

4.2 Conceptual Framework

The fieldwork is based on Current State Analysis, which includes interviews with relevant stakeholders, literature research and existing knowledge on business case creation. After business problems are fully understood, data is collected from these three elements and consolidated into proposal which includes required data inputs, calculations to turn numerical data into relevant information and then the outputs in a form of dashboards.

Conclusions in this Thesis are based on available knowledge from literature review and my own experience in business planning and business case creation. The most important outcome should be a proposal that supports the findings in CSA (current strengths and weaknesses) and provides a solution for going forward, rather than just a list of issues. After all, this Thesis is about supporting innovation by finding innovative solutions to existing problems.

4.3 Literature Review

As **Data Visualization** revealed to be the biggest weakness in CSA questionnaire and followed by lacking of **Life Cycle Analysis** and **Scenario Planning** features in open-ended questions section, this review is focusing on these three topics. In addition, I have reviewed literature in area of **Business Case** as well in order to understand how much we can use existing written knowledge in development. Combining existing knowledge from these areas should lead into more accurate and informative outcome to support business planning.

There were other relevant issues that came up in the interviewing process, such as data entry simplification and remote access capability for business cases. Latter is a fully technological feature, which can be evaluated and added in the development stage, if we decide one day that it is worthwhile to build an actual application. Data simplification is briefly reviewed later on in this Thesis, but excluded from literature review.

4.3.1 Data Visualization

The goal of data visualization is to help the audience gain information from a large quantity of raw data quickly and efficiently through metaphor, mental model alignment, and cognitive magnification (Zhu, 2013). Ideally visualization should also support scenario planning as common components can be reviewed for example side by side in order to identify needed variables. Most of the data should be available for visualization as it then naturally turns into information such as Key

Performance Indicator (KPI) or a trend view. Also charts and icons can be used to illustrate significant sections of the visualized information. When highlighting one part of the presentation, we also need to avoid discrimination another.

Visualization usually belongs to output field of a Business Case or an analysis and can be seen for example as a Dashboard. Along with the continual monitoring of information to achieve our objectives, a dashboard helps us to organize and introduce more profound analysis (Pover, 2013). Available time also matters when thinking about data visualization, sometimes a one-page dashboard can help to present results quickly and audience can discover enough information to fit their schedules.

Data visualization provides a much richer interpretation of this definition since information is no longer the mere result of processed raw facts but rather a visual metaphor of the facts (Zhu, 2013). One must also be selective when building visualized effects as all data don't have the elements suitable for revealing the meaning of the source in visual form, and having everything visualized also easily dilutes the value of most important information.

In this illustration by Zhu, the two circles represent two joined sets. Set A depicts your data set while set B represents the visual elements (You don't need to visualize all the data and vice versa, all visualization must have corresponding data available):

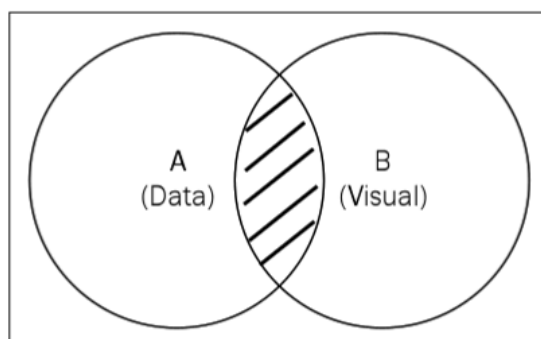


Figure 5 - Data and Visual Set according to Zhu

The task of matching each datum with its visual representation, for example, drawing a single bar for every data point you have in your data set, updating the bars when the data points change, and then eventually removing the bars when certain data points no longer exist, seems to be a complicated and tedious task (Zhu, 2013). We need to remember that planning and reporting in different organizations is typically time constraint and therefore fine tuning and looking for perfection may not be feasible all the time.

By using the existing tools, we can save significant amount of time in visualization process, reporting and business planning with relatively low cost, sometimes even free of charge.

Qlik company, which was founded in Sweden in 1993, has a wide range of products and online documentation available for visual analytics. Even though this is not 100% literature review related, I think it's beneficial to review Pitfalls of Data Visualization in this section. Here are the five most common areas of failure we should avoid when visualizing data (Qlik, 2016):

1. Color Abuse

The wrong color can lead to confusion, or even worse, misinterpretation. Try to avoid brand colors for visualization and try to use shapes and colors that are easiest for the most people to see.

2. Misuse of Pie Charts

If you try to squeeze too much information into a pie chart, the big picture gets lost. Try to avoid using pie charts side by side and use them to compare different sets of data. Always remember to order your slices from largest to smallest for easier comparison.

3. Visual Clutter

“Making discoveries in a cluttered visualization is like finding a needle in a haystack”. Try to Limit the number of KPIs in a dashboard to 9 or less and keep the visualization simple. The less there is to interpret, the easier it is to understand.

4. Poor Design

“Just because a visualization is beautiful to look at doesn’t mean it’s effective”. Try not to just create visuals and dashboards, design them. If possible, work with designers to ensure that visualization is effective.

5. Bad Data

Unexpected results in visualization may mean that you’re using bad data. A good visualization can also be used to spot errors in data and you need to address these issues before presenting, don’t let the visualization take the blame for poor data.

Thesis proposal includes most of the findings from visualization literature review. One of the most important learnings is that informative outcome from already collected data should be presented as a simple Dashboard, keeping the graphs in minimum in order to avoid visual Cluttering.

Data can be presented in a graphical way, for example with lines, bars, colored areas, gauges, or just with a simple red/green indicator. But on the other hand, in some cases, it may be more effective to use a simple list of values instead of these graphs. This totally depends on the purpose of the dashboard (Lai and Hacking, 2011). I have chosen only two of the Key Performance Indicators to be shown as a graph; discounted cash flow and incremental sales and margin development over the years. Everything else is simply presented in a numerical format, just divided into two section based on the purpose; General Information and Financial KPI’s.

4.3.2 Life Cycle

Comparing different stages, gates or milestones in development life cycle is currently lacking from many business case processes. Development projects often fail, or the outcome value is nowhere near to original approved an original development plan. Also budgets can extent significantly and schedules often have delays. There are organic reasons for this kind of performance, many times the reason is simply that firs plans must be overly optimistic in order to be noticed by investors or internal approvers. Vice versa, sand backing is a well-known problem in planning as being slightly conservative in early stages may increase people's changes for better incentives when actual success rates are measured.

