A Business Culture of Reflection

Part 1

Systemic Strategy Development and Risk Analysis
(including Strategy Maps and SWOT Analysis)

by Kai Neumann

About

This paper describes the modeling process of a qualitative model (with a quantitative model briefly referenced in the appendix) of the strategy development and risk analysis of a start-up enterprise that intends to develop an electric vehicle (E-car). It is only a rough model intended to show the general methodology of qualitative modeling of strategies using the iMODELER (by Consideo: www.consideo.com). By reflecting on an enterprise and its environment to develop a strategy we form the basis for deriving a Dynamic Strategy Map (Kaplan/Norton: Strategy Maps), a systemic SWOT Analysis and a Systemic Risk Analysis - all of which rely on this reflection.

This paper comes in a series of papers for “A Business Culture of Reflection” in line with:

1. Systemic Strategy Development including Risk and SWOT Analysis
2. Systemic Product Development featuring Idealized System Design
3. Quantitative Optimization and Risk Analysis of Projects and Processes
4. Systemic Project Management
5. Systemic Management and Organizational Development featuring KNOW-WHY Method

The series describes the application of the iMODELER software (both the freeware and the full version) using the example of a start-up enterprise (newly founded or a profit center within a company) that plans to become successful by developing, manufacturing and selling a revolutionary electric vehicle.

The business culture of reflection captures the idea that any enterprise can leverage the collective

potential of its employees by collaboratively looking at the interconnections of all the existing arguments within the enterprise (and also from the stakeholders outside). Not only the all-too-common phenomenon of endless and repeated meetings with little progress but also that of reluctant or simply unfounded decision-making can be tackled with this change of corporate culture.

The iMODELER (www.imodeler.info), being probably the most important app in the world, allows for the visualization and analysis of interconnections behind any challenge. It works bionically: mimicking yet extending our brain power to capture thousands of arguments with the possibilities of either modeling them qualitatively (comparable to Fuzzy Cognitive Maps) using so-called Insight Matrices to see what would be comparably the most effective measure or risk, or quantitatively (based on System Dynamics and more) to simulate the extent and likelihood of possible developments. The iMODELER comes with a number of unique features like process factors to identify constraints (Goldratt: Theory of Constraints), the iM Optimizer (Operations Research), the iM Data Manager (to integrate data e.g. from Excel), extremely powerful collaborative modeling, sophisticated simulation game functionality, and KNOW-WHY.NET - the platform for building collective intelligence.

The major difference compared to other tools is that it is not merely for visualization (such as mind mapping or concept mapping). However, it is also not overly complicated and yet

still avoids following mere simple linear relationships. Rather, the iMODELER allows for direct translation of any kind of argument and the consideration of any linear or non-linear, dynamic phenomena that we find in the complexity of the real world, where often soft factors cause major effects e.g. by triggering reinforcing feedback loops of virtuous or vicious cycles.

Arguments are simply translated into the intuitive notation of "more of one factor leads directly to more/less of another factor" - using factors and connections that either depict a - or +.

You can use the iMODELER to reflect on business issues such as those described in this series or indeed for any other challenge in which you have to consider the interplay of several factors (hint: nearly all challenges are multifactorial). Whether it is a personal challenge like family topics, vacation or career planning, or societal goals like the transition of our society towards a better world, the iMODELER can help. The long list of possible applications includes horizon scanning, change management, six sigma, asset allocation, corporate foresight, and many more…

Note: the models of this series are fictitious. Being far from complete they lack a lot of details but nevertheless provide instruction through useful examples. For some models you will find a list of further details in the model's description (Menu … Model properties).

Here the link to the models from this paper on KNOW-WHY.NET:
https://www.know-why.net/model/C2Hbs8XnHom31Np2sjcr8cQ

So you want to start something meaningful

This chapter's title touches on an important aspect of anything you start: your own and other´s motivation to do it. Sometimes it is extrinsically motivated as something you are perhaps just ordered to do, sometimes it is simply just for profit, and sometimes you may wish to undertake a fulfilling task or even to change the world - hopefully making it a better place.

Interestingly, in all these cases the model is usually the same although you start from different perspectives. In our example you can begin to reflect on your enterprise starting with the product, the outcome of profit, or the vision of a better world and the mission to achieve it. You will see that the product depends on profit and vice versa, that the mission needs the product and hence the profit, and that the product can benefit from people and customers motivated by the mission and vision. This will become apparent later during the modeling. For now, let us start the model beginning with the product (As there is no wrong answer, I just chose this randomly as the starting point!).

Note: The possible fact that you are intrinsically motivated to do something meaningful can also be considered by identifying explicit factors. Thus you will find them within the model as well.

Starting to model

I would argue (see Appendix 2 at the end of this paper) that you should not use the word ‘systemic’ although it is a systemic approach, simply because for many people ‘systemic’ almost sounds esoteric. As shown in Appendix 2 ‘systemic’ has (at least) two implied meanings: one would mean looking at the interplay of many factors in order to better approximate reality, and the other would involve reflecting on one’s own role and situation as part of a system. This has two possible implications for your modeling: one would be that you should model the enterprise alone in order to reflect on your personal motivation and to quickly shape your ideas and only later show this to others. The other would be the exact opposite, to collaboratively model with others (iMODELER offers truly powerful features for collaborative modeling) with the risk of long discussions but the chance for a more objective, balanced model, the full potential of increased creativity from group modeling, and the important effect of creating mental ownership for the stakeholders (usually the team).

By the way, if a collaborative modeling session does not achieve the set goal (i.e. it doesn’t lead to a common mental model), it is most likely not because of the wrong idea but because of certain psychological reasons (I will explain them in part 5 of this series of papers). If this occurs I suggest that every participant develop her or his own view separately in order to compare their mental models later and continue with the discussion. If that discussion is repeatedly jeopardized by the same people, simply fire them or get yourself a new job.

For collaborative modeling (even within the same room) you just open the model and go to Menu….Share…. in order to share a collaborative link with all the participants who, of course, should bring their own devices (laptops, tablets, or smartphones). Before you start, let them play with the iMODELER and the shared model and ask everybody to create a new linked factor so that afterwards there is no reason for them not to actively participate. Also have them practice deleting their factors via the factor’s property window or the delete key from the keyboard. All the other functions, especially changing perspectives, adding description text, defining categories, etc. you can show later.

