Business cases in the world of geo data - quantifying benefits

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Key words: Business case, geodata, quantifying benefits

SUMMARY

Focusing on the public sector, there is internationally a growing use of business cases as a high-level decision making tool due to an increased focus on projects with "value for money". Well carried out, a business case offers a panoramic view on the broad spectrum of costs and benefits (both monetary and non-monetary), and provides the management board with a sound tool for decision-making.

Taking Denmark as an example, the paper explores how business cases are being used as a decision making tool in the public geodata sector. The paper explores whether business cases regarding decision-making in the area of geographical data differ from other areas in the public sector. Especially the paper focuses on the notion that the societal benefits of geodata often are regarded as very hard to quantify, which may impede projects with a geo data focus. Lastly, building on experiences from the Danish Geodata Agency, the paper outlines a model that may help taking the first steps when building a business case.

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1. INTRODUCTION

Focusing on the public sector, there is internationally a growing use of business cases as a high-level decision making tool due to an increased focus on projects with "value for money". Well carried out, a business case offers a panoramic view on the broad spectrum of costs and benefits(both monetary and non-monetary), and provides the management board with a sound tool for decision-making.

Taking Denmark as an example, the paper explores how business cases are being used as a decision making tool in the public geodata sector. The paper explores whether business cases regarding decision-making in the area of geographical data differ from other areas in the public sector. Especially the paper focuses on the notion that the societal benefits of geodata often are regarded as very hard to quantify, which may impede projects with a geo data focus. Lastly, building on experiences from the Danish Geodata Agency, the paper outlines a model that may help taking the first steps when building a business case.

2. WHAT IS A BUSINESS CASE?

In general, a business case is a document accounting for the conditions that motivates the need for changes in a company or organisation, e.g. organisational changes, strategy changes or the importation of new technology. Typically, a business case firstly display precise arguments for a change or the implementation of a project, followed by the problems and costs the changes will cause, plus an assessment of the benefits - both monetary and non-monetary (Bukh and Ehlers 2005).

Even though the focus of a business case is both monetary and non-monetary, a business case is most often synonymous with a "financial case". As a rule, business cases focuses also mostly on decisions regarding investments and especially the return of the investment. However, more seldom business cases are also used for projects regarding strategic planning where the focus is to identify risks, different scenarios, or evaluate alliances and partnerships (Bukh and Ehlers 2005).

Regarding the structure of a business case, no universal model exists. However, a business case in general is build from five elements (Bukh and Ehlers 2005):

- Introduction and overview
- Presumptions and methods
- Meaning for the business
- Sensitivity analysis and risk
- Conclusion and recommendations

3. THE BUSINESS CASE-MODEL IN THE DANISH PUBLIC SECTOR

Today, business cases are used more and more in the Danish public sector, especially within the sector of digitisation. In fact it is often a demand for the acceptance of bigger investments within this sector. A circular from 2008 hence states that IT-projects with a budget above €1.5m must compose a business case, while it is urged that also projects with smaller budgets compose business cases. The circular states that one of two models must be used. The below sections shortly will go through the newest model.

Firstly, the model should clearly illustrate the primary objects of the project - efficiency, higher level of quality or implementation of international legislation. With the business case-model the decision makers are able to see, when projects are motivated by an economic potential (and consequently provides a positive business case), and when there are other arguments for initiating and implementing it-projects. (Danish Agency for Digitisation 2012)

Secondly, the model put an increased focus on profit realisation by systematising opportunities for follow up on the project benefits. The model is therefore tied to a financial part that gives an opportunity to follow the resource consumption and not least where in the processes the individual benefits are to be realised. (Danish Agency for Digitisation 2012)

Thirdly, the business case model ensures a more systematic focus on benefits which can not directly be evaluated in budgetary effects. In this manner, the new business case model can handle multiple profit types and systematically compare these. (Danish Agency for Digitisation 2012)

The business case model for IT-projects often requires a significant degree of involvement of stakeholders from outside the project. An example could be the need seek contributions to the completion of the model with a central finance function or similar. This ensures a continuous solid focus on the project's financial management and coordination with the decision makers, project owner and other stakeholders. (Danish Agency for Digitisation 2012)

In addition, a series of terms that are mainly related to the decision-makers are introduced (Danish Agency for Digitisation 2012);

Net present value:
States the sum of the project's costs and benefits over a predefined period - discounted to present value. A positive, discounted value is the target of a positive business case. The project is profitable at a net present value above 0.