Product life cycle cost analysis, customer involvement, and cost management are three factors likely to have strategic importance to the enhancement of a firm's competitive advantage (Lee and Epstein, 2012). We also need to remember that products or service's life cycle only begins when it's launched and therefore it would be beneficial for future learning and risk reduction, to understand if there's a trend in current planning process that leads into incorrect interpretation of the risks and opportunities. Trends as such should be easy to be diverted into more desired direction, they just need to be recognized first.

Some of the variances can be explained by the changing requirements or including more features into project, but whatever the reason, these changes should be measurable in a trend form. One of the common causes of project failures is that the project sponsor demands that the project manager must finish the job by a certain time, within budget, and at a given magnitude or scope, while achieving specific performance levels (Heagney, 2011). According to Heagney, "Cost is a function of Performance, Time, and Scope", i.e. $C = f(P, T, S)$.

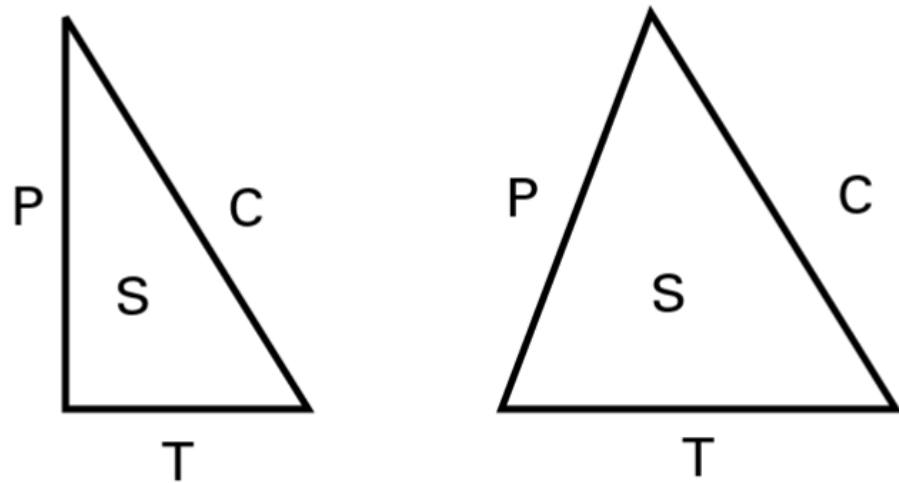


Figure 6 - Heagney's Triangle for Cost, Performance, Time & Scope

After having interviews in CSA, and openly discussing about the issues related to changes in development life cycle, I came to a conclusion that comparing all different variable in all development stages may not be feasible in business case planning. Instead of researching literature on life cycle analysis, it's more valuable to concentrate on creating a new Index to measure changes during the life cycle and therefore have a simple comparison metric which can explain what went well and where some improvements are needed for the future business cases.

Quite conveniently, Heagney's view on relationship between four elements; Cost, Performance, Time and Scope should work at least for some of the variables as a basis for Digital Business Case Index calculation. These elements are easy to measure in different stages of business case life cycle and having a comparison in an Index from should become quite valuable when reviewing back to fluctuations in these variables. Project evaluation appraises the progress and performance of a job and compares them to what was originally planned (Heagney, 2011).

4.3.3 Scenario Planning

Review and later on the proposal are almost fully based on one book, Business Model Renewal by Linda Gorchels (McGrawHill). This is a comprehensive collection on what's needed in scenario planning and how this information impacts the planning process and outcomes. A planning process of Scenario Development is divided into five separate steps, each suitable for both existing organizations and new companies such as start-ups:

1. Define the Scenario Development Team

In order to gain enough perspective and understanding of different function, it's important to involve people with diverse experience into planning process. Comprehensive scenarios rarely are developed by one person.

2. Identify Drivers of Change

After a team is assembled, it's time to define the external variables (Drivers). The team should identify for example technological innovations; industry shifts or any other key factors or events that can change the future of the organization during the planning process.

3. Create Scenarios

Now, as we have the team and the possible drivers in place, it's time to think about the different extremes that particular variable could be and to create stories about the future and how different scenarios are linked to each other.

4. Determine How to Be Successful in Each of the Scenarios

For this step, team needs to determine a customer definition (where to compete and a value proposition (how to win).

5. Seek Common or Agile Components and Establish Strategic Direction

Scenario planning is about finding a range of plausible futures and at the same time, making the decision on the way forward. One approach is to find common elements in all scenarios and then modify the strategy in order to minimize risks. Another approach is to find a dominant scenario and move on with that one. Top tips for an effective Scenario Development and enablement of deeper insight into drivers of change are: Allow the process to provide a safe haven for contrarian thinking, don't ignore extreme scenarios and don't allow your firm to become paralyzed by too many options (Gorchels, 2012).

We also need to keep in mind that most of the time different scenarios may not be significant strategic variables, but for example, managers may just want to see the impact from removing one person or subcontractor from the team to do something else and see how this impacts to schedule, payback time or cash flow.

Learnings from this literature review are combined with CSA interview findings and a result in a final proposal is an adjustment spectrum that that can be used to adjust one or several variables and then calculates to overall impact to related elements, i.e. cash flow and incremental revenue and margin.

4.3.4 Business Case

Business Case can be described as a cost and benefits analysis to evaluate whether it's worth investing into one particular idea or find alternatives. The Business case should predict the outcome if this decision is taken and it's important to approach case building as ammunition for decision making. The process of

developing a business case begins with answering the question of why you are considering this concept at this time (Gorchels, 2012).

So overall idea and reasoning for having Business Cases in use, is to support decision making process by having an analytical and objective way to research alternatives. Ideally these elements should lead to high quality actions that can later on be compared to original plan and variance can be clarified and analyzed. Business case planning should also support budgeting, which can serve several crucial functions including the provision of a framework for judging performance (Lee and Epstein, 2012).