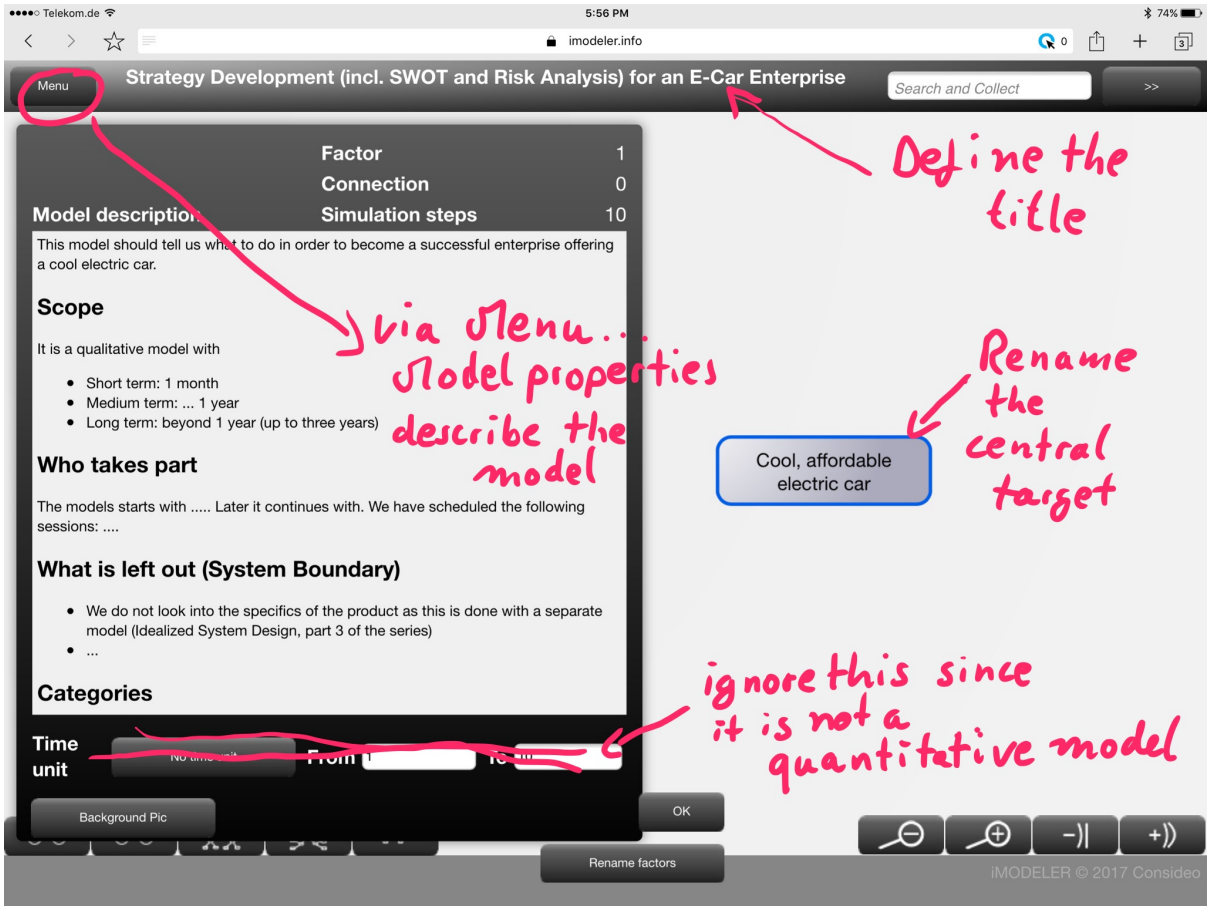

Fig. 1: Start of the model - naming it, describing it, defining the central target

The actual model, as seen in Figure 2, is best started by defining a name via title bar. The model is always stored in real-time in an internal database and you can retrieve older versions from Menu…Changelog). Next, you should consider starting to edit the Menu….Model properties… to describe the question you want to answer with your model, the time frame, the participants of the modeling, possible notes, the aspects you decide not to include (setting system boundaries), and anything else that may seem important to document for describing your model.

Explorative Qualitative Cause and Effect Modeling

The model does not reflect on the concrete features of the product as this is done in a separate model on Systemic Product Development shown in part 2 of this series of papers. Now, with the central target defined we can start to use the four KNOW-WHY-Questions.

1. What leads directly to more of our cool, affordable electric car
2. What leads directly to less of our cool, affordable electric car
3. What might lead directly to more of our cool, affordable electric car in the future
4. What might lead directly to less of our cool, affordable electric car in the future

These are called ‘KNOW-WHY-Questions’ because they are based on a meta-systemic principle I have discovered. According to this anything in order to be successful (or simply exist) needs to integrate (adapt to the environment) and develop (change with the

environment or beat competition). If either integration or development is lacking something is jeopardized. Therefore the four KNOW-WHY-Questions ask for factors that help or hinder integration and development, factors that are thus crucial to the model. As simple as this is it may still sound complicated so you may want to just ignore the background and enjoy the power of these four questions.

By accident we have an important lesson to learn right from the beginning of our model. The central target is too fuzzy to come up with concrete influencing factors so we need to be more specific to answer the four KNOW-WHY-Questions. I recommend asking how the factor could be measured. In this case we can agree that we are referring to the cars sold on the market, therefore the factor does not yet describe the development of the car, but rather its sales.

You may vary the four KNOW-WHY-Questions and ask
- What do we need at the organizational level?
- What do we need financially?
- What might be some psychological barriers?
- What is technically needed?
- What might happen on the market?
- ….

However, if we start asking more specific questions we shouldn't be tempted to only consider hard factors (money, resources, certificates, …), but also soft factors (skills, motivation, attractiveness, …).

Figure 2 shows the first four answers. More 'availability of car' leads directly to more sales of the 'Cool, affordable electric car'. The more or better the sales channel, the more sales are possible. A problem could be 'no demand for our car' as one answer to "What leads directly to less sales of the cool, affordable electric car?" For "What might lead to more sales in the future?" an answer was 'sales abroad'. Note that the connection from 'sales abroad' already depicts an increase of weight, explained by Figures 3 and 4 found on the following pages.

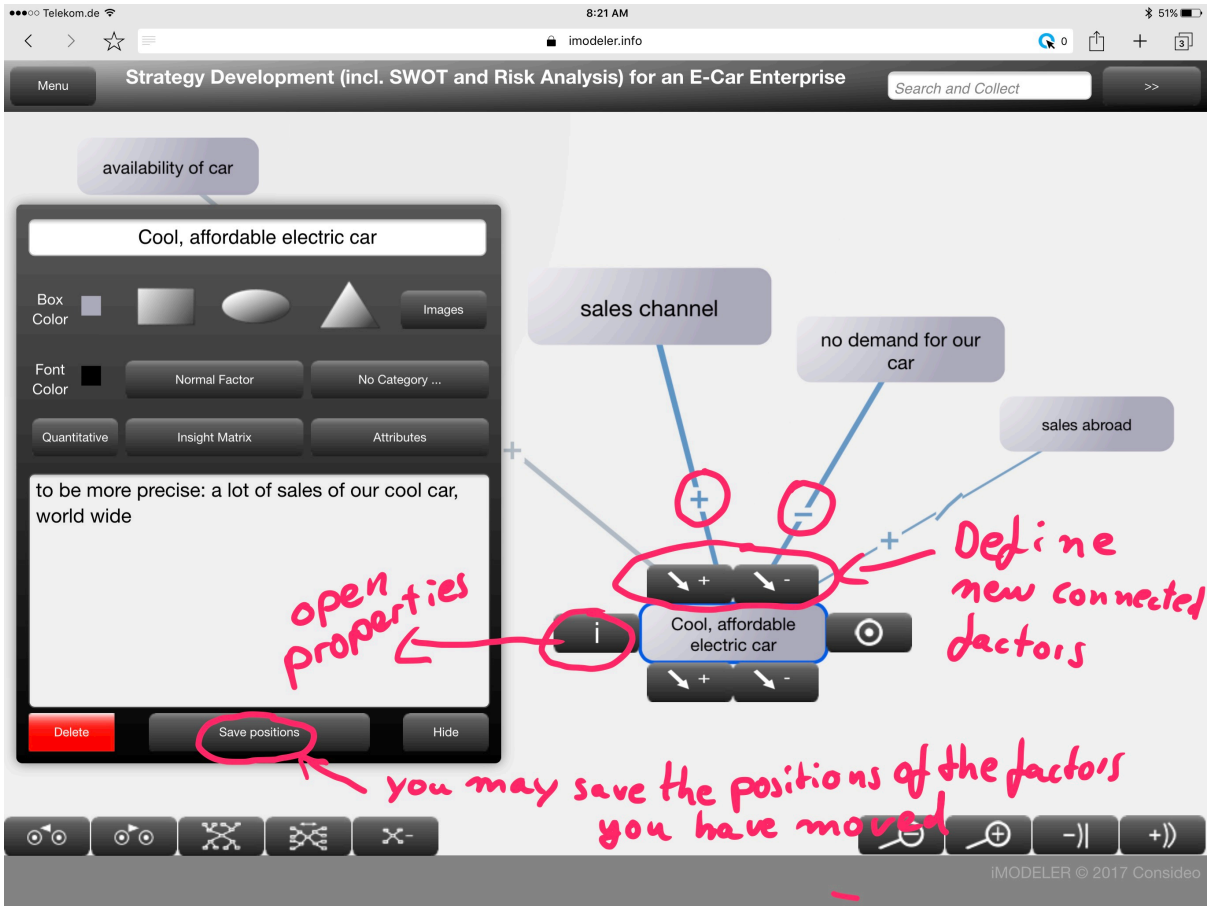

Fig. 2: The first connections to the central target

Figure 3 shows an advanced state of the model. We can look at it from the perspective of the factor ‘motivated staff’, showing only two levels of connections. These features of iMODELER (together with filters, clusters, and search functions) allow for models containing thousands of factors. Mimicking how our brain works, we can choose any factor from the model to explore what chains of factors lead to it and what chains are triggered by it.