Internal rate of return:
Indicates the percentage return for the project. Investments are generally valued a rate of 5 % annually, which means that if a project generates more than 5 % annually, then the internal rate of return is sufficient to initiate the project.

Risk Adjustment:
The business case model for IT projects contains a number of variables for correction of risks. These risks can have both positive and negative effect on the overall project economy - both in relation to net present value and the internal interest. It is therefore particularly interesting to focus on the effects of the specified risks and continually assess whether they are handled properly.

3.1 The general use of business cases in the geodata sector

The model shown above leaves narrow frames on the building of business cases in the Danish public sector. This makes the variation in business cases from the geodata sector quite small at first glance. This is due to the fact, that sub-elements in the businesscases naturally will be the same. At a second glance it turns out that that variety does exist. In one of the examples below there is a duty to provide a business case and in the other the budget is so small, that the project can be initiated without it.

The examples below outline two different business cases, focusing on the elements they consist of.

3.1.1 Geo-referencing buildings

In 2009, the Danish Enterprises and Construction Authority prepared a business case that would identify whether it could be worthwhile to implement a project that on one hand secured a geographical reference for all dwelling buildings in Denmark and on the other hand, developed an IT infrastructure that could show the result on the basis of a cadastral map.
Besides providing the opportunity to make geographic referencing to buildings one of the aims with the project was to develop an IT-based environment that could streamline existing workflows, and consequently reduce the need of resources. The project was estimated to have a project budget of approx. € 2.5m, which triggered the obligation to provide a business case.

The business case was prepared under the regulations that the public sector underlies. To meet the requirements from the above mentioned circular, the business case was made with the following elements:

- Solution Description
- Business consequences
- Implementation and follow-up
- Ownership

The business case contained all the elements from the above-mentioned circular. It was thus possible to identify the objects, it was setting the economy of the project (costs and benefits) and it was specifying the benefits that weren't immediately possible to quantify.

In addition, the business case also handled the three terms NPV, internal rate of return and a description of how the risk adjustment is being performed.

The mean to pursue the objects was to create a more efficient IT-system, to create standardised data formats and to centralise the storage ofd data. All in all the business case indicated that this would result in a calculated benefit of efficiency around € 350.000 each year compared to the status quo.

DKK, Tusinder

	Ar 0	Ar 1	Ar 2	Ar 3	Ar 4	Ar 5
OMKOSTNINGER:						
Forretningsmæssige investeringer:						
Procesdesign	0	0	0	0	0	0
Andre forretningsmæssige investeringer	0	0	0	0	0	0
Forretningsmæssige investeringer total	*0*	*0*	*0*	*0*	*0*	*0*
It-investeringer:						
BG-komponent	1.200	0	0	0	0	0
Kortvindue til BBR-klient	500	0	0	0	0	0
It-investeringer total	*1.700*	*0*	*0*	*0*	*0*	*0*
Øgede forretningsmæssige driftsomkostninger						
Lønomkostninger	500	0	0	0	0	0
Omkostninger til materialer og eksterne services	0	0	0	0	0	0
Andre forretningsmæssige driftsomkostninger	0	0	0	0	0	0
Øgede forretningsmæssige driftsomkostninger total	*500*	*0*	*0*	*0*	*0*	*0*
Øgede it-driftsomkostninger						
BG-kompont - drift og vedligehold	0	240	240	240	240	240
Andre it-driftsomkostninger	0	0	0	0	0	0
Øgede it-driftsomkostninger total	*0*	*240*	*240*	*240*	*240*	*240*
OMKOSTNINGER TOTAL	2.200	240	240	240	240	240
ØKONOMISKE GEVINSTER:						
Forretningsmæssige gevinster:						
Besparelse på den komplekse del af godkodningen	0	4.000	4.000	4.000	4.000	4.000
Besparelse på data sammenstilling og konvertering	0	1.500	1.500	1.500	1.500	1.500
Besparelse på udvikling af nye systemer	0	300	300	300	300	300
Forretningsmæssige gevinster total	*0*	*5.800*	*5.800*	*5.800*	*5.800*	*5.800*
It-gevinster:						
Besparelser på systemvedligehold	0	100	100	100	100	100
Andre it-driftsbesparelser	0	0	0	0	0	0
It-gevinster total	*0*	*100*	*100*	*100*	*100*	*100*
ØKONOMISKE GEVINSTER TOTAL	0	5.900	5.900	5.900	5.900	5.900
PENGESTRØM TOTAL	-2.200	5.660	5.660	5.660	5.660	5.660

