2.3 Identifying all stakeholders i.e. all direct or indirect stakeholders

The stakeholders and stakeholder expectations & management are most crucial during an data analytics project.

Stakeholders are anyone affected by the project.

The identification contains:

- The interests of all stakeholders, who may affect or be affected by the project, along with their constraints.
- Potential issues that could disrupt the project.
- Key people for information distribution during execution phase.
- Groups that should be encouraged to participate in different stages of the project.
- Communication planning and stakeholder management strategies during the project planning phase.
- Ways to reduce potential negative impacts and manage negative stakeholders.

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2.3 Identifying all stakeholders i.e. all direct or indirect stakeholders

Stakeholder Analysis Worksheet

These questions should be answered with "yes" if the project should be successful:

Identifying all stakeholders: Is it clear what executives have a stake in the success of your quantitative analysis project?

Documenting stakeholders needs: Have they been briefed on the problem and the outline of the solution?

Assessing and analysing stakeholder interest/influence: Do they have the ability to provide the necessary resources and to bring about the business changes needed to make the project successful?

Managing stakeholders' expectations: Do they generally support the use of analytics and data for decision making?

Take actions: Does the proposed analytical story and method of communicating it coincide with their typical way of thinking and deciding?

Reviewing status and repeating: Do you have a plan for providing regular feedback and interim results to them?

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2.3 Identifying all stakeholders i.e. all direct or indirect stakeholders

Most important question:

What is the decision they want to make as a result of the analysis?

This helps the stakeholders to frame their needs and expectations.

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2.4 Analyse whether the business problem is amenable to an analytics solution

Solving the problem are costs for the organisation. Thus, a cost - benefit analysis should be undertaken early in the whole process if a data analytics solution is appropriate.

The questions to be asked are:

- Is the answer out of the analytics process and the implementation within the organisation's control?

- Would be data available to perform an analysis?

- How likely it is that the problem can be modelled and solved?

- Will the organisation accept the solution and deploy it?

2.4 Analyse whether the business problem is amenable to an analytics solution

Example:

Result of an analysis: A life insurance company loses policy holders because the investment return participation for the policyholder is too low compared to banking products.

Conclusion: Due to low interest rates in the market and regulatory restrictions the insurance company cannot change that as the company cannot control them.

2.4 Analyse whether the business problem is amenable to an analytics solution

Example:

A hotel wants to introduce dynamic pricing i.e. prices for the rooms are depending on demand and trigger events but have no detailed past data recorded about the utilised capacity in the past.

Conclusion: No appropriate data are available for a data analytics performance.

2.4 Analyse whether the business problem is amenable to an analytics solution

Example:

A government wants to analyse the potential change of the strategy of location but cannot provide economic interactions nor expert judgement about influences.

Conclusion: Thus, to set up a model at least minimal information about economic interactions and/or possible influences should be provided. Without such information thousands of models could be build up. Thus, there is high probability that we would build up a wrong model.

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2.4 Analyse whether the business problem is amenable to an analytics solution

Example:

Result of the analysis: It would be more cost effective to close down a manufacturing plant and to buy these items from a third party. The manufacturing plant was build few years ago out of a strategic decision of the board of directors and the management. 90% of these people are still in the same position.

Conclusion: There will be no political will to change this otherwise these people have to state that they did a wrong decision and endanger their job positions.

2.5 Refinement of the problem statement and if necessary depict known or possible constraints

1. It may be necessary to refine or even redefine the problem statement to make it more accurate and more appropriate to the stakeholders.

2. It has to make more amenable to available analytic tools and methods as well as to the available data.

Important: We have to adapt the problem the expectations, needs, decision making process, available tools and data.

And this is actually contrary what one learns in all the statistics lectures.

2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Further, define what constraints the project will operate under.

These constraints could be **analytical**, **financial**, or **political** in nature.

Example: In an optimisation problem with a large number of constraints no solution can be found with available tools or software. Weakening the constraints would lead in inappropriate results.

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2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Example: The required data analytics effort including data cleansing would be several weeks and thus, the project too expensive for an organisation (bad cost – benefit relation)

Example: If the results could show explicitly or implicitly a past failure in decision making of some key stakeholder, there is no interest in doing an analysis.