Figure 3 also shows colored factors. These colors come from categories I have chosen for the factors. For example, yellow are targets, green - measures, red - problems, and blue - resources. One best practice is to assign categories with the weighting of the incoming connections of that factor as shown in Figures 4 and 5.

Figure 3 shows deliberately arranged factors. Factors are automatically positioned and remain only temporarily fixed if we drag them to other positions. However, we can also decide to save their positions via the properties window of the factor from which perspective you are currently viewing the model.

To explore the content of the model you should use the link and navigate through by switching perspectives. You will find examples of hard factors like ‘profit’, soft factors like ‘motivation’, resources like ‘brilliant engineers’, and measures like ‘patenting’. Some of them I will show later when we look at strengths and weaknesses as well as Balanced Scorecard factors.

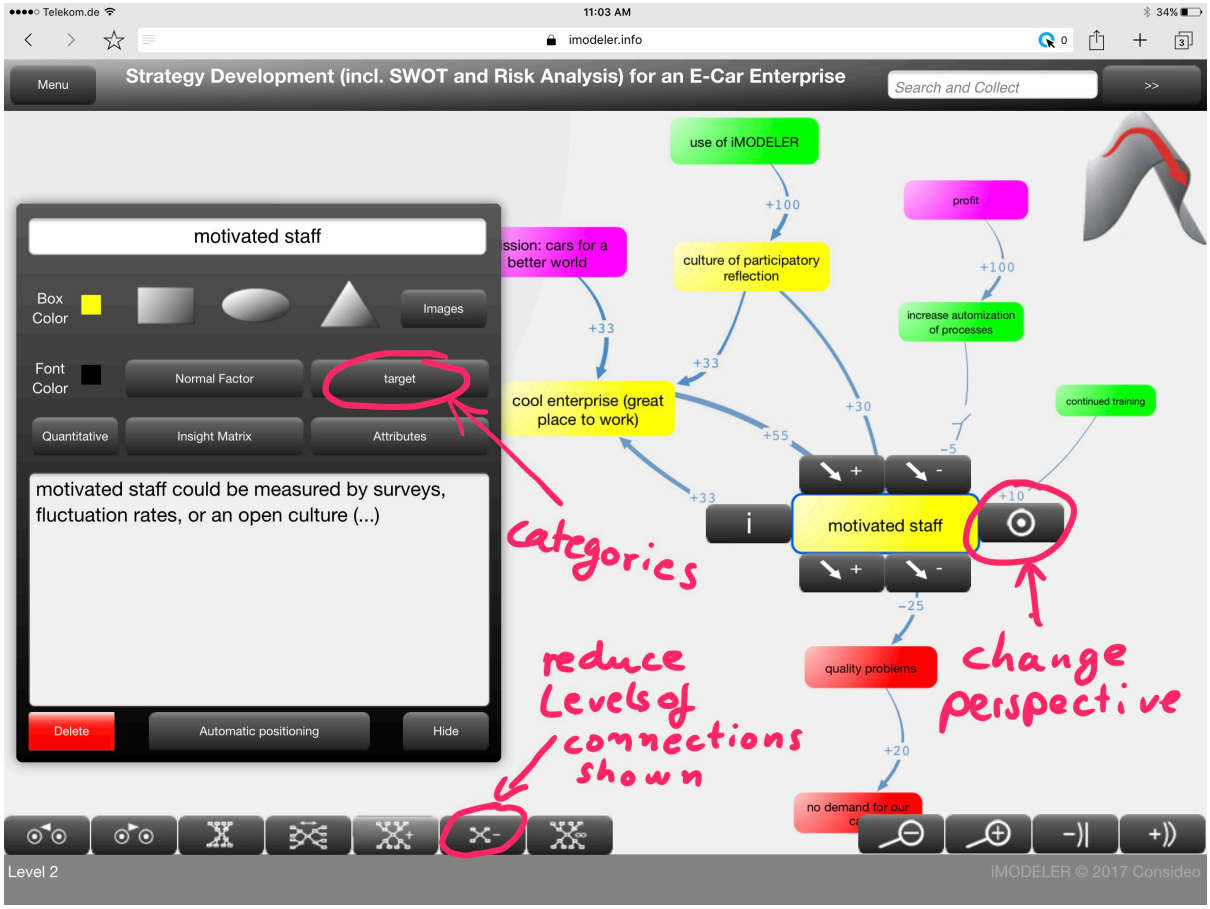

Fig. 3: The model from a different perspective colored via categories

Qualitative weighting of connections

You should first finish adding all the factors and connections to your model before you start with the weighting. Theoretically, you can endlessly add further factors when systematically asking the four KNOW-WHY-Questions. However, you should at least continue until you add concrete measures and ask the corresponding questions for these measures. In many cases you will model in more than one session and even add further arguments to the model after already having analyzed one version. Here you may also find that you need more factors if you have important targets but no measures leading to them, or problems and no measures to cope with them.

With Figure 4 you can see how to qualitatively weight the connections one by one, while Figure 5 shows how to use the weighting matrix to compare the impact from parallel factors at the same time. Here we are simply comparing the impacts of different factors onto a selected factor to define whether an impact is comparably weaker or stronger.

You can make use of the sum of 100 as a rule of thumb for all incoming connections though sometimes you may argue that there are additional influences outside the model and therefore the sum of impacts should remain below 100. In any case, this decision will not have a dramatic influence and consistency is the best practice.