Picture 1: A typical chart in a business case - here we see the cash flow chart

To work as a tool for obtaining approval from the decision makers to initiate a project, it is important to emphasize the elements of the business case that supports the initiation. In this case it was rather easy to identify the supporting elements – increased efficiency and therefore a need for fewer resources.

That meant that a number of quantitative benefits were being demonstrated to make the

decision makers convinced that the initiation and follow-through of the project should be performed. The benefits primarily regarded deductions in IT-expenses and FTE[1].

At the same time a few qualitative benefits were mentioned. It was benefits like "open interface" and "More flexible access to the underlying data via open interface and web services". These weren't quantified further in the business case.

So in this case it was pretty much straight forward to build the right business case. The expenses were outlined, the benefits were outlined and the recommendation then was made after simple mathematics.

3.1.2 Modernisation of the cadastral archives (the MAMA-project)

Another project from the geodata sector, where a business case was used, is the project "Modernisation of the cadastral Archives" initiated in the Danish National Survey and Cadastre (now the Danish Geodata Agency) in 2012. The implementation of the project meant that approximately 3000 shelf-meters with analogue archives were to be digitised (scanned and assigned with metadata) and a web application that would allow access to the scanned archive were to be developed.

The project had several objects which differed a lot. On one hand an object was to secure the information in the cadastral archives as they were vulnerable to flooding, fire, wearing etc. Another purpose with the digitisation was to streamline the workflows associated with the cadastral archive which included a lot of time-consuming, manual work (and then reduce the costs to maintain the services from the archive). Finally, it was an object to ensure easier access to the information in the archive while knowledge of the contents wished to be anchored wider among the users of the archive.

The circular that outlines the frames for the preparation of business cases is aimed at IT projects with a budget over € 1.5m. The MAMA-project had an IT budget significantly below this, and for that reason there were of a certain degree of freedom in the choice of a model for a business case. In fact there would be no formal demand of a business case prior to initiating the project. Nevertheless elements from the business case model were chosen as a tool to support the decision-makers – with a strong focus on the net present value (NPV).

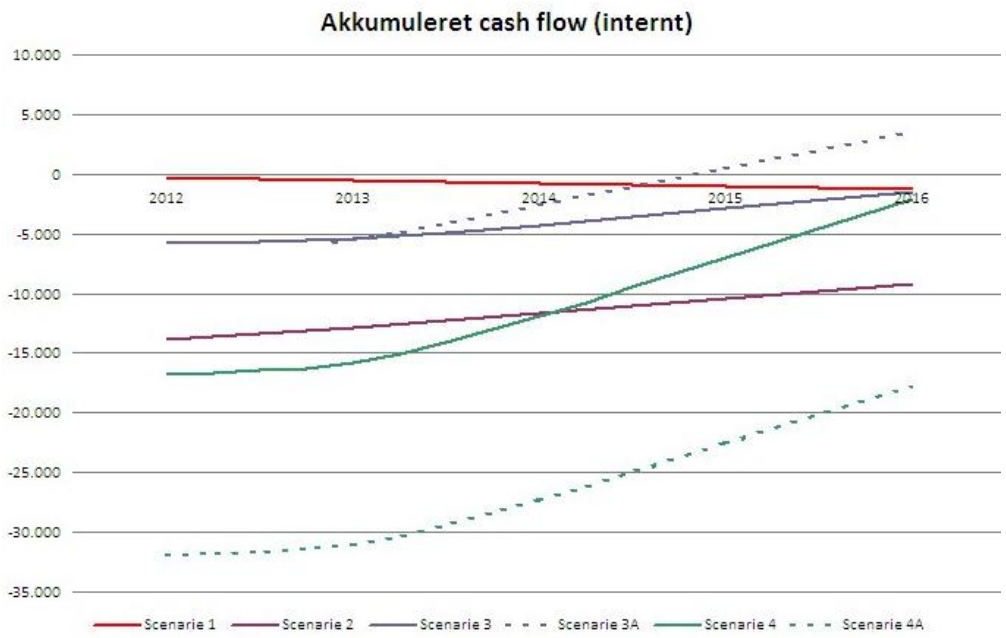
A subset of the benefits consisted of e.g. "an improved digital expression" or similar. Benefits that aren't easy to quantify, but the project group set as a goal that they should make an effort to get all the benefits quantified. This was due to the fact that it was a costly project and there was a need to include all benefits in the financial part of the business case, see section 5.