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2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Finally, how we know that we have framed the problem well?

Tool: Worksheet for framing the business problem

If the problem is framed well the following questions can be answered in a positive way.

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2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Worksheet questions:

1. Have you defined a clear problem or opportunity to address what is important to your business or organisation?

2. Have you considered multiple alternative ways to solve the problem?

3. Have you identified the stakeholders and that the will use the results to make a decision?

4. Are you confident that the way you plan to solve the problem will resonate with the stakeholders and that they will use the results to make a decision?

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2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Worksheet questions:

5. Are you clear on what decision is to be made - and who will make it – on the basis of the results from your analysis once the problem is solved?

6. Have you started with a broad definition of the problem but then narrowed it down to a very specific problem with a clear phrasing on the question to be addressed, the data to be applied to it and the possible outcomes?

7. Are you able to describe the type of analytical story that you want to tell in solving this particular question?

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2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Worksheet questions:

8. Do you have someone who can help you in solving that particular type of analytical story?

9. Have you looked systematically to see whether there are previous findings or experiences related to this problem either within or outside your organisation?

10. Have you revised your problem definition based on what you have learned from your review of previous findings?

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2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Example Direct marketing

In direct marketing potential customer are contacted - by e-mail or phone - making them buying our products. Typical approach is test a sample of customers and based on the results back from the customers developing a response model. This model is then used to score the customer about their likelihood to buy the product. The model itself is quite simple.

But what is wrong with that approach?

2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Example Direct marketing (cont'd)

This approach and model suggest the response "of the customer in buying the product is caused by the marketing contact".

But there are customers who went anyway to a shop / on-line store and buy the article.

Or there are customers who never will buy this product and it does not matter if they are contacted or not. And contacting both of them is waste of money and time.

Thus, you have to re-frame the problem to the customer who will buy the product based on the fact that they are contacted.

And this is a much more complex problem with much more complex models used to solve this.

2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Example Cross-boarder activities of client advisors

For compliance reasons client advisors of banks have restrictions to certain countries where they are permitted to acquire new customers or assets (money).

To monitor compliance the travelling, expenses and cash transactions associated to a certain client advisor is monitored.

One question is if a client advisor was travelling abroad, follow then transactions from the geographical area where the advisor has been which are related to his or her visit?

It can be relatively simply tested if there are cash transactions from this region after a certain period after the visit.

But are these really the transaction we want to review?

2.5 Refinement of the problem statement and if necessary depict known or possible constraints

Example Cross-boarder activities of client advisors (cont'd)

There are transactions made on a regular basis if there a certain obligations like rent, pension fund plan or just other regular spendings.

All these transactions happen anyway and do not relate to the client advisor's trip.

Thus, one have to identify the transactions which happen directly linked to this travel abroad.

And this needs then another approach of analysis then the first one.

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2.6 Determine the business benefits

A project will only be conducted if it brings more benefits than it costs.

Benefits can be determined quantitatively or qualitatively.

If quantitative, it may be financial or contractual (e.g., service level agreements).

This is also known as the **business case**.

2.6 Determine the business benefits

Usual measures in financial analyses are:

• Return on Investment (ROI)

• Net Present Value (NPV) calculation

• Internal rate of return (IRR)

• Cost of Capital (CoC)

• Payback Period

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2.6 Determine the business benefits

It is often very difficult to quantify the return or cash flows out of data analytics results:

How to estimate and allocate the following costs and benefits:

- Costs of the IT infrastructure used and the support of the IT experts?
- Costs of the people involved in the projects for providing support when questions arises?
- How to quantify the benefit of better compliance with regulations in the cross-boarder activities of client advisors example?

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2.7 Obtain stakeholder agreement on the business problem statement

When the problem is finally clearly defined and a cost - benefit analyses has been conducted and shows a positive result, it is necessary to obtain stakeholder agreement before proceeding further with the project.

At the end of this process, you will have agreement in writing on

- the projects objectives,
- the definition of the problem,
- the resources,
- the time frame,
- the performance measures and
- the budget to get there.