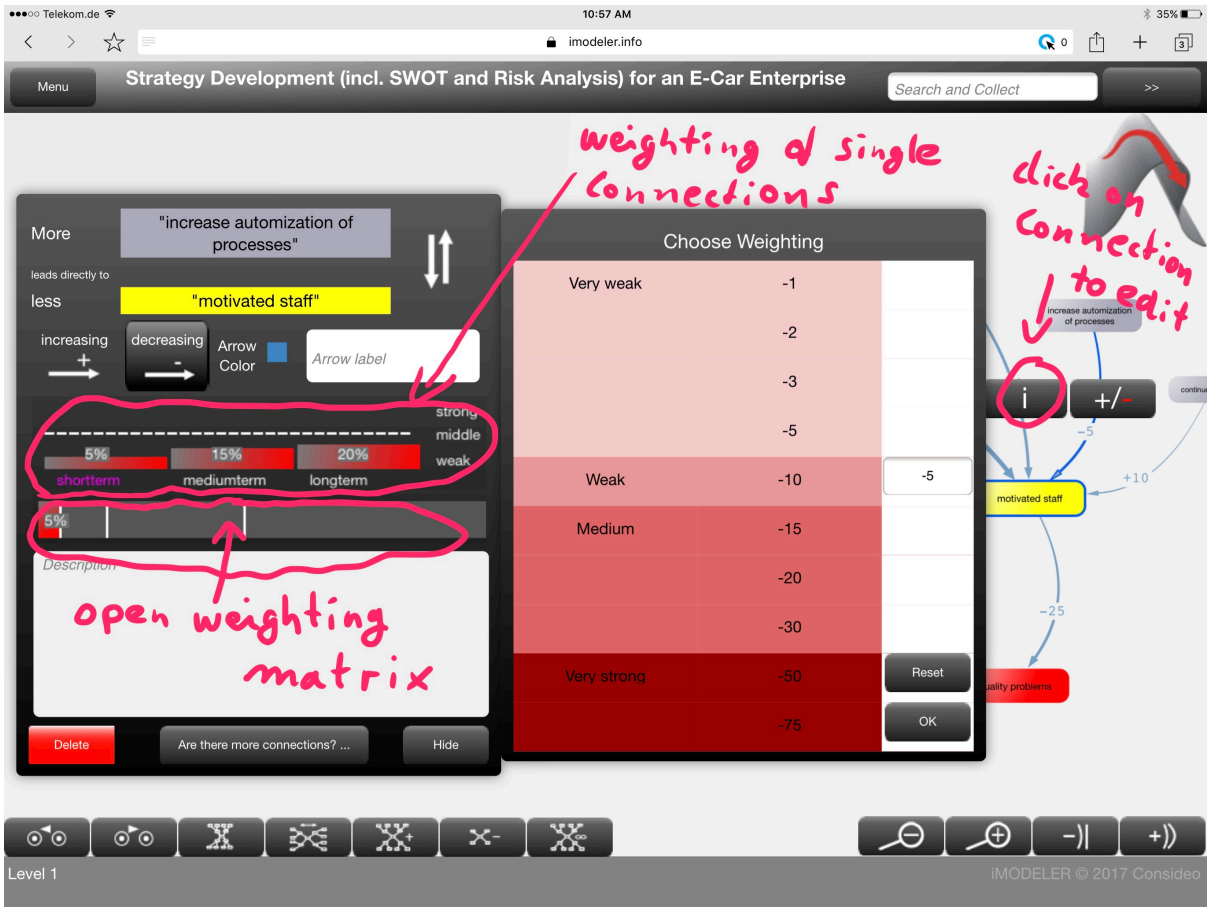

Fig. 4: Weighting of single connections

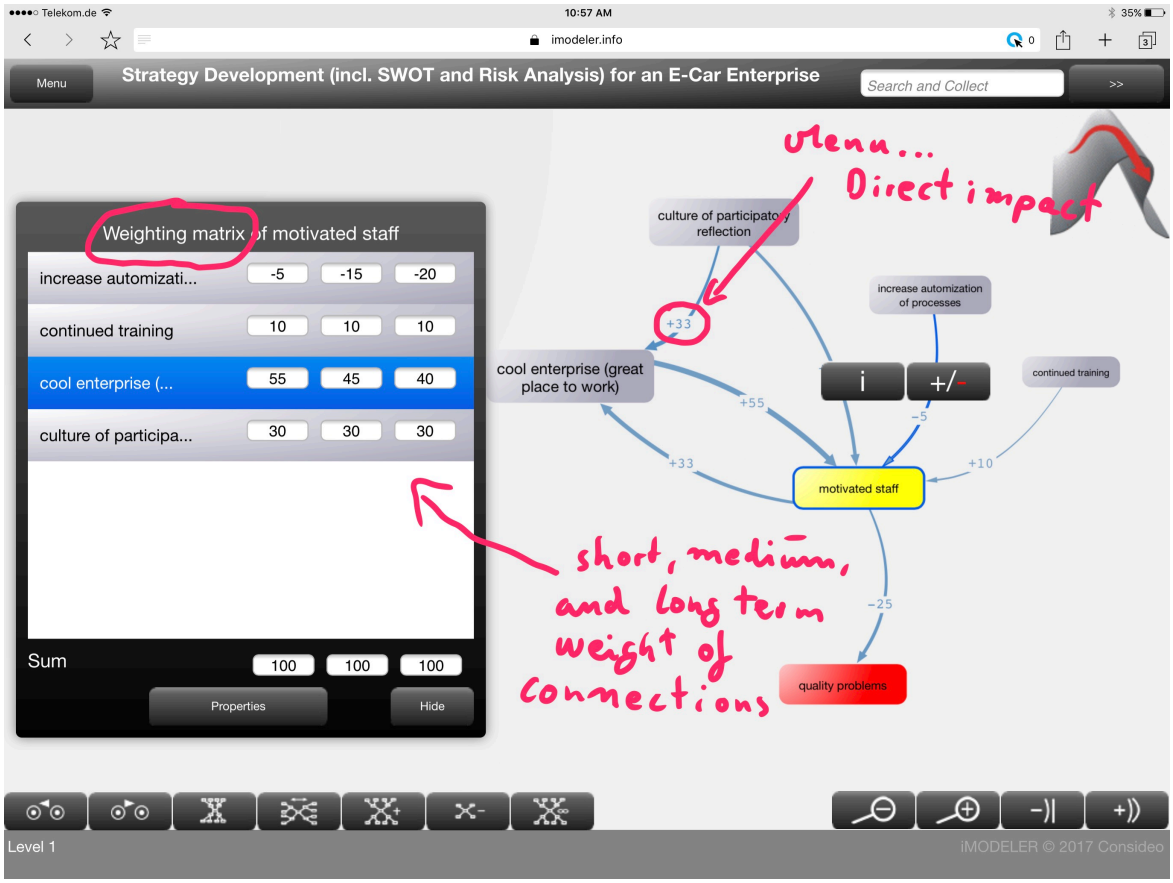

Fig. 5: Use of weighting matrix to weight all incoming connections

First analyses of the model

In Figure 3 you see that in a factor's properties window there is an 'Insight Matrix' button. The Insight Matrix (Figure 6) allows you to see for each factor how it is influenced by all the other factors - short, medium, and long term. It thus shows which factors are significant risks or problems, which factors are important targets or resources, and which factors are the most effective measures. This visualization is aided by your assignment of categories to the factors and corresponding colors (also shown in Figure 3).

You read the Insight Matrix by comparing the factor's position on the horizontal x-axis. The vertical y-axis only indicates how the effect of a factor is going to change from short to medium or from medium to long term due to feedback loops (Figures 8 and 9) or temporal changes of weighting as you have them defined somewhere along the chains (Figure 5).