Janusz Kacprzuk is reviews advantages in intelligent decision making in Handbook on Decision Making by separating the six different elements of decision quality (Kacprzuk, Lakhmi C and Cheng, 2010):

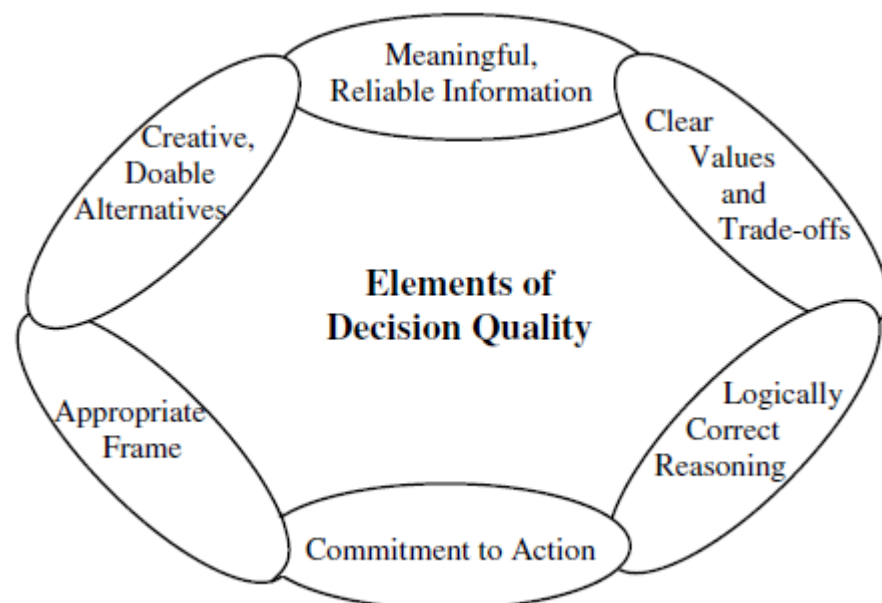


Figure 7 - Elements of decision quality by Kacprzuk

Business case development is the process of realizing the business case as an 'artefact', by gathering and analyzing data to define and valuate evaluation criteria, presenting it in documents, spreadsheets or presentations. It may take place

before project execution for investment appraisal, during project execution for continuous monitoring and control, or after project execution for organizational learning (Putten, 2012).

Development can be hard and complex work and there are several constraints coming from limitations of available tools, i.e. spreadsheets, or simply just from lack of knowledge and limited communications. There are two barriers to good planning. The first is prevailing paradigms, and the second is the nature of human beings (Heagney, 2011).

In this Thesis, scenarios above and different versions of Business Cases can be linked directly into decision making process by considering them as detailed steps (Christensen, 2006):

- Objective of the decision
- Create a context for success
- Frame the issue properly
- Generate alternatives
- Evaluate alternatives
- Choose the best alternative

Companies typically measure their proposed capital appropriations by only one or two of the following yardsticks; return on investment, payback period, cash flow or discounted present value. None of these is the right method. To understand a proposed investment, a company needs to look at all four (Drucker P, 1998). Working harder, being smarter, investing more aggressively, and listening more absolutely to customers are all solutions to the problems posed by new sustaining technologies (Christensen, 2006).

The final Business Case proposal in this Thesis will include several findings from above literature review. It can provide information on funding requirements gives comparability with other investment proposal and most importantly, provides an objective background support for decision making process. We also have an opportunity to develop measurement methods that will be common to an industry or

across industries. While this should not be overdone, one reason financial measures carry such weight is that they are assumed to be a uniform metric, comparable across divisions and companies, and thus a valid basis for resource allocation decisions (Eccles, 1998).

4.4 Experience

So far I have gained several years of experience in Business Case creation and planning from several companies and it makes sense to use this background as a platform for experience framework. I've also shown this plan for several stakeholders in product development environment and collected their improvement ideas in order to develop further knowledge in addition to CSA findings. This knowledge combined with CSA and Literature Review provides a solid background for actual tool development as looking at required and desired functionalities from several different angles is more fulfilling than relaying in just one source of suggestions.

Data Entry Simplification – This is a vital part of the development process, however mainly covered in this Thesis based on combination of CSA findings and my own experience. A successful application must be straight forward and systematic support for users as matters inside development are already complicated enough. In order to make new tools desirable for intended user group, it must be user friendly and self-directive with minimal amount of constraints coming from the fact that planners should have at least some business understanding.

Ideally any simplified tool should work without instructions, but in financial planning this might be too strong statement. Satisfactory level should rather be that users find a new tool easy to use and not requiring to fill data that is not relevant for initial investment decision making process.

Version Control – Currently this is a huge issue as ownership in Excel spreadsheet planning is fragmented and there's always a risk that different stakeholders are reviewing a different version of a business case. Only way to avoid having incorrect data and information in decision making point, is to freeze business case

amendments after approval and store this tool in shared place, without different versions.

The future development of this tool, a possible mobile application, makes the version control easier as all the data in Digital Business Case platform will be stored centrally in the cloud service, differed versions are not available as soon as all amendments in business cases are approved. However, this first Excel-based tool can be seen as a major step towards one version policy.

Remote Access – All business cases should be available remotely with different mobile devices. Once again, storing these plans in cloud servers helps here as access can always be gained via internet. Desktop saving shouldn't be allowed for different versions or scenarios.

This was one of the main discoveries in CSA as well as Interviewees see remote access as a solution to version control issue as well. By having all Business Cases stored in a cloud server, we can make sure that only one and the most the current version is always used.

Information Output – Dashboard report helps to create a structured and an informative platform for carefully designed information. Output must be visually impressive and quality of information must be good enough to be used in operative and strategic decision making. This must also be available in a user friendly format for tablets, mobile devices and different desktop & laptop web clients.

It's also important to document what is behind every number or graph in a Dashboard report as the questions usually populate from viewing the information. If an investor wants to know for example why there's a discrepancy between different cash flow output formats, explanation must be found quickly or opportunity to secure funding may disappear.

Scenario Planning – One of the key new elements will be Adjustment Spectrum which is available for all business cases planned with this application. This gives

flexibility in planning process as an impact from different variable can be taken in count while creating a plan. However, we still need to keep in mind that only one version will be available at any given time and therefore a consensus must be found between different scenarios before plans are approved in gate review process.

Building this feature into toll will benefit development team as they can ideally see straight away, what's the impact in overall project when one variable changes. Development projects usually suffer from delayed schedules and exceeding budgeted costs, therefore it's beneficial to have visibility on overall impact to for example future cash generation. This may support the idea of re-thinking resource allocation or maybe be more optimistic with sales predictions and so on.

Lifetime Analysis – Development plans are rarely reviewed after the product or service launches, mainly due to lack of a structured way of evaluating the planning accuracy. Companies need to be able to find out whether the trend in planning lifetime is showing significant variances between approved plans and what actually happened when project was ready.