Chapter 3
Framing the Analytics Problem

3.1 Content of this Chapter

The business people are interested in information and tools to solve the problem but they are typically not interested in what are the techniques to solve them:

1. How to translate a business problem statement into an analytics problem
2. Propose a set of drivers and relationships to inputs
3. State the set of assumptions related to the problem
4. Define key metrics of good performance
5. Obtain stakeholder agreement on the approach

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3.2 How to translate a business problem statement into an analytics problem

You can think of data analytics tools and methods as if you are using a tool at home for solving a problem.

If you want to hang a picture and you are using a hammer and nails or a drill and a screwdriver you are not interested in all the technical features e.g. how many rotation per minute the drill has.

You are just interested in hang a picture.

Similar, the business just want the problem to be solved reliably and deliver the results.

3.2 How to translate a business problem statement into an analytics problem

You have to translate the "what" of the business problem into the "how" of the data analytics problem.

3.2 How to translate a business problem statement into an analytics problem

Why is it important to translate it into the "how"?

Example. "Do the customers of a retail store fall into different groups"?

Versus

"Can we find groups of customers who have a high likelihood of being lost as a customer if they did not buy anything anymore for n weeks"?

3.2 How to translate a business problem statement into an analytics problem

In the first example, there is no specific purpose nor target which has been specified for the grouping. When there is no such target, the data analytics problem is referred to as *unsupervised*.

In the second example, a specific target is defined namely customer who would be lost when they did not purchasing anything for a certain time period.

Thus, a segmentation is being done for a specific goal. It is to take actions based on likelihood of churn. This is called a *supervised* data analytics problem.

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3.2 How to translate a business problem statement into an analytics problem

Formal techniques for translating the "what" into the "how":

• Quality function deployment (QFD)

• Kano's model

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3.2 How to translate a business problem statement into an analytics problem

Quality function deployment:

Quality must be designed into the product.

A definition of quality is `meeting customer needs and providing superior value´

3.2 How to translate a business problem statement into an analytics problem

The quality function deployment is a systematic approach to design products

- based on <u>customer needs and desires</u>

- with the <u>integration of the different functions</u> within an company i.e. marketing, business, accounting, controlling, manufacturing

- is used to translate often subjective quality criteria into <u>objective characteristics</u>

- which can then be <u>measured and quantified</u>.

Based on measured and quantified characteristics a product can be designed and produced.

3.2 How to translate a business problem statement into an analytics problem

The QFD has four stages
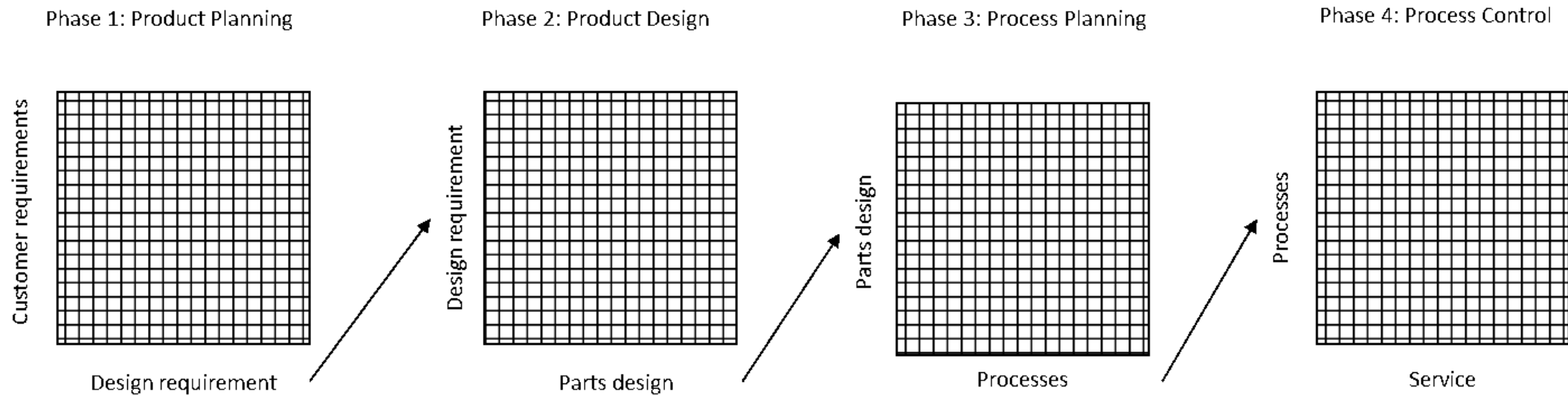
3.2 How to translate a business problem statement into an analytics problem