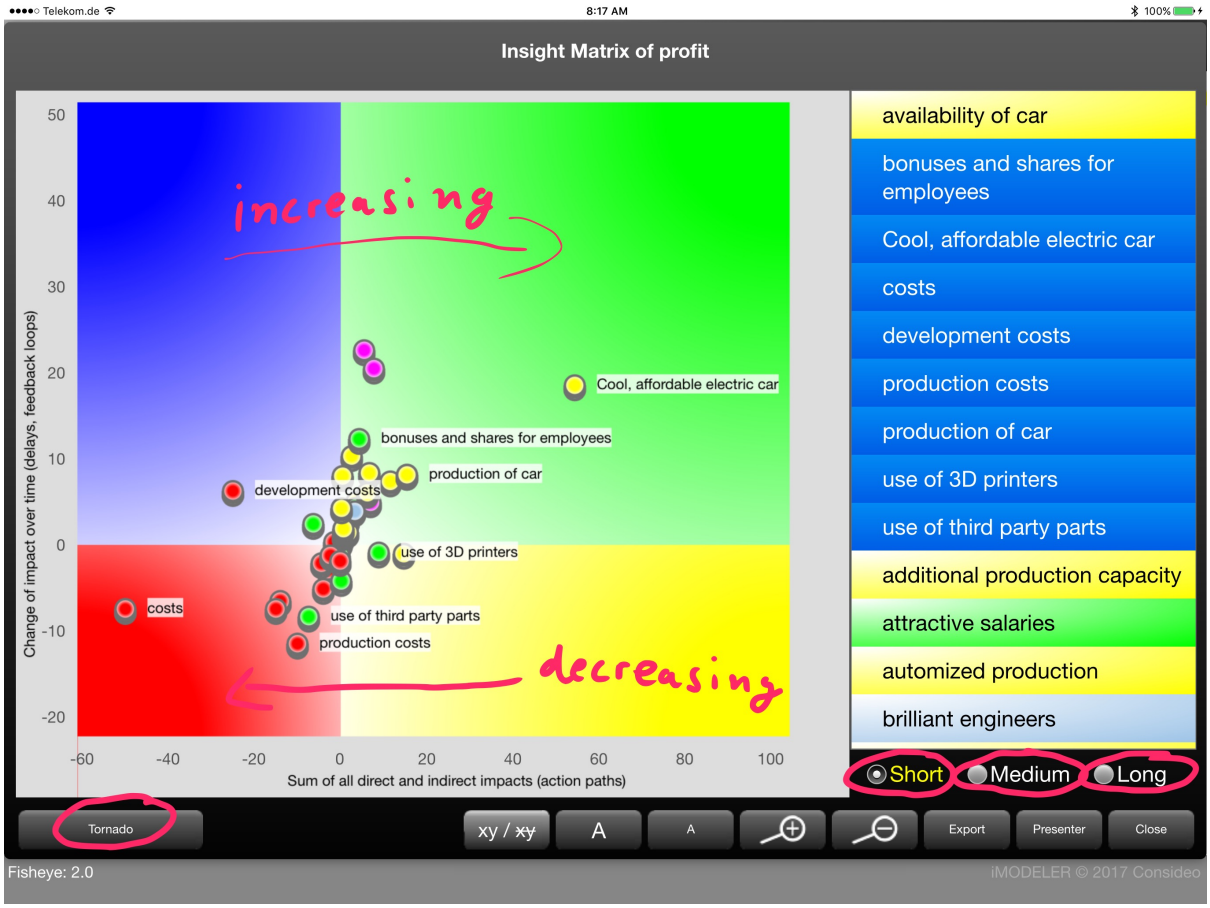

Fig. 6: The Insight Matrix of a selected factor

While in the Insight Matrix you have to click on a factor to see its position or on a position to see its name, the Tornado chart lists all the factors with their impacts. However, the Tornado chart does not show the development (y-axis of the insight matrix) of values from short to medium to long term unless explicitly selected at the bottom right. Figure 7 shows the Tornado chart. It features the 'Show why' function so you can list all the impact chains (Figure 8) and the feedback loops (Figure 9) that explain a factor's overall impact. Balancing feedback loops indicate ambivalences or limits to something while reinforcing feedback

loops describe escalation either as vicious cycles making things worse or virtuous cycles improving things.

Fig. 7: The tornado chart of the insight matrix x-values

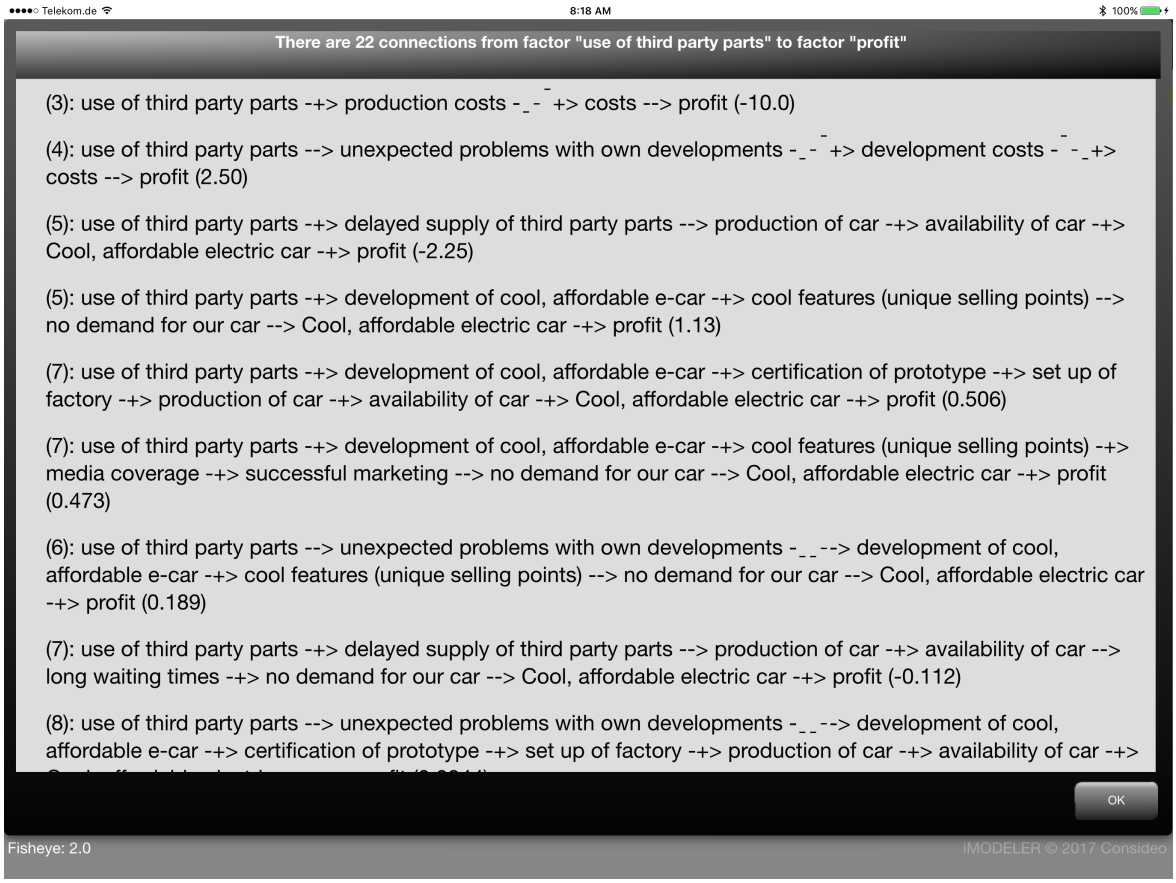

Fig. 8: A list of impact chains from the ‘Show why’ function. Impact chains show the flow of connection between factors as modeled and the associated resulting values of all paths.