DBC Index is calculated from beginning of a business case lifetime cycle. An index for a first approved version can be 100 or 10 and then a new index is automatically calculated later on in different gates. If the index goes up, development is going better than expected in the beginning, and vice versa, index going down is bad news. This reduces a risk of creating too optimistic or conservative plans in the beginning as participants know that accuracy will be measured throughout to process.

After Thesis objective is set up, research process follows fairly straight forward path with CSA, literature review and actual business case tool proposal in the end. Work is to be distributed between interviews, literature and writing down existing knowledge while taking notes on possible tool features and dashboard outcomes. Turning input data into key figures and graphs may require significant

amount of work, depending on final requirements for usable functions within the tool.

5 Proposal for a New Solution

5.1 An Overview

Issues identified in Current State Analysis are fairly easy to be investigated and analyzed. **Data Visualization** was the issue that came obvious after interviewing different stakeholders and the gap between desired state (How Important) and current state was the highest among **Version Control**. Also development **Life Cycle** and **Scenario Planning** were seen as important factors, and therefore these areas will gain main emphasis in the actual development proposal.

Problem	Solution	Benefits
Data Entry Requirements	Standard entry with limited input	Guides users to think about vital information
Version Control	Application with Cloud data storage	All users see the same information
Remote Access	Mobile and Browser access	No need for Spreadsheets, Dashboards always available
Informative Output	DBC Dashboard	Compares Apples to Apples, informative support for investors
Scenario Planning	Adjustment Spectrum in Dashboard	Users can adjust different elements and see impact immediately
How to gain investors interest?	DBC Marketplace	Public projects can be viewed by anyone
Roadmap Budgeting	Gate to Fiscal Year conversion	Individual projects can be added directly into budgets
Business Case Lifetime Analysis	DBC Index	Comparing Cases in different stages makes future forecasting more accurate

Figure 8 - DBC “Problem-Solution-Benefits” -table

Current **Strengths** included simplicity in one of the case companies; this must be applied into general proposal as well. This doesn’t mean only straight forward technical simplicity, but also having specified people allocated into different development cycles all the time. Current way of handling business cases was also relatively light weight in all companies and at the same time agile as only limited number of people was assigned in the process.

Weaknesses included one similar element to main risks; currently business cases are unrealistic, too optimistic and therefore misleading. This leads into next

improvement area, following up the life time development of business cases doesn't exist at the moment and therefore it's difficult to improve accuracy as people in general don't know what went wrong with previous ones. Development sites also want to get rid of using Excel spreadsheets as a primary tool for business case planning and add more visualization into dashboards reporting.

Logic in *Conceptual Framework* follows the findings in CSA; focus must be in current risks and weaknesses; this includes also the scoring results from questionnaire. There's a wide range of articles and literature available within these topics and existing knowledge comes mainly from my own work experience in in this field. I've also interviewed another expert from EY in order to gain improvement ideas and possible application development tip's, including where to find seed funding if it we decide to build an actual application.

5.2 A Roadmap

Schedules for building an actual Excel tool development and this Thesis work were mostly parallel. Once the CSA was done, Excel tool development started and process roadmap started following the progress of literature review as well. When something new was recovered, for example a need for DBC Index calculation, information was included into Excel tool and written down into Thesis documentation.

Design for both data input and a dashboard report has changed several times as more information was covered on the way. I also reviewed the content and functionality of tool with some of the interviewees while it was developed and applied suggested changes.

Another point worth mentioning is that while this Thesis has been accelerating, I've also met possible partners and presented the idea and actual work for them. Ideally there will be funding available for an actual application development at some stage, Thesis itself would work as a foundation of the future addition into a roadmap.

5.3 Proposal Development

Once all the requirements to fulfill current and future demand for this application were clear, calculation methods got finalized in Excel. Some additional formulas were added based on latest feedback. This was also a trial and error type of an exercise, all calculations were tested several times and final proposal did change from original one as logic for information output was reviewed several times.

In general, it can be said that Action Research & Agile methods have been partially used to understand current situations of possible application users prior to actual development work has been started.

- How organization works, what are the critical events, how to collect relevant data?
- Who is involved, what we know & what we think we know?
- Are these real events which must be managed in real time?

“Turning familiar situations, timely events or special expertise into objects of research, rather than neglecting “at hand” knowledge or expertise.” (Coghlan and Brannick, 2014).

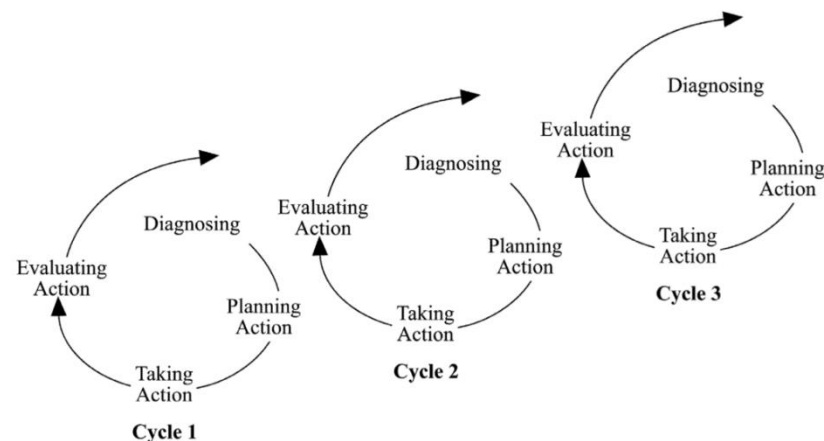


Figure 9 - Development Cycle according to Coghlan and Brannick 2014

Initial solutions for the business challenges identified in CSA did evolve while more knowledge was gained via different versions and testing. Final proposal looked a lot different from drafted plans, but this is not a negative thing as development cycles should result as a better outcome. Also the fact that possible future application developer was involved in the process did have an impact in final proposal as all functionalities must be feasible in tool development.

5.4 A Model

Digital Business Case model includes two main features. First one is the **Data Input** function, which directs users throughout the planning process to include all the necessary elements but at the same time to keep it simple and fast to fill in. One of the key elements in the CSA findings was “Data entry simplification” and this is also vital for tool’s workability, keeping in mind that first version of this tool will be aimed towards small and start-up businesses.

Second part of a new model is a **Dashboard** report, which is combined and calculated output for all elements needed in Data Input. Report shows main costs and benefits for the development plan and is following the learnings from experience and literature review.