The understanding of the customer needs is then summarized in a product planning matrix or "house of quality", the first step.
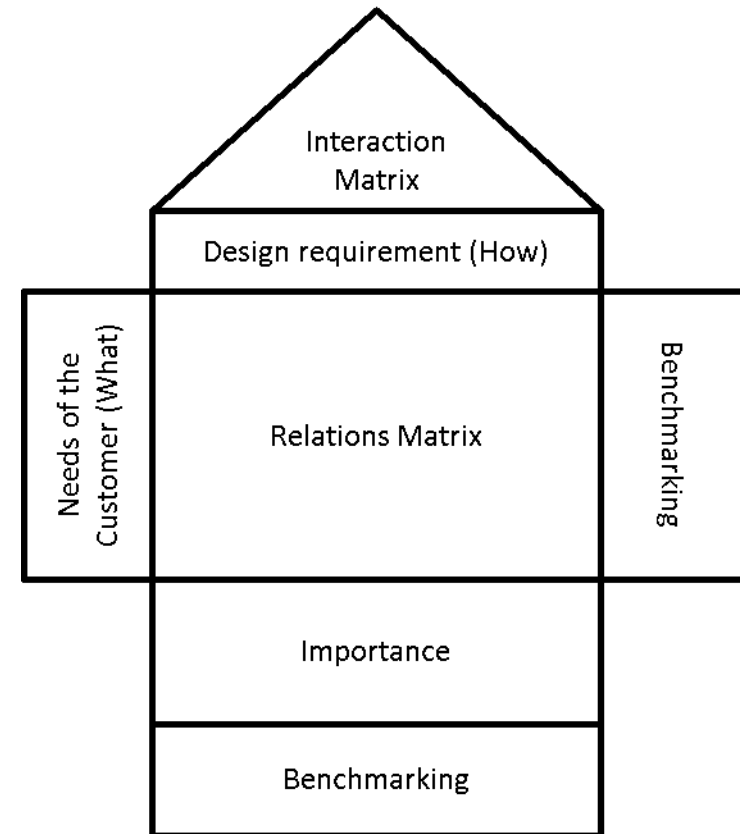
- Each phase, represented by a "matrix" or a house, is representing a specific aspect of the requirements of the product.

- The relationships between each requirement are evaluated for each phase.

- Then, the most important aspects and elements of each matrix are deployed into the next one.

3.2 How to translate a business problem statement into an analytics problem

The "matrix" in more detail:

Translation of the "what", the customer needs into the "how" of the design requirements.

Phase 1: Product Planning

Interaction Matrix

Design requirement (How)

Needs of the Customer (What)

Relations Matrix

Benchmarking

Importance

Benchmarking

3.2 How to translate a business problem statement into an analytics problem

First, some words to the four phases:

For our purpose of framing the analytical problem, the first phase is important.

A data analytics project is nothing else as a product we have to deliver.

3.2 How to translate a business problem statement into an analytics problem

Phase 1: Product Planning

- This is also called the "House of Quality"

- This process is typically done by most of us in any assessment when we evaluate or think about a product e.g. buying a tablet

- Documentation of the customer requirements, competitive advantage, product measurements and the technical ability of the organization and if the product meets each customer needs

- Obtaining good data from the customer to understand the needs in detail

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3.2 How to translate a business problem statement into an analytics problem

Phase 2: Product Design

- Design phase where creativity and innovation is important
- Development of product concepts and parts of the specifications are defined and documented

Phase 3: Process Planning

- Flowcharts of the intended processes and the process parameters (or target values) are documented

Phase 4: Process Control

- Performance indicators are set up to monitor the production process and maintenance
- Decisions about which process poses the most risk and controls are put in place to prevent failures

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3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis

The marketing department would like to know how to better retain the clients.