Along with the strong focus on the NPV, several alternative solutions on how the intended objects could be achieved were outlined. The idea was that the decision-makers should be able to make their decision on the project in the light of both the level of investment, return of

[1] Full-time equivalent (FTE) is a unit that indicates the workload of an employed person (or student) in a way that makes workloads comparable across various contexts.

investment and the degree of achievement of objectives. In that sense the business case itself did not consider which solution would be the best. This assessment was taken separately by the project group. A recommendation and the business case were subsequently handed to the decision makers.

Below is shown a chart that indicates how fast benefits in six various scenarios would make the investment worth while. This was good tool to make a graphical representation of the result of the benefits.



Picture 2: Chart showing how fast various scenarios will make an overall profit

In this case scenario 4 were recommend (the green line). The choice would mean high costs in the implementation phase, but the benefits gave a quick return of investment.

4. IS THE GEO-DATA SECTOR DIFFERENT FROM OTHER SECTORS?

The examples in the previous chapter show the use of the model for business cases in the Danish public sector in various ways. In one case the size of the project budget automatically triggered a duty to present a business case according to the rules and frames that exists in the Danish state. The second case shows a project economy so small that the duty to prepare a business case is absent. Despite the fact that only one of the projects demanded a business case before initiation we see that the business case model is used in both of them – although in different ways.

The fact that the projects are carried out in the public sector means that there basically cannot be a big difference in how business cases are built in the geodata sector. When preparing a "full" business case it contains the elements that are needed. This will be the case in all parts of the public sector.

5. QUANTIFYING BENEFITS – AN EXAMPLE

However, it is interesting to see how qualitative benefits are handled when these appear in a business case. Often several of the benefits in a business case lies in qualitative benefits. Besides having a qualitative nature, these benefits also often regards external stakeholders. An example is "happier costumers", or "better accessibility". These kinds of benefits are often regarded as very hard to put in a business case because they are difficult to quantify both because they are hard to measure and because they concern matters outside the organisation. It is hence much easier for a decision maker to understand the value of a saved FTE in the organisation, rather than the value the project generates regarding "happier costumers". A goal is therefore to try to quantify qualitative benefits as hard this may be.

In the project on modernisation of the cadastral archives the business case highlights two benefits that concerns qualitative benefits regarding external stakeholders:

- **Improved digital image**
  - The project will make the agency appear more "on the cutting edge" to the outside world and will help fulfilling a strategic goal within the Ministry of Environment and the government in general regarding "improvement of performance and digital services for citizens and companies".

- **Improved services for citizens**
  - The project will make it possible for businesses to develop new innovative products and services that will improve the overall service for the citizens.

Both of the above examples were outside the obvious focus of the project. In a perfect world it would be possible by means of larger analysis to quantify both examples quite precisely. E.g. could a big questionnaire for the top businesses in the area help condense the possible new products that the business could see being developed. However, often when the timeframe is short, it often makes more sense to think outside the box and make use of the numbers already available.