Overall Data Visualization is built on simplicity in order to avoid color misuse and visual clutter. There’s only a minimum amount of charts and overall colors, i.e. RGB 38-38-38 for cells and 234-234-234 for text & numbers, and only one font is used, Agency FB. Changes waiting for approval can be highlighted in yellow (255-192-0), this allies to future application only.

Schedule	Scoping	Build BC	Development	Testing	Launch	Volume	Ramp Down
Gate / Milestone	G1	G2	G3	G4	G5	G6	G7
Date	9.7.2016	23.7.2016	31.12.2016	2.4.2017	4.5.2017	1.1.2018	2.2.2022
Passed	Yes	Yes	No	No	No	No	No

Figure 10 - DBC Color scene, highlighting updates

Current Business Case tools (mainly Excel spreadsheets) include data entry fields that are difficult to understand by all participants collectively. The aim for simplification is to make sure that anyone involved in start-up's business planning process can understand what goes into this application and what comes out in a dashboard. At the same time this should make pitching and presenting ideas easier as approach is so simplified that by looking at the dashboard it's easy to understand where information is extracted and calculated from in data input. There's no need to understand formulas behind calculations, just a basic understanding of terms like cash flow, payback time, profit and loss and so on is enough.



Figure 11 - DBC Data Input and Dashboard Report Overview

Referring back to Handbook on Decision Making (Kacprzuk, Lakhmi C and Cheng, 2010), a Business Case format should be able support intelligent decision making and to have all six different elements of decision quality build in:

- *Appropriate frame: As strategic decisions normally result in major, long-term consequences, a team of decision makers from different background is required in the decision making process. As a result, an appropriate frame has to be established, with a clear purpose, conscious perspective, and defined scope.* – In a Thesis tool, development is measured over the period of five years, which usually is seen as a strategic long term time frame.
- *Creative, doable alternatives: Owing to the nature of uncertainty, making a strategic decision needs to consider a lot of alternatives. It is therefore vital to explore all possibilities and to understand fully different alternatives that are available before making a decision. Quality is achieved when a number of different innovative and realizable alternatives are established for consideration.* – This is included by including an Adjustment Spectrum feasibility for Scenario Planning.
- *Meaningful, reliable information: Information quality is very important in influencing strategic decisions. The team of decision makers ought to establish correct and explicit information based on appropriate facts. The uncertainty involved can then be expressed in the form of a probabilistic judgement.* – A new tool is reflecting key findings in CSA, Literature Review and Experience by having vital decision making information presented in a Dashboard.
- *Clear values and trade-offs: Strategic decisions need to take into account a variety of trade-offs, which include trade-offs between present and future returns, trade-offs between risk and certainty, as well as trade-offs among different criteria. As such, explicit statements of fundamental values need*

to be established. – Cannibalization calculations of existing products or services represent Trade-Offs in developed tool.

- *Logically correct reasoning: As strategic decisions are complex in nature, consequences of each alternative on the value measure should be evaluated comprehensively. In this case, a clear choice of the frame, alternatives, information, and values is necessary in order to allow logical reasoning to be conducted.* – Dashboard report is pinpointing Payback Time, Discounted Cash Flow and Incremental Sales and Margins, which all support Investor's evaluation.
- *Commitment to action: In any decision making process, a full commitment to put the action plan into implementation is a significant factor of ensuring success. Without commitments from all parties involved, it is unlikely to obtain any useful and beneficial results, even with the most sophisticated and comprehensive action plan in hand.* – DBC Index measures Commitment and Accuracy of the Results over the new technology's products or services life-cycle.

Once data entry for all required fields is done, information can be sent to dashboard and at the same time for approval by business case owner. This is vital in order to make sure there's only one set of approved figures and therefore reduces risk of presenting misleading information.

5.4.1 Data Input

First set of required data entry is related to projects general information. The scope can be selected between "Technology Development", "New Product Introduction", "Software Development" and "Other" such as service development plan. Objective, Strategic Fit and Roadmap fields are used to explain why this particular project is important and how finishing it is going to support existing business.

Scope	New Product Introduction						
Project Title	An Illustration for a Thesis.						
Objective What's the problem to be fixed?	Shows the input and output (Dashboard) for a Thesis model.						
Strategic Fit Why is this important?	To get all calculations tested and data visualization presented.						
Roadmap What needs to be done?	Fill all required fields for a new product, with existing sales, and view a Dashboard report.						
Schedule	Scoping	Build BC	Development	Testing	Launch	Volume	Ramp Down
Gate / Milestone	G1	G2	G3	G4	G5	G6	G7
Date	9.7.2016	23.7.2016	31.12.2016	2.4.2017	4.5.2017	1.1.2018	2.2.2022
Passed	Yes	Yes	No	No	No	No	No
Currency	EUR						
Adjustment Spectrum	30.0%						
Interest Rate	6.0%						
WACC	8.0%						

Figure 12 - DBC Data Input fields for General Information

Schedule is divided into seven separate gates; the planned date always represents the target when each gate should be approved. Once approval is given, status on Passed field updates from “No” to “Yes”. There are currently three currencies available for this tool, EUR, USD and GBP. Adjustment Spectrum % defines the range used in Scenario Planning later on. Interest rate is used to calculate discounted cash flow over the becoming years and Weighted Average Cost of Capital (WACC) rate calculates the opportunity cost related to each project.

Approvers are listed in Data Input as all changes and gate passing's must be approved by all owners listed here. This is the vital part when making sure that there's only one set of numbers and information available at any given time. A dashboard report should only update when all changes are approved. Once something is changed in Data Input fields, color will turn red for that particular

field and only when change is approved by all owners, color will turn back to white and a Dashboard updates automatically.

Owners	
General Manager	general.manager@email.com
Product Manager	product.manager@email.com
R&D Manager	development.manager@email.com
Finance Manager	finance.manager@email.com

Figure 13 - DBC Data Input fields for Approvers

Profit and Loss plans for a new product, existing product with a new project and existing product without a new project fields are used for Incremental sales and margin calculations, including cannibalization, are included in a dashboard report. List of details needed in this area is quite long, but this helps to format honest and creates transparent scenarios on a range of plausible futures.

This part of the planning can be seen as a miniature skills test as well; if users are struggling with for example average unit cost or sales price calculations, maybe they should look for additional support before moving further with planning process. After all, purpose of this tool is to provide investors and decision makers accurate and trustworthy outcome and people presenting them must know how information is created.