First, they would like to know which clients have a high likelihood for leaving.

Further, they are interested in the value of each client as they want only have marketing efforts for these clients who bring a benefit for the company.
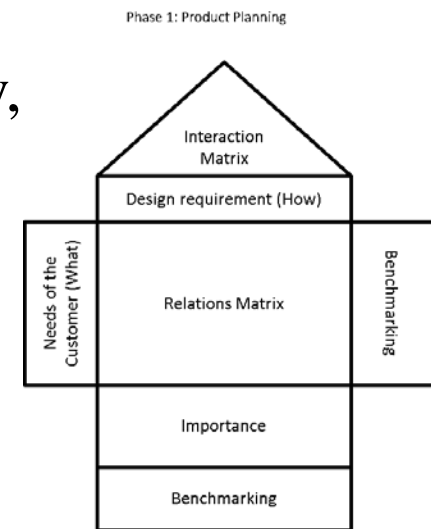
Also based on the information gained they would like to define actions for retention of these identified clients.

Of course, marketing is very busy and has no time to perform such an analysis. Thus, they engage you to perform for them a data analytics project.

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3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis

- Marketing department = your customer with their needs (what)

- Data analytics project & resulting results = design requirements (how)

- Benchmarking that is the current status against this project and typically, against an other option e.g. if only parts of the project would be performed

- In the interaction matrix you will summarise how strong the design requirements are linked to each other

- The importance states the relative significance of each customer needs (What) and design requirement (How) to achieve the desired goal

- And finally, an overall benchmarking is done

Phase 1: Product Planning

Interaction Matrix

Design requirement (How)

Needs of the Customer (What)

Relations Matrix

Benchmarking

Importance

Benchmarking

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3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis

Customer needs

From the description we can identify the following needs:

• Which clients will leave

• Which client we want to keep

• Indications why they leave

• Actions for keeping clients

• Not spending a lot of time in the project

3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis

Analytics project requirement

• Appropriate methods (regression, classification methods, tests,…)

• Appropriate data

• Actionable results

• Proper project planning

• Scheduled interactions

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3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis Link them with the relationship

	Appropriate methods	Appropriate data	Actionable results	Proper project planing
Which clients will leave	3	2	2	
Which client we want to keep	2	2	3	
Indications why they leave	3	2	3	
Actions for keeping clients			3	1
Not spending a lot of time in the project				2

1	weak relationship
2	medium relationship
3	strong relationship

Phase 1: Product Planning

Interaction Matrix

Design requirement (How)

Needs of the Customer (What)

Relations Matrix

Benchmarking

Importance

Benchmarking

3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis

Often, the requirements are very general or vague or even difficult to write down.

Customers have typically three kinds of them:

- Expected or basic requirements: These requirements are considered as given and are often unspoken.

- Normal or performance requirements: requirements a customer directly will mention and which can be verbalised.

- Exciting or emotional requirements: These reflect a need that the client has not appreciated before.

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3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis

The benchmark is done against current status and if only parts of the project are conducted:

	Appropriate methods	Appropriate data	Actionable results	Proper project planing	Current Status	Full Analytics Project	Only performing parts A, C, E
Which clients will leave	3	2	2				
Which client we want to keep	2	2	3				
Indications why they leave	3	2	3				
Actions for keeping clients			3	1			
Not spending a lot of time in the project				2			

1	weak relationship
2	medium relationship
3	strong relationship

Phase 1: Product Planning

Interaction Matrix

Design requirement (How)

Needs of the Customer (What)

Relations Matrix

Benchmarking

Importance

Benchmarking

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3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis

Interactions of the design requirements (what) to the customer needs (how):

3.2 How to translate a business problem statement into an analytics problem
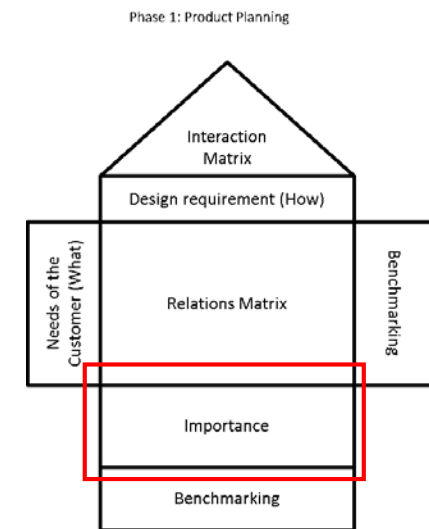
Example: Churn Analysis