Regarding the first benefit concerning an improved digital image the project looked into what subsidizes the archival part of the organisation received from the government for that specific task. The logic in using this factor as a starting point was that the government would be more likely to support the organisation if it was highlighted as an organisation fulfilling the overall strategic digital goals.

Regarding the second benefit concerning improved services for citizens the project took a very different approach and looked into one of the derived benefits of better products, namely the time factor. When the project was initiated it took at least 10 working days for a citizen to get access to cadastral information in the archive. When building a new house on a property a citizens is often obliged to present a certificate from a surveyor who makes use of the historical cadastral information. The faster this information can be obtained, the less cost the citizen will have to pay for a pre-loan in a bank and get quick access to a much cheaper

financing at a mortgage institute. In term of this project this sum was, even when conservatively calculated, of more value than the overall project expenses.

Especially the latter example illustrates that when looking into quantifying qualitative benefits it is fruitful to think outside the box and try looking for derived, more accessible benefits.

However, the latter example also raises another challenge concerning external qualitative benefits. The so called "harvest-sowing-challenge". The fact is that regarding external benefits it is often another organisation that gets the benefits, than the organisation paying for the project. Whereas this paper will not go deeper into this, it is often a show stopper for using qualitative benefits as "hard currency" in a business case.

6. A STARTING MODEL

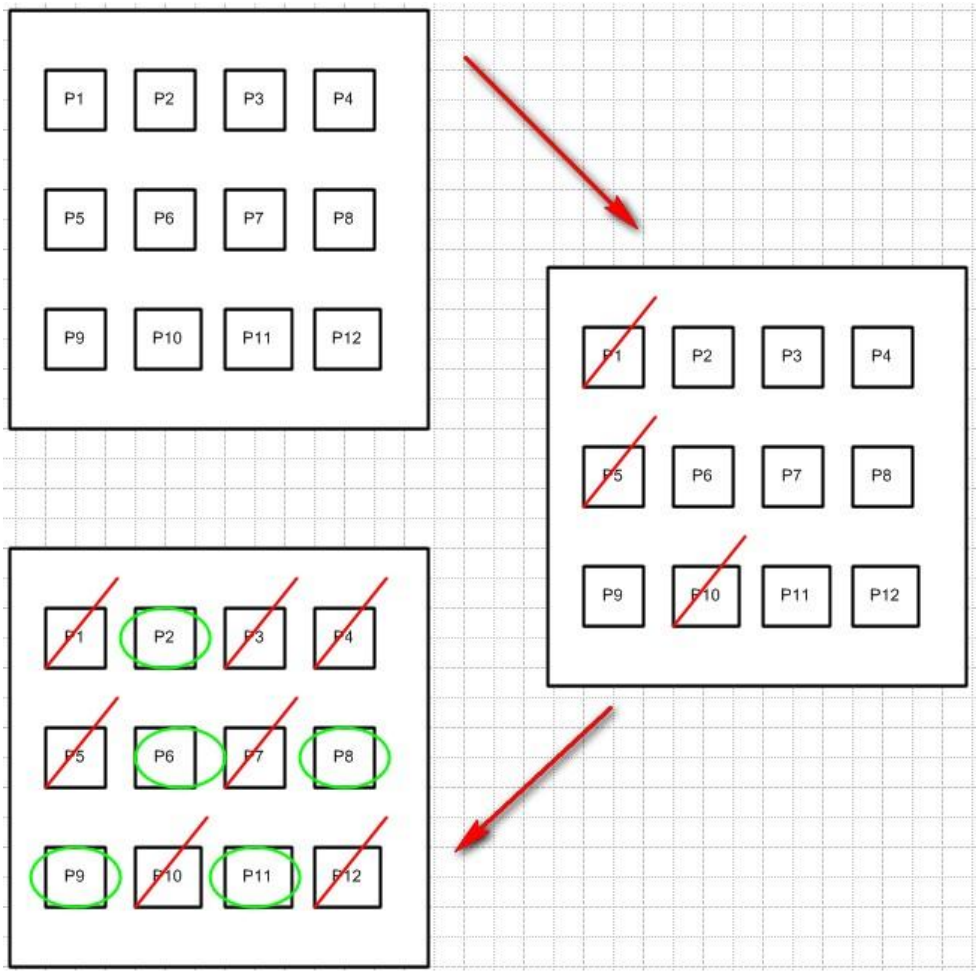
In the work with Danish IT-projects with large budgets, there are basically not given much space in the preparation of a business case. But at the same time the model is a very good template for the purpose. The model and the build-in frames should therefore not be regarded as an obstacle but on the contrary as a great tool to achieve a good advisory for the decision makers.