It's also vital to review what happens to existing sales i.e. cannibalization, if there are similar sales items in the market already. Incremental change, which takes all variable in count, is more valuable in decision making process than just planning for new sales and margin. Impact to additional sales opportunities, such as accessories and services, is also beneficial as these elements may have a significant positive impact in long term planning.

	2017	2018	2019	2020	2021
New Product Profit & Loss					
Units to be sold - Qty	500	1 500	2 500	3 500	5 000
Average Unit Sales Price	1 000,0	980,0	950,0	900,0	850,0
Average Unit Cost	400,0	380,0	350,0	320,0	300,0
Accessories Sales Value	10 000,0	20 000,0	30 000,0	50 000,0	100 000,0
Accessories Costs	1 000,0	1 900,0	2 700,0	4 500,0	8 000,0
Services Sales Value	10 000	25 000	50 000	100 000	150 000
Services Costs	5 000	12 500	25 000	50 000	75 000
Other Cost of Sales	2 000	4 000	8 000	12 000	15 000
Existing Products P&L with new project					
Units to be sold - Qty	500	200	-	-	-
Average Unit Sales Price	750,0	750,0	-	-	-
Average Unit Cost	380,0	400,0	-	-	-
Accessories Sales Value	20 000,0	15 000,0	10 000,0	5 000,0	-
Accessories Costs	3 000,0	2 800,0	2 000,0	2 000,0	-
Services Sales Value	25 000	15 000	10 000	5 000	-
Services Costs	15 000	6 000	5 000	2 000	-
Other Cost of Sales	5 000	5 000	3 000	2 000	-
Existing Products P&L without new project					
Units to be sold - Qty	700	600	500	200	-
Average Unit Sales Price	750,0	730,0	680,0	550,0	-
Average Unit Cost	370,0	380,0	400,0	400,0	-
Accessories Sales Value	25 000,0	23 000,0	15 000,0	10 000,0	5 000,0
Accessories Costs	4 000,0	5 000,0	3 000,0	2 000,0	1 000,0
Services Sales Value	30 000	25 000	15 000	8 000	5 000
Services Costs	18 000	8 000	6 000	3 000	2 000
Other Cost of Sales	7 000	6 000	5 000	3 000	1 000

Figure 14 - DBC Data Input fields for P&L

A chosen time period is five years as it fits into both strategic and short term planning. This timescale also helps seeing impact on annual budgeting as tool can convert gate stages into fiscal years by splitting each gate into days and then allocates costs into relevant years. Longer than five years would decrease accuracy towards to end of planning cycle, however long term planning usually requires full five years of planning based on my own experience.

Investment Costs	Scoping	Build BC	Development	Testing	Launch	Volume	Ramp Down
Gate / Milestone	G1	G2	G3	G4	G5	G6	G7
Total Labour Cost	6 100	19 000	375 000	189 000	79 000	110 500	20 600
HC Group 1 Name	HW Development						
Cost per hour	100	100	120	120	105	105	120
Total hours qty	10	40	2 000	600	200	500	30
Total cost	1 000	4 000	240 000	72 000	21 000	52 500	3 600
HC Group 2 Name	SW Development						
Cost per hour	150	150	150	150	160	160	180
Total hours qty	10	20	500	700	200	200	50
Total cost	1 500	3 000	75 000	105 000	32 000	32 000	9 000
HC Group 3 Name	Product Management						
Cost per hour	120	120	120	120	130	130	160
Total hours qty	30	100	500	100	200	200	50
Total cost	3 600	12 000	60 000	12 000	26 000	26 000	8 000
Other Cost Elements	Scoping	Build BC	Development	Testing	Launch	Volume	Ramp Down
Outsourcing Costs	-	-	250 000	200 000	40 000	30 000	40 000
Materials Costs	-	-	200 000	150 000	60 000	30 000	30 000
Other Costs	-	-	150 000	50 000	80 000	20 000	40 000
(-) External Funding / Grants	-	-	-	-	-	-	-
Total	-	-	600 000	400 000	180 000	80 000	110 000
Total Development Cost (Excl. Funding)	6 100	19 000	975 000	589 000	259 000	190 500	130 600
Capitalization %	0,0 %	0,0 %	100,0 %	100,0 %	100,0 %	0,0 %	0,0 %
Depreciation Period in Months	36						

Figure 15 - DBC Data Input fields for Development Costs

Investment Costs are estimated for all cost elements, including Labor, Outsourcing, Materials and Other Costs. Also all possible External Funding, such as Tekes, can be estimated in this field. Total Development Cost is calculated already in Data Input in order to make Capitalization estimation easier. Capitalization percentages can be added for each Gate and Depreciation Period in Months helps to calculate future P&L impact for activated costs.

Different HC Groups (Headcount based on different roles) are used here because salary costs may have significant variances between different headcount groups. Having this allocation in a planning stage also makes comparison between

planned and actual costs easier in future as well. There are overall six different HC groups available in tool, below illustration only shows the active one's in a Thesis planning scenario.

Last part of data input is filling in total market size; market share is the automatically calculated from sales information. Risk Rating helps to estimate Net Present Value (NPV) of a project. Higher the Strategic, Market, Customer and Business Risks are, lower the present value comes.

Market Information	2017	2018	2019	2020	2021
Total Market Size (MS) EUR	1 000 000	3 000 000	6 000 000	8 000 000	10 000 000
MS % - Current Products & Technology	58.0 %	16.2 %	6.2 %	1.6 %	0.1 %
Risk Rating 1 (Low Risk) to 10 (High Risk)	5.0	3.5	2.3	2.3	2.8
Strategic Risk	5	4	3	2	3
Market Risk	5	3	1	2	3
Customer Risk	5	4	2	3	3
Business Risk	5	3	3	2	2

Figure 16 - DBC Data Input fields for Market Share & Risks

5.4.2 Dashboard Report

The aim for this kind of dashboard is to make sure that possible funders, i.e. Venture Capitalists, can compare different proposals like apples to apples and therefore reduce the risk of misunderstanding the value of a project. Dashboard report is a one pager that shows all relevant information in a simple format, visually focusing on discounted cash flow and incremental profit and loss impact. Cash flow forecast is vital for all companies as it predicts when next funding round is required or can operating profit cover the costs in the future.

This Dashboard report follows the guidelines defined in a Literature Review (Christensen, 2006); it is objective of the decision, creates a context for success, frames the issues properly, generates alternatives, evaluates alternatives and helps to choose the best alternative.