Add the importance

	Appropriate methods	Appropriate data	Actionable results	Proper project planing	Current Status	Full Analytics Project	Only performing parts A, C, E		
Which clients will leave	3	2	2						++ strong positive
Which client we want to keep	2	2	3						+ positive
Indications why they leave	3	2	3					1 weak relationship	- negative
Actions for keeping clients			3	1				2 medium relationship	-- strong negative
Not spending a lot of time in the project				2				3 strong relationship	
Importance	68%	54%	80%	45%					

Phase 1: Product Planning

Interaction Matrix

Design requirement (How)

Needs of the Customer (What)

Relations Matrix

Benchmarking

Importance

Benchmarking

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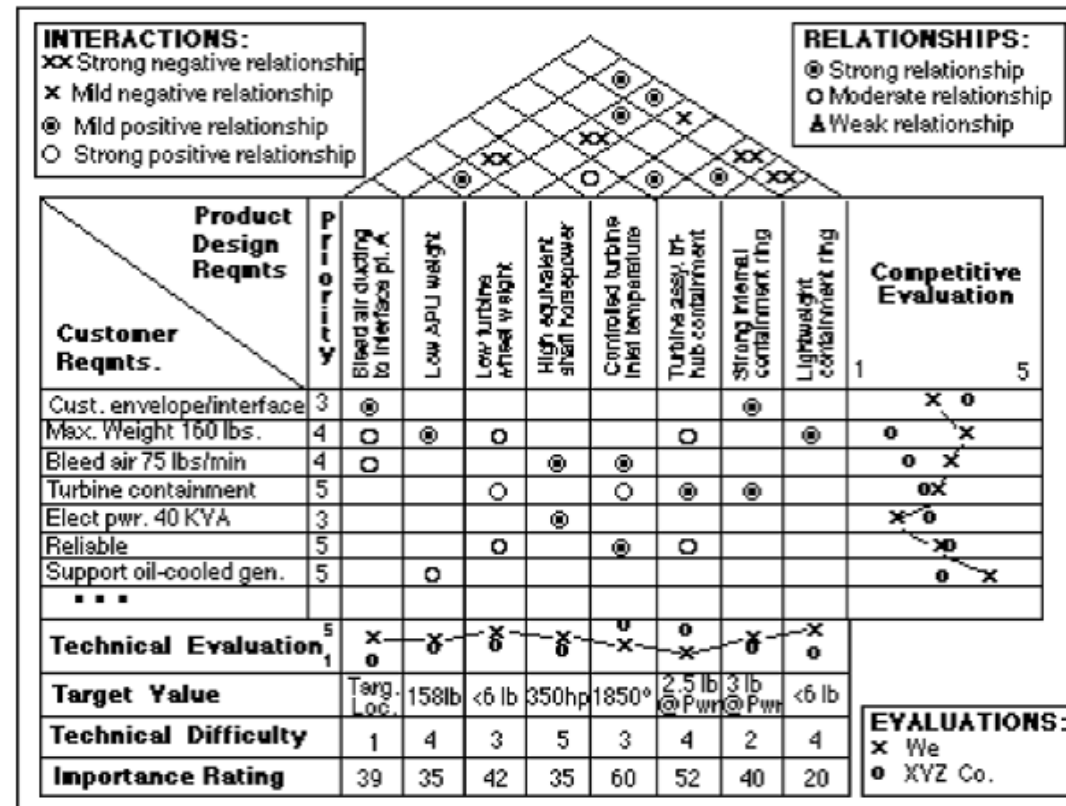# 3.2 How to translate a business problem statement into an analytics problem