This should however not imply that there is no space for creativity in the process. It is important, that a project throughout the process relates openly to the elements of the business case. In particular, it is important to work openly and creatively with the benefits that are included in the business case. Often there are benefits that one not immediately would think of, and it may in some cases be decisive for the result. A simple tool to use, to include as many benefits as possible, is to get the project members to brainstorm on the subject. This method helps to broaden the perspective and to prevent a narrowed sight and having focus on the obvious benefits only.

Picture 3: Brainstorming is important when working with business cases

At the same time, it is important to consider the surroundings. Often there are benefits that do not occur in the immediate vicinity of the organisation. In spite of the fact that the benefits within the organisation are most convincing, then a public organisation also has to assess the social benefits which could be direct spinoff from the project.

Just as it is important to be creative in the identification of a project's potential benefits, it is also important to be open about possible solutions to achieve the object in the project. With this in mind, it may be possible to find several completely different alternative scenarios, but you must also be open to ideas that you can achieve the objects in varying degrees when changing the span of the project.



Picture 4: It is important to include a variety of scenarios in the work – and narrowing them down to realistic scenarios

An example is the above mentioned MAMA-project, which outlined a number of different solutions that presented similar solutions - but with large differences in the costs of implementation.

Keeping in mind that creativity is important, a model that appears as a barrier can turn out to be a fantastic tool.

7. CONCLUSION

The model for business cases in IT-projects in Denmark gives only little room for creativity. There is a template to be followed and most times the decision makers require a business case showing positive cash flow over a certain period of time. If the presented business case isn't positive, then the project probably will be rejected. This will in most cases makes sense seen with the eyes of society.

Above, two IT projects is presented - one in which the budget was so large that it was required to prepare a business case and one that gave freedom of choice to prepare a business case. In this second project it was nevertheless decided to use many of the elements that are in the model of business cases in Danish IT projects. Why? Because it on one hand is a good way to create an overview of the implications of a project and on the other and – and especially – because a business case can be a great convincing tool to present to decision makers. Who can say no to a good business case?

One of the questions in this paper was whether the Danish geodata sector uses business cases in a different manner than the rest of the public sector in Denmark. The short answer is that this is not the case. All of the Danish public sector is subject to the same rules. However, it was illustrated that the geodata sector is aware of the fact, that the benefits after implementation of projects is not always obvious and easy to identify. And it is important to be creative and open in the process when the benefits are to be identified. In this context it was emphasized that simple tools such as brainstorming is relevant to take in use - it's all about getting ideas on the table.

Likewise, it is important to be open and creative about the choice of solutions to fulfil the project objectives. In the MAMA project a number of scenarios which all, in some degree, could fulfil the objects in the project, was outlined. In the end, a recommendation to the decision makers was given with emphasis on the financial benefits. The mean to get find the "perfect" set of scenarios can be to use – again – the brainstorming sessions in the project group. Starting out with a wide span of scenarios it is most likely that a subset of these scenarios seem more realistic than others. These are to be worked with in the business case.

One of the problems that arise when working with business cases is, that subset of the benefits must be regarded as qualitative benefits. These are not "hard-hitters" to decision-makers who often seek quantitative benefits in their own organisation. In those situations it is important to make an effort to quantify the qualitative benefits - as hard as it may be. In the end, it may be these benefits that turns out to be the decisive factors tipping the balance in a positive direction.

Working with business cases is not only about working with templates – it is also about being creative when creativity appears impossible.

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BIOGRAPHICAL NOTES

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