First section of a Dashboard report indicates the key dates for development schedule by showing how many days are left before next gate review, how many days are left into planned product launch and what is the next gate. This information can be used by development team and dates can be updated on data entry fields, then they just need to be approved again by owners.

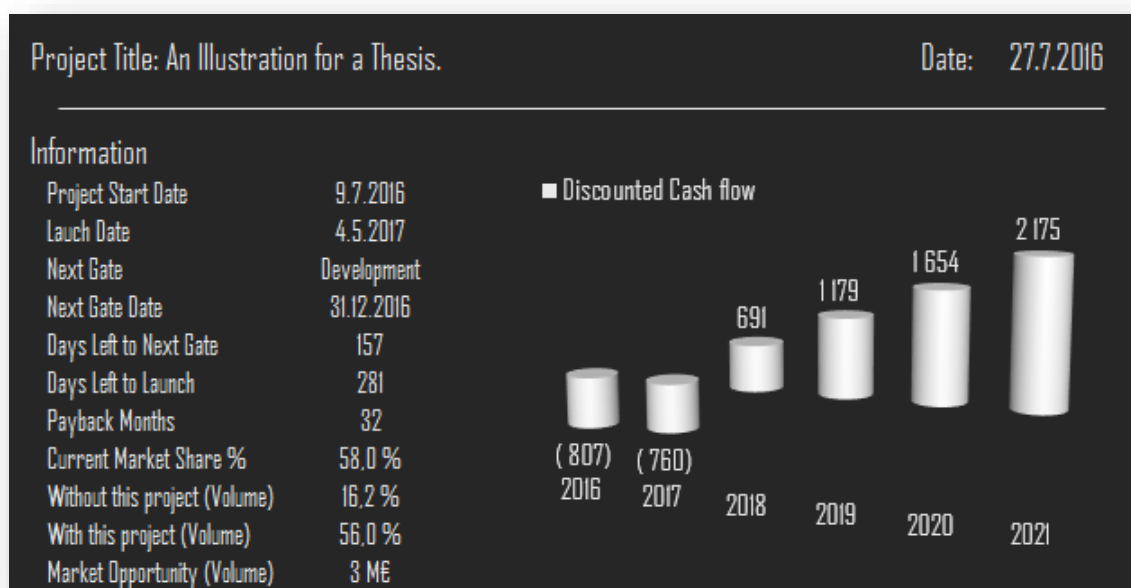


Figure 17 - DBC Dashboard General Information

Discounted cash flow a key visual indicator in a first section of a dashboard report, aiming to clearly show when project is becoming self-funding and how much it can create cash annually during the five-year period. This data also relates directly into Payback time, which is reported in months from starting the project, i.e. when the first costs start accumulating. Market information highlights impact to overall market share and compares two events; what happens to market share at the time of volume gate approval if we decide to move on with a new project or we stay with old offerings.

Report supports budgeting as it turns different gates into calendar years and therefore helps companies to get exact sales and costs numbers for each fiscal

year during development. Once the actual costs start appearing, this budget data can be used for variance analysis and updates can be done immediately.

Key Figures €'000	NPV 32 % 4 051	Total Net Cost 1 839	Incremental Margin 65 %	Total Cash Flow 4 133			
Financial KPI's €'000	2016	2017	2018	2019	2020	2021	Total
Total Incremental Sales	-	360	1 209	2 105	3 182	4 490	11 346
Total Incremental Margin	-	227	777	1 404	2 089	2 910	7 407
Project Cost incl. WACC	(1 087)	(1 115)	(0)	-	-	-	(2 202)
Gross Project Cost	(1 007)	(1 032)	(0)	-	-	-	(2 039)
External Funding	200	-	-	-	-	-	200
Net Project Cost	(807)	(1 032)	(0)	-	-	-	(1 839)
Capitalized Costs	591	1 032	-	-	-	-	1 623
Depreciation Cost	-	(316)	(541)	(541)	(225)	-	(1 623)
Discounted Cash Flow	(807)	(760)	691	1 179	1 654	2 175	4 133
Cumulative Investment Multiplier	-	0.1	0.5	1.1	1.9	3.0	3.0

Figure 18 - DBC Dashboard Key Financial Information

Investors get all the key financial information from dashboard and therefore they can justify their funding decisions ideally on one report. Of course this should lead to further clarifying questions towards business planners but at the same time, they should be able to explain output via data input they have done before. This also reduces investors time spend on investigating different proposals as they can just pick up the most interesting one's and see the difference immediately.

Incremental Sales and Margin includes effects from cannibalization caused to existing products or services. Project cost including WACC take opportunity in count, i.e. money could be used to pay dividend or loans instead of investing into this project. Gross project cost excludes all external funding and vice versa, Net cost includes funding. Depreciation starts when capitalization ends, usually this means passing the product or service launch gate. Total Discounted in this field

represents cumulative value, including annual allocation. Cumulative Investment Multiplier indicates the relationship between project cost and incremental margin.

Adjustment Spectrum helps with scenario planning, for example by reviewing how increased development costs impact to cash flow forecast and payback time. On the other hand, different kind of scenarios can be built in order to find out the best schedule and cost for each plan. Scenario planning availability was one of the key findings in CSA as there's no such function available currently.