Example: Churn Analysis

Finally, the requirements benchmark:
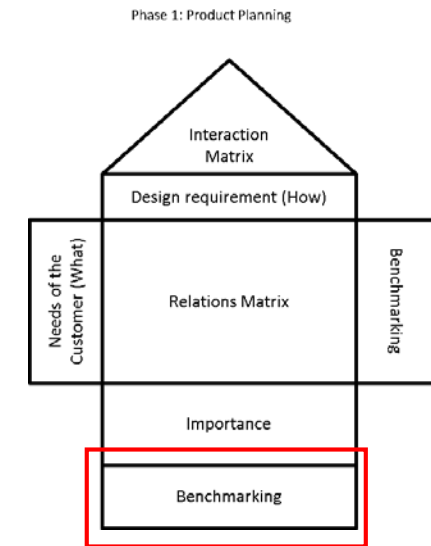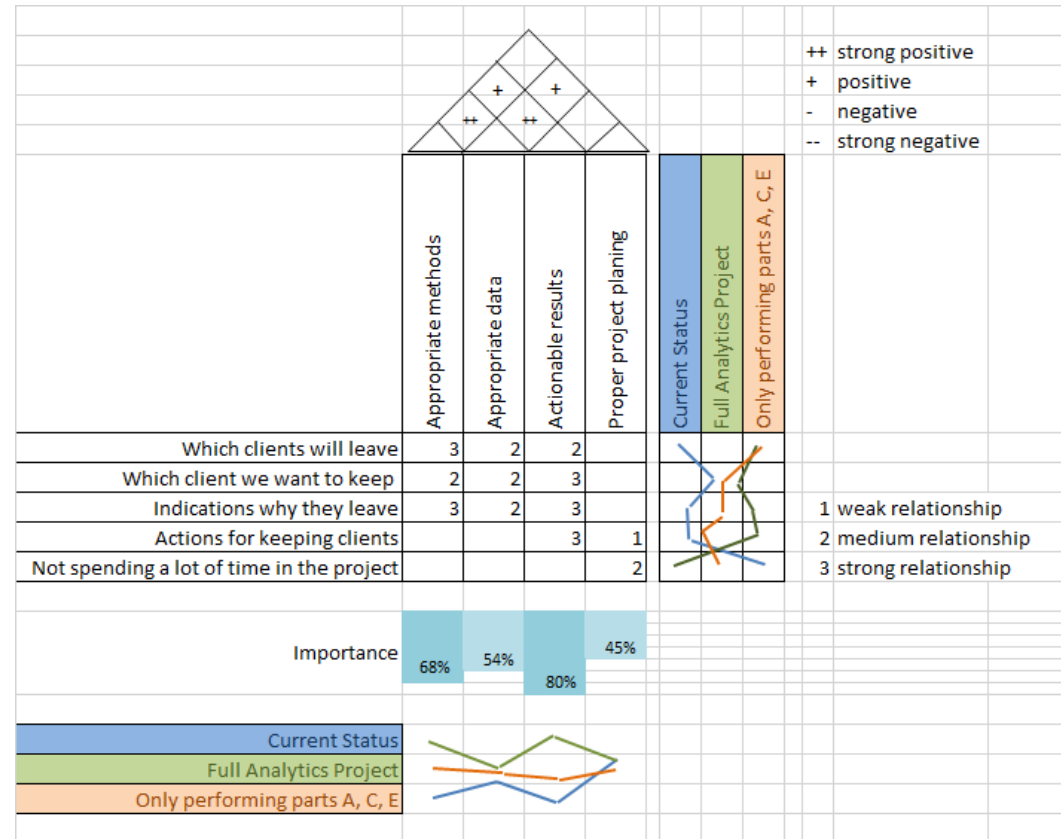
3.2 How to translate a business problem statement into an analytics problem

Example (Kenneth A. Crow, Quality Function Deployment):

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3.2 How to translate a business problem statement into an analytics problem

Conclusion:

- This is a very rigorous process that can be applied to any data analytics process
- It maps the translation of requirements from one level to the next, e.g., from the business level to the first analytics level, from the first analytics level to the second level, and so on
- The method requires time to think through all aspects of a project
- It is recommended for larger projects and where the detailed design and process has to be set up in advance with high reliability as it is crucial for the success of the whole project

But it is worth to think about all these aspects in any analytics problem to solve finally the right problem

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