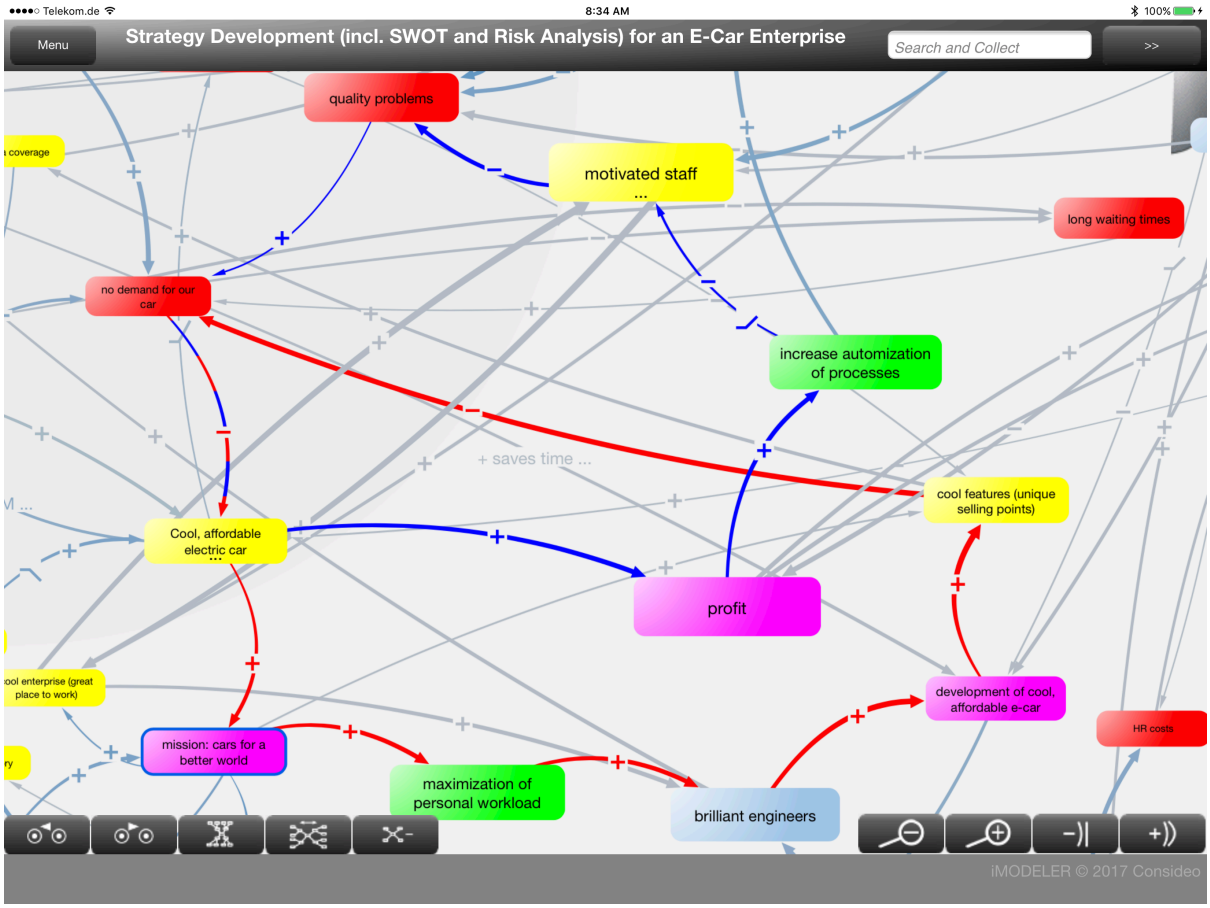

Fig. 9: Highlighted feedback loops, blue a balancing feedback loop, red a reinforcing feedback loop. It shows how increased automation leads to decreased motivation and thus to more quality problems that limit the profits needed for the automation. The reinforcing feedback loop (in this case a virtuous cycle) shows the motivational pushes the entrepreneurs get from success.

Usually you look at more than just one matrix. At least you should analyze the matrices of the most effective measures to search for hindrances, ambivalences or synergies, as well as the matrices of the most threatening risks or problems in order see if you have planned for measures to tackle these problems. This fictitious and only small model doesn´t yet offer very many surprising insights, as you can see from the list of impacts in Figure 7. However, there are important lessons to learn. For example, if you consider ‘delayed supply from third party suppliers’ a significant risk and look at its Insight Matrix, you will see that you need to continue modeling and coming up with ideas on how to overcome this potential threat, e.g. by increased integration of the supplier or by distributing the demand to two suppliers. Both measures come with side effects that you will identify once you continue to use the four KNOW-WHY-Questions.

Here is an abstract yet more comprehensive enterprise model that includes traditional business functions: https://www.know-why.net/model/A8rslLgjB2toQEfuOxlUWrw

Part 3 of this series of papers features a quantitative model that could easily be used as a quantitative simulation model to reflect on strategies and risks.

Systemic strategy development with Dynamic Strategy Maps (BSC)

The renowned Balanced Scorecard (BSC) has matured from a mere collection of measurable scorecards to now go beyond just financial targets (hence balanced) - namely from financial, customer, internal processes and learning/growth perspectives - to connected targets in so called Strategy Maps (Norton/Kaplan) and the latest variants of it like the Dynamic Strategy Map. The main reason a BSC is not able to derive the scorecards from a comprehensive reflection on an enterprise and its environment (as we show with our model), has probably been the lack of tools to handle larger numbers of factors and connections. This model certainly is the least reduced way to understand an enterprise and identify the crucial levers.

However, what is useful from the concept of the BSC is the strict demand for measurable results and requirement that each measure should lead to a factor that can only be the result of a measure, just as each result (in our model the factors with the category 'target') should lead to at least one measure. This means that even in a qualitative model we will think about target factors and how we would measure them.

It is, by the way, quite common to quantify and simulate soft factors with a quantitative model using the iMODELER. The factors could for example be given the unit 'Index' and assigned values from 0 (not existent) to 1 (the maximum we can think of). With the Relation editor (see part 3 of this series of papers), you can relate them to hard factors and their corresponding units, e.g. to relate attractiveness of a car to its price, horsepower, range, or design.

Let us return to this qualitative model. You can easily make it an explicit Balanced Scorecard model simply by using additional categories (see Figure 10).

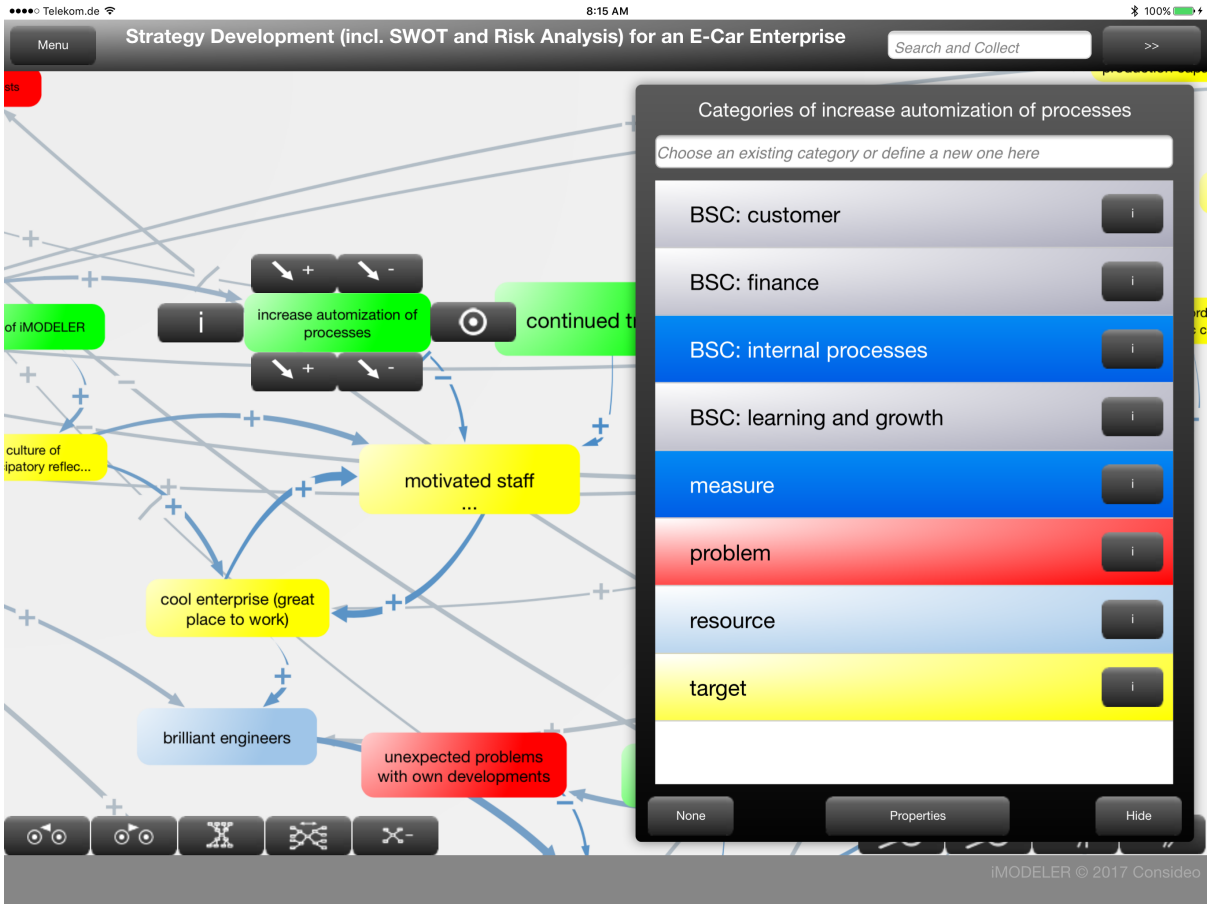

Fig. 10: The four dimensions of the BSC as additional categories

These additional categories allow for a clustered (Figure 11) or filtered view. Also, they help us check if our model really is balanced, which, of course, it should be as the result of explorative modeling using the four KNOW-WHY-Questions. On the contrary, already with this little start of a model I had difficulties to allocate some of the factors to the four dimensions of a BSC as I had wished for more dimensions.