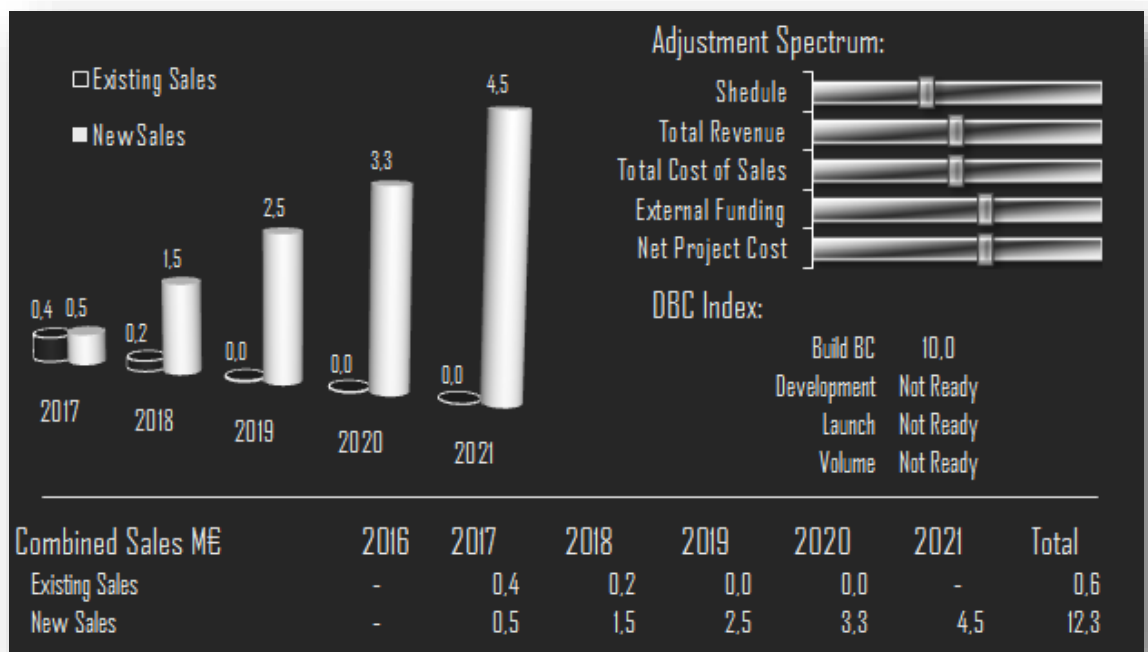


Figure 19 - DBC Dashboard Incremental Sales & Adjustment Spectrum

After identifying the Drivers of Change, Adjustment Spectrum was included as a percentage field in Data Entry as for some users even a small variable, such as 10% might be significant for overall business plan, and for example start-up's may want to use wider range when building different scenarios. Gorchels listed five separate steps for scenario planning, which are visible in Literature Review. However, only two of them are relevant to this approach; Identify drivers of change and create scenarios.

DBC Index helps both planning team and investors to retrospectively see how accurate original, approved plan was and what are the key learnings when creating next business cases. This is also an answer to weakness that came up in CSA; How to improve Life Cycle planning? A “Build BC” is always fixed, for example 10 and then in next stages; Development, Launch and Volume, the Index is automatically calculated again after each gate is approved. This creates an Index that helps to find the trend in development life cycle – Less than 10 means weakening trend in planning and higher than 10 means that project is more successful than was originally planned.

Individual elements used for life cycle index follow partially the “Heagney's Triangle” for Cost, Performance, Time & Scope analysis referred in a literature review. A working Excel tool was developed along with writing this Thesis and it take in count following criteria for Index calculations; Revenue, Profit, Cost and Net Present Value. This means that Time and Scope are excluded from Index, and replaced with slightly more relevant NPV.

5.4.3 Calculation Formulas

All calculations in a Dashboard output are based on actual Excel formulas. These are tested with several Business Case scenarios and validated while planning for actual product output. Actual calculation formulas can be found in an Excel tool, which is a second Appendix in returned Thesis. Listing the formulas into this Thesis workbook would not add any value as a “Dashboard” report links into separate calculations tap called “Information Output”, which picks data from “Data Input” tap in Excel.

As this Thesis is a public document and a new tool may be used as a platform for an application development later on, publishing calculation formulas would also risk some of the potential intellectual property protection in the future.

5.4.4 Terminology and Definitions

As a purpose of the final product is to be as simplified as possible, and it's vital to explain what is meant by terminology in different parts of the planning process. The list of definitions is created to clear some of the confusion, however trying to keep focus on explaining these shortly.

Term	Definition
Data Input:	
Adjustment Spectrum	Percentage that defines the range of Scenario Planning
Interest Rate	An estimated annual rate for present value calculations
WACC	Weighted Average Cost of Capital
Capitalization %	Percentage of development costs activated into Balance Sheet
Depreciation Period in Months	Time period for depreciating the activated costs
Dashboard:	
Payback	How long it takes to gain invested funds back
Discounted Cash Flow	Cash flow in today's money including the interest rate
Net Present Value	Total Margin multiplied by a combined risk factor
Gross Project Cost	Costs excluding external funding and WACC
Project Cost incl. WACC	Costs deducted by WACC rate
Net Project Cost	Costs including external funding
Capitalized Costs	Costs activated into Balance Sheet
Depreciation Cost	Release of activated costs into P&L
External Funding	For example Tekes
Incremental Sales	Sales including a cannibalization impact from current products or services
Incremental Margin	Margin including a cannibalization impact from current products or services
DBC Index	Life cycle index to measure accuracy of planning

Figure 20 - A List of Definitions

Terminology is divided into two separate parts, Data Input and Dashboards, following the logic of an actual business case tool information flow. The list only includes terminology used in a tool, without covering all the abbreviations in this Thesis document.

6 Conclusions

Purpose of this Thesis is to bring clarity into business case planning process and support small companies and start-up's in their strategic and operational work by making forecasting process easier. After all, product and technology innovation should be areas where these companies spend most of their time, not filling excel sheets and in the worst case, filling them wrong and producing misleading information towards potential investors and to themselves. Once the planning process is well structured and supports management in making evaluations with the correct ingredients, we can also avoid information overflow, which could push decision makers (including managers, owners, and stakeholders) to select partial information subsets (Lee and Epstein, 2012).

Along the way I've also learned that Thesis work like this one can be used to encourage companies to innovate freely, build different scenarios and visually understand what is needed to make future investments reliable and profitable. We can now pinpoint the importance of required cash flow, calculate the incremental impact from new technologies and products, estimate the payback time and returns for venture capitalists and build budgets for different fiscal years on detailed levels.

Hopefully this work helps companies to improve their planning processes and some of the key findings will be taken in use. Companies need business cases in order to plan their future in a structured and reliable way. There are countless different ways of doing this and at the moment a lot of time is wasted in small and big organizations. Unnecessary confusion is created due to lack of **thoughtful** and **affordable** application that is easy to use and available for all. I hope this Thesis work triggers a development process for an actual digitalized application at some stage.

Having been done this exercise in a small scale, next step forwards is to extend knowledge and planning procedures and implement a Digital Business Case platform also for bigger businesses, with several development programs and full

roadmap planning in mind. Meanwhile an actual application development process hopefully continues and a first version will be introduced soon. Corporation version will follow if funding is secured and right partners for business are found.

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Interviews

Interview 1



Interview_SN.pdf

Interview 2



Interview_MV.pdf

Interview 3



Interview_VS.pdf

Excel Tool

Excel Tool



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