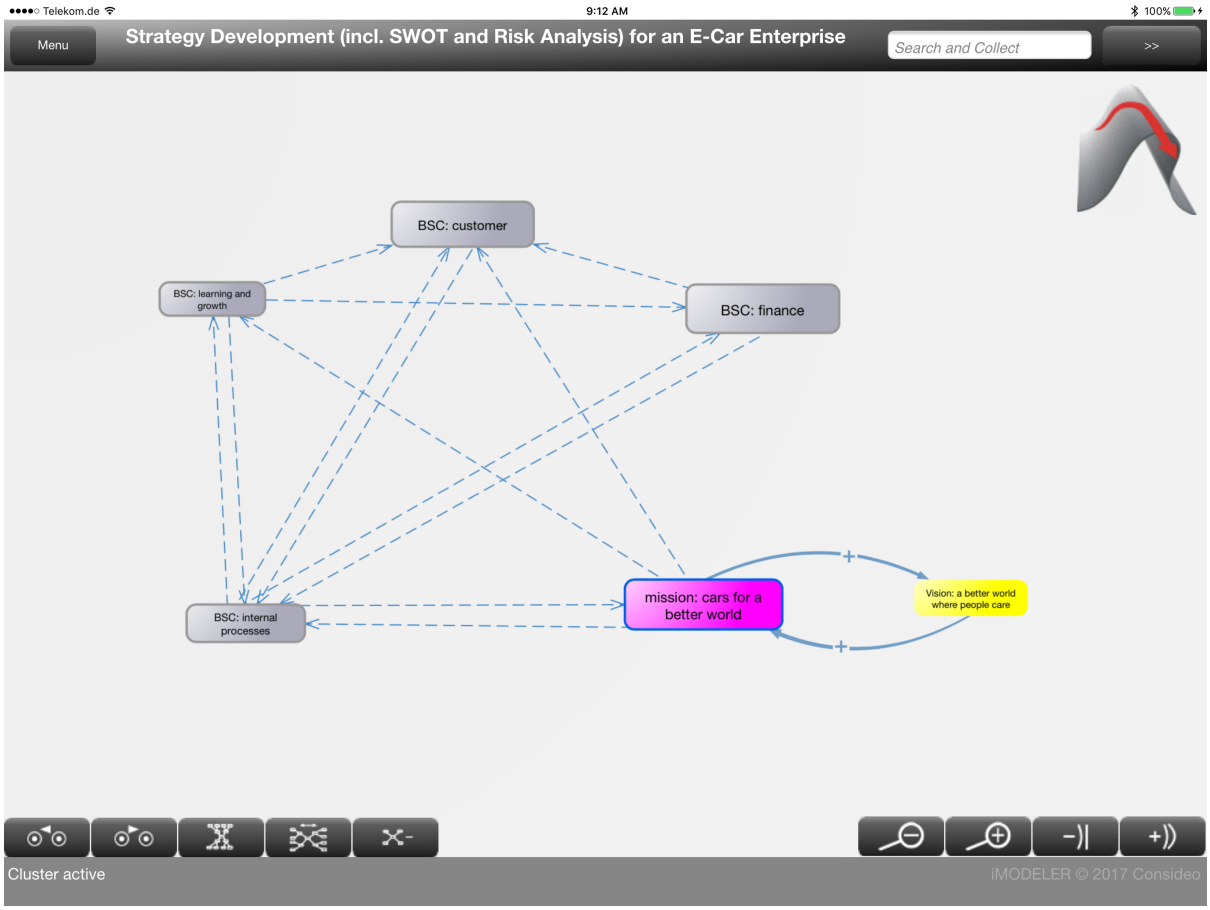

Fig. 11: Clustered (Menu … Filter/Cluster) view showing the four BSC dimensions

Even without the aforementioned quantitative model, you can still integrate the concrete measures for the ‘scorecards’ within a mere qualitative model through the use of attributes as described in the following chapter.

Systemic SWOT Analysis

You have certainly already realized that the explorative reflection of an enterprise can reveal strengths, weaknesses, opportunities and threats (SWOT) much better than any classic SWOT analysis could. The four KNOW-WHY-Questions illicit what is needed and what might hinder reaching the target in the present or future, thereby basically asking for strengths, weaknesses, opportunities and threats! The Insight Matrix shows in the short term the strengths and weaknesses and long term (via values from the vertical axis) the opportunities and threats (or risks).

Something, though, is still missing. A factor´s position in the Insight Matrix shows its possible effect if it happens or has happened. The likelihood of occurrence and current state are missing details. The iMODELER offers attributes which allow you to add this information.

Figure 3 shows the ‘Attributes’ button for each factor. You can define any attribute, such as the likelihood or the current state of something, in percentage values from 0 to 100. The Insight Matrix will then show the value of the attribute by means of the diameter of the factor and its potential effect by its position. That way you can track the progress of targets and measures, the likelihood of risks, or indeed any other desired attribute in a very comfortable way.

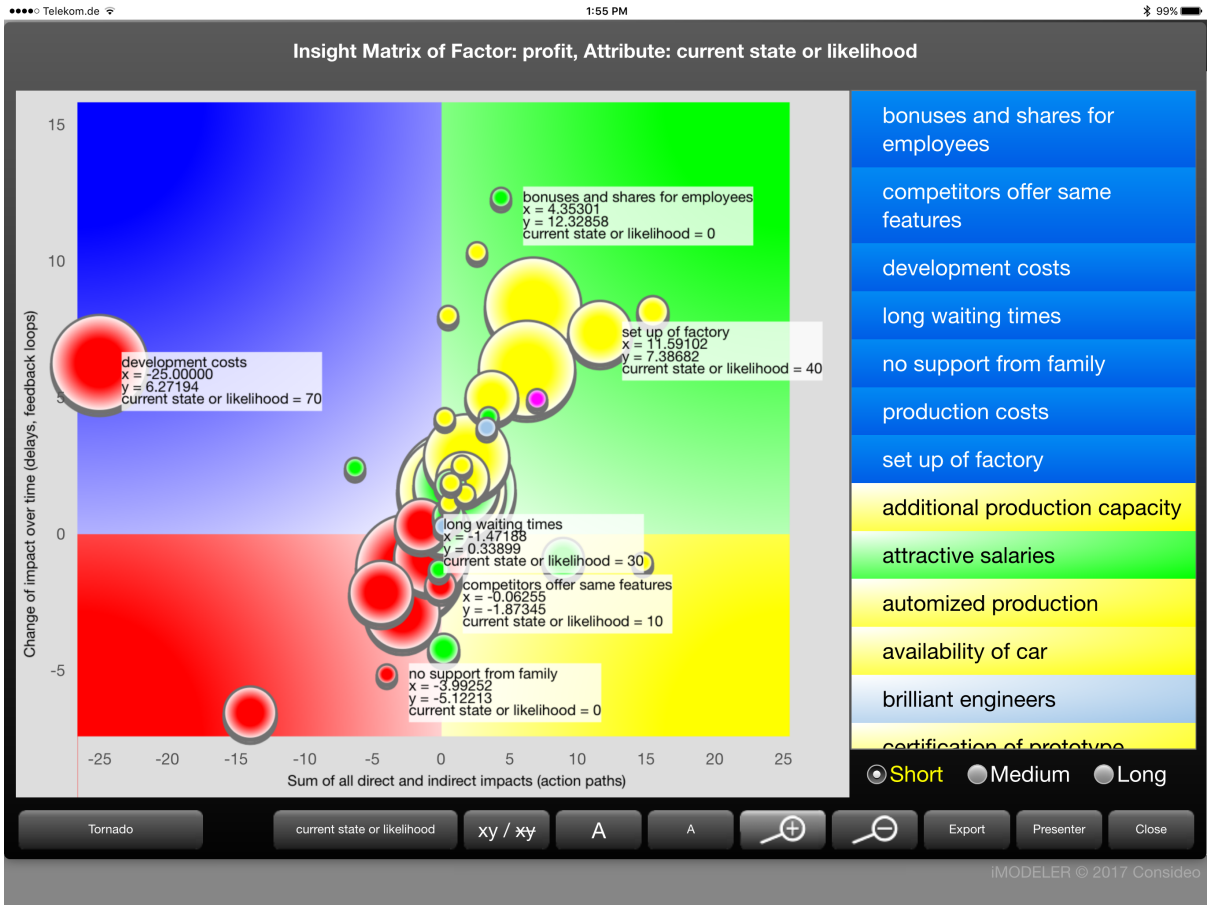

Fig. 12: Attributes shown as diameters of factors in the insight matrix. Of course, you can zoom in on the matrix or reduce the number of shown factors.

With the possibility of a collaborative web link you can enable your team to continue editing and updating the model. Each meeting can start with the model and spare time otherwise wasted for fruitless discussions. The visualization enhances creativity and, as previously mentioned, this culture of reflection creates mental ownership (a feeling of integration) among the team.

Appendix 1: Burning Investor's Money

Especially when your enterprise can be bold (Diamandis/Kotler) and disruptive a quantitative modeling of your strategy makes perfect sense as you and your investors need to understand exponential developments. So far, this enterprise of launching an electric vehicle doesn't fit the description of being bold or disruptive as it is not easily scalable. However, as you will see with part 2 of this series (product development), there are ways to make this scalable as well. And even without - as Tesla shows with just one factory - it takes a lot of faith in an enterprise's strategy to heavily invest in it.

Part 3 (https://www.know-why.net/model/COfweXMDN6IXVjBu_L73gRw) of this series of papers with its quantitative model (Figure 13) will demonstrate a phenomenon sometimes called "burning investor's money" (forgot the source). It also features Monte Carlo simulations for risk analysis and the iM Optimizer to identify optimal resource allocations.

Fig. 13: Screenshot of quantitative model from part 3 showing the massive debts the enterprise would have to make in order to become super successful.

In my workshops on quantitative modeling I usually use a so-called bass diffusion model: http://www.imodeler.info/ro?key=CpaYBqOLH9vi94lTwqRlMjg that allows you to play with the initial amount of investment. The key is that this needs to be high enough in order to initiate the word of mouth effect (a kind of diffusion), but not too high as then no capital would be returned to the investors.

Appendix 2: Excerpt from Consideo's various publications on the methodological or scientific basis of the iMODELER, KNOW-WHY-Thinking and Systems Thinking

For more please consider my books "Qualitative und Quantitative Ursache-Wirkungsmodellierung…", "KNOW-WHY: Systems Thinking and Modeling…", "KNOW-WHY: Erfolg durch Begreifen", and various papers (http://www.consideo.com/papers-33.html)

Systems Thinking

There are two views on systems thinking. One is rather complicated and involves reflecting on one's own perspective as an observer and as a part of a system (see constructivism and systemic constellations). Another is generally to describe a system as the interplay of as many factors as necessary in order to understand the reality (see Sterman's "Business Dynamics").
To many practitioners the term 'systems thinking' is too abstract and one should thus consider just describing the visualization and analysis of the interplay of many aspects (factors) of a complex challenge.

Modeling

Modeling at its core is just that, a visualization and its analysis. There are various approaches, e.g. Agent Based Models, System Dynamics, Discrete Event Simulation, Neural Networks, Cross-Impact Matrix, Fuzzy Cognitive Maps, etc..
The iMODELER allows for a direct translation of arguments with a connection between two factors like "more of (factor 1) leads directly to more/less of (factor 2)". Every connection can and should be read in this way.
Modeling allows us to overcome a mental boundary (…). Usually, models should help us to come up with the right decisions. Therefore they refer to a future that can never be known for sure and is seldom the same as the past, or what was happening somewhere else. Thus, a model can only show possible developments and corresponding likelihoods. However, there is no way to validate this. and we can only falsify the models to an extent either by showing that a connection is wrong are a factor is missing.
Despite these shortcomings, there are no alternatives.. They are based on abductive logic. Many scientists, however, don't get this.

Quantitative Modeling using iMODELER

Quantitative models simulate the numerical extent and likelihood of the development of something over time. The iMODELER is based on System Dynamics, yet as the result of an international EU research project the iMODELER allows for a more flexible use without the strict rules which govern System Dynamics. For example, you can use so-called stocks and flows from System Dynamics, but you can also have stock functions operate as flows by using formulas comparable to those in MS Excel. Thus, the notation is simple and no knowledge of System Dynamics is required!

Qualitative Modeling using iMODELER

Qualitative models can not predict the development of something. They rather are able to provide answers regarding what the most promising measures and troublesome obstacles seem to be. Instead of a formula and data the connections between factors are weighted to define whether one factor's impact is more or less compared to parallel impacts from other factors and whether it changes in the short, medium or long term. The sum of all the impacts along the chains and through feedback loops (reinforcing and balancing) can be analyzed with Insight Matrices. These allow you to compare to what extent all the other factors influence a selected factor.
The calculation behind this is basically the simulation of an impulse of a value of 1 from each factor through the network of connections. It is thus comparable to Fuzzy Cognitive Maps, yet goes beyond and allows for other features like feedback loops to cause exponential developments as we experience them in reality.
Another approach is the cross impact matrix (…) and its derivatives (e.g. Vester's 'Sensitivity Model'). The way this method considers passive and active sums etc. as well as its disconnected consideration of feedback loops come with a number of shortcomings, one of the reasons we have developed our alternative approach. (https://m.youtube.com/watch?v=BvxAaipG8Eo)

Explorative Modeling and the KNOW-WHY-Method

As mentioned, models looking into the future are based on abductive logic. In order to describe a system it is not only important to have the correct logic for the connections of "more of … leads directly to more/less of …", we also need to consider the crucial factors. Descriptive modeling refers to systems that are already well-defined while explorative modeling deals with new challenges. In order to include the necessary factors we should not only refer to literature, experts and stakeholders, but also ask the right inquisitive questions which help expose the 'WHY' behind everything.
According to the meta-systemic approach of KNOW-WHY-Thinking (…), we can reflect on anything by asking whether it is integrated (adapted to its environment) and also developing (to change with the environment or to beat out competition). Anything that helps with integration or development is just as important as any hindering factor. Therefore, the four KNOW-WHY Questions; "What leads directly to more/less of something present/in the future?" directly ask for crucial factors. A model can systematically use these four questions for any factor starting with the overall target in order to come up with a useful model.

Other features

Process Modeling (featuring Goldratt's "Theory of Constraints"), Idealized System Design (part of KNOW-WHY-Thinking), participatory modeling, Hard and Soft Operations Research, Monte Carlo Simulations and Simulation Games are additional concepts used by the iMODELER and our modeling, coaching and consulting.

What makes iMODELER (iM) unique - why use it?

Quantitatively, the iM allows you to explore possible developments of projects, strategies, or otherwise in what is probably the easiest way currently available. Qualitatively it allows you to analyze the sum of your thoughts and arguments in order to identify the most effective measures and hindrances in the most advanced way without the flaws of other approaches. It is easy to use and can be done quickly (important for shortening your meetings or using on the go).
Decisive, however, is the productive way you can work with iMODELER: using a bionic concept to switch perspectives like the way we do in our mind, together with filters, clusters, etc. The iM allows you to model thousands of factors. You can collaboratively model with others on any kind of device (incl. smartphones and tablets). For most actions you need just two clicks or touches, making it more practical and saving you time. And with KNOW-WHY.NET you have the intelligent learning system for the magic button in the iMODELER that you can click with every definition of a new connection to ask for appropriate proposals derived from all the shared models on KNOW-WHY.NET. Lastly, you can easily share your models by sending a link that directly starts iMODELER in someone else´s browser with no need for a license or registration.

“I model - therefore